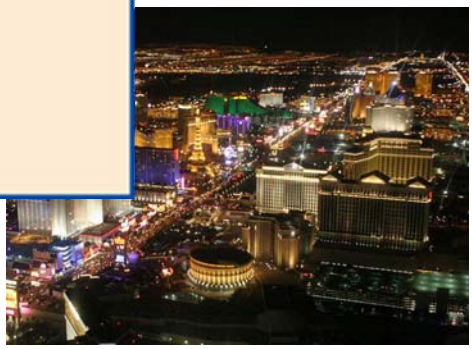
Annual Monitoring Network Plan Report



June 2017

Clark County Department of Air Quality
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Las Vegas, Nevada 89118

Executive Summary

This document reports the status of the Clark County air monitoring network in 2017, as required by Title 40, Part 58 of the Code of Federal Regulations (CFR). It describes network operation in 2016, changes planned for 2017–2018, 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
CBSA	Core-Based Statistical Area
CFR	Code of Federal Regulations
CO	carbon monoxide
DAQ	Clark County Department of Air Quality
EPA	U.S. Environmental Protection Agency
FAST-LVOS	Fires, Asian, and Stratospheric Transport–Las Vegas Ozone Study
FEM	federal equivalent method
FRM	federal reference method
LiDAR	Light Detection And Ranging
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NCore	National Core Multi-Pollutant Monitoring Network
NO_X	oxides of nitrogen
NOAA	National Oceanic and Atmospheric Administration
NPAP	National Performance Audit Program
O_3	ozone
PAMS	Photochemical Assessment Monitoring Stations
POC	Parameter Occurrence Code
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
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
TOPAZ	Tunable Optical Profiler for Aerosol and Ozone

SCIENTIFIC UNITS

m	meters
$\mu g/m^3$	micrograms per cubic meter
s	seconds

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. Each State/Local Air Monitoring System (SLAMS) monitor meets the requirements of 40 CFR 58 Appendices A, B, C, D, and E, where applicable. During 2016, the following conditions existed:

1. DAQ operated monitoring instruments to measure ambient concentrations of pollutants using continuous and filter-based methods, including continuous and filter-based particulate matter 2.5 micrometers in diameter or smaller ($PM_{2.5}$), continuous particulate matter 10 micrometers in diameter or smaller (PM_{10}), ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO, NO_2, NO_x, NO_y), sulfur dioxide (SO_2), and lead (Pb) content from total suspended particulate (TSP), which was discontinued June 30, 2016 in accordance with U.S. Environmental Protection Agency (EPA) approval.

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 EPA, which developed **National Ambient Air Quality Standards (NAAQS)** for these pollutants to protect public health and the environment. The six criteria pollutants are O_3, $PM_{2.5}$/PM_{10}, CO, NO_2, SO_2, and Pb. With the exception of 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 PM_{10}, CO, and O_3. The Las Vegas Valley (Hydrographic Area 212) is subject to a maintenance plan for CO and PM_{10}. In 2000, DAQ submitted a CO State Implementation Plan (SIP), which described the control measures and technologies required to bring the Las Vegas Valley into compliance with the CO NAAQS. The CO SIP was approved by EPA, effective October 21, 2004. A Federal Register notice denoting EPA's determination of attainment of the CO NAAQS within the valley was issued in January 2005. A CO Maintenance Plan and a request for redesignation to attainment were submitted to EPA in 2008 and approved by EPA, effective September 27, 2010.

The Las Vegas Valley attained the PM_{10} standard by December 31, 2006, and EPA issued a "Finding of Attainment" in August 2010. DAQ submitted a request for redesignation and maintenance plan for PM_{10}, which EPA approved in August 2012, with an effective date of November 5, 2014.

Central portions of Clark County, including the Las Vegas Valley, were classified as nonattainment for O_3 in 2004. On March 29, 2011, EPA made the determination that Clark County is in attainment with the 1997 O_3 NAAQS. DAQ submitted a request for redesignation and maintenance plan for O_3 to EPA on April 11, 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 O_3 standard. EPA redesignated the area to attainment effective February 7, 2013.

DAQ submitted the 2015 annual data certification to EPA on February 10, 2016, and submitted the 2016 annual data certification in April 2017.

As part of this report, DAQ is required to ensure that Clark County is meeting its minimum monitoring requirements. In order to conduct a traffic count assessment, DAQ utilized the Nevada Department of Transportation's (NDOT) most recent annual traffic report, dated 2015, that 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 2016 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 2015 report, which was based on the Metropolitan Statistical Area (MSA) and the Core-Based Statistical Area (CBSA). All particulate matter (PM) monitoring instruments are low-volume instruments (flow rates less than 200 liters per minute).

Table 1. Flow Rates for PM Monitoring Instruments

Instrument	Flow Rates (liters per minute)
Met One SASS	6.7
URG	22
Teledyne T640	16.67 for PM_{10}; 5 for $PM_{2.5}$
All other	16.67

For all gaseous monitoring operations at all sites, a two-point (zero/span) quality control (QC) check is conducted daily, a three-point (zero/precision/span) QC check is conducted weekly, and calibrations are conducted quarterly and as needed.

2.1 O_3

Table 2. Minimum Monitoring Requirements for O_3

MSA	County	Population and Census Year	8-hr Design Value [ppb], Design Value Years[1]	Design Value Site (name, AQS ID[2])	Number of Required SLAMS Sites	Number of Active SLAMS Sites	Number of Additional SLAMS Sites Needed
Las Vegas-Paradise (29820)	Clark, NV	2,147,641 (2015)	75, (2014-16)	Joe Neal (32-003-0075)	2	12	0

[1] Design Value Years = the three years for which the design value was calculated (i.e., 2014-2016).
[2] AQS (site) Identification.

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 3. Minimum Monitoring Requirements for $PM_{2.5}$ (FRM – Filter Based)

MSA	County	Population and Census Year	Annual Design Value [µg/m³], Design Value Years[1,2]	Annual Design Value Site (name, AQS ID)	Daily Design Value [µg/m³], Design Value Years[3]	Daily Design Value Site (name, AQS ID)	Number of Required SLAMS Sites[4]	Number of Active SLAMS FRM Sites[5]	Number of Additional SLAMS Sites Needed[5]
Las Vegas-Paradise (29820)	Clark, NV	2,147,641 (2015)	10.3, (2014-16)	Sunrise Acres (32-003-0561)	25, (2014-16)	Sunrise Acres (32-003-0561)	3	2 + collocation	0

[1] µg/m³ = micrograms per cubic meter.
[2] FRM stands for federal reference method.
[3] Design Value Years = the three years for which the design value was calculated (i.e., 2014-2016).
[4] Pursuant to 40 CFR 58 Appendix D 4.7.1 and 4.7.2, this number of required SLAMS sites includes both FRM and federal equivalent method (FEM) instruments.
[5] Meets requirements in 40 CFR 58 Appendix D 4.7.1 based on total number of FRM and FEM instruments.

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

Table 4. Minimum Monitoring Requirements for $PM_{2.5}$ (FEM – Continuous)

MSA	County	Population and Census Year	Annual Design Value [µg/m³], Design Value Years[1]	Annual Design Value Site (name, AQS ID)	Daily Design Value [µg/m³], Design Value Years[1]	Daily Design Value Site (name, AQS ID)	Number of Required Continuous FEM Sites[2]	Number of Active Continuous FEM Sites[2]	Number of Additional Continuous FEM Sites Needed
Las Vegas-Paradise (29820)	Clark, NV	2,147,641 (2015)	10.3, (2014-16)	Sunrise Acres (32-003-0561)	25, (2014-16)	Sunrise Acres (32-003-0561)	2	7	0

[1] Design Value Years = the three years for which the design value was calculated (i.e., 2014-2016).
[2] Meets requirements in 40 CFR 58 Appendix D 4.7.2 and Table D-5.

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

2.3 PM_{10}

Table 5. Minimum Monitoring Requirements for PM_{10}

MSA	County	Population and Census Year	Maximum Concentration in 2016 [µg/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	2,147,641 (2015)	1255	Jean (32-003-1019)	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 NO_2

Table 6. Minimum Monitoring Requirements for NO_2

CBSA	Population and Census Year	Max AADT Counts[1] (2015)	Number of Required Near-Road Monitors[2]	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)	2,147,641 (2015)	271,000	2	2	0	1	2	0

[1]This number represents the highest AADT (annual average daily traffic) count of any roadway segment in Clark County as measured by NDOT on Interstate 15 near downtown between Exits 41 and 42. It is presumed that high traffic count locations are indicative of maximum hourly NO_2 concentrations (as per 40 CFR 58, App. D, Sec. 4.3.2(a)).

[2] Two near-road NO_2 monitors are required in any CBSA with one or more roadway segments carrying traffic volumes of 250,000 or more vehicles (as per 40 CFR 58, App. D, Sec. 4.3.2(a)).

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 (PAMS): NA.
Two near-road NO_2 monitors were operational in 2016.

2.5 SO_2

Table 7. Minimum Monitoring Requirements for SO_2

CBSA	County	Population and 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	2,147,641 (2015)	7,165	15,387	1	0	1	0

[1] Using 2014 National Emissions Inventory data (most currently available).
[2] Calculated by multiplying CBSA population by total SO_2 and dividing product by one million.
[3] Used for Population Weighted Emissions Index (PWEI) calculation.
Notes: PWEI, Regional Administrator, and Data Requirements Rule 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 and Census Year	Number of Required Near-Road Monitors	Number of Active Near-Road Monitors	Number of Additional Monitors Needed
Las Vegas-Paradise Pahrump (332)	2,147,641 (2015)	1	1	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

On June 30, 2016, DAQ terminated Pb monitoring at the Jerome Mack National Core Multi-Pollutant Monitoring Network (NCore) site in accordance with 40 CFR 58.14(c) and EPA approval.

Table 9. Minimum Monitoring Requirements for Pb at NCore

NCore Site	CBSA	Population and 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)	2,147,641 (2015)	0	0	0

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

2.8 Near-Road NO_2, $PM_{2.5}$, and CO Monitors

Table 10. Minimum Monitoring Requirements for Near-Road NO_2, $PM_{2.5}$, and CO

CBSA	Population and Census Year	Max AADT counts[1] (2015)	Number of Required NO_2 Monitors	Number of Active NO_2 Monitors	Number of Required $PM_{2.5}$ Monitors	Number of Active $PM_{2.5}$ Monitors	Number of Required CO Monitors	Number of Active CO Monitors	Number of Additional Monitors Needed
Las Vegas-Paradise Pahrump (332)	2,147,641 (2015)	271,000 (2015)	2	2	1	1	1	1	0

Note: The near-road network meets the minimum monitoring requirement as outlined in 40 CFR Part 58.13 and sections 4.2, 4.3, 4.7 of Appendix D to 40 CFR Part 58.
[1]This number represents the highest AADT (annual average daily traffic) count of any roadway segment in Clark County as measured by NDOT on Interstate 15 near downtown between Exits 41 and 42. It is presumed that high traffic count locations are indicative of high hourly pollutant concentrations.

3.0 COLLOCATED MONITORS AS OF 2016

Table 11. 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 12. 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	5: J.D. Smith, Green Valley, Sunrise Acres, Jean, and Rancho & Teddy	1	1	1: FEM (primary) 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, Jean, and Rancho & Teddy each have a $PM_{2.5}$ continuous FEM monitor that serves as the primary $PM_{2.5}$ monitor for the site.

DAQ has no manual PM_{10} samplers in its network. DAQ has only continuous PM_{10} monitors in its network, and there are no CFR requirements for collocation of continuous PM_{10} monitors.

4.0 2016 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. Meteorological measurements at the Apex site include wind speed, wind direction, and ambient temperature. Due to expiration of the right of way grant, DAQ is exploring an alternate monitoring location in the Apex Valley in 2019. DAQ will utilize the process outlined 40 CFR 58.14 (c) for system modifications.

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 (meters (m))	U.S. Highway 93:108
Traffic counts (AADT, year)	U.S. Highway 93: 2800 (2015)
Ground cover	Native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, Parameter Occurrence Code (POC)	O_3, 1
Parameter code	44201
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Regional transport
Network affiliation	NA
Monitor type(s)	SLAMS
Primary, Quality Assurance (QA) Collocated, or Other	Primary
Instrument manufacturer and 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	Seasonal: contingent upon waiver
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 (seconds (s))	3.1
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	3/24/2016
Last two semiannual flow rate audits for PM monitors	NA

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 O_3 and PM_{10}.

This site is in a split-flow corridor, which may impact pollutant measurements, and the shelter is sited directly below high voltage power lines that prevent installation of a meteorological tower. The current location does not properly monitor for population exposure, and DAQ is investigating a suitable location in Boulder City for more effective monitoring. DAQ will utilize the process outlined 40 CFR 58.14 (c). DAQ's interest in monitoring in Boulder City is based on continued implementation of the NAAQS, fulfilling the objective of population exposure. This site is the only NAAQS site in the Eldorado Valley airshed (Hydrographic Basin Number 167).

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, year)	Industrial Rd: 1,700; U.S. Highway 93: 26,500 (2015)

Local Site Name (AQS ID)	Boulder City (32-003-0601)
Ground cover	Paved, native desert
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, regional transport
Network affiliation	NA	NA
Monitor type(s)	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary
Instrument manufacturer and 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[1]	Y[1]
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

Pollutant, POC	PM_{10}, 1	O_3, 1
Last annual performance evaluation for gaseous parameters	NA	4/19/2016
Last two semiannual flow rate audits for PM monitors	2/9/2016, 10/19/2016	NA

[1] Changes are anticipated in accordance with 40 CFR 58.14 (System modification).

Figure 3: Casino Center: Near-Road Site 2.

The Casino Center Near-Road Site 2 is located in the parking lot of Las Vegas Fire and Rescue, which is southeast of E. Bonanza Road and N. Veterans Memorial Drive, and adjacent to US Highway 93 This monitoring station is the second near-road site. The Casino Center Near-Road Site 2 was approved by EPA in 2014, and DAQ deployed it in July 2016. Meteorological measurements at this site include wind speed, wind direction, ambient temperature, and barometric pressure.

Local Site Name (AQS ID)	Casino Center (32-003-1502)
GPS Coordinates (latitude, longitude)	+36.174365°, -115.139770°
Street Address	500 N. Casino Center Boulevard, Las Vegas, NV
Distance to roadways (m)	U.S. Highway 93: 16; N. Casino Center Boulevard 120; Bonanza Road:180
Traffic counts (AADT, year)	U.S. Highway 93: 185,000; N. Casino Center Boulevard 4,000; Bonanza Road: 13,500 (2015)
Ground cover	Paved
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	NO_2, 1
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 and 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	07/01/2016
Current sampling frequency	Continuous
Calculated sampling frequency	Continuous
Sampling season	Year-round
Probe height (m)	5.1
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)	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)	31.7
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)	3.3

Pollutant, POC	**NO_2, 1**
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	7/18/2016
Last two semiannual flow rate audits for PM monitors	NA

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 PM_{10} and $PM_{2.5}$. O_3 monitoring was established in 2015. Meteorological measurements at the Green Valley site include wind speed, wind direction, and ambient temperature.

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, year)	Santiago Drive: 3,700; Arroyo Grande Blvd: 9,300; North Stephanie: 33,500 (2015)
Ground cover	Paved, gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**PM_{10}, 1**	**$PM_{2.5}$ (continuous), 3**	**O_3, 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 and 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)	Neighborhood
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)	8.7	9.4	7.2
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)	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	2.5
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

Pollutant, POC	PM_{10}, 1	$PM_{2.5}$ (continuous), 3	O_3, 1
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	4/18/2016
Last two semiannual flow rate audits for PM monitors	2/9/2016, 10/19/2016	2/23/2016, 11/1/2016	NA

Figure 5: Indian Springs.

Monitoring at Indian Springs was approved as part of the 2015 Annual Network Plan. The O_3 monitor at Indian Springs will help identify high O_3, 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-O_3 triangulation between Joe Neal and the Las Vegas Paiute Tribe.

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, year)	< 1,000 (2015)
Ground cover	Native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**O_3, 1**
Parameter code	44201
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Regional transport
Monitor type(s)	SLAMS
Instrument manufacturer and model	TAPI 400 series
Method code	EQOA-0992-087
FRM/FEM/ARM/other	FEM

Pollutant, POC	**O_3, 1**
Collecting agency	DAQ
Analytical lab	NA
Reporting agency	DAQ
Spatial scale	Regional
Monitoring start date	05/11/2010
Current sampling frequency	Continuous, seasonal
Calculated sampling frequency	Continuous, seasonal
Sampling season	Seasonal: contingent upon waiver
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	4/4/2016
Last two semiannual flow rate audits for PM monitors	NA

Figure 6: J.D. Smith.

The J.D. Smith site is located in North Las Vegas. This site monitors gaseous (NO_2, CO, and O_3) and particulate (PM_{10} and $PM_{2.5}$) pollutants using continuous methods. This site serves as an indicator of population exposure to pollutants. Meteorological measurements at the J.D. Smith site include wind speed, wind direction, and ambient temperature. Siting obstructions continue to pose measurement challenges at this site. DAQ intends to shut down monitors at JD Smith, and is utilizing the process outlined 40 CFR 58.14 (c).

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, year)	Tonopah Ave: 7,800; Bruce Street: 7,800; Stanley Ave: 500 (2015) (estimated)
Ground cover	Paved, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**PM_{10}, 1**	**CO, 1**	**NO_2, 1**	**O_3, 1**	**$PM_{2.5}$ (continuous), 3**
Parameter code	81102	42101	42602	44201	88101
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 and 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	PM_{10}, 1	CO, 1	NO_2, 1	O_3, 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	1.0	5.7	2.3	NA
Will there be changes within the next 18 months? (Y/N)	Y	Y	Y	Y	Y
Is it suitable for comparison against the annual $PM_{2.5}$? (Y/N)	N	N	N	N	N[1]
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	6/13/2016	5/3/2016	4/21/2016	NA
Last two semiannual flow rate audits for PM monitors	2/11/2016, 10/21/2016	NA	NA	NA	2/11/2016, 10/21/2016

[1] $PM_{2.5}$ not comparable to NAAQS due to siting obstruction.

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. Its primary objective for O_3 monitoring is measuring transport from Southern California. Meteorological measurements at the Jean site include wind speed, wind direction, and ambient temperature.

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, year)	State Route 161: 1,600 (2015)
Ground cover	Gravel, native desert
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM_{10}, 1	O_3, 1	$PM_{2.5}$ Primary (continuous), 3
Parameter code	81102	44201	88101
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison
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 and 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	3.1	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

Pollutant, POC	PM_{10}, 1	O_3, 1	$PM_{2.5}$ Primary (continuous), 3
Frequency of one-point QC check for gaseous instruments	NA	Daily	NA
Last annual performance evaluation for gaseous parameters	NA	4/14/2016	NA
Last two semiannual flow rate audits for PM monitors	2/11/2016, 10/20/2016	NA	2/11/2016, 10/20/2016

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 PM_{10}, $PM_{2.5}$, particulate matter between 2.5 and 10 micrometers in diameter (PM Coarse), and speciated PM parameters), and meteorological measurements as part of the nationwide NCore network. This site operates 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.

This site is slated for required PAMS operations, and DAQ anticipates beginning these operations in 2019. DAQ intends to utilize the attached national PAMS Quality Assurance Implementation Plan (QAIP) and to adopt the national PAMS QAPP.

Pb sampling was discontinued June 30, 2016, based on EPA approval. Meteorological measurements at this site include wind speed, wind direction, ambient temperature, relative humidity, precipitation, and barometric pressure.

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, year)	Sahara: 25,500; Lamb: 27,000; Karen: 3,000 (est.) (2015)
Ground cover	Concrete, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

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, 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	42601	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	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	Population exposure
Network affiliation	NCore	NCore	NCore	NCore	NCore	CSN Supple-mental, NCore	CSN Supple-mental, NCore	NCore	NCore	NCore	NCore	NCore	NCore
Monitor type(s)	SLAMS	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	Primary
Instrument manufac-turer and model	MetOne BAM 1020	MetOne BAM 1020	MetOne BAM 1020 (mathe-matical dif-ference)	Thermo 2025i	Thermo 2025i	Met One SASS	URG 3000	TAPI 400 series	TAPI 200 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	811, 812	838	EQOA-0992-087	RFNA-1194-099	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	Other	FRM	FEM	FEM
Collecting agency	DAQ	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	NA	ERG
Reporting agency	DAQ	DAQ	DAQ	DAQ	DAQ	UC Davis	UC Davis	DAQ	DAQ	DAQ	DAQ	DAQ	DAQ
Spatial scale	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Urban	Urban	Neighbor-hood	Neighbor-hood	Neighbor-hood
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	01/01/2011	01/01/2012

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, 1	NO_Y, 1	Trace CO, 1	Trace SO_2, 1	Pb, 1
Current sampling frequency	Continuous	Continuous	Continuous	1:3	1:6	1:3	1:3	Continuous	Continuous	Continuous	Continuous	Continuous	1:6
Calculated sampling frequency	Continuous	Continuous	Continuous	1:3	1:6	1:3	1:3	Continuous	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	Year-round
Probe height (m)	5.2	5.2	5.2	3.0	3.0	3.1	3.3	4.3	7.0	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	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	NA
Distance from obstructions on roof – vertical height (m)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Distance from obstructions not on roof – horizontal distance (m)	NA	NA	NA	5.2	3.7	7.5	5.3	NA	NA	NA	NA	NA	NA
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	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, 1	NO_Y, 1	Trace CO, 1	Trace SO_2, 1	Pb, 1
Obstruction height above probe (m)	NA	NA	NA	0.2	0.2	0.3	0.3	NA	NA	NA	NA	NA	NA
Distance from trees (m)	16.7	18.7	NA	22.1	18.4	23.0	20.8	15.7	13.8	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	NA
Distance between monitors fulfilling QA collocation require-ments (m)	NA	NA	NA	3.7	3.7	NA	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	NA	NA
Unrestricte d airflow (degrees)	360	360	360	360	360	360	360	360	360	360	360	360	360
Probe ma-terial for re-active gases	NA	NA	NA	NA	NA	NA	NA	Teflon	Teflon	Teflon	Teflon	Teflon	NA
Residence time for re-active gases (s)	NA	NA	NA	NA	NA	NA	NA	2.7	7.0	7.0	1.3	3.2	NA
Will there be changes within the next 18 months? (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N

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, 1	NO_Y, 1	Trace CO, 1	Trace SO_2, 1	Pb, 1
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	N
Frequency of flow rate verification for manual PM samplers	NA	NA	NA	Monthly	Monthly	Monthly	Monthly	NA	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	NA
Frequency of one-point QC check for gaseous instruments	NA	NA	NA	NA	NA	NA	NA	Daily	Daily	Daily	Daily	Daily	NA
Last annual performance evaluation for gaseous parameters	NA	NA	NA	NA	NA	NA	NA	5/10/2016	11/21/2016	11/21/2016	6/14/2016	5/18/2016	NA
Last two semiannual flow rate audits for PM monitors	2/23/2016, 9/13/2016	2/23/2016, 9/13/2016	2/23/2016, 9/13/2016	2/1/2016, 5/10/2016, 7/28/2016, 10/14/2016	2/1/2016, 5/10/2016, 7/28/2016, 10/14/2016	1/26/2016, 5/10/2016, 7/28/2016, 10/11/2016	1/26/2016, 5/10/2016, 7/28/2016, 10/11/2016	NA	NA	NA	NA	NA	1/26/2016, 5/10/2016; monitor discontinued 7/1/2016

Figure 9: Joe Neal.

The primary objectives of the Joe Neal site, located in northwest Las Vegas, are to monitor O_3 and NO_2 in an area of high O_3 concentrations, and to support DAQ modeling efforts. Due to topography at this location, the summertime loft brings higher O_3 and precursor levels toward this site from the east end of the Las Vegas Valley.

PM_{10} monitoring was initially deployed at this site due to population growth in the northwest. Meteorological measurements at the Joe Neal site include wind speed, wind direction, and ambient temperature.

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, year)	Rebecca: 4,000 (est.); Azure 6,000 (est.); Tropical 6,200 (2015)
Ground cover	Gravel, grass, pavement
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**PM_{10}, 1**	**O_3, 1**	**NO_2, 1**
Parameter code	81102	44201	42602
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	Research support, NAAQS comparison
Site type(s)	Population exposure	Max.O_3 concentration	Population exposure
Network affiliation	NA	NA	NA
Monitor type(s)	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary
Instrument manufacturer and model	Thermo 5014i	TAPI 400 series	TAPI 500 series
Method code	EQPM-1102-150	EQOA-0992-087	EQNA-0514-212
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	Middle
Monitoring start date	01/01/2001	07/01/2000	01/01/2008
Current sampling frequency	Continuous	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	4.6	3.8	3.8
Distance from supporting structure (m)	2.1	1.4	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)	20.3	22.7	22.7
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	Teflon	Teflon
Residence time for reactive gases (s)	NA	3.2	2.9
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	N
Frequency of flow rate verification for manual PM samplers	NA	NA	NA

Pollutant, POC	PM_{10}, 1	O_3, 1	NO_2, 1
Frequency of flow rate verification for automated PM analyzers	Monthly	NA	NA
Frequency of one-point QC check for gaseous instruments	NA	Daily	Daily
Last annual performance evaluation for gaseous parameters	NA	4/27/2016	4/26/2016
Last two semiannual flow rate audits for PM monitors	2/8/2016; 10/21/2016	NA	NA

Figure 10: Mesquite.

The Mesquite site is approximately 70 miles north of Las Vegas and monitors O_3. The site sits along a transport and exit corridor connecting jurisdictional boundaries, and it serves as an indicator of population exposure of pollutants. Meteorological measurements at the Mesquite site include wind speed, wind direction, and ambient temperature.

The O_3 monitor at Mesquite does not meet distance-to-roadway siting requirements, and DAQ is investigating a suitable location in Mesquite for effective monitoring. DAQ will continue to conduct SLAMS O_3 monitoring at the existing site until a relocation is established, and will utilize the process outlined 40 CFR 58.14 (c). DAQ's interest in monitoring in Mesquite is based on continued implementation of the NAAQS, fulfilling the objective of population exposure, and the monitor being the only NAAQS site in the Virgin Valley airshed (Hydrographic Area 222). When the new location is established, DAQ will also monitor in Mesquite for PM_{10}.

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, year)	<1,000 (est.), 2015
Ground cover	Pavement, gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Local Site Name (AQS ID)	Mesquite (32-003-0023)
Pollutant, POC	**O_3, 1**
Parameter code	44201
Basic monitoring objective(s)	NAAQS comparison
Site type(s)	Population exposure
Network affiliation	NA
Monitor type(s)	SLAMS
Primary, QA Collocated, or Other	Primary
Instrument manufacturer and 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, seasonal
Calculated sampling frequency	Continuous, seasonal
Sampling season	Seasonal: contingent upon waiver
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)	2.7
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	3/29/2016
Last two semiannual flow rate audits for PM monitors	NA

[1] Tree is 1.5 meters above inlet.

Figure 11: Palo Verde.

The primary objective of the Palo Verde site in west Las Vegas is to monitor O_3, but it also monitors PM_{10}. Due to topography at this location, the summertime loft brings higher O_3 and precursor levels toward this site from the east end of the Las Vegas Valley. Meteorological measurements at the Palo Verde site include wind speed, wind direction, and ambient temperature.

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, year)	Pavilion Center Dr.: 7,000 (est.); Greenmoor Lane: 4,000 (est.) (2016)
Ground cover	Paved
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

Pollutant, POC	**PM_{10}, 1**	**O_3, 1**
Monitor type(s)	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary
Instrument manufacturer and 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	Middle	Neighborhood
Monitoring start date	07/01/1998	07/01/1998
Current sampling frequency	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous
Sampling season	Year-round	Year-round
Probe height (m)	4.8	3.7
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)	3.8	1.3
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	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	4/5/2016
Last two semiannual flow rate audits for PM monitors	2/23/2016; 10/10/2016	NA

Figure 12: Paul Meyer.

The primary objective of the Paul Meyer site in southwest Las Vegas is to monitor O_3, but it also monitors PM_{10}. Due to topography at this location, the summertime loft brings higher O_3 and precursor levels toward this site from the east end of the Las Vegas Valley. Meteorological measurements at the Paul Meyer site include wind speed, wind direction, and ambient temperature.

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, year)	New Forest Dr.: 3,500 (est.); South Tenaya Way: 3,900 (2015)
Ground cover	Concrete, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**PM_{10}, 1**	**$PM_{2.5}$, 1**	**O_3, 1**
Parameter code	81102	88101	44201
Basic monitoring objective(s)	NAAQS comparison	Provide air pollution data to public in a timely manner	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Population exposure
Network affiliation	NA	NA	NA
Monitor type(s)	SLAMS	Special Purpose Monitor (SPM)	SLAMS

Pollutant, POC	**PM_{10}, 1**	**$PM_{2.5}$, 1**	**O_3, 1**
Primary, QA Collocated, or Other	Primary	Primary	Primary
Instrument manufacturer and 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	01/01/1998	01/01/2017	07/01/1998
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	2.1	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)	11.5	10.0	11.8
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)	1.7	1.7	NA
Unrestricted airflow (degrees)	360	360	360
Probe material for reactive gases	NA	NA	Teflon
Residence time for reactive gases (s)	NA	NA	3.1
Will there be changes within the next 18 months? (Y/N)	N	Y (SPM)	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	4/13/2016
Last two semiannual flow rate audits for PM monitors	2/5/2016; 10/11/2016	Monitoring started 2017	NA

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. The primary objective of the Sunrise Acres site is to monitor CO, NO2, and PM. DAQ is conducting NO_2 monitoring to meet RA 40 requirements outlined in 40 CFR 58, App. D, Sec. 4.3.4. The site monitors PM_{10} 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. Meteorological measurements at the Sunrise Acres site include wind speed, wind direction, and ambient temperature.

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, year)	Sunrise Ave: 4,000 (est.); Eastern Ave: 31,000 (2015)
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, 1
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 and 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, 1
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	0.8	NA	NA	2.1
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	5/9/2016	NA	NA	4/25/2016
Last two semiannual flow rate audits for PM monitors	2/23/2016; 10/21/2016	NA	2/1/2016; 5/11/2016; 7/27/2016; 10/13/2016	2/10/2016; 10/21/2016	NA

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

The first near-road monitoring site that DAQ deployed, the Near-Road Site 1 monitoring station was approved by EPA in 2014 and began operation in 2015. The site in Las Vegas is at the southeast side of the intersection of South Rancho Drive and Teddy Drive, which is adjacent to Interstate 15. DAQ established near-road CO and $PM_{2.5}$ monitoring in January 2017. Meteorological measurements at Near-Road Site 1 include wind speed, wind direction, and ambient temperature.

Local Site Name (AQS ID)	**Rancho & 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, year)	Interstate 15: 260,000; South Rancho Drive: 15,000 (est.); Teddy Drive: 10,000 (est.) (2015)
Ground cover	Gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Local Site Name (AQS ID)		Rancho & Teddy (32-003-1501)	
Pollutant, POC	**NO_2, 1**	**CO, 1**	**$PM_{2.5}$, 1**
Parameter code	42602	42101	88101
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Highest concentration	Highest concentration	Highest concentration
Network affiliation	Near Road	Near Road	Near Road
Monitor type(s)	SLAMS	SLAMS	SLAMS
Primary, QA Collocated, or Other	Primary	Primary	Primary
Instrument manufacturer and model	TAPI 500 series	API 300 series	Thermo 5014i
Method code	EQNA-0514-212	RFCA-1093-093	EQPM-0609-183
FRM/FEM/ARM/other	FEM	FRM	FEM
Collecting agency	DAQ	DAQ	DAQ
Analytical lab	NA	NA	NA
Reporting agency	DAQ	DAQ	DAQ
Spatial scale	Microscale	Microscale	Microscale
Monitoring start date	08/01/2015	01/01/2017	01/01/2017
Current sampling frequency	Continuous	Continuous	Continuous
Calculated sampling frequency	Continuous	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	4.2	4.2	4.9
Distance from supporting structure (m)	1.2	1.2	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)	23	23	22
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	Teflon	Teflon	NA
Residence time for reactive gases (s)	10.3	2.0 (est.)	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)	NA	NA	Y
Frequency of flow rate verification for manual PM samplers	NA	NA	NA

Local Site Name (AQS ID)		Rancho & Teddy (32-003-1501)	
Frequency of flow rate verification for automated PM analyzers	NA	NA	Monthly
Frequency of one-point QC check for gaseous instruments	Daily	Daily	NA
Last annual performance evaluation for gaseous parameters	4/28/2016	Monitoring started 2017	NA
Last two semiannual flow rate audits for PM monitors	NA	NA	Monitoring started 2017

Figure 15: Walter Johnson.

The primary objective of the Walter Johnson site, located on the west side of Las Vegas, is to monitor O_3 and PM_{10}. Due to topography at this location, the summertime loft brings high O_3 and precursor levels toward this site from the east end of the Las Vegas Valley. The PM_{10} monitor provides spatial representation and neighborhood scale monitoring. Meteorological measurements at the Walter Johnson site include wind speed, wind direction, and ambient temperature.

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, year)	Villa Monterey Drive: 3,000 (est.); Ducharme Avenue: 5,000 (est.); South Buffalo Drive: 28,500 (2015)
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 and 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
Frequency of one-point QC check for gaseous instruments	Daily	NA
Last annual performance evaluation for gaseous parameters	4/6/2016	NA
Last two semiannual flow rate audits for PM monitors	NA	2/23/2016; 10/10/2016

5.0 MAPS OF CRITERIA POLLUTANT MONITORING STATIONS IN 2016

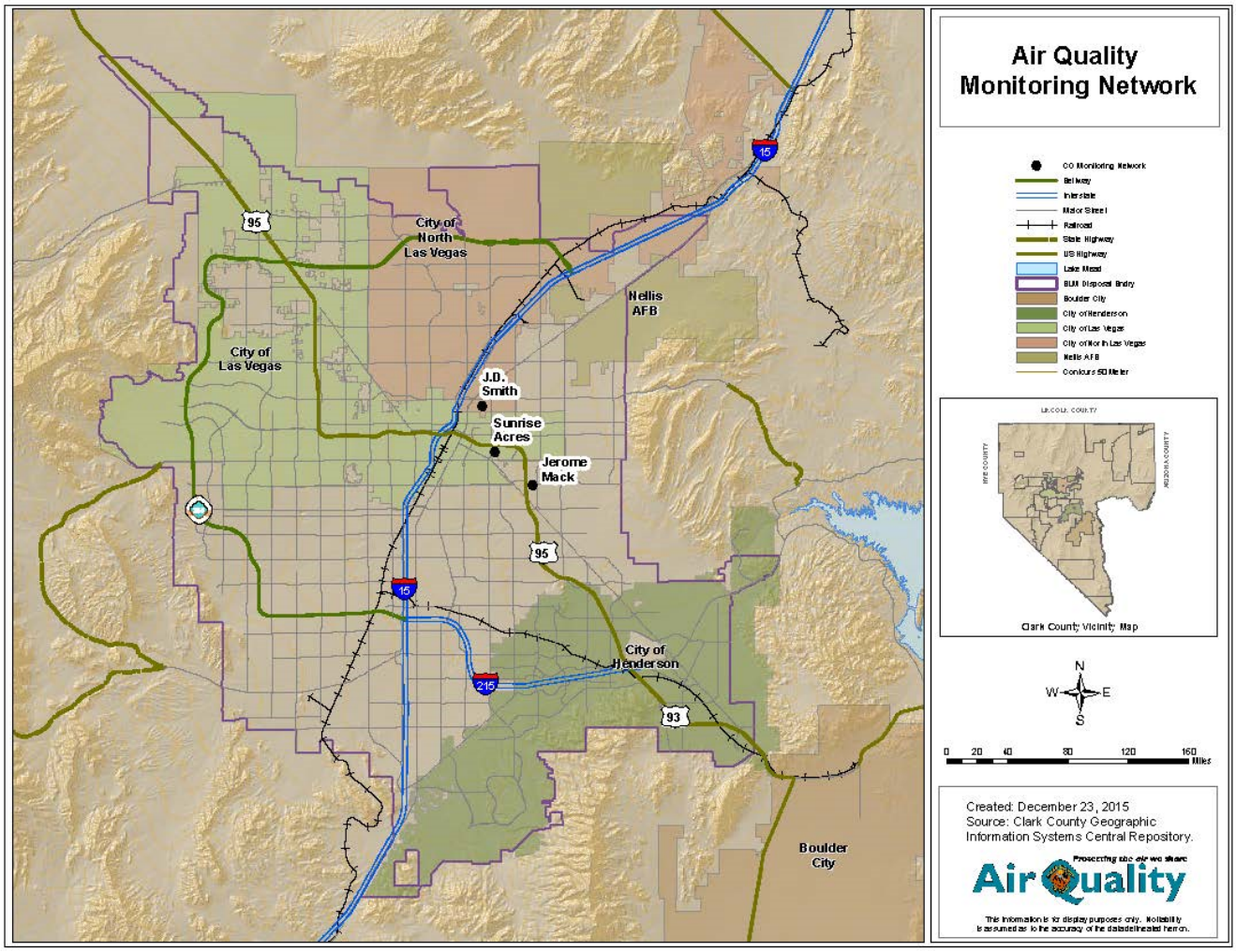

Figure 16: CO Monitors.

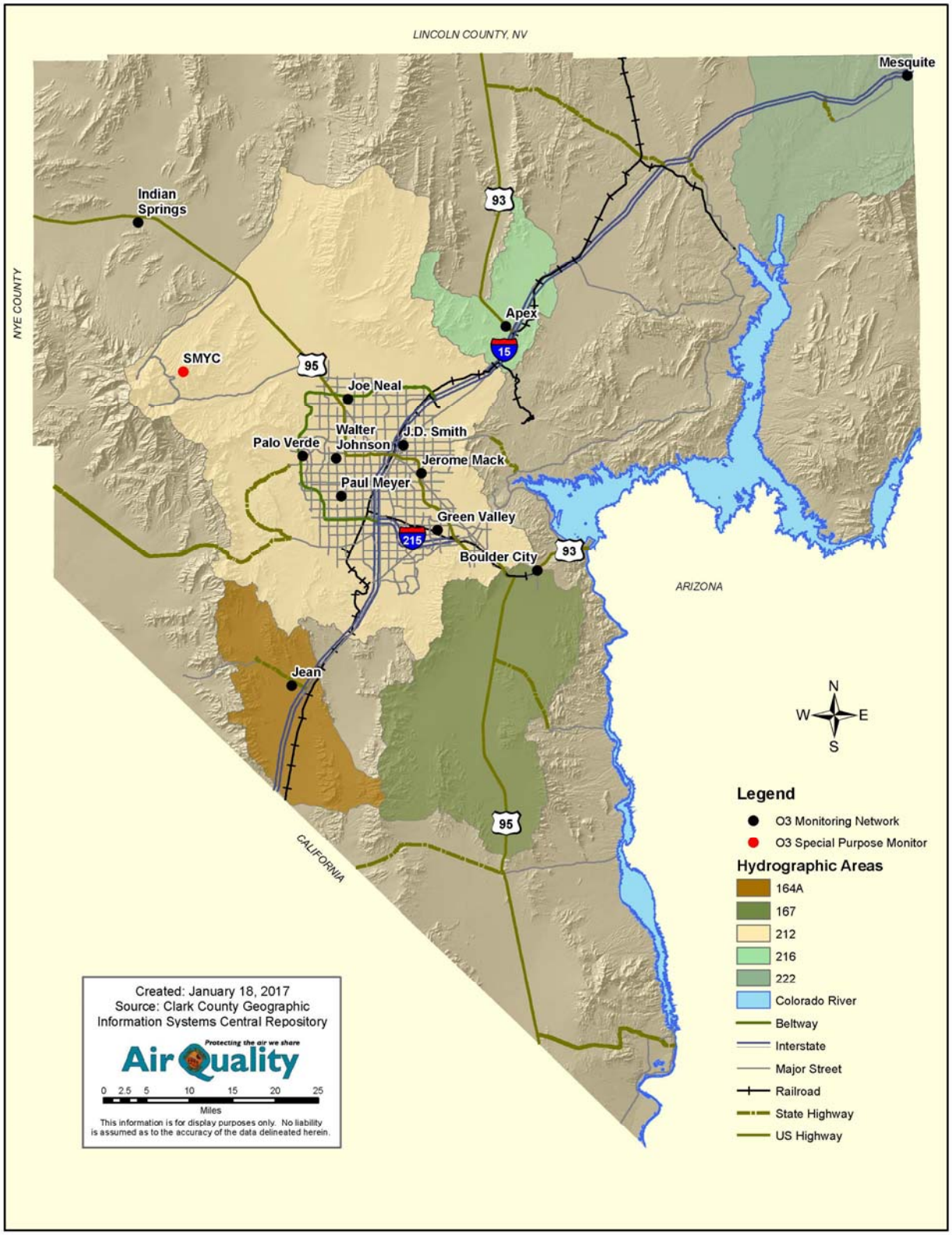

Figure 17: O_3 Monitors.

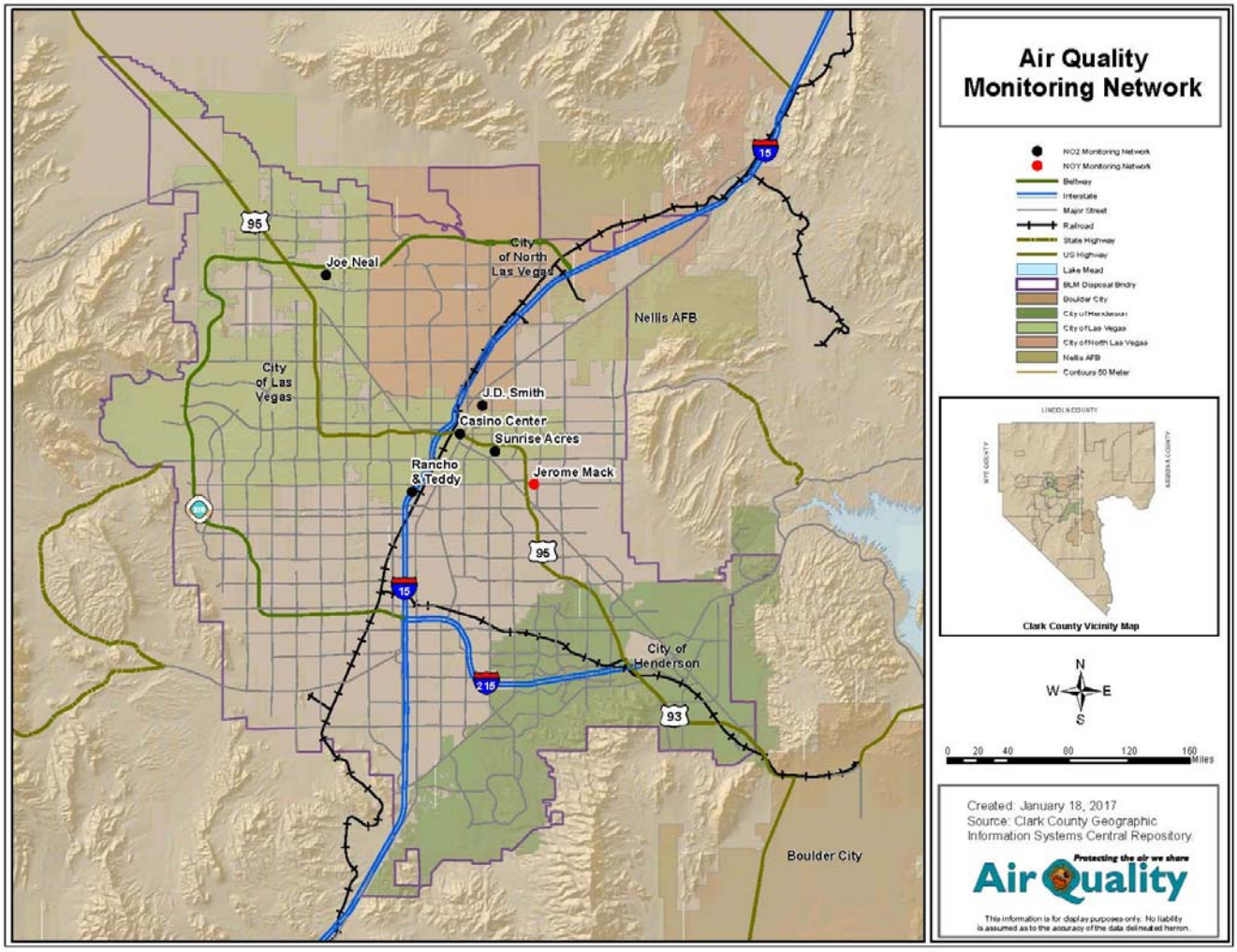

Figure 18: NO_x Monitors.

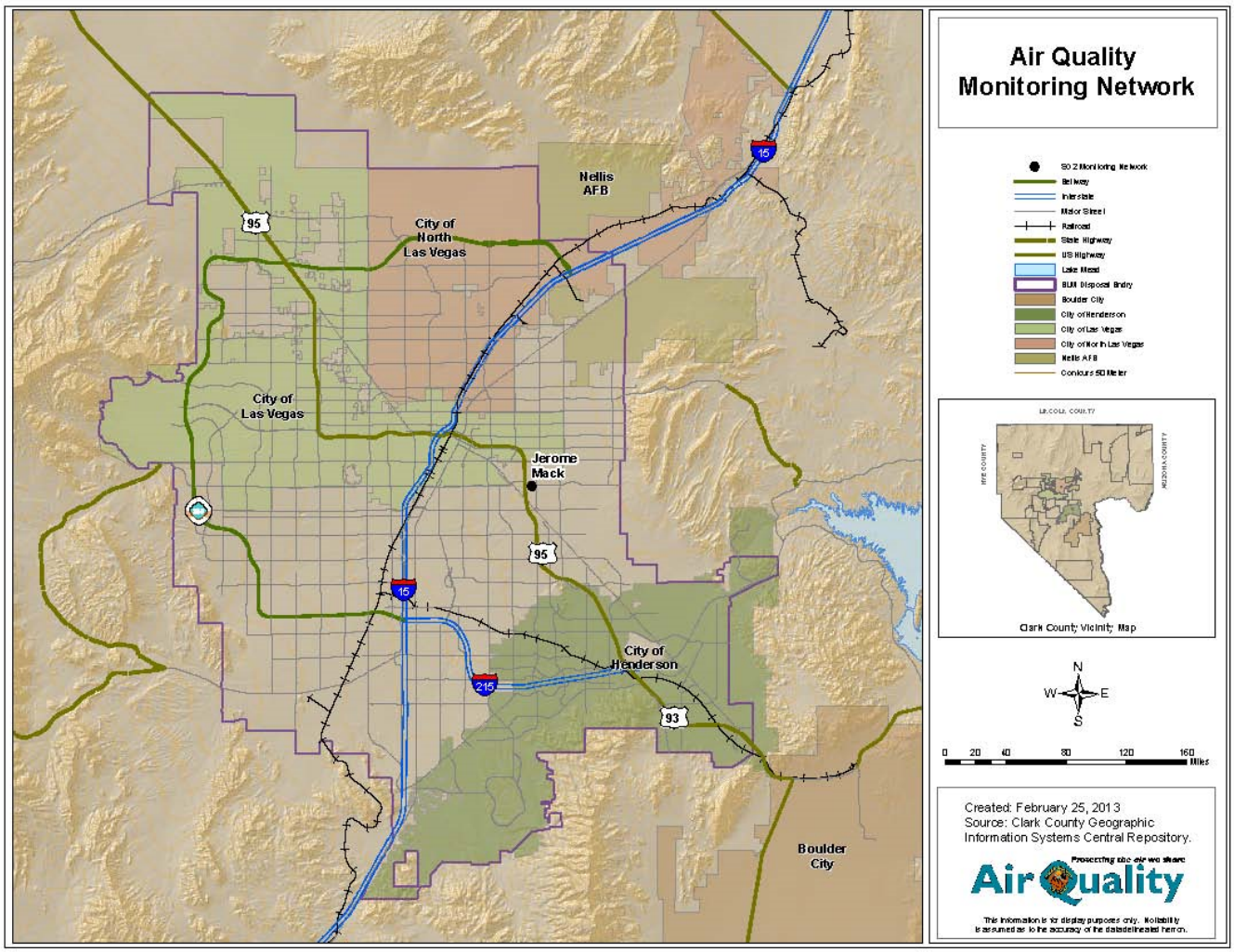

Figure 19: SO_2 Monitor.

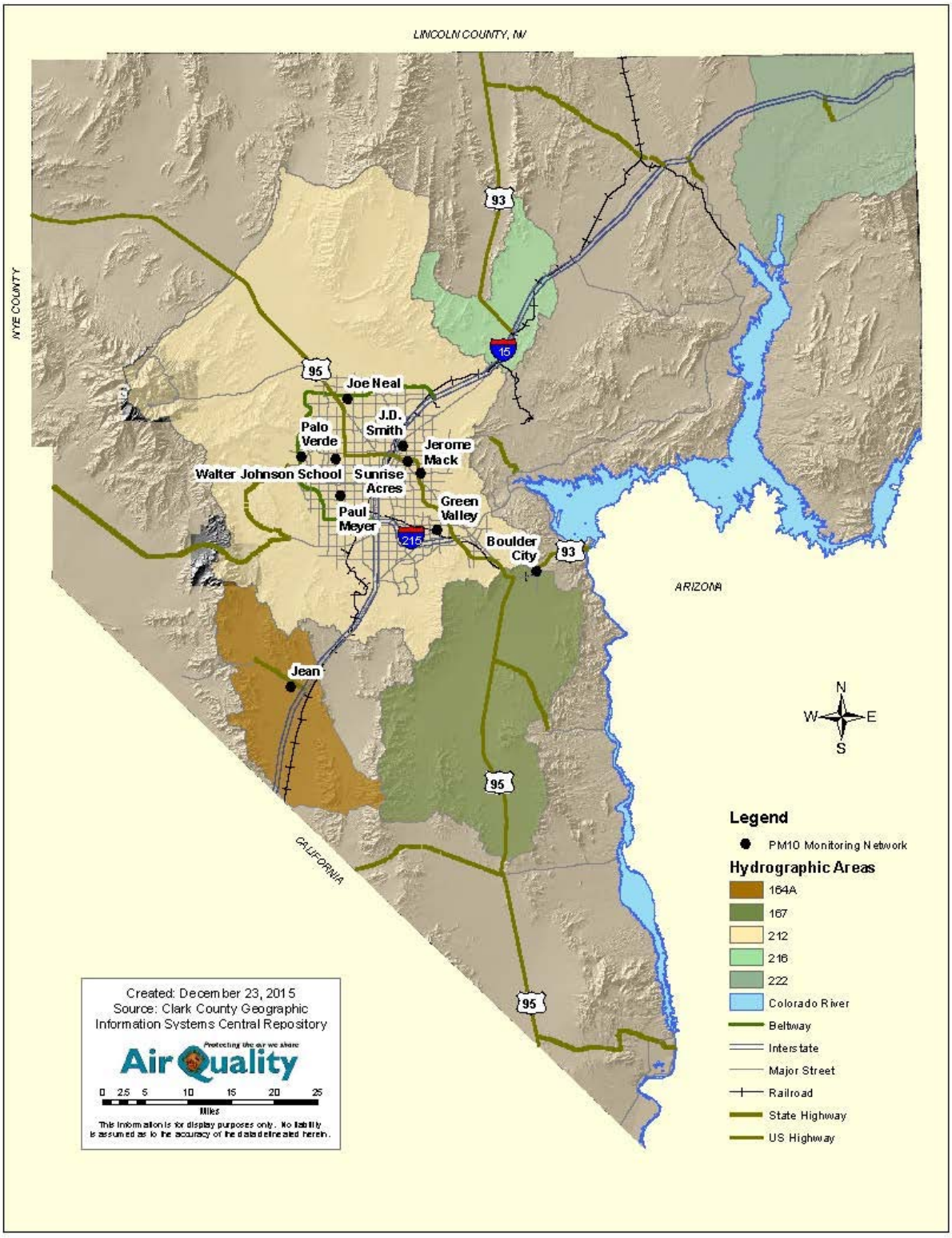

Figure 20: Continuous PM_{10} Monitors.

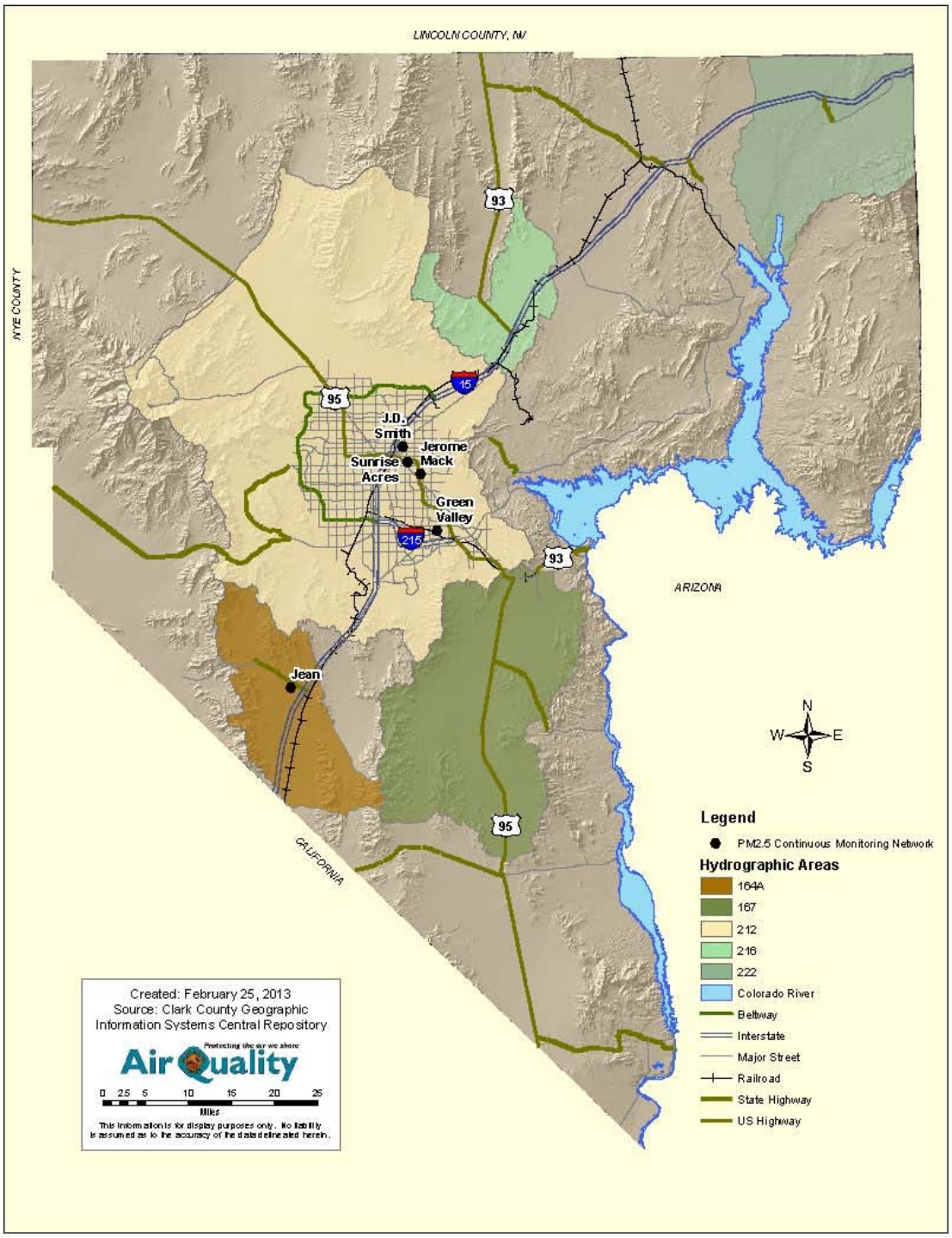

Figure 21: Continuous $PM_{2.5}$ Monitors.

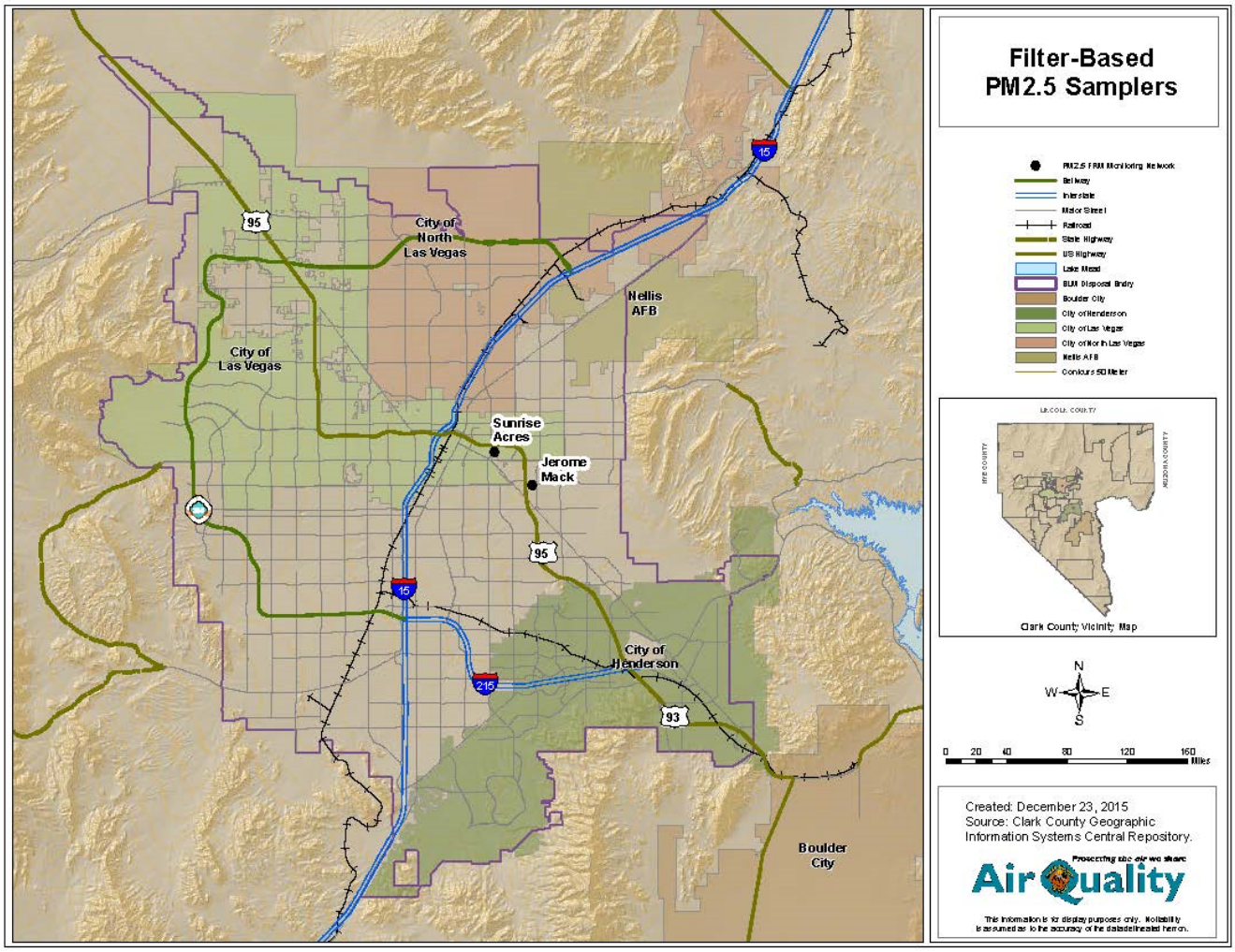

Figure 22: Filter-Based $PM_{2.5}$ FRM Samplers.

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 2016 NPAP/TTP performance evaluations.

Table 13. 2016 NPAP and TTP Evaluations

Monitoring Station	Pollutant	Evaluation Date
Joe Neal	O_3	05/12/2016
Apex	O_3	05/17/2016
Jerome Mack	O_3, CO, SO_2	12/06/2016

Each year, the $PM_{2.5}$ FRM sampling network undergoes a Performance Evaluation Program (PEP) audit. PEP audit results (in $\mu g/m^3$) are generated by an independent lab and then submitted to the AQS database though an EPA contractor.

Table 14. 2016 PEP Audit Activity

Sampler Location	Pollutant	Audit Date
Sunrise Acres	$PM_{2.5}$ FRM	1/31/2016
		5/15/2016
	$PM_{2.5}$ FEM (BAM)	7/20/2016
		12/6/2016
Jerome Mack	$PM_{2.5}$ FRM	5/15/2016
	$PM_{2.5}$ FRM (collocated POC2)	5/18/2016
	$PM_{2.5}$ FEM (BAM)	7/20/2016
Green Valley	$PM_{2.5}$ FEM (BAM)	5/15/2016
		12/6/2016
Jean	$PM_{2.5}$ FEM (BAM)	7/20/2016

7.0 NETWORK MODIFICATIONS

7.1 Completed Changes

DAQ has made the following network changes:

Table 15. Summary of Network Modifications

Action	Date	Explanation
Began operation of Near-Road Site 2: Casino Center	July 2016	DAQ received EPA approval for Casino Center Near-Road Site 2 in the 2014 network plan approval letter. DAQ began operation (NO_2 monitoring) of this site in July 2016.
Discontinued O_3 SPMs at Spring Mountain Youth Camp	October 2016	Enhanced summertime O_3 monitoring completed.
Began monitoring CO and $PM_{2.5}$ at Near-Road Site 1: Rancho & Teddy	January 2017	DAQ began monitoring CO and $PM_{2.5}$ at the Rancho & Teddy Near-Road Site 1 in accordance with requirements in 40 CFR 58 Appendix D – Network Design Criteria for Ambient Air Quality Monitoring.
Began monitoring $PM_{2.5}$ at Paul Meyer	January 2017	Due to local community concerns, DAQ deployed a $PM_{2.5}$ monitor as SPM at the Paul Meyer site. These $PM_{2.5}$ data are available to the public through the DAQ website.

7.2 Proposed Changes

This section describes anticipated and potential changes to the monitoring network over the next two years. Proposed changes will be carried out in accordance with 40 CFR 58.14, as applicable. This constitutes Clark County's official request to Region 9 for approval of proposed changes outlined in Table 16.

Table 16. 2017-2018 Proposed Site and Equipment Changes

Site/Equipment Change	Date of Proposed Change	Explanation
Redeploy O_3 SPM at Spring Mountain Youth Camp	April 2017	This site will be run as SPM, and will help support the Fires, Asian, and Stratospheric Transport–Las Vegas Ozone Study (FAST-LVOS) and characterize upper elevation O_3. More detailed discussion is contained later in this document.
Deploy NO_2 monitor at Jerome Mack	2017	This monitor will provide true-NO_2 readings at the NCore site, and may qualify as an area-wide or RA 40 monitor.

Site/Equipment Change	Date of Proposed Change	Explanation
Deploy SLAMS O_3 and PM monitoring in the Southeast portion of the Las Vegas Valley	2018	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. The 2015 5-Year Network Assessment identified the need to fill this spatial gap. Commencement of installation activities is planned for 2018.
Deploy SLAMS O_3 and PM monitoring in the Southwest portion of the Las Vegas Valley	2018	In an effort to improve spatial coverage for O_3 and PM monitoring, DAQ proposes to deploy SLAMS monitoring at Mountains Edge Park in the southwest part of the Las Vegas Valley. The 2015 5-Year Network Assessment identified the need to fill this spatial gap. Commencement of installation activities is planned for 2018.
Mesquite	2018	Due to distance-to-roadway siting issue 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 PM_{10} at this new location in Mesquite. Commencement of installation activities is planned for 2018.
Deploy a replacement O_3 and PM monitoring site in Boulder City	2018	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 these issues and is expected to be a good indicator of population exposure. Commencement of installation activities is planned for 2018.
JD Smith site shutdown	2017/2018	The JD Smith does not have optimal siting for monitoring. Utilizing requirements outlined in 40 CFR 58.14, DAQ is in the process of working with EPA to shut down SLAMS monitoring at this site. Monitoring at the proposed Walnut Community Center is expected to replace monitoring at the JD Smith site.
Deploy SLAMS criteria pollutant monitoring at Walnut Community Center	2018	In an effort to improve spatial monitoring coverage, DAQ proposes to deploy SLAMS monitoring at Walnut Community Center in the northeast part of the Las Vegas Valley as a replacement to the JD Smith site. The 2015 5-Year Network Assessment identified the need to fill this spatial gap. Commencement of installation activities is planned for 2018.

7.2.1 O_3 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 O_3 research site, with an elevation of 8,400 feet, it will be redeployed in 2017 and 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 O_3 monitor in compliance with FRM or FEM requirements, and DAQ will designate related data as SPM.

One of the main FEM requirements is to comply with testing procedures for the specific pollutant (40 CFR 53.3(b)). For O_3, 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 O_3 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 have topographic and siting 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 O_3 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, year)	350 (2015)
Ground cover	Gravel, concrete
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**O_3, 1**
Parameter code	44201
Basic monitoring objective(s)	Research support
Site type(s)	Regional transport
Monitor type(s)	SPM
Instrument manufacturer and 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	Continuous
Sampling season	Summer season
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 (est.)
Distance from obstructions not on roof – vertical height (m)	2 (est.)
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)	5.1
Will there be changes within the next 18 months? (Y/N)	N[2]
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

[1]Open fetch, but air flow is limited by obstructions.
[2] Anticipate O_3 monitor deployment.

7.2.2 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 O_3 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 will also be used to support the 2017 FAST-LVOS study to help characterize upper elevation O_3 and perhaps other studies in the future.

Figure 27: North Las Vegas Airport.

7.2.3 Monitoring in Southeast 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 (2016)
Traffic count (AADT, year)	Liberty Heights Ave: 1,000 (est.); Chaperral Rd: 1,000 (est.); Bermuda Rd: 5,200 (2015)
Ground cover	Asphalt, gravel, and grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	PM_{10}, 1	$PM_{2.5}$	O_3, 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
Monitor type(s)	SLAMS	SLAMS	SLAMS
Instrument manufacturer and 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	2017 (proposed)	2017 (proposed)	2017 (proposed)
Current sampling frequency	NA	NA	NA
Calculated sampling frequency	Continuous	Continuous	Continuous
Sampling season	Year-round	Year-round	Year-round
Probe height (m)	5.0 (anticipated)	5.0 (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

7.2.4 Monitoring in Southwest Las Vegas

Figure 24: Mountains Edge Park.

Local Site Name (AQS ID)	**Mountains Edge Park (TBD)**
GPS Coordinates (latitude, longitude)	+36.004130°, -115.267990°
Street Address	8101 W Mountains Edge Pkwy, Las Vegas, NV
Distance to roadway (m)	Mountains Edge Pkwy.: 20; S. Buffalo Dr.: 488; Rumrill St.: 100
Traffic count (AADT, year)	Mountains Edge Pkwy.: 6,400; Buffalo Dr.: 11,500; Rumrill St.: <1,000 (est.) (2015)
Ground cover	Asphalt and gravel
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	**PM_{10}, 1**	**$PM_{2.5}$**	**O_3, 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
Instrument manufacturer and model	Thermo 5014i	Thermo 5014i	API 400 series
Method code	EQPM-1102-150	EQPM-0609-183	EQOA-0992-087

Pollutant, POC	**PM_{10}, 1**	**$PM_{2.5}$**	**O_3, 1**
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	2017 (proposed)	2017 (proposed)	2017 (proposed)
Current sampling frequency	NA	NA	NA
Calculated sampling frequency	Continuous	Continuous	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

7.2.5 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, year)	Valley View Dr.: < 2,000 (est.); Hillside Dr.: 5,500; Interstate 5: 18,000 (2015)
Ground cover	Asphalt, gravel, and 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, regional transport
Monitor type(s)	SLAMS	SLAMS
Instrument manufacturer and 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 2018 (proposed)	2018 (proposed)
Current sampling frequency	NA	NA
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

7.2.6 Boulder City (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, year)	Adams Blvd: 5,000; Avenue G: 2,000: (2015)
Ground cover	Grass, unpaved, paved
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 and 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	2017 (anticipated)	2017 (anticipated)
Current sampling frequency	NA	NA
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
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

7.2.7 Criteria Pollutant Monitoring at Walnut Community Center Site

Figure 29: Walnut Community Center.

DAQ is proposing SLAMS monitoring at the Walnut Community Center location in the northeast part of the Las Vegas Valley. Operation of this site is expected to improve spatial monitoring coverage. A need to fill spatial gaps was identified in the 2015 5-Year Network Assessment. This site is intended to be a replacement for JD Smith.

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, year)	Cecile Ave. 1,000 (est.), W. Walnut Rd.: 550, E. Cheyenne Ave. 21, 500 (2015)
Ground cover	Concrete, grass
Representative statistical area name	Las Vegas-Paradise, NV MSA

Pollutant, POC	O_3, 1	CO, 1	NO_2, 1	PM_{10}	$PM_{2.5}$
Parameter code	44201	42101	42602	81102	88101
Basic monitoring objective(s)	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site type(s)	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure
Monitor type(s)	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Instrument manufacturer and 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	2017 (anticipated)	2017 (anticipated)	2017 (anticipated)	2017 (anticipated)	2017 (anticipated)
Current sampling frequency	NA	NA	NA	NA	NA
Calculated sampling frequency	Continuous	Continuous	Continuous	Continuous	Continuous
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)	12 (anticipated)	12 (anticipated)	12 (anticipated)	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, 1	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 shut down any noncompliant SLAMS monitor. DAQ will post all notices and documents for public review on its website. Exceptions to this notification procedure include when DAQ is involuntarily removed or evicted from a site.

7.4 O_3 Monitoring Waivers

Due to the recently revised O_3 NAAQS, EPA has revoked all previous seasonal O_3 waivers. If agencies desire an O_3 waiver approval, they must reevaluate O_3 data and resubmit waiver requests. Based on this direction, DAQ has submitted an O_3 waiver request for the Apex, Mesquite, and Indian Springs sites in February 2017, 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 Casino Center (Near-Road Site 2) was approved by EPA as part of the 2014 Annual Network Plan approval, and operations commenced in July 2016. 40 CFR Part 58 requires one CO monitor and one $PM_{2.5}$ monitor to be placed at a near-road NO_2 monitoring site. DAQ deployed both of these monitors at the Rancho & Teddy site (Near-Road Site 1) beginning January 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 O_3 season. None of the upper-elevation O_3 research monitors that are a part of these studies will be a part of the SLAMS or regulatory monitoring network.

In 2017, DAQ will partner with the National Oceanic and Atmospheric Administration (NOAA), Princeton University, and Scientific Aviation in order to facilitate the FAST-LVOS study. Primary objectives of the study are to characterize O_3 transport and stratospheric O_3 intrusions, and develop related models. There will be a surface-based O_3 monitoring SPM site at Spring Mountain Youth Camp. There will also be a mobile monitoring laboratory that will measure O_3 precursors and be placed on top of Angel Peak (adjacent to Spring Mountain Youth Camp). The North Las Vegas Airport site will house and operate a Tunable Optical Profiler for Aerosol and Ozone (TOPAZ) Light Detection And Ranging (LiDAR) instrument that will be used to detect atmospheric O_3 intrusions. Additionally, Ozonesondes will be launched from the Joe Neal site.

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.

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 O_3 exceptional event demonstration packages when smoke from wildfires may be a significant factor.

7.7 Future Needs

As part of the new O_3 rule, EPA is requiring PAMS measurements to be collocated with existing NCore sites in areas with population of one million or more, irrespective of O_3 NAAQS attainment status. Clark County meets these requirements and is expecting to deploy PAMS monitoring at the Jerome Mack NCore monitoring site. PAMS monitoring will begin by the regulatory deadline of June 1, 2019. DAQ intends to utilize the attached national PAMS Quality Assurance Implementation Plan (QAIP) and adopt national PAMS QAPP. Some of the measurements will include, but are not limited to, volatile organic compound measurements, carbonyl samples, true NO_2, solar radiation, and UV radiation. Upper air measurements are expected to be provided by an on-site ceilometer, and measurements from the North Las Vegas Airport may also be used to support PAMS operations.

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 continue exploring the possibility of gaseous, particulate, or meteorological monitoring in unrepresented/underrepresented areas. Any special study sites will likely be started as SPM.