Limited Maintenance Plan (LMP) for the Charlotte-Gastonia-Rock Hill Maintenance Area for the 1997 8-Hour Ozone National Ambient Air Quality Standard (NAAQS)

Prepared by

North Carolina Department of Environmental Quality

Division of Air Quality

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Preface: This document contains the Limited Maintenance Plan (LMP) for the North Carolina portion of the Charlotte-Gastonia-Rock Hill North Carolina-South Carolina maintenance area for the 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS). The LMP covers the last 10-years of the 20-year maintenance period for the North Carolina portion of the Charlotte-Gastonia-Rock Hill maintenance area, running from January 3, 2024 through January 2, 2034.

EXECUTIVE SUMMARY

The 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS) was set at 0.08 parts per million (ppm). A violation of this NAAQS is determined based on the "design value" (DV) of the monitors in a given area. The DV is calculated from the annual fourth highest daily maximum 8-hour ozone values over a consecutive three-year period. A violation occurs when the average of these annual fourth highest daily maximum 8-hour ozone values is greater than or equal to 0.085 ppm. For areas with more than one ozone monitor, the DV for the area is based on the monitor with the highest DV.

The U. S. Environmental Protection Agency (EPA) designated the Charlotte-Gastonia-Rock Hill area nonattainment for the 1997 8-hour ozone NAAQS on April 30, 2004.[1] This nonattainment area includes the North Carolina counties of Cabarrus, Gaston, Lincoln, Mecklenburg, Rowan and Union; Coddle Creek and Davidson Townships in Iredell County, North Carolina; and the Rock Hill Metropolitan Planning Organization boundary in York County, South Carolina. In keeping with past practice and for brevity, the North Carolina portion of the Charlotte-Gastonia-Rock Hill maintenance area is referred to as the "Metrolina" area throughout this document. In accordance with Clean Air Act (CAA) Section 175A, the North Carolina Division of Air Quality (DAQ) submitted a redesignation demonstration and maintenance plan for the Metrolina area.[2] The DAQ submitted the redesignation request and maintenance plan on November 2, 2011, and on March 28, 2013 submitted a supplemented request/plan. In December 2013, EPA approved the redesignation demonstration and maintenance plan and redesignated the area to attainment for the 1997 8-hour ozone NAAQS. The EPA's approval of the DAQ's March 2013 demonstration request/plan included a January 2, 2014 effective date, resulting in the approved maintenance plan covering the period January 2, 2014 through January 2, 2024.[3]

Under CAA section 175A(b), states must submit a revision to the first maintenance plan eight years after redesignation to provide for maintenance of the NAAQS for ten additional years following the end of the first 10-year period. The EPA's final implementation rule for the 2008 8-hour ozone NAAQS revoked the 1997 8-hour ozone NAAQS for areas that EPA designated or redesignated as attainment of the 1997 8-hour ozone NAAQS because the 2008 standard of 0.075 ppm was more stringent than the 1997 standard. Once an area qualified for revocation of the

[1] "Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates," Final Rule, 69 FR 23858, April 30, 2004.
[2] The South Carolina Department of Health and Environmental Control is responsible for developing the maintenance plan for the South Carolina portion of the Charlotte-Gastonia-Rock Hill maintenance area.
[3] "Approval and Promulgation of Implementation Plans and Designation of Areas for Air Quality Planning Purposes; North Carolina; Redesignation of the Charlotte; 1997 8-Hour Ozone Moderate Nonattainment Area to Attainment," Final Rule, 78 FR 72036, December 2, 2013.

1997 standard, the area was no longer required to submit a second 10-year maintenance plan under CAA section 175A(b).

In South Coast Air Quality Management District versus EPA (the "South Coast decision"), the D.C. Circuit vacated EPA's interpretation that the second maintenance plans were not required for "orphan maintenance areas," (i.e., areas that had been redesignated to attainment for the 1997 NAAQS (maintenance areas) and also designated attainment for the 2008 ozone NAAQS).[4] Thus, states with these "orphan maintenance areas" under the 1997 8-hour ozone NAAQS must submit maintenance plans for the second maintenance period. The Metrolina maintenance area was affected by the South Coast decision because it was originally a nonattainment area under the 1997 ozone NAAQS and specific townships within the Metrolina maintenance area were subsequently designated attainment for the 2008 ozone NAAQS.

A limited maintenance plan (LMP) is a key compliance option that EPA provides states with maintenance areas that have air quality values well below a given NAAQS. In past guidance documents describing LMPs, EPA has interpreted CAA Section 175A to indicate that an area can provide for maintenance of the NAAQS if it meets certain air quality-related criteria. Specifically, the key criteria outlined in these documents are that the current air quality levels for ambient monitoring sites in the area are below 85% of the standard, and that air quality levels had not been highly variable during preceding years. The EPA guidance went on to state that the continued applicability of prevention of significant deterioration requirements, and control measures already contained in the State Implementation Plan (SIP) and federal measures, such as the Federal Motor Vehicle Control Program, should provide adequate assurance of maintenance for such areas.

There are currently 5 ozone monitors located in the North Carolina portion of the Metrolina maintenance area and one monitor located in the South Carolina portion of the maintenance area (and an additional monitor in South Carolina just west of the area). The DV for each of these monitors is below the 85% LMP applicability threshold for the 1997 8-hour ozone NAAQS. Furthermore, in keeping with EPA LMP guidance, air quality levels have not been highly variable during preceding years in the maintenance area.

The DAQ prepared this LMP for the North Carolina portion of the Charlotte-Gastonia-Rock Hill 1997 8-hour ozone NAAQS maintenance area consistent with EPA guidance. This LMP covers the remainder of the 20-year maintenance period for the 1997 8-hour ozone NAAQS in the Metrolina area, which runs from January 3, 2024 through January 2, 2034. This LMP will

[4] South Coast, 882 F.3d 1138 (D.C. Cir. 2018).

continue to remain in effect at the end of the 20-year maintenance period. However, the DAQ may revise its SIP, including this LMP, during and after the 20-year period, subject to a CAA Section 110(l) demonstration.

This LMP sets forth air quality and emissions data that demonstrates that the affected areas will continue to maintain the NAAQS. The LMP includes a contingency plan to promptly address the unlikely occurrence of events that may increase ozone levels that may jeopardize continued attainment of the ozone NAAQS. The DAQ believes that the information presented in this LMP fulfills the requirements of CAA Section 175A(b) with respect to the second maintenance plan period and requests that EPA approve this LMP for the North Carolina portion of the Metrolina maintenance area for the 1997 8-hour ozone NAAQS.

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Acronym	Definition
ARRA	American Recovery and Reinvestment Act
CAA	Clean Air Act
CAIR	Clean Air Interstate Rule
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CSAPR	Cross State Air Pollution Rule
DAQ	North Carolina Division of Air Quality
DERA	Diesel Emissions Reduction Act
DV	Design Value
EGU(s)	Electricity Generating Unit(s)
EMT	Environmental Mitigation Trust
EPA	Environmental Protection Agency
FR	Federal Register
GHG	Greenhouse Gas
I&M	Inspection and Maintenance
LMP	Limited Maintenance Plan
MCAQ	Mecklenburg County Air Quality
MOA	Memorandum of Agreement
MVEBs	Motor Vehicle Emissions Budgets
NAAQS	National Ambient Air Quality Standard
NBP	NO_x Budget Trading Program
NCAC	North Carolina Administrative Code
NEI	National Emissions Inventory
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standard
PM	Particulate Matter
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers
ppb	Parts per billion
ppm	Parts per million
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RICE	Reciprocating Internal Combustion Engines
SCDHEC	South Carolina Department of Health and Environmental Control
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SUVs	Sport Utility Vehicles
VOC(s)	Volatile Organic Compound(s)
VW	Volkswagen

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1.0 INTRODUCTION

1.1 WHAT IS TROPOSPHERIC OZONE?

Ozone, a strong chemical oxidant, adversely impacts human health through effects on respiratory function and can also damage forests and crops. Ozone is not emitted directly emitted by man-made (anthropogenic) sources, however, it is formed in the lower atmosphere (troposphere) by a complex series of chemical reactions involving nitrogen oxides (NO_x) and reactive volatile organic compounds (VOCs). Anthropogenic NO_x is primarily emitted as a byproduct of combustion processes for the mobile, electric utility, and industrial/commercial source sectors. Likewise, anthropogenic VOCs are largely associated with the evaporation of solvents (e.g., toluene, xylene and hexane) from industrial, commercial and consumer sources, as well as the various hydrocarbons that are evaporated from the gasoline used by motor vehicles and other types of equipment, or are emitted following combustion.

Ozone formation is promoted by strong sunlight, warm temperatures, and light winds. High concentrations tend to be a problem in the eastern United States during the months when these conditions frequently occur. Therefore, the U. S. Environmental Protection Agency (EPA) mandates seasonal monitoring of ambient ozone concentrations in North Carolina from March 1 through October 31.[5] The North Carolina Division of Air Quality (DAQ) has examined both the man-made and natural sources of VOC emissions and their contribution to ozone formation in North Carolina. Because of the generally warm and moist climate of North Carolina, vegetation abounds in many forms, and forested lands naturally cover much of the state. As a result, the biogenic sector is the most abundant source of VOC in North Carolina and accounts for 77% of the total VOC emissions statewide.[6] The abundance of biogenic VOC makes the majority of North Carolina a NO_x-limited environment for the formation of ozone. This is supported by a study published in the *Journal of Environmental Management* that concludes that the sensitivity of ozone to anthropogenic VOC emissions in the Southeastern United States is 2-3 orders of magnitude smaller than the sensitivity of ozone to NO_x emissions, primarily due to the abundance of biogenic VOC emissions in this region.[7] As a result, controlling anthropogenic VOC emissions in the Southeast is far less effective than controlling NO_x emissions for purposes of reducing ozone levels.

[5] 40 CFR 58 App. D, 2.5.
[6] Data reported in U.S. EPA's 2016 emissions modeling platform (see "Air Emissions Modeling, 2016v1 Platform," available from: https://www.epa.gov/air-emissions-modeling/2016v1-platform,) accessed April 2020.
[7] Odman, M Talat et al., "Quantifying the sources of ozone, fine particulate matter, and regional haze in the Southeastern United States," 90 *Journal of Environmental Management* 3155-3168 (2009).

1.2 OZONE NATIONAL AMBIENT AIR QUALITY STANDARD HISTORY

The 1997 8-hour ozone National Ambient Air Quality Standard (NAAQS) was set at 0.08 parts per million (ppm).[8] An exceedance of the 1997 8-hour ozone NAAQS occurs when a monitor measures ozone at or above 0.085 ppm on average for an 8-hour period (0.084 ppm is considered to be in compliance with the 1997 ozone standard to three decimal places). A violation of this NAAQS occurs when the annual fourth highest daily maximum 8-hour ozone values, averaged over three consecutive years, is greater than or equal to 0.085 ppm. This three-year average is termed the "design value" (DV) for the monitor. For areas with more than one ozone monitor, the DV for the area is based on the monitor with the highest DV. On March 12, 2008, EPA revised the ozone NAAQS to a level of 0.075 ppm.[9] The EPA's final implementation rule for the 2008 ozone NAAQS revoked the 1997 ozone NAAQS.[10]

1.3 MAINTENANCE PLANS

The Clean Air Act (CAA) requires areas that EPA has redesignated from nonattainment to attainment for a NAAQS to develop plans demonstrating continued NAAQS attainment and strategies for addressing potential future NAAQS violations. The EPA requires that these maintenance plans be developed to cover a 20-year period, with the initial plan developed to cover the first ten years, and then a subsequent plan developed to cover the next ten years. The EPA's 2008 ozone NAAQS final implementation rule stated that one consequence of revocation of the 1997 ozone NAAQS was that areas that had been redesignated to attainment (i.e., maintenance areas) for the 1997 standard no longer needed to submit a second 10-year maintenance plan under CAA Section 175A(b).

In South Coast Air Quality Management District versus EPA (the "South Coast decision"), the D.C. Circuit vacated EPA's interpretation that the second maintenance plans were not required for "orphan maintenance areas," i.e., areas that had been redesignated to attainment for the 1997 NAAQS (maintenance areas) and also designated attainment for the 2008 ozone NAAQS.[11] Thus, states with these "orphan maintenance areas" under the 1997 8-hour ozone NAAQS must submit maintenance plans for the second maintenance period. The Metrolina maintenance area was affected by the South Coast decision as it was originally a nonattainment area under the

[8] 62 FR 38856, July 18, 1997.
[9] The EPA also designated the Charlotte, North Carolina-Rock Hill, South Carolina area marginal nonattainment for the 2008 ozone NAAQS (80 FR 44873). The EPA redesignated this area as attainment for the 2008 standard after approving North Carolina's redesignation demonstration and maintenance plan. North Carolina's second maintenance plan for the 2008 ozone standard is due to EPA in January 2023.
[10] 80 FR 12264, March 6, 2015.
[11] South Coast, 882 F.3d 1138 (D.C. Cir. 2018).

1997 ozone NAAQS, and portions of the area were designated attainment for the 2008 ozone NAAQS. The purpose of this document is to serve as the second maintenance plan for the Metrolina 1997 8-hour ozone orphan maintenance area in North Carolina. The South Carolina Department of Health and Environmental Control (SCDHEC) has developed a maintenance plan for the South Carolina portion of the nonattainment area, which is available upon request.

As displayed via the non-hatched blue shaded areas in Figure 1.1, the 1997 8-hour ozone NAAQS orphan maintenance area encompasses the following Townships that were not designated nonattainment for the 2008 ozone NAAQS:

- Cabarrus county – Gold Hill;
- Gaston county – Cherryville;
- Lincoln county – Howards Creek and North Brook;
- Rowan county – Cleveland, Morgan, Mount Ulla, and Scotch Irish; and
- Union county – Buford, Jackson, Lanes Creek, and New Salem.

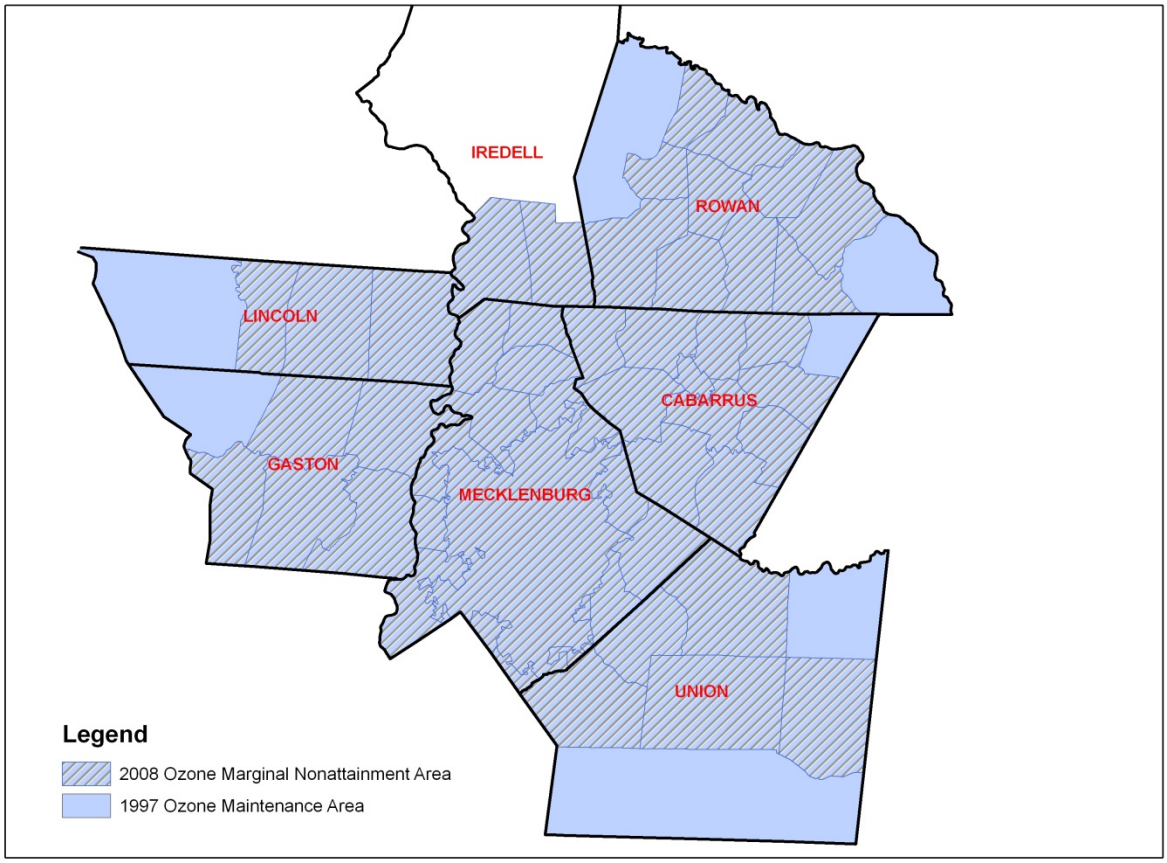

Figure 1.1 North Carolina Portion of 1997 and 2008 Ozone NAAQS Nonattainment/Maintenance Area

A limited maintenance plan (LMP) is a key maintenance plan compliance option that EPA provides for maintenance areas with air quality values well below a given NAAQS. In guidance documents describing LMPs, EPA has interpreted section 175A to indicate that an area can provide for maintenance of the NAAQS if it meets certain air quality-related criteria. These criteria are that the current air quality levels for monitoring sites in the area are below 85% of the level of the standard, and that air quality levels were not highly variable during preceding years.

Table 1.1 summarizes key maintenance plan dates associated with the North Carolina portion of the Metrolina 1997 8-hour ozone NAAQS maintenance area that is the subject of this LMP. The first maintenance period covers 10 years starting with the effective date of EPA's final approval of the redesignation demonstration and maintenance plan, while the second maintenance period covers the 10 years following the end of the first maintenance period.

Table 1.1 Key Dates for Metrolina Area Maintenance Plan for 1997 8-Hour Ozone NAAQS

Effective Date of First Maintenance Plan	Period Covered by First Maintenance Plan	Period Covered by this Second Maintenance Plan
January 2, 2014	January 2, 2014 through January 2, 2024	January 3, 2024 through January 2, 2034

The following provides the reference to EPA's final approval of the original maintenance plan for the North Carolina portion of the Metrolina 1997 8-hour ozone maintenance area:

- Final Rule: Approval and Promulgation of Implementation Plans and Designation of Areas; North Carolina; Redesignation of the Charlotte Gastonia-Rock Hill, 1997 8-Hour Ozone Moderate Nonattainment Area to Attainment (78 FR 72036, December 2, 2013). The effective date of this plan is January 2, 2014.

The remainder of this document addresses the key elements of a LMP. These elements include air quality data that meet EPA's criteria for use of the LMP option, an attainment emissions inventory, foundation control program, a commitment to continue monitoring in the ozone maintenance area, and a contingency plan.

2.0 AIR QUALITY

2.1 BACKGROUND

The EPA released guidance to assist states in developing plans for maintenance of the 1997 ozone NAAQS.[12] The guidance includes information specific to LMPs, and identifies the following criteria for use of the LMP option:

- *Current air quality levels significantly below the level of the standard*: "the EPA believes that an air quality DV below 85% of the level of the standard (i.e., a DV of 0.071 ppm as compared to a level of 0.084 ppm, which is considered to be in compliance with the 1997 ozone standard to three decimal places) could be considered significantly below the standard and may be a good indicator that air quality is not likely to deteriorate to a level that would violate the NAAQS over the next 10 year period."

- *Stable or improving air quality trend*: "Several kinds of analyses can be performed to assess whether an area has had relatively stable or consistently improving air quality levels over the long term such that the probability of the area violating the standard in the future would be considered low. One basic approach would be to take the most recent DV for the area and add the maximum DV increase (over one or more consecutive years) that has been observed in the area over the past several years. A sum that does not exceed the level of the 1997 ozone standard may be a good indicator of expected continued attainment. This type of metric should be considered on a case-by-case basis."

2.2 HISTORIC AIR QUALITY DATA (2001 – 2019)

The DAQ and Mecklenburg County Air Quality (MCAQ) have collected ambient monitoring data for the Metrolina area since the late seventies. At the time of the 1997 8-hour ozone designations, there were seven ozone monitors throughout the Metrolina area and one monitor located in York County, South Carolina just outside of the area. The DAQ operated four of the monitors in the Metrolina area, MCAQ operated three of the monitors (all in Mecklenburg County), and the SCDHEC operated the York County monitor.

[12] "Resource Document for 1997 Ozone NAAQS Areas: Supporting Information for States Developing Maintenance Plans," U.S. EPA, November 20, 2018, available from https://www.epa.gov/sites/production/files/2018-11/documents/ozone_1997_naaqs_lmp_resource_document_nov_20_2018.pdf, accessed August 2021.

The Metrolina area was designated nonattainment for the 1997 8-hour ozone NAAQS on April 30, 2004.[13] Due to emissions reduction measures, ozone values in this area have declined significantly over the years. In 2010, the Metrolina area monitors came into attainment with the 1997 8-hour ozone NAAQS. The Metrolina area is now in attainment for all of the ozone NAAQS, including the most recent (2015), most restrictive NAAQS of 0.070 ppm. There are currently five active ozone monitors in the North Carolina portion of the Metrolina area. The University Meadows monitoring site replaced the County Line site and came online in 2016. Figure 2.1 displays the Metrolina maintenance area active and discontinued ozone monitors as well as nearby ozone monitors in South Carolina. Table 2.1 shows 3-year average 1997 8-hour ozone DVs for the period 2001-2003 through 2018-2020 for all monitors displayed in Figure 2.1. These values are reported throughout the rest of this document in parts per billion (ppb) to make them easier to reference. To change from ppb to ppm, the decimal point is moved three places to the left (e.g., 70 ppb is equal to 0.070 ppm).

The DAQ compiled the DVs in Table 2.1 from values reported in EPA's Air Quality System data base.[14] All of the ozone monitoring data through 2020 have been certified. The monitoring network is re-evaluated and adjusted on an annual basis to ensure that it is providing adequate coverage. In most years, these adjustments include starting new monitors, shutting down others, or simply relocating established monitors as reflected in the data shown in Table 2.1. Furthermore, the proposed annual network plan is annually subject to a 30-day public review period prior to being submitted to EPA for their review, comments, and recommendations.

Table 2.1 indicates that all of the ozone monitors in the Metrolina area attained the 1997 8-hour ozone NAAQS (84 ppb) beginning with 2008-2010. In addition, all areas attained the 2008 8-hour ozone NAAQS (75 ppb) beginning with 2012-2014, and all met the 2015 ozone NAAQS (70 ppb) beginning with 2016-2018. Figure 2.2 graphs the ozone DVs from Table 2.1 to illustrate the downward trend in ozone DVs, with ozone DVs declining substantially through 2015 and has been generally flat since then.

The key requirement for use of a LMP approach is monitored air quality data that demonstrates ozone levels below 85% of the NAAQS. In the case of the 1997 8-hour ozone NAAQS that is subject of this LMP, this translates to a DV of 71 ppb. Table 2.1 demonstrates that the Metrolina

[13] "Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates," Final Rule, 69 FR 23858, April 30, 2004.
[14] U.S. EPA, "Air Quality Database," AMP480 reports," available from https://www.epa.gov/aqs, accessed September 2021.

maintenance area monitors have consistently had ozone DVs at or below the 85% threshold since 2015-2017.

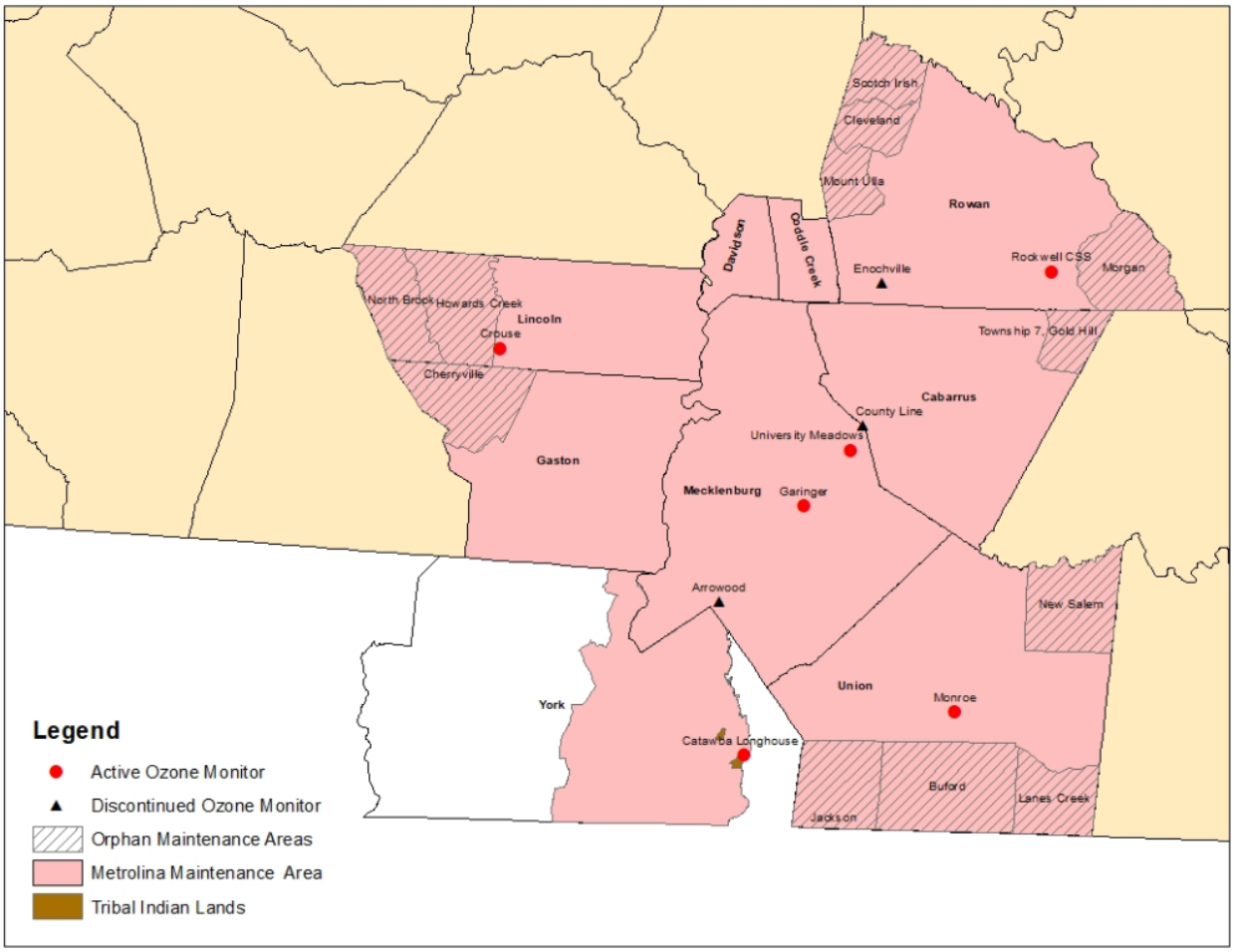

Figure 2.1 Original/Orphan Charlotte-Gastonia-Rock Hill, North Carolina-South Carolina Maintenance Area for 1997 8-Hour Ozone NAAQS

Table 2.1 Historic Ozone Design Values for the Charlotte-Gastonia-Rock Hill, North Carolina-South Carolina Maintenance Area

AQS Site ID	Local Site Name	Site Name	County Name	2001-2003 DV (ppb)	2002-2004 DV (ppb)	2003-2005 DV (ppb)	2004-2006 DV (ppb)	2005-2007 DV (ppb)	2006-2008 DV (ppb)	2007-2009 DV (ppb)	2008-2010 DV (ppb)	2009-2011 DV (ppb)	2010-2012 DV (ppb)	2011-2013 DV (ppb)	2012-2014 DV (ppb)	2013-2015 DV (ppb)	2014-2016 DV (ppb)	2015-2017 DV (ppb)	2016-2018 DV (ppb)	2017-2019 DV (ppb)	2018-2020 DV (ppb)
37-109-0004	1487 RIVERVIEW ROAD	Crouse	Lincoln	92	86	81	79	83	82	76	72	71	75	72	68	65	67	67	65	64	60
37-119-0041	1130 EASTWAY DRIVE	Garinger	Mecklenburg	96	91	86	88	90	89	82	78	79	83	78	70	68	69	69	68	70	67
37-119-0046	1660 PAVILION BOULEVARD	University Meadows	Mecklenburg														70[a]	70[a]	70	69	67
37-119-1005	400 WESTINGHOUSE BLVD.	Arrowood	Mecklenburg	84	81	78	80	83	79	76	73	76	77	72	66[b]						
37-119-1009	29 N@ MECKLENBURG CAB CO	County Line	Cabarrus	98	92	87	88	93	94	86	82	78	83	78	73	67[c]					
37-159-0021	301 WEST ST & GOLD HILL AVENUE	Rockwell CSS	Rowan	100	94	88	83	89	88	83	77	75	78	73	68	64	65	64	62	62	61
37-159-0022	925 N ENOCHVILLE AVE	Enochville	Rowan	99	91	85	85	90	88	83	77	76	77	72[d]							
37-179-0003	701 CHARLES STREET	Monroe	Union	88	85	79	78	81	80[e]	76	72	70	73	70	68	65	68	67	68[e]	68[e]	63
45-091-8001	WORLD CHANGERS LANE	Catawba Longhouse	York, SC										67	65	65	63					
45-091-8801	996 AVENUE OF THE NATIONS	Catawba Longhouse	York, SC														66	62	63	64	62

[a] Monitor started in 2016 to replace 37-119-1009; EPA approved combining data for the two sites to calculate a design value; value reported is a combined design value.
[b] Monitor was shut down at the end of the 2014 ozone season.
[c] Monitor was shut down at the end of the 2015 ozone season and replaced by 37-119-0046 in 2016. The EPA approved combining data from the two monitors to calculate design values.
[d] Monitor was shut down at the end of the 2013 ozone season.
[e] Monitor did not meet 3-year completeness requirement of 90 percent.

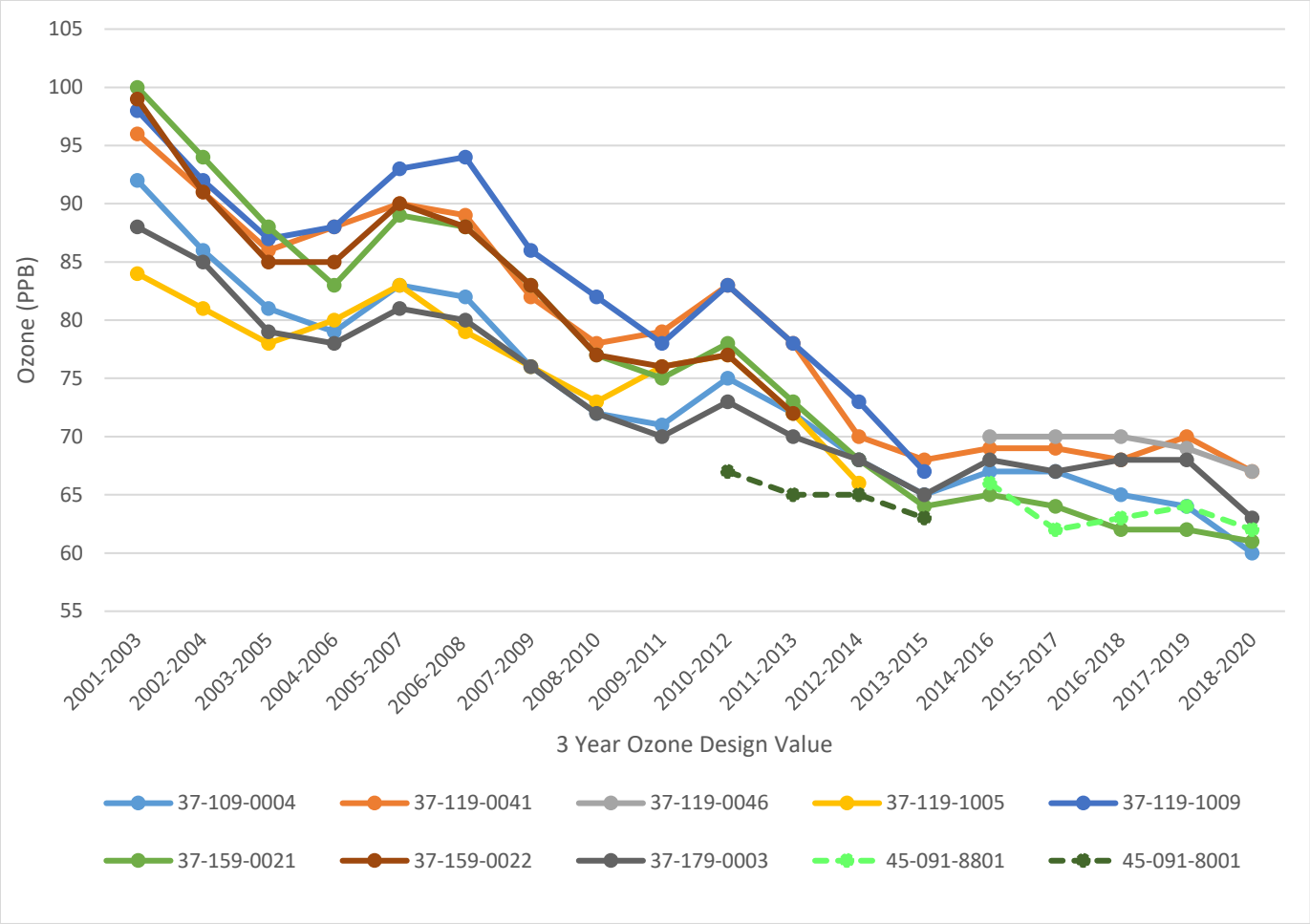

Figure 2.2 3-Year Ozone Design Value History for Charlotte-Gastonia-Rock Hill, North Carolina-South Carolina Maintenance Area

2.3 EVALUATION OF RECENT AND POTENTIAL FUTURE DESIGN VALUES

Consistent with the second of EPA's LMP applicability criteria, ozone trends have been stable in the maintenance area during the recent historical period as shown in Figure 2.2. Given this stability, there are only a couple of DV increases over the last decade that can be used to evaluate whether the magnitude of a recent increase could result in nonattainment. Using the basic approach outlined in the second bullet in Section 2.1, as summarized in Table 2.2, this test would result in the area not only having DVs well below the 1997 8-hour ozone NAAQS, but also continuing to attain the current 2015 8-hour ozone NAAQS of 70 ppb.

Table 2.2 Evaluation of Worst-Case Future Design Values

Monitors with Highest DV (2018-2020)	Monitor with Largest DV Increase	"Worst-Case" Future DV
University Meadows – 67 ppb Garinger–67 ppb	Monroe – +3 ppb from 2013-2015 to 2014-2016	70 ppb

3.0 LIMITED MAINTENANCE PLAN

3.1 EMISSIONS INVENTORY

3.1.1 Approach

To meet the maintenance plan requirement for an attainment emissions inventory, the DAQ compiled 2017 average summer day NO_x and VOC emissions data for the Metrolina maintenance area.[15] These estimates were derived from emissions modeling files EPA created from the 2017 National Emissions Inventory (NEI).[16] A table of the 2017 average summer day NO_x and VOC emissions by county and sector can be found in Appendix A. The use of 2017 emissions inventory data is appropriate for this maintenance plan because the DVs covering this year (and all subsequent years) confirm attainment of the 1997 8-hour ozone NAAQS as well as ozone levels below the 85% threshold for a LMP. The Metrolina maintenance area emissions inventory is comprised of anthropogenic (man-made) sources. Naturally occurring, or biogenic, emissions are not included in the inventory, as these emissions are outside the state's purview.

Consistent with EPA's collection of 2014 year summer season emissions to support 1997 8-hour ozone NAAQS maintenance plans,[17] the DAQ has chosen to use maintenance area emissions during the months of May through September to represent summer season emissions.[18] In particular, the DAQ calculated average 2017 summer day emissions by dividing May through September emissions by the number of days in those months (153).

[15] As described in EPA's ozone LMP guidance, the inventory "should represent emissions during the time period associated with the monitoring data showing attainment." The DAQ includes 2017 emissions data in this LMP because the Metrolina maintenance area was attaining in that year, and it is the latest year for which comprehensive emissions data are available.
[16] U.S. EPA, 2017 Emissions Modeling Data downloaded from ftp://newftp.epa.gov/air/emismod/2017/reports/, accessed August 2021.
[17] U.S. EPA, "Resource Document for 1997 Ozone NAAQS Areas: Supporting Information For States Developing Maintenance Plans," November 20, 2018, available from https://www.epa.gov/sites/production/files/2018-11/documents/ozone_1997_naaqs_lmp_resource_document_nov_20_2018.pdf, accessed August 2021.
[18] Note that these months are generally representative of the highest ozone values in the Metrolina 1997 8-hour ozone maintenance area.

Because much of the EPA's 2017 NEI is compiled at the county-level, but the Metrolina orphan maintenance area includes only a sub-set of the townships in relevant counties (see Figure 2.1), the DAQ developed methodologies to estimate the proportion of county emissions occurring in the orphan maintenance area. When available, these methodologies utilize locational information, or else assume population as a surrogate indicator of emissions activity. The methodologies are described below, organized by major source sector.

Fire Sources

The DAQ reviewed the location of prescribed fires and wildfires in relevant counties during the summer months in 2017 to determine whether emissions occurred in the orphan maintenance area. This procedure identified 2017 summer season emissions in the Metrolina area as displayed in Table 3.1 below. These estimates were divided by 153 days to estimate average summer day fire sector emissions in the orphan maintenance area portion of each county.

Table 3.1 Summer Season 2017 Fire Sector Emissions in Orphan Area by County (tons)

County	NO_x	VOC
Cabarrus	n/a	n/a
Gaston	<0.001	0.003
Lincoln	n/a	n/a
Rowan	0.028	0.266
Union	<0.001	<0.001
TOTAL	**0.028**	**0.269**

n/a – no orphan area fires during 2017 summer season.

Point Sources

For point sources, the DAQ plotted the locations of point source facilities to identify the extent to which each county's 2017 NEI NO_x and VOC emissions are located in the orphan maintenance area. Table 3.2 presents each county's percentage of point source emissions from these pollutants in the orphan maintenance area.

Table 3.2 Percentage of 2017 Point Source Emissions in Orphan Area by County

County	NO_x	VOC
Cabarrus	1.2%	0.1%
Gaston	0.3%	10.2%
Lincoln	0.004%	0.004%
Rowan	0.9%	28.1%
Union	0.2%	0.2%

The DAQ allocated 2017 average summer day point source emissions in each county based on the percentages noted above. The resulting values represent estimated 2017 average summer day point source emissions in the Metrolina orphan maintenance area.

All Other Sources

To estimate orphan area emissions for all other source sectors, the DAQ multiplied these sectors' county-level emissions by the percentage of total 2020-year county population in the townships that comprise the orphan maintenance area. These population values were obtained from the Bureau of the Census' 2020 State Redistricting File.[19] Table 3.3 displays the percentages that were used to represent the proportion of stationary nonpoint, nonroad mobile, and onroad mobile source county emissions originating within the Metrolina orphan maintenance area portion of each county.

Table 3.3 Percentage of 2020 Population in Orphan Area by County

County	Population in Orphan Area
Cabarrus	0.8%
Gaston	7.3%
Lincoln	16.9%
Rowan	6.8%
Union	13.0%

3.1.2 Summary of Emissions

Table 3.4 displays the average 2017 summer day anthropogenic NO_x and VOC emissions for the Metrolina 1997 8-hour ozone NAAQS orphan maintenance area. The DAQ notes that the 2017 county-level NO_x and VOC emissions estimates that were compiled as a first step in the process of developing the orphan maintenance area emissions were lower than the estimates for all years for which inventories were developed in the previous maintenance plan, which covered select years over the 2010-2025 time frame.[20]

[19] Bureau of the Census, "2020 Census State Redistricting Data (Public Law 94-171) Summary Files," available from https://www2.census.gov/programs-surveys/decennial/2020/data/01-Redistricting_File--PL_94-171/North_Carolina/, accessed August 2021.

[20] NC DAQ, "Supplement to the Redesignation Demonstration and Maintenance Plan for the Charlotte-Gastonia-Rock Hill, NC-SC 1997 8-Hour Ozone Nonattainment Area," available from https://deq.nc.gov/about/divisions/air-quality/air-quality-planning/state-implementation-plans/charlotte-gastonia-salisbury-nc-rock-hill-1997-8-hour-ozone-area, accessed August 2021.

Table 3.4 Metrolina Orphan Areas Average Summer Day 2017 Anthropogenic NO_x and VOC Emissions by Sector (tons)

Sector	NO_x	VOC
Fire	0.028	0.269
Nonpoint	0.267	2.266
Nonroad	0.436	0.451
Onroad	2.184	1.376
Point	0.072	0.912
TOTAL	**2.987**	**5.274**

3.2 FOUNDATION CONTROL PROGRAM

A key element of the maintenance plan is the foundation control program, which consists of the federal and state control measures that ensure continued maintenance of the NAAQS. Table 3.5 displays each of these measures along with a list of additional supporting programs. The following provides a summary of each federal and state control measure included in the foundation control program for the Metrolina maintenance area. All of these programs are: (1) implemented or are in the process of being implemented; and (2) apply to emission sources in the maintenance areas or to sources that may contribute to the transport of ozone into these areas.

The foundation control program includes federally and state enforceable control programs that have been adopted by North Carolina. These programs will remain enforceable and ensure that maintenance of the 1997 8-hour ozone standard will continue. The state rules included in the foundation control program are approved into the Federally approved SIP. Sources in maintenance areas are prohibited from reducing the effectiveness or removing emission controls (anti-backsliding) unless such a change is first approved by EPA as a revision to the North Carolina SIP that is consistent with Section 110(l) of the CAA.

Table 3.5 Summary of Foundation Control and Additional Supporting Programs

Jurisdiction	Control Program
Foundation Control Programs	
Federal	Tier 2 Vehicle and Fuel Standards
	Tier 3 Vehicle and Fuel Standards
	Heavy-duty Gasoline and Diesel Highway Vehicles Standards
	Medium- and Heavy-duty Vehicle Fuel Consumption and Greenhouse Gas (GHG) Standards
	Large Nonroad Diesel Engine Standards
	Nonroad Spark-ignition Engine and Recreational Engine Standards
	Boiler National Emissions Standards for Hazardous Air Pollutants (NESHAP)
	Reciprocating Internal Combustion Engines (RICE) NESHAP
	Utility New Source Performance Standards (NSPS)

Jurisdiction	Control Program
Foundation Control Programs	
	NO_x SIP Call Rule, Clean Air Interstate Rule (CAIR), and Cross State Air Pollution Rule (CSAPR)
State	Clean Smokestacks Act
	Clean Air Bill/Vehicle Emissions Inspection and Maintenance (I&M) Program
	Open Burning Rule
Additional Supporting Programs	
State	Air Awareness Program
	Advance Program
	Grant Program
	Volkswagen Settlement
	EPA Consent Decree with Duke Energy Corporation

3.2.1 Summary of Federal and State Control Programs

The federal measures in the foundation control program include:

- Tier 2 Vehicle and Fuel Standards: These standards required passenger vehicles in each manufacturer's fleet to meet an average standard of 0.07 grams of NO_x per mile by 2007. The Tier 2 standards also cover passenger vehicles over 8,500 pounds gross vehicle weight rating (i.e., larger pickup trucks and sport utility vehicles [SUVs]). For these vehicles, the standards were phased in beginning in 2008, with full compliance required by 2009. The Tier 2 standards require vehicles to be 77% to 95% cleaner. Additionally, in January 2006, the sulfur content of gasoline was required to be on average 30 ppm which assists in lowering NO_x emissions by increasing the efficiency of the catalytic converter. Most gasoline sold in North Carolina prior to January 2006 had a sulfur content of about 300 ppm. These emission reductions are federally enforceable.

- Tier 3 Vehicle and Fuel Standards: Federal Tier 3 vehicle standards require all passenger vehicles in a manufacturer's fleet, including light-duty trucks and SUVs, to meet an average standard of 0.03 grams/per mile of NO_x. Heavy-duty passenger vehicles must meet average standards of 0.178 to 0.247 grams/per mile of NO_x depending on vehicle classification. Implementation began in 2017, with full compliance required by 2025. Compared to Tier 2, the Tier 3 tailpipe standards for light-duty vehicles are expected to reduce combined NO_x + non-methane organic gases by approximately 80%. Tier 3 vehicle standards also include evaporative standards using onboard diagnostics that result in a 50% reduction in VOC emissions over Tier 2. The rule reduced the sulfur content of gasoline to 10 ppm in January 2017. These emission reductions are federally enforceable.

- Heavy-duty Gasoline and Diesel Highway Vehicle Standards: Implementation of these standards, designed to reduce NO_x and VOC emissions from heavy-duty gasoline and diesel highway vehicles, began in 2004 with full implementation in 2010. The program was estimated to reduce NO_x emissions by 95% and required that the sulfur content of fuel be reduced to 15 ppm. These emission reductions are federally enforceable.

- Medium- and Heavy-duty Vehicle Fuel Consumption and GHG Standards: In September 2011, EPA and the National Highway Traffic Safety Administration promulgated joint rules to reduce GHG emissions and improve fuel efficiency of combination tractor trucks, heavy-duty pickups and vans, and vocational trucks beginning with model year 2014 and applying to all model years by 2018. The decrease in fuel consumption is expected to result in a 7% to 20% decrease in NO_x emissions. These emission reductions are federally enforceable.

- Large Nonroad Diesel Engine Standards: EPA promulgated rules for new large nonroad diesel engines, such as those used in construction, agricultural and industrial equipment, to be phased in between 2008 and 2014. The combined engine and fuel requirements are estimated to reduce NO_x emissions by 90% and reduce the sulfur content in nonroad diesel fuel to 15 ppm. These emission reductions are federally enforceable.

- Nonroad Spark-ignition Engine and Recreational Engine Standards: Tier 1 of these standards was implemented in 2004 and Tier 2 began in 2007. These engine standards apply to all new engines sold in the United States and all engines imported after these standards began, and applies to large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all-terrain-vehicles), and recreational marine diesel engines. When the nonroad spark-ignition and recreational engine standards were fully implemented in 2020, an overall 72% reduction in hydrocarbons and 80% reduction in NO_x is expected. These emission reductions are federally enforceable.

- Boiler NESHAP: The NESHAP for industrial, commercial, and institutional boilers and space heaters is estimated to result in a small decrease in VOC emissions. Facilities with affected units were required to comply with the NESHAP by January 31, 2016 for all states except North Carolina which had a compliance date of May 20, 2019 (because of delays associated with EPA's promulgation of the boiler NESHAP, North Carolina adopted and implemented equivalent emission limitations by permit under Section 112(j) of the CAA; these limits have been superseded by the federal standards). Some facilities in North Carolina complied with the NESHAP by converting affected units from burning coal to natural gas resulting in additional reductions in NO_x, SO_2, and particulate matter (PM) emissions. These emission reductions are federally enforceable.

- RICE NESHAP: The RICE NESHAP has provided emission reductions of NO_x, VOC, PM, and SO_2. RICE owners and operators were required to comply with the NESHAP by May 3, 2013. These emission reductions are federally enforceable.

- Utility NSPS: On February 16, 2012, EPA published a final rule for the NSPS for fossil-fuel fired electric utility, industrial-commercial-institutional and small industrial-commercial-institutional steam generating units. In the NSPS, EPA revised the standards that new coal- and oil-fired power plants must meet for NO_x, SO_2, and PM. The rule can be expected to result in the reduction of both NO_x and SO_2 emissions in addition to the reduction in mercury and other air toxic emissions. The emission reductions associated with the revised NSPS are federally enforceable.

- NO_x SIP Call Rule Clean Air Interstate Rule (CAIR), and Cross State Air Pollution Rule (CSAPR) Rules: EPA promulgated the NO_x SIP Call in October 1998 to reduce ozone transport and precursor emissions from upwind states contributing to ozone attainment and maintenance issues in downwind states. A central component of the NO_x SIP Call included the NO_x Budget Trading Program (NBP), which was a cap-and-trade system to reduce NO_x emissions from electricity generating units (EGUs) and large industrial boilers during the ozone season (May 1 through September 30). In May 2005, EPA promulgated CAIR to reduce NO_x and SO_2 emissions from EGUs. In so doing, CAIR incorporated the EGUs and large boilers covered by the NBP but did not incorporate budgets for other sectors covered by the NBP (e.g., onroad and nonroad sources). On December 23, 2008, the United States Court of Appeals for the District of Columbia Circuit issued an opinion remanding the CAIR program to EPA without vacatur. Therefore, because of EPA's "anti-backsliding" rules, North Carolina remains subject to the NO_x SIP Call's ozone season EGU budgets.

  After the court challenges to CAIR, EPA issued CSAPR in July 2011. As amended, CSAPR required 28 states to limit their statewide emissions of SO_2 and/or NO_x in order to reduce or eliminate the states' contributions to fine particulate matter ($PM_{2.5}$) and/or ground-level ozone pollution in other states. The emissions limitations are defined in terms of maximum statewide "budgets" for emissions of annual SO_2, annual NO_x, and/or ozone-season NO_x by each state's large EGUs. The EPA excluded large industrial boilers from CSAPR, resulting in a group of "orphaned" industrial units that are still subject to the NO_x SIP call budget for these sources. North Carolina EGUs are subject to the Phase I and II annual NO_x and SO_2 budgets as of January 1, 2015 and January 1, 2017, respectively. However, it is important to note that North Carolina does not have an ozone season budget for EGUs under the CSAPR program. Although the state is not relying on CSAPR for ozone season reductions, CSAPR is a federally enforceable program that has yielded residual NO_x and SO_2 emissions reduction

benefits. As of EPA's 2018 progress report for the power sector's air programs, CSAPR was estimated to reduce annual EGU SO_2 and NO_x emissions by 91% and 73% below 2005 levels, respectively.

The state measures that are included in the foundation control program include:

- Clean Smokestacks Act: This state law required coal-fired power plants to reduce annual NO_x emissions by 77% by 2009, and to reduce annual SO_2 emissions by 49% by 2009 and 73% by 2013. This law set a NO_x emissions cap of 56,000 tons/year for 2009 and SO_2 emissions caps of 250,000 tons/year and 130,000 tons/year for 2009 and 2013, respectively. In 2013, the power plants subject to this law had combined NO_x emissions of 38,857 tons/year, well below the 56,000 tons/year cap. The emissions cap has been met in all subsequent years as well. With the requirement to meet annual emissions caps and disallowing the purchase of NO_x credits to meet the caps, the Clean Smokestacks Act reduces NO_x emissions beyond the requirements of the NO_x SIP Call. These emissions limits are enforceable at both the federal and state level.

- Clean Air Bill/Vehicle Emissions I&M Program: In 1999, the North Carolina State Legislation passed the Clean Air Bill that expanded the on-road vehicle I&M program from 9 to 48 counties. This program reduces NO_x, VOC, and carbon monoxide (CO) emissions. The rule for the I&M program was submitted to EPA for adoption into the SIP in August 2002 and was federally approved in October 2002. Therefore, these emission reductions are both state and federally enforceable. On February 5, 2015, EPA approved a change to North Carolina's I&M rules triggered by a state law which exempted plug-in vehicles and the three newest model year vehicles with less than 70,000 miles on their odometers from emission inspection in all areas in North Carolina where I&M is required.[21] In North Carolina's Section 110(l) demonstration, the state showed that the change in the compliance rate from 95% to 96% more than compensates for the NO_x and VOC emissions increase.

  The 2017 session of the North Carolina General Assembly enacted Session Law 2017-10, Senate Bill 131 (An Act to Provide Further Regulatory Relief to the Citizens of North Carolina). Section 3.5.(a) of the Act amended *North Carolina General Statue (NCGS) §143-215.107A(c)* to remove 26 of 48 counties from North Carolina's emissions inspection and maintenance (I&M) program. For the 22 counties remaining in the I&M program, Section 3.5.(b) of the Act also amended *NCGS §20-183.2(b)* by changing the vehicle model year

[21] Approval and Promulgation of Implementation Plans; North Carolina; Inspection and Maintenance Program Updates, 80 FR 6455, February 5, 2015.

coverage. Specifically, the Act requires the following changes to North Carolina's I&M program:

- Eliminate the following 26 counties from vehicle I&M requirements: Brunswick, Burke, Caldwell, Carteret, Catawba, Chatham, Cleveland, Craven, Edgecombe, Granville, Harnett, Haywood, Henderson, Lenoir, Moore, Nash, Orange, Pitt, Robeson, Rutherford, Stanly, Stokes, Surry, Wayne, Wilkes, and Wilson.

  Retain the vehicle I&M program in the following 22 counties: Alamance, Buncombe, Cabarrus, Cumberland, Davidson, Durham, Forsyth, Franklin, Gaston, Guilford, Iredell, Johnston, Lee, Lincoln, Mecklenburg, New Hanover, Onslow, Randolph, Rockingham, Rowan, Union, and Wake.

- For the 22 counties remaining in the program, change the model year vehicle coverage to: (i) a vehicle with a model year within 20 years of the current year and older than the three most recent model years, or (ii) a vehicle with a model year within 20 years of the current year and has 70,000 miles or more on its odometer. Previously, the program applied to (i) a 1996 or later model year vehicle and older than the three most recent model years, or (ii) a 1996 or later model year vehicle and has 70,000 miles or more on its odometer.

On September 25, 2018, EPA approved removal of the 26 counties from the I&M program (83 FR 48383) which became effective on December 1, 2018. On September 11, 2019, EPA approved revisions to the vehicle model year coverage for the 22 counties that remain subject to the I&M program (84 FR 47889), which became effective on December 1, 2019.

The 2020 session of the North Carolina General Assembly enacted Session Law 2020-05, House Bill 85 (An Act to Remove Lee, Onslow, and Rockingham Counties from the Motor Vehicle Emissions Inspection Program). Section 1 of the Act amended *North Carolina General Statue (NCGS) §143-215.107A(c)* to remove 3 of 22 counties from North Carolina's I&M program: Lee, Onslow, and Rockingham. Section 3 of the Act identifies that this change will become effective on the later of the following dates, and applies to motor vehicles inspected, or due to be inspected, on or after that effective date: (1) January 1, 2021; or (2) the first day of a month that is 60 days after the Secretary of the Department of Environmental Quality certifies to the Revisor of Statutes that EPA has approved this I&M program amendment to North Carolina's SIP. The I&M rules are state and federally enforceable.

- Open Burning Rule (15A North Carolina Administrative Code [NCAC] 02D .1903): This rule prohibits open burning of man-made materials throughout the state. Additionally, the

rule prohibits nearly all types of open burning during Air Quality Action Days of Code Orange or higher in forecasted areas of the state. Ozone forecasts are issued for each of the maintenance areas from March 1 through October 31, therefore the areas in this LMP are covered by this rule. The open burning rule reduces NO_x, VOC, and CO emissions as well as PM with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}) and 2.5 micrometers ($PM_{2.5}$). In addition, the local program, MCAQ, has a more restrictive open burning rule, Mecklenburg County Air Pollution Control Ordinance (MCAPCO) Section 1.5106, than the State's open burning rule, therefore, enhancing this control measure's emission reductions.

3.2.2 Additional Programs Supporting Maintenance

This section provides a summary of state programs that have been implemented in the nonattainment areas to maintain compliance with the NAAQS. Although these are important programs that help to ensure compliance with the NAAQS, they have not been relied upon as federally enforceable measures. State programs that have been implemented include:

- Air Awareness Program: The North Carolina Air Awareness Program is a public outreach and education program of the DAQ. The goal of the program is to reduce air pollution though voluntary actions by individuals and organizations. The program seeks to educate individuals about (1) the sources of air pollution; (2) the health effects of air pollution and how these effects can be mitigated by modification of outdoor activities on ozone action days; and (3) simple "action tips", such as carpooling, vehicle maintenance and energy conservation that reduce individual contributions to air pollution. One of the major program components is the daily air quality forecast. The DAQ produces the 8-hour ozone forecasts and corresponding air quality index for the 1997 8-hour ozone nonattainment area from March 1 through October 31 of each year.[22]

- Advance Program: The DAQ joined the EPA Advance program in September 2017. The EPA Advance Program encourages collaborations between state, local, and community organizations to encourage emissions reductions in areas that are currently in attainment of the ozone and $PM_{2.5}$ NAAQS. The program provides a flexible framework for organizations who want closer involvement and support from the DAQ and EPA in achieving these emission reductions. In 2019, the DAQ developed a set of Advance Program plans that

[22] DAQ, "N.C. Air Awareness," available from https://deq.nc.gov/ncairawareness.

could be used to leverage Air Awareness Program projects in support of continued NAAQS maintenance.[23]

- Grant Program: The DAQ has offered multiple forms of grant funding from state and federal funds to help cover the costs associated with emission reduction projects across the state. These projects include diesel engine replacements, diesel oxidation catalyst retrofits, marine diesel repowers, replacing gasoline vehicles with electric vehicles, vehicle replacement and many more. Grant projects that have been awarded have helped to reduce PM, NO_x, CO and VOC emissions from mobile sources, and have included federal funds from the Diesel Emissions Reduction Act (DERA) and the American Recovery and Reinvestment Act (ARRA). The DERA and ARRA funds have been used to retrofit, repower or replace existing diesel engines from on-road and nonroad mobile source vehicles/equipment. Even though these emission reductions are voluntary and not enforceable, they still represent permanent reductions.

- Volkswagen Settlement: In 2015, Volkswagen (VW) publicly admitted that it had secretly and deliberately installed defeat-device software designed to cheat emissions tests and deceive federal and state regulators in approximately 590,000 model year 2009 to 2016 motor vehicles containing 2.0 and 3.0 liter diesel engines. The United States Department of Justice filed a complaint against VW, alleging that the company had violated the CAA. In October 2016 and May 2017, the U.S. District Court, Northern District of California ("Court"), approved two partial settlements related to the affected 2.0- and 3.0-liter vehicles, respectively, totaling $14.9 billion ("the VW Settlement"). The VW Settlement will be implemented through the First Partial Consent Decree and Second Partial Consent Decree. Under these consent decrees, VW has agreed to: (1) dedicate $10 Billion to the recall of at least 85% of the affected 2.0 and 3.0 liter vehicles; (2) invest $2 Billion in zero-emission vehicle infrastructure and promotion ("Zero Emission Vehicle Investment Plan"); and (3) establish a $2.9 Billion Environmental Mitigation Trust (EMT) to mitigate the environmental effects of the excess NO_x emissions from the affected vehicles. The purpose of the EMT is to execute environmental mitigation projects that reduce emissions of NO_x. In accordance with the EMT goal, North Carolina will use the funds to achieve significant NO_x emissions reductions across the state by soliciting for projects from all eligible mitigation actions. Based on the distribution of violating vehicles registered across the state, North Carolina plans to allocate the funds between urban/suburban counties (68%) and rural counties (32%). North Carolina will select projects throughout the state that will reduce or eliminate emissions of NO_x focusing on the most cost-effective projects, the quantity of NO_x emission

[23] DAQ, "Ozone and Particulate Matter Advance Programs Path Forward," October 2019.

reductions and other factors. The State of North Carolina has submitted its mitigation plan for the state's $92 million share of the EMT on August 22, 2018. This plan details how the state will invest the first 33% of the state's allocation in Phase 1 on projects to significantly reduce NO_x emissions and improve air quality. Project solicitations for Phase 1 for the diesel and Direct Current Fast Charging projects closed on September 30, 2019. Once projects are awarded, NO_x reductions from the projects will be realized in the state.

- EPA Consent Decree with Duke Energy Corporation: A consent decree between EPA and Duke Energy Corporation was finalized in September 2015 to resolve CAA Prevention of Significant Deterioration (PSD) program violations at 13 electricity generating units (EGUs).[24] The consent decree includes the following five plants, with the first three plants located in the Metrolina area:
  - GG Allen (Units 1 and 2) – ORIS ID 2718, EIS Facility ID 8137511, NC ID 3600039 (Gaston County);
  - Riverbend (Units 4, 6, and 7) - ORIS ID 2732, EIS Facility ID 8176211, NC ID 3600040 (Gaston County);
  - Buck (Units 3, 4, and 5) - ORIS ID 2720, EIS Facility ID 8506911, NC ID 8000004 (Rowan County);
  - Cliffside (Units 1, 2, 3, and 4) - ORIS ID 2721, EIS Facility ID 8300611, NC ID 8100028 (Rutherford County); and
  - Dan River (Unit 3) - ORIS ID 2723, EIS Facility ID 8009611, NC ID 7900015 (Rockingham County).

  The consent decree required 11 of 13 EGUs that had been shut down prior to finalizing the consent decree to be a permanent and an enforceable obligation. At the GG Allen plant, which is in the Metrolina area, the consent decree requires Duke to permanently retire Units 1 and 2 (165 megawatts (MW) each) by 2024. In the interim, Duke must continuously operate existing NO_x pollution controls at Allen Units 1 and 2 and comply with a 365-day rolling average emission rate of 0.250 pound per million British Thermal Units (lb/mmBTU). Each unit must also meet a NO_x tonnage cap of 600 tons per year. In addition, the settlement requires Duke to retire an additional 265 MW unit (i.e., Unit 3) at the GG Allen plant by 2024. The consent decree also requires Duke to spend at least $4.4 million on environmental mitigation projects. Some projects are mandatory, and some are optional as described in the consent decree. In addition, the Buck facility, which is also located in the Metrolina

[24] Civil No. 1:00 cv 1262, September 10, 2015; the consent decree is available at EPA's website at: https://www.epa.gov/enforcement/duke-energy-corporation-clean-air-act-caa-settlement.

maintenance area, retired all coal-fired units in April 2013, and the Riverbend facility air permit was inactivated on December 6, 2013 and the facility closed in 2014.

3.3 MAINTENANCE DEMONSTRATION

In a LMP, the maintenance demonstration requirement is considered to be satisfied if the monitoring data show the area is meeting the air quality criteria for a LMP (i.e., current air quality levels for ambient monitoring sites in the area are below 85% of the standard, and that air quality levels were not highly variable during preceding years). As demonstrated earlier in Section 2.0 (Air Quality), these criteria are fully satisfied for the maintenance area that is the subject of this plan.

As noted in EPA's LMP guidance, there is no requirement to project emissions over the maintenance period. The EPA believes that the continued applicability of PSD requirements, and control measures already in the SIP and Federal measures should provide adequate assurance of maintenance for such areas. When EPA approves a LMP, EPA is concluding that an emissions budget may be treated as essentially non-constraining for the length of the maintenance period because it is unreasonable to expect that such an area will experience so much growth in that period that a violation of the ozone NAAQS would occur.

3.4 MONITORING NETWORK

The LMP requires a commitment to continue operating an EPA-approved air quality monitoring network, in accordance with 40 Code of Federal Regulations (CFR) Part 58. This is to verify the attainment status of the area over the maintenance period especially since there is no cap on emissions under a LMP.

The DAQ commits to continue monitoring ozone in the Metrolina 1997 8-hour ozone NAAQS maintenance area. Any monitor shutdowns or relocations will only be made with the approval of EPA. The current ozone monitors are operated consistent with 40 CFR Part 58, and any monitoring changes will only be made if they are consistent with 40 CFR Part 58.

3.5 CONTINGENCY PLAN

A contingency plan is required to promptly correct any violation of the ozone standard that occurs after approval of the LMP. The contingency plan does not need to include control measures that have been fully adopted. However, the plan is considered to be an enforceable part of the SIP and should ensure that the contingency measures are expeditiously adopted once their need is triggered. The two main elements of the North Carolina contingency plan are

tracking and triggering mechanisms to determine when control measures are needed, and a process for developing and adopting appropriate control measures.

There are three potential triggers for the contingency plan. The primary trigger of the plan will be a violation of the 1997 8-hour ozone NAAQS at any of the maintenance area monitors. The secondary trigger will be a monitored air quality pattern that suggests an actual 1997 8-hour ozone NAAQS violation may be imminent. The tertiary trigger will be a monitored fourth highest exceedance of the NAAQS. Upon either the primary or secondary triggers being activated, the DAQ, working in consultation with the SCDHEC and the MCAQ local program, will commence analyses to determine what additional measures, if any, will be necessary to attain or maintain the ozone standard. If activation of either the primary or secondary triggers occurs, this plan provides a regulatory adoption process for revising emission control strategies. Activation of the tertiary trigger will result in an analysis to understand the cause of the exceedance and to identify voluntary measures if needed.

3.5.1 Contingency Plan Triggers

The primary trigger of the contingency plan will be a violation of the 1997 8-hour ozone standard or when the three-year average of the 4th highest values is equal to or greater than 85 ppb at a monitor in the maintenance area. The trigger date will be 60 days from the date on which an ozone monitor in a maintenance area records a 4th highest value that, when averaged with the two previous ozone seasons' fourth highest values, results in a 3-year average equal to or greater than 85 ppb.

The secondary trigger will apply where no actual violation of the 1997 8-hour ozone standard has occurred, but where the state finds monitored ozone levels indicating that an actual ozone NAAQS violation may be imminent. A pattern will be deemed to exist when there are two consecutive ozone seasons in which the 4th highest values are 85 ppb or greater at a single monitor within the maintenance area. The trigger date will be 60 days from the date on which an ozone monitor in the maintenance area records a 4th highest value of 85 ppb or greater for which the previous season had a 4th highest value of 85 ppb or greater.

Similarly, the tertiary trigger will not be an actual violation of the 1997 8-hour ozone standard. This trigger will be a first alert as to a potential air quality problem on the horizon. The trigger will be activated when a monitor in a maintenance area has a 4th highest value of 85 ppb or greater, starting the first year after the maintenance plan has been approved. The trigger date will be 60 days from the date on which an ozone monitor in a maintenance area records a 4th highest value of 85 ppb or greater.

3.5.2 Actions Resulting from Trigger Activation

Once the primary or secondary trigger is activated, the Planning Section of the DAQ, in consultation with the SCDHEC and MCAQ, shall commence analyses including trajectory analyses of high ozone days, and an emissions inventory assessment to determine emission control measures that will be required for maintaining the 1997 8-hour ozone standard. The analysis will include an evaluation of any future federal, state, and local measures that will be implemented after the trigger is activated to determine their effectiveness for bringing the area into attainment and assure maintenance going forward. If deemed applicable, the DAQ will submit to EPA an analysis supporting the conclusion that control measures will be adequate to reduce ozone concentrations to attain and maintain the 1997 8-hour ozone NAAQS. If additional state and local control measures are determined to be necessary, the DAQ will perform an analysis to determine the most effective measure(s) to bring the area back into attainment of and maintain compliance with the NAAQS. The analysis of state and local control measures will focus on NO_x controls because North Carolina is NO_x-limited for ozone formation (see Section 1.1 of this LMP).

The measures that will be considered for adoption upon a trigger of the contingency plan include: NO_x Reasonably Available Control Technology (RACT) on stationary sources with a potential to emit less than 100 tons per year in the North Carolina portion of the maintenance area, implementation of diesel retrofit programs, including incentives for performing retrofits, and additional controls in upwind areas.

By May 1 of the year following the ozone season in which the primary or secondary trigger has been activated, North Carolina will complete sufficient analyses to begin adoption of necessary rules for ensuring attainment and maintenance of the 1997 8-hour ozone NAAQS. These rules would become effective by the following March 1 (the beginning of the ozone season) unless legislative review is required.

The DAQ commits to begin implementing as expeditiously as practicable, but no later than 24 months of the primary or secondary trigger, at least one control measure that is determined to be most appropriate for reducing NO_x emissions to attain and maintain the standard based on the analyses performed.

Once the tertiary trigger is activated, the Planning Section of the DAQ, in consultation with the SCDHEC and MCAQ, shall commence analyses including meteorological evaluation, trajectory analyses of high ozone days, and emissions inventory assessment to understand why a 4^{th} highest exceedance of the standard has occurred. Once the analyses are completed, the DAQ will work with SCDHEC, MCAQ and the local air awareness program to develop an outreach plan

identifying any additional voluntary measures that can be implemented. If the 4th highest exceedance occurs early in the season, the DAQ will work with entities identified in the outreach plan to determine if the measures can be implemented during the current season, otherwise, the DAQ will work with SCDHEC, MCAQ and the local air awareness coordinator to implement the plan for the following ozone season.

3.6 CONFORMITY DETERMINATIONS

The federal transportation and general conformity regulations apply to nonattainment areas and maintenance areas operating under maintenance plans. Transportation conformity determinations are required in nonattainment and maintenance areas whenever the State Transportation Improvement Program or Metropolitan Transportation Plan is revised.

North Carolina's transportation conformity rules are codified in 15A NCAC 02D Section .2000, *Transportation Conformity.* The rules in this Section assure conformity of federally funded transportation plans, programs, and projects in areas designated as nonattainment or maintenance for PM, VOC, or NO_x in 40 CFR 81.334. In accordance with CAA Section 176(c), the North Carolina Department of Environmental Quality chose through rulemaking in 15A NCAC 02D .2005, *Memorandum of Agreement*, to develop Transportation Conformity Memorandum of Agreements (MOA) to ensure that interagency consultation procedures for transportation conformity are followed in each of the state's nonattainment or maintenance areas pursuant to 40 CFR 93.105. Each MOA is federally enforceable and outlines the responsibilities and processes that each signatory entity will follow to ensure that transportation plans conform to the motor vehicle emissions budgets (MVEBs) set forth in North Carolina's SIP.

General conformity determinations are required whenever there is a federal action, other than transportation related, within a nonattainment or maintenance area that will increase emissions above a *de minimis* level. In a traditional maintenance plan, emission budgets are established explicitly for transportation conformity by means of MVEBs and implicitly for general conformity where the estimated emissions in the SIP becomes the emission budget that must be met.

In a LMP, it is unreasonable to expect that such a maintenance area will experience so much growth in the period to result in a violation of the NAAQS. As specified in EPA guidance, emission budgets are non-constraining for the length of the maintenance period, and MVEBs are

not established in the LMP.[25] This guidance states that Federal actions requiring transportation conformity determinations under the transportation conformity rule are considered to satisfy the budget test without the need for a regional emissions analysis. General conformity is treated in a similar fashion under a LMP – emissions for non-transportation related Federal actions will no longer need to be compared to the SIP since the LMP is considered to satisfy the required budget test.

It should be noted that approval of the LMP does not relieve transportation partners of other transportation conformity requirements. Transportation plan revisions and transportation improvement program conformity determinations must satisfy all other applicable requirements of the transportation conformity rule and hot-spot requirements must be satisfied for transportation projects (40 CFR 93.109(e)).

4.0 CONCLUSION AND RECOMMENDATIONS

The 1997 8-hour ozone NAAQS orphan maintenance area encompasses the following Townships that were not designated nonattainment for the 2008 ozone NAAQS:

- Cabarrus county – Gold Hill;
- Gaston county – Cherryville;
- Lincoln county – Howards Creek and North Brook;
- Rowan county – Cleveland, Morgan, Mount Ulla, and Scotch Irish; and
- Union county – Buford, Jackson, Lanes Creek, and New Salem.

The DAQ believes that the orphan maintenance area for the 1997 8-hour ozone NAAQS meets the requirements for a LMP. The area has 2018-2020 DVs that are well below the threshold of 85% (71 ppb) of the NAAQS (with a 2018-2020 DV of 67 ppb, the Metrolina area is 80% of the ozone 8-hour standard) and show stable or improving air quality trends with DVs below the LMP threshold since 2013-2015. An attainment inventory for 2017 has been provided, as well as a contingency plan in case the maintenance area should have such an increase in ozone emissions that the area would violate the standard in the future. Finally, the DAQ has committed to continue operating ozone monitors in the maintenance area in accordance with 40 CFR Part 58. The DAQ believes that this LMP fulfills the requirements of CAA Section 175A(b) with respect to the second maintenance plan period for the orphan maintenance area and requests that EPA approve the LMP into the North Carolina SIP.

[25] Sally Shaver, U.S. EPA, "Limited Maintenance Plan Option for Nonclassifiable Ozone Nonattainment Areas," November 16, 1994.

Appendix A

Average 2017 Summer Day Anthropogenic Emissions by County and Sector

Appendix A
County and Sector-Level Emissions Summary

Table A-1 Average 2017 Summer Day Anthropogenic Emissions by County and Sector

		2017 Emissions (tons/day)	
County	**Sector**	**NOx**	**VOC**
Cabarrus	Fire	0.000	0.000
	Nonpoint	0.782	5.211
	Nonroad	1.058	0.985
	Onroad	5.700	3.517
	Point	1.653	1.087
	TOTAL	**9.192**	**10.801**
Gaston	Fire	0.000	0.003
	Nonpoint	0.772	7.055
	Nonroad	0.914	1.008
	Onroad	6.666	3.997
	Point	6.973	1.439
	TOTAL	**15.326**	**13.501**
Lincoln	Fire	0.001	0.009
	Nonpoint	0.156	2.565
	Nonroad	0.473	0.497
	Onroad	3.079	1.962
	Point	0.173	0.499
	TOTAL	**3.882**	**5.532**
Rowan	Fire	0.046	0.440
	Nonpoint	1.026	5.261
	Nonroad	0.715	0.854
	Onroad	5.700	3.432
	Point	3.758	2.709
	TOTAL	**11.244**	**12.696**
Union	Fire	0.001	0.011
	Nonpoint	0.825	7.016
	Nonroad	1.776	1.739
	Onroad	5.670	3.750
	Point	0.731	1.584
	TOTAL	**9.003**	**14.101**