

Air Quality Monitoring Group

2014 Annual Monitoring Network Plan Mecklenburg County Air Quality

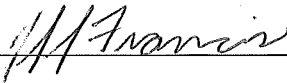


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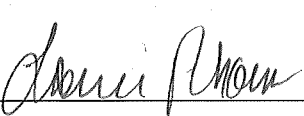
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CERTIFICATION

By the signatures below, Mecklenburg County Air Quality (MCAQ) certifies that the information contained in the "2014 Annual Monitoring Network Plan for Mecklenburg County Air Quality" is complete and accurate, to the best of our knowledge, at the time of submittal to USEPA Region 4. However, due to circumstances that may arise during the sampling year, network information may change. A notification of change and a request for approval will be submitted to USEPA Region 4 at that time.

Print Name: Jeff Francis Signature:  Date: 5-30-2014

Air Quality Monitoring Manager, MCAQ

Print Name: Leslie Rhodes Signature:  Date: 5/30/14

Director, MCAQ

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**2014 ANNUAL MONITORING NETWORK PLAN
MECKLENBURG COUNTY AIR QUALITY
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I. INTRODUCTION

The Mecklenburg County Air Quality (MCAQ) monitoring program, a division of the Mecklenburg County Land Use and Environmental Services Agency (LUESA); provides air quality monitoring services in Mecklenburg County, North Carolina. Mecklenburg County Air Quality is a state “certified local air pollution program” whose purpose is to improve and maintain ambient air quality and reduce exposure to unhealthy levels of air pollution.

MCAQ has operated an air quality monitoring program since the mid 1960’s. The air monitoring services provided by the program are conducted to measure concentrations of criteria air pollutants (carbon monoxide - CO, nitrogen dioxide - NO₂, sulfur dioxide - SO₂, particulate matter - PM, lead - Pb, and ozone - O₃) in accordance with USEPA regulatory requirements.

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards or NAAQS (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. *Primary standards* set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. *Secondary standards* set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for six principal pollutants, known as "criteria" pollutants. They are listed in Table 1:

National Ambient Air Quality Standards

Pollutant [final rule cite]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide [76 FR 54294, Aug 31, 2011]	primary	8-hour	9 ppm	Not to be exceeded more than once per year	
		1-hour	35 ppm		
Lead [73 FR 66964, Nov 12, 2008]	primary and secondary	Rolling 3 month average	0.15 $\mu\text{g}/\text{m}^3$ ⁽¹⁾	Not to be exceeded	
Nitrogen Dioxide [75 FR 6474, Feb 9, 2010] [61 FR 52852, Oct 8, 1996]	primary	1-hour	100 ppb	98th percentile, averaged over 3 years	
	primary and secondary	Annual	53 ppb ⁽²⁾	Annual Mean	
Ozone [73 FR 16436, Mar 27, 2008]	primary and secondary	8-hour	0.075 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years	
Particle Pollution Dec 14, 2012	PM _{2.5}	primary	Annual	12 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
		secondary	Annual	15 $\mu\text{g}/\text{m}^3$	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 $\mu\text{g}/\text{m}^3$	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24-hour	150 $\mu\text{g}/\text{m}^3$	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide [75 FR 35520, Jun 22, 2010] [38 FR 25678, Sept 14, 1973]	primary	1-hour	75 ppb ⁽⁴⁾	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years	
	secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year	

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 $\mu\text{g}/\text{m}^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard (“anti-backsliding”). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO₂ standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Table 1.

The MCAQ air monitoring program operates a network of state and local air monitoring stations (SLAMS) in Mecklenburg County. The current network configuration consists of six monitoring stations that measure concentrations of criteria air pollutants. In addition to the SLAMS network the county network also includes monitoring for meteorological parameters, National Core (NCore) multi-pollutant monitoring, and occasionally, other special purpose monitoring.

The annual monitoring network plan, as provided for in 40 CFR Part 58.10, *Annual Monitoring Network Plan and Periodic Network Assessment* must contain the following information for each monitoring station in the network:

1. The Air Quality System (AQS) site identification number for existing stations.
2. The location, including the street address and geographical coordinates, for each monitoring station.
3. The sampling and analysis method used for each measured parameter.
4. The operating schedule for each monitor.
5. Any proposal to remove or move a monitoring station within a period of eighteen months following the plan submittal.
6. The monitoring objective and spatial scale of representativeness for each monitor.
7. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual PM_{2.5} NAAQS.
8. The Metropolitan Statistical Area (MSA), Core-Based Statistical Area (CBSA), combined Statistical Area (CSA) or other area represented by the monitor.

The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC. **The July 1, 2013 population estimate for the MSA is 2,335,358.**

9. The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 CFR part 58. (MCAQ comment: 37-119-0041 NCore Pb-PM₁₀ is a non-source-oriented monitor.)
10. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 CFR part 58. (MCAQ comment: There are no requirements for source-oriented monitoring within the MCAQ network.)
11. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM₁₀

monitoring in lieu of Pb-TSP monitoring as allowed for under paragraph 2.10 of Appendix C to 40 CFR part 58.

12. The identification of required NO₂ monitors as near-road, area-wide, or vulnerable and susceptible population monitors in accordance with Appendix D, section 4.3 of this part.

13. The identification of any PM_{2.5} FEMs and/or ARMs used in the monitoring agency's network where the data are not of sufficient quality such that data are not to be compared to the NAAQS. For required SLAMS where the agency identifies that the PM_{2.5} Class III FEM or ARM does not produce data of sufficient quality for comparison to the NAAQS, the monitoring agency must ensure that an operating FRM or filter-based FEM meeting the sample frequency requirements described in §58.12 or other Class III PM_{2.5} FEM or ARM with data of sufficient quality is operating and reporting data to meet the network design criteria described in appendix D to this part.

This report constitutes the Mecklenburg County Air Quality “annual monitoring network plan” and continues in the following sections outlined below:

II. Site Description Background Information and Definitions: This section provides an overview of the designations, parameters, monitoring methods, and the basis for site selection.

III. Network Summary: This section presents an overview of the sites and monitors in Mecklenburg County. Also included is a listing of all proposed changes to the current network.

IV. Air Monitoring Station Description: In this section each air monitoring station is described in detail. Modification to the network as determined by the annual review process will be made each year to maintain a current up-to-date network description document.

II. SITE DESCRIPTION BACKGROUND INFORMATION AND DEFINITIONS

1. Site Description

Specific information is provided to show the location of the monitoring equipment at the site, if the site is located in a CSA/CBSA/MSA, the AQS identification number, the GPS coordinates, and evidence that monitors and monitor probes conform to the siting criteria.

2. Date Established

The date when each existing monitoring station was established is shown in the description. For those stations, which are proposed, a date is provided when it is expected for the station to be in operation.

3. Site Approval Status

Each monitoring station in the existing network has been reviewed with the purpose of determining whether it meets all design criteria for inclusion in the SLAMS network. Stations that do not meet the criteria will either be relocated in a nearby area or when possible, re-sited at the present location.

4. Monitoring Objectives

Per 40 CFR 58 Appendix D, Section 1.1: “The ambient air monitoring networks must be designed to meet three basic monitoring objectives. These basic objectives are listed below. The appearance of any one objective in the order of this list is not based upon a prioritized scheme. Each objective is important and must be considered individually.” The objectives are listed below:

(a) Provide air pollution data to the general public in a timely manner. Data can be presented to the public in a number of attractive ways including through air quality maps, newspapers, internet sites, and as part of weather forecasts and public advisories.

(b) Support compliance with ambient air quality standards and emissions strategy development. Data from FRM (Federal Reference Method), FEM (Federal Equivalent Method), and ARM (Approved Regional Method) monitors for NAAQS pollutants will be used for comparing an area’s air pollution levels against the NAAQS. Data from monitors of various types can be used in the development of attainment and maintenance plans. SLAMS, and especially NCore station data, will be used to evaluate the regional air quality models used in developing emission strategies, and to track trends in air pollution abatement control measures' impact on improving air quality. In monitoring locations near major air pollution sources, source-oriented monitoring data can provide insight into how well industrial sources are controlling their pollutant emissions.

(c) Support for air pollution research studies. Air pollution data from the NCore network can be used to supplement data collected by researchers working on health effects assessments and atmospheric processes, or for monitoring methods development work.

5. Monitoring Station Designations

Most stations described in the air quality surveillance network are designated as State and Local Air Monitoring Stations (SLAMS). In addition, some of these stations fulfill other requirements, which must be identified. In the description of the network, designations may also be made for Special Purpose Monitors (SPM) and National Core (NCore) multi-pollutant monitoring stations. The following is the criteria used for each of these designations.

(A) SLAMS: Requirements for air quality surveillance systems provide for the establishment of a network of monitoring stations designated as State and Local Air Monitoring Stations (SLAMS) that measure ambient air concentrations of those pollutants for which standards have been established. These stations must meet requirements that relate to four major areas: quality assurance, monitoring methodology, sampling interval and siting of instruments and instrument probes.

(B) SPM: Not all monitors and monitoring stations in the air quality surveillance network are included in the SLAMS network. In order to allow the capability of providing monitoring for various reasons such as: special studies, modeling verification and compliance status, and other objectives; certain monitors are designated as Special Purpose Monitors (SPM). These monitors are not committed to any one location or for any specified time period. They may be located as separate monitoring stations or be included at SLAMS locations. Monitoring data may be reported, provided that the monitors and stations conform to all requirements of the SLAMS network. Specific regulations regarding SPM's are contained in 40 CFR 58 §58.20.

(C) NCore (National Core multi-pollutant monitoring stations): “The NCore multi-pollutant stations are intended to track long-term trends for accountability of emissions control programs and health assessments that contribute to ongoing reviews of the NAAQS; support development of emissions control strategies through air quality model evaluation and other observational methods; support scientific studies ranging across technological, health, and atmospheric process disciplines; and support ecosystem assessments. These stations together with the more numerous PM_{2.5}, PM₁₀, O₃, and other NAAQS pollutant sites also provide data for use in attainment and nonattainment designations and for public reporting and forecasting of the AQI.”⁶

6. Monitoring Methods

Sampling and analytical procedures for criteria air pollutant monitoring performed in the MCAQ ambient air monitoring network are conducted in accordance with applicable USEPA Designated Federal Reference (FRM) or Federal Equivalent Methods (FEM) unless otherwise noted. Analytical techniques for non-criteria air pollutant monitoring (methods employed that are not USEPA Designated Federal Reference (FRM) or Federal Equivalent Methods (FEM)) are documented in the applicable MCAQ Quality Assurance Project Plan (QAPP), MCAQ Standard Operating Procedure (SOP), or the appropriate North Carolina Division of Air Quality (NCDAQ) QAPP or SOP. Methods used by MCAQ for criteria pollutant monitoring and selected non-criteria monitoring are listed below:

(A) Particulate Matter 10 microns in size (PM₁₀)

All PM₁₀ samplers operated by MCAQ are operated as federal reference method (FRM) or equivalent samplers and are operated according to the requirements set forth in 40 CFR 50 and 40 CFR 53. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
Sierra-Andersen/GMW 1200	RFPS-1287-063	063
R & P Partisol-Plus 2025 PM-2.5 Seq.	RFPS-1298-127	127

(B) Particulate Matter (PM_{2.5}, PM₁₀ lo-vol, PM_c)

With the exception of continuous samplers and speciation samplers, all PM_{2.5} samplers operated by MCAQ are either FRM or FEM samplers. Listed below are the applicable USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
R & P Partisol-Plus 2025 PM-2.5 Seq.	RFPS-0498-118	118
R & P Partisol-Plus 2025 PM-2.5 Seq.	RFPS-1298-127	127
R & P TEOM (Continuous)	NA	(716,717)
MetOne Beta Attenuation Sampler (Continuous)	NA	(731)

(C) PM_{2.5} Speciation sampling and analysis

In addition to operating PM_{2.5} samplers that determine only PM_{2.5} mass values, MCAQ also operates PM_{2.5} speciation samplers that collect samples that are analyzed to determine the chemical makeup of PM_{2.5}. Data collected using this method cannot be compared to the NAAQS. Listed below is the method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
MetOne SuperSASS	NA	810
URG-3000N (Carbon Channel)	NA	Various

(D) Sulfur Dioxide

Instruments used to continuously monitor sulfur dioxide levels in the atmosphere employ the pulsed UV fluorescence method. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
Thermo Electron 43A, 43C-TLE, 43i	EQSA-0486-060	560

(E) Carbon Monoxide

Continuous monitoring for carbon monoxide is performed by use of the non-dispersive infrared (gas filter correlation) method. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
Thermo Electron or Thermo Environmental Instruments 48, 48C, 48i	RFCA-0981-054	054, 554
Teledyne API Model 300EU	RFCA-1093-093	593

(F) Ozone

Ozone is monitored using the UV photometry method. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
Thermo Electron or Thermo Environmental Instruments 49, 49C, 49i	EQOA-0880-047	047

(G) Nitrogen Dioxide

The chemiluminescence method is used in monitoring the nitrogen dioxide level in the ambient air. Listed below is the USEPA Designated Reference or Equivalent Method used in the MCAQ monitoring network:

Method	Designation Number	Method Code
Thermo Environmental Instr. 42, 42C, 42i	RFNA-1289-074	074
Teledyne API T200UP	EQNA-0512-200	600

(H) Reactive Oxides of Nitrogen

The chemiluminescence method is used in monitoring the reactive oxides of nitrogen levels in the ambient air. Listed below is the instrumentation used in the MCAQ monitoring network:

Method	Designation Number	Method Code
Thermo Environmental Instr. 42C-Y, 42i-Y	NA	574

(I) Lead (Pb)

The PM10 lo-vol method will be used for monitoring lead. Analysis for lead in PM10 collected on the filters will be conducted in accordance with 40 CFR 50, Appendix Q. Listed below is the instrumentation used in the MCAQ monitoring network:

Method	Designation Number	Method Code
R & P Partisol-Plus 2025 PM-10 Seq.	RFPS-1298-127	811
X-ray Fluorescence (EDXRF) FRM	RFLQ-1108-804	811

7. Quality Assurance Status

MCAQ has an extensive quality assurance program to ensure that all air monitoring data collected meets established criteria for precision and bias. MCAQ operates according to EPA approved Quality Assurance Project Plans (QAPP) and Standard Operating Procedures. Staff members audit instrumentation on a scheduled basis to ensure that each instrument is calibrated and operating properly. Data validation is performed monthly to ensure data reported by each instrument is recorded accurately in the air quality monitoring database.

8. Scale of Representativeness

Each station in the monitoring network must be described in terms of the physical dimensions of the air parcel nearest the monitoring station throughout which actual pollutant concentrations are reasonably similar. Area dimensions or scales of representativeness used in the network description are:

- (a) Microscale - defines the concentration in air volumes associated with area dimensions ranging from several meters up to about 100 meters.
- (b) Middle scale - defines the concentration typical of areas up to several city blocks in size with dimensions ranging from about 100 meters to 0.5 kilometers.
- (c) Neighborhood scale – defines concentrations within an extended area of a city that has relatively uniform land use with dimensions ranging from about 0.5 to 4.0 kilometers.

(d) Urban scale - defines an overall citywide condition with dimensions on the order of 4 to 50 kilometers.

(e) Regional Scale - defines air quality levels over areas having dimensions of 50 to hundreds of kilometers.

Closely associated with the area around the monitoring station where pollutant concentrations are reasonably similar are the basic monitoring exposures of the station. There are six basic exposures:

(a) Sites located to determine the highest concentrations expected to occur in the area covered by the network.

(b) Sites located to determine representative concentrations in areas of high population density.

(c) Sites located to determine the impact on ambient pollution levels of significant sources or source categories.

(d) Sites located to determine general background concentration levels.

(e) Sites located to determine the extent of regional pollutant transport among populated areas; and in support of secondary standards.

(f) Sites located to measure air pollution impacts on visibility, vegetation damage, or other welfare-based impacts.

The design intent in siting stations is to correctly match the area dimensions represented by the sample of monitored air with the area dimensions most appropriate for the monitoring objective of the station. The following relationship of the six basic objectives and the scales of representativeness are appropriate when siting monitoring stations:

Site Type	Appropriate Siting Scales
1. Highest concentration.....	Micro, middle, neighborhood (sometimes urban or regional for secondarily formed pollutants).
2. Population oriented.....	Neighborhood, urban.
3. Source impact.....	Micro, middle, neighborhood.
4. General/background & regional transport.....	Urban, regional.
5. Welfare-related impacts...	Urban, regional.

Table 2.

9. Data Processing and Reporting

All ambient air quality data are stored in the Agilaire AirVision SQL database located on the 2nd floor of the Hal Marshall County Services Center, 700 North Tryon Street, Suite 205, Charlotte, North Carolina. On a weekly basis the AirVision data are backed up to

the Hall Marshall local area network (lan) server. After all monthly data validation procedures are successfully completed, data is transmitted to the USEPA's national Air Quality System (AQS) database. The AQS database is maintained by EPA as the official repository of the fully quality assured ambient air quality dataset.

III. NETWORK SUMMARY

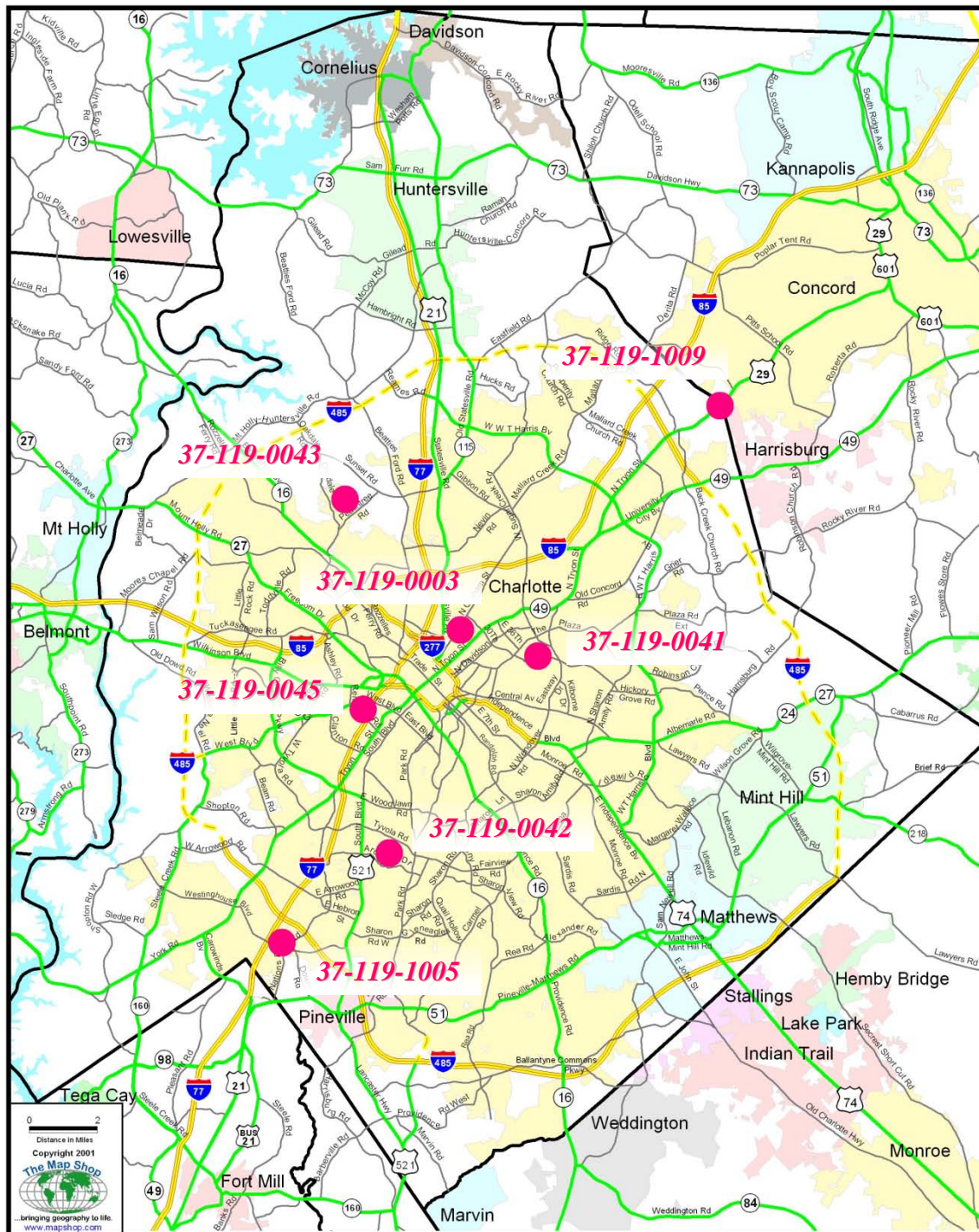
1. Site Table and Criteria Pollutants Monitored

Site	AQS ID #	CO	NO ₂	O ₃	Pb	PM _{2.5}	PM ₁₀	SO ₂	PM _C
#11 Fire Station	37-119-0003						X hi-vol		
Arrowood	37-119-1005			X					
County Line	37-119-1009			X					
Garinger	37-119-0041	X	X	X	X	X	X lo-vol	X	X
Montclair	37-119-0042					X	X lo-vol		X
Oakdale	37-119-0043					X			
Remount	37-119-0045		X						

Table 3.

2. Site Map

AIR QUALITY MONITORING STATIONS MECKLENBURG COUNTY, NC 2014



 = Monitoring Site.

Figure 1. (Ref. 5.)

3. Monitoring Methods

Site	Parameter	Instrument / Method	Meth. Num. ¹	Param. Num. ²	MT ³
37-119-0003	PM10	FRM-Hi Vol	063	81102	SLAMS
37-119-0041	Barometric Pressure	R. M. Young	011	64101	SLAMS
37-119-0041	CO, POC 1	Gas Filter Correlation	054	42101	SLAMS
37-119-0041	CO, POC 3, Trace	Gas Filter Correlation	593	42101	SLAMS (NCore)
37-119-0041	CO, POC 4, Trace	Gas Filter Correlation	554	42101	SLAMS (NCore)
37-119-0041	Dew Point	Vasaila	020	62103	SLAMS
37-119-0041	NO	Chemi-luminescence	074	42601	SLAMS
37-119-0041	NO2	Chemi-luminescence	074	42602	SLAMS
37-119-0041	NOx	Chemi-luminescence	074	42603	SLAMS
37-119-0041	NO, POC 2	Chemi-luminescence	574	42601	SLAMS (NCore)
37-119-0041	NOy, POC 2	Chemi-luminescence	574	42600	SLAMS (NCore)
37-119-0041	NOy - NO, POC 2	Chemi-luminescence	574	42612	SLAMS (NCore)
37-119-0041	Outdoor Temperature	R. M. Young	020	62101	SLAMS (NCore)
37-119-0041	Ozone	UV Photometric	047	44201	SLAMS (NCore)
37-119-0041	PM2.5	TEOM	716	88501	SLAMS
37-119-0041	PM2.5	TEOM	717	88502	SLAMS (NCore)
37-119-0041	PM2.5	FRM	118	88101	SLAMS (NCore)
37-119-0041	PM2.5	Speciation	810	Multiple	STN (NCore)
37-119-0041	Precipitation	R. M. Young	011	65102	SLAMS
37-119-0041	Relative Humidity	Vasaila	012	62201	SLAMS (NCore)
37-119-0041	SO2, POC 2	Pulsed UV Fluorescent	560	42401	SLAMS (NCore)

Site	Parameter	Instrument / Method	Meth. Num. 1	Param. Num. 2	MT ³
37-119-0041	Solar Radiation	Matrix	011	63301	SLAMS
37-119-0041	PM10-2.5 Coarse	FRM-Lo Vol (LC)	118	86101	SLAMS (NCore)
37-119-0041	PM10	FRM-Lo Vol (LC)	127	85101	SLAMS
37-119-0041	PM10	FRM-Lo Vol (STP)	127	81102	SLAMS
37-119-0041	Wind Direction-Resultant	MetOne	061	61104	SLAMS (NCore)
37-119-0041	Wind Speed-Resultant	MetOne	061	61103	SLAMS (NCore)
37-119-0041	Wind Direction-Scalar	MetOne	061	61101	SLAMS (NCore)
37-119-0041	Wind Speed-Scalar	MetOne	061	61102	SLAMS (NCore)
37-119-0042	Lead (Pb)	Pb-PM10 Lo Vol (LC)	811	85129	SLAMS (NCore)
37-119-0041	PM2.5, POC 4	MetOne	731	88501	SPM
37-119-0042	PM2.5	TEOM	716	88501	SLAMS
37-119-0042	PM2.5	TEOM	717	88502	SLAMS
37-119-0042	PM2.5	FRM	118	88101	SLAMS
37-119-0042	PM10-2.5 Coarse	FRM-Lo Vol (LC)	118	86101	SLAMS
37-119-0042	PM10	FRM-Lo Vol (LC)	127	85101	SLAMS
37-119-0042	PM10	FRM-Lo Vol (STP)	127	81102	SLAMS
37-119-0043	PM2.5	FRM	118	88101	SLAMS
37-119-0045	NO	Chemi-luminescence	200	42601	SLAMS
37-119-0045	NO	Chemi-luminescence	200	42602	SLAMS
37-119-0045	NO	Chemi-luminescence	200	42603	SLAMS

Site	Parameter	Instrument / Method	Meth. Num. ¹	Param. Num. ²	MT ³
37-119-1005	Ozone	UV Photometric	047	44201	SLAMS
37-119-1009	Ozone	UV Photometric	047	44201	SLAMS

Table 4.

1- Meth. Num. = Method Number

2- Param. Num. = Parameter Number

3- MT = Monitor Type: SLAMS – State and Local Air Monitoring Station, NCore – National Core, SPM – Special Purpose, NON – Non-regulatory, STN – Speciation Trends Network

4. Network Modifications

(A) Monitoring Station Siting Modifications

37-119-1005 (Arrowood) Ozone Site:

Mecklenburg County Air Quality (MCAQ) operates an ozone monitoring station at 400 Westinghouse Boulevard, Charlotte, NC. The station AQS ID is 37-119-1005. The 2011 – 2013 ozone NAAQS compliance value for site (37-119-1005) is 72 ppb. The level of the 2008 ozone NAAQS is 75 ppb.

On February 27, 2014 the property located at 400 Westinghouse Boulevard, Charlotte, NC was sold. MCAQ does not have a lease agreement with the new property owner. At this time (5/28/2014), MCAQ continues to operate the station on a day to day operational schedule; however, **MCAQ will terminate operation of the ozone monitoring station at this location without delay** if suitable terms for the continuation of the operation of the monitoring station cannot be agreed upon; or if, for any reason it is determined that the location is no longer suitable for MCAQ to continue operations. MCAQ will evaluate potential replacement sites for the Arrowood ozone monitoring station if a satisfactory nearby location is available. If a satisfactory nearby location cannot be found, MCAQ may terminate monitoring in this area.

(B) Instrumentation Operation Modifications

None proposed at this time.

IV. AIR MONITORING STATION DESCRIPTIONS

1. #11 Fire Station

(A) #11 Fire Station Site Table

Site Name: #11 Fire Station				
AQS Site Identification Number: 37-119-0003				
Location: 620 West 28 th Street				
Charlotte, NC 28206				
Latitude: N35.251717°		Datum: WGS84		
Longitude: W80.824717°				
Elevation: 223 meters				
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
PM10	Gravimetric	63	6	1 in 6 day
PM10 Collocated	Gravimetric	63	6	1 in 6 day
Date Monitor Established:		PM10	October 1, 1992	
Date Monitor Established:		PM10 Collocated	June 8, 1996	
Nearest Road:	Bancroft Street	Distance to Road:	25 meters	
Traffic Count:	300	Year of Count:	2001	
Nearest Road:	West 28 th ST	Distance to Road:	33 meters	
Traffic Count:	2000	Year of Count:	2012	
MSA: Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area			MSA #: 16740	
2011 Population (Census blocks within 1 mile of property)		Projected 2016 Population (Census Blocks within 1 mile of property)		
13155		14997		

Table 6.

(B) #11 Fire Station Site Description and Statement of Purpose

A PM₁₀ monitor has been located on the roof of #11 Fire Station (620 W. 28th Street) since 10/01/1992. A collocated sampler has been located 2.9 m NE of the reporting sampler since 06/08/1996. The site is located 3.2 kilometers NE of the central business district at latitude N35.251717° and longitude W80.824717°. The site elevation is 223 meters above sea level. The nearest road is Bancroft Street (ADT=300, 2001) at a distance of 25.3 meters from the sample inlet. Prior to the installation of the PM₁₀ sampler, a TSP sampler was located at this site (11/03/1966 to 10/01/1992).

The inlet of the sampler is 6.4 meters above ground level and 1.5 meters above roof level. The area is a transition zone of business (≈50%) to residential (≈50%) within a 1 km radius. The PM₁₀ sampler is a SLAMS.

A motor vehicle emissions evacuation device exhaust stack is located 8.8 meters from the PM₁₀ sampler and 10.0 meters from the collocated sampler. This device activates when vehicles are operated for emergency response and routine maintenance. The device exhausts tailpipe emissions from vehicles to protect personnel from exposure to exhaust gases that might otherwise be trapped in the garage. Operation is intermittent.

The sampling frequency for PM₁₀ is 1 in 6 day sampling. The sampling interval is 24 hours, from midnight to midnight every sixth day.

The site complies with the siting requirements of 40CFR58 for criteria air pollutants.

OBJECTIVE AND SPATIAL SCALE

The #11 Fire Station sampling site is representative of particulate concentrations in a mixed industrial, commercial, and residential area. The PM₁₀ monitoring site objective is to determine representative concentrations in an area of high population density (population exposure) and to measure potential maximum PM₁₀ concentrations in the network. #11 Fire Station is a neighborhood scale site. Data is used to assess compliance with the particulate NAAQS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

(C) #11 Fire Station Aerial Photograph

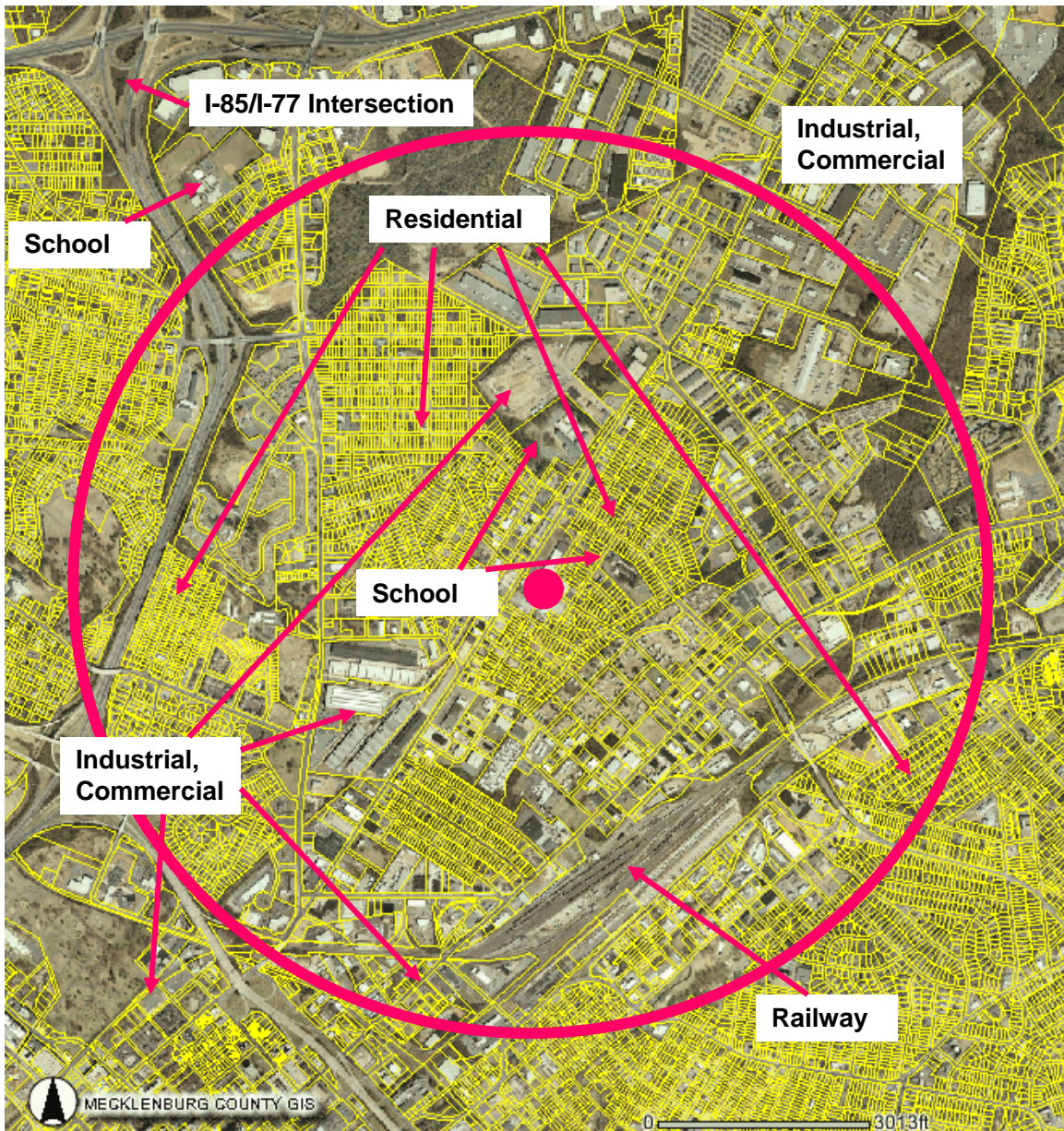


Figure 3. #11 Fire Station aerial photograph with 4 km diameter circle.

(D) #11 Fire Station Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

2. Arrowood

(A) Arrowood Site Table

Site Name: Arrowood				
AQS Site Identification Number: 37-119-1005				
Location: 400 Westinghouse Boulevard				
Charlotte, NC 28273				
Latitude: N35.113400°		Datum: WGS84		
Longitude: W80.919706°				
Elevation: 195 meters				
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
Ozone	UV Photometry	47	5	April 1 – Oct. 31
Date Monitor Established: Ozone June 6, 1980				
Date Monitor Established: PM10 January 1, 1991				
Date Monitor Terminated: PM10 December 31, 2010				
Nearest Road: Westinghouse Boulevard		Distance to Road: 63 meters		
Traffic Count: 24000		Year of Count: 2010		
MSA: Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)				MSA #: 16740
2011 Population (Census blocks within 1 mile of property)		Projected 2016 Population (Census Blocks within 1 mile of property)		
5321		6148		

Table 7.

(B) Arrowood Site Description and Statement of Purpose

The Arrowood site monitors ozone. The site is located at 400 Westinghouse Boulevard, 14.5 kilometers SW of the central business district and 0.4 kilometers east of I-77 at latitude N35.113164° and longitude W80.919532°. The site elevation is 195 meters. The nearest road, Westinghouse Boulevard, is 63 meters from the inlet and has a daily traffic flow of 24000 vehicles (2010). The nearest tallest building is a small strip shopping center (Height = 5.6 meters). The inlet is 15 meters from the shopping center. The ozone inlet is 5.4 meters above the ground and 2.8 meters above the roof of the monitoring station. There is unrestricted airflow in at least a 270° arc of exposure, including the predominant SW wind direction. The area is a mixture of commercial and industrial business. The ozone analyzer is the first of three oriented along the primary summer wind vector (SW to NE), which intersects the central business district. The ozone monitor is a SLAMS.

The ozone instrument is operated during the North Carolina ozone monitoring season which begins April 1 and ends October 31. The ozone instrument operates continuously during this period.

The site complies with the siting requirements of 40CFR58 for criteria air pollutants. The 2011 – 2013 ozone NAAQS compliance value for site (37-119-1005) is 72 ppb. The level of the 2008 ozone NAAQS is 75 ppb.

On February 27, 2014 the property located at 400 Westinghouse Boulevard, Charlotte, NC was sold. MCAQ does not have a lease agreement with the new property owner. At this time (5/28/2014), MCAQ continues to operate the station on a day to day operational schedule; however, **MCAQ will terminate operation of the ozone monitoring station at this location without delay** if suitable terms for the continuation of the operation of the monitoring station cannot be agreed upon; or if, for any reason it is determined that the location is no longer suitable for MCAQ to continue operations. MCAQ will evaluate potential replacement sites for the Arrowood ozone monitoring station if a satisfactory nearby location is available. If a satisfactory nearby location cannot be found, MCAQ may terminate monitoring in this area.

OBJECTIVE AND SPATIAL SCALE

The monitoring objectives of the ozone instrument are to measure: 1) upwind background ambient concentrations and 2) population exposure.

The site is a neighborhood spatial scale for ozone. Data from this site is used to assess compliance with the NAAQS for ozone.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

(C) Arrowood Aerial Photograph

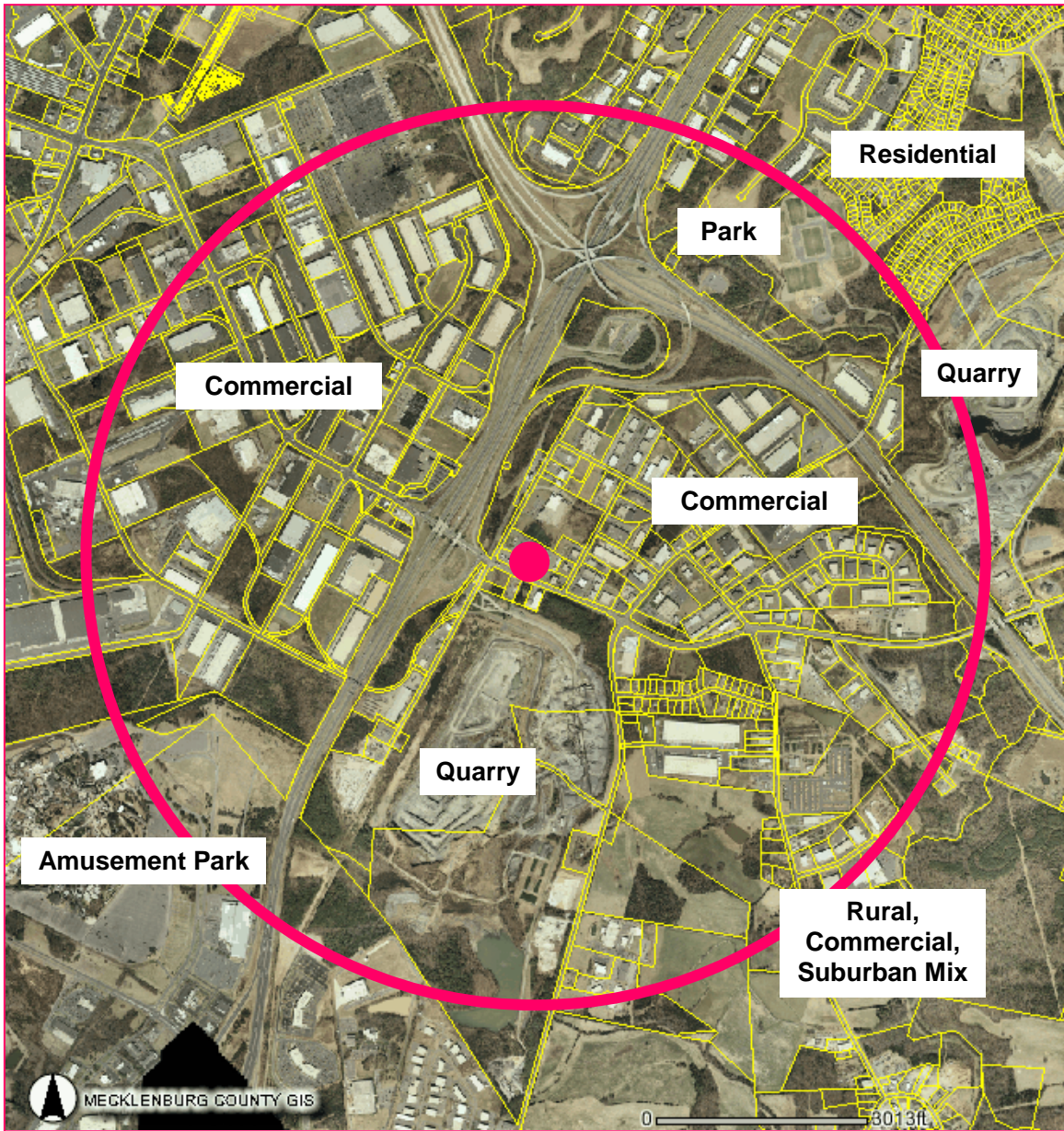


Figure 4. Arrowood aerial photograph with 4 km diameter circle.

(D)Arrowood Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

3. County Line

(A) County Line Site Table

Site Name: County Line				
AQS Site Identification Number: 37-119-1009				
Location: Highway 29 North at Hudspeth Road (13001 US 29 HY UNINC) Charlotte, NC 28262				
Latitude: N35.348752°		Datum: WGS84		
Longitude: W80.693402°				
Elevation: 216 meters				
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
Ozone	UV Photometry	47	4	April 1 – Oct. 31, Continuous
Date Monitor Established:		Ozone	November 9, 1979	
Nearest Road:	NC Highway 29	Distance to Road:	128 meters	
Traffic Count:	22000	Year of Count:	2012	
MSA: Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)			MSA #:	16740
2011 Population (Census blocks within 1 mile of property)		Projected 2016 Population (Census Blocks within 1 mile of property)		
5899		6560		

Table 8.

(B) County Line Site Description and Statement of Purpose

The County Line site is located near Highway 29 North at the Mecklenburg/Cabarrus County line. It has monitored ozone since 11/09/1979. The site is located 20 kilometers NE of the central business district at latitude N35.348752° and longitude W80.693402°. The site elevation is 216 meters. The nearest road is NC Highway 29, which is 128 meters from the probe and has a daily traffic count of 22000 (2012). The monitoring building is located in a large grass field near the Mecklenburg County-Cabarrus County line. The probe inlet is 4.1 meters above the ground and 1.7 meters from the roof of the monitoring building.

The site is located downwind from the central business district. It is the last of three analyzers oriented along the primary summer wind vector (SW to NE) which intersects the central business district. The site should measure peak ozone concentrations.

The ozone monitor was a NAMS monitoring site through December 31, 2006. The site type was changed to SLAMS by USEPA on January 1, 2007 in accordance with the revised 40CFR58 monitoring rules published October 17, 2006. Data is used to assess compliance with the NAAQS.

The ozone instrument is operated during the North Carolina ozone monitoring season which begins April 1 and ends October 31. The ozone instrument operates continuously during this period.

The site complies with the siting requirements of 40CFR58 for criteria air pollutants. There are no proposed changes for this site. It is recommended that the current site status be maintained.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the County Line ozone site is to determine the highest concentrations expected to occur in the area covered by the network. This site is considered an urban scale site which represents ozone levels over several kilometers. Data from this site is used to assess compliance with the NAAQS for ozone.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

(C) County Line Aerial Photograph



Figure 5. County Line aerial photograph with 4 km diameter circle.

(D) CountyLine Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

4. Garinger

(A) Garinger Site Table

Site Name: Garinger

AQS Site Identification Number: 37-119-0041

Location: 1130 Eastway Drive

Charlotte, NC 28205

Latitude: N35.240100°

Datum: WGS84

Longitude: W80.785683°

Elevation: 232 meters

Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
Ozone	UV Photometry	47	5	Continuous
PM _{2.5}	FRM Gravimetric	118	5	1 in 3 day
PM _{2.5}	MetOne, Speciation	810	5	1 in 3 day
PM _{2.5}	URG-3000n, Carbon Speciation		5	1 in 3 day
PM _{2.5}	TEOM, BAM	716,717, 731	5	Continuous
PM ₁₀ FRM	FRM Lo-Vol Gravimetric	127	5	1 in 3 day
PM _{10-2.5} Coarse	FRM difference	118	5	1 in 3 day
NO ₂	Chemiluminescence	74	5	Continuous
CO	NDIR, GFC	554	5	Continuous
SO ₂ Pre-cursor Gas	UV Pulsed Fluorescence	560	5	Continuous
NO _y Pre-cursor Gas	Chemiluminescence	574	5	Continuous
Wind Speed	MetOne	61	10	Continuous
Wind Direction	MetOne	61	10	Continuous
Pressure	R. M. Young	11	2	Continuous
Outdoor Temperature	R. M. Young	20	3	Continuous
Solar Radiation	Matrix	11	3	Continuous
Precipitation	R. M. Young	11	4	Continuous
Dew Point	Vaisala	20	3	Continuous
Relative Humidity	Vaisala	12	3	Continuous
Date Monitor Established:	Ozone		March 3, 2000	

Date Monitor Established:	PM _{2.5} FRM	July 30, 1999	
Date Monitor Established:	PM _{2.5} Speciation (MetOne)	January 13, 2001	
Date Monitor Established:	PM _{2.5} Speciation (URG)	February 27, 2009	
Date Monitor Established:	PM _{2.5} TEOM	November 1, 1999	
Date Monitor Established:	PM _{2.5} BAM (Non-FEM)	January 1, 2010	
Date Monitor Established:	PM ₁₀ FRM	April 1, 2008	
Date Monitor Established:	PM _{10-2.5} Coarse	April 1, 2008	
Date Monitor Established:	Pb-PM ₁₀	December 29, 2011	
Date Monitor Established:	NO ₂	November 12, 1999	
Date Monitor Established:	CO	November 11, 1999	
Date Monitor Established:	SO ₂ Precursor Gas	January 1, 2006	
Date Monitor Established:	CO Precursor Gas	January 1, 2006	
Date Monitor Established:	NO _y Precursor Gas	May 4, 2007	
Date Monitor Established:	Meteorological Parameters	January 1, 2003 (latest)	
Nearest Road:	Shamrock Drive	Distance to Road:	298 meters
Traffic Count:	9300	Year of Count:	2012
MSA:	Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)	MSA #:	16740
2011 Population (Census blocks within 1 mile of property)	Projected 2016 Population (Census Blocks within 1 mile of property)		
28136	31028		

Table 9.

(B) Garinger Site Description and Statement of Purpose

The Garinger High School site is a SLAMS (NCore) multi-pollutant site. The monitoring site is located at 1130 Eastway Drive. The site is located in a grassy area at the rear of Garinger High School near the left field line of the baseball field.

The site is located 5.6 kilometers ENE of the Charlotte, NC central business district at latitude N35.240100° and longitude W80.785683°. The site elevation is 232 meters above sea level. All sampler inlet probes are located at a height of 5 meters except for meteorological parameters. There is unrestricted airflow in at least a 270° arc of exposure, including the predominant southwest wind direction. Sample inlets are >20 meters from the nearest trees. The nearest road, Shamrock Drive, is 298 meters from the inlets and has a daily traffic flow of 9300 (ADT 2012). The ozone analyzer is the second of three oriented along the primary summer wind vector (SW to NE), which intersects the downtown area.

A 1/3 day PM_{2.5} sequential monitor (est. 07/30/1999), a 1/3 day PM₁₀ sequential monitor (est. 04/01/2008), a PM_{2.5} Speciation monitor (MetOne SuperSASS, est. 01/13/2001), and a URG-3000n carbon sampler (est. 04/01/2009) are located on the roof of the building. Nitrogen Dioxide (est. 11/12/1999), Carbon Monoxide (est. 11/11/1999), Ozone (est.03/03/2000), Sulfur Dioxide (est. 11/15/1999), and continuous TEOM PM_{2.5} (est. 11/01/1999) monitors are located inside the monitoring shelter. A meteorological station is also located at the site. The meteorological station monitors wind speed (est. 04/12/2000), wind direction (04/12/2000), pressure (04/14/2000), temperature (10/06/2000), solar radiation (09/26/2000), precipitation (1/11/2002), dew point (11/1/2001), and relative humidity (1/11/2002).

The site is an NCore multi-pollutant monitoring site. Parameters monitored include trace-level CO (<5000 ppb, 1/1/2006), trace-level SO₂ (<200 ppb, 1/1/2006), and trace-level NO and NO_y (<200 ppb, 5/4/2007). The NCore gas instruments operate year round.

The ozone and CO monitors used for NAAQS determination were NAMS. USEPA re-designated them to SLAMS on January 1, 2007 in accordance with the revised 40 CFR 58 rules published on October 17, 2006. The re-designated SLAMS ozone and CO monitors are used for NAAQS determination. The PM_{2.5}-FRM, meteorological parameters, NO₂, trace-level SO₂, trace-level NO_y, and trace-level CO are SLAMS. The trace-level SO₂, trace-level NO_y, and trace-level CO are also NCore. The PM_{2.5}-FRM SLAMS monitor is used for NAAQS determination. The SLAMS NO₂ and SO₂ monitors are used for NAAQS determination. The PM_{2.5}-TEOM is designated as a SLAMS for AQI determination and forecasting purposes. The PM_{2.5} speciation monitor is part of the Speciation Trends Network (STN). Data from this monitor (STN) is not used for compliance determination. A MetOne BAM PM_{2.5} monitor (BAM) began operation on 1/1/2010. The BAM is operated as an SPM in a non-FEM configuration.

The Garinger site is an NCore site and as such must meet additional probe siting criteria. The meteorological tower at this site does not comply with the 10x rule for spacing from obstructions for meteorological measurements. Due to terrain features in the Mecklenburg County region it is difficult to locate a site that meets the requirements of the EPA Volume 4 QA/QC guidance for wind speed and wind direction measurements. Large trees are a dominant landscape feature in the area. The closest terrain feature is 2.6x and is to the southeast of the WS/WD instrument. The next closest obstructions (trees) are to the west of the sensor at 3.4x. MCAQ's 2009 NCore Plan was approved as acceptable for WS/WD and included documentation noting the deviation from 10x siting criteria. Therefore, WS/WD monitoring is conducted at the current location as documented in the 2009 NCore Plan as approved by USEPA Region 4 and USEPA Office of Air Quality Planning and Standards (OAQPS).

NCore probe siting guidance for NO_y is a probe height of 10 meters. The NO_y probe inlet is currently mounted at a height of 8 meters.

A PM₁₀ lo-vol sampler was installed at this site on 4/1/2008. The PM₁₀ lo-vol sampler is used in tandem with the PM_{2.5} FRM to determine PM_{10-2.5} (lc) as well as PM₁₀ (lc and stp).

Lead monitoring began at this site on December 29, 2011 and is conducted as required for NCore monitoring (40 CFR 58, Appendix D, 3.(b) and 4.5(b)) as a non-source-oriented monitor measured as Pb-PM₁₀.

The site complies with the siting requirements of 40CFR58 for criteria air pollutants. There are no proposed changes for the siting of this station. It is recommended that the current site status be maintained.

Additional Monitoring at Garinger High School

Monitoring for air toxics is conducted at the Garinger High School site. The North Carolina Division of Air Quality (NCDAQ), provides a Xontech 911 sampling device for the Garinger High School site. MCAQ operates the sampler on a 1/6 day sampling schedule as specified by NCDAQ. The sample operates on local time.

Whole air samples are collected in stainless steel 6 liter- pressurized canisters supplied by NCDAQ. Analysis of samples is conducted by NCDAQ. Samples are analyzed by NCDAQ using cryogenic pre-concentration gas chromatography with mass spectrometric detection (GC/MS) via the Compendium Method for Toxic Organics 15 (TO-15) for 70 compounds. The list of compounds is shown in Table 10:

Parameter Description	Parameter Code	Parameter Description	Parameter Code
Carbon Disulfide	42153	Chloroethane	43812
Propene	43205	1,1-Dichloroethane (Ethylidene Chloride)	43813
Freon 114	43208	1,1,1-Trichloroethane (Methyl chloroform)	43814
Isobutene	43218	1,2-Dichloroethane	43815
1,3-Butadiene	43220	Tetrachloro ethylene (perchloroethylene)	43817
Pentane	43231	1,1,2,2-Tetrachloroethane	43818
Hexane	43242	Bromomethane	43819
Cyclopentane	43243	1,1,2-Trichloroethane (vinyl trichloride)	43820
Isoprene	43248	Freon 113	43821
Cyclohexane	43270	Freon 12	43823
Ethanol	43302	Trichloroethylene	43824
1-Butanol	43305	1,1-Dichloroethene (Vinylidene chloride)	43826
Isopropyl Alcohol	43312	Bromodichloromethane	43828
Freon 22	43359	1,2 Dichloropropane (propylene dichloride)	43829
MTBE	43372	trans-1,3 Dichloropropene	43830
Vinyl Acetate	43447	cis-1,3 Dichloropropene	43831
Acetaldehyde	43503	1,2-Dichloroethene (ethylene dichloride)	43838
Acrolein	43505	Ethylene dibromide	43843
Methacrolein	43515	Vinyl chloride	43860
Acetone	43551	m- & p-Xylene	45109
Methyl Ethyl Ketone	43552	Benzene	45201
3-Pentanone	43553	Toluene	45202
Ethylpropylketone (3-hexanone)	43557	Ethylbenzene	45203
Methyl Vinyl Ketone	43558	o-Xylene	45204
Methyl Butyl Ketone	43559	1,3,5-Trimethyl-benzene (mesitylene)	45207
Methyl Isobutyl Ketone	43560	1,2,4-Trimethyl-benzene (pseudocumene)	45208
2-Pentanone	43562	Styrene	45220
Acetonitrile	43702	1,2,3-Trimethyl Benzene	45225
Methyl chloride (chloroMethane)	43801	Chlorobenzene (phenylchloride)	45801
Methylene chloride	43802	o-Dichlorobenzene	45805
Chloroform	43803	m-Dichlorobenzene	45806
Carbon tetrachloride	43804	p-Dichlorobenzene	45807
Bromoform	43806	Benzyl chloride	45809
Methyl Iodide	43808	1,2,4-Trichlorobenzene	45810
Freon 11	43811	1,4-Dioxane	46201

Parameters Code

Table 10.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the Garinger ozone, CO, NO₂, SO₂, PM₁₀, and PM_{2.5} (FRM) monitors is to determine representative concentrations in areas of high population density (population exposure). Maximum concentrations for ozone and PM_{2.5} may be measured under stagnant meteorological conditions. This site is a neighborhood scale site for all parameters. Data from this site is used to assess compliance with the NAAQS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

(C) Garinger Aerial Photograph

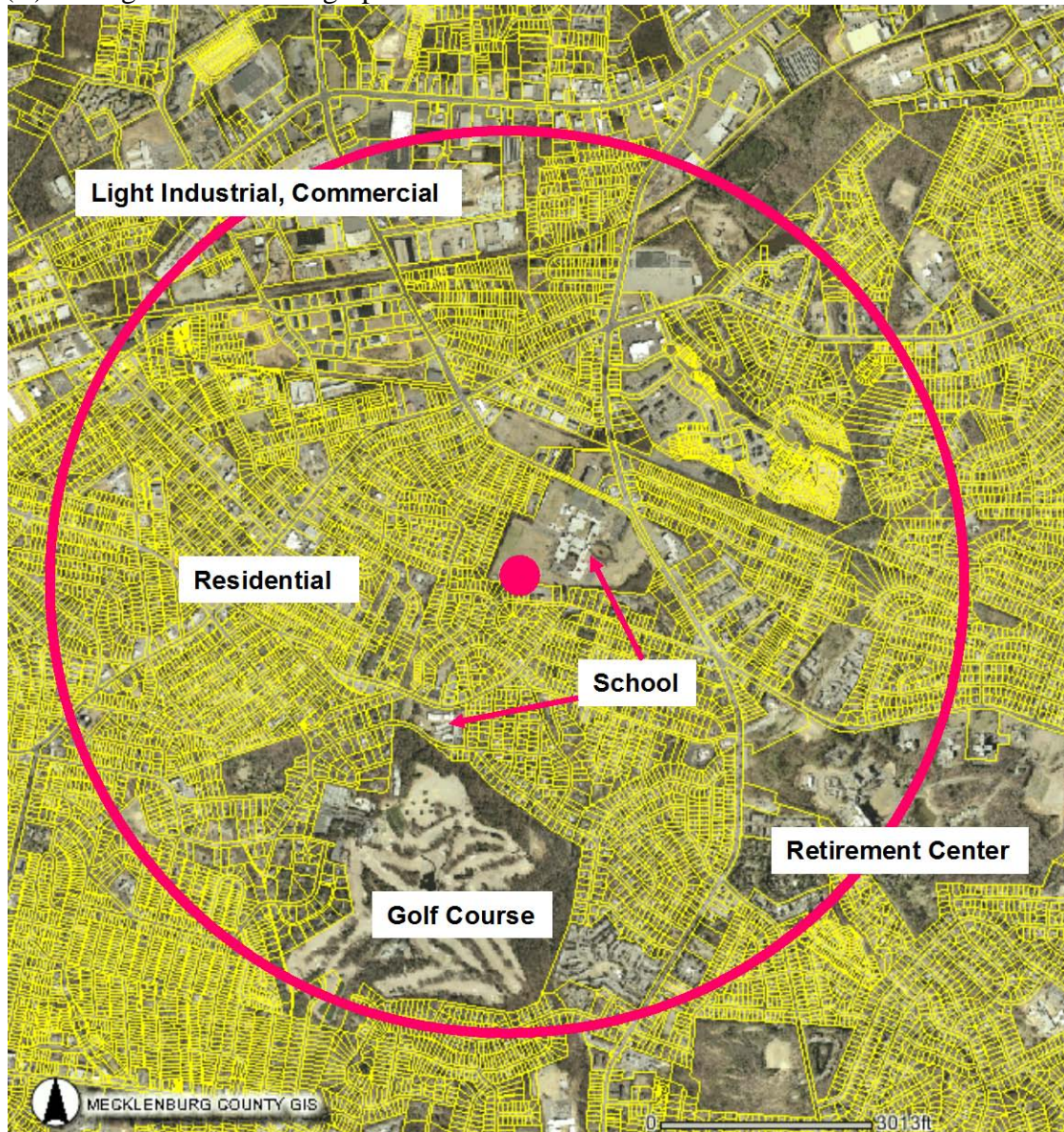


Figure 6. Garinger aerial photograph with 4 km diameter circle.

(D) Garinger Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

5. Montclair

(A) Montclair Site Table

Site Name:	Montclair			
AQS Site Identification Number:	37-119-0042			
Location:	1935 Emerywood Drive			
	Charlotte, NC 28210			
Latitude:	N35.151283°	Datum: WGS84		
Longitude:	W80.866983°			
Elevation:	209 meters			
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
PM _{2.5}	FRM	118	2	1 in 3 day
PM _{2.5}	FRM - Collocated	118	2	1 in 6 day
PM _{10-2.5}	FRM diff.	118	2	1 in 3 day
PM _{10-2.5}	FRM diff.- Collocated	118	2	1 in 6 day
PM _{2.5}	TEOM, Continuous	716, 717	2	Continuous
PM ₁₀	FRM- lo-vol	127	2	1 in 3 day
PM ₁₀	FRM- lo-vol - Collocated	127	2	1 in 6 day
Date Site Established:	PM _{2.5}	September 15, 2000		
Date Site Established:	PM _{2.5} Collocated	September 15, 2000		
Date Site Established:	PM _{2.5} TEOM	May 13, 2002		
Date Site Established:	PM ₁₀	July 1, 2008		
Date Site Established:	PM ₁₀ Collocated	July 1, 2008		
Date Monitor Established:	PM _{10-2.5} Coarse	July 1, 2008		
Date Monitor Established:	PM _{10-2.5} Coarse Collocated	July 1, 2008		
Nearest Road:	Emerywood Drive	Distance to Road:	70 meters	
Traffic Count:	3600	Year of Count:	2007	
MSA:	Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)	MSA #:	16740	
2011 Population (Census blocks within 1 mile of property)	Projected 2016 Population (Census Blocks within 1 mile of property)			
20807	22273			

Table 11.

(B) Montclair Site Description and Statement of Purpose

A federal reference method (FRM) PM_{2.5} sampler and a collocated FRM sampler have been located at 1935 Emerywood Drive since 09/15/2000. The distance between the official and collocated PM_{2.5} FRM samplers is 2.7 meters. A TEOM PM_{2.5} was established 5/13/02. These monitors are situated in a grassy area between the school and a ball field. The site is located 8.6 kilometers SW of the central business district at latitude N35.151283° and longitude W80.866983°. The site elevation is 209 meters above sea level. The nearest road is Emerywood Drive (ADT=3600, 2007) at a distance of 70 meters from the sample inlets. The PM_{2.5} inlets are 2 meters above the ground. The PM_{2.5} is a SLAMS. The PM_{2.5}-TEOM is designated as a SLAMS for AQI determination and forecasting purposes. PM₁₀ lo-vol samplers (official and collocated) were installed at this site on 7/1/2008. The distance between the official and collocated PM₁₀ sampler inlets is 1.4 meters. The PM₁₀ lo-vol samplers are used to determine PM_{10-2.5} (lc) and PM₁₀ (lc and stp).

The site complies with the siting requirements of 40CFR58 for criteria air pollutants. There are no proposed changes for this site. It is recommended that the current site status be maintained.

OBJECTIVE AND SPATIAL SCALE

The Montclair PM₁₀ and PM_{2.5} sites are classified as neighborhood scale and the monitoring objective is population exposure in an area of potentially poor air quality. Data is used to assess compliance with the particulate NAAQS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

(C) Montclair Aerial Photograph

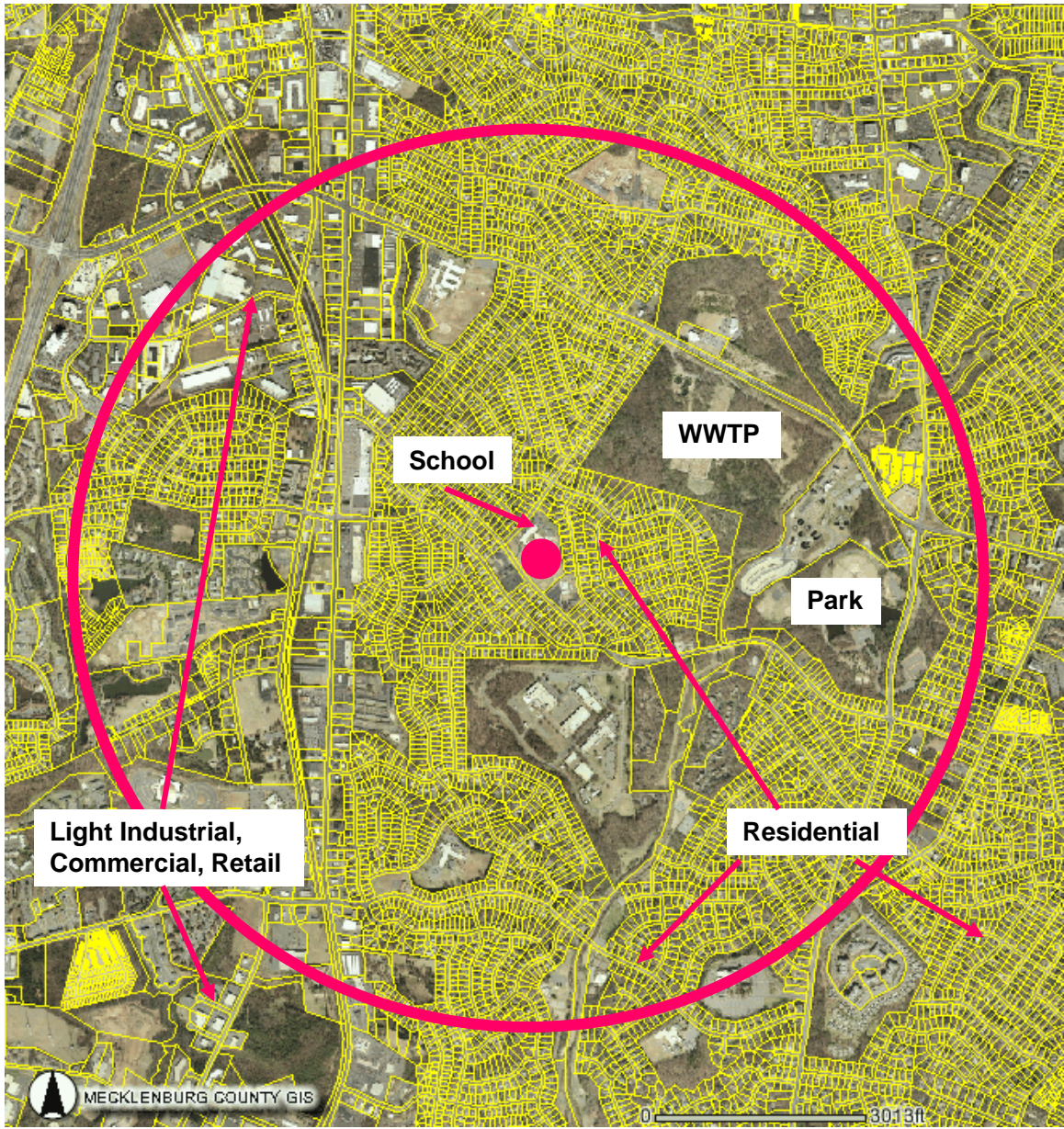


Figure 8. Montclair aerial photograph with 4 km diameter circle.

(D) Montclair Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

6. Remount

(A) Remount Site Table

Site Name: Remount				
AQS Site Identification Number: 37-119-0045				
Location: 1030 Remount Road				
Charlotte, NC 28208				
Latitude: N35.213171°		Datum: WGS84		
Longitude: W80.874084°				
Elevation: 194 meters				
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
NO ₂	FEM	200	5	Continuous
Date Site Established: NO ₂		June 1, 2014		
Nearest Road: I-77 South		Distance to Road:	31 meters	
Traffic Count: 153,000		Year of Count:	2011	
MSA: Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2013)			MSA #:	16740
2011 Population (Census blocks within 1 mile of property)		Projected 2016 Population (Census Blocks within 1 mile of property)		
14,474		16,788		

Table 12.

(B) Remount Site Description and Statement of Purpose

A federal equivalent method (FEM) NO₂ analyzer is located at the Remount monitoring site. The sampler has been in operation at 1030 Remount Road since 06/01/2014. The monitor is located in a field adjacent to the edge of Interstate 77 South (I-77S) at mile marker 8. The site is located 3.2 kilometers SW of the central business district at latitude N35.213171° and longitude W80.874084°. The site elevation is 194 meters above sea level. The nearest road is I-77S (AADT 153,000 (2011)) at a distance of 31 meters from the sample inlet. The NO₂ inlet is 5 meters above the ground.

The site complies with the siting requirements of 40CFR58 for criteria air pollutants. There are no proposed changes for this site. It is recommended that the current site status be maintained.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the Remount NO₂ site is to determine the highest concentrations expected to occur in the area covered by the network. The NO₂ site is classified as a microscale site. The Remount site is representative of nitrogen dioxide concentrations in the near-road environment. Data is used to assess compliance with the nitrogen dioxide NAAQS. The NO₂ monitor is a SLAMS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

BACKGROUND

On January 22, 2010, EPA strengthened the health-based National Ambient Air Quality Standard (NAAQS) for nitrogen dioxide (NO₂). EPA established a new 1-hour NO₂ standard at a level of 100 parts per billion (ppb). The form of the 1-hour standard is the 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

To determine compliance with the new standard, EPA established new ambient air monitoring and reporting requirements for NO₂. Generally, monitoring is required as follows:

- At least one monitor must be located near a major road in any urban area with a population greater than or equal to 500,000 people. A second monitor is required near another major road in areas with either:
 - 1) population greater than or equal to 2.5 million people, or
 - 2) one or more road segment with an annual average daily traffic (AADT) count greater than or equal to 250,000 vehicles.
- A minimum of one monitor must be placed in any urban area with a population greater than or equal to 1 million people to assess community-wide concentrations.
- Working with the states, EPA Regional Administrators will site at least 40 additional NO₂ monitors to help protect communities that are susceptible and vulnerable to NO₂ -related health effects.

The 2012 population estimate for the Core Based Statistical Area (CBSA) of Charlotte-Gastonia-Rock Hill, NC-SC MSA is 2,296,569. The 2011 maximum annual average daily traffic (AADT) count in the CBSA is 171,000. Based on this information, one (1) near-road NO₂ monitoring station is required in the CBSA (37-119-0045) and one (1) area-wide NO₂ monitoring station is required in the CBSA (37-119-0041).

(C) Remount Aerial Photograph and Map

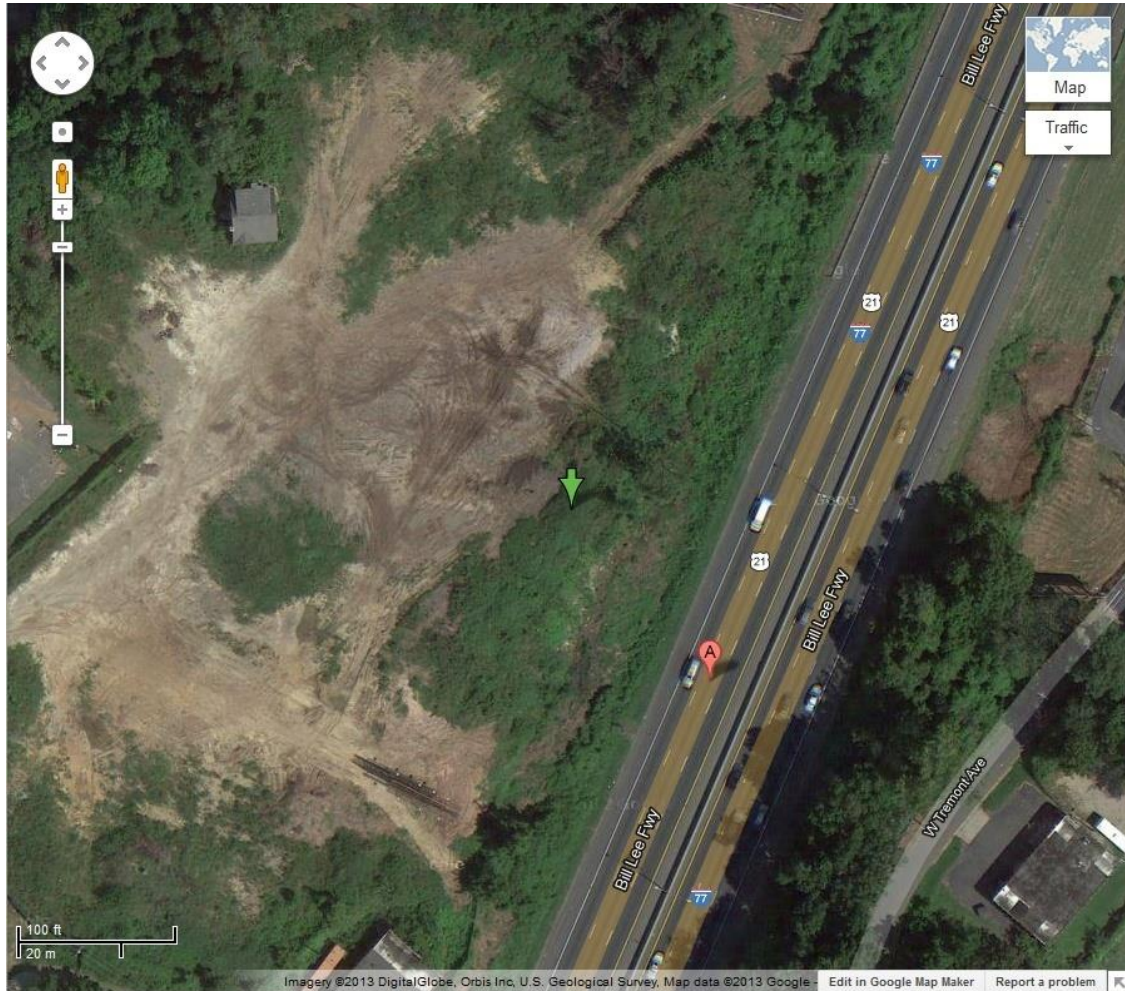


Figure 9. Aerial Photograph (green arrow denotes site location)

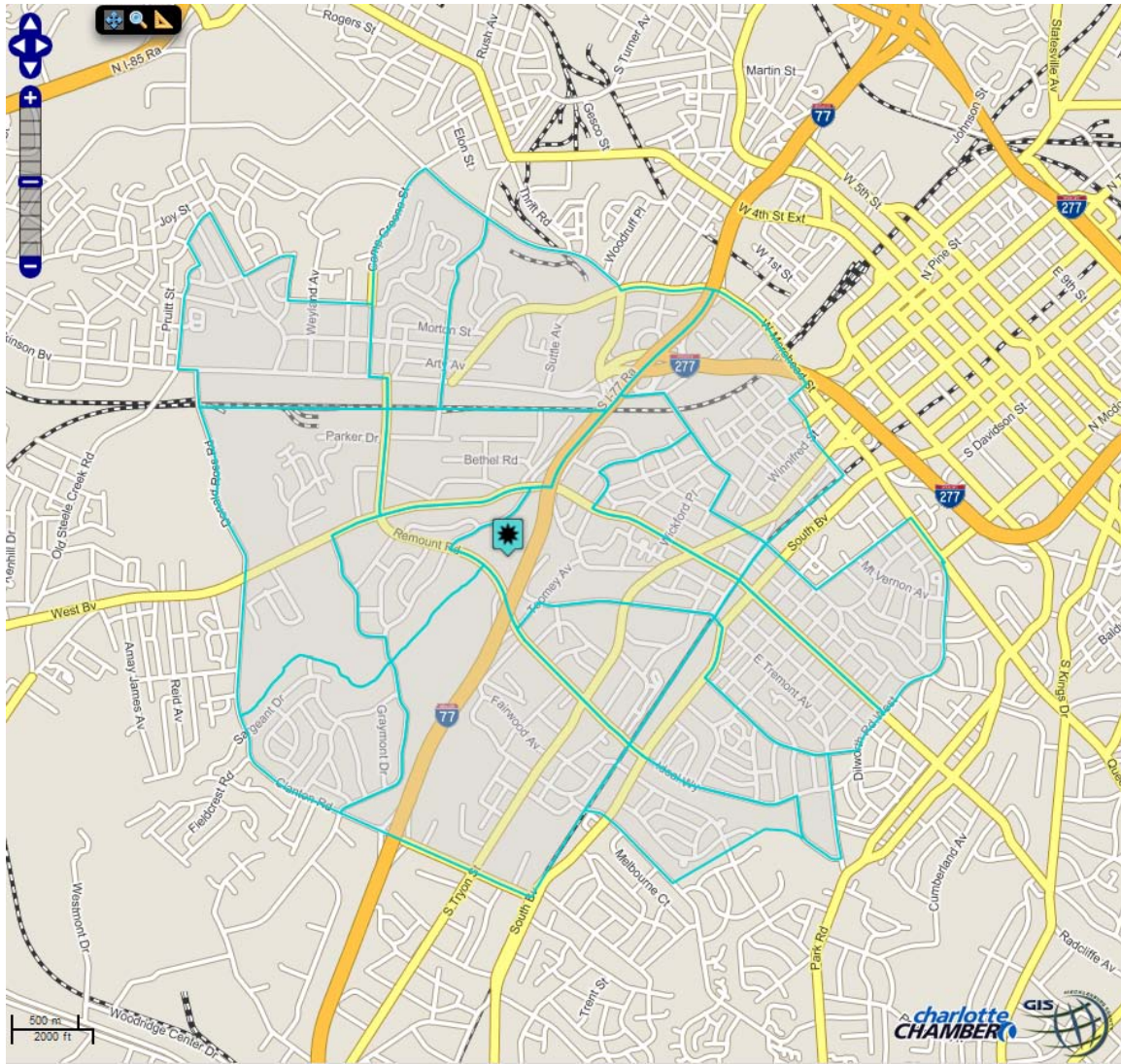


Figure 10. Census blocks within 1 mile.

(D) Remount Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

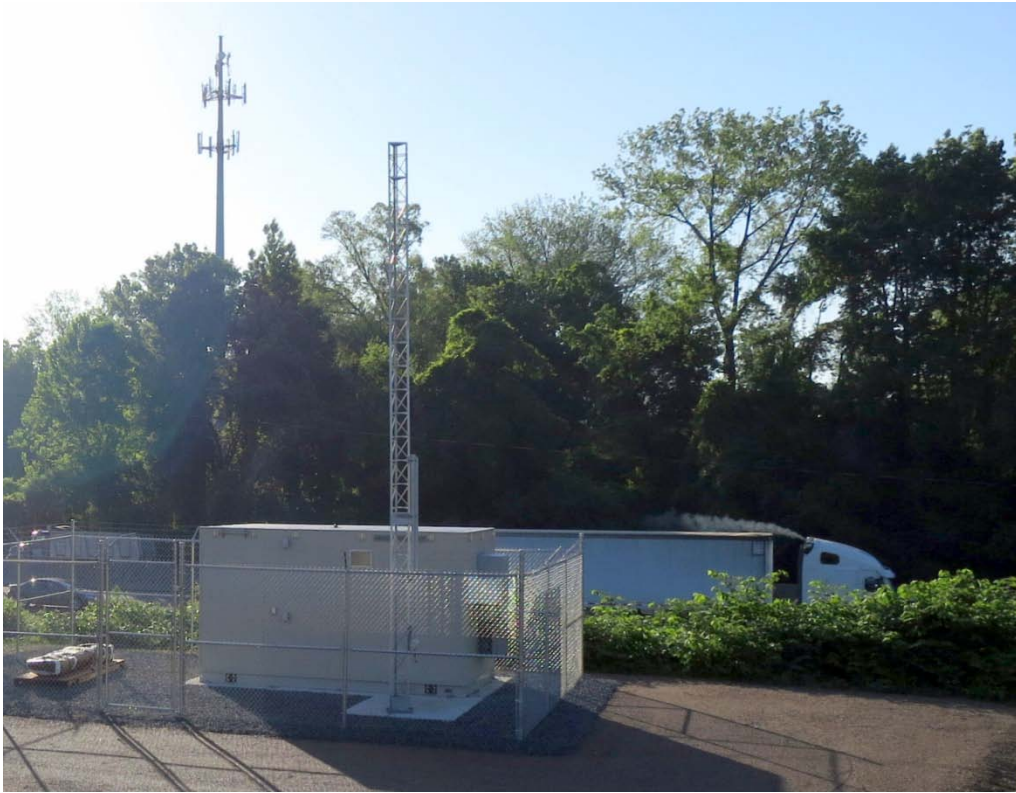


Figure 11. View of site toward roadway (I-77S).



Figure 12. View of site toward roadway (I-77) looking NE with uptown Charlotte over the horizon.

7. Oakdale

(A) Oakdale Site Table

Site Name: Oakdale				
AQS Site Identification Number: 37-119-0043				
Location: 513 Radio Road				
Charlotte, NC 28216				
Latitude: N35.304100°		Datum: WGS84		
Longitude: W80.888650°				
Elevation: 245 meters				
Parameter	Method	Method Number	Probe Height (m)	Sampling Schedule
PM2.5	FRM	118	2	1 in 3 day
Date Site Established: PM2.5 January 1, 2006				
Nearest Road: Radio Road		Distance to Road: 36 meters		
Traffic Count: < 1000		Year of Count: Estimated		
MSA: Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area (2012)				MSA #: 16740
2011 Population (Census blocks within 1 mile of property)		Projected 2016 Population (Census Blocks within 1 mile of property)		
16367		19405		

Table 13.

(B) Oakdale Site Description and Statement of Purpose

A federal reference method (FRM) PM_{2.5} sampler is located at the Oakdale monitoring site. The sampler has been in operation at 513 Radio Road since 01/01/2006. The monitor is located in a grass field at the entrance to the Sunset Hills Golf Course. The site is located 9.5 kilometers NW of the central business district at latitude N35.304100° and longitude W80.888650°. The site elevation is 245 meters above sea level. The nearest road is Radio Road (ADT estimated <1000) at a distance of 36 meters from the sample inlet. The PM_{2.5} inlet is 2 meters above the ground.

The sampling frequency for PM_{2.5} at this site is 1 in 3 day sampling. The sampling interval is 24 hours, from midnight to midnight every day.

The site complies with the siting requirements of 40CFR58 for criteria air pollutants. There are no proposed changes for this site. It is recommended that the current site status be maintained.

OBJECTIVE AND SPATIAL SCALE

The monitoring objective of the Oakdale PM_{2.5} site is population exposure and maximum concentration. The PM_{2.5} site is classified as a neighborhood scale. The Oakdale sampling site is representative of particulate concentrations in a residential area downwind of industrial and commercial emission sources west of the Charlotte central business district. Data is used to assess compliance with the particulate NAAQS. The PM_{2.5} monitor is a SLAMS.

The site is located in the Charlotte-Gastonia-Concord, NC-SC Metropolitan Statistical Area. The principal cities and counties in the MSA are Charlotte, NC; Gastonia, NC; Concord, NC; Rock Hill, SC and Cabarrus County, NC; Gaston County, NC; Iredell County, NC; Lincoln County, NC; Mecklenburg County, NC; Rowan County, NC; Union County, NC; Chester County, SC; Lancaster County, SC; and York County, SC.

(C) Oakdale Aerial Photograph

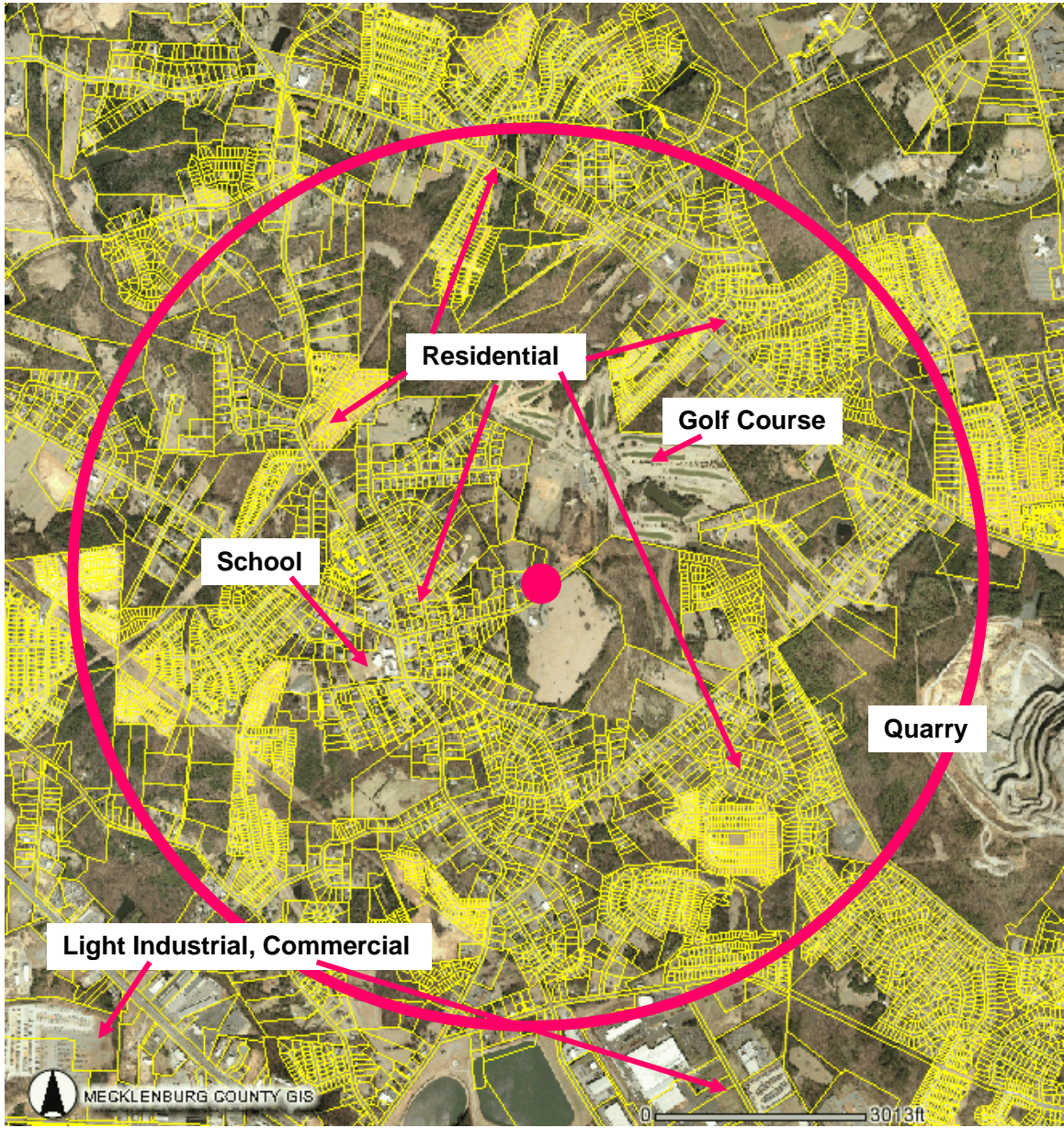


Figure 13. Oakdale aerial photograph with 4 km diameter circle.

(D) Oakdale Site Photographs



NORTH



NORTHEAST



EAST



SOUTHEAST



SOUTH



SOUTHWEST



WEST



NORTHWEST

V. REFERENCES

1. Title 40 Code of Federal Regulations Part 58, Ambient Air Quality Surveillance. Part 58 and Part 58 Amended: Federal Register/Vol. 71 No. 200/Tuesday, October 17, 2006/Rules and Regulations. May 28, 2014.
2. Watson, John G., Chow, Judith C., DuBois, David, Green, Mark, Frank, Neil, Pitchford, Marc. Guidance for Network Design and Optimum Site Exposure for PM2.5 and PM10. Office of Air Quality Planning and Standards, U. S. Environmental Protection Agency, Research Triangle Park, NC 27711. December 15, 1997.
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6. Weinstock, Lewis. Documenting NCore Stations in 2010 Annual Monitoring Plans. E-mail memorandum from EPA, OAQPS, Air Quality Assessment Division, Ambient Air Monitoring Group. April 15, 2009.
7. U.S. EPA, Office of Air Quality Planning and Standards. Quality Assurance Handbook for Air Pollution Measurement Systems Volume IV: Meteorological Measurements (Draft). EPA-454/D-06-001. Research Triangle Park, NC, October 2006.
8. Charlotte-Mecklenburg Site One Economic Development GIS. <http://maps.co.mecklenburg.nc.us/edgis/> , Reports from website – 2013.

VI. APPENDIX A

Monitoring Equipment Replacement Tables

Equipment Evaluation Report

05/23/2013

Number	Location	Equipment	Manufacturer/Model	Parameter	Sampler SN	Condition	Date of Purchase	5-Year Replace Target Date	Scheduled Replace Date
3	3115	Datalogger	ESC 8832		A0409	Good	10/03	10/08	2016
4	3115	Ozone Analyzer - 49c	Therm Environmental	44201-1	432209351	Good	09/04	08/09	NA
5	3115	Ozone Analyzer PS	Therm Environmental		432209352	Good	09/04	08/09	2016
6	3115	Ozone Analyzer PS	TAPI 401X		374	Good	02/05	01/10	2015
7	3115	Ozone Analyzer Thermo	Therm Environmental		49i-PS-0734726810	Good	08/07	08/12	2016
8	Lab	PM2.5 FRM	R&P/2025	88101-1	2025A204679807	Poor	10/98	09/03	NA-spare
9	3115	Voltage Calibrator	Transcat		9733019	Good	08/07	08/12	NA
10	3115	Zero Air System	TAPI 701		1757	Good	03/05	02/10	2016
11	3128	Datalogger	ESC 8832		A0304	Good	03/03	03/08	2017
12	37-119-0003	PM-10	GMW-1200	81102-1	54176	Good	1991		NA
13	37-119-0003	PM-10	GMW-1200	81102-2	54174	Good	1991		NA
15	37-119-0042	PM2.5 FRM, Coll	R&P/2025	88101-2	2025A202869805	Poor	10/98	09/03	2014
16	37-119-0041	CO	Therm Environmental		48C-327402211	Good	10/03	10/08	NA
18	37-119-0041	Datalogger	ESC 8816		3656	Good	10/00	09/05	NA
20	37-119-0041	Outdoor Enclosure PM2.5	EKTO		3278-7	Good	11/01	10/06	NA
22	37-119-0041	NOx	Therm Environmental	42602-1	42C-70033-364	Good	11/01	10/06	2015
23	37-119-0041	TEOM	R & P	88501-3	140ab244570302	Good	11/01	10/06	2016
24	37-119-0042	Datalogger	ESC 8832		A0064	Good	03/02	03/07	2016

Number	Location	Equipment	Manufacturer/Model	Parameter	Sampler SN	Condition	Date of Purchase	5-Year Replace Target Date	Scheduled Replace Date
26	37-119-0041	Ozone Analyzer Thermo	Therm Environmental		49i-0728225131	Good	07/07	07/12	2016
27	3115	Multi-gas Calibrator	Enviroics 6103		3170	Good	10/03	09/08	2015
28	37-119-0042	PMc, PM10 off	R&P/2025	81102-1, 86502-1, 85101-1	2025B217200408	Good	10/04	10/09	2014
29	37-119-0042	Outdoor Enclosure PM2.5	EKTO		3275-7	Good	11/04	10/09	2016
31	37-119-0042	TEOM	R & P	88501-3	140ab252890408	Good	11/04	10/09	2016
32	37-119-0041	Datalogger	ESC 8832		A0896	Good	01/05	12/09	2017
33	37-119-0041	CO trace	Teledyne - API	42101-3	300EU-0068	Good	03/05	02/10	NA
36	37-119-0041	Thermo 146i Calibrator	Therm Environmental		717821846	Good	12/06	12/11	2015
37	Love	Computer	Optiplex 790		3J9D5V1	Good	07/07	06/12	2015
38	37-119-0042	PMc,PM10 Coll	R&P/2025	81102-2, 86502-2, 85101-2	2025B221720804	Good	07/07	07/12	2017
39	37-119-0041	BAM 1020	MetOne	88501-4	H1935	Good	03/08	02/13	2017
40	37-119-0041	Multi-gas Calibrator	Enviroics 6100		4202	Good	04/08	03/13	2016
41	37-119-0041	PMc, PM10	R&P/2025	81102-1, 86502-1, 85101-1	2025B219590706	Good	05/08	05/13	2017
42	37-119-0041	Zero Air System	TAPI M701H		2809	Good	09/08	08/13	2017
43	37-119-0041	Computer	Optiplex 755		JSVBGH1	Good	09/08	08/13	2014

Number	Location	Equipment	Manufacturer/Model	Parameter	Sampler SN	Condition	Date of Purchase	5-Year Replace Target Date	Scheduled Replace Date
45	37-119-1005	Computer	GX620		7G9JG81	Poor	09/05	08/10	2015
46	37-119-1005	Datalogger	ESC 8832		A2333K	Good	07/07	07/12	2017
47	37-119-1005	Ozone Analyzer	Therm Environmental	44201-1	49i-0636319877	Good	12/06	12/11	2015
48	37-119-1005	Ozone Analyzer PS	Therm Environmental		49CPS-73996-375	Good	02/02	02/07	2014
50	37-119-1005	Shelter	EKTO		2958-1	Good	03/97	02/02	2014
51	37-119-1005	Zero Air System	TAPI 701H		3033	Good	09/08	09/13	2017
52	37-119-1009	Computer	Dell 330		9M9X1C1	Good	11/08	10/13	2015
53	37-119-1009	Datalogger	ESC 8832		A0160	Good	10/02	10/07	2017
54	37-119-1009	Ozone Analyzer	Therm Environmental	44201-1	49i-0636319876	Good	09/05	08/10	2015
55	37-119-1009	Ozone Analyzer PS	Therm Environmental		49CPS-73997-375	Good	02/02	02/07	2014
56	37-119-1009	Shelter	EKTO		2475-3	Poor	12/91	11/96	2014
57	37-119-1009	Zero Air System	TAPI 701H		3035	Good	09/08	09/13	2017
58	Central	Central Computer	Dell Optiplex 755		2TVBGH1	Good	09/08	08/13	2015
59	Claire	Central Computer	Dell Optiplex 755		GSVBGH1	Good	11/08	10/13	2015
60	Digitrend	Central Computer	Dell Optiplex 755		HSVBGH1	Good	09/08	08/13	2015
61	Francis	Computer	Optiplex 760		39KHKK1	Good	07/09	06/14	2016
62	Visibility Cam	Laptop Computer	Dell D630		B62GFD1	Good	08/07	07/12	2015
63	Hollenbeck	Computer	Optiplex 760		49KHKK1	Good	07/09	06/14	2015
64	Montclair	Laptop Computer	Dell E5420		BBPT5R1	Good	03/12	08/17	2017
66	Grass	Laptop Computer	Dell D620		DQG8XH1	Good	03/07	02/12	2014
67	Lab	Air Compressor	Junair		546919	Good	04/04	03/09	2016
68	Lab	Central Software	AirVision		2.4.161	Good	11/10	06/15	2016
69	Lab	Filter Weighing Balance			20902085	Good	1992	06/10	2015
74	37-119-0041	Speciation	URG 3000n		3N-B0428	Good	02/2009	02/14	2016

Number	Location	Equipment	Manufacturer/Model	Parameter	Sampler SN	Condition	Date of Purchase	5-Year Replace Target Date	Scheduled Replace Date
75	37-119-0041	Meteorological Equipment			Various	NA	Various	NA	NA
79	3106	Computer	Optiplex 790		1B0XJQ1	Good	01/11	06/16	2017
80	3106	Laptop Computer	Dell D630		J019GH1	Good	09/08	08/13	2014
81	37-119-0042	PM2.5 FRM	R&P/2025	88101-1	2025A202879805	Poor	10/98	09/03	2014
82	37-119-0043	PM2.5 FRM	Thermo 2025	88101	2025B217230804	Good	10/04	10/09	2015
83	Air Lab	PM2.5 FRM	Thermo 2025	88101	2025B226221002	Good	03/10	02/15	2017
85	Lab	Flow Measurement Device	BGI Tetra Cal		000441	Good	01/08	01/13	2016
86	Lab	Flow Measurement Device	BGI Tetra Cal		000345	Good	08/07	07/12	2016
87	Lab	Flow Measurement Device	BGI Tetra Cal		000365	Good	02/09	01/14	2016
88	Lab	Flow Measurement Device	BGI Delta Cal		000078	Good	05/01	04/06	2016
89	Lab	Flow Measurement Device	BGI Delta Cal		000036	Good	01/01	12/05	2016
90	Lab	Temperature Calibrator	Hart Scientific		7102-A32653	Good	02/03	01/08	NA
91	Lab	Pressure Calibrator	Druck DPI-740		7401000	Good	02/01	01/06	2016
92	Lab	Pressure Calibrator	Druck DPI-740		74001098	Good	06/01	05/06	2017
93	Lab	Pressure Calibrator	Druck DPI-740		74001908	Good	08/04	07/09	2018
94	Lab	Zero Air System	TAPI M701H		98	Good	10/11	10/16	2018
95	37-119-0041	Equipment Shelter 11.5'X20'	ShelterOne		20053-01	Good	12/11	12/26	2027
96	37-119-0041	NOy Analyzer	Thermoenvironmental	NOy	1213152833	Good	05/12	05/17	05/17
97	37-119-0041	SO2 Analyzer	Thermoenvironmental	SO2	1213152834	Good	05/12	05/17	05/17
98	37-119-0041	SuperSASS	MetOne	STN	N1099	Good	03/12	05/17	05/17
201	Lab	48i-TLE CO Analyzer	Thermoenvironmental	CO	1220753779	Good	06/12	06/17	06/17
202	Lab	2025i	Thermoenvironmental	PM2.5	2025i202341205	Good	06/12	06/17	06/17
203	37-119-0045	Datalogger	ESC 8832		4829	Good	3/2014	2019	2019
204	37-119-0045	T200UP	Teledyne-API	NO2	81	Good	8/2012	2017	2017
205	37-119-0045	T700U	Teledyne-API	Calibrator	182	Good	10/2012	2017	2017
206	37-119-0045	M701H	Teledyne-API	Zero Air	793	Good	10/2012	2017	2017
207	37-119-0045	Equipment Shelter 10 X 16	Shelter One	Near-road	23053-01	Good	4/2013	2033	2033