# Appendix B

# Emission Inventory Documentation

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# Appendix B.1

# Point Source Emissions

# Inventory Documentation

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# 1.0 INTRODUCTION AND SCOPE

The point source inventory consists of emissions from individual facilities. Primarily, these are industrial or commercial facilities that must have operating permits issued by the North Carolina Division of Air Quality (NCDAQ) and the three local county air quality agencies (Buncombe, Forsyth, and Mecklenburg).

Although both the State and county agencies inventory all the criteria pollutants and a large number of toxic pollutants, only the nitrogen oxides (NOx), fine particle ($PM_{2.5}$), volatile organic compounds (VOC), and sulfur dioxide ($SO_2$) are reported in this documentation. All emissions are calculated on a ton per year basis.

# 2.0 OVERALL METHODOLOGY

All large permitted sources are required to report emissions annually and every five years in the case of smaller sources to the NCDAQ. Local air quality agencies require that all large permitted sources report emissions annually and small sources report or calculate their emission from every year to every five years' range. Additionally, the U.S. Environmental Protection Agency (USEPA) requires the NCDAQ and the Local Agencies to submit annually data for large stationary point sources. For the smaller sources that report emissions every five years, the most recent emissions inventory available was used.

## 2.1 SOURCE CATEGORY IDENTIFICATION

All facilities required to have permits to operate sources of air pollution are known and are required to submit emission inventories.

## 2.2 EMISSION ESTIMATION APPROACH

The documentation of emission estimates used for emission inventories is a very important aspect of the inventory. The documentation is used as basis for quality assurance and verification of the validity of information submitted on NCDAQ forms or via internet based data system. NCDAQ documentation titled "Uniform Policy and Documentation Standards for Emission Estimates" is provided to reporting facilities and NCDAQ inventory reviewers as a guide to support quality inventory development efforts.

The emission inventory information reported to the NCDAQ and the local county air quality agencies was transferred to a state developed emissions inventory program that helps ensure

required data elements are not omitted. It also performs some calculations, thereby minimizing the occurrence of errors. Depending on the particular process and facility, emissions may be calculated by various means. In many cases, emissions are estimated using emission factors published in the USEPA's AP-42, Compilation of Air Pollutant Emission Factors. In a relatively few cases, site-specific emission factors may be used, (i.e., based on emissions test results). Sometimes, a mass balance calculation can be employed. In some cases, there is direct continuous monitoring of emissions that are reported.

Emissions reported to and maintained by the NCDAQ are annual emissions. A variety of detailed operating data, source configuration, and other process parameters are also reported according to NCDAQ reporting guidelines. NCDAQ provides specific instructions and guidelines for submitting emissions data to the agency via its website.

## 3.0 QUALITY ASSURANCE MEASURES

The emission inventory has undergone a number of quality assurance checks so that it meets the standards for submitting the annual inventory to the USEPA. The state emissions inventory database program helps insure that important data elements are present. Where the program performs calculations, it helps avoid calculation errors. In addition, since the State began collecting annual fees for emissions from Title V sources, both the State and the sources are careful that the tons-per-year emissions reported are accurate.

The detail quality assurance and quality control procedures and measures, as outlined in the North Carolina Division of Air Quality (NCDAQ) Emissions Inventory Quality Assurance Project Plan (QAPP) and approved by the USEPA, were applied to ensure the data meets specific data indicator goals and objectives.

## 4.0 SUMMARY OF POINT SOURCE EMISSIONS

The facility level emissions data for each of North Carolina's counties are summarized in Table 4.1. The state total point source emissions data are summarized in Table 4.2. All of the emissions are in tons per year.

**Table 4-1 2010 Facility Level Emissions Reported to DAQ (tons/year)**

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Alamance | Alamance Regional Medical Center, Inc. | 5.35 | 0.28 | 0.53 | 0.15 |
| | Alexander Fabrics, LLLP | 2.85 | 0.22 | 0.02 | 2.45 |
| | Andersen Products, Inc. | 0.20 | | | 0.02 |
| | APAC-Atlantic, Inc. - Plant #8 | 6.10 | | 12.47 | 3.10 |
| | Braxton Sawmill, Inc. | | 0.60 | 0.11 | 0.92 |
| | Carolina Finishing of North Carolina LLC - Elmira Street | 1.04 | 0.91 | | 13.88 |
| | CEMEX Construction Materials, Atlantic, LLC | | 0.31 | | |
| | City of Burlington - East Burlington WWTP | 1.20 | 0.08 | 0.11 | 5.92 |
| | City of Burlington - South Burlington WWTP | 0.57 | 0.01 | 0.00 | 0.01 |
| | City of Graham Wastewater Treatment Plant | 0.32 | 0.01 | | 0.01 |
| | Copland Industries, Inc. | 9.55 | 0.72 | 0.05 | 31.29 |
| | Craftique LLC | 0.10 | | | 11.23 |
| | Glen Raven Technical Fabrics, LLC | 8.08 | 0.59 | 0.07 | 35.31 |
| | ITG/Burlington Industries LLC - Burlington Finishing Plant | 14.01 | 6.54 | 0.08 | 3.24 |
| | Kayser-Roth Corporation - Mens Finishing | 4.28 | 0.08 | 0.03 | 0.90 |
| | Kingsdown, Incorporated | 0.24 | 0.51 | | 0.02 |
| | Liberty Dry Kiln, Inc. | 5.72 | 2.07 | 0.29 | 1.46 |
| | Liggett Group LLC | 2.83 | 0.96 | 0.05 | 126.71 |
| | Luxfer Inc. - Luxfer Gas Cylinders Division | 3.43 | | 0.02 | 1.82 |
| | Millender Furniture Company | | | | 4.02 |
| | Mount Vernon Chemicals, LLC / Apollo Chemical – Burlington | 1.45 | 0.11 | 0.01 | 5.02 |
| | National Spinning Co., Inc. - Alamance Co. Dyeing Operation | | | | 62.75 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | New South Lumber Company, Inc. - Graham Plant | 55.40 | 19.22 | 6.30 | 220.54 |
| | NovaFlex Hose Inc. | 5.41 | 0.10 | 4.54 | 1.21 |
| | Permatech Inc | | | | 0.59 |
| | Piedmont Truck Tires, Inc. - Graham Plant | 0.16 | | | 2.00 |
| | Riley Paving, Inc. | 0.84 | | 0.78 | 0.08 |
| | S.T. Wooten Corporation - Haw River Asphalt | 5.06 | 0.08 | 4.87 | 3.22 |
| | Stericycle, Inc. | 23.92 | 1.19 | 2.50 | 0.94 |
| Alamance Total | | 158.11 | 34.59 | 32.83 | 538.80 |
| Alexander | Brushy Mountain Dry Kilns, LLC | 4.59 | 1.66 | 0.23 | 0.12 |
| | Carpenter Company, Taylorsville Plant | 0.10 | | 0.34 | 12.38 |
| | Chase Coating & Laminating | 0.62 | 0.02 | | 1.83 |
| | Craftmaster Furniture Facility | | | | 7.64 |
| | Daniels Woodcarving Company, Inc. | 0.01 | 0.03 | | |
| | Hancock & Moore - Plant 1 | | | | 39.49 |
| | Hancock & Moore Plant 2 | 0.50 | 3.94 | 0.03 | 0.02 |
| | Hancock & Moore, Plant No. 3 | 0.12 | 4.59 | | 4.77 |
| | Hickory Springs Hiddenite | | | | 7.44 |
| | Huntington House, Inc. | | 2.95 | | 2.67 |
| | Industrial Timber, Inc. | | 0.16 | | |
| | J & R Sales, Inc. | | 0.20 | | |
| | LIAT, LLC - Jasper Library Furniture - Plant 2 | 0.26 | 0.00 | 0.94 | 10.69 |
| | Mitchell Gold | 0.34 | 0.16 | | 29.17 |
| | NC DOC-Enterprise Woodworking Plant | 1.15 | 0.08 | 0.17 | 4.29 |
| | Piedmont Fiberglass, Inc. | | 0.11 | | 16.78 |
| | Piedmont Wood Products | 0.02 | | 0.06 | |
| | Royale Comfort Seating Inc., Plant No. 1 | | | | 68.36 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Schneider Mills, Inc. | 3.05 | 0.23 | 15.83 | 0.07 |
| | Select Frames, Inc. | 0.03 | 0.05 | | |
| | Shurtape Technologies Inc. - Stony Point Plant | 0.22 | | 0.58 | 220.78 |
| | Taylor King Furniture, Inc. | | | | 6.57 |
| | Vintage Editions, Inc. | 0.03 | | | 4.86 |
| Alexander Total | | 11.04 | 14.18 | 18.18 | 437.93 |
| Alleghany | Chandler Concrete Co., Inc. - Sparta Plant 505 | 0.02 | | | |
| | Hearthstone Enterprises, Inc. dba Charleston Forge Plant V | | | | 8.46 |
| | International Pipes and Accessories LLC | 0.11 | 0.07 | 0.39 | 1.49 |
| Alleghany Total | | 0.13 | 0.07 | 0.39 | 9.95 |
| Anson | B.V. Hedrick Gravel and Sand Company | 0.31 | 0.02 | 0.02 | 0.03 |
| | Bonsal American | 0.13 | 0.48 | | 0.01 |
| | Coffing Hoists | | | | 6.62 |
| | CP&L - Blewett Hydroelectric Plant | 7.39 | 0.06 | 1.09 | |
| | Hildreth Septic Tanks | | 0.02 | | |
| | Hornwood Inc | 5.00 | 23.41 | 0.04 | 16.01 |
| | NCEMC - Anson Plant | 118.82 | 31.29 | 0.78 | 23.99 |
| | The Quikrete Companies - Peachland Plt | 1.78 | 0.22 | | 0.14 |
| | Triangle Brick Co – Wadesboro | 7.36 | 9.48 | 17.78 | 3.21 |
| | Valley Protein Inc - Wadesboro Div | 21.10 | 0.71 | 3.38 | 13.05 |
| | Venture Milling- Ansonville | | 0.31 | | |
| | Wade Manufacturing Co – Wadesboro | 5.03 | 6.58 | 0.02 | 12.67 |
| Anson Total | | 166.92 | 72.58 | 23.11 | 75.73 |
| Ashe | Adams Construction Company | 5.65 | | 12.02 | 0.52 |
| | Elk Creek International, Inc. | 25.34 | 9.16 | 1.30 | 5.36 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Halcore Group, Inc. d/b/a American Emergency Vehicles, Inc. | 0.27 | 0.24 | 0.00 | 29.06 |
| | Jordan Land Development, Inc. | 1.32 | 0.10 | 0.05 | 0.11 |
| | Leviton Manufacturing Company, Inc. | 1.35 | | 0.91 | 1.13 |
| | Paddy Mountain Lumber, Inc. - M & N Wood Products | 12.23 | 8.16 | 0.62 | 3.05 |
| | Radford Quarries of Boone, Inc. | 4.59 | 0.32 | 0.30 | 0.37 |
| | The Gates Corporation | 7.70 | 0.58 | 0.04 | 4.59 |
| | United Chemi-Con, Inc. | 4.12 | 0.32 | 5.75 | 0.14 |
| Ashe Total | | 62.57 | 18.88 | 20.99 | 44.33 |
| Avery | Banner's Cabinets, Inc. | | 0.16 | | 5.59 |
| | Lees-McRae College | 1.42 | 0.02 | 0.50 | 0.07 |
| | Maymead Materials Inc | 2.70 | | 5.00 | 2.30 |
| | Rare Woods Manufacturing, Inc. | | | | 0.03 |
| | U.S. Textile Corporation | 0.68 | 0.01 | 2.40 | 0.02 |
| | Unimin Corp - Schoolhouse Quartz Plant | 2.36 | 0.38 | 0.02 | 0.06 |
| Avery Total | | 7.16 | 0.57 | 7.92 | 8.07 |
| Beaufort | Brooks Boatworks Inc | | | | 0.30 |
| | DPD Concrete Chocowinity | | 0.44 | | |
| | DPD Team Concrete-Belhaven | | 0.24 | | |
| | Flanders Filters, Inc. | 3.22 | 0.14 | 1.11 | 23.12 |
| | Fountain Power Boats | | 0.07 | | 8.72 |
| | Impressions Marketing Group, Inc. | | | | 1.60 |
| | International Broadcasting Bureau -Transmitter Site A | 0.03 | 0.00 | 0.00 | 0.00 |
| | National Spinning Company – Washington | 0.94 | | 0.28 | 0.82 |
| | OBI Linings Inc | 0.12 | | 0.04 | 2.11 |
| | PCS Phosphate Company Inc. – Aurora | 708.63 | 162.00 | 3554.42 | 105.18 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Perdue Grain and Oilseed, LLC – Pantego | 0.20 | 2.15 | | 0.02 |
| | Radcliffe Marine Sales & Service | | | | 1.47 |
| | Riverside Grain Company, Inc. | 0.20 | | 0.80 | |
| | Stanadyne Corporation | 0.29 | 0.02 | | 13.52 |
| | VT Hackney, Inc. | | | | 12.45 |
| | Weir Valves & Controls, USA | | | | 0.74 |
| Beaufort Total | | 713.63 | 165.06 | 3556.65 | 170.05 |
| Bertie | Avoca Incorporated | 9.07 | 0.18 | 13.60 | 231.31 |
| | Eastern Carolina Regional Solid Waste Landfill | 18.66 | 3.06 | 2.33 | 14.93 |
| | Perdue Farms Inc – Lewiston | 42.81 | 0.98 | 11.68 | 12.12 |
| | Rose Brothers Paving Co Inc. – Windsor | 6.81 | | 5.58 | 0.67 |
| Bertie Total | | 77.35 | 4.22 | 33.19 | 259.03 |
| Bladen | Columbus Industries, LLC | | | | 2.26 |
| | Danaher Sensors & Controls | | | | 0.51 |
| | DuPont Company - Fayetteville Works | 43.89 | 7.93 | 2.04 | 296.10 |
| | Elizabethtown Energy, LLC | 0.05 | | | 0.31 |
| | KBAR Parts L.L.C. | | | | 0.35 |
| | Lower Cape Fear Water & Sewer Authority - Kings Bluff | 0.12 | | 0.02 | |
| | Murphy-Brown, LLC-Bladenboro Feed Mill | 4.73 | 24.15 | 0.04 | 0.26 |
| | Peanut Processors Inc - Plt 1 | 0.24 | 0.02 | | 0.02 |
| | Peanut Processors Inc - Plt 2 | 0.66 | 0.02 | | 0.04 |
| | Piedmont Natural Gas-Bladenboro Compressor Station | 1.13 | | | 0.02 |
| | Sachs Peanuts, LLC | 0.96 | 0.02 | | 0.06 |
| | Smithfield Packing Company Inc - Tar Heel | 54.07 | 7.05 | 13.67 | 21.41 |
| | Taylor Mfg | | | | 6.17 |
| Bladen Total | | 105.85 | 39.19 | 15.77 | 327.51 |
| Brunswick | American Distillation, Inc. | 2.62 | 0.03 | | 67.37 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Archer Daniels Midland Company | 28.20 | 2.28 | 1.01 | 4.94 |
| | Barnhill Contracting Company – Shallotte | 4.52 | | 7.81 | 0.82 |
| | Carolina Pole Leland, Inc. | 15.05 | 30.57 | 1.71 | 46.06 |
| | CPI USA North Carolina - Southport Plant | 752.04 | 32.24 | 1970.81 | 6.27 |
| | DAK Americas LLC | 1022.38 | 34.27 | 2163.97 | 1097.47 |
| | ExxonMobil Chemical Company | 0.02 | | | 2.02 |
| | Glycotech, Inc. | | | | 4.04 |
| | Malmo Asphalt Plant | 3.16 | | 6.50 | 2.21 |
| | Progress Energy Carolinas - Brunswick Plant | 14.43 | 0.48 | 0.31 | 0.40 |
| | Ready Mixed Concrete Company – Leland | | 0.75 | | |
| | Technical Coating International, Inc. | 0.28 | 0.02 | | 112.02 |
| | US Marine Navassa | 0.04 | 0.03 | | 0.02 |
| | Victaulic Company | 1.38 | | 0.01 | 9.45 |
| Brunswick Total | | 1844.12 | 100.67 | 4152.13 | 1353.09 |
| Burke | Adden Furniture, Inc. | 0.06 | | 0.38 | 1.63 |
| | American Concrete, Inc. | | 0.26 | | |
| | Bakers Waste Equipment, Inc. | | 1.30 | | 35.17 |
| | Blackstone Wood Products, Inc. | | 0.03 | | 2.71 |
| | Brackett Brothers Corp | | 0.07 | | |
| | Broughton Hospital | 7.65 | 0.78 | 17.84 | 0.29 |
| | Carolina Frameworks | | 0.02 | | |
| | Case Farms Processing, Inc. - Rand St. | 4.74 | 0.36 | 0.03 | 0.26 |
| | Caterpillar Inc. - Precision Engine Components – Morganton | 2.40 | 0.04 | 0.02 | 3.25 |
| | Chesterfield Wood Products, Inc. | | 0.03 | | |
| | Drexel Heritage Furniture Industries, Inc. Plt. 60 | 3.81 | 0.86 | 4.24 | 69.09 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | E J Victor Inc | 0.50 | 0.04 | | 17.91 |
| | E J Victor Upholstery Division | 0.11 | | 0.41 | 1.02 |
| | Earthgrains Baking Companies, Inc. | 3.13 | 3.30 | 0.01 | 127.45 |
| | Environmental Inks - A Member of the Siegwerk Group | | | | 2.90 |
| | FBI, Inc., Drexel Heritage Furniture - Plant 7 | 0.03 | 0.02 | | 7.40 |
| | Ferguson Copeland, LLC d/b/a Ferguson Copeland Ltd | 0.40 | 0.01 | | 26.25 |
| | Hairfield Wilbert Burial Vault Company | | | | 3.18 |
| | Kaylow Furniture Company | | | | 9.35 |
| | Kellex Corporation, Inc. - Valdese Manufacturing | 3.24 | 1.77 | 0.17 | 5.21 |
| | Kohler Co., DBA Baker Furniture | 7.48 | 3.47 | 0.38 | 53.46 |
| | Kontane, Inc. | | 0.06 | | |
| | Leviton - Southern Devices Div | 1.25 | 0.02 | 0.01 | 16.13 |
| | Lexington Furniture Industries - Plant No. 10 | 0.14 | 0.06 | 0.51 | 7.87 |
| | Marves Industries, LLC - Hildebran Facility | 0.01 | | | |
| | Maymead Materials, Inc. - Hildebran Plant | 1.89 | | 4.68 | 0.90 |
| | Maymead Materials, Inc. - Morganton Plant | 3.50 | 0.80 | 4.60 | 0.91 |
| | Meridian Specialty Yarn Group, Inc. - Valdese Plant | 3.76 | 0.20 | 0.02 | 0.21 |
| | Molded Fiberglass Co/North Carolina | 2.01 | 0.15 | 0.01 | 15.12 |
| | Momentive Specialty Chemicals, Inc. - Morganton | 2.00 | 0.15 | 0.01 | 1.48 |
| | NC DOC Western Youth Institution #3905 | 0.22 | 0.01 | | 0.02 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | NC Municipal Power Agency No. 1 - Morganton | 1.15 | 0.02 | 0.02 | 0.04 |
| | North Carolina Municipal Power Agency No. 1 - Drexel | 0.99 | 0.02 | 0.02 | 0.04 |
| | North Carolina Municipal Power Agency No. 1 - Morganton | 0.63 | 0.01 | 0.40 | 0.02 |
| | Packaging Corporation Of America | 0.59 | 0.09 | 0.03 | 1.89 |
| | Ran's Finishing, Inc. | | | | 4.60 |
| | Roy and JoAnn Pritchard, d/b/a Cut Right Frame Company | | 0.31 | | 0.14 |
| | S&B Industrial Minerals North America, Inc. | 1.49 | 3.63 | 0.01 | 0.08 |
| | Saft America, Inc. | 0.59 | 0.04 | 0.22 | 136.69 |
| | SBFI-NA, Inc. | 0.04 | | | 0.63 |
| | SGL Carbon LLC | 17.81 | 111.17 | 201.58 | 1.13 |
| | SpartaCraft Inc | 0.07 | | 0.25 | 12.00 |
| | Valdese Textiles Inc | 0.79 | 0.01 | | 0.60 |
| | Valdese Weavers, Inc. Crescent Street Plant | 2.74 | 0.05 | 0.02 | 0.15 |
| | Valdese Weavers, LLC - Plant No. 1 | 5.55 | 0.42 | 0.03 | 0.31 |
| | Viscotec Automotive Products, LLC | 9.25 | 2.76 | 0.06 | 0.68 |
| | Vulcan Construction Materials LP - Morganton | | 0.06 | | |
| | Vulcan Construction Materials, LP - Burke Quarry | | 0.02 | | |
| | W.M. Cramer Lumber Co | 3.23 | 2.14 | 0.19 | 4.37 |
| | WNC Dry Kiln, Inc. - Morganton | 5.19 | 1.87 | 0.26 | 1.76 |
| | Wright Table Company | | 0.01 | | 3.28 |
| Burke Total | | 98.44 | 136.44 | 236.41 | 577.58 |
| Cabarrus | Americhem, Inc. | 1.46 | 0.12 | 0.35 | 0.15 |
| | Berenfield Containers SE Ltd | 1.13 | 0.10 | 0.01 | 93.98 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | BFI Waste Systems of North America, CMS Landfill V | 39.55 | 11.19 | 10.22 | 24.35 |
| | Blythe Brothers Asphalt Co., LLC - Concord Plant | 7.80 | | 13.70 | 6.20 |
| | Blythe Construction, Inc., Plant No. 2 | 2.39 | | 4.75 | 1.95 |
| | Builders FirstSource-Atlantic Group, Inc. | | | | 0.15 |
| | Carolina Counters Corporation | 0.08 | | 0.03 | 2.27 |
| | Chemical Specialties, Inc. | 10.72 | 0.14 | 0.02 | 6.86 |
| | CMC - Northeast, Inc. | 14.05 | 0.71 | 1.33 | 0.67 |
| | Concord City Generating Plant #1 | 20.00 | 0.58 | 1.40 | 1.13 |
| | Concord City Generating Plant #2 | 15.00 | 0.43 | 0.99 | 0.82 |
| | Concrete Supply Company, Concord Plant | 0.06 | | | |
| | Corning Incorporated | 138.54 | 3.01 | 0.05 | 27.63 |
| | Ferebee Asphalt Corporation | 2.91 | | 0.01 | 4.51 |
| | Galvan Industries, Inc. | 3.18 | 4.62 | 0.02 | 0.18 |
| | Greif Packaging, LLC - Southeastern Packaging | 3.44 | 0.26 | 0.01 | 0.19 |
| | Johnson Concrete Company, Piedmont Block Division | 0.58 | | | 0.03 |
| | Martin Marietta Materials, Inc. - Bonds Quarry | 14.02 | | 0.92 | 1.14 |
| | McGee Brothers Company, Inc. | 0.01 | | | |
| | Morton Custom Plastics, Inc., A Wilbert Company | | | | 0.66 |
| | Owens Corning Sales, LLC-Concord | | 0.03 | | |
| | Perdue Farms Incorporated, Concord | 7.51 | | 0.05 | 0.41 |
| | Philip Morris USA Inc., Cabarrus Manufacturing Facility | 3.34 | 0.38 | 0.06 | 0.28 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Piedmont Natural Gas - Concord Compressor Station | 5.78 | 0.37 | 0.03 | 6.54 |
| | Rinker Materials Concrete Pipe Division | 0.36 | 0.01 | | 0.02 |
| | S & D Coffee, Inc. | 4.91 | 8.95 | 0.03 | 68.47 |
| | Southern Concrete Materials - Concord Plant | 0.01 | | | |
| | Technicon Acoustics | 0.17 | | | 0.01 |
| | Thomas Concrete Company, Inc., Concord Plant | 0.18 | 0.01 | | 0.01 |
| | Thomas Concrete of Carolina, Inc. - Harrisburg Plant | 0.35 | 0.02 | | 0.03 |
| | Vulcan Construction Materials LP - Cabarrus Quarry | | 0.37 | | |
| | Vulcan Construction Materials LP - Gold Hill | 2.24 | 0.19 | 0.35 | 0.06 |
| | Whitley Handle, Inc. | | 0.01 | | 35.45 |
| | WSACC - Rocky River Regional WWTP | 13.93 | 0.15 | 1.81 | 4.43 |
| | WSACC-Lower Rocky River Pump Station | 0.39 | 0.01 | 0.06 | |
| Cabarrus Total | | 314.09 | 31.66 | 36.20 | 288.58 |
| Caldwell | Associated Hardwood Products, Inc. | 30.18 | 10.93 | 1.54 | 6.78 |
| | Autumn House, Inc. | | 0.02 | | 0.13 |
| | Avery Dennison Corporation - Lenoir | 4.51 | 0.09 | 0.03 | 31.69 |
| | B & E Woodturning, Inc. | 0.02 | | 0.07 | |
| | Bernhardt Furniture Company - Plants 2 & 5 | 4.23 | 1.83 | 0.60 | 15.21 |
| | Bernhardt Furniture Company - Plants 3 & 7 | 8.66 | 5.38 | 0.44 | 70.37 |
| | Blue Ridge Tissue Corporation - Patterson Mill | 4.26 | 0.19 | 15.13 | 0.05 |
| | Boone Lumber, Inc. | | 0.21 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Burns Wood Products, Inc. | | 0.05 | | 0.88 |
| | D.R. Kincaid Chair Company, Inc. | | 0.41 | | 4.38 |
| | Davis Wood Products, Inc. | | 0.01 | | 0.07 |
| | ECMD, Inc., d/b/a Crown Heritage | 0.06 | 0.02 | 0.21 | 0.01 |
| | Fairfield Chair Plant 1 | 3.28 | 0.58 | 0.17 | 0.76 |
| | Fairfield Chair Plant No. 2 | 7.31 | 4.63 | 0.37 | 82.74 |
| | Grand Manor Furniture, Inc. | 0.08 | 0.86 | | 4.25 |
| | Granite Hardwoods, Inc. | 9.29 | 3.28 | 0.47 | 0.32 |
| | H. Parsons, Inc. | | 2.04 | | |
| | Hickory Springs Manufacturing Company - Lenoir Plant | | | | 6.10 |
| | Hickory Springs Manufacturing Company, Allen-Beck Ind. Inc. | | | | 5.05 |
| | J & M Woodworking Plant 2 | 0.19 | 0.10 | 0.01 | 3.36 |
| | Jacob D. Sanders d.b.a. Valley Woodworking Company | | 0.10 | | |
| | Kerr's Hickory Ready-Mixed Concrete Co., Inc. | | 0.98 | | |
| | Kincaid Furniture Company, Inc. - Plant No. 1 | 47.88 | 17.86 | 2.36 | 132.16 |
| | Kincaid Furniture Company, Inc.; La-Z-Boy Casegoods | | 0.00 | | 2.14 |
| | Lenoir Mirror Company, Plants 1 & 3 | 0.29 | 0.02 | 0.59 | 34.06 |
| | Log Homes of America Inc dba Log Home Cooperative of America | | 0.18 | | |
| | M & S Warehouse, Inc. | 0.20 | 0.03 | 0.08 | |
| | Magna Composites, LLC - Lenoir | 1.42 | 0.21 | 0.01 | 23.15 |
| | Mat NuWood LLC | 0.48 | 0.17 | 0.00 | 3.07 |
| | McCreary Modern Inc - Upholstery Plant | | | | 23.40 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | McCreary Modern, Inc. - Plant No. 6 | 0.10 | 0.04 | 1.51 | 0.01 |
| | McGee's Crating, Inc. | | 3.97 | | |
| | Midstate Contractors, Inc. | 1.82 | 0.41 | 5.66 | 0.45 |
| | Minton Ventures, LLC | 2.39 | 0.87 | 0.12 | 0.08 |
| | NEPTCO, Inc. | 3.79 | 0.11 | 0.02 | 60.77 |
| | New River Building Supply, Inc. | | 0.01 | | |
| | Pine Mountain Finishing, Inc. | | | | 10.85 |
| | Pregis Innovative Packaging, Inc. | 2.12 | 0.17 | 0.02 | 174.11 |
| | Robinson Lumber Company, Inc. | 6.27 | 4.46 | 0.32 | 1.70 |
| | RPM Wood Finishes Group, Inc. | | 0.60 | | 69.70 |
| | Sealed Air Corp - Hudson | 2.63 | | | 32.51 |
| | Sealed Air Corporation | 0.93 | 0.01 | 3.29 | 55.85 |
| | Shuford Yarns, LLC, Dudley Shoals Plant | | | | 0.35 |
| | Shurtape Technologies, Inc. - Plant No. 24 | 1.45 | 0.11 | 0.01 | 95.97 |
| | The Woodsmiths Company | 0.97 | 0.60 | 0.04 | 3.54 |
| | Thomasville Furniture Industries, Inc. - Lenoir Plant | 20.39 | 5.45 | 17.57 | 330.00 |
| | Timber Wolf Forest Products, Inc. | | 0.02 | | 1.98 |
| | Tommy Ray Shew dba Caldwell Woodcarving and Turning Company | 0.05 | 0.04 | | |
| | Vulcan Construction Materials, LP - Lenoir Quarry | | 0.04 | | |
| | Wood Character Builders LLC | | 0.54 | | |
| Caldwell Total | | 165.25 | 67.62 | 50.64 | 1287.99 |
| Camden | C & L Concrete Works Inc | 3.17 | | 9.68 | 0.22 |
| | George Wood Farms Inc | 0.78 | | 2.77 | 0.01 |
| Camden Total | | 3.95 | | 12.45 | 0.23 |
| Carteret | Atlantic Veneer Corporation | 7.22 | 4.84 | 4.43 | 1.79 |
| | Bally Refrigerated Boxes, Inc. | | | | 7.48 |
| | Carteret General Hospital | 1.47 | 0.03 | 0.27 | 0.09 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | CP&L - Morehead City Plant | 1.40 | 0.02 | 0.32 | |
| | Jones Brothers Marine Manufacturing, Inc. | | | | 7.92 |
| | NC State Ports Authority - Morehead City | | | | 0.11 |
| | Open Grounds Farm, Inc. | 1.87 | 0.41 | | 0.05 |
| | Parker Marine Enterprises Inc | | | | 9.59 |
| | PCS Phosphate - Radio Island Terminals | 6.34 | 0.99 | 24.47 | 0.04 |
| | PCS Phosphate Company, Inc. - Morehead City Port | | 0.13 | | |
| | Veneer Technologies, Inc. | | 0.03 | | 23.50 |
| | W A Page & Sons Inc | 1.41 | 2.86 | 0.16 | 0.11 |
| Carteret Total | | 19.71 | 9.31 | 29.65 | 50.68 |
| Caswell | Piedmont Asphalt, LLC | 3.47 | | 6.28 | 1.61 |
| | Southside Materials, LLC - Shelton Quarry | | 0.21 | | |
| Caswell Total | | 3.47 | 0.21 | 6.28 | 1.61 |
| Catawba | Appalachian Hardwood Flooring | 4.95 | 0.66 | 0.25 | 0.47 |
| | Armacell Engineered Foams | 5.22 | 2.11 | 0.03 | 9.84 |
| | Bassett Upholstery Division | 4.54 | 1.97 | 2.97 | 24.14 |
| | Blackburn Sanitary Landfill | 38.93 | 6.60 | 2.60 | 3.84 |
| | Blue Ridge Products, Inc. | | | | 3.18 |
| | Carolina Container Company | 2.23 | 3.45 | 0.01 | 1.58 |
| | Carolina Curves, Inc. | 0.01 | 0.01 | | 4.86 |
| | Carolina Foam, LLC - Claremont | | | | 8.03 |
| | Carolina Foam, LLC - Maiden | | | | 2.21 |
| | Carolina Glove Company, Plant #8 | 0.10 | | | 1.54 |
| | Carolina House Furniture, Inc. | | | | 4.40 |
| | Carolina Paving of Hickory, Inc. | 2.09 | | 5.06 | 1.01 |
| | Carolina Pelleting and Extrusion, Inc. | | 0.02 | | |
| | Carolina Solvents, Inc. | 0.06 | | 0.02 | 9.59 |
| | Carpenter Company Conover | 1.23 | 0.04 | 0.02 | 8.35 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Carpenter Company, Long View Plant | | | | 9.74 |
| | Carving Craft, Inc. | 0.03 | 0.01 | | 0.01 |
| | Catawba Sox, LLC | 0.03 | | | |
| | Century Furniture Company, Upholstery Division-Plant #2 | 0.17 | 0.18 | | 4.60 |
| | Century Furniture Industries Plant #1 | 9.92 | 6.59 | 0.48 | 113.96 |
| | Century Furniture Industries, Inc., Plant #3 | 0.50 | 0.47 | | 28.49 |
| | Certainteed Vinyl Operations | | | | 13.79 |
| | Classic Leather, Inc. | 2.35 | 2.16 | 1.01 | 42.08 |
| | Commercial Fabricators, Inc. | | | | 25.97 |
| | Commscope Inc. - Claremont Operations | 1.19 | 0.04 | | 9.00 |
| | Commscope, Inc. - Catawba Plant | 3.17 | 0.11 | | 8.04 |
| | Conover Lumber Company, Inc. | 0.85 | 0.31 | 0.04 | 1.97 |
| | Corning Cable Systems, LLC - Hickory Cable Facility | | | | 39.96 |
| | Craftwork Guild, Ltd. | | 0.06 | | |
| | Cranford Woodcarving, Inc. Plant #1 | | 0.02 | | |
| | Custom Frame Works, Inc. | | 3.85 | | |
| | D & S Frames, Inc. | | 2.25 | | 0.05 |
| | Delta Apparel, Inc. | 13.69 | 0.28 | 0.08 | 1.97 |
| | Dimension Wood Products, Inc. - Brian Drive Plant | | 0.04 | | 4.20 |
| | Dimension Wood Products, Inc., Plant 1 | | 0.02 | | |
| | Distinction Leather Company, Plant #1 | | | | 1.54 |
| | Draka Communications Americas, Inc. | 166.29 | 0.08 | 5.17 | 17.25 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Duke Energy Carolinas, LLC - Marshall Steam Station | 9608.90 | 1221.81 | 3657.90 | 145.52 |
| | Eades Wood, Inc. d/b/a Timber Creek Wood Products | | 0.01 | | |
| | Elite Wood Products, Inc. | | 0.57 | | 0.04 |
| | Ethan Allen Operations, Inc. - Maiden Division | 4.86 | 0.77 | 0.21 | 12.79 |
| | Flowers Baking Co. of Newton, LLC | 3.33 | 0.45 | 0.02 | 1.17 |
| | Framewright, Inc. | 0.02 | 0.68 | | 0.13 |
| | Frye Regional Medical Center | 12.87 | 0.90 | 0.25 | 0.65 |
| | GKN Sinter Metals, Inc. | 0.76 | 0.70 | | 0.04 |
| | Hardwood Furniture, Inc. | | 0.64 | | 12.08 |
| | Hickory Chair Company | 6.05 | 2.43 | 4.70 | 87.63 |
| | Hickory Printing Solutions, LLC | 0.02 | | | 59.37 |
| | Hickory Springs Manufacturing - Conover Complex | 0.41 | | 0.01 | 209.58 |
| | Hickory Springs Manufacturing Company | 4.48 | 0.20 | 0.04 | 1.71 |
| | HK Research Corporation | 0.23 | | | 0.79 |
| | HM Frame Company, Inc. dba HM Woodworking, Inc. | | 1.67 | | 0.15 |
| | HNI Corporation | 0.43 | 0.01 | | 15.87 |
| | HWS Company Inc. dba Hickory White | 5.67 | 2.79 | 0.28 | 74.28 |
| | International Cushioning Company, LLC Hickory | 0.11 | 0.09 | 1.59 | 123.90 |
| | International Paper Company - Newton Container Plant | 1.46 | 0.74 | 0.01 | 3.17 |
| | J. T. Russell & Sons, Inc. - Conover Plant | 21.87 | 0.04 | 26.87 | 17.59 |
| | Klingspor Abrasives, Inc. | | | | 1.35 |
| | Kroehler Furniture Mfg. Co. Inc. | | | | 13.50 |
| | Laneventure | 0.29 | 1.06 | | 38.89 |
| | Leathercraft, Inc. | | 0.01 | | 2.39 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Lee Industries, Inc. | 1.34 | 0.05 | | 4.39 |
| | Lee Roys Frame Company, Inc. | | 1.02 | | 0.16 |
| | Magna Composites LLC | | | | 2.23 |
| | Maymead Materials, Inc. - Hickory Plant | 1.70 | | 3.50 | 0.90 |
| | McCreary Modern - Maiden Frame Plant | | 0.04 | | |
| | Meghan Blake Industries, Inc. dba Fine Furniture | | 0.95 | | |
| | Meghan Blake Industries, Inc. dba Hickory Leather Co. | | | | 6.10 |
| | Midstate Contractors, Inc. | 2.17 | | 2.89 | 2.52 |
| | Midstate Mills, Inc. | 0.41 | 0.28 | | 0.02 |
| | NC Municipal Power Agency No. 1 - Maiden Community Ctr Unit | 0.65 | 0.01 | 0.41 | 0.02 |
| | NC Municipal Power Agency No. 1-Maiden | 0.60 | 0.01 | 0.01 | 0.02 |
| | Newton Sanitary Landfill | 0.71 | 0.30 | 0.38 | 0.14 |
| | Newton Wood Carving Company, Inc. | | 1.27 | | |
| | Parker Southern, Inc. | | | | 6.96 |
| | Plastic Packaging Inc | 0.55 | 0.04 | | 201.93 |
| | Prodelin Catawba Molding Facility | | | | 7.74 |
| | Quaker Furniture, Incorporated dba Studio Q Furniture | 1.03 | 0.05 | 0.01 | 23.46 |
| | R & D Plastics of Hickory Ltd. | | | | 25.20 |
| | Ramsey's Finishing, Inc. | | 1.11 | | 42.40 |
| | Robert Abbey, Inc. | 0.12 | 0.01 | | 1.93 |
| | Rock-Tenn Company - Claremont Folding | | | | 25.40 |
| | Rock-Tenn Company Conover Folding | 0.02 | | | 26.11 |
| | Rudisill Frame Shop, Inc. | | 0.87 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Sherrill Furniture Company, Inc. | 1.40 | | 0.01 | 18.68 |
| | Sherrill Furniture Company, Inc., CTH-Sherrill Occasional | 0.31 | | | 31.28 |
| | Shuford Yarns, LLC - Hickory Spinners Plant | | | | 0.35 |
| | Shurtape Technologies - Hickory/Highland Plt | 10.00 | 0.75 | 0.07 | 246.67 |
| | Sipes Carving Shop, Inc. | | 0.10 | | |
| | Snyder Paper Corporation | | | | 31.22 |
| | Southern Furniture Company of Conover #1 | 3.83 | 0.90 | 0.20 | 3.18 |
| | Southern Graphic Systems, Inc. | | | | 1.05 |
| | Southwood Furniture Corporation | | 0.07 | | 1.90 |
| | Southwood Furniture Corporation - Plant No. 3 | 0.06 | 0.02 | 0.02 | |
| | Special Metals Welding Products Company | 0.74 | 0.06 | | 0.04 |
| | Stanford Furniture Corporation | | | | 3.05 |
| | Star Furniture Company | | 1.04 | | 0.05 |
| | Structural Steel of Carolina - Hickory Steel | | | | 5.30 |
| | Style Upholstering, Inc. | | 1.11 | | 2.08 |
| | Sure Wood Products, Inc. | | 0.84 | | |
| | Synthetics Finishing - Conover | 0.27 | 0.02 | | 0.01 |
| | Synthetics Finishing Longview | 1.76 | 0.05 | | 0.10 |
| | Terra-Mulch Products, LLC | 6.99 | 0.08 | 0.05 | 46.73 |
| | Thomasville Furniture Industries, Inc., Upholstery Plant 5 | 0.03 | | | |
| | Timmerman Mfg. Inc. | | | | 4.09 |
| | Tradewinds International, Inc. | 3.08 | 1.11 | 0.16 | 0.11 |
| | TSG, Inc. - Combeau Industries | 0.67 | 0.05 | | 3.21 |
| | Unifour Finishers, Inc., Division II | 0.44 | 0.01 | | 30.14 |
| | Unifour Frame Company | | 0.14 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Vanguard Furniture Company, Inc., Plant No. 2 | 0.28 | 0.06 | | 19.90 |
| | Wesley Hall Incorporated | | | | 12.53 |
| | Wood Products of Conover | | 0.03 | | 9.19 |
| Catawba Total | | 9968.47 | 1279.34 | 3717.33 | 2076.73 |
| Chatham | 3M Industrial Mineral Products | 15.68 | 50.07 | 0.10 | 8.83 |
| | Acme-McCrary Corporation - Siler City Plant | 0.41 | 0.01 | | 0.02 |
| | Arclin USA, LLC | 1.80 | 0.03 | 0.01 | 2.65 |
| | Carolina Wood Enterprises, Inc. | 3.23 | 5.37 | 0.37 | 18.60 |
| | General Shale Brick, Inc. Moncure Facility | 39.14 | | 72.80 | 8.18 |
| | Goldston Lumber, Inc. | | 7.13 | | |
| | Luck Stone Corporation - Pittsboro Plant | 1.55 | 0.11 | 0.10 | 0.13 |
| | Moncure Plywood, LLC | 33.44 | 56.26 | 3.06 | 35.11 |
| | Olympic Steel - PS&W | 0.64 | 0.01 | | 17.29 |
| | Performance Fibers, Inc. | 31.26 | 12.14 | 27.60 | 125.33 |
| | Progress Energy Carolinas - Cape Fear Plant | 2990.01 | 197.11 | 13352.37 | 22.85 |
| | S. T. Wooten Corporation/Apex Plant -Plant No. 18 | | 0.66 | | |
| | S.T. Wooten - Pea Ridge Asphalt Plant | 3.80 | | 7.58 | 2.10 |
| | S.T. Wooten - Pittsboro Asphalt Plant | 4.50 | | 10.60 | 2.60 |
| | Townsends Bonlee Plant #1 (9215) | 2.31 | 12.20 | 34.47 | 0.02 |
| | Townsends Bonlee Plant #2 (9217) | 2.05 | 10.70 | 7.28 | 0.02 |
| | Triangle Brick Company - Merry Oaks | 6.95 | 11.61 | 3.45 | 3.61 |
| | Uniboard USA LLC | 278.79 | 93.80 | 11.13 | 487.17 |
| Chatham Total | | 3415.56 | 457.21 | 13530.92 | 734.51 |
| Cherokee | Cherokee County Landfill | 0.48 | 0.12 | 0.11 | 0.64 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Harrison Construction Division of APAC-Atlantic Inc. | 0.91 | | 3.63 | 0.06 |
| | Moog, Inc. | | 0.05 | | 0.01 |
| | TEAM Industries Andrews, Inc. | 0.95 | 0.04 | | 4.20 |
| Cherokee Total | | 2.34 | 0.21 | 3.74 | 4.90 |
| Chowan | Albemarle Sportfishing Boats | 1.83 | 0.23 | 0.52 | 1.98 |
| | Carolina Classic Boats Inc | | | | 1.50 |
| | Regulator Marine Inc | 0.79 | 0.20 | 0.25 | 24.84 |
| | Seabrook Ingredients | 2.00 | 12.00 | | |
| Chowan Total | | 4.62 | 12.43 | 0.77 | 28.32 |
| Clay | Colwell Construction Company, Inc. - Asphalt Plant | 4.23 | | 4.79 | 1.52 |
| Clay Total | | 4.23 | | 4.79 | 1.52 |
| Cleveland | Asphalt Paving of Shelby, Inc. | 2.19 | 0.02 | 0.01 | 1.61 |
| | Baldor Electric Company | 2.28 | 0.30 | 0.01 | 17.99 |
| | Blachford RP Corporation/Kings Mountain Plant | 0.01 | 0.02 | | 3.86 |
| | Case Farms, LLC - Feed Mill | 0.07 | 1.55 | 0.19 | |
| | Chemetall Foote Corporation Kings Mountain | 0.53 | 0.07 | 0.00 | 5.95 |
| | Cleveland Regional Medical Center | 5.43 | 0.37 | 0.40 | 0.30 |
| | CNA Holdings, Inc.; Ticona Polymers Shelby Plant | 16.37 | 1.65 | 0.28 | 79.76 |
| | Concrete Supply Company, Portable Plant | 0.10 | 0.01 | | 0.01 |
| | Cunningham Brick Company, Inc. | 6.49 | 19.62 | 12.43 | 1.01 |
| | Curtiss-Wright Controls, Inc. | | | | 18.15 |
| | CVG Acquisition, LLC - Kings Mountain Plant | 2.46 | 0.09 | 0.01 | 43.07 |
| | Dicey Fabrics, Inc. | 0.42 | | | 0.02 |
| | Eaton Corporation Transmission Division | 5.15 | | 0.06 | 0.41 |
| | Ellis Lumber Company, Inc. | 0.41 | 0.01 | | 3.03 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | IMC-MetalsAmerica, LLC | 2.50 | 0.16 | 0.09 | 0.17 |
| | Kings Mountain Minerals, Inc. - Moss Plant | 1.97 | 0.05 | 0.01 | 0.11 |
| | Kings Mountain Minerals, Inc. - Battleground | 1.07 | 0.12 | 0.01 | 0.06 |
| | Kings Mountain Minerals, Inc. - Patterson | 0.53 | 0.01 | | 0.03 |
| | NC Municipal Power Agency No. 1-Shelby Plant | 0.57 | 0.01 | 0.01 | 0.02 |
| | Performance Fibers Operations, Inc. - Shelby | | | | 5.11 |
| | PPG Industries Fiber Glass Products Inc | 84.56 | 0.92 | 24.57 | 36.90 |
| | Rea Contracting (Kings Mountain) | 6.70 | 2.00 | 15.86 | 3.20 |
| | Rock Tenn CP, LLC | 1.94 | | 0.39 | 0.73 |
| | Wellington Hamrick, Inc., Shelby Plant | | 0.09 | | |
| Cleveland Total | | 141.75 | 27.07 | 54.34 | 221.51 |
| Columbus | Frank Horne Construction, Inc. | 0.15 | 0.24 | 0.02 | 0.01 |
| | Georgia - Pacific Whiteville Plant | 1.96 | 0.83 | 2.23 | 0.36 |
| | International Paper - Riegelwood Mill | 1866.09 | 306.44 | 1176.48 | 3091.12 |
| | J L Powell & Company, Inc. | | 0.33 | | |
| | Kroy Building Products, Inc. | | 0.26 | 0.17 | 0.46 |
| | Momentive Specialty Chemicals, Inc. - Acme Operations | 25.90 | 5.01 | 47.12 | 37.77 |
| | National Spinning Company - Whiteville | 3.37 | 0.48 | 12.52 | 0.01 |
| | Perdue Grain and Oilseed, LLC | 0.04 | 0.16 | | |
| | West Fraser, Inc. - Armour Lumber Mill | 155.53 | 161.08 | 11.11 | 341.13 |
| | Whiteville Plywood Company, Inc. | | 0.75 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Whiteville Ready Mixed Concrete | | 0.10 | | |
| Columbus Total | | 2053.04 | 475.68 | 1249.65 | 3470.86 |
| Craven | Barnhill Contracting Company - New Bern Plant | 2.37 | | 4.73 | 1.43 |
| | Carolina Stone, LLC - Grifton | 18.60 | 1.60 | 1.24 | 1.50 |
| | CarolinaEast Medical Center | 12.80 | | 2.82 | 0.50 |
| | Craven County Wood Energy | 1274.17 | 3.48 | 70.20 | 27.90 |
| | Fleet Readiness Center East | 18.94 | | 2.83 | 131.49 |
| | Frit Car, Inc. | | | | 6.23 |
| | Hatteras Yachts | | | | 20.24 |
| | Havelock Waste Water Treatment Plant | 7.00 | 4.30 | 3.60 | 1.30 |
| | INGENCO Wholesale Power, LLC | 41.40 | 1.94 | 12.80 | 24.46 |
| | Marine Corps Air Station | 175.63 | 8.81 | 383.21 | 10.81 |
| | New Bern Waste Water Treatment Plant | 11.88 | 0.35 | 2.00 | 0.30 |
| | S & W Ready Mix Concrete - New Bern | | 0.01 | | |
| | S.T. Wooten Corporation - Craven Co Plant | 8.55 | | 14.29 | 8.13 |
| | Schlaadt Plastics Limited | 16.76 | 1.38 | 29.77 | 3.54 |
| | Tuscarora Long-Term Regional Landfill | 10.54 | | 0.70 | 2.02 |
| | Urethane Innovators Inc | 0.25 | 0.10 | 0.10 | 14.50 |
| | Warmack Lumber Co Incorporated | 0.90 | | 0.10 | 3.10 |
| | Weyerhaeuser NR Company Vanceboro Pulp | 712.70 | 46.56 | 717.05 | 740.77 |
| | Weyerhaeuser NR Company - New Bern Lumber Facility | 21.30 | 8.40 | 1.90 | 96.60 |
| | World Wood Company | 29.56 | 10.68 | 1.51 | 2.17 |
| Craven Total | | 2363.35 | 87.61 | 1248.85 | 1096.99 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Cumberland | Barnhill Contracting - Fayetteville Plant | 10.76 | | 23.89 | 9.14 |
| | Cape Fear Valley Med Center | 8.64 | 0.20 | 1.20 | 0.41 |
| | Cargill Inc - Fayetteville | 94.69 | 34.92 | 238.03 | 382.39 |
| | Carolina By-Products Fayetteville Division | 45.78 | 1.72 | 3.59 | 24.16 |
| | Cumberland Co - Ann Street Landfill | 0.78 | 0.33 | 0.26 | 8.24 |
| | DAK Americas, LLC | 34.32 | 7.59 | 28.29 | 16.94 |
| | Dupont Teijin Films | 6.23 | 1.01 | 0.05 | 7.39 |
| | Fay Block Company | 2.15 | | 0.01 | 0.12 |
| | H. B. Mellott Company - Cumberland Quarry | | 0.10 | | |
| | Hercules Steel Co Inc | | | | 6.34 |
| | Highland Paving Company, LLC | 3.70 | | 2.71 | 5.44 |
| | HQ XVIII ABN Corps & Fort Bragg | 68.82 | 4.80 | 3.37 | 44.44 |
| | Momentive Specialty Chemicals, Inc. - Fayetteville Facility | 10.03 | 1.76 | 2.47 | 19.89 |
| | Motiva Enterprises - Fayetteville Terminal | | | | 23.37 |
| | MW Manufacturers Inc - Pine St | | | | 0.02 |
| | N C Products Corporation | 0.02 | | | |
| | Nitta Gelatin USA | 5.07 | 0.10 | 0.04 | 0.28 |
| | Pope Field | 7.74 | 1.02 | 0.25 | 1.32 |
| | Public Works Commission Butler-Warner Generation Plant | 55.00 | 2.14 | 2.19 | 0.90 |
| | Purolator Filters NA, LLC | 3.32 | 1.40 | 0.01 | 169.41 |
| | Quality Concrete Company | | 2.31 | | |
| | Rankin Brothers Company | 0.29 | 0.20 | 0.02 | 0.01 |
| | S&W Ready Mix Concrete Co. - Spring Lake Plant | | 0.11 | | |
| | The Goodyear Tire & Rubber Company | 51.15 | 74.49 | 50.85 | 156.11 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Veterans Affairs Medical Center - Fayetteville | 1.97 | 0.12 | 0.02 | 0.12 |
| | Wilkes Road Landfill | 19.05 | 0.72 | 2.80 | 0.73 |
| Cumberland Total | | 429.51 | 135.04 | 360.05 | 877.17 |
| Dare | NCEMC - Buxton | 27.95 | 0.75 | 0.15 | 0.36 |
| | RPC Contracting Inc - Kitty Hawk | 1.62 | | 3.07 | 1.26 |
| Dare Total | | 29.57 | 0.75 | 3.22 | 1.62 |
| Davidson | A. M. Haire Body Company, Inc. | | | | 9.36 |
| | Albright Quality Wood Turning, Inc. | | 0.02 | | |
| | Bartimaeus by Design, Inc. | 0.65 | 0.26 | 0.22 | 0.02 |
| | Brass-Craft Manufacturing Company, BrassCraft - Thomasville | 0.69 | 0.01 | | 0.04 |
| | Carolina Drawers Inc | | 0.45 | | 0.43 |
| | Carolina Drawers, Inc. - Biesecker Road | | 0.64 | | |
| | CEMEX Construction Materials, Atlantic, LLC | | 1.65 | | |
| | Central Lumber Company, Inc. | 2.55 | 1.71 | 0.13 | 0.09 |
| | Chesapeake Pharmaceutical Packaging Co LLC | 0.64 | 0.02 | 0.01 | 30.26 |
| | Councill Company, LLC - Plant #1 | 7.47 | 2.87 | 0.54 | 50.46 |
| | Councill Company, LLC - Plant #2 | 0.88 | 0.32 | 0.04 | 0.03 |
| | Creative Metal and Wood, Inc. | | 0.02 | | 0.27 |
| | Cunningham Brick Company Inc. | 2.83 | 8.03 | 5.43 | 4.73 |
| | Davidson Water, Inc. | 5.83 | 0.17 | | 0.17 |
| | Dell Inc | 0.05 | | | 9.32 |
| | Diebold Southeast Manufacturing, Inc. | 0.04 | | | 0.70 |
| | Dimension Milling Company, Inc. | 7.19 | 2.60 | 0.37 | 0.25 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Exopack - Thomasville, LLC | 0.28 | 0.02 | | 101.59 |
| | Finch Industries Inc | 0.27 | 0.23 | 0.07 | 49.62 |
| | Flint Trading, Inc. | 1.72 | | | |
| | G & G Refinishing, Inc. | | | | 2.46 |
| | Hanes Construction Company | 2.65 | | 4.74 | 1.70 |
| | Hedrick Brothers Lumber Company, Inc. | | 0.68 | | |
| | Hydro Conduit Corporation DBA Rinker Materials | 0.12 | | | 0.01 |
| | Industrial Performance Group, Inc. | | | | 23.36 |
| | JELD-WEN, Inc. d/b/a JELD-WEN | 0.56 | | | 78.93 |
| | Johnson Concrete Company - Lexington Facility | 0.31 | 0.10 | | 0.02 |
| | Kimberly Clark Corporation | 8.61 | 6.87 | 0.05 | 66.46 |
| | Kurz Transfer Products, LP | 2.70 | 0.03 | 0.99 | 12.99 |
| | Leggett & Platt, Inc. - Metal Bed Rail | 2.97 | 0.24 | 0.04 | 31.78 |
| | Leonard Block Company | 0.05 | | 0.18 | |
| | Lexington Furniture Inc., Plant 5 | 28.51 | 10.45 | 1.46 | 6.45 |
| | Linwood Furniture, LLC | 10.54 | 4.82 | 0.54 | 37.65 |
| | NC Municipal Power Agency No. 1 - Cotton Grove Peaking Stat | 1.64 | 0.02 | 1.03 | 0.06 |
| | NC Municipal Power Agency No. 1 - Lexington Plant No. 1 | 0.72 | 0.01 | 0.02 | 0.03 |
| | NC Municipal Power Agency No. 1- Lexington Plant No. 2 | 0.55 | 0.01 | 0.01 | 0.02 |
| | Owens-Brockway Glass Container Plt 6 | 578.34 | 92.84 | 204.73 | 11.79 |
| | Pallet Resource of NC, Inc. | 11.00 | 0.32 | 1.80 | 0.53 |
| | PPG Industries Fiber Glass Products, Inc. | 120.79 | 0.87 | 66.07 | 44.87 |
| | Shaw Industries Group, Inc. - | 2.73 | 0.05 | 0.02 | 1.49 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Plant LP | | | | |
| | Smith Millwork, Inc. | | 0.36 | | |
| | Southern Resin, Inc. | 0.85 | 0.02 | | 0.29 |
| | Southern Veneer Company, Inc. | 1.24 | 2.51 | 0.14 | 0.10 |
| | Special Fab & Machine, Inc. | 0.10 | | | 0.01 |
| | Superior Wood Products, Inc. | 0.11 | 2.12 | | 6.36 |
| | Tarheel Plastics, LLC | 0.99 | 0.03 | 0.17 | 0.03 |
| | The North Carolina Moulding Company | 2.79 | 1.11 | 0.14 | 1.88 |
| | The Paint Company of NC, Inc. dba Johnson Industrial Coating | | | | 0.58 |
| | Thermo Products, LLC. | 0.09 | | | 5.26 |
| | Thomasville Furniture Industries, Inc. - County Line | 2.43 | 1.20 | 0.51 | 1.06 |
| | Thomasville Furniture Industries, Inc. - Plant C/M/W/SB | 8.65 | 2.98 | 3.48 | 43.39 |
| | Tomlinson/Erwin-Lambeth, Inc. | 0.05 | 0.03 | | 5.80 |
| | Transcontinental Gas Pipe Line Company, LLC - Station 155 | 132.02 | 7.40 | 0.13 | 69.26 |
| | Unilin Flooring NC, LLC - Thomasville Facility | 3.87 | 0.27 | 0.04 | 45.20 |
| | V and E Components, Inc. - North Davidson Facility | | | | 15.79 |
| | Whitewood Industries, Inc. | 0.04 | 0.90 | | 13.00 |
| | Wilderness N.C., Inc. | 28.78 | 24.66 | 1.47 | 4.02 |
| Davidson Total | | 985.89 | 179.91 | 294.57 | 789.97 |
| Davie | Anderson Land & Timber Company, LLC | | 0.10 | | 9.98 |
| | APAC-Atlantic, Inc. - Plant #13 Mocksville | 3.70 | | 8.23 | 2.11 |
| | Avgol America, Inc. | 0.02 | 3.53 | | 8.70 |
| | Carolina Finishing, Inc. | 0.07 | | | 4.33 |
| | Concrete Supply Company - Mocksville Plant | 0.03 | | | |
| | Cycle Group, Inc. | 1.60 | 0.12 | 0.01 | 0.09 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Funder America, Inc. | 17.21 | 12.49 | 2.20 | 11.88 |
| | Ingersoll - Rand Company | 0.17 | 0.02 | 0.00 | 7.48 |
| | PalletOne of North Carolina, Inc | | 9.84 | | |
| | Panels, Services & Components, Inc. | 1.03 | 0.69 | 0.05 | 0.03 |
| | Vulcan Construction Materials, LP - Smith Grove Quarry | | 0.15 | | |
| Davie Total | | 23.83 | 26.94 | 10.49 | 44.60 |
| Duplin | Barnhill Contracting Company - Kenansville | 3.65 | | 10.34 | 1.25 |
| | Bay Valley Foods, LLC | 3.67 | 0.28 | 0.02 | 0.50 |
| | Butterball, LLC | 11.32 | 0.86 | 0.07 | 0.62 |
| | Case Farms Feed Mill - Mt. Olive | 4.54 | 2.33 | 0.02 | 0.24 |
| | Coastal Carolina Clean Power LLC | 263.78 | 4.61 | 111.40 | 8.12 |
| | Guilford Mills, Inc. - East Plant | 28.48 | 2.24 | 38.93 | 2.70 |
| | House of Raeford Farms, Inc. - Rose Hill | 3.31 | 0.77 | 19.86 | 0.02 |
| | House of Raeford Farms, Inc. - Wallace Division | 2.11 | 0.03 | 7.48 | 0.02 |
| | Johnson Breeders, Inc. | 29.05 | 0.53 | 1.48 | 1.01 |
| | Murphy - Brown LLC - Chief Feed Mill | 10.62 | 1.19 | 32.41 | 0.10 |
| | Murphy Milling Company - Register Site | 0.05 | 0.06 | | |
| | Murphy-Brown LLC - Rosemary Feed Mill | 4.01 | 0.93 | 15.76 | 0.04 |
| | Murphy-Brown LLC Warsaw Feed Mill | 5.72 | 30.53 | 0.06 | 0.30 |
| | Nash Johnson & Sons Farms - Feed Mill | 16.60 | 43.17 | 23.69 | 0.08 |
| | Nash Johnson & Sons Farms, Inc. - Warsaw Grain Elevator | 0.19 | 3.04 | | |
| | Southeastern Grain Company | 0.10 | 0.07 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | LLC | | | | |
| | Southern Block Company, Inc. | 0.08 | | | |
| | Tri - County Gin, Inc. | 0.21 | 0.01 | | 0.01 |
| | Valley Proteins, Inc. - Carolina By-Products | 95.63 | 13.65 | 307.58 | 14.48 |
| Duplin Total | | 483.12 | 104.30 | 569.10 | 29.49 |
| Durham | ARE-NC Region No. 5, LLC | 1.65 | | 0.03 | 0.09 |
| | AW North Carolina, Inc. | 2.38 | 0.04 | 0.02 | 56.31 |
| | Becton Dickinson Labware | 0.87 | 0.15 | 0.07 | 8.40 |
| | Becton Dickinson Technologies | 2.02 | 0.12 | 0.14 | 0.14 |
| | Brenntag Southeast, Inc. | 0.11 | | | 10.57 |
| | Brown Water Treatment Plant | 0.65 | 0.02 | 0.18 | 0.01 |
| | Carolina Sunrock LLC - Muirhead Distribution Center | 12.00 | | 13.71 | 4.90 |
| | City of Durham Sanitary Landfill | 29.00 | 1.00 | 2.00 | 2.00 |
| | Cormetech Inc | 1.67 | | 9.51 | 0.09 |
| | Cree Inc - Silicon Dr | 23.83 | | 0.29 | 12.62 |
| | Cree RTP | 8.39 | | 0.06 | 4.93 |
| | Duke University | 185.04 | 4.72 | 229.21 | 5.19 |
| | Durham Regional Hospital | 4.46 | 0.48 | 0.28 | 0.84 |
| | Eisai Inc | 10.25 | 0.30 | 0.24 | 103.31 |
| | Federal Medical Center | 6.77 | 0.14 | 0.13 | 0.34 |
| | Freudenberg Nonwovens Group | 13.82 | 1.05 | 0.06 | 9.95 |
| | Garland Woodcraft Co Inc | | 0.06 | | 2.69 |
| | GlaxoSmithKline | 27.00 | 2.14 | 8.48 | 6.39 |
| | Hanson Aggregates Southeast, LLC - Rougemo | 1.73 | 0.43 | 0.11 | 0.14 |
| | IBM Corporation | 28.90 | 0.70 | 0.20 | 0.20 |
| | Intermont Group Ltd. | | 0.03 | | |
| | Lehigh Cement Company | | 0.17 | | |
| | MP Durham, LLC | 38.90 | 5.30 | 1.68 | 5.58 |
| | NIEHS | 27.79 | 1.67 | 1.76 | 1.47 |
| | North Carolina Central University | 7.44 | 0.75 | 0.10 | 0.54 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | PBM Graphics - A Consolidated Graphics Company | 0.46 | 0.03 | | 20.95 |
| | RR Donnelley, Litho Plant | 0.10 | 0.01 | | 9.81 |
| | SCM Metal Products, Inc. | 3.35 | 0.07 | 0.02 | 0.41 |
| | South Durham Water Reclamation Facility | 32.12 | 0.27 | 0.06 | 19.15 |
| | The Hamner Institutes for Health Sciences | 3.81 | 0.13 | 1.66 | 0.16 |
| | United Therapeutics Corporation | 2.41 | 0.27 | 0.04 | 0.23 |
| | Valassis Communications | 3.81 | 0.29 | 0.02 | 53.06 |
| | Veterans Affairs Medical Hospital | 5.36 | 0.12 | 0.33 | 0.31 |
| | Williams Water Treatment Plant | 1.40 | | 0.02 | 0.05 |
| Durham Total | | 487.49 | 20.47 | 270.41 | 340.84 |
| Edgecombe | Air Systems Components | 1.23 | 0.02 | | 27.52 |
| | Barnhill Contracting Company | 9.86 | | 17.54 | 8.62 |
| | City of Wilson - Pinetops Genset | 3.94 | 0.11 | 0.07 | 0.12 |
| | Edgecombe Genco, LLC | 1789.06 | 15.15 | 379.42 | 4.04 |
| | General Foam Plastics, Inc. | 3.09 | | 0.49 | 27.09 |
| | Glenoit Fabrics (TT) Corporation | 3.34 | 1.00 | 0.52 | |
| | HC Composites LLC | | | | 16.84 |
| | Hickory Springs Manufacturing Co | | | | 3.47 |
| | Keihin Carolina Systems Technology, LLC | 16.18 | 0.51 | 1.02 | 13.93 |
| | Nomaco Inc - Tarboro | 4.56 | | 0.04 | 138.16 |
| | Parsons' Woodworking, Inc. | 0.03 | | | |
| | PNG Battleboro Compressor Station | 4.38 | 0.03 | 0.05 | 0.03 |
| | Sara Lee Bakery | 16.61 | 0.83 | 1.68 | 20.60 |
| Edgecombe Total | | 1852.28 | 17.65 | 400.83 | 260.42 |
| Franklin | Briggs Sawmill and Company Inc | | | | 0.04 |
| | Franklin Veneers Inc | 0.64 | 0.78 | 0.07 | 0.20 |
| | Harborlite Corporation | 1.45 | 0.14 | 0.01 | 0.12 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | K-Flex USA, LLC | | 21.60 | | 6.80 |
| | Majestic Marble and Glass Company - Youngsville | | | | 11.08 |
| | Martin Marietta Materials Franklin Plant | 19.20 | 0.59 | 2.98 | 0.53 |
| | NC DOC - Enterprise Sign Plant | 0.15 | | | 9.55 |
| | Novozymes North America, Inc. | 15.66 | 6.73 | 1.60 | 4.20 |
| | Pruitt Lumber Company Inc. | 1.55 | 1.92 | 0.01 | 20.67 |
| | S T Wooten Corporation - Youngsville Asphalt plant # 206 | 5.50 | 1.70 | 12.82 | 2.70 |
| | Southern Lithoplate Inc. | | | | 7.89 |
| | Toney Lumber Company Inc | 13.00 | 16.00 | 2.00 | 38.00 |
| Franklin Total | | 57.15 | 49.46 | 19.49 | 101.78 |
| Gaston | Affinia Group, Inc., Wix Filtration Corp. - Allen Plant | 6.32 | 0.48 | 0.02 | 81.19 |
| | American & Efird Plants #5 & #15 | 11.10 | 0.25 | 0.05 | 38.90 |
| | Apex Tool Group (Gastonia Operations) | 2.00 | | 0.02 | 0.21 |
| | Bradington-Young LLC, Cherryville Plant | | | | 11.37 |
| | Buckeye Mt. Holly, LLC | 15.91 | | 0.10 | 9.43 |
| | Caromont Health, Gaston Memorial Hospital | 9.16 | | 1.24 | 0.46 |
| | Chemtura Corporation | 2.18 | 0.47 | 0.13 | 0.39 |
| | City of Gastonia - Long Creek WWTP | 6.60 | 0.19 | | 0.19 |
| | Concrete Supply, North Gastonia Plant | 0.02 | | | |
| | Daimler Trucks North America, LLC - Mt. Holly Plant | 3.99 | | 0.11 | 35.15 |
| | Duke Energy Carolinas, LLC - Riverbend Steam Station | 1538.20 | 477.61 | 10407.70 | 17.85 |
| | Duke Power Company, LLC - Allen Steam Station | 5045.63 | 595.93 | 2071.55 | 69.87 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Firestone Fibers & Textiles Company, LLC | 7.95 | 0.28 | | 4.22 |
| | Firestone Fibers and Textiles Company, Kings Mountain Plant | 34.02 | 0.70 | 0.02 | 5.88 |
| | FMC Corporation - Lithium Division | 20.28 | 1.58 | 0.12 | 5.78 |
| | Gaston Community College | 0.95 | | 0.01 | 0.05 |
| | Gastonia Components & Logistics, LLC | 2.05 | 0.04 | 0.02 | 12.96 |
| | Gatza Marble Products | | | | 3.83 |
| | J. Charles Saunders Company | 0.33 | 0.02 | | 11.44 |
| | Keystone Powdered Metal Company | 1.03 | 0.15 | | 2.29 |
| | LNS Turbo, Inc. - Kings Mountain | | | | 8.25 |
| | Lubrizol Advanced Materials, Inc. | 5.34 | 0.38 | 0.23 | 4.49 |
| | Modern Polymers, Inc. | 3.16 | 0.24 | 0.02 | 38.86 |
| | NC Municipal Power Agency No. 1 - Cherryville City Hall Unit | 0.70 | 0.01 | 0.44 | 0.03 |
| | NC Municipal Power Agency No. 1 - Gastonia Freightliner | 2.24 | 0.06 | 1.40 | 0.08 |
| | NC Municipal Power Agency No. 1 - Gastonia Prime Power Park | 1.25 | 0.02 | 0.04 | 0.18 |
| | NC Municipal Power Agency No. 1-Gastonia Plant 1 | 0.52 | 0.01 | 0.01 | 0.02 |
| | NC Municipal Power Agency No. 1-Gastonia Plant 2 | 0.60 | 0.01 | 0.01 | 0.02 |
| | New NGC, Inc. d/b/a National Gypsum Company | 11.47 | 0.47 | 0.31 | 2.90 |
| | Orograin - Gastonia | 1.11 | 0.12 | | 3.76 |
| | Parker Hannifan Corporation | 0.42 | 0.04 | 0.04 | 6.02 |
| | Pharr Yarns I-85 Complex | 0.55 | 0.01 | | 0.03 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Pharr Yarns Complex 46 | 6.70 | 0.14 | 3.39 | 11.14 |
| | Pharr Yarns, Inc., Space Dye Plant | 4.02 | 0.08 | 1.10 | 10.40 |
| | Spartan Dyers, Inc., Sterling Division | 3.57 | 0.20 | 3.80 | 0.15 |
| | Stabilus, Inc. | 1.42 | 2.27 | 0.01 | 68.48 |
| | Valley Proteins, Inc. dba Carolina By-Products - Gastonia | 23.27 | 0.65 | 0.30 | 10.03 |
| Gaston Total | | 6774.06 | 1082.41 | 12492.19 | 476.30 |
| Gates | Ashton Lewis Company | 9.40 | | 1.10 | 0.90 |
| Gates Total | | 9.40 | | 1.10 | 0.90 |
| Graham | Harrison Constr. APAC-Atlantic, Inc. - Massey Branch Quarry | 1.63 | 0.05 | 0.27 | 0.04 |
| | Stanley Furniture Company, Inc. | 23.77 | 5.72 | 40.90 | 451.78 |
| Graham Total | | 25.40 | 5.77 | 41.17 | 451.82 |
| Granville | Altec Industries, Inc. - Creedmoor Facility | 0.76 | 0.21 | | 13.78 |
| | Atlantic Industrial Finishing, Inc. | 0.10 | 0.01 | | 1.27 |
| | BKC Industries Inc | 0.08 | 0.06 | | 3.50 |
| | Bridgestone-Bandag, LLC | 3.20 | 3.80 | 0.02 | 124.37 |
| | Carolina Sunrock LLC - Butner Quarry | 4.58 | 0.33 | 0.30 | 0.37 |
| | Central Region Psychiatric Hospital | 3.96 | 0.07 | 0.65 | 0.19 |
| | CertainTeed Corporation | 23.97 | 99.33 | 78.16 | 88.52 |
| | Clayton Homes Inc | | | | 3.79 |
| | CurveMakers, Inc. | | 0.07 | | 0.10 |
| | Federal Bureau Of Prisons - Fed Corr Com | 2.95 | 0.07 | 0.09 | 0.15 |
| | Gate Precast Company | | 0.69 | | |
| | Ideal Fastener Corporation | 0.67 | 0.01 | | 1.68 |
| | John Umstead Hospital | 5.98 | 0.10 | 2.93 | 0.88 |
| | Maysteel LLC | 0.69 | 0.06 | | 4.95 |
| | Murdoch Center | 1.92 | | 11.01 | 0.10 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Newton Instrument Company Inc | 1.36 | 0.02 | | 0.14 |
| | PalletOne of North Carolina Inc | | 1.78 | | |
| | Rea Contracting (Butner) | 4.10 | | 5.61 | 1.40 |
| | Revlon Consumer Products Corp | 2.41 | | 0.02 | 0.53 |
| | Santa Fe Natural Tobacco Co. - Knotts Grove Rd. | 0.67 | 0.15 | | 1.66 |
| | Tegrant Diversified Brands, Inc. | 3.32 | 0.60 | 0.02 | 69.18 |
| | Universal Leaf North America Oxford Facility | 17.18 | 0.33 | 0.10 | 1.20 |
| Granville Total | | 77.90 | 107.69 | 98.91 | 317.76 |
| Greene | NC DOC - Eastern Correctional Institution | 1.40 | 0.08 | 2.10 | 0.07 |
| | Piedmont Natural Gas -- Junction B Compressor Station | 5.36 | 0.02 | | 0.08 |
| Greene Total | | 6.76 | 0.10 | 2.10 | 0.15 |
| Guilford | Adams Wood Turning, Inc. | 0.03 | 6.46 | | 4.57 |
| | Akzo Nobel Coatings, Inc. | 0.03 | 4.65 | | 41.79 |
| | Alberdingk Boley, Inc. | 1.13 | 0.09 | 0.01 | 0.07 |
| | Allen Industries, Inc. | | 0.15 | | 34.16 |
| | Allen Industries, Inc. - Architectural Signage Division | 0.01 | 0.16 | | 4.11 |
| | APAC-Atlantic, Inc. - Plant #10 | 4.36 | | 1.80 | 3.93 |
| | APAC-Atlantic, Inc. - Plant #11 | 13.35 | | 30.40 | 10.55 |
| | APAC-Atlantic, Inc. - Plant #15 | 1.67 | | 3.60 | 0.76 |
| | Apex Oil Company, Inc. | | | | 7.72 |
| | Associated Asphalt Greensboro, LLC | 3.21 | 0.25 | 0.02 | 8.05 |
| | Avery Dennison Corporation | | | | 8.39 |
| | Banknote Corporation of America, Inc. | | | | 6.56 |
| | Banner Pharmacaps, Inc. a subsidiary of Sobel USA | 3.33 | 0.06 | 0.02 | 43.77 |
| | Beard Hardwoods, Inc. | 7.83 | 2.64 | 0.37 | 1.13 |
| | Bluegrass Labels Company, LLC - Graphic Packaging | | | | 25.11 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Blythe Construction, Inc - Plant #1 | 5.31 | | 5.25 | 4.26 |
| | Bolection Door, A Division of Marshfield DoorSystems, Inc. | 0.04 | 0.01 | | 8.45 |
| | Brayton International Inc, a Steelcase Co | 0.10 | | | 31.50 |
| | Brenntag Southeast, Inc. | 0.32 | 0.01 | | 0.39 |
| | Burlington Distributing Company - Old Master Cabinet Co | 0.03 | 0.13 | 0.10 | 0.32 |
| | Carolina Container Company | 2.57 | 0.19 | 0.02 | 1.12 |
| | Carolina Steel Group LLC - Colfax | | 0.10 | | 31.90 |
| | Carpenter Co. | 0.48 | 0.01 | | 67.61 |
| | Carsons, Inc. | 0.47 | 0.19 | 0.02 | 2.34 |
| | Cascade Die Casting Group, Inc. - Atlantic Division | 3.23 | 0.06 | 0.02 | 0.18 |
| | CEMEX Construction Materials Atlantic, LLC - Boeing Drive | | 0.32 | | |
| | CEMEX Construction Materials Atlantic, LLC - Colfax | 0.49 | | | 0.03 |
| | Central Carolina Concrete, LLC | 0.01 | | | |
| | Chambers Fabrics, Inc. | 0.32 | 1.01 | | 0.02 |
| | Chandler Concrete/Piedmont, Inc. - Swing Rd. Plt. # 102 | 0.02 | | | |
| | Chemol Company, Inc. | 6.47 | 1.22 | 31.22 | 12.87 |
| | Childers Concrete Company | 0.22 | | | 0.01 |
| | City of Greensboro - Thomas Z. Osborne POTW | 16.81 | 8.88 | 11.26 | 12.78 |
| | City of Greensboro - White Street Landfill | 25.16 | 4.54 | 8.60 | 18.51 |
| | City of High Point - Eastside Wastewater Treatment Plant | 8.19 | 0.12 | 1.91 | 1.97 |
| | City of High Point - Ward Water Plant | 1.50 | 0.05 | 0.24 | 0.04 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Clyde Pearson Company, A Div. of Henredon Furn. Ind., Inc. | | | | 11.34 |
| | Colonial Pipeline Company | 3.04 | 0.24 | 0.20 | 322.78 |
| | Concept Plastics, Inc. | 0.12 | 1.07 | | 18.81 |
| | Cone Denim LLC - White Oak Plant | 36.66 | 1.22 | 0.11 | 2.56 |
| | Culp, Inc. - Ticking | 1.69 | 0.29 | 0.01 | 0.09 |
| | Custom Drum Services, Inc. | 0.16 | 0.04 | | 7.41 |
| | Custom Finishers, Inc. | 0.13 | 0.12 | | 24.90 |
| | Davis Furniture Industries, Inc. | 0.15 | | | 10.95 |
| | DFP, Inc. dba Edward Ferrell + Lewis Mittman | | 0.05 | | 4.09 |
| | Dow Corning Corporation | 0.63 | 0.05 | | 7.44 |
| | Eagle Compressors, Inc. | 0.27 | | | |
| | Ecoflo, Inc. | | | | 1.83 |
| | EFA, Inc. | 6.03 | 0.67 | 0.04 | 12.69 |
| | Endura Products, Inc. | 0.20 | | | 3.54 |
| | Engineered Polymer Solutions, Inc. dba Valspar Coatings | 0.37 | 0.40 | | 28.28 |
| | Environmental Air Systems, Inc | | | | 3.70 |
| | Evonik Stockhausen, LLC | 39.68 | 16.78 | 0.33 | 20.57 |
| | Fiber Dynamics, Inc. | 3.78 | 0.07 | 0.03 | 1.30 |
| | Filtrona Greensboro, Inc. | | | | 3.56 |
| | Flowers Baking Company of Jamestown, LLC | 3.50 | 0.28 | 0.01 | 52.05 |
| | Future Foam, Inc. | 0.26 | 0.02 | | 0.01 |
| | Gilbarco, Inc. | 0.47 | 1.81 | | 26.68 |
| | Goria Enterprises, Inc. | | | | 15.48 |
| | Hanson Brick East, LLC - Pleasant Garden Plant #1 | | | | 0.23 |
| | Hartley Ready Mix Concrete Manufacturing, Inc. | 0.04 | | | |
| | Haworth, Inc. - Haworth Wood Seating | 0.79 | 0.18 | 0.01 | 14.30 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Hercules Incorporated - Ashland Hercules Water Technologies | | | | 25.38 |
| | High Point Fibers, Inc. | 0.26 | 4.13 | | 2.50 |
| | High Point Furniture Industries, Inc. | 0.20 | 0.61 | 0.22 | 14.77 |
| | High Point Regional Health System | 10.07 | 0.54 | 1.31 | 0.46 |
| | Highland Containers, Inc. | 1.35 | | 0.01 | 0.37 |
| | Highland Tank of North Carolina, Inc. | 0.11 | | | 7.79 |
| | HM Real Estate Co. No. 1 dba Woodmark Originals, Inc. | 0.84 | 0.70 | 0.08 | 5.25 |
| | Innospec Active Chemicals, LLC | 0.96 | 0.01 | | 0.43 |
| | Jessica Charles LLC | | | | 2.78 |
| | Kao Specialties Americas, LLC | 9.69 | 0.89 | 0.05 | 1.75 |
| | Kay Chemical Company | 0.06 | | | 0.57 |
| | KI High Point, Inc. | 0.11 | | | 35.07 |
| | Kinder Morgan Southeast Terminals, LLC - Greensboro #2 | | | | 50.48 |
| | Kinder Morgan Southeast Terminals, LLC - Greensboro Terminal | 4.64 | 0.35 | 0.03 | 43.83 |
| | Lane Furniture Industries Inc. Royal Development Co Division | 0.02 | | | 20.70 |
| | Larco Construction - Division of Sloan Construction Co., Inc | 3.87 | | 11.67 | 2.35 |
| | Lorillard Tobacco Company | 22.94 | 8.65 | 0.24 | 326.78 |
| | Magellan Terminals Holdings, L.P. | | | | 19.09 |
| | Magellan Terminals Holdings, L.P. - Greensboro I Terminal | 2.42 | | | 23.37 |
| | Mannington Mills, Inc. - Mannington Wood Floors Company | 0.88 | 0.18 | 0.01 | 6.31 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Mannington Mills, Inc. dba Mannington Laminate Floors | 0.41 | 0.01 | | 0.79 |
| | Mark David, a Division of Baker, Knapp and Tubbs, Inc. | 0.02 | | | 5.30 |
| | Marsh Furniture Company | 8.70 | 3.64 | 0.45 | 199.04 |
| | Marshall's Finishing Company, Inc. | | 0.08 | | 14.60 |
| | Mickey Truck Bodies Inc | 7.05 | 0.13 | 0.04 | 16.72 |
| | Mother Murphy's Laboratories, Inc. | 0.24 | | | 0.01 |
| | Motiva Enterprises LLC - Greensboro | 4.28 | | | 22.18 |
| | N. S. Flexibles, LLC | 0.19 | | | 163.52 |
| | National Pipe & Plastics, Inc. | | | | 0.75 |
| | NC Municipal Power Agency No. 1 - High Point Plant 2 | 0.57 | 0.01 | 0.01 | 0.02 |
| | NC Municipal Power Agency No. 1 - High Point Water Pump Stat | 1.22 | 0.04 | 0.78 | 0.04 |
| | North Carolina Agricultural and Technical State University | 1.79 | 0.09 | 0.20 | 0.01 |
| | Oldcastle Precast, Inc. | 0.10 | | | 0.01 |
| | Olympic Products, LLC | 0.74 | 0.06 | | 0.37 |
| | Ornamental Products, LLC | | 0.07 | | 2.36 |
| | Pactiv LLC | 0.04 | 0.80 | | 198.34 |
| | Piedmont Chemical Industries I, LLC | 1.60 | 0.01 | 0.06 | 10.55 |
| | Pine Needle LNG Company, LLC | 6.11 | 0.43 | 0.26 | 0.69 |
| | Plantation Pipe Line Company | | | | 156.22 |
| | PPG Industries, Inc. | 0.21 | 0.16 | | 0.01 |
| | Precision Fabrics Group, Inc. | 14.80 | 0.56 | 0.04 | 78.06 |
| | Premiere Cushion | | | | 7.30 |
| | Purolator Facet, Inc. | 0.68 | | | 22.51 |
| | Qualicaps, Inc. | 2.52 | 0.19 | 0.01 | 1.97 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Redbud, LLC | 11.76 | 7.85 | 0.60 | 1.12 |
| | Resco Products, Inc. | 1.41 | 20.45 | 1.16 | 0.18 |
| | RF Micro Devices, Inc. - Fab. 2 | 3.59 | | 0.11 | 0.24 |
| | RF Micro Devices, Inc. - FAB1, FAB3 and Packaging | 9.27 | | 0.51 | 41.99 |
| | Ritch Face Veneer Company & Faces South, Inc. | 0.46 | 0.23 | 0.02 | 0.02 |
| | Rowland Woodworking, Inc. | | | | 0.69 |
| | Royal Carolina Corporation | 0.38 | | | 4.16 |
| | Safco Patrician Company | 0.14 | 0.01 | | 13.46 |
| | Shamrock Corp - Bruce St | 0.26 | | | 0.15 |
| | Shamrock Corporation - Chimney Rock Printing | 0.79 | 0.06 | | 18.89 |
| | Shamrock Corporation Tipping Division | 0.14 | | | 219.69 |
| | Shamrock Environmental Corporation | 0.01 | | | 1.33 |
| | Sharpe Bros., a Div. of Vecellio & Grogan, Inc. - Burnt Popl | 3.03 | 0.65 | 3.36 | 0.87 |
| | Sharpe Bros., a Div. of Vecellio & Grogan, Inc.-Lebanon Rd. | 4.77 | | 7.45 | 4.73 |
| | Shinycars Inc. | | | | 2.05 |
| | Slane Hosiery Mills Inc | 10.40 | 0.82 | 28.50 | 1.72 |
| | Snyder Paper Corporation - Snyder Cushion of High Point | 0.07 | | | 3.39 |
| | Specialized Packaging Flexo, LLC | | | | 14.84 |
| | Surteco USA, Inc. - Canplast Division | | 0.02 | | 27.33 |
| | Swaim, Inc. | | 0.88 | | 18.95 |
| | Syngenta Crop Protection, LLC | 2.81 | 0.06 | 0.01 | 0.14 |
| | TEVA Pharmaceuticals USA, Inc. | 4.06 | 17.85 | 0.02 | 10.13 |
| | The Black Bros. Co. - Southeast Division | 0.03 | 0.01 | | 0.15 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | The Moses H. Cone Memorial Hospital | 9.16 | 0.65 | 0.37 | 0.57 |
| | The Procter & Gamble Manufacturing Company - Brown Summit | 10.79 | 0.20 | 0.08 | 14.96 |
| | The Sherwin - Williams Co, Consumer Group | 0.99 | 0.88 | 0.01 | 17.56 |
| | The Sherwin - Williams Company - Stagecoach Trail | 0.38 | 0.44 | | 70.47 |
| | The University of North Carolina at Greensboro - Physical pl | 21.69 | 0.40 | 0.19 | 1.07 |
| | Thomas Built Buses - Courtesy Road | 6.64 | 0.73 | 0.03 | 61.24 |
| | Thomas Built Buses - Fairfield Road | 2.28 | 0.50 | 0.02 | 95.42 |
| | Thomasville - Dexel Incorporated | 0.57 | | | 0.03 |
| | TIMCO Aviation Services, Inc. | 10.18 | 0.73 | 0.55 | 12.09 |
| | Total Petrochemicals USA, Inc. - Former Fina Bulk Terminal | 1.03 | 0.02 | 0.01 | 1.61 |
| | TransMontaigne Operating Company, L.P. | 3.14 | | | 52.32 |
| | Treeforms, Inc. | | | | 10.30 |
| | United Finishers, Incorporated | 0.04 | | | 2.18 |
| | United Metal Finishing, Inc. of Greensboro | 0.16 | | | 0.01 |
| | Unitex Chemical Corporation | 2.80 | 0.21 | 0.02 | 14.85 |
| | Univar USA, Inc. - 108 Oakdale Road, Jamestown, NC | 0.06 | | | 8.90 |
| | V & E Components, Incorporated | 0.09 | | | 3.75 |
| | Vertellus Performance Materials, Inc. | 6.69 | | 0.08 | 8.47 |
| | Vulcan Construction Materials, LP - Stokesdale Quarry | | 0.04 | | |
| | Western Roto Engravers, | | 0.01 | | 2.24 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Incorporated | | | | |
| | Williams Steel Company | | | | 6.60 |
| | Zink Imaging Incorporated | 3.88 | 0.07 | 0.02 | 2.18 |
| Guilford Total | | 448.30 | 130.70 | 154.19 | 3254.01 |
| Halifax | Airboss Rubber Compounding (NC) Inc. | | | | 2.02 |
| | Coastal Lumber Weldon Plt | 7.07 | 8.58 | 0.80 | 1.63 |
| | Josey & Joco Lumber Companies Inc | | 6.11 | | |
| | JSW Enterprises, Inc. | 0.02 | 0.38 | | 0.26 |
| | KapStone Kraft Paper Corporation | 1515.68 | 190.70 | 914.97 | 299.48 |
| | Kennametal Incorporated | 0.35 | | | 3.98 |
| | Nash Brick Company Inc | 14.94 | | 26.34 | 6.83 |
| | NC DOC - Caledonia Correctional Institute | 4.91 | 0.20 | | 0.08 |
| | Patch Rubber Company | 0.08 | 0.09 | | 18.93 |
| | Roanoke Valley Energy Facility | 2046.72 | 19.16 | 670.37 | 16.12 |
| | Rosemary Power Station | 74.25 | 2.30 | 6.52 | 1.83 |
| | Safelite Glass Corporation | 5.59 | 0.12 | 0.19 | 16.77 |
| Halifax Total | | 3669.61 | 227.64 | 1619.19 | 367.93 |
| Harnett | Armtec Countermeasures Company | 0.40 | 0.04 | 0.45 | 0.03 |
| | Barnhill Contracting - Lillington Plant | 4.30 | | 10.96 | 1.70 |
| | Campbell University | 3.99 | | 0.02 | 0.21 |
| | Capital Marble Creations, Inc. | | | | 1.07 |
| | Edwards Brothers Inc | 0.21 | 0.02 | | 27.01 |
| | Godwin Manufacturing Co., Champion Hoist and Equipment Co. | 0.03 | 0.08 | | 1.07 |
| | Godwin Manufacturing Company, Inc. | 0.31 | 0.59 | | 5.05 |
| | Gould & Goodrich Leather Inc | | | | 3.30 |
| | Hanson Aggregates - Gardner | | 0.30 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Quarry | | | | |
| | Hanson Aggregates - Elliott Plant | 0.01 | 0.13 | | |
| | Hanson Pipe and Precast - Dunn | 0.25 | 0.32 | 0.56 | 1.71 |
| | Heritage Concrete Service Corporation - Dunn Plant | | 1.06 | | |
| | Johnson Brothers Utility and Paving Co. | 2.20 | | 5.30 | 1.20 |
| | Saab Barracuda, LLC | 1.08 | 0.07 | 0.05 | 27.71 |
| | Thomas Concrete Inc. - Fuquay-Varina | | 0.36 | | |
| | Womble Feed Mill and Farm Supplies | 0.01 | | | |
| Harnett Total | | 12.79 | 2.97 | 17.34 | 70.06 |
| Haywood | Americarb, Inc. d/b/a Imerys Pigments for Paper & Packaging | | 0.94 | | 0.37 |
| | Blue Ridge Paper Prod. dba Evergreen Packaging - Waynesville | 5.17 | 6.79 | | 7.03 |
| | Blue Ridge Paper Products - Canton Mill | 3981.98 | 508.71 | 8839.21 | 1293.71 |
| | Consolidated Metco, Inc. - Canton Plant | 0.34 | 0.02 | | 17.65 |
| | Giles Chemical, A Division of Premier Magnesia, LLC | 1.53 | 0.12 | 0.01 | 0.08 |
| | Harrison Construction Division of APAC-Atlantic, Inc. | 3.84 | | 6.15 | 1.42 |
| | Holston Environmental Services, Inc. | 0.42 | 0.06 | 0.70 | 1.05 |
| | Oaks Unlimited, Inc. | 5.72 | 3.07 | 0.30 | 0.87 |
| | Town of Waynesville - Wastewater Treatment Plant | 0.33 | 0.02 | 0.02 | 0.03 |
| Haywood Total | | 3999.33 | 519.73 | 8846.39 | 1322.21 |
| Henderson | AGI-Shorewood | | | | 12.33 |
| | APAC-Atlantic, Inc. - Hendersonville | 3.91 | | 7.33 | 2.78 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | APAC-Atlantic, Inc. - Limestone Facility | | 3.48 | | |
| | Blue Ridge Metals Corporation | 6.21 | 0.51 | 0.03 | 0.34 |
| | Clement-Pappas NC, Inc. | 2.98 | 0.06 | 0.02 | 0.24 |
| | Coats American, Inc. d/b/a Coats North America | 0.68 | 0.01 | | 101.96 |
| | Cumberland Gravel & Sand Company - Henderson County | 3.69 | 0.11 | 0.62 | 0.11 |
| | Enerdyne III LLC | 0.91 | 0.08 | 0.11 | 0.02 |
| | GE Lighting Solutions, LLC | 12.75 | 2.33 | 0.07 | 9.72 |
| | Greenleaf Corporation | 0.03 | | | 0.30 |
| | Henderson County Hospital Corporation, Margaret R. Pardee Ho | 1.25 | 0.03 | 0.01 | 0.06 |
| | Hendersonville Water Treatment Plant | 0.31 | 0.02 | 0.01 | 0.03 |
| | Kimberly-Clark Corp., Berkeley Mills | 5.55 | 2.70 | 0.04 | 31.84 |
| | Kyocera Industrial Ceramics Corporation | 4.52 | | 0.03 | 0.53 |
| | Leisure Craft, Inc. | 0.66 | 3.95 | | 2.10 |
| | Meritor Heavy Vehicle Systems, LLC - Asheville | 2.34 | 0.18 | 0.01 | 5.14 |
| | Mills River Regional Water Treatment Fac | 3.90 | 0.11 | 0.07 | 0.12 |
| | Minute-Man Anchors, Inc. | 0.18 | | 0.00 | 1.90 |
| | Printpack, Inc. | 4.08 | 0.09 | 0.01 | 33.04 |
| | Ralph Rogers and Company - Hendersonville Plant | 1.10 | | | 2.65 |
| | Selee Corporation | 16.58 | 3.86 | 0.11 | 2.30 |
| | UPM Raflatac, Inc | 8.15 | 0.62 | 0.05 | 67.62 |
| | Van Wingerden International, Inc. - Haywood and Glasshouse | 1.87 | 0.06 | 0.02 | 0.11 |
| | Vulcan Construction Materials LP - Hendersonville | | 0.24 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Wilsonart International, Inc. | 46.77 | 1.42 | 0.13 | 78.69 |
| Henderson Total | | 128.42 | 19.86 | 8.67 | 353.93 |
| Hertford | ALFINITI Inc. | 0.44 | | | 38.66 |
| | Freeman Metal Products Inc | | | | 4.30 |
| | Nucor Steel Hertford | 280.27 | | 151.57 | 12.42 |
| | Perdue Grain and Oilseed, LLC - Cofield | 12.66 | 0.43 | 0.37 | 153.32 |
| | Roanoke Chowan Hospital | 2.33 | 0.04 | 0.07 | 0.13 |
| | Rose Brothers Paving Company - Murfreesboro | 4.03 | | 4.13 | 0.81 |
| Hertford Total | | 299.73 | 0.47 | 156.14 | 209.64 |
| Hoke | Burlington Industries LLC - Raeford Plant | 12.14 | 4.65 | 0.06 | 5.37 |
| | Conopco, Inc. | 0.85 | 0.13 | 0.01 | 2.19 |
| | House of Raeford Farms, Inc. - Kill Plant | 2.52 | 0.04 | 0.02 | 0.14 |
| | House of Raeford Further Processing/Distribution Inc. | 4.79 | 0.08 | 0.16 | 0.27 |
| | NC DOC - McCain Hospital | 1.33 | 0.02 | 0.01 | 0.07 |
| | Oldcastle Lawn and Garden, Inc. - Aberdeen Plant | 11.13 | 0.39 | | 0.41 |
| | Polymer Technologies, Inc. | 0.06 | | | |
| Hoke Total | | 32.82 | 5.31 | 0.26 | 8.45 |
| Hyde | Benjamin Cartwright Simmons III | 0.29 | 0.15 | | 0.02 |
| | NCEMC - Ocracoke | 6.89 | 0.19 | 0.02 | 0.09 |
| Hyde Total | | 7.18 | 0.34 | 0.02 | 0.11 |
| Iredell | 3A Composites USA Inc. | 4.50 | 0.34 | 0.02 | 24.64 |
| | Armstrong Hardwood Flooring Company - Statesville Plant | 7.65 | 9.03 | 0.38 | 15.62 |
| | ASMO North Carolina, Inc. | 0.93 | 0.07 | 0.01 | 20.68 |
| | Bartlett Milling Company, LP, Statesville Flour Mill | 0.50 | 5.35 | | 0.03 |
| | Bay State Milling Company | | 2.72 | | 0.70 |
| | BestSweet, Inc. | 3.43 | 0.07 | 0.02 | 0.19 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Cabinet Makers, Inc. | | | | 10.33 |
| | Cardinal Fg Flat Glass Plant | 752.27 | 49.14 | 200.46 | 37.68 |
| | Carolina CAT | 0.13 | | | 7.27 |
| | Carris Reels of North Carolina, Inc. | 0.93 | 0.69 | 0.05 | 0.03 |
| | CEMEX Construction Materials Atlantic, LLC - Statesville | 0.03 | | | |
| | CEMEX Construction Materials Atlantic, LLC - Statesville | | 0.08 | | |
| | Custom Products, Inc. | | | | 6.74 |
| | D&F Consolidated, Inc. dba Car-Mel Products, Inc. | 0.01 | | | 4.56 |
| | EGA Products, Inc. | | | | 1.47 |
| | Elmer's Products, Inc. | 1.52 | 0.11 | 0.45 | 115.87 |
| | Engineered Polymer Solutions, D/B/A Valspar | | | | 3.71 |
| | Engineered Sintered Components | 1.27 | 0.03 | 0.01 | 61.96 |
| | G & G Lumber Company, Inc. | 12.99 | 13.01 | 1.48 | 37.81 |
| | G & M Milling Company, Inc. | 0.15 | | 0.53 | |
| | General Microcircuits, Inc. | | | | 0.52 |
| | Godfrey Lumber Company, Inc. | 3.82 | 3.07 | 0.43 | 0.30 |
| | Hexagon Polymers Compounding NC, Inc. | | | | 0.07 |
| | International Paper - Statesville Container | 3.71 | | 0.02 | 2.21 |
| | Iredell County Landfill | | | | 2.03 |
| | Iredell Transmission, LLC | 40.80 | 6.10 | 1.30 | 30.30 |
| | J C Steele & Sons, Inc. | 1.82 | 2.03 | 0.02 | 20.21 |
| | JPS Composite Materials Corporation - Statesville Plant | 3.27 | | 0.01 | 13.58 |
| | Kewaunee Scientific Equipment Corporation | 2.57 | 0.50 | 0.02 | 17.74 |
| | L. Gordon Iron & Metal Company | 20.65 | 1.45 | 0.01 | 5.35 |
| | Lake Norman Regional Medical | 2.88 | 0.06 | 0.30 | 0.14 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Center | | | | |
| | Land O'Lakes Purina Feed, LLC - Statesville Mill | 0.79 | 0.06 | | 0.04 |
| | LIAT, LLC - Jasper Library Furniture - Plant 1 | | | | 2.30 |
| | Mack Molding Company | | | | 24.85 |
| | Maymead Materials, Inc. - Statesville Plant | 6.24 | | 9.44 | 4.92 |
| | McCombs Steel Company | | | | 2.84 |
| | Mocaro Dyeing & Finishing, Inc. | 5.63 | 0.13 | 0.03 | 4.27 |
| | NC Municipal Power Agency No. 1-Statesville | 0.62 | 0.01 | 0.01 | 0.02 |
| | NC Municipal Power Agency No.1, Statesville Delivery #3 Unit | 0.90 | 0.02 | 0.02 | 0.03 |
| | NGK Ceramics USA, Inc. | 11.80 | 3.45 | 2.09 | 1.77 |
| | Pneu-Mech Systems Manufacturing, Inc. | | | | 3.68 |
| | Ready Mixed Concrete Company, Mooresville Plant #91 | 0.04 | | | |
| | Ready Mixed Concrete Company, Statesville Plant #90 | 0.02 | | | |
| | Snider Tire, Inc. | 0.01 | 0.20 | | 0.92 |
| | Somers Lumber and Manufacturing, Inc. | | 0.56 | | 0.05 |
| | Sonoco Corrflex Graphics, LLC | | | | 0.37 |
| | Southeastern Concrete Products of NC, LLC | 0.20 | 0.02 | | 0.01 |
| | Southern States Cooperative, Inc., Statesville Fertilizer | 0.38 | | | 0.02 |
| | Star Milling Company | 0.15 | 0.10 | | 0.01 |
| | Statesville Brick Company | 9.37 | | 16.71 | 5.24 |
| | The Emerson Group, Inc. | | | | 17.79 |
| | Transcontinental Gas Pipe Line Company, LLC - Station 150 | 1109.31 | 49.31 | 0.91 | 302.39 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Troutman Chair Company | 0.15 | 0.58 | 0.01 | 10.13 |
| | Tyson Foods, Inc. Harmony | 83.01 | 52.20 | 292.02 | 4.96 |
| | Union Grove Moulding & Millwork, Inc. | 1.24 | 0.51 | 0.06 | 0.41 |
| | Warlick Paint Company, Inc. | 0.10 | | | 4.62 |
| Iredell Total | | 2095.79 | 201.00 | 526.82 | 833.38 |
| Jackson | Harrison Construction Division of APAC-Atlantic, Inc. | 6.71 | | 21.64 | 3.19 |
| | Jackson Paper Manufacturing Company | 95.69 | 73.80 | 6.99 | 52.38 |
| | T & S Hardwoods, Inc. | 5.63 | 3.53 | 0.64 | 2.27 |
| | Western Carolina University | 10.14 | 0.30 | 1.57 | 0.55 |
| Jackson Total | | 118.17 | 77.63 | 30.84 | 58.39 |
| Johnston | APC, Inc. - Selma | 3.14 | 4.72 | 0.08 | 0.15 |
| | Arc Terminals Holdings LLC | | | | 9.01 |
| | B P Products North America, Selma Terminal | | | | 21.03 |
| | Barnhill Contracting Company - Princeton | 4.40 | | 8.55 | 2.80 |
| | Bartlett Milling - Wilson Mills | | 0.33 | | |
| | Bentonville LNG Facility | 11.63 | | 0.01 | 0.34 |
| | Caterpillar | 3.69 | 0.25 | 0.24 | 0.54 |
| | Charles Cabinets Inc | | | | 4.77 |
| | Citgo Petroleum Corporation | 5.72 | | | 71.81 |
| | Colonial Pipeline Company | | | | 1.77 |
| | Conestoga Wood Specialties - Kenly | 0.32 | 4.04 | | 20.75 |
| | Grifols Therapeutics, Inc. | 20.92 | 1.43 | 14.84 | 36.84 |
| | Hanson Aggregates Southeast, LLC - Princeton | | 0.63 | | |
| | House-Autry Mills, Inc. | | 2.90 | | |
| | Jerry G Williams and Sons Inc | 10.80 | 7.16 | 1.27 | 23.05 |
| | Johnston County MSW Landfill | | | | 8.71 |
| | Johnston Memorial Hospital | 8.62 | 0.23 | 1.12 | 0.31 |
| | Kinder Morgan Southeast | 0.02 | | | 26.27 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Terminals | | | | |
| | Kinder Morgan Southeast Terminals LLC | | | | 0.67 |
| | Kinder Morgan Southeast Terminals LLC - Selma #1 | 0.05 | | | 59.11 |
| | Lampe & Malphrus Lumber Company | | 0.42 | | 0.60 |
| | Lampe and Malphrus Lumber Company | 30.20 | 8.49 | 3.48 | 90.52 |
| | Magellan Terminals Holdings, L.P. | 2.02 | | | 35.70 |
| | Marathon Petroleum Company LP - Selma | | | | 35.50 |
| | May-Craft Fiberglass Products Inc | | 0.06 | | 5.13 |
| | NC DOC - Selma | | | | 0.66 |
| | Novo Nordisk Pharmaceutical | 5.12 | 0.11 | 0.11 | 9.90 |
| | NSEW Corp DBA Bailey Feed Mill | | 0.93 | | |
| | OmniSource Southeast, LLC - Smithfield | | 0.79 | | 3.88 |
| | PGI Nonwovens DBA Chicopee Inc | 17.25 | 6.07 | 1.32 | 26.03 |
| | Raven NC, LLC | 1.77 | 0.15 | | 14.13 |
| | S.T. Wooten Corporation- Drug Store Asphalt Plant #207 | 2.60 | | 3.76 | 2.30 |
| | S.T. Wooten Corporation Princeton Asphalt Plant 205 | 5.50 | | 12.74 | 3.10 |
| | Southeastern Grain Company LLC - Bentonville Division | 0.01 | | | |
| | Structural Coatings Inc. | | 0.50 | | 39.90 |
| | TransMontaigne Operating Company, LP - Selma Terminal | | | | 20.21 |
| | Williamsburg Woodcraft | | 0.07 | | |
| Johnston Total | | 133.78 | 39.28 | 47.52 | 575.49 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Jones | Kinston Grain, LLC | 0.06 | | | 0.01 |
| | ROWMARK, LLC dba Color Path Technologies | 0.20 | 0.01 | | 2.70 |
| Jones Total | | 0.26 | 0.01 | | 2.71 |
| Lee | 3M Sanford - Plant 11 | | | | 0.06 |
| | 3M Sanford - Plant 13 | 0.61 | 0.01 | | 167.93 |
| | Caterpillar Inc., BCP Sanford | 4.51 | 0.90 | 0.13 | 32.56 |
| | City of Sanford Water Treatment Plant | 2.76 | 0.17 | 0.24 | 0.20 |
| | Coty US LLC | 1.75 | 0.13 | 0.03 | -9.10 |
| | GKN Driveline Sanford Precision Forming | 1.36 | 0.02 | 0.01 | 3.71 |
| | Hallman Foundry | 1.22 | 2.02 | 0.02 | 3.47 |
| | Lee Brick and Tile Company | 11.23 | | 0.04 | 0.90 |
| | Magneti Marelli Powertrain USA Inc. | 0.14 | 0.02 | | 1.38 |
| | Moen, Inc. | 4.00 | 1.22 | 0.38 | 0.22 |
| | Noble Oil Services Inc | 2.49 | 0.04 | 3.09 | 3.75 |
| | Pentair Water Pool and Spa, Inc. | 0.56 | 1.32 | | 6.74 |
| | Pfizer | 32.74 | 0.11 | 4.06 | 2.70 |
| | S. T. Wooten Corporation - Sanford Asphalt Plant | 5.40 | | 9.63 | 3.60 |
| | Saiden Technologies | 0.23 | | | 0.21 |
| | Static Control Components, Inc. - Plant 17 | 0.24 | 0.06 | | 76.04 |
| | Trion | 0.49 | 0.02 | | 0.84 |
| | Tyson Foods Inc | 7.18 | 1.80 | 0.05 | 0.83 |
| | Wake Stone Corp - Moncure Quarry | | 0.10 | | |
| Lee Total | | 76.91 | 7.95 | 17.68 | 296.04 |
| Lenoir | Caswell Center | 39.97 | 3.04 | 0.24 | 5.87 |
| | Cooper Crouse-Hinds, Cooper Interconnect - LaGrange | | | | 2.50 |
| | Crown-Kinston | 0.01 | | | 0.59 |
| | Dopaco | 0.39 | 0.03 | | 2.92 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | EI du Pont - Kinston Plant | 82.71 | 8.02 | 203.20 | 21.42 |
| | Electrolux Home Products, Dishwasher Division | 21.74 | 0.86 | 2.53 | 0.53 |
| | Lenoir Memorial Hospital Inc | 22.40 | | 3.14 | 0.74 |
| | Lenox Corporation | 18.91 | 0.49 | 0.48 | 0.99 |
| | MBCI - MasterBrand Cabinets Inc | 1.28 | 2.59 | 0.01 | 243.36 |
| | Neuse Regional Water Treatment Plant | 4.07 | 0.29 | 0.27 | 0.33 |
| | Smithfield Packing Company Inc - Kinston 2 | 7.07 | | 0.09 | 0.14 |
| | West Pharmaceutical Services | 8.94 | 0.68 | 0.06 | 0.50 |
| Lenoir Total | | 207.49 | 16.00 | 210.02 | 279.89 |
| Lincoln | Blythe Construction, Inc., Plant No. 8 | 3.30 | | 3.20 | 3.05 |
| | Cataler North America Corporation | 13.22 | 0.44 | 0.00 | 1.56 |
| | CPI Packaging, Inc. | 0.21 | 1.56 | | 277.15 |
| | Duke Energy Corporation LCTS | 42.17 | 3.04 | 0.71 | 2.22 |
| | HOF Textiles, Inc. | 4.11 | 0.31 | 0.03 | 22.50 |
| | Lincolnton Wastewater Treatment Plant | 5.20 | 0.15 | 0.88 | 0.14 |
| | McMurray Fabrics, Inc. | 1.08 | 0.08 | | 0.14 |
| | McMurray Fabrics, Inc. - Lincolnton | 9.71 | 4.40 | 0.07 | 22.77 |
| | Mohican Mills, Inc. | 17.25 | 0.34 | 38.26 | 13.31 |
| | NC Municipal Power Agency No. 1 -Lincolnton High School Unit | 0.61 | 0.01 | 0.38 | 0.02 |
| | NFP Holdings, LLC | 8.65 | 2.00 | 51.83 | 1.38 |
| | Rea Contracting (Denver) | 4.80 | | 11.31 | 2.70 |
| | RSI Home Products | | 4.11 | | 0.90 |
| | South Fork Industries, Inc. | 6.14 | 1.99 | 0.03 | 2.94 |
| | Textile Piece Dyeing Co., Inc. | 2.52 | | 0.01 | 7.25 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | The Timken Company, Lincolnton Bearing Plant | 10.51 | 37.63 | 0.13 | 1.66 |
| | VT LeeBoy, Inc. | 0.05 | | | 12.08 |
| | Wireway/Husky Systems | 0.04 | 0.41 | | 31.03 |
| Lincoln Total | | 129.57 | 56.47 | 106.84 | 402.80 |
| Macon | Harrison Construction Division of APAC-Atlantic Inc. | 2.99 | | 8.82 | 0.35 |
| | Rhodes Brothers Paving, Inc. | 2.80 | | 2.39 | 0.60 |
| | Zickgraf Hardwood Flooring Company, LLC - Plant Z1 | 31.05 | 9.45 | 1.59 | 4.97 |
| Macon Total | | 36.84 | 9.45 | 12.80 | 5.92 |
| Madison | McCrary Stone Service, Inc. - Crushing & Screening Plant | 2.79 | 0.20 | 0.18 | 0.23 |
| | Printpack, Inc. - Marshall | | | | 7.41 |
| Madison Total | | 2.79 | 0.20 | 0.18 | 7.64 |
| Martin | Anns House of Nuts | 0.93 | | 0.01 | 0.05 |
| | Barnhill Contracting Company - Williamston | 8.11 | | 12.60 | 6.02 |
| | Domtar Paper Company, LLC | 2268.76 | 260.02 | 931.01 | 516.22 |
| | J&J Commodities a Division of Abbitts Inc. | 0.43 | | | 0.01 |
| | Roberson Contracting, Inc. | 144.72 | | 298.88 | 97.53 |
| | Weyerhaeuser NR Company - Plymouth Lumber | | 5.62 | | 239.04 |
| Martin Total | | 2422.95 | 265.64 | 1242.50 | 858.87 |
| McDowell | Baxter Healthcare Corporation | 108.62 | 61.13 | 1.03 | 5.12 |
| | CEMEX Construction Materials Atlantic, LLC - Marion | 1.50 | | 0.01 | 0.08 |
| | Coats American - Sevier Plant | 4.12 | 0.17 | 1.32 | 220.80 |
| | Columbia Plywood Corporation - Columbia Carolina Division | 30.07 | 22.22 | 4.10 | 5.81 |
| | Crane Co., Crane Resistoflex | 0.99 | | | 15.03 |
| | Cumberland Gravel & Sand Company - McDowell County | 30.40 | 2.16 | 2.00 | 2.47 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Ethan Allen Operations, Inc. - Pine Valley Division | 31.28 | 13.28 | 1.86 | 141.67 |
| | IAC Old Fort, LLC | 1.61 | 0.03 | 0.01 | 6.83 |
| | ITL Corp., Industrial Timber & Lumber Company | 2.37 | 1.08 | 0.96 | 1.74 |
| | Jason Incorporated - Janesville Acoustics - Plant 80 | 0.41 | | 0.06 | 1.57 |
| | JELD-WEN, Inc. | 31.88 | 29.21 | 1.39 | 63.23 |
| | Johnson Paving Company, Inc. | 2.64 | | 8.81 | 0.36 |
| | Maymead Materials, Inc. | 3.90 | | 8.94 | 3.30 |
| | McDowell County Millwork, LLC | 27.51 | 26.04 | 1.40 | 4.25 |
| | McDowell Panel & Components | | 0.01 | | |
| | Metal Industries, Inc. | 0.22 | | | |
| | Parker Legwear LLC | 0.96 | 0.01 | 2.24 | 0.01 |
| | Perfect Air Control, Inc. | 0.12 | 0.01 | | 0.51 |
| | RockTenn Converting Company, Marion | 0.09 | 0.18 | | 5.08 |
| | Town of Old Fort WWTP | 0.37 | 0.03 | 0.02 | 0.03 |
| | Unlimited Finishing, Inc. - Marion | | | | 3.13 |
| | WNC Dry Kiln, Inc. - Marion | 0.41 | 0.58 | 0.05 | 0.15 |
| McDowell Total | | 279.47 | 156.14 | 34.20 | 481.17 |
| Mitchell | BRP US, Inc. - Spruce Pine | 8.56 | 3.52 | 0.05 | 15.22 |
| | Mayland Court, Inc. | | | | 15.30 |
| | New Buck Corporation | 0.21 | 0.05 | 0.02 | 1.17 |
| | The Quartz Corp USA - Chalk Mountain Mine | | 0.48 | | |
| | The Quartz Corp USA - Sullins Wiseman Mine | | 0.44 | | |
| | The Quartz Corp USA, K-T Feldspar Corporation | 1.80 | 3.79 | 1.90 | 0.02 |
| | The Quartz Corp USA, The Feldspar Corporation | 1.85 | 12.17 | 0.01 | 9.00 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Unimin Corporation Green Mountain - Plant 2 | | 0.04 | | |
| | Unimin Corporation Quartz/Feldspar Facility | | 0.36 | | |
| | Unimin Corporation, Crystal Quartz Operation | | 0.38 | | |
| | United States Gypsum Company | 1.16 | 10.27 | 4.14 | 98.82 |
| | V. Alan Atkins, d.b.a. Appalachian Paving and Grading | 0.50 | | 1.20 | 0.20 |
| | Vulcan Construction Materials LP - Spruce Pine Quarry | | 0.03 | | |
| Mitchell Total | | 14.08 | 31.53 | 7.32 | 139.73 |
| Montgomery | Biscoe Papers LLC | 1.12 | 0.01 | 3.98 | 0.92 |
| | Candor Creek Investments LLC | | 0.68 | | |
| | Capel, Inc. | 4.27 | 0.34 | 6.09 | 0.02 |
| | Gibraltar Packaging Group, Inc. | | | | 107.84 |
| | Grede II - Biscoe, LLC | 2.51 | 41.40 | 0.43 | 27.51 |
| | Heritage Moulding Corporation | | | | 1.07 |
| | International Automotive Components Group of North America | 0.33 | 0.02 | | 0.83 |
| | Jess Crate, Inc. | | | | 0.48 |
| | Jordan Lumber & Supply Co | 49.56 | 38.90 | 5.76 | 300.66 |
| | Lancer, Inc. | | 0.01 | | |
| | L'GAEL Manufacturing, LLC | 0.10 | 0.63 | 0.01 | 0.01 |
| | McBride Lumber Company | | 3.32 | | |
| | McNeill's Frame Shop | | 1.07 | | |
| | McRae Industries, Inc. | | | | 2.30 |
| | Megawood, Incorporated | | 0.45 | | |
| | Mountaire Farms Inc - Candor Feed Mill | 8.72 | 0.88 | 21.13 | 0.27 |
| | NC DOC - Southern Correctional Institute | 0.77 | 0.03 | 0.01 | 0.02 |
| | S.T. Wooten Corporation - Plant No. 15 | 21.90 | 0.49 | 12.17 | 3.50 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Select Frame Shop Inc | | 6.00 | | |
| | Troy Lumber Co | 38.19 | 20.87 | 4.34 | 204.33 |
| | Troy Ready Mix, Inc. | | 0.86 | | |
| | Unilin Flooring N.V. | 112.13 | | 11.23 | 132.45 |
| | Uwharrie Lumber Company | | 2.49 | | |
| | Uwharrie Regional Landfill | 10.37 | 2.60 | 1.11 | 11.39 |
| Montgomery Total | | 249.97 | 121.05 | 66.26 | 793.60 |
| Moore | Blackwelder Tank Service | | 0.18 | | |
| | Carolina Crate & Pallet, Inc. | | 0.37 | | |
| | CEMEX Construction Materials Atlantic,LLC-Aberdeen | | 0.55 | | |
| | FirstHealth Moore Regional Hospital | 7.63 | 0.15 | 0.21 | 0.38 |
| | Fletcher Industries | | 0.09 | | 0.05 |
| | Glendon Pyrophyllite, Inc. - Mine Site | | 0.12 | | |
| | Gulistan Carpet, Inc. - Aberdeen | 3.54 | 1.97 | 0.67 | 4.42 |
| | Holmes Building Systems, LLC | | 0.05 | | 0.11 |
| | Ingersoll - Rand Tool and Hoist Division | | | | 24.30 |
| | Perdue Farms Inc - Eagle Springs | 17.77 | 3.34 | 73.37 | 0.09 |
| | R. T. Vanderbilt Company, Inc., Standard Mineral Division | 1.01 | | 3.59 | 0.01 |
| | Riley Paving, Inc. - Carthage Plant | 7.39 | | 13.89 | 1.80 |
| | Speer Concrete, Inc. | | 0.94 | | |
| Moore Total | | 37.34 | 7.76 | 91.73 | 31.16 |
| Nash | Befco Inc | | | | 6.03 |
| | Belt Concepts of America Inc a subsidiary of Veyance Tec. In | 1.41 | 0.07 | | 0.43 |
| | Carolina Steel Group LLC - Nashville | | 0.02 | | 5.70 |
| | Cavalier Home Builders, LLC dba Nashville Division of Cavali | | 0.03 | | 1.90 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | City of Rocky Mount at Draka Elevator Products | 3.40 | 0.10 | 0.57 | 0.10 |
| | City of Rocky Mount at Tietex International | 3.90 | 0.11 | 0.65 | 0.11 |
| | Consolidated Diesel Company | 147.54 | 13.68 | 8.91 | 81.21 |
| | Eaton Aeroquip Incorporated | | | | 24.18 |
| | Glover Milling Co Inc | 0.06 | 0.20 | | |
| | Honeywell International, Inc. | 1.22 | 0.09 | 0.01 | 31.75 |
| | Hospira, Inc. | 1.25 | 0.09 | 0.05 | 33.00 |
| | Interstate Brands - Merita | 2.80 | 0.81 | 0.02 | 89.12 |
| | Kaba Ilco Corporation | 1.11 | 0.22 | | 0.67 |
| | Nash Hospitals, Inc. | 7.22 | 0.41 | 5.72 | 0.27 |
| | Perdue Farms - Nashville Feedmill | 6.97 | 9.91 | 41.80 | 0.04 |
| | Rose Brothers Paving Co., Inc. | 8.69 | | 6.69 | 2.85 |
| | Strickland Industries Inc | 0.06 | | | 9.78 |
| | Universal Leaf North America, Inc. | 11.44 | 0.28 | 1.76 | 0.57 |
| | Wake Stone Corporation - Nash County Quarry | | 0.19 | | |
| Nash Total | | 197.07 | 26.21 | 66.18 | 287.71 |
| New Hanover | Apex Oil Company, Inc. | 4.55 | 0.06 | 0.05 | 42.68 |
| | Barnhill Contracting Company | 3.69 | | 7.20 | 2.58 |
| | Bradley Creek Pump Station | 0.41 | 0.03 | 0.03 | 0.03 |
| | Carolina Marine Terminal | | 4.26 | | |
| | Carolina Power and Light Company d/b/a Progress Energy Caro | 4958.09 | 358.21 | 18843.97 | 32.61 |
| | CEMEX, Inc. | | 0.55 | | |
| | Container Products Corporation | | | | 14.00 |
| | Corning Incorporated | 185.74 | 7.05 | 0.06 | 38.95 |
| | CTI of NC Inc | 1.34 | 0.10 | 0.01 | 19.35 |
| | Elementis Chromium | 443.59 | 59.41 | 577.27 | 59.61 |
| | Flint Hills Resources, LP | 0.22 | | | 2.23 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Fortron Industries LLC | 33.93 | 0.83 | 6.39 | 34.82 |
| | Global Nuclear Fuel - Americas, LLC | 5.29 | | | 21.84 |
| | Hess Corporation - Wilmington Terminal | 5.32 | 0.30 | 12.32 | 44.83 |
| | Hewletts Creek Pump Station | 0.82 | 0.02 | 0.14 | 0.02 |
| | INVISTA S.a.r.l. | 0.13 | | | 12.12 |
| | Invista, S.a.r.l. | 399.39 | 66.17 | 1029.98 | 270.98 |
| | James A Loughlin WWTP (aka Northside) | 11.78 | 0.34 | 1.98 | 0.34 |
| | Kinder Morgan, Wilmington | 2.28 | | 0.60 | 11.36 |
| | Louisiana-Pacific Corporation | 1.46 | 10.20 | 0.01 | 25.56 |
| | McKean Maffitt WWTP (aka Southside) | | | 0.08 | 0.06 |
| | NC State Ports Authority - Wilmington | | 0.21 | | |
| | New Hanover County Secure Landfill | | | | 11.61 |
| | New Hanover County WASTEC | 138.46 | 3.78 | 20.42 | 0.04 |
| | New Hanover Regional Medical Center | 13.06 | 1.02 | 0.38 | 0.83 |
| | NuStar Asphalt Refining, LLC | 8.92 | 0.16 | 0.05 | 0.55 |
| | Oldecastle - Adams Products Company | 0.13 | 0.01 | | 0.01 |
| | S.T. Wooten Corporation | 4.20 | 1.40 | 6.78 | 3.00 |
| | Sweeney Water Treatment Plant | 0.91 | 0.03 | 0.15 | 0.03 |
| | TEREX Cranes Wilmington, Inc. | | | | 11.41 |
| | Vopak - Woodbine Street Terminal | 1.76 | 0.13 | 0.01 | 20.62 |
| | Vopak Terminal South Wilmington | 2.45 | 0.43 | 10.48 | 2.73 |
| | Wilbara, LLC | 0.36 | 0.06 | 3.56 | |
| | Wilmington Materials | 0.12 | | 0.01 | |
| New Hanover Total | | 6228.40 | 514.76 | 20521.93 | 684.80 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Northampton | Georgia-Pacific Chemicals, LLC - Conway | 6.70 | 10.98 | 0.05 | 59.92 |
| | John B. Sanfilippo & Son, Inc. | 0.51 | 9.37 | | 0.03 |
| | Pleasant Hill Compressor Station | 3.83 | 0.01 | | 0.08 |
| | Resinall Corp Severn Plt | 10.71 | 0.73 | 36.42 | 20.40 |
| | Rightmyer Machine Rentals Inc | 2.21 | | 3.96 | 0.18 |
| | Rose Brothers Paving Co Inc - Gaston Asphalt Plant | 4.12 | | 6.32 | 0.40 |
| | Severn Peanut Co Inc | 0.22 | 0.01 | | 0.01 |
| | West Fraser - Seaboard Lumber Mill | 51.26 | 23.45 | 5.83 | 211.83 |
| Northampton Total | | 79.56 | 44.55 | 52.58 | 292.85 |
| Onslow | Camp Lejeune Marine Corp Base | 525.65 | 13.94 | 731.05 | 34.08 |
| | Mine Safety Appliances | 0.24 | 0.11 | 0.01 | 2.60 |
| | Onslow County Landfill | 1.14 | 0.48 | 0.35 | 3.96 |
| | Onslow Grading & Paving, Inc. | 6.01 | | 8.32 | 4.59 |
| | Onslow Memorial Hospital | 2.57 | 0.01 | 0.55 | 0.12 |
| Onslow Total | | 535.61 | 14.54 | 740.28 | 45.35 |
| Orange | Armacell LLC | 6.77 | 12.91 | 0.03 | 95.48 |
| | Bingham Facility | 1.25 | 0.04 | 0.01 | 0.05 |
| | General Electric Company | 2.62 | 0.21 | 0.01 | 1.09 |
| | MeadWestvaco Consumer Packaging Group LLC | 0.13 | | | 58.26 |
| | Resco Products Inc. - Piedmont Minerals | 0.39 | 0.89 | | 0.12 |
| | University of North Carolina at Chapel Hill | 481.01 | 10.49 | 240.79 | 2.07 |
| Orange Total | | 492.17 | 24.54 | 240.84 | 157.07 |
| Pasquotank | Albemarle Hospital | 14.95 | | 0.62 | 1.62 |
| | Barnhill Contracting Company - Elizabeth City | 3.76 | | 6.24 | 2.65 |
| | Elizabeth City Wastewater Treatment Plant | 2.50 | 0.07 | 0.43 | 0.08 |
| | J W Jones Lumber Co Inc | 25.79 | 10.70 | 1.31 | 49.01 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Parkway Ag Supply, L. L. C. - Morgans Corner | 0.38 | | 1.33 | |
| | Sanders Co Inc | 0.02 | | 0.56 | |
| | UFP Elizabeth City, LLC | | 1.90 | | |
| | USCG Base Support Unit Elizabeth City | 20.84 | 0.63 | 2.25 | 34.49 |
| Pasquotank Total | | 68.24 | 13.30 | 12.74 | 87.85 |
| Pender | H & P Wood Turnings, Inc. | | 0.81 | | |
| | Ready Mixed Concrete Company - Scotts Hill | | 0.90 | | |
| | TriEst Ag Group, Inc. | | | | 6.53 |
| | Windsor Fiberglass, Inc. | | 0.08 | | 8.62 |
| Pender Total | | | 1.79 | | 15.15 |
| Person | Aleris Rolled Products, Inc. | 16.29 | 1.28 | 0.20 | 7.66 |
| | CPI USA North Carolina - Roxboro Plant | 219.57 | 6.32 | 668.00 | 2.52 |
| | Georgia - Pacific Roxboro | 11.77 | 15.39 | 1.23 | 12.50 |
| | Keystone Farm Service Inc | 0.04 | | | |
| | Louisiana-Pacific Corp - Roxboro | 76.98 | 42.34 | 6.54 | 89.34 |
| | Progress Energy - Mayo Facility | 1906.45 | 727.67 | 5368.61 | 62.42 |
| | Progress Energy - Roxboro Plant | 7028.44 | 799.24 | 12115.14 | 192.19 |
| | Public Service Company of NC - Roxboro Compressor Station | 2.69 | 0.05 | 0.02 | 0.15 |
| | Upper Piedmont Regional Landfill | 5.99 | 1.55 | 0.67 | 3.78 |
| | US Flue Cured Tobacco Growers, Inc. | 2.62 | 0.20 | 0.01 | 52.18 |
| Person Total | | 9270.84 | 1594.04 | 18160.42 | 422.74 |
| Pitt | Alliance One International - Farmville | 6.67 | 0.13 | 0.04 | 26.96 |
| | ASMO Greenville of North Carolina Inc | 5.48 | 0.19 | 0.80 | 15.54 |
| | Attends Health Care Products, Inc. | 0.21 | | | 0.01 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Barnhill Contracting Company - Greenville Plant | 5.27 | | 8.54 | 3.97 |
| | Cooke Communications North Carolina LLC | | | | 3.02 |
| | DSM Pharmaceuticals, Inc. | 43.40 | 3.26 | 3.37 | 44.49 |
| | East Carolina University | 7.45 | 0.34 | 12.78 | 0.74 |
| | East Carolina University Facilities Services | 2.11 | 0.18 | 0.21 | 0.11 |
| | ECU School of Medicine | 54.54 | 2.09 | 15.66 | 5.59 |
| | Goldsboro Milling Grain Company - Farmville Field St | 0.10 | | | 0.02 |
| | Grady - White Boats Inc | | | | 32.18 |
| | Greenville Paving & Contracting Co | 4.89 | | 8.05 | 4.90 |
| | Greenville Ready Mix Concrete Inc. - Winterville | | 1.58 | | |
| | Greenville Water Treatment Plant | 3.10 | | 0.49 | 0.10 |
| | International Broadcasting Bureau - Transmitter Site B | 2.60 | | 0.00 | 0.01 |
| | Mestek Inc | 0.57 | 0.01 | 0.00 | 4.43 |
| | Metallix Refining, Inc | 1.31 | 0.91 | 0.58 | 0.36 |
| | Metrics Inc. | 0.04 | | | 0.33 |
| | Mohawk Industries, Inc.- Greenville | 0.92 | 0.02 | 0.34 | 0.05 |
| | NACCO Materials Handling Group Inc | | | | 69.72 |
| | Perdue Grain and Oilseed, LLC - Greenville | 0.94 | 0.02 | 0.01 | 0.05 |
| | Pitt County Memorial Hospital | 10.04 | 0.25 | 0.76 | 0.08 |
| | Pitt Landfill Gas LLC | 0.54 | | 0.14 | 0.03 |
| | Rose Brothers Paving Company, Inc. - Greenville | 2.18 | | 6.44 | 1.85 |
| | Southern States Farmville Feed - Farmville | 0.59 | 0.05 | | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | The Roberts Company | | | | 0.50 |
| | Weyerhaeuser Company - Grifton | 43.32 | 4.42 | 5.10 | 307.41 |
| Pitt Total | | 196.27 | 13.45 | 63.32 | 522.44 |
| Polk | Carolina Yarn Processors, Divis. of Fendrich Industries, Inc | 1.40 | 0.04 | 0.63 | 0.39 |
| | D & S Asphalt Materials, Inc. | 3.37 | | 2.03 | 0.34 |
| | Public Service Company of NC, Inc. - Mill Spring Compressor | 0.12 | | | |
| Polk Total | | 4.89 | 0.04 | 2.66 | 0.73 |
| Randolph | Acme McCrary Corp. North Street Finishing Plant | 2.48 | 0.18 | 0.02 | 0.14 |
| | Acme McCrary Corp. Pritchard Street Plant | 4.10 | 0.32 | 0.02 | 0.61 |
| | Allred Metal Stamping Works, Inc. | | 0.01 | | 0.12 |
| | AMT/BCU, Inc. dba American Modular Technologies | | | | 0.70 |
| | APAC-Atlantic, Inc. - Plant # 9 | 4.50 | | 7.26 | 3.00 |
| | Arrow International, Inc. - Asheboro | 1.66 | 0.05 | 0.03 | 25.15 |
| | B & H Panel Company | 0.80 | 0.65 | 0.01 | 30.23 |
| | Bossong Hosiery Mills Inc | 2.43 | 0.05 | 0.01 | 0.63 |
| | Braxton Culler, Incorporated | 0.28 | 0.01 | | 83.84 |
| | Carolina Business Furniture, LLC | 0.13 | 0.33 | 0.00 | 15.37 |
| | Carolina Custom Finishing, LLC | 0.27 | 1.48 | | 61.93 |
| | Carrick Turning Works, Incorporated | 0.01 | | | |
| | Chandler Concrete/Piedmont, Inc. - Asheboro Plant 108 | 0.01 | | | |
| | COMM-KAB, INC. | | | | 1.60 |
| | Commonwealth Hosiery Mills, Inc. | 1.58 | 0.03 | 0.01 | 0.09 |
| | DAR/RAN Furniture Industries, | 0.47 | 0.13 | | 42.67 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Inc. | | | | |
| | Deep River Dyeing Company, Inc. | 13.70 | 3.92 | 0.53 | 0.76 |
| | Electra-Finish, Inc. | | 0.47 | | 17.78 |
| | Energizer Battery Manufacturing, Inc. | 3.06 | 0.16 | 0.02 | 34.23 |
| | Esco Industries, Incorporated | | | | 0.21 |
| | Flexible Foam Products, Inc. - High Point Facility | 0.19 | | | 1.04 |
| | Georgia - Pacific Corrugated, LLC - Asheboro Plant | 2.50 | 10.35 | 1.12 | 3.45 |
| | Gilbert Hardwood Centers, Inc. | 30.94 | 11.18 | 1.58 | 1.60 |
| | Gotico Furniture and Accents, Inc. | | | | 1.91 |
| | H & H Furniture Manufacturers, Inc. - Plant 2 | | 0.25 | | 11.08 |
| | Harris House Furniture Industries Inc | | | | 5.67 |
| | High Point Furniture Industries, Inc. | 0.87 | 0.14 | 0.04 | 1.14 |
| | Hyosung USA, Inc. | 8.74 | 0.64 | 0.04 | 0.47 |
| | J & P Finishing, Inc. | | 0.01 | | 11.49 |
| | Jalco, Inc. | | | | 7.80 |
| | Jones Frame, Inc. - Trinity | | 3.75 | | |
| | Jowat Corporation | 0.60 | 9.69 | | 4.39 |
| | J's Color Creations, Inc. | | | | 6.32 |
| | Kayser-Roth Corporation - Asheboro Facility | 2.33 | 0.04 | 0.01 | 0.18 |
| | Liberty Lumber Company | 4.47 | 5.42 | 0.51 | 1.75 |
| | Lodging by Liberty, Inc. | | | | 3.06 |
| | Lowes Companies, Inc. - Asheboro | 0.33 | 0.02 | 0.04 | 0.02 |
| | March Furniture Manufacturing, Inc. | | 0.55 | | |
| | Matlab, Inc. - North Facility | | 0.01 | | 1.33 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Matlab, Inc. - Plants 1-4, 5, 7, 8 and 11 | 0.90 | 0.43 | 0.01 | 31.21 |
| | Matlab, Inc. - Ramseur Plant | 0.22 | | | 9.54 |
| | McDowell Lumber Company, Inc. | 0.05 | 8.05 | 0.05 | 2.02 |
| | Michael Thomas Furniture, Inc. | | | | 7.81 |
| | Mid-Coastal Development Corp. DBA Southern Aggregates | 0.10 | | | 0.09 |
| | Norcraft Companies, LP, dba UltraCraft Cabinetry | 0.80 | 0.15 | | 109.75 |
| | Oliver Rubber Company | 3.02 | 5.08 | 0.02 | 206.04 |
| | Ornamental Mouldings, LLC | | 0.01 | | |
| | Pilgrim's Pride Corporation, Staley Feed Mill | 1.50 | 10.22 | 0.01 | 0.08 |
| | Plastics Color Corporation of North Carolina | | 0.04 | | 0.08 |
| | Prestige Fabricators, Inc. - Foam Plant | 0.57 | 0.02 | 0.04 | 0.04 |
| | Prestige Fabricators, Inc. - Plant 2 | 0.10 | 0.14 | | 38.81 |
| | Quality Veneer Company | 3.11 | 6.31 | 0.35 | 0.33 |
| | Ralph's Frame Works, Inc. | 0.19 | 0.21 | 0.01 | 0.01 |
| | Riley Paving, Inc. - Liberty Plant | 0.57 | | 2.04 | 0.01 |
| | Sapona Manufacturing Company, Inc. | 0.30 | 1.03 | | 5.43 |
| | Starpet, Inc. | 25.68 | 0.49 | 0.15 | 21.60 |
| | Swaim, Inc. - Wagner Division | 0.03 | 0.13 | 0.11 | |
| | T.D. Custom Coatings, Inc. | | | | 5.49 |
| | The North Carolina Lumber Company | 0.09 | 1.02 | | 0.01 |
| | The Timken Company - Asheboro Bearing Plant | 1.60 | 5.30 | 0.01 | 0.09 |
| | Tower Components, Inc. | | | | 80.80 |
| | Trinity Furniture, Inc. | | 0.11 | | 11.41 |
| | Woodline, Inc. | | | | 2.23 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Randolph Total | | 125.28 | 88.58 | 14.05 | 914.64 |
| Richmond | Barnhill Contracting Company - Rockingham Plant | 11.43 | | 20.15 | 5.84 |
| | Burlington Industries LLC - Richmond Plant | 6.36 | 2.41 | 18.43 | 2.80 |
| | Cascades Tissue Group - NC, a Div of Cascades Holding Inc | 21.12 | 0.41 | 0.13 | 1.16 |
| | CEMEX Construction Materials Atlantic,LLC-Hamlet | | 0.34 | | |
| | FirstHealth Richmond Memorial Hospital | 1.76 | 0.04 | 0.13 | 0.11 |
| | Hudson Paving Inc | 4.00 | 1.04 | 9.42 | 1.28 |
| | NCEMC - Hamlet Plant | 81.23 | 25.30 | 0.65 | 18.18 |
| | Perdue Farms Inc - Rockingham | 5.17 | 0.39 | 0.29 | 0.27 |
| | Progress Energy Carolinas Inc. - Richmond Cty Comb Turbine | 442.12 | 118.70 | 12.46 | 35.51 |
| | Ritz-Craft Corporation | | | | 0.21 |
| | Sandhills Regional Medical Center | 0.99 | 0.02 | 0.02 | 0.05 |
| | Sealed Air Corp - Cryovac Div | 0.15 | 0.01 | 0.05 | |
| | Southern Products & Silica Company Inc | 0.83 | 0.53 | 2.45 | 0.01 |
| | Trans Carolina Products, LLC | 1.40 | 21.07 | | 0.53 |
| | Trinity Manufacturing, Inc. | | | | 0.33 |
| | Unimin Corporation - Marston Plant | 16.22 | 3.23 | 0.16 | 0.17 |
| | Unique Stone, Inc. | | 0.04 | | |
| | Vulcan Construction Materials, LP - Rockingham Quarry | | 0.36 | | |
| | Wade Manufacturing Co - Rockingham | 0.68 | 0.01 | | 0.57 |
| Richmond Total | | 593.46 | 173.90 | 64.34 | 67.02 |
| Robeson | Acme Electric Corporation | 0.55 | | | 35.81 |
| | Alamac American Knits, LLC | 6.51 | 1.62 | 2.40 | 8.36 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Barnhill Contracting Co. - Lumberton Asphalt Plant Site #2 | 8.18 | | 0.02 | 7.17 |
| | Barnhill Contracting Company - Lumberton Plant | 2.50 | | 5.92 | 1.40 |
| | Buckeye Lumberton Inc | 4.00 | 0.08 | 0.02 | 0.22 |
| | Campbell Soup Supply Company | 101.31 | 3.63 | 70.62 | 3.58 |
| | Elkay Plumbing Products Company | 3.20 | 0.06 | 0.02 | 16.97 |
| | Fex Straw Manufacturing, Inc. | 0.06 | | | |
| | Graphic Packaging International Inc. | | 0.18 | | 43.73 |
| | Hasty Plywood Co Inc | | | | 0.40 |
| | Industrial & Agricultural Chemicals, Inc. | 0.20 | 0.56 | 0.71 | |
| | International Paper Company - Lumberton Packaging Plant | 0.23 | 3.39 | | 6.87 |
| | J & D Wood Inc. | 8.03 | 2.90 | 0.41 | 0.28 |
| | Kayser-Roth Hosiery Inc-Lumberton | 0.03 | | | 2.53 |
| | Lumberton Energy, LLC | 0.05 | | | 0.31 |
| | Mueller Steam Specialty | 1.10 | 0.03 | 0.17 | 0.84 |
| | NYP Corp. - Division of Ampack, LLC | 0.40 | | | 1.20 |
| | Perdue Grain & Oil Seed LLC - Lumberton | | 0.21 | | |
| | Piedmont Natural Gas - Pembroke Compressor Station | 5.07 | 0.10 | 0.97 | 0.03 |
| | Progress Energy Carolinas, Inc., W.H. Weatherspoon Plant | 2578.70 | 107.50 | 6590.61 | 10.01 |
| | Silgan Can Company | 4.04 | 0.08 | 0.02 | 62.63 |
| | Southeastern Concrete of Lumberton, Inc. | | 1.35 | | |
| | XMC Films, Inc. | | | | 54.79 |
| Robeson Total | | 2724.16 | 121.69 | 6671.89 | 257.13 |
| Rockingham | A.C. Furniture Company, Inc. | | | | 6.99 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Alltech, Inc. | 4.00 | 18.10 | 0.03 | 32.50 |
| | Amcor Tobacco Packaging Americas Inc. | 1.31 | 0.10 | | 7.51 |
| | Ball Metal Beverage Container Corp | 5.77 | 3.29 | 0.04 | 238.64 |
| | Beta Fluid Systems, Inc. | | | | 3.20 |
| | Bridgestone Aircraft Tire (USA), Inc. | 1.47 | 0.11 | | 18.71 |
| | Clean Harbors Reidsville, LLC | | 0.01 | | 5.90 |
| | Commonwealth Brands, Inc | 5.29 | 0.10 | 0.03 | 4.84 |
| | Duke Energy Carolinas, LLC - Dan River Steam Station | 973.64 | 200.86 | 4292.09 | 9.20 |
| | Duke Energy Carolinas, LLC- Rockingham Co Comb. Turb. | 101.83 | 3.89 | 1.40 | 5.24 |
| | Dystar Limited Partnership | 2.12 | 0.05 | 0.03 | 0.40 |
| | Global Textile Alliance, Inc. | 0.97 | 6.70 | | 3.51 |
| | Henniges Automotive North Carolina, Inc. | 1.10 | 0.04 | 0.01 | 24.19 |
| | Loparex LLC | 5.58 | 1.98 | 0.02 | 36.50 |
| | MillerCoors LLC | 532.53 | 8.72 | 1053.55 | 105.82 |
| | Mohawk Industries, Inc. - Karastan Eden Rug Mill | 5.44 | 0.13 | 0.02 | 10.34 |
| | Morrisette Paper Company, Inc. | | | | 50.00 |
| | Piedmont Asphalt, LLC | 3.98 | | 6.80 | 2.20 |
| | Pine Hall Brick Co., Inc. | 32.69 | 3.22 | 61.77 | 8.38 |
| | Premiere Finishing & Coating, LLC | 0.07 | 0.75 | | 3.37 |
| | Southern Graphic Systems, Inc. - Reidsville Facility | 0.17 | | | 0.36 |
| | The Equity Group, Inc. - NC Division | 5.38 | 1.79 | 0.04 | 3.51 |
| | The Southern Finishing Company, Incorporated - Plant 6 | 0.09 | 0.51 | | 33.21 |
| | Transcontinental Gas Pipe Line Co, LLC - Station 160 | 2088.68 | 45.47 | 1.21 | 201.60 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Unifi Manufacturing, Inc. Dyeing Business Unit - Plant 2 | 7.22 | 0.14 | 0.46 | 0.40 |
| | Unifi, Inc. | | 1.33 | | |
| Rockingham Total | | 3779.33 | 297.29 | 5417.50 | 816.52 |
| Rowan | Akzo Nobel Surface Chemistry LLC. | 12.59 | 4.11 | 0.08 | 135.18 |
| | APAC-Atlantic, Inc., Salisbury Plant # 69 | 2.24 | | 2.90 | 1.40 |
| | Associated Asphalt Salisbury, Inc. | 0.26 | 0.02 | | 0.64 |
| | Athena Marble Inc. | | | | 2.03 |
| | B & E Custom Cabinets, Inc. | | 0.21 | | 2.67 |
| | Baja Products Ltd. | | | | 1.17 |
| | Boral Bricks Inc - Salisbury Plant | 21.10 | 4.23 | 29.48 | 1.37 |
| | C & H Frameworks, Inc | 0.08 | 4.38 | | |
| | Cansorb Industries, Inc. | 0.11 | | | |
| | Carolina Perlite Company, Inc. | 1.27 | | 0.01 | 0.07 |
| | Carolina Perlite, Inc. | 1.26 | 3.37 | 0.01 | 0.04 |
| | Carolina Stalite Company | 435.38 | 12.74 | 713.24 | 0.16 |
| | Centurion Medical Products Corporation | 0.23 | | | 0.05 |
| | CMH Manufacturing Inc. d/b/a Schult Homes - Plant 957 | | | | 4.53 |
| | Concrete Supply Company - Salisbury Plant | 0.02 | | | |
| | Cronland Lumber Co., Inc. | 7.33 | 2.65 | 0.37 | 1.87 |
| | Daimler Trucks North America - Cleveland Plant | 7.49 | 0.03 | 0.04 | 211.29 |
| | Duke Power Company, LLC - Buck Steam Station | 1144.54 | 256.04 | 6499.46 | 16.97 |
| | Goodman Millwork, Inc. | 0.11 | 0.33 | 0.01 | 6.28 |
| | HBD Industries Inc. | 2.07 | 0.18 | 4.51 | 6.24 |
| | Hitachi Metals North Carolina, Ltd. | 2.02 | 3.04 | 0.01 | 0.13 |
| | Indopco, Inc. dba Henkel, | 10.10 | 6.18 | 0.06 | 124.34 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Innospec Performance Chemicals U.S. Company | 2.13 | 0.17 | 0.35 | 0.23 |
| | Johnson Concrete Company, Inc., Central Division | 0.19 | 0.01 | | 3.41 |
| | Magna Composites LLC - Salisbury Operations | 3.24 | 1.61 | 0.02 | 28.78 |
| | McKenzie Sports Products, Inc. | | | | 4.50 |
| | Myers Forest Products, Inc. | | 0.51 | | |
| | NC Municipal Power Agency No. 1 - Landis Delivery No. 2 Unit | 1.02 | 0.02 | 0.02 | 0.04 |
| | Norandal USA Inc | 16.76 | 0.55 | 0.12 | 800.41 |
| | Old Carolina Brick Company | 2.91 | 4.97 | 6.85 | 0.17 |
| | Old Carolina Brick Gold Hill | 0.20 | | 0.38 | 0.01 |
| | Packaging Corporation Of America | 2.25 | 0.15 | 0.01 | 2.04 |
| | Performance Fibers Operations, Inc. - Salisbury Plant | 28.42 | 6.18 | 0.17 | 34.55 |
| | Perma-flex Roller Technology - Salisbury, LLC | 0.25 | 0.01 | | 2.65 |
| | Pinnacle Corrugated LLC | 2.28 | 0.01 | 0.26 | 0.12 |
| | Plant Rowan County | 116.05 | 49.46 | 5.30 | 14.17 |
| | Rea Contracting (Kannapolis) | 6.30 | | 20.14 | 2.20 |
| | Rowan Regional Medical Center | 7.17 | 0.38 | 0.72 | 0.30 |
| | Southern States Cooperative, Inc. - Barber Feed Mill | 0.52 | 0.04 | | 0.03 |
| | Taylor Clay Products, Inc. | 12.96 | 19.11 | 17.13 | 0.88 |
| | W A Brown and Son Inc - Plant 2 | 0.27 | 0.02 | | 2.51 |
| | Wingfoot Commercial Tire Systems, LLC | 1.02 | 0.80 | | 2.38 |
| Rowan Total | | 1852.14 | 381.51 | 7301.65 | 1415.81 |
| Rutherford | Aallied Die Casting Company of NC | 3.47 | 1.66 | 0.02 | 0.19 |
| | Abercrombie Textiles II, LLC - Jacquards Plant | 0.30 | 0.03 | | 0.01 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | All American Homes of North Carolina, LLC - Rutherfordton | | | | 0.82 |
| | American Greetings Corporation | 0.54 | 0.34 | | 15.35 |
| | APAC-Atlantic, Inc. - Rutherfordton Plant | 1.42 | 0.42 | 3.01 | 0.60 |
| | Associated Rack Corporation, Southeastern Rack Co. Division | 0.06 | | | 0.01 |
| | Carpenter Design, Inc. | 2.60 | 0.25 | 0.82 | 0.14 |
| | Duke Energy Carolinas, LLC - Cliffside Steam Station | 864.72 | 714.85 | 12219.62 | 31.50 |
| | Eaton Aeroquip, Inc. | 1.07 | 0.02 | 0.01 | 1.26 |
| | Forest City Wastewater Treatment Plant | 0.50 | 0.01 | | 0.03 |
| | Gilkey Lumber Company, Inc. | 2.97 | 6.14 | 0.34 | 1.85 |
| | Gourmet Group LLC - dba Geppetto Kitchens | 0.24 | 0.01 | | 12.54 |
| | Meritor Heavy Vehicle Systems, LLC. - Forest City | 2.24 | 0.37 | 0.26 | 8.14 |
| | Mr. Rodney McCurry, d.b.a. McCurry Grading & Paving | 1.59 | 0.23 | 2.15 | 0.09 |
| | Outdoor Colors, LLC | 0.23 | 0.02 | | 30.71 |
| | Parton Lumber Company, Inc. | 57.97 | 21.41 | 3.00 | 58.58 |
| | Plastic Packaging, Inc. - Plant No. 2 | 0.24 | | | 180.01 |
| | Sonoco Products Company - Forest City Plant | | | | 29.56 |
| | Spindale Mills, LLC | 1.57 | 0.12 | 0.02 | 0.09 |
| | Town of Forest City - Beaver Street | 12.00 | 0.35 | 2.00 | 0.35 |
| | Town of Forest City - Lawing Road | 16.00 | 0.46 | 2.70 | 0.47 |
| | Trelleborg Coated Systems US, Inc - Grace Advanced Materials | 3.67 | 0.28 | 0.03 | 9.50 |
| | Ultimate Textile, Inc. | 1.19 | 0.02 | 0.08 | 0.81 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Yelton Milling Division of Lakeside Mills, Inc. | | 0.72 | | |
| Rutherford Total | | 974.59 | 747.71 | 12234.06 | 382.60 |
| Sampson | Allens, Inc. | 14.07 | 1.08 | 13.36 | 1.53 |
| | Barnhill Contracting - Clinton Plant (Multi-Site) | 3.21 | | 6.99 | 2.20 |
| | Butterball, LLC. - Feed Manufacturing Plant | 0.79 | 0.07 | | 0.06 |
| | Cathedral Church Interiors | | 0.01 | | 3.23 |
| | Coastal Protein, Inc | 8.91 | 0.64 | 21.33 | 4.93 |
| | DuBose Strapping, Inc. | 1.06 | 0.06 | 0.01 | 16.98 |
| | Garland Farm Supply | | 0.16 | | |
| | Hanson Brick East, LLC, dba Hanson Brick - Roseboro | | | | 0.17 |
| | Hog Slat, Inc. - Clinton Plant 2 | 0.13 | 0.36 | | |
| | Keener Lumber Company | 2.94 | 3.57 | 0.33 | 12.43 |
| | Kivetts Incorporated | | | | 16.55 |
| | Miller Control and Manufacturing Co Inc | | | | 0.60 |
| | Prestage Farms - Moltonville | 4.11 | 0.66 | 0.02 | 0.23 |
| | Prestage Farms, Inc. - Hwy. 421 Plant | 3.71 | 0.09 | 5.27 | 0.04 |
| | Sampson County Disposal LLC | 7.90 | 3.30 | 2.97 | 21.36 |
| | Sampson County Landfill | 3.76 | 1.56 | 1.42 | 2.50 |
| | Sampson County Regional Medical Center | 1.93 | 0.14 | 0.01 | 0.11 |
| | Schindler Elevator Corp | 1.46 | 1.37 | 0.01 | 0.08 |
| | Smithfield - Clinton Plant | 24.94 | 1.28 | 6.49 | 12.22 |
| | Southeastern Grain Co, LLC. - Clinton Division | 0.05 | 8.40 | | |
| | Turlington Lumber Co Inc | 2.29 | 1.36 | 0.25 | 5.89 |
| Sampson Total | | 81.26 | 24.11 | 58.46 | 101.11 |
| Scotland | Arvin Meritor | 0.04 | 0.00 | | 7.46 |
| | BlueScope Buildings North America, Inc. | 0.19 | 0.36 | | 25.15 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Carolina Crating, Inc. | | 7.95 | | |
| | Edwards Wood Products, Inc. | 0.67 | 44.15 | | 0.63 |
| | FCC (North Carolina), Inc. | | | | 3.92 |
| | Gulistan Carpet, Inc. - Wagram | 4.13 | 21.04 | 0.04 | 8.31 |
| | Kordsa, Inc. | 4.97 | 4.61 | 0.03 | 3.78 |
| | Murphy-Brown, LLC. - Laurinburg Feed Mill | 3.15 | 18.99 | 0.02 | 0.17 |
| | Pilkington North America, Inc. | 2813.36 | 235.18 | 244.81 | 32.02 |
| | Railroad Friction Products Corp | 0.35 | 1.33 | | 215.45 |
| | Umicore USA, Inc.-Umicore Autocatalyst Recycling | 0.50 | | | 0.03 |
| | WestPoint Home, Inc. | | | | 1.00 |
| Scotland Total | | 2827.36 | 333.61 | 244.90 | 297.92 |
| Stanly | American Fiber & Finishing, Inc. | 0.32 | | | 0.02 |
| | C K Earnhardt & Son, Inc. | 3.29 | | 5.18 | 0.24 |
| | Carolina Stalite Company | 77.68 | 7.08 | 141.50 | 0.47 |
| | CMH Manufacturing Inc. d/b/a Schult Homes - Plant 958 | | | | 2.18 |
| | Concrete Supply Company Albemarle Plant | 0.01 | | | |
| | Enterprise Rendering Company | 12.14 | | 0.48 | 2.36 |
| | Eudy's Cabinet Shop, Inc. | 0.08 | 0.02 | | 43.50 |
| | Fiber Composites, LLC | 0.78 | 0.03 | | 1.45 |
| | Gentry Mills, Inc. | 2.24 | 0.04 | 0.02 | 2.21 |
| | H W Culp Lumber Co, Inc | 63.16 | 42.15 | 3.22 | 200.50 |
| | Hanson Pipe & Products - Oakboro | 0.02 | | | 0.39 |
| | IAC Albemarle, LLC. | 77.17 | 1.97 | 171.67 | 98.46 |
| | J. T. Russell & Sons, Inc. | 5.76 | | 13.11 | 3.18 |
| | J. T. Russell & Sons, Inc. - Albemarle | 17.06 | 1.22 | 1.13 | 1.38 |
| | Michelin Aircraft Tire Company | 7.26 | 0.43 | 0.09 | 47.42 |
| | NC Municipal Power Agency No. 1 - Albemarle Hospital Unit | 0.63 | 0.01 | 0.40 | 0.02 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | NC Municipal Power Agency No. 1, Albemarle Prime Power Park | 1.01 | 0.02 | 0.63 | 0.04 |
| | Piedmont Natural Gas - Monroe Compressor Station | 2.05 | 0.01 | 0.02 | 0.04 |
| | Preformed Line Products Company | 0.01 | | | 1.77 |
| | Rusco Fixture Company, Inc. | | | | 7.91 |
| | Smith Novelty Company, Inc. | | 0.14 | | 0.60 |
| | Southern Pipe, Inc. | | | | 2.67 |
| | Stanly Fixtures Acquisition, LLC dba Stanly Fixtures | | | | 17.78 |
| | Stanly Regional Medical Center | 1.70 | 0.05 | 0.23 | 0.18 |
| Stanly Total | | 272.37 | 53.17 | 337.68 | 434.77 |
| Stokes | Bill Hanks Lumber Company | 18.21 | 6.62 | 0.93 | 0.64 |
| | CEMEX Construction Materials, Atlantic, LLC | | 1.24 | | |
| | Duke Energy Carolinas, LLC - Belews Creek Steam Station | 3277.07 | 1485.86 | 3643.67 | 167.21 |
| | Parkdale America, LLC - Plant 26 | | | | 0.60 |
| | The SEFA Group, Inc. - Fly Ash Facility, Belews Creek | | 0.44 | | |
| | Wieland Copper Products, LLC | 4.92 | 3.48 | 4.32 | 46.89 |
| Stokes Total | | 3300.20 | 1497.64 | 3648.92 | 215.34 |
| Surry | Adams Construction Company - Mt. Airy Plant | 2.78 | 0.96 | 0.60 | 1.62 |
| | Ararat Rock Products Company | | | | 0.60 |
| | Bassett Furniture, Inc. | 0.34 | 0.04 | 0.02 | 0.01 |
| | Candle Corporation of America | 3.60 | 0.07 | 0.30 | 12.17 |
| | Carl Rose & Sons, Inc. - Elkin Asphalt Plant | 5.70 | | 3.97 | 4.81 |
| | CEMEX Construction Materials Atlantic, LLC - Mt. Airy North | 0.02 | | | |
| | City of Mount Airy WWTP | 0.15 | | 0.02 | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | CK Technologies, LLC | | 0.06 | | 7.96 |
| | Hamlin Casting Corp. | 0.68 | 0.05 | 1.00 | 0.21 |
| | Hanesbrands, Inc. - Mt. Airy Socks | 5.76 | 0.44 | | 0.53 |
| | Harvest Time Bread Co of NC, LLC | 0.68 | 0.01 | | 3.49 |
| | Henredon Furniture Industries, Inc. | 0.16 | | 0.49 | 7.40 |
| | Miller Brothers Lumber Co., Inc. | 13.56 | 4.90 | 0.69 | 3.63 |
| | NCFI Polyurethanes, Division of Barnhardt Manufacturing Co. | 2.84 | 0.14 | 9.04 | 1.53 |
| | Perdue Farms Incorporated | 1.38 | 12.21 | 4.91 | 0.02 |
| | The North Carolina Granite Corporation | 0.12 | 3.80 | 0.22 | 0.11 |
| | True Elkin, Inc. | 4.60 | 1.84 | 0.04 | 2.25 |
| | United Plastics Corporation | | 0.50 | | |
| | Vaughan-Bassett Furn Co - Elkin Furniture | 1.71 | 1.04 | 0.09 | 58.31 |
| | Vulcan Construction Materials, LP - Elkin Quarry | | 0.12 | | |
| | Wayne Farms LLC | 12.86 | 1.09 | 73.39 | 0.30 |
| | Wayne Farms, LLC | 4.01 | 0.30 | 0.02 | 0.22 |
| | Weyerhaeuser NR Company - Elkin Facility | 30.33 | 130.23 | 10.03 | 248.07 |
| Surry Total | | 91.28 | 157.80 | 104.83 | 353.24 |
| Swain | Consolidated Metco, Inc. - Bryson City | 1.03 | 0.03 | 0.00 | 19.15 |
| | HMC Paving & Construction Company, Inc. | 1.29 | | 0.95 | 0.26 |
| | Nantahala Talc and Limestone Company | | 0.05 | | |
| | Powell Industries, Inc. | 18.59 | 6.36 | 1.81 | 1.74 |
| | Zickgraf Hardwood Flooring Company, LLC - Plant Z4 | | 1.42 | | 1.73 |
| Swain Total | | 20.91 | 7.86 | 2.76 | 22.88 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Transylvania | APAC-Atlantic, Inc. - Transylvania County | 2.48 | 0.62 | 7.08 | 0.84 |
| | Excelsior Packaging Group | 0.01 | | | 17.63 |
| | Rhodes Brothers Paving, Inc. - Transylvania | 1.00 | | 2.32 | 0.38 |
| | Vulcan Construction Materials, LP - Penrose Quarry | 4.30 | 0.78 | 0.28 | 0.35 |
| Transylvania Total | | 7.79 | 1.40 | 9.68 | 19.20 |
| Union | AEP Industries, Inc. | | | | 12.00 |
| | Archer Daniels Midland Company, Golden Grain & Feeds, Inc. | 1.93 | 0.29 | 0.13 | 0.16 |
| | ATI Allvac - Bakers Plant | 19.12 | 0.91 | 1.80 | 0.71 |
| | ATI Allvac - Monroe Plant | 58.74 | 8.38 | 3.40 | 3.76 |
| | Bakery Feeds | 50.07 | 3.04 | 2.50 | 135.49 |
| | BonaKemi USA, Inc. | 0.22 | | | 0.65 |
| | Caledonian Alloys, Inc. | 0.33 | 0.03 | | 1.00 |
| | Carolina Wood Products of Marshville, Inc. | 1.71 | 0.12 | 0.11 | 0.14 |
| | Cedar Valley Finishing Company, Inc. | 0.18 | | | 0.01 |
| | CEMEX Construction Materials Atlantic, LLC - Indian Trail | | 0.25 | | |
| | Challenge Golf | | 0.36 | | 13.01 |
| | Charlotte Pipe and Foundry Company - Plastics Division | 0.26 | 1.90 | 0.01 | 8.72 |
| | Colfax Pump Group, IMO Pump Division | | | | 4.96 |
| | Concrete Supply Company - Monroe Plant | 0.02 | | | |
| | Concrete Supply Company Matthews Plant | 0.03 | | | |
| | Conn-Selmer Ludwig Facility Plant 2 | | | | 2.77 |
| | Conn-Selmer Ludwig Facility, | 0.02 | | | 2.92 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Plant 3 | | | | |
| | Consolidated Metco, Inc. | 17.25 | | 1.35 | 0.86 |
| | Darnel, Inc. | | | | 90.78 |
| | Decore-ative Specialties, Inc. | 0.85 | 0.24 | 0.13 | 4.00 |
| | DUCO-SCI, Inc. | 0.15 | 0.14 | 0.62 | 0.10 |
| | Edwards Wood Products, Inc. | 7.35 | 14.30 | 0.84 | 6.75 |
| | Hanson Brick East, LLC, dba Hanson Brick-Monroe | 11.80 | 0.40 | 13.29 | 1.47 |
| | Hudson Bros. Trailer Mfg., Inc. | 0.17 | 0.11 | 0.17 | 4.44 |
| | ITC Millwork, LLC | | 0.04 | | |
| | Matthews Building Supply Company, Inc. | | 0.01 | | |
| | McGee Corporation | | 0.20 | | 2.58 |
| | Mint Hill Cabinet Shop, Inc. | | 0.06 | | 12.48 |
| | NC Municipal Power Agency No. 1 - Monroe Middle School Unit | 0.71 | 0.01 | 0.44 | 0.03 |
| | OMNOVA Solutions, Inc. | 3.64 | 0.05 | 0.01 | 58.77 |
| | Oro Manufacturing Company | | | | 0.60 |
| | Pilgrim's Pride Corporation of Virginia, Inc. | 8.00 | 12.62 | 32.83 | 0.04 |
| | Radiator Specialty Company | 1.30 | 0.07 | 4.63 | 0.47 |
| | Ready Mixed Concrete Company - Plant 102 - Indian Trail | 0.26 | | | 0.01 |
| | Thomas Concrete of Carolinas, Inc., Monroe Plant | 0.06 | | | |
| | Tyson Foods, Inc., Monroe Processing Plant and Feed Mill | 18.64 | 1.31 | 0.84 | 0.97 |
| | Vanguard Pai Lung | | | | 0.89 |
| | Yale Security Inc., Norton Door Controls | 2.65 | 1.49 | 0.21 | 7.73 |
| Union Total | | 205.46 | 46.33 | 63.31 | 379.27 |
| Vance | Carolina Sunrock | 5.09 | 0.36 | 0.34 | 0.42 |
| | Carolina Sunrock LLC | 3.10 | | 2.72 | 1.30 |
| | Greystone Concrete Products Inc | 0.07 | 0.27 | 0.37 | |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Idaho Timber of NC, LLC - Henderson Plant | | 0.13 | | |
| | Kennametal Incorporated | 0.43 | 0.01 | | 160.01 |
| | Kerr Lake Regional Water System | 0.31 | | 0.01 | |
| | Maria Parham Medical Center, Inc. | 3.79 | 0.05 | 0.50 | 0.22 |
| | S.T. Wooten Corporation - Henderson Asphalt Plant #203 | 5.00 | | 11.37 | 2.73 |
| | Saint-Gobain Containers | 609.60 | 63.48 | 126.17 | 19.36 |
| | The Iams Company d/b/a Procter & Gamble Pet Care | 14.91 | 1.34 | 0.09 | 8.35 |
| | Vulcan Construction Materials LP - Greystone Quarry | | 0.14 | | |
| Vance Total | | 642.30 | 65.78 | 141.56 | 192.38 |
| Wake | Adams Products Company - Morrisville | 0.56 | | | 0.02 |
| | Ajinomoto North America, Inc. | 27.96 | | 1.70 | 3.66 |
| | Apex Tool Group, LLC - Apex NC Operation | 1.05 | | | 16.80 |
| | Austin Quality Foods, Inc. | 10.21 | 0.77 | 0.06 | 48.70 |
| | Barnhill Contracting Company | 2.50 | | 2.79 | 3.20 |
| | Biogen Idec US Limited Partnership | 8.39 | 0.45 | 0.07 | 0.66 |
| | Cargill Inc - Raleigh | 27.29 | 2.25 | 8.54 | 333.35 |
| | Carolina Sunrock, LLC - RDU Distribution Center | 9.13 | 0.09 | 4.07 | 2.81 |
| | Chesapeake Pharmaceutical Packaging Company, LLC | 0.01 | | | 1.53 |
| | City of Raleigh Wilders Grove Landfill | 0.17 | | 0.89 | 3.85 |
| | Column & Post Inc. | | | | 12.68 |
| | CP&L - Harris Nuclear Plant | 12.33 | 0.40 | 2.40 | 0.45 |
| | Dorothea Dix Campus | 24.19 | 6.30 | 70.99 | 0.80 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Enterprise Propane Terminals and Storage, LLC -Apex Terminal | 2.56 | 0.07 | | 13.60 |
| | EnWood Structures Inc | 1.76 | 0.69 | 0.09 | 2.07 |
| | Escalade Sports Playground Inc. | | 0.01 | | 0.37 |
| | Evergreen Packaging - Raleigh Plant | 1.21 | 0.09 | | 15.71 |
| | Fred Smith Company - Holly Springs Asphalt Plant | 2.20 | | 6.90 | 1.60 |
| | Fred Smith Company - Knightdale Asphalt Plant | 5.78 | 2.06 | 8.45 | 6.34 |
| | Fred Smith Company - Westgate plant | 4.40 | 1.70 | 5.00 | 4.80 |
| | FUJIFILM Diosynth Biotechnologies U.S.A., Inc. | 2.82 | 0.22 | 0.07 | 0.16 |
| | Gelder & Associates Incorporated | 4.40 | | 0.01 | 6.34 |
| | GSK, Inc. | 9.98 | 0.23 | 0.48 | 28.65 |
| | Hanson Aggregates Southeast, LLC - Crabtree | 0.58 | 0.32 | 0.04 | 0.04 |
| | Hanson Aggregates Southeast, LLC - Holly Springs Quarry | 2.50 | 0.24 | 0.16 | 0.20 |
| | Hanson Aggregates Southeast, LLC - North Raleigh | | 0.43 | | |
| | Henry Wurst Inc | 0.31 | 0.01 | | 29.72 |
| | Hi - Cone Division Of Itw | | | | 1.34 |
| | John Deere Turf Care | 5.35 | 0.41 | 0.03 | 1.04 |
| | Johnson Concrete Company | 0.70 | 0.02 | | 0.02 |
| | Mallinckrodt LLC | 36.90 | 9.52 | 35.53 | 16.92 |
| | Meredith College | 2.85 | 0.19 | 0.18 | 0.16 |
| | Motiva Enterprises LLC | 2.10 | | | 35.04 |
| | NC DOA Central Heating Plant | 7.39 | 0.31 | 1.07 | 0.77 |
| | NC DOC - Central Prison | 8.90 | 0.59 | 5.35 | 0.32 |
| | NC Products Corporation | 0.40 | 0.01 | | 0.01 |
| | NCSU Central Heat Plant | 97.09 | 10.00 | 130.33 | 4.60 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | NCSU Lake Wheeler Field Laboratory | | 0.01 | | |
| | Nomaco Inc - Zebulon | 0.03 | | 0.12 | 268.32 |
| | Nomacorc LLC | | 0.30 | | 91.75 |
| | North Carolina Electric Membership Corp | 0.12 | | 0.02 | |
| | North Wake County Landfill Facility | 5.22 | 1.43 | 1.21 | 9.78 |
| | Pergo, Inc. | 1.61 | 0.61 | 0.01 | 0.94 |
| | PNG Clayton Compressor Station | 4.67 | | 0.01 | 6.08 |
| | Potters Industries L.L.C. | 36.00 | 0.04 | 0.25 | 2.20 |
| | Pratt Industries (USA) - Raleigh | | | | 0.63 |
| | Public Service Company of NC Inc | 2.72 | 0.04 | 0.07 | 0.18 |
| | Raleigh Steam Producers, LLC | 0.20 | 0.01 | 0.02 | 0.01 |
| | Raleigh-Durham Airport Authority | 6.21 | 0.30 | 0.70 | 0.68 |
| | Rea Contracting (Garner) | 7.50 | | 15.37 | 4.20 |
| | Rea Contracting (Gresham Lake) | 2.00 | 0.02 | 0.01 | 1.56 |
| | Rea Contracting (West Raleigh) | 5.80 | | 4.42 | 8.40 |
| | Rex Healthcare | 10.07 | 0.25 | 0.95 | 0.43 |
| | Russell Carroll Manufacturing | | | | 20.40 |
| | Surtronics Inc | | | | 0.08 |
| | T R Vernal Paving, Inc. | 4.70 | | 10.20 | 3.00 |
| | Town of Cary - South Cary Water Reclamation Facility | 1.64 | 0.70 | 0.14 | 0.12 |
| | TRANSFLO Terminal Services, Inc. | | 0.03 | | 0.02 |
| | Wake Stone Corporation - Triangle Quarry | 3.53 | 0.74 | 0.23 | 0.29 |
| | WakeMed | 14.34 | 0.33 | 0.06 | 0.71 |
| | WakeMed Cary Hospital | 6.06 | 0.43 | 0.16 | 0.33 |
| | Wood Products Inc | | | | 0.34 |
| Wake Total | | 436.40 | 42.62 | 319.15 | 1018.76 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Warren | Arcola Lumber Company Inc | | 4.33 | | |
| | Elberta Crate and Box Company | 4.31 | 4.26 | 0.49 | 1.40 |
| Warren Total | | 4.31 | 8.59 | 0.49 | 1.40 |
| Washington | Mackeys Ferry Sawmill Inc | 7.32 | | 0.83 | 0.57 |
| | NC Department of Transportation - Creswell2 | 0.45 | | | 0.23 |
| | New Colony Farms, L.L.C. | 0.11 | | 0.37 | |
| | Perdue Grain and Oilseed, LLC - Plymouth | 0.10 | 0.98 | | 0.01 |
| Washington Total | | 7.98 | 0.98 | 1.20 | 0.81 |
| Watauga | Appalachian Regional Healthcare Sys.Inc-Watauga Medical Ctr. | 2.91 | 0.07 | 0.16 | 0.11 |
| | Appalachian State University | 11.63 | 0.53 | 3.54 | 5.35 |
| | Boone Custom Forest Products, Inc. | | 0.05 | | 1.77 |
| | Hearthstone Enterprises Inc dba Charleston Forge - Boone Plt | 0.87 | 0.03 | 0.04 | 1.02 |
| | Highland International, Inc. | | | | 14.11 |
| | International Resistive Company, Inc. | 0.04 | | 0.14 | 39.44 |
| | Maymead Materials, Inc. - Brown Brothers Site | 9.48 | | 10.19 | 2.76 |
| | New River Building Supply, Inc. | | 0.16 | | |
| | Town of Boone Jimmy Smith Wastewater Treatment Plant | 0.95 | 0.25 | | 0.02 |
| | Vulcan Construction Materials, LP - Boone Quarry | | 0.09 | | |
| | Watauga Wood Products, Inc. | 10.66 | 7.09 | 0.69 | 6.84 |
| Watauga Total | | 36.54 | 8.27 | 14.76 | 71.42 |
| Wayne | Boling of Mt. Olive, LLC | | | | 0.72 |
| | Cherry Hospital | 8.60 | 0.07 | 0.19 | 0.47 |
| | Cooper Bussmann Inc. | | | | 2.17 |
| | Cooper Standard Automotive - Woodland Church Road | | 0.01 | | 13.44 |
| | Cooper-Standard - Fedelon Trail | 1.76 | 0.13 | 0.01 | 45.93 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Eastern Hardwoods, Inc. | 1.18 | 2.39 | 0.13 | 0.53 |
| | Evans and Sons Inc | 0.15 | | | |
| | Franklin Baking Company - Goldsboro | 3.45 | 0.26 | 0.02 | 107.02 |
| | Georgia - Pacific Plywood/OSB/CNS - Dudley | 227.82 | 152.39 | 22.07 | 257.26 |
| | Goldsboro Milling Co. - Goldsboro | 6.60 | | | 0.36 |
| | MP Wayne, LLC Lndfill Gas to Energy Project | 0.46 | 0.12 | 0.03 | 0.11 |
| | Mt Olive Pickle Co Inc | 4.69 | | 28.14 | 0.02 |
| | Packaging Corporation Of America - Goldsboro | 0.06 | | | 0.14 |
| | Progress Energy - H.F. Lee Plant | 4462.27 | 253.11 | 15552.32 | 47.64 |
| | Seymour Johnson Air Force Base | 19.80 | 1.88 | 1.23 | 55.77 |
| | SPX Flow Technology Services, Inc. | 0.13 | | | 2.25 |
| | Transformer Salvage Inc | 0.01 | | | |
| | Turner Equipment Co Inc | | | | 6.39 |
| | Uchiyama America Inc | | | | 6.13 |
| | Unifirst Corporation | 0.23 | | 0.80 | |
| | Waukesha Electric Systems | | 0.23 | | 6.43 |
| | Wayne County Municipal Solid Waste Landfill | 3.70 | 0.91 | 0.86 | 4.37 |
| | Wayne Memorial Hospital | 5.85 | 0.42 | 0.42 | 0.70 |
| | White's Tire Service | | | | 0.65 |
| Wayne Total | | 4746.76 | 411.92 | 15606.22 | 558.50 |
| Wilkes | American Drew, Inc. - Plant 14 | 0.04 | 0.04 | | 3.19 |
| | Appalachian Lumber Company, Inc. | | 0.23 | | |
| | Bryant Church Hardwoods, Inc. | 5.02 | 1.81 | 0.26 | 2.14 |
| | Carl Rose & Sons, Inc. - N. Wilkesboro Plant | 76.84 | 0.12 | 7.08 | 0.98 |
| | Carl Rose and Sons, Inc. - Wilkesboro Plant | 1.25 | | 2.19 | 0.70 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Carolina Precision Fibers, Inc. | | | | 0.12 |
| | CEMEX Construction Materials, Atlantic, LLC | 0.31 | | 1.11 | |
| | CertainTeed Corporation - Roaring River Facility | 11.50 | 16.29 | 1.14 | 33.30 |
| | Church & Church Lumber, LLC - Select Hardwoods | 7.53 | 4.68 | 0.92 | 0.58 |
| | Dixie Forest Products, LLC | 4.86 | 3.03 | 0.55 | 2.06 |
| | ECMD, Inc. - East Coast Mouldings/A & H Windows Plant | 0.29 | 0.02 | | 2.86 |
| | Gardner Glass Products Inc | 0.14 | | | 46.39 |
| | Greene Brothers Furniture Company | 0.98 | 1.24 | 0.05 | 1.88 |
| | Johnston Casuals Furniture, Inc. | | | | 0.54 |
| | Key City Furniture Company | 0.41 | 0.16 | 0.09 | 2.31 |
| | Louisiana-Pacific Corporation - Roaring River | 177.88 | 33.95 | 28.17 | 250.62 |
| | The Interflex Group - Carolina Plant | 0.23 | | | 39.21 |
| | Tyson Farms, Inc. | 27.00 | 1.97 | 0.15 | 1.40 |
| | Tyson Farms, Inc. - Roaring River Feed Mill | 3.93 | 0.30 | 0.02 | 0.22 |
| | Vulcan Construction Materials, LP - 115 Quarry | | 0.10 | | |
| | Woodpecker Partners, LLC | 12.47 | 4.50 | 0.64 | 2.68 |
| Wilkes Total | | 330.68 | 68.45 | 42.37 | 391.18 |
| Wilson | Abbitts Incorporated dba J&J Commodities | 0.22 | 0.02 | | 0.03 |
| | Alliance One International - Stantonsburg Road facility | 21.10 | 9.10 | 70.40 | 16.19 |
| | Alliance One Specialty Products, LLC | 1.15 | 0.02 | 0.01 | 142.09 |
| | Bridgestone/Firestone Inc | 136.43 | 10.52 | 23.55 | 353.28 |
| | Cargill Nutrena Feed Div | 0.56 | | | 0.03 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| | Carolina Classic Mfg Inc | | 1.55 | | 61.38 |
| | Carolina Forge Company | 1.53 | 0.03 | | 0.08 |
| | City of Wilson - Bridgestone/Firestone Genset | 24.47 | 0.71 | 4.13 | 0.71 |
| | City of Wilson - Peninsula Packaging | 4.29 | 0.13 | | 0.11 |
| | City of Wilson - Substation #8 | 3.00 | 0.09 | 0.47 | 0.08 |
| | City of Wilson - WWTP Generator | 2.70 | 0.09 | 0.43 | 0.08 |
| | Cott Beverages USA | 29.00 | 0.85 | 4.90 | 0.78 |
| | Hanson Aggregates Southeast, LLC - Neverson | | 0.30 | | |
| | Joyners Memorial Incorporated | | 0.08 | | |
| | Kencraft Manufacturing Inc | | 0.02 | | 2.16 |
| | Martin Marietta Materials, Inc. - Wilson Quarry | 4.61 | | 0.30 | |
| | Merck Sharp and Dohme Corporation | 24.33 | 0.69 | 4.21 | 13.82 |
| | NBTY Acquisition, LLC dba Leiner Products, Inc. | 0.00 | 0.05 | | |
| | Nexans, Inc. | | | | 4.35 |
| | Parker TechSeal Division | 0.01 | | | 0.85 |
| | Purdue Pharmaceuticals LP | 6.54 | 0.04 | 1.00 | 0.19 |
| | Rinker Materials Hydro Conduit - Wilson | 0.27 | 0.01 | | 0.01 |
| | RR Donnelley / Wilson | | | | 3.12 |
| | S. T. Wooten Asphalt Mixing Services LLC | 10.20 | | 18.34 | 6.90 |
| | Saint-Gobain Containers | 214.73 | 143.80 | 205.38 | 12.15 |
| | Sandoz | 21.28 | 0.84 | 2.89 | 13.86 |
| | Stephenson Millwork Co., Inc. | 1.17 | 1.09 | 0.06 | 7.32 |
| | Tobacco Rag Processors, Inc. | 0.52 | 0.01 | | 70.40 |
| | White's Tire Service Incorporated | 0.79 | 0.01 | | 14.35 |
| | Wilson Medical Center | 9.81 | 0.32 | 17.82 | 0.28 |
| Wilson Total | | 518.71 | 170.37 | 353.89 | 724.60 |

| County | Facility Name | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|---|
| Yadkin | Ferrellgas, LP d.b.a. Blue Rhino of N.C.- Hamptonville Plant | 1.68 | 1.09 | | 16.02 |
| | J.H. Craver and Son, Inc. | | | 0.19 | 29.80 |
| | Parrish Tire Company | | 0.01 | | 0.22 |
| | Unifi Manufacturing, Inc. - Plant T5 | | | | 1.67 |
| Yadkin Total | | 1.68 | 1.10 | 0.19 | 47.71 |
| Yancey | Altec Industries, Inc. - Burnsville Facility | 1.50 | 1.96 | | 12.35 |
| | Glen Raven, Inc. | 1.58 | | 21.14 | 0.01 |
| | Hickory Springs Manufacturing Company - Micaville | 0.44 | 0.01 | | 8.58 |
| | Mr. Scotty Gouge, d.b.a. R & S Gouge Excavating | | 0.24 | | |
| | Yancey Stone, Inc. - Low Gap Quarry | 5.36 | 0.38 | 0.35 | 0.43 |
| Yancey Total | | 8.88 | 2.59 | 21.49 | 21.37 |
| **97 County Total** | | 88,221.99 | 13,727.93 | 149,211.01 | 39,349.71 |

**Table 4-2 Total State 2010 Emissions (tons/year)**

| County | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|
| Buncombe | 1291.83 | 293.92 | 2019.02 | 484.66 |
| Forsyth | 600.03 | 44.76 | 308.44 | 1324.63 |
| Mecklenburg | 207.93 | 5.11 | 168.93 | 197.60 |
| Local Programs Total | 2099.79 | 343.79 | 2496.39 | 2006.89 |
| 97 County Total | 88,221.99 | 13,727.93 | 149,211.01 | 39,349.71 |
| **State Total** | **90,321.78** | **14,071.72** | **151,707.40** | **41,356.60** |

# Appendix B.2

# Area Source Emissions Inventory Documentation

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## LIST OF TABLES

**List of Acronyms**

| Acronym | Definition |
|---|---|
| BEIS | Biogenic Emission Inventory System |
| BELDV2 | Biogenic Emissions Landuse Database version 2 |
| EIIP | Emissions Inventory Improvement Program |
| E-GAS 5.0 | Economic Growth Analysis System version 5.0 |
| ERTAC | Eastern Regional Technical Advisory Group |
| LPG | Liquid Petroleum Gas |
| MSW | Municipal Solid Waste |
| NAPAP | National Acid Precipitation Assessment Program |
| NAICS | North American Industry Classification System |
| NCDAQ | North Carolina Division of Air Quality |
| NCDFR | North Carolina Division of Forest Resources |
| NCDOT | North Carolina Department of Transportation |
| NCSU | North Carolina State University |
| NG | Natural Gas |
| NOx | Nitrogen Oxides |
| PM | Particulate Matter |
| QAPP | Quality Assurance Project Plan |
| SAF | Seasonal Adjustment Factor |
| SEMAP | Southeastern Modeling, Analysis, and Planning |
| SIC | Standard Industrial Classification |
| $SO_2$ | Sulfur Dioxide |
| USEPA | U.S. Environmental Protection Agency |
| USFA | U.S. Fire Administration |
| VMT | Vehicle Miles Traveled |
| VOC | Volatile Organic Compounds |

# 1.0 INTRODUCTION AND SCOPE

Area sources represent a collection of many small, unidentified points of air pollution emissions within a specified geographical area, emitting less than the minimum level prescribed for point sources. Because these sources are too small and/or too numerous to be surveyed and characterized individually, all area source activities are collectively estimated. The county is the geographic area for which emissions from area sources are compiled, primarily because counties are the smallest areas for which data used for estimating emissions is readily available. All emissions are calculated on a ton per day basis. For the Regional Haze Mid-Course Review, the emissions are estimated for 2010.

# 2.0 OVERALL METHODOLOGY

## 2.1 SOURCE CATEGORY IDENTIFICATION

The area source categories were identified from two U. S. Environmental Protection Agency (USEPA) guidance documents: EPA-450/4-91-016, Procedures for the Preparation of Emission Inventories of Carbon Monoxide and Precursors of Ozone, Vol. 1, hereafter Procedures, and the Emissions Inventory Improvement Program (EIIP) Technical Reports, Vol. 3, Area Sources as of December 2002 (the most current version at the time of the inventory development), hereafter EIIP Tech. Report.

## 2.2 EMISSION ESTIMATION APPROACH

Area source emissions are estimated by multiplying an emission factor by some known indicator of collective activity for each source category within the inventory area. An indicator is any parameter associated with the activity level of a source that can be correlated with the air pollutant emissions from that source, such as production, number of employees, or population.

In general, one of the following emissions estimation approaches is used to calculate the area source emissions: per capita emission factors, employment-related emission factors, commodity consumption-related emission factors, and level of activity based emission factors. The emission factors used were obtained from the EIIP Tech. Report, the USEPA's AP-42 Compilation of Air Pollutant Emission Factors, 5$^{th}$ Edition, referred to as AP-42 or the methodologies outlined by E.H. Pechan & Associates, Inc., referred to as Pechan, based on the ongoing emission factor development work conducted by the Eastern Regional Technical Advisory Group (ERTAC) in conjunction with the USEPA. For certain categories, there can be overlap between the point source emissions and the area source emissions. To avoid double counting, the 2007 point

source emissions in these categories were identified so that they could be subtracted from the area source emissions where appropriate.

## 3.0 QUALITY ASSURANCE MEASURES

The first step in the quality assurance process is to develop a list of area sources. The Procedures document and the EIIP Tech. Report were the primary references used in preparing this list for the emissions inventory. Next, the quality assurance techniques, as outlined in the North Carolina Division of Air Quality (NCDAQ) Emissions Inventory Quality Assurance Project Plan (QAPP), were applied to ensure the data was properly quality assured.

Under the direction of the quality assurance coordinator, emission sources whose contribution was either at the high or low end of the range of estimates were scrutinized more closely for reasonableness. The accuracy was addressed by performing independent checks of the emissions calculations, verifying the activity data and emission factors as well as plotting all of the area source categories vs. pollutants.

## 4.0 DISCUSSION OF AREA SOURCE CATEGORIES

There are five major area source categories comprised of a number of individual types of area sources. Sections 4.1 through 4.5 address each of these categories and include a number of subsections that correspond to the corresponding category. The objective of each subsection is to describe each category and the emission estimation and/or projection procedures.

The emissions for 2010 were developed by forecasting the 2007 emissions from the Southeastern Modeling, Analysis, and Planning (SEMAP) project emissions. The FORECAST function in Microsoft EXCEL was used to develop the 2010 future year emissions. The FORECAST tool uses linear interpolation to project future values based on historic data. By applying this methodology, the 2010 growth factors were determined. The following table list the growth factors used to develop the 2010 projected emissions.

**Table 4-1 Area Source Categories Growth Factors**

| Area Source Category | Growth Factor |
|---|---|
| Agricultural Burning | 0.7937 |
| Structure Fires | 0.9169 |
| Vehicle Fires | 0.8398 |
| Paved Roads | 1.0156 |

| Area Source Category | Growth Factor |
|---|---|
| Unpaved Roads | 0.9100 |
| Dry Cleaning | 0.8333 |
| Graphic Arts | 0.9071 |
| Asphalt Paving-Emulsified | 1.0156 |
| Asphalt Roofing | 0.8767 |
| Agricultural Pesticide | 1.0111 |
| Traffic Markings | 1.1230 |
| Industrial Fuel Consumption | 0.9194 |
| Commercial/Institutional Fuel Combustion | 1.0176 |
| Residential Fuel Combustion | 1.0514 |
| Charbroiling | 1.0692 |
| Aircraft Gas Distribution | 0.8428 |
| Architectural Surface Coating | 1.0514 |
| Autobody Refinishing | 0.9535 |
| **Industrial Surface Coating Subcategories** | |
| Factory Finished Wood | 0.8286 |
| Furniture & Fixtures | 0.9528 |
| Metal Containers | 0.9487 |
| Sheet, Strip & Coil | 0.9358 |
| Machinery and Equipment | 0.9528 |
| Appliances | 1.0789 |
| Electrical Insulation | 0.6605 |
| New Automobiles | 0.9974 |
| Other Misc. Manufacturing | 0.9528 |
| Marine Coatings | 0.9721 |
| Other Transportation equipment | 0.9528 |
| Other Product Coatings | 0.9038 |
| High-Performance Maintenance Coatings | 1.0514 |
| Other Special Purpose Coatings | 1.0514 |
| **Solvent Cleaning** | |
| Electronics/Electrical-Open Top Degreasing | 0.9194 |
| Misc. Manufacturing-Open Top Degreasing | 0.9522 |
| Manufacturing-Cold Cleaning | 0.9194 |
| Auto Repair-Cold Cleaning | 0.9522 |
| Commercial/Consumer Solvent Use | 1.0514 |
| Gasoline Distribution | 1.1440 |
| Open Burning | 1.0514 |

The 2010 projected emissions were calculated using the following equation.

$$PJEM = EM * GF \quad (4\text{-}1)$$

where:

EM = 2007 total daily emissions, tons/day
PJEM = 2010 projected future emissions, tons/day
GF = growth factor

## 4.1 GASOLINE DISTRIBUTION

The area source emissions attributed to this category are associated with various operations related to gasoline and aircraft fuel handling and distribution. Since tank farms and bulk plants are specifically addressed in the point source inventory, the area source category is limited to fuel handling, storage, and distribution operations associated with the service stations and in the refueling of aircrafts.

### 4.1.1 Gasoline Dispensing Facilities

Since service stations are so numerous, they are collectively considered as an area source. The area source emissions that are derived for this subsection involve determining the estimated emissions that occur at each of the following operations: 1) losses during storage tank filling, 2) storage tank breathing and working losses, and 3) truck transit losses. The emissions from vehicle refueling are captured in the on-road mobile source emissions inventory and are not estimated as part of the area sources emissions inventory.

As part of the air toxics program, Stage I controls for gasoline dispensing facilities was adopted by the State, effective May 1990 with final compliance by January 1, 1994. Stage I is the vapor recovery technology on the underground storage tanks and reduces the emissions during the tank filling operations at service stations.

The North Carolina Department of Agriculture, Standards Division is responsible for going to all gasoline dispensing facilities and testing the fuels to ensure that it meets the quality standards of the State. The NCDAQ has worked out an agreement with the Standards Division to also check for Stage I controls. A notice is sent to the NCDAQ for every facility checked by the Standards Division verifying if a facility has properly maintained control equipment. If a facility is found to not be properly maintaining the control equipment, then the NCDAQ sends a notice of

violation informing the facility that the controls are required and gives the facility time to correct the violation before fines are accessed. From this information the rule effectiveness and rule penetration can be estimated. The rule effectiveness (RE) is the percentage of facilities complying with the rule and the rule penetration (RP) is the percentage of facilities requiring Stage I controls. Control efficiency (CE) is the expected percent reduction from this control technology. The rule penetration and rule effectiveness rates for Stage I controls were obtained from the Stage I vapor recovery reports supplied by the Mobile Sources Compliance Branch, North Carolina Division of Air Quality for 2010. The control efficiency rate, 0.95, is a conservative estimate used for the entire State. The compliance rates are determined based on the region. The Stage I compliance factors are listed in Table 4.1.1-1.

**Table 4.1.1-1 Compliance Rates for Stage I Controls**

| County | Regional Office | Rule Effectiveness | Rule Penetration |
|---|---|---|---|
| Alamance | Winston-Salem | 0.99 | 0.99 |
| Alexander | Mooresville | 1.00 | 0.99 |
| Alleghany | Winston-Salem | 0.99 | 0.99 |
| Anson | Fayetteville | 1.00 | 0.98 |
| Ashe | Winston-Salem | 0.99 | 0.99 |
| Avery | Asheville | 1.00 | 0.98 |
| Beaufort | Washington | 0.97 | 0.99 |
| Bertie | Washington | 0.97 | 0.99 |
| Bladen | Fayetteville | 1.00 | 0.98 |
| Brunswick | Wilmington | 1.00 | 0.99 |
| Buncombe | Asheville | 1.00 | 0.98 |
| Burke | Asheville | 1.00 | 0.98 |
| Cabarrus | Mooresville | 1.00 | 0.99 |
| Caldwell | Asheville | 1.00 | 0.98 |
| Camden | Washington | 0.97 | 0.99 |
| Carteret | Wilmington | 1.00 | 0.99 |
| Caswell | Winston-Salem | 0.99 | 0.99 |
| Catawba | Mooresville | 1.00 | 0.99 |
| Chatham | Raleigh | 0.99 | 0.98 |
| Cherokee | Asheville | 1.00 | 0.98 |
| Chowan | Washington | 0.97 | 0.99 |
| Clay | Asheville | 1.00 | 0.98 |
| Cleveland | Mooresville | 1.00 | 0.99 |
| Columbus | Wilmington | 1.00 | 0.99 |
| Craven | Washington | 0.97 | 0.99 |
| Cumberland | Fayetteville | 1.00 | 0.98 |
| Currituck | Washington | 0.97 | 0.99 |

| County | Regional Office | Rule Effectiveness | Rule Penetration |
|---|---|---|---|
| Dare | Washington | 0.97 | 0.99 |
| Davidson | Winston-Salem | 0.99 | 0.99 |
| Davie | Winston-Salem | 0.99 | 0.99 |
| Duplin | Wilmington | 1.00 | 0.99 |
| Durham | Raleigh | 0.99 | 0.98 |
| Edgecombe | Raleigh | 0.99 | 0.98 |
| Forsyth | Winston-Salem | 0.99 | 0.99 |
| Franklin | Raleigh | 0.99 | 0.98 |
| Gaston | Mooresville | 1.00 | 0.99 |
| Gates | Washington | 0.97 | 0.99 |
| Graham | Asheville | 1.00 | 0.98 |
| Granville | Raleigh | 0.99 | 0.98 |
| Greene | Washington | 0.97 | 0.99 |
| Guilford | Winston-Salem | 0.99 | 0.99 |
| Halifax | Raleigh | 0.99 | 0.98 |
| Harnett | Fayetteville | 1.00 | 0.98 |
| Haywood | Asheville | 1.00 | 0.98 |
| Henderson | Asheville | 1.00 | 0.98 |
| Hertford | Washington | 0.97 | 0.99 |
| Hoke | Fayetteville | 1.00 | 0.98 |
| Hyde | Washington | 0.97 | 0.99 |
| Iredell | Mooresville | 1.00 | 0.99 |
| Jackson | Asheville | 1.00 | 0.98 |
| Johnston | Raleigh | 0.99 | 0.98 |
| Jones | Washington | 0.97 | 0.99 |
| Lee | Raleigh | 0.99 | 0.98 |
| Lenoir | Washington | 0.97 | 0.99 |
| Lincoln | Mooresville | 1.00 | 0.99 |
| McDowell | Asheville | 1.00 | 0.98 |
| Macon | Asheville | 1.00 | 0.98 |
| Madison | Asheville | 1.00 | 0.98 |
| Martin | Washington | 0.97 | 0.99 |
| Mecklenburg | Mooresville | 1.00 | 0.99 |
| Mitchell | Asheville | 1.00 | 0.98 |
| Montgomery | Fayetteville | 1.00 | 0.98 |
| Moore | Fayetteville | 1.00 | 0.98 |
| Nash | Raleigh | 0.99 | 0.98 |
| New Hanover | Wilmington | 1.00 | 0.99 |
| Northampton | Raleigh | 0.99 | 0.98 |
| Onslow | Wilmington | 1.00 | 0.99 |
| Orange | Raleigh | 0.99 | 0.98 |

| County | Regional Office | Rule Effectiveness | Rule Penetration |
|---|---|---|---|
| Pamlico | Washington | 0.97 | 0.99 |
| Pasquotank | Washington | 0.97 | 0.99 |
| Pender | Wilmington | 1.00 | 0.99 |
| Perquimans | Washington | 0.97 | 0.99 |
| Person | Raleigh | 0.99 | 0.98 |
| Pitt | Washington | 0.97 | 0.99 |
| Polk | Asheville | 1.00 | 0.98 |
| Randolph | Winston-Salem | 0.99 | 0.99 |
| Richmond | Fayetteville | 1.00 | 0.98 |
| Robeson | Fayetteville | 1.00 | 0.98 |
| Rockingham | Winston-Salem | 0.99 | 0.99 |
| Rowan | Mooresville | 1.00 | 0.99 |
| Rutherford | Asheville | 1.00 | 0.98 |
| Sampson | Fayetteville | 1.00 | 0.98 |
| Scotland | Fayetteville | 1.00 | 0.98 |
| Stanly | Mooresville | 1.00 | 0.99 |
| Stokes | Winston-Salem | 0.99 | 0.99 |
| Surry | Winston-Salem | 0.99 | 0.99 |
| Swain | Asheville | 1.00 | 0.98 |
| Transylvania | Asheville | 1.00 | 0.98 |
| Tyrrell | Washington | 0.97 | 0.99 |
| Union | Mooresville | 1.00 | 0.99 |
| Vance | Raleigh | 0.99 | 0.98 |
| Wake | Raleigh | 0.99 | 0.98 |
| Warren | Raleigh | 0.99 | 0.98 |
| Washington | Washington | 0.97 | 0.99 |
| Watauga | Winston-Salem | 0.99 | 0.99 |
| Wayne | Washington | 0.97 | 0.99 |
| Wilkes | Winston-Salem | 0.99 | 0.99 |
| Wilson | Raleigh | 0.99 | 0.98 |
| Yadkin | Winston-Salem | 0.99 | 0.99 |
| Yancey | Asheville | 1.00 | 0.98 |

Truck Transit

Truck transit emissions are the emissions that emanate from gasoline trucks in transit. The emissions equation is from the EIIP Tech. Report, Chapter 11-Gasoline Marketing, equation 11.3-3. The daily allocation for truck transit is also 6 days/week.

$$EM = \frac{(TGD * L_{EF} * GTA) + (TGD * U_{EF} * GTA)}{2{,}000 \text{ lbs/ton}} * (1 \text{ yr}/52 \text{ wks}) * (1 \text{ wk}/6 \text{ dys}) \qquad 4.1.1\text{-}1$$

where:

EM = total daily VOC emissions, tons/day
TGD = total gasoline dispensed per county per 1,000 gallons
GTA = default value (1.25) obtained from EIIP Tech. Report, Chapter 11, page 11.3-7
$L_{EF}$ = loaded tank truck EF = 0.005 lbs/1,000 gallons
$U_{EF}$ = unloaded tank truck EF = 0.055 lbs/1,000 gallons

The $L_{EF}$ and the $U_{EF}$ factors were obtained from the EIIP Tech. Report, Table 11.3-1.

Underground Tank Breathing and Emptying

Stage I controls capture the displacement of gasoline vapors from unloading gasoline from tank trucks to storage tanks at gas service stations. The emissions calculation was obtained from AP-42, Section 5.2 – Transportation and Marketing of Petroleum Liquids. The emission factor was also obtained from AP-42, equation 1. According to the EIIP Tech. Report, Table 11.3-5, the daily allocation for the delivery to outlets is 6 days/week.

$$EM = \frac{EF * TGD * [1-(CE)(RP)(RE)]}{2{,}000 \text{ lbs/ton}} * (1 \text{ yr}/52 \text{ wks}) * (1 \text{ wk}/6 \text{ days}) \qquad 4.1.1\text{-}2$$

where:

EM = total daily VOC emissions, tons/day
EF = VOC liquid loss during loading, lbs/gallon
TGD = total gasoline dispensed per county per gallon in June, July, and August
CE = control efficiency
RP = rule penetration
RE = rule effectiveness

The emission factor is calculated by determining the amount of uncontrolled liquid loss during loading from the gasoline trucks to the storage tanks. The following equation is used to determine the loading loss.

$$EF = 12.46 * \frac{S * P * M}{T} \qquad 4.1.1\text{-}3$$

where:

P = true vapor pressure of the liquid loaded, based on the Reid Vapor Pressure (RVP), is determined from equation 4.1.1-4 below.

$$P = \exp\{[0.7553-(413/(T+459.6))](Sl)^{0.5}\log_{10}(RVP) - [1.854-(1,042/(T+459.6))](Sl)^{0.5} + [(2,416/(T+459.6))-2.013]\log_{10}(RVP) - (8.742/(T+459.6)) + 15.64\} \quad 4.1.1\text{-}4$$

S = saturation factor, 1.0 for submerged loading
M = molecular weight of vapors, 68 lb/lb-mole for an RVP of 7.8
T = temperature of liquid loaded, $81^{o}$ F = $541^{o}$ R
Sl = slope of ASTM distillation curve at 10% evaporated is 3.0 for gasoline in degrees Fahrenheit per percent
RVP = Reid Vapor Pressure, 7.8 psi.

### 4.1.2 Aircraft Refueling

Similar to vehicle refueling, aircraft refueling results in VOC emissions. There are two processes that are generated from aircraft refueling stations. Stage I is the displacement of vapors during the transfer of gasoline from tank trucks to storage tanks and vice versa. The other process is Stage II that involves the transfer of fuel from the tanker trucks into general aviation aircraft. The methodology employed for this category was developed by Pechan utilizing the emission factors developed by the ERTAC workgroup.

For Stage I and Stage II, the national-level emissions were calculated by multiplying the nationwide aviation gasoline (AvGas) consumption by the VOC emission factors and summing the emissions.

Once the national-level emissions were calculated, they were allocated to the Petroleum Administration for Defense (PAD) Districts based on the amount of gasoline reported for each PAD. The PAD for North Carolina is PAD 1, which comprises 17 states along the Atlantic Coast. The emissions were then allocated to the county-level based on the number of landing-take offs (LTOs) for general aviation flights per county. The amount of aviation gasoline consumed nationally and for PAD 1 was obtained from the US Department of Energy, Energy Information Administration. The number of LTOs was obtained from the US Federal Aviation Administration. The 2008 LTOs were used for PAD 1 District counties because that is the only data that was available, therefore, it is assumed the LTOs remain constant between 2007 and 2008. The VOC emission factors are shown in Table 4.1.2-1.

**Table 4.1.2-1 Aircraft Refueling Emission Factors**

| Emission Source | VOC Emission Factor (lb/gallon AvGas/year) |
|---|---|
| *Stage I Emission Factors* | |
| Aviation gas unloading/tank filling-tank fill | 0.009021383 |
| Aviation gas unloading/tank filling-storage tank working | 0.003605215 |
| Aviation gas tank truck filling-composite | 0.010306575 |
| Aviation gas storage tank-breathing loss | 0.001694117 |
| *Stage II Emission Factors* | |
| Fuel transfer from tanker trucks to aircraft | 0.0136 |

The following equation shows the emission estimate for the nationwide aviation gasoline consumption.

US AvGas Consumption = amt of nationwide AvGas consumed * 42 gal/barrel * VOC EF

For Stage I, the US aviation gasoline consumed is generated for each VOC emission factor and the total consumption is calculated by summing the emissions. The emission estimate for the county-level is shown in equation 4.1.2-1.

EM = US VOC Emissions * (PAD 1 consumption/ US AvGas Consumption) * (County LTOs/PAD 1 LTOs) * (1 ton/2,000 lbs/year) * (1 year/365 days) 4.1.2-1

where:

EM = total daily VOC emissions, tons/day
US VOC Emissions = nationwide annual AvGas VOC emissions, lbs/year
PAD 1consumption = PAD 1 District I total AvGas consumption, barrels/year
PAD 1 LTOs = PAD 1 District I landing-take offs for general aircraft
County LTOs = county-level landing-take offs for general aircraft

### 4.1.3 Portable Fuel Containers

Portable fuel containers (PFCs, or gas cans) are consumer products used to refuel a wide variety of gasoline-powered equipment.

The emissions for portable fuel containers were already prepared by the USEPA for 2002 and 2010; therefore, the 2010 portable fuel container emissions from the USEPA for 2010 were used for this emissions inventory.

## 4.2 STATIONARY SOURCE SOLVENT EVAPORATION

There are eleven subcategories that involve stationary source solvent evaporative emissions. They include: dry cleaning, graphic arts, solvent cleaning, automotive refinishing, architectural coatings, traffic markings, industrial surface coating, asphalt paving, roofing operations, pesticide application and consumer/commercial solvent use. The methodology used to calculate the emissions from these sources are described in detail in each subsection.

### 4.2.1 Dry Cleaning

The VOC emissions from dry cleaning vary with the type of process and the solvent used. For the most part, dry cleaning (coin-operated and conventional) are small business entities. As a result of their size, dry cleaning emissions are not captured as point sources. However, dry cleaning operations can be a significant emission source for VOC emissions, when taken collectively.

The emissions from dry cleaning are estimated by multiplying the number of employees at dry cleaning by a national per-employee emission factor, 467 lbs of VOC/employee/year. The emissions estimation and emission factor used for dry cleaning were obtained from ERTAC. The number of employees was obtained from the US Census Bureau, County Business Patterns. Any facilities with 100 or more employees were deemed to be point sources and not included in the area source emissions inventory.

### 4.2.2 Graphic Arts/Printing

Graphic arts include operations that are involved in printing of newspapers, magazines, books, and other printed materials, which can be divided into several subsets based upon printing technology. Over the last decade ink-jet and offset lithography have emerged as the dominant technologies. The use of oils as ink solvents and the reduction of alcohols in the fountain

solution and in the cleanup solutions have resulted in notable reductions in emissions for offset lithography. Ink-jet printing results in essentially no VOC emissions.

A number of establishments that generate emissions in this source category are in-house graphic arts operations at plants that are in non-printing industries. The per-capita emission factor of 1,482 lbs VOC/employee/year provided by ERTAC was used to calculate the VOC emissions. The emissions are from facilities that emit less than 100 tons VOC/year. It assumes that facilities greater than 100 tons VOC/year will be included in the point source emissions inventory. The county employment was obtained from the US Census Bureau, County Business Patterns, and the emissions are based on the methodology outlined by Pechan.

### 4.2.3 Solvent Cleaning and Degreasing

Solvent cleaning operations are integral to many businesses and industries, and are conducted for the purpose of removing grease, oils, waxes, carbon deposits, etc. from metals, plastic, or glass surfaces. Solvent cleaning is usually performed prior to painting, plating, inspection, repair, assembly, etc. The solvents used in the cleaning operations can be either in a liquid or vapor phase. Generally, these solvents have high vapor pressures that emit VOC emissions.

There are two basic types of solvent cleaning techniques, cold cleaning and vapor cleaning. Cold cleaning machines use solvents in the liquid phase to clean and remove foreign material such as oils and grease from the surface of materials. Cleaning operations include spraying/flushing solvent or parts agitation, wipe cleaning, brushing, and immersion.

The vapor cleaning technique can be further divided into open top degreasing and in-line cleaning. The open top degreasing machines are tanks designed to generate and contain solvent vapor. The tank is equipped with a heating system that boils the liquid solvent. As the solvent boils, dense solvent vapors rise and displace the air in the tank. Coolant is circulated in condensing coils on the top of the tank to create a controlled vapor zone within the tank. Condensing solvent vapors dissolve the contaminants on the surface of the workload and flush both the dissolved and undissolved contaminants from the workload.

In-line cleaning machines employ automated loading on a continuous basis. These machines are often custom made for large-scale operations. A continuous or multiple-batch loading system greatly reduces or even eliminates the manual parts handling associated with batch cleaning. In-line cleaning machines are enclosed to prevent solvent losses; however, entry and exit openings cannot be sealed.

The VOC emissions for this category are estimated by using per employee factors obtained from the EIIP Tech. Report, Chapter 6, Table 6.5-2. The emission factors for these subcategories are listed in Table 4.2.3-1.

**Table 4.2.3-1 Solvent Cleaning and Degreasing Emission Factors**

| Subcategory | Emission Factor (lbs/VOC/employee) |
|---|---|
| Electronic & Other Electrical: Open Top Degreasing | 29 |
| Miscellaneous Manufacturing: Open Top Degreasing | 9.8 |
| Miscellaneous Manufacturing: Cold Cleaning | 24 |
| Auto Repair Services: Cold Cleaning | 270 |

Employment data was derived from the US Census Bureau, County Business Patterns. Employment data for each subcategory is based on a North American Industry Classification System (NAICS) code. The following table shows the NAICS codes that correspond to each subcategory.

**Table 4.2.3-2 Cleaning and Degreasing Employment**

| Subcategory | NAICS Code |
|---|---|
| Electronic & Other Electrical: Open Top Degreasing | 33 |
| Miscellaneous Manufacturing: Open Top Degreasing | 31-33, 44, 48, 81 |
| Miscellaneous Manufacturing: Cold Cleaning | 31 |
| Auto Repair Services: Cold Cleaning | 44, 48, 81 |

Federal rules are expected to reduce VOC emissions from solvent cleaning in the future years. The USEPA estimates (EPA420-R-00-020) that the federal rules reduce the emissions from this source category by approximately 31% for open top processes and about 43% from cold cleaning processes. This reduction was applied to the 2007 emissions.

### 4.2.4 Auto Body Refinishing

Auto body refinishing operations consist of vehicle preparation, primer application, topcoat application and spray equipment cleaning. These operations result in significant VOC emissions. The solvents are typically 100% volatile and can constitute up to 6.5 lbs of VOC per gallon of cleaner or paint.

The methodology outlined in Pechan based on the emission factor development work from ERTAC was used for estimating emissions for this category. The emissions calculation is based on a per employee emission factor, 89 lbs/VOC/employee. The number of employees was obtained from the US Census Bureau, County Business Patterns.

### 4.2.5 Architectural Coatings

This category includes the application of paint, primer, varnish or lacquer to architectural surfaces, and the use of solvents as thinners and for cleanup.

The VOC emissions for this source category were estimated by multiplying the county population by a per capita emission factor as shown in equation 4.2.5-1.

$$EM = \frac{\text{county population} * EF}{\text{2,000 lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/7 \text{ days}) * [1\text{-}RF] \qquad 4.2.5\text{-}1$$

where:

EM = total daily VOC emissions, tons/day
EF = emission factor
RF = reduction factor

The USEPA estimates that the federal rules reduce the emissions from this source category by approximately 25%. This reduction factor was applied to all of the emissions.

### 4.2.6 Traffic Markings

The paint used in traffic markings operations (the painting of center lines, shoulders, etc.) emits VOC emissions during the drying process.

The emission estimation used to calculate the traffic marking emissions is based upon the number of lane miles for each county as specified in the methodology outlined by Pechan. The number of lane miles was obtained from the North Carolina Department of Transportation (NCDOT). Federal rules are expected to reduce the VOC emission from traffic markings in the future years. The USEPA estimates that the federal rules will reduce the emissions from this source category by approximately 25%. This reduction was applied to the 2010 emissions. According to the EIIP Tech. Report, the activity is 5 days per week and the season adjustment factor (SAF) is 1.3. The traffic marking emissions were calculated using equation 4.2.6-2.

$$EM = \frac{\text{no. of lane miles} * EF * SAF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/5 \text{ days}) * [1-RF] \quad 4.2.6\text{-}2$$

where:

EM = total daily VOC emissions in tons/day
EF = emission factor
SAF = seasonal adjustment factor
RF = reduction factor

### 4.2.7 Industrial Surface Coating

Surface coating operations involve applying a thin layer of coating (e.g. paint, lacquer, enamel, varnish, etc.) to the surface of an object for decorative or protective purposes. The coating products, which are solvent based, emit VOC emissions as the result of solvent evaporation during the drying or curing process.

For industrial maintenance coatings and other special purpose coating emissions calculation, the county population is the activity data used. The county employment is used for the remaining subcategories.

The emission factors, obtained from ERTAC, for the surface coating subcategories are listed in Table 4.2.7-1.

**Table 4.2.7-1 Emission Factors for Industrial Surface Coating**

| Subcategory | Per Capita Emission Factor (lbs VOC /yr/person) |
|---|---|
| Industrial Maintenance Coatings | 0.960 |
| Other Special Purpose Coatings | 0.007 |
| | **Per Employee Emission Factor (lbs VOC/employee/yr)** |
| Furniture & Fixtures | 244 |
| Metal Containers | 2,326 |
| Automobile (new) | 164 |
| Machinery & Equipment | 109 |
| Appliances | 249 |
| Other Transportation Equipment | 222 |
| Sheet, Strip & Coil | 2,877 |
| Factory Finished Wood | 43 |
| Electrical Insulation | 24.7 |
| Marine Coatings | 198 |

Federal rules are expected to reduce VOC emission from industrial surface coating operations. The USEPA estimates of percent reduction of emissions for the Federal rules are listed in Table 4.2.7-2 below. These reductions were applied starting with the 2010 projection year emissions.

**Table 4.2.7-2 Industrial Surface Coating Percent Reductions from Federal Rules**

| Subcategory | Expected Reduction |
|---|---|
| Furniture & Fixtures | 30% |
| Metal Containers | 36% |
| Automobiles (New) | 36% |
| Machinery & Equipment | 36% |
| Appliances | 36% |
| Other Transportation Equipment | 36% |
| Sheet, Strip, & Coil | 36% |
| Factory Finished Wood | 36% |
| Electrical Insulation | 36% |
| Marine Coatings | 24% |
| Other Product | 25% |
| Industrial Maintenance Coatings | 36% |
| Other Special Purpose Coatings | 25% |

The emissions estimation for the industrial maintenance coatings and other special purpose coatings are shown in equation 4.2.5-1.

$$EM = \frac{\text{county population} * EF}{\text{2,000 lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/5 \text{ days}) * [1\text{-}RF] \quad 4.2.5\text{-}1$$

The emissions estimation for the subcategories that are based upon a per employee emission factor are shown in equation 4.2.5-2.

$$EM = \frac{\text{no. of employees} * EF}{\text{2,000 lbs/ton}} * (1 \text{ year}/52 \text{ weeks}) * (1 \text{ week}/5 \text{ days}) * [1\text{-}RF] \quad 4.2.5\text{-}2$$

where:

EM = total daily VOC emissions, tons/day
EF = emission factor
RF = reduction factor

### 4.2.8 Asphalt Paving

Asphalt paving is the process of applying asphalt concrete to seal or repair the surface of roads, parking lots, driveways, walkways, or airport runways. Asphalt concrete is a composite material comprised of a binder and a mineral aggregate. The binder, referred to as asphalt cement, is a byproduct of petroleum refining and contains the semi-solid residual material left after the more volatile chemical fractions have been distilled off.

Asphalt cements thinned with water and an emulsifying agent are known as emulsified asphalts. This thinning reduces the viscosity of the asphalt making it easier to work with the mixture. The primary uses of emulsified asphalt include tack and seal operations, priming roadbeds, and paving operations for pavements up to several inches thick.

Emulsified asphalt may contain up to 12 percent organic solvents by volume. Emissions from emulsified asphalt result from the evaporation of VOCs after the mixture is laid down.

The method used to estimate the emissions was developed by Pechan. The general approach to calculating emulsified asphalt paving emissions is to multiply the estimated county-level emulsified asphalt usage by emission factors for VOCs.

State-level emulsified asphalt usage was obtained from the Asphalt Institute's *2007 Asphalt Usage Survey*. State-level data were allocated to county-level according to the fraction of paved road vehicle miles traveled (VMT) in each county.

Total annual VMT estimates by State and roadway class were obtained from the Federal Highway Administration's (FHWA) annual Highway Statistics report. The paved road VMT was calculated by subtracting the State roadway class unpaved road VMT from the total State roadway class VMT. State-level paved road VMT was spatially allocated to counties according to the fraction of total VMT in each county for the specific roadway class as shown by the following equation:

$$VMT_{x,total} = \sum VMT_{ST,y} * VMT_{x,y} / VMT_{ST,y}$$

where:

$VMT_{x,total}$ = VMT (million miles) per county on all paved roadways
$VMT_{ST,y}$ = paved road VMT for the entire State for roadway class y
$VMT_{x,y}$ = total VMT (million miles) per county and roadway class y
$VMT_{ST,y}$ = total VMT (million miles) in entire State for roadway class y

The county-level total VMT by roadway class used in this calculation was obtained from the USEPA's report *Documentation for the Onroad National Emission Inventory (NEI) for Base Years 1970 – 2002*.

The VOC emission factor, 9.2 lbs/barrel, for emulsified asphalt usage was obtained from the *Technical Report Series* produced by the USEPA EIIP.

Emissions were calculated by using equation 4.2.8-1.

$$EM = \frac{(\text{asphalt usage} * EF)}{2{,}000 \text{ lbs/ton}} \qquad 4.2.8\text{-}1$$

where:

EM = total daily VOC emissions, tons/day
asphalt usage = emulsified asphalt in barrels by using the conversion
barrels of asphalt = (tons of asphalt * 2,000 lbs / 8.34 lbs/gal) / 42 gal/barrel
EF = emission factor

### 4.2.9 Roofing Operations

This category covers the installation and repair of asphalt roofs on commercial and industrial buildings. This category includes only hot-applied asphalt roofing, for which the only significant emissions source is the kettle used to heat the asphalt. The 2007 base year emissions were determined from E-GAS 5.0 because the number of felt, cap, and flashing squares used in North Carolina for 2007 was unavailable. The 2007 emissions were projected from the 2005 emissions submitted to the USEPA to meet the requirement of the Consolidated Emissions Requirement Rule.

### 4.2.10 Pesticide Application

Pesticides broadly include any substance used to kill or retard the growth of insects, rodents, fungi, weeds or microorganisms. Formulations of organic pesticides are commonly made by combining synthetic materials with various petroleum products. The petroleum products, or inert ingredients, act as a carrier of the active component and usually evaporate into the atmosphere.

Agricultural pesticides are applied in various manners, which directly affect the possible emissions associated with the application, regardless of the amount of solvent contained in the pesticide. There are basically three types of pesticide/herbicide application methods. One is the "incorporated" type, in which the product is applied and immediately incorporated into the soil. It is expected that little, if any, evaporation of solvent occurs in this type of application. The next type, "pre-emergence", is where the product is put on the ground immediately after the crop is planted. This provides a protective layer. Some evaporation of solvent would be expected with this type of application. The largest emissions would occur from "over the top" application of pesticides. These pesticides are sprayed directly on the foliage to kill weeds or insects. This application would provide an opportunity for a great deal of solvent to evaporate.

The overall pesticide usage associated with agricultural crop production continues to slowly decrease in North Carolina driven by conservative pest management practices and the cost of pesticides as reported by the North Carolina State University (NCSU) Extension Center. The large majority of pesticide usage is confined to the production of tobacco and cotton crops.

The planted crop acreage from the North Carolina Agricultural Statistic Division and crop profile reports prepared by the NCSU Extension Center, and other university extension services, for the US Department of Agriculture Pest Management Center were used to estimate agricultural pesticide usage. Crop acreage was obtained for each county from the North Carolina Agricultural Statistic Division was obtained from http://www.ncagr.com/stats/. Crop profile

reports conducted by NCSU are based on surveys, where participation is reported to be as high as 90 percent for the more important cash crops.

The individual crop profiles outline the current agricultural pesticide practices, i.e., the pesticide agents (insecticides, herbicides, fungicides), the percentage of acres treated and the pounds of active ingredient pesticide applied per acre. The crop profiles often report the application of the active ingredient (pounds of active ingredient per acre) as a range of values. For the worst case scenario, the highest reported value was used. The number of applications of a single pesticide was usually one for all pesticides. The few exceptions to one application are more than accounted for by the conservative practice of using the highest value of application rate.

The pounds of active ingredients for each crop were calculated by using equation 4.2.10-1 and an example calculation for soybeans follows. Table 4.2.10-1 presents the pesticides associated with a particular crop, the % of treated acres, and the lbs. of active pesticide ingredient per year.

$$(\text{lbs. AI/acre})_{CROP} = \sum (\%\ \text{acres treated}) \times (\text{lb AI/acre})_{pesticide} \qquad 4.2.10\text{-}1$$

where AI = active ingredient.

For soybeans, the pounds of active ingredients for the crop is:

| **Pesticide** | **% Acres Treated** | **lbs AI/acre** |
|---|---|---|
| Paraquat | 20 | 0.47 |
| Glyphosate | 10 | 4 |
| Sulfusate | 5 | 4 |
| Carbaryl | 10 | 1.5 |

$$(\text{lbs AI/acre})_{soybean} = (0.20 \times 0.47) + (0.10 \times 4) + (0.05 \times 4) + (0.10 \times 1.5)$$
$$= 0.844 \text{ lbs. AI/acre for soybeans}$$

**Table 4.2.10-1 Agriculture Pesticides Application Rates**

| Crop/Agent | % Acres Treated | lbs. active ingredient/Acre |
|---|---|---|
| ***Soybeans*** | | |
| Paraquat | 20 | 0.47 |
| Glyphosate | 10 | 4 |
| Sulfusate | 5 | 4 |
| Carbaryl | 10 | 1.5 |
| ***Cotton*** | | |
| Tribufos | 100 | 0.75 |
| Aldicarb | 91 | 0.75 |
| Prourgite | 0.45 | 0.73 |
| Dicofol | 0.55 | 1.6 |
| Dicrotophos | 0.45 | 0.2 |
| Acephate | 2.1 | 0.5 |
| M-Parathion | 1 | 0.5 |
| L-cyhalothrin | 99 | 0.145 |
| Thiocarb | 40 | 0.75 |
| Aldicarb | 50 | 0.725 |
| ***Tobacco*** | | |
| Acephate | 70 | 1.5 |
| Spinosad | 13 | 0.05 |
| Methomyl | 11 | 0.45 |
| Endosulfan | 7 | 1 |
| Imidacoloprid | 62 | 0.03 |
| Chloropicrin | 41 | 79.8 |
| Dichloropropene | 35 | 89.5 |
| Clomazone | 75 | 1 |
| Metalaxyl | 49 | 0.76 |
| ***Barley*** | | |
| M Parathion | 0.8 | 0.5 |
| ***Irish Potatoes*** | | |
| Phorate 3 | 40 | 1.20 |
| Glyphosate | 6 | 5 |
| Metolachor | 8 | 2 |
| Metribuzin | 55 | 0.5 |
| ***Sorghum*** | | |
| MethyParathion | 1 | 0.75 |
| Chlorpyrifus | 1 | 1 |
| Carbaryl | 1 | 2 |

| Crop/Agent | % Acres Treated | lbs. active ingredient/Acre |
|---|---|---|
| ***Corn Silage*** | | |
| Terbufos | 35 | 1 |
| Chloropyrifus | 10 | 1 |
| Phorate | 10 | 1 |
| Ethoprop | 5 | 1 |
| Carbofuran | 5 | 1 |
| M Parathion | 50 | 0.75 |
| Thiocarb | 90 | 0.6 |
| Methomyl | 50 | 0.45 |
| ***Corn Grain*** | | |
| Terbufos | 35 | 1 |
| Chloropyrifus | 10 | 1 |
| Phorate | 10 | 1 |
| Ethoprop | 5 | 1 |
| Carbofuran | 5 | 1 |
| M Parathion | 50 | 0.75 |
| Thiocarb | 90 | 0.6 |
| Methomyl | 50 | 0.45 |
| ***Oats*** | | |
| M Parathion | 5 | 0.5 |
| ***Wheat*** | | |
| M Parathion | 5 | 0.5 |
| ***Sweet Potatoes*** | | |
| Napropamide | 50 | 1.5 |
| Clomazone | 25 | 0.87 |
| Fluazifop | 20 | 0.17 |
| Carbaryl | 25 | 0.67 |
| ***Peanuts*** | | |
| Chlorpyrifus | 60 | 1 |
| Disulfoton | 90 | 0.75 |
| Esfenvalerate | 25 | 0.03 |
| Folicur 1 | 51 | 0.51 |
| Vernolate | 45 | 2.5 |
| Dichloropropene | 0.16 | 80 |
| | | |
| | | |
| | | |

The emission factors for each crop were calculated utilizing information from the EIIP Tech. Report, which relates active ingredients to VOC emissions. According to the EIIP Tech. Report, for every pound of active ingredient there are 2.45 lbs of VOC emitted and 90% of the emissions are evaporated. The emission factors for each crop were calculated using equation 4.2.10-2, with an example calculation for soybean following.

$$EF_{crop} = (\text{lb } AI_{crop}/\text{acre}) * (2.45 \text{ lb. VOC/lbs of AI}) * (0.90) \qquad 4.2.10\text{-}2$$

where:

$EF_{crop}$ = emission factor in lbs VOC/active ingredient for each crop
$AI_{crop}$ = active ingredient for each crop.

The emission factor for soybeans is

lbs AI/acre for soybean = 0.844 lbs. AI/acre

$EF_{soybean}$ = (0.844 lbs active ingredient/acre) * (2.45 lbs VOC/active ingredient) * (0.90)
= 1.861 lbs VOC/acre.

An exception to the above calculation was for the usage of the following pesticides: chloropicrin and 1,3 dichloropropene. These fumigants are widely used for treating tobacco beds for nematodes and constitute a major portion of the pesticide inventory. They have a moderate vapor pressure of 18.3 and 34 millimeters of mercury (at 77° F), respectively, and their formulation is approximately 96% to 98% of the active ingredient. In light of these properties, the VOC emissions are assumed to be equal to the application per acre, which are 79 lbs/acre for chloropicrin and 89.5 lbs/acre for 1,3 dichloropropene. Table 4.2.10-2 list the pounds of active ingredients per acre and the calculated emission factor for each crop.

**Table 4.2.10-2 Emission Factors by Crop Type**

| Crop | lbs active ingredients/acre | lbs VOC/acre |
|---|---|---|
| Soybeans | 0.844 | 1.861 |
| Cotton | 2.267 | 4.999 |
| Barley | 0.004 | 0.009 |
| Corn – Silage | 1.79 | 3.947 |
| Corn – Grain | 1.79 | 3.947 |
| Wheat | 0.025 | 0.055 |
| Oats | 0.025 | 0.055 |
| Sweet Potato | 1.169 | 2.578 |
| Tobacco | | |
| - *Non-fumigant* | 2.317 | 5.109 |
| - *Fumigant* | 64.043 | 64.043 |
| Total Tobacco | | 69.152 |
| Peanuts | | |
| - *Non-fumigant* | 2.9175 | 6.433 |
| - *Fumigant* | 0.128 | 0.282 |
| Total Peanuts | | 6.715 |
| Irish Potatoes | 1.9350 | 4.267 |
| Sorghum | 0.0375 | 0.083 |

A seasonal adjustment factor (SAF) of 2.4 is applied to correct for the almost exclusive use of agricultural pesticides from April to August. The emissions for 2007 were calculated using equation 4.2.10-3.

$$EM = \frac{(\sum (CROP) * EF_{crop}) * SAF}{2{,}000 \text{ lbs/tons}} * (1 \text{ year}/365 \text{ days}) \qquad 4.2.10\text{-}3$$

where:

EM = total daily VOC emissions, tons/day
$EF_{crop}$ = emission factor per crop
SAF = seasonal adjustment factor

### 4.2.11 Commercial/Consumer Solvent Use

This category includes only non-industrial solvents that are used in commercial or consumer applications. The solvent containing products consist of a diverse grouping, e.g. personal care products, household products, automotive aftermarket products, adhesives and sealants, pesticides, some coatings and other commercial and consumer products that may emit VOC emissions.

The VOC emissions are estimated based on per capita emissions factors. There are seven subcategories within the commercial/consumer solvent use category. The categories are listed in Table 4.2.11-1 with their respective emission factor.

**Table 4.2.11-1 Consumer/Commercial Emission Factors**

| Subcategory | lbs VOC/year/person |
|---|---|
| All Coatings and Related Products | 0.95 |
| All FIFRA Related Products | 1.78 |
| Miscellaneous Products | 0.07 |
| Personal Care Products | 1.9 |
| Household Products | 1.8 |
| Automotive Aftermarket Products | 1.36 |
| Adhesives and Sealants | 0.57 |

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year and there is no seasonal adjustment required. The USEPA estimates that Federal rules will reduce the emissions from this source category by approximately 25%. This reduction was applied to the estimated emissions. The emissions for the base were calculated using equation 4.2.11-1.

$$EM = \frac{\text{county population} * EF}{2{,}000 \text{ lbs/tons}} * (1 \text{ year}/365 \text{ days}) * [1 - RF] \qquad 4.2.11\text{-}1$$

where:

EM = total daily VOC emissions, tons/day
EF = emission factor
RF = reduction factor

## 4.4 OTHER MAN MADE AREA SOURCES

Other man made area sources include forest fires, slash burning and prescribed burning, agricultural burning, structure fires and vehicle fires. The methodology used to calculate the emissions from these sources are described in detail in each subsection.

### 4.4.1 Forest Fires

There are two types of forest fires: wildfires, which are accidental or felonious fires and prescribed burns, which are intentionally set for the purpose of forest and/or grassland management practice. The number of acres burned for each of these categories was obtained from the North Carolina Division of Forest Resources (NCDFR).

The makeup of the plant life burned in each fire can vary from woodland to brush to grassland. The emission factors for the southern region of the United States from AP-42, Table 13.1-2, were used to estimate the emissions from forest burns. The emission factors are 0.108 tons VOC per acre burned and 0.018 tons of NOx per acre burned.

The NCDFR was not able to provide seasonal numbers, so the daily emissions are estimated by dividing by 365 days per year. For the 2007 and 2010 emission inventories, it is assumed that the number of acres burned remains relatively constant; therefore, the emissions between 2007 and 2010 remain constant. The emissions were calculated using equation 4.4.1-1.

$$EM = \text{no. acres burned} * EF * (1 \text{ year}/365 \text{ days}) \qquad 4.4.1\text{-}1$$

where:

EM = total daily VOC and NOx emissions, tons/day
EF = emission factor per pollutant

### 4.4.2 Structure Fires

The structure fires category is based on both residential and non-residential structures. The U.S. Fire Administration (USFA) maintains statistics on residential and non-residential structures per county. The number of fires per county for 2007 was derived from the USFA fire statistics. The 2007 USFA fire statistics were obtained from the USFA website. A fires per person factor was calculated for the residential structures based on the national number of residential fires divided by the national population for 2007. The fires per person factor for residential structures 0.0014

fires/person. A fires per person factor was also calculated for the non-residential structures based on the national number of non-residential fires divided by the national employment for 2007. The fires per employee factor for non-residential structures 0.00086 fires/employee. The 2007 county population was obtained from the North Carolina State Demographics and the 2007 county employment was obtained from the US Census Bureau, County Business Patterns. The fires per person factor was applied to the 2007 population for each county to determine the number of residential structure fires in each county. The fires per employee factor was applied to the 2007 county employment to determine the non-residential structure fires emissions for each county. To determine the total emissions from structure fires, the sum of the residential and non-residential structure fires emissions were totaled for each county.

The emission factors and fuel loading factors were obtained from the EIIP Tech. Report, Table 18.4-1 and Table 18.4-2, respectively. The emission factors are 11 lbs of VOC per ton burned and 1.4 lbs of NOx per ton burned. The loading factor, which is 1.15 tons of material burned per structural fire, was also obtained from the EIIP Tech. Report.

According to the EIIP Tech. Report, emissions from this source category occur 365 days per year and there is no seasonal adjustment required.

The structure fires emissions for 2007 were calculated using equation 4.4.2-1.

$$EM = \frac{[(\text{cnty pop} * FPP) + (\text{cnty empl} * FPE)]}{2{,}000 \text{ lbs/tons}} * LF * EF * (1 \text{ year}/365 \text{ days}) \qquad 4.4.2\text{-}1$$

where:

EM = total daily VOC and NOx emissions, tons/day
FPP = fires per person
FPE = fires per employee
LF = loading factor
EF = emission factor per pollutant

### 4.4.3 Vehicle Fires

Vehicle fire emissions are estimated by considering the estimated number vehicles burned, the amount of material burned (the fuel loading) in a vehicle fire, and the emission factors for the open burning of automobile components. The assumptions for amount of material burned and the emission factors were based on the USEPA's AP-42, Section 2.5, Open Burning.

The estimated number of vehicle fires was determined by apportioning a national fire statistic to a county level. The USFA maintains national-level fire statistics. The number of vehicle fires nationwide in 2007 was 258,000. The number of national vehicle fires was apportioned to a state-level using ratio of North Carolina vehicle miles traveled (VMT) to U.S. VMT (249,698,650 miles/3,029,822 x $10^6$ miles). The number of statewide vehicle fires was then apportioned to a county level based on VMT in each county. The nationwide VMT statistics were obtained from the U.S. Department of Transportation, Federal Highway Administration website. The statewide and county VMT is Highway Performance Monitoring System data that was received from the NCDOT. The above methodology was employed to calculate the vehicle fire emission per county.

The amount of vehicle material burned (the fuel loading) in a vehicle fire was estimated by assuming that an average vehicle has 500 lbs. of components (0.25 tons) that can burn in a fire, based on a 3,700 lbs. average vehicle weight (CARB, 1995).

The emission factors were obtained from AP-42, Table 2.5-1. The emission factors are 32 lbs. of VOC per ton burned and 4 lbs. of NOx per ton burned.

The emissions for were calculated using equations 4.4.3-1.

$$EM = \frac{\text{US veh fires} * CF * EF}{\text{2,000 lbs/tons}} * (\text{NC VMT/US VMT}) * (\text{cnty VMT/NC VMT}) * (\text{1 yr/365 dys}) \quad 4.4.3\text{-}1$$

where:

EM = total daily VOC and NOx emissions, tons/day
CF = conversion factor, 0.25 tons burned/vehicle fire
EF = emission factor per pollutant

### 4.4.4 Charbroiling

Commercial Cooking emissions are for five source categories based on equipment type. The categories are Conveyorized Charbroiling, Under-fired Charbroiling, Deep Fat Frying, Flat Griddle Frying, and Clamshell Griddle Frying. Emission estimates are for all types of meat cooked in a particular piece of equipment. The emissions are calculated by multiplying the county population by the emission factor for each pollutant. The county population is the activity data and was obtained from the North Carolina Office of State Budget and Management, State Data Center. The emission factors were developed by ERTAC. They were created by

taking the 2002 emissions in the National Emissions Inventory (NEI) and dividing them by the 2002 population to develop per capita emission factors. The emission factors are shown in Table 4.4.4-1.

**Table 4.4.4-1 Charbroiling Emission Factors**

| Subcategory | Pollutant | Emission Factor (lbs year/person) |
|---|---|---|
| Conveyorized Charbroiling | $PM_{2.5}$ | 0.048 |
| Under-fired Charbroiling | $PM_{2.5}$ | 0.342 |
| Flat Griddle Frying | $PM_{2.5}$ | 0.08 |
| Clamshell Griddle Frying | $PM_{2.5}$ | 0.006 |
| Conveyorized Charbroiling | VOC | 0.01 |
| Under-fired Charbroiling | VOC | 0.04 |
| Deep Fat Flying | VOC | 0.01 |
| Flat Griddle Frying | VOC | 0.006 |
| Clamshell Griddle Frying | VOC | 0.0002 |

### 4.4.5 Open Burning – Municipal Solid Waste and Yard Trimmings

Open burning of residential municipal solid waste (MSW) and yard waste are the purposeful burning of MSW and leaf and brush species in outdoor areas. It was assumed that all municipal solid waste and yard trimmings were burned outside municipal corporate limits since it is illegal to burn within the corporate limits. The emissions estimation calculations are based on the methods outlined by Pechan.

Municipal Solid Waste

For MSW, the amount of household MSW burned was estimated using data from the USEPA's report *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures 2007*. Based on the report, residential waste generation accounts for 55% - 65% of the total waste from the residential and commercial sectors. A median value of 60% was assumed for the calculation of the per capita household waste subject to burning. This data was then used to calculate a per capita household waste subject to burning of 1.99 lbs/person/day. Non-combustible waste, such as glass and metals, was not considered to be waste subject to burning. Approximately 25% - 32% of all waste that is subject to open burning is actually

burned; therefore, a median value of 28% is assumed to be burned in all US counties. The rural population was calculated by applying the 2000 census rural population percentage to the total 2007 county population. The 2007 total population for each county was obtained from the North Carolina Office of State Budget and Management, State Data Center.

The emission factors were developed by the ERTAC Workgroup, as shown in Table 4.4.5-1.

**Table 4.4.5-1 Municipal Solid Waste Emission Factors**

| Pollutant | Emission Factors (lbs/ton) |
|---|---|
| NOx | 6.00 |
| VOC | 34.80 |
| $SO_2$ | 1.00 |
| $PM_{2.5}$ | 8.56 |

Since the NCDAQ has an open burning regulation that prohibits the burning of man-made materials, the emissions estimated for MSW were reduced to account for this rule. The control efficiency is 100% since no burning yields no emissions. The rule penetration is also 100% since the regulation prohibits the burning of man-made materials Statewide. Finally the rule effectiveness was set to a conservative 56% for 2007 since the NCDAQ knows that burning of man-made materials does occur. The NCDAQ has started an aggressive campaign to make the public aware that it is illegal to burn man-made materials. The NCDAQ has sponsored radio ads as well as billboard signs in an effort to educate the public. Additionally, the NCDAQ has developed an educational video discussing open burning and the State's regulation. This video has been distributed to the fire departments across the State. Finally, at the 2009 North Carolina State Fair, the NCDAQ had a booth that allowed staff to talk with the general public about the open burning regulations and provide hand outs that discussed what was legal to burn. The NCDAQ expects that as the public becomes more aware of the open burning regulations, the rule effective will increase over time.

The equation used to estimate the MSW emissions is shown below in equation 4.4.5-1.

$$EM_{MSW,Controlled} = \frac{\text{county rural population} * CF * EF}{\text{2,000 lb/tons}} * (1 \text{ year}/365 \text{ days}) * (1 - (CE \times RP \times RE)) \quad 4.4.5\text{-}1$$

where:

$EM_{MSW,Controlled}$ = total daily VOC, NOx, $SO_2$, and $PM_{2.5}$ emissions, tons/day
CF = per capita MSW generated
EF = emission factor per pollutant
CE = control efficiency
RP = rule penetration
RE = rule effectiveness

Yard Trimmings

For yard trimmings, the amount of leaf and brush waste burned was also obtained from the USEPA's report *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures 2007*. The total mass of yard waste in the US was obtained from this report. This information was used to calculate a daily estimate of the per capita yard waste, 0.59 lbs/person/day. Of the total amount of yard waste generated, the yard waste composition was assumed to be 25% leaves, 25 % brush, and 50% grass by weight. Approximately 25% - 32% of all waste is subject to open burning is actually burned; therefore, a median value of 28% is assumed to be burned in all counties in the US. A percentage of forested acres from the Biogenic Emissions Landuse Database (BELDV2) within the Biogenic Emission Inventory System (BEIS) was used to adjust for variations in vegetation. The percentage of forested acres per county was then determined. To avoid double counting from agricultural burning, agricultural land acreage was subtracted.

The emission factors were developed by the ERTAC Workgroup, as shown in Table 4.4.5-2.

**Table 4.4.5-2 Yard Trimmings Emission Factors**

| Pollutant | Emission Factors (lbs/ton) |
|---|---|
| NOx | 6.2 |
| VOC | 28.0 |
| $SO_2$ | 0.8 |
| $PM_{2.5}$ | 22.0 |

The equation used to estimate the yard trimming emissions is shown below in equation 4.4.5-2.

$$EM_{yard\ trimmings} = \frac{\text{county rural population} * CF * LW * EF * PF}{2{,}000\ \text{lb/tons}} * (1\ \text{year}/365\ \text{days}) \quad 4.4.5\text{-}2$$

where:

$EM_{yard\ trimmings}$ = total daily VOC, NOx, $SO_2$, and $PM_{2.5}$ emissions, tons/day
EF = emission factor per pollutant per pollutant
CF = per capita yard waste generated
LW = leaf fraction of waste
PF = fraction of rural population that burns waste

### 4.4.6 Small Stationary Combustion Sources

This source category covers emissions from natural gas (NG), liquid petroleum gas (LPG), fuel oil, coal and wood combustion in the residential, commercial/institutional (referred to as commercial) and industrial sectors.

The "demand for energy" for these fuel types is known as fuel usage. The 2007 fuel usage data for North Carolina was obtained from the U.S. Department of Energy, Energy Information Administration (EIA) website for fuel consumption.

The following tables show the 2007 fuel usage for the residential, commercial and industrial source sectors in North Carolina.

**Table 4.4.6-1 2007 Residential Fuel Use in North Carolina**

| Fuel | Units | Residential |
|---|---|---|
| Natural Gas (NG) | $10^6$ $ft^3$ | 58,365 |
| Liquefied Petroleum Gas (LPG) | barrels | 4,795,252 |
| Oil | barrels | 1,972,120 |
| Coal | tons | 4,496 |

**Table 4.4.6-2 2007 Commercial and Industrial Fuel Use in North Carolina**

| Fuel | Units | Commercial | Industrial |
|---|---|---|---|
| Natural Gas (NG) | $10^6$ $ft^3$ | 45,434 | 88,401 |
| Liquefied Petroleum Gas (LPG) | barrels | 1,939,653 | 4,439,814 |
| Oil | gallons | 63,063,286 | 58,358,000 |
| Coal | tons | 40,464 | 0 |

The emission factors used to estimate the emissions, except residential wood, were obtained from Pechan based on the ongoing emission factor development work conducted by ERTAC in conjunction with the USEPA. The residential wood emission factors were obtained from a tool developed by the USEPA to calculate the emissions generated from residential wood combustion.

The emission factors used are shown in Table 4.4.6-3 below.

**Table 4.4.6-3 Fuel Combustion Emission Factors**

| Fuel | Units | NOx | VOC |
|---|---|---|---|
| *Residential* | | | |
| NG | lb/$10^6$ $ft^3$ | 94 | 5.5 |
| LPG | lb/ barrel | 0.562 | 0.0219 |
| Fuel Oil | lb/gal | 0.018 | 0.0007 |
| Wood | lb/ton | 2.6 | 18.9 |
| Coal | lb/ton | 9.1 | 10 |
| *Commercial* | | | |
| NG | lb/$10^6$ $ft^3$ | 100 | 5.5 |
| LPG | lb/barrel | 0.398 | 0.0219 |
| Fuel Oil | lb/gal | 0.02 | 0.00034 |
| Coal | lb/ton | 11 | 0.05 |
| *Industrial* | | | |
| NG | lb/$10^6$ $ft^3$ | 100 | 5.5 |
| LPG | lb/barrel | 0.398 | 0.0219 |
| Fuel Oil | lb/gal | 0.02 | 0.0002 |

Residential Combustion Sources

The residential category for the fuel oil, coal, NG, and LPG sources fuel usage was calculated by apportioning the State total fuel usage to a county level. Fuel usage was apportioned by applying the ratio of the number of households heated with the appropriate fuel type in a county to the total households in the State heated with the appropriate fuel type, see equation 4.4.6-1 below.

$$\text{no. gal. fuel per cnty} = (\text{no. gal. fuel for state}) * \frac{(\text{no. housing units heated by fuel per cnty})}{(\text{no. housing units heated by fuel in state})} \qquad 4.4.6\text{-}1$$

The number of households heated with fuel oil, coal, NG and LPG was obtained from the U.S. Census Bureau based on the latest census data, which is 2000.

For the residential wood combustion emissions, the USEPA developed a tool to generate the emissions for this subcategory. The emissions for this subcategory are for housing units with fireplaces as their main source of heating. The activity data used in the calculation was also obtained from the tool the USEPA developed to calculate residential wood combustion emissions. The emissions calculation is shown in equation 4.4.6-2 below.

$$EM = \frac{\text{activity data} * EF}{\text{2,000 lbs/ton}} * (\text{1 year/365 days}) \qquad \text{4.4.6-2}$$

where:

EM = total daily VOC, NOx, $PM_{2.5}$, and $SO_2$ emissions, tons/day
EF = emission factor per pollutant
activity data = tons wood burned per year per county

Commercial and Industrial Combustion Sources

Commercial and industrial fuel usage was apportioned according to the number of employees in the commercial/industrial business establishments in the State and the Triad nonattainment counties. The commercial employment data was obtained from the County Business Patterns for NAICS codes 42(wholesale trade) through 81(other services - except public administration). For industrial combustion, the employment data was also obtained from the County Business Patterns for NAICS codes 31-33(manufacturing). Fuel usage was apportioned to the county level by applying the ratio of county employment to the total State employment, see equation 4.4.6-3.

$$\text{no. gal. fuel per county} = (\text{no. gal. fuel for State}) * \frac{\text{(commercial/industrial employment per county)}}{\text{(commercial/industrial employment in State)}} \qquad \text{4.4.6-3}$$

The total number of employees for these establishments was used to allocate emissions to the county level.

For the residential source sectors, the growth factors are based on the population for each county. The manufacturing (NAICS 31), wholesale trade (NAICS 42) and retail trade (NAICS 44) establishments were used to represent the employment data for the commercial and industrial source sectors.

The 2007 emissions for each small stationary combustion source were calculated using equations 4.4.6-4 – 4.4.6-8.

$$EM_{coal} = \frac{\text{no. tons/year coal} * EF_{coal}}{\text{2,000 lb/ton}} * (1 \text{ year}/365 \text{ days}) \quad \text{4.4.6-4}$$

$$EM_{NG} = \frac{\text{no. ft}^3\text{/year NG} * EF_{NG}}{\text{2,000 lbs /ton}} * (1 \text{ year}/365 \text{ days}) \quad \text{4.4.6-5}$$

$$EM_{LPG} = \frac{\text{no. gal/year LPG} * EF_{LPG}}{\text{2,000 lbs /ton}} * (1 \text{ year}/365 \text{ days}) \quad \text{4.4.6-6}$$

$$EM_{\text{fuel oil}} = \frac{\text{no. gal/year fuel oil} * EF_{oil}}{\text{2,000 lbs /ton}} * (1 \text{ year}/365 \text{ days}) \quad \text{4.4.6-7}$$

$$EM_{wood} = \frac{\text{no. ton/year wood} * EF_{wood}}{\text{2,000 lbs /ton}} * (1 \text{ year}/365 \text{ days}) \quad \text{4.4.6-8}$$

where:

$EM_{coal}$ = daily total coal VOC, NOx, $PM_{2.5}$, and $SO_2$ emissions in tons/day
$EM_{NG}$ = daily total NG VOC, NOx, $PM_{2.5}$, and $SO_2$ emissions in tons/day
$EM_{LPG}$ = daily total LPG VOC, NOx, $PM_{2.5}$, and $SO_2$ emissions in tons/day
$EM_{\text{fuel oil}}$ = daily total fuel oil VOC, NOx, $PM_{2.5}$, and $SO_2$ emissions in tons/day
$EM_{wood}$ = daily total wood VOC, NOx, $PM_{2.5}$, and $SO_2$ emissions in tons/day
$EF_{coal}$ = emission factor for coal combustion per pollutant
$EF_{NG}$ = emission factor for NG combustion per pollutant
$EF_{LPG}$ = emission factor for LPG combustion per pollutant
$EF_{oil}$ = emission factor for fuel oil combustion per pollutant
$EF_{wood}$ = emission factor for wood combustion per pollutant

Point sources are those stationary sources that require an air permit to operate. In general, these sources have a potential to emit more than 5 tons per year of $NO_x$, PM, $SO_2$, and/or VOC from a single facility. Point sources that meet this criterion are accounted for in the point source emissions inventory. Additionally, they are subtracted from the area source emissions inventory to prevent double counting of emissions.

### 4.4.7 Agricultural Burning

This source subcategory covers burning practices used to clear and/or prepare land for planting. These operations include stubble burning, burning or agricultural crop residues, and the burning of stand field crops as part of harvesting (e.g., sugar cane). According to the North Carolina Department of Agriculture, when soybeans are double cropped with wheat, the wheat stubble is usually burned back after harvest about one fourth of the time. According to Dr. J. Dunphy, a soybean specialist at North Carolina State University, the acres of soybean double cropped with wheat in North Carolina is approximately equal to the acres of wheat planted. Therefore, ¼ of the acreage of wheat planted was used to calculate the emissions from agricultural burning practices in North Carolina.

The fuel loading factor and the yield of pollutant for burning wheat stubble was obtained from AP-42, Table 2.4.2. The fuel loading factor is 1.9 tons of fuel consumed per acre burned. The yield of pollutant was dependent upon whether the field was head-fire burned or back-fire burned. The percentage of each burning type used was not available, therefore, the assumption was made that each type was used 50% of the time. The yield of pollutant used, 11 lbs. of VOC per ton of fuel consumed, is an average of the two types of burning. To calculate the emission factor for VOC emissions, the fuel loading factor is multiplied by the yield of pollutant.

$$EF_{VOC} = (1.9 \text{ tons/acre})\ (11 \text{ lbs VOC/ton burned})$$
$$= 20.9 \text{ lbs VOC/acre burned}$$

The annual emissions were calculated using the number of acres burned and the per acre emission factor. According to the North Carolina Department of Agriculture, field burning occurs only during June and July so the daily emissions for agricultural burning were calculated by dividing the annual emissions by 61 days. No seasonal adjustment is needed since all of the burning occurs during the ozone season.

The number of acres of wheat planted was obtained from the North Carolina Agriculture Statistic Division.

The emissions were calculated using equation 4.4.7-1.

$$EM = \frac{(¼ \times \text{wheat acreage}) * EF}{2{,}000 \text{ lbs/ton}} * (1 \text{ year}/61 \text{ days}) \qquad 4.4.7\text{-}1$$

where:

EM = total daily VOC and $PM_{2.5}$ emissions, tons/day
EF = emission factor per pollutant

### 4.4.8 Paved Roads

Emissions from paved roads results from fugitive dust. The method used to calculate the emissions is derived from Pechan using emission factors from AP-42.

Uncontrolled paved road emissions were calculated at the State level by roadway class and month. This was done by multiplying the State/roadway class VMT by the appropriate monthly temporal allocation factor and by the paved road emission factor. After the paved road emissions were calculated at the State/road class/monthly level of detail, the uncontrolled emissions were then allocated to the county level using total county VMT as a surrogate. The emissions and VMT by roadway class were then totaled to the county level.

The emissions for paved roads were estimated using paved road VMT and the emission factor equation from AP-42, Section 13.2.1, Paved Roads, as follows:

$$EF = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C ] * [1 - P/(4*N)] \quad \text{4.4.8-1}$$

where:

EF = paved road dust emission factor, gram(g)/VMT
k = particle size multiplier, 1.1 g/VMT for $PM_{2.5}$
sL = road surface silt loading, g/square meter ($m^2$)
W = average weight (tons) of all vehicles traveling the road
C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear, 0.1617 g/VMT for $PM_{2.5}$ primary
N = number of days in the month
P = number of days in the month with at least 0.01 inches of precipitation

Equation 4.4.8-1 AP-42 includes a correction factor to adjust for the number of days with measurable precipitation in each month. The factor of "4" in the precipitation adjustment accounts for the fact that paved roads dry more quickly than unpaved roads and that precipitation may not occur over the entire 24-hour day period. There are cases where the calculated emission

factor results in a negative number due to the subtraction of the C term that accounts for vehicle exhaust, brake wear, and tire wear. In these cases, the emission factor was reset to 0, under the assumption that the emissions have been accounted for in the on-road mobile emission inventory.

Table 4.4.8-1 below summarizes the uncontrolled $PM_{2.5}$ emission factors for paved roads per road type and month.

**Table 4.4.8-1 $PM_{2.5}$ Paved Road Emission Factors**

| Road Type | Month | Emission Factors (g/VMT) |
|---|---|---|
| Rural Major Collector | Jan | 0.0998694 |
| Rural Major Collector | Feb | 0.1001437 |
| Rural Major Collector | Mar | 0.1025208 |
| Rural Major Collector | Apr | 0.0968056 |
| Rural Major Collector | May | 0.0998694 |
| Rural Major Collector | Jun | 0.0995454 |
| Rural Major Collector | Jul | 0.0989856 |
| Rural Major Collector | Aug | 0.1025208 |
| Rural Major Collector | Sep | 0.1022852 |
| Rural Major Collector | Oct | 0.106056 |
| Rural Major Collector | Nov | 0.1022852 |
| Rural Major Collector | Dec | 0.0998694 |
| Rural Minor Collector | Jan | 0.0998694 |
| Rural Minor Collector | Feb | 0.1001437 |
| Rural Minor Collector | Mar | 0.1025208 |
| Rural Minor Collector | Apr | 0.0968056 |
| Rural Minor Collector | May | 0.0998694 |
| Rural Minor Collector | Jun | 0.0995454 |
| Rural Minor Collector | Jul | 0.0989856 |
| Rural Minor Collector | Aug | 0.1025208 |
| Rural Minor Collector | Sep | 0.1022852 |
| Rural Minor Collector | Oct | 0.106056 |
| Rural Minor Collector | Nov | 0.1022852 |
| Rural Minor Collector | Dec | 0.0998694 |
| Rural Local | Jan | 0.3575629 |
| Rural Local | Feb | 0.3585449 |
| Rural Local | Mar | 0.3670557 |
| Rural Local | Apr | 0.3465934 |
| Rural Local | May | 0.3575629 |
| Rural Local | Jun | 0.3564027 |
| Rural Local | Jul | 0.3543987 |
| Rural Local | Aug | 0.3670557 |
| Rural Local | Sep | 0.3662119 |
| Rural Local | Oct | 0.3797128 |
| Rural Local | Nov | 0.3662119 |
| Rural Local | Dec | 0.3575629 |

| Road Type | Month | Emission Factors (g/VMT) |
|---|---|---|
| Urban Collector | Jan | 0.0998694 |
| Urban Collector | Feb | 0.1001437 |
| Urban Collector | Mar | 0.1025208 |
| Urban Collector | Apr | 0.0968056 |
| Urban Collector | May | 0.0998694 |
| Urban Collector | Jun | 0.0995454 |
| Urban Collector | Jul | 0.0989856 |
| Urban Collector | Aug | 0.1025208 |
| Urban Collector | Sep | 0.1022852 |
| Urban Collector | Oct | 0.106056 |
| Urban Collector | Nov | 0.1022852 |
| Urban Collector | Dec | 0.0998694 |
| Urban Local | Jan | 0.0998694 |
| Urban Local | Feb | 0.1001437 |
| Urban Local | Mar | 0.1025208 |
| Urban Local | Apr | 0.0968056 |
| Urban Local | May | 0.0998694 |
| Urban Local | Jun | 0.0995454 |
| Urban Local | Jul | 0.0989856 |
| Urban Local | Aug | 0.1025208 |
| Urban Local | Sep | 0.1022852 |
| Urban Local | Oct | 0.106056 |
| Urban Local | Nov | 0.1022852 |
| Urban Local | Dec | 0.0998694 |

Paved road silt loadings were assigned to each of the twelve functional roadway classes (six urban and six rural) based on the average annual traffic volume of each functional system by state. The resulting paved road silt loadings calculated from the average annual traffic volume data are shown in Table 4.4.8-2.

**Table 4.4.8-2 Slit Loading Values for North Carolina per Road Type**

| Roadway Type | Slit Loading |
|---|---|
| *Rural* | |
| Interstate | 0.015 |
| Arterial | 0.03 |
| Arterial | 0.06 |
| Major Collector | 0.20 |
| Minor Collector | 0.20 |
| Local | 0.60 |
| *Urban* | |
| Interstate | 0.015 |
| Freeways & Expressways | 0.015 |
| Other Principal Arterial | 0.03 |
| Minor Arterial | 0.06 |
| Collector | 0.20 |
| Local | 0.20 |

The number of days with at least 0.01 inches of precipitation in each month was obtained from the National Climatic Data Center. Data were collected from a meteorological station selected to be representative of urban areas within each North Carolina.

Total annual VMT estimates by State and roadway class were obtained from the Federal Highway Administration's annual Highway Statistics report. The paved road VMT was calculated by subtracting the State/roadway class unpaved road VMT from total State/roadway class VMT. The paved road VMT estimates by state/roadway class were temporally allocated by season using the National Acid Precipitation Assessment Program (NAPAP) Inventory seasonal temporal allocations factors for VMT. The VMT per road type and seasonal temporal allocation factors are shown in Tables 4.4.8-3 and 4.4.8-4, respectively.

**Table 4.4.8-3 VMT per Road Type**

| Road Type | VMT by Road Type (millions of miles) |
|---|---|
| Rural Minor Collector | 0.579 |
| Rural Local | 87.852 |
| Urban Local | 2.325 |

**Table 4.4.8-4 VMT Seasonal Allocation Temporal Factors**

| Road Type | Season | VMT Fraction |
|---|---|---|
| Rural | Winter | 0.2199 |
| Rural | Spring | 0.2403 |
| Rural | Summer | 0.2845 |
| Rural | Fall | 0.2553 |
| Urban | Winter | 0.236 |
| Urban | Spring | 0.2547 |
| Urban | Summer | 0.264 |
| Urban | Fall | 0.2453 |

The seasonal VMT values were then multiplied by the ratio of the number of days in a month to the number of days in a season to adjust to monthly VMT. The paved road activity and emissions were spatially allocated to counties according to the fraction of total VMT in each county for the specific roadway class as shown by equation 4.4.8-2.

$$EM_{x,y} = EM_{ST,y} * VMT_{x,y} / VMT_{ST,y} \qquad 4.4.8\text{-}2$$

where:

$EM_{x,y}$ = paved road $PM_{2.5}$ emissions for county x and roadway class y, tons/month
$EM_{ST,y}$ = paved road emissions (grams) for the entire State for roadway class y
$VMT_{x,y}$ = total VMT (million miles) in county * and roadway class y
$VMT_{ST,y}$ = total VMT (million miles) in entire State for roadway class y

The county-level VMT by roadway class was used in equation 4.4.8-2. Note that because of differences in the methodologies for calculating total and unpaved road VMT, there are rural counties where unpaved road VMT was higher than the total VMT. For these counties, unpaved VMT was reduced to total VMT and paved road VMT was assigned a value of zero.

The emission factor was then applied to the paved road emissions for each county x and roadway class y to estimate the total paved road emissions per county.

$$EM = \frac{\sum [EM_{x,y} * (EF_{\text{road type}} / 907{,}185 \text{ g/ton})]_{\text{per county}}}{\text{days/month}} \qquad 4.4.8\text{-}3$$

where:

EM = total daily $PM_{2.5}$ emissions, tons/day
$EM_{x,y}$ = paved road emissions for county x and roadway class y, tons/month
$EF_{\text{road type}}$ = emission factor per road type

### 4.4.9 Unpaved Roads

Unpaved roads emissions result from reentrained fugitive dust. Like the paved roads, the method used to calculate the emissions is derived from Pechan using emission factors from AP-42.

Uncontrolled unpaved road emissions were calculated at the State level by roadway class and month. This was done by multiplying the State/roadway class unpaved roadway VMT by the appropriate monthly temporal allocation factor and by the monthly unpaved road emission factor. After the unpaved road dust emissions were calculated at the state/roadway class/monthly level, the uncontrolled emissions were then allocated to the county level using the 2000 rural population data as a surrogate. Emissions and VMT by roadway class were then totaled to the county level.

Reentrained road dust emissions for unpaved roads were estimated using unpaved road VMT and the emission factor equation from AP-42, Section 13.2.2, Unpaved Roads, as shown in equation 4.4.9-1:

$$EF = [k * (s/12)^{1} * (SPD/30)^{0.5}] / (M/0.5)^{0.2} - C \qquad 4.4.9\text{-}1$$

where:

EF = size specific emission factor (lb/VMT)
k = particle size multiplier, 0.18 lb/VMT
s = surface material silt content (%)
SPD = mean vehicle speed (mph)
M = surface material moisture content (%)

C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear, 0.00036 lb/VMT

The unpaved road emission factors are shown in Table 4.9-1 below.

**Table 4.4.9-1 Unpaved Road Emission Factors for $PM_{2.5}$**

| Road Type | Month | Emission Factors (g/VMT) |
|---|---|---|
| Rural Minor Arterial | Jan | 25.42 |
| Rural Minor Arterial | Feb | 25.81 |
| Rural Minor Arterial | Mar | 29.23 |
| Rural Minor Arterial | Apr | 21.01 |
| Rural Minor Arterial | May | 25.42 |
| Rural Minor Arterial | Jun | 24.95 |
| Rural Minor Arterial | Jul | 24.15 |
| Rural Minor Arterial | Aug | 29.23 |
| Rural Minor Arterial | Sep | 28.89 |
| Rural Minor Arterial | Oct | 34.32 |
| Rural Minor Arterial | Nov | 28.89 |
| Rural Minor Arterial | Dec | 25.42 |
| Rural Major Collector | Jan | 23.73 |
| Rural Major Collector | Feb | 24.1 |
| Rural Major Collector | Mar | 27.29 |
| Rural Major Collector | Apr | 19.61 |
| Rural Major Collector | May | 23.73 |
| Rural Major Collector | Jun | 23.29 |
| Rural Major Collector | Jul | 22.54 |
| Rural Major Collector | Aug | 27.29 |
| Rural Major Collector | Sep | 26.97 |
| Rural Major Collector | Oct | 32.03 |
| Rural Major Collector | Nov | 26.97 |
| Rural Major Collector | Dec | 23.73 |
| Rural Minor Collector | Jan | 22.28 |
| Rural Minor Collector | Feb | 22.63 |
| Rural Minor Collector | Mar | 25.62 |
| Rural Minor Collector | Apr | 18.42 |
| Rural Minor Collector | May | 22.28 |
| Rural Minor Collector | Jun | 21.87 |
| Rural Minor Collector | Jul | 21.17 |
| Rural Minor Collector | Aug | 25.62 |
| Rural Minor Collector | Sep | 25.33 |
| Rural Minor Collector | Oct | 30.08 |
| Rural Minor Collector | Nov | 25.33 |

| Road Type | Month | Emission Factors (g/VMT) |
|---|---|---|
| Rural Minor Collector | Dec | 22.28 |
| Rural Local | Jan | 22.28 |
| Rural Local | Feb | 22.63 |
| Rural Local | Mar | 25.62 |
| Rural Local | Apr | 18.42 |
| Rural Local | May | 22.28 |
| Rural Local | Jun | 21.87 |
| Rural Local | Jul | 21.17 |
| Rural Local | Aug | 25.62 |
| Rural Local | Sep | 25.33 |
| Rural Local | Oct | 30.08 |
| Rural Local | Nov | 25.33 |
| Rural Local | Dec | 22.28 |
| Urban Other Principal Arterial | Jan | 18.17 |
| Urban Other Principal Arterial | Feb | 18.46 |
| Urban Other Principal Arterial | Mar | 20.9 |
| Urban Other Principal Arterial | Apr | 15.02 |
| Urban Other Principal Arterial | May | 18.17 |
| Urban Other Principal Arterial | Jun | 17.84 |
| Urban Other Principal Arterial | Jul | 17.26 |
| Urban Other Principal Arterial | Aug | 20.9 |
| Urban Other Principal Arterial | Sep | 20.66 |
| Urban Other Principal Arterial | Oct | 24.53 |
| Urban Other Principal Arterial | Nov | 20.66 |
| Urban Other Principal Arterial | Dec | 18.17 |
| Urban Minor Arterial | Jan | 18.17 |
| Urban Minor Arterial | Feb | 18.46 |
| Urban Minor Arterial | Mar | 20.9 |
| Urban Minor Arterial | Apr | 15.02 |
| Urban Minor Arterial | May | 18.17 |
| Urban Minor Arterial | Jun | 17.84 |
| Urban Minor Arterial | Jul | 17.26 |
| Urban Minor Arterial | Aug | 20.9 |
| Urban Minor Arterial | Sep | 20.66 |
| Urban Minor Arterial | Oct | 24.53 |
| Urban Minor Arterial | Nov | 20.66 |
| Urban Minor Arterial | Dec | 18.17 |
| Urban Collector | Jan | 18.17 |
| Urban Collector | Feb | 18.46 |
| Urban Collector | Mar | 20.9 |

| Road Type | Month | Emission Factors (g/VMT) |
|---|---|---|
| Urban Collector | Apr | 15.02 |
| Urban Collector | May | 18.17 |
| Urban Collector | Jun | 17.84 |
| Urban Collector | Jul | 17.26 |
| Urban Collector | Aug | 20.9 |
| Urban Collector | Sep | 20.66 |
| Urban Collector | Oct | 24.53 |
| Urban Collector | Nov | 20.66 |
| Urban Collector | Dec | 18.17 |
| Urban Local | Jan | 18.17 |
| Urban Local | Feb | 18.46 |
| Urban Local | Mar | 20.9 |
| Urban Local | Apr | 15.02 |
| Urban Local | May | 18.17 |
| Urban Local | Jun | 17.84 |
| Urban Local | Jul | 17.26 |
| Urban Local | Aug | 20.9 |
| Urban Local | Sep | 20.66 |
| Urban Local | Oct | 24.53 |
| Urban Local | Nov | 20.66 |
| Urban Local | Dec | 18.17 |

Average State-level unpaved road silt content values, developed as part of the 1985 NAPAP Inventory, were obtained from the Illinois State Water Survey. Silt contents of over 200 unpaved roads from over 30 states were obtained. Average silt contents of unpaved roads were calculated for each state that had three or more samples for that state. For states that did not have three or more samples, the average for all samples from all states was used as a default value.

Table 4.4.9-2 lists the speeds modeled on the unpaved roads by roadway class. These speeds were determined based on the average speeds modeled for on-road mobile emission calculations and weighted to determine a single average speed for each of the roadway classes. The value of 0.5%, the surface material moisture content (M) from equation 4.4.9-1, was chosen as the National default as sufficient resources were not available at the time the emissions were calculated to determine more locally-specific values for this variable.

**Table 4.4.9-2 Speeds Modeled by Roadway Type on Unpaved Roads**

| Unpaved Roadway Type | Speed (mph) |
|---|---|
| Rural Minor Arterial | 39 |
| Rural Major Collector | 34 |
| Rural Minor Collector | 30 |
| Rural Local | 30 |
| Urban Other Principal Arterial | 20 |
| Urban Minor Arterial | 20 |
| Urban Collector | 20 |
| Urban Local | 20 |

Correction factors were applied to the emission factors to account for the number of days with a sufficient amount of precipitation to prevent road dust resuspension. Monthly corrected emission factors by state and roadway classification were calculated using equation 4.4.9-2:

$$E_{corr} = E * [(D-p)/D] \qquad 4.4.9\text{-}2$$

where:

$E_{corr}$ = unpaved road dust emission factor corrected for precipitation effects
E = uncorrected emission factor
D = number of days in the month
p = number of days in the month with at least 0.01 inches of precipitation

The number of days with at least 0.01 inches of precipitation in each month was obtained from the National Climatic Data Center. Data were collected from a meteorological station selected to be representative of rural areas within North Carolina.

Unpaved roadway mileage estimates were obtained from the FHWA's annual Highway Statistics report. Unpaved mileage data for 2007 were used. Separate calculations of VMT were performed for county- and noncounty- (state or federally) maintained roadways. State-level, county-maintained roadway mileage was organized by surface type (rural and urban) and the average daily traffic volume (ADTV) groups shown in Table 4.4.9-3.

**Table 4.4.9-3 Assumed Values for Average Daily Traffic Volume by Volume Group**

| **Rural Roads** | | | | |
|---|---|---|---|---|
| Volume Category (vehicles per day per mile) | < 50 | 50-199 | 200-499 | > 500 |
| Assumed ADTV | 5* | 125** | 350** | 550*** |
| **Urban Roads** | | | | |
| Volume Category (vehicles per day per mile) | < 200 | 200-499 | 500-1999 | > 2000 |
| Assumed ADTV | 20* | 350** | 1250** | 2200*** |

Notes: *10% of volume group's maximum range endpoint.
** Average of volume group's range endpoints.
*** 110% of volume group's minimum range endpoint.

From these data, State-level unpaved roadway mileage estimates were made. The following equation was then used to calculate State-level unpaved road VMT estimates:

$$VMT_{UP} = ADTV * FSRM * 365 \text{ days/year} \qquad 4.4.9\text{-}3$$

where:

$VMT_{UP}$ = VMT on unpaved roads, miles/year
ADTV = average daily traffic volume, vehicles/day/mile
FSRM = functional system roadway mileage, miles

State and federally maintained roadway mileage was categorized by arterial classification, not roadway traffic volume; therefore, the VMT was calculated differently than for county-maintained roadways. The ADTV was assumed to not vary by roadway maintenance responsibility, so the ADTV calculated from county-maintained VMT and mileage (ADTV = VMT/mileage) was used with noncounty-maintained roadway mileage to calculate VMT in the above equation.

The unpaved road VMT estimates by State/roadway class were first temporally allocated by season using the NAPAP Inventory seasonal temporal allocations factors for VMT (see Table 4.4.8-4).

The seasonal VMT values were then multiplied by the ratio of the number of days in a month to the number of days in a season to adjust to monthly VMT. The emission factors were then applied to estimate emissions by month. The state/roadway class unpaved road emissions were

then spatially allocated to each county using estimates of the ratio of 2000 county rural population to the State rural population from the U.S. Census Bureau as shown by the following equation:

$$EM_{x,y} = (CL_x / SL) * EM_{,y} \qquad 4.4.9\text{-}4$$

where:

$EM_{x,y}$ = unpaved road $PM_{2.5}$ emissions for county x and roadway class y, tons/month
$CL_x$ = rural population in county * SL = rural population in the State $EM_{,y}$ = unpaved road emissions in entire State for roadway class y

The county-level VMT allocation factors are provided in Table 4.4.8-3. The seasonal VMT values were then multiplied by the ratio of the number of days in a month to the number of days in a season to adjust to monthly VMT.

The emission factor was then applied to the unpaved road emissions for each county x and roadway class y to estimate the total paved road emissions per county.

$$EM = \frac{\sum [EM_{x,y} * (EF_{\text{road type}} / 907{,}185 \text{ g/ton})]_{\text{per county}}}{\text{days/month}} \qquad 4.4.8\text{-}3$$

where:

EM = total daily $PM_{2.5}$ emissions, tons/day
$EM_{x,y}$ = unpaved road emissions for county x and roadway class y, tons/month
$EF_{\text{road type}}$ = emission factor per road type

## 4.5 BIOGENIC EMISSIONS

Biogenic emissions are primarily VOC emissions from vegetation and are kept constant through all years. Since the Regional Haze State Implementation Plan is a comparison of future year to base year emissions and the biogenic emissions are kept constant, the biogenic emissions are not included in this demonstration. Upon discussions with the USEPA Region 4, it was agreed upon that the biogenic emissions do not need to be included.

## 4.6 SUMMARY OF AREA SOURCE EMISSIONS

The total area source emissions per county are summarized in the table below. All of the emissions are in tons per day.

**Table 4.6-1 Total County Area Source 2010 Emissions (tons/day)**

| County | VOC | NOx | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Alamance | 1,651 | 202 | 85 | 232 |
| Alexander | 398 | 42 | 27 | 124 |
| Alleghany | 148 | 21 | 19 | 45 |
| Anson | 289 | 31 | 17 | 89 |
| Ashe | 488 | 37 | 47 | 105 |
| Avery | 198 | 36 | 34 | 74 |
| Beaufort | 921 | 92 | 41 | 241 |
| Bertie | 468 | 34 | 16 | 93 |
| Bladen | 499 | 44 | 16 | 141 |
| Brunswick | 1,143 | 113 | 52 | 284 |
| Buncombe | 2,434 | 433 | 394 | 366 |
| Burke | 959 | 85 | 82 | 183 |
| Cabarrus | 1,557 | 189 | 95 | 274 |
| Caldwell | 814 | 98 | 73 | 156 |
| Camden | 155 | 11 | 6 | 72 |
| Carteret | 702 | 92 | 45 | 149 |
| Caswell | 627 | 31 | 14 | 94 |
| Catawba | 1,877 | 226 | 185 | 295 |
| Chatham | 607 | 73 | 20 | 192 |
| Cherokee | 271 | 51 | 34 | 105 |
| Chowan | 233 | 28 | 15 | 54 |
| Clay | 114 | 18 | 7 | 42 |
| Cleveland | 936 | 109 | 94 | 247 |
| Columbus | 819 | 79 | 36 | 236 |
| Craven | 1,176 | 93 | 33 | 200 |
| Cumberland | 2,649 | 252 | 170 | 369 |
| Currituck | 299 | 34 | 13 | 126 |
| Dare | 451 | 73 | 56 | 83 |
| Davidson | 1,666 | 155 | 135 | 377 |
| Davie | 885 | 50 | 33 | 139 |
| Duplin | 719 | 82 | 24 | 242 |
| Durham | 2,693 | 373 | 292 | 248 |

| County | VOC | NOx | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Edgecombe | 769 | 76 | 34 | 159 |
| Forsyth | 3,460 | 454 | 449 | 332 |
| Franklin | 787 | 69 | 23 | 215 |
| Gaston | 1,854 | 243 | 112 | 282 |
| Gates | 205 | 16 | 8 | 59 |
| Graham | 105 | 15 | 11 | 33 |
| Granville | 1,056 | 54 | 22 | 165 |
| Greene | 389 | 28 | 9 | 104 |
| Guilford | 5,658 | 788 | 436 | 536 |
| Halifax | 1,199 | 87 | 26 | 221 |
| Harnett | 1,151 | 130 | 49 | 305 |
| Haywood | 554 | 97 | 101 | 136 |
| Henderson | 994 | 135 | 113 | 218 |
| Hertford | 363 | 38 | 32 | 69 |
| Hoke | 1,228 | 35 | 17 | 119 |
| Hyde | 229 | 11 | 4 | 60 |
| Iredell | 1,582 | 178 | 174 | 350 |
| Jackson | 357 | 55 | 44 | 122 |
| Johnston | 1,787 | 154 | 108 | 454 |
| Jones | 356 | 15 | 7 | 54 |
| Lee | 1,179 | 60 | 40 | 133 |
| Lenoir | 721 | 90 | 46 | 170 |
| Lincoln | 762 | 63 | 45 | 202 |
| McDowell | 397 | 52 | 54 | 129 |
| Macon | 641 | 64 | 41 | 100 |
| Madison | 466 | 31 | 35 | 100 |
| Martin | 310 | 46 | 20 | 101 |
| Mecklenburg | 8,629 | 1,852 | 1,212 | 779 |
| Mitchell | 176 | 28 | 30 | 64 |
| Montgomery | 303 | 37 | 16 | 98 |
| Moore | 1,562 | 127 | 78 | 227 |
| Nash | 1,064 | 165 | 61 | 245 |
| New Hanover | 1,778 | 252 | 165 | 191 |
| Northampton | 410 | 31 | 16 | 113 |
| Onslow | 1,399 | 135 | 99 | 283 |
| Orange | 1,094 | 166 | 115 | 218 |
| Pamlico | 247 | 20 | 10 | 82 |
| Pasquotank | 509 | 64 | 51 | 160 |
| Pender | 759 | 59 | 28 | 192 |

| County | VOC | NOx | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Perquimans | 289 | 19 | 10 | 94 |
| Person | 1,050 | 50 | 31 | 138 |
| Pitt | 1,774 | 210 | 125 | 343 |
| Polk | 226 | 31 | 18 | 67 |
| Randolph | 1,747 | 146 | 94 | 352 |
| Richmond | 970 | 58 | 30 | 101 |
| Robeson | 1,759 | 154 | 56 | 499 |
| Rockingham | 1,973 | 117 | 62 | 253 |
| Rowan | 1,389 | 151 | 116 | 288 |
| Rutherford | 690 | 83 | 56 | 173 |
| Sampson | 931 | 69 | 26 | 289 |
| Scotland | 449 | 44 | 22 | 108 |
| Stanly | 727 | 78 | 45 | 200 |
| Stokes | 2,168 | 53 | 34 | 149 |
| Surry | 998 | 95 | 77 | 225 |
| Swain | 161 | 28 | 20 | 60 |
| Transylvania | 323 | 56 | 33 | 93 |
| Tyrrell | 160 | 7 | 3 | 79 |
| Union | 2,099 | 191 | 82 | 526 |
| Vance | 692 | 65 | 39 | 109 |
| Wake | 7,730 | 1,443 | 801 | 917 |
| Warren | 880 | 27 | 14 | 81 |
| Washington | 269 | 22 | 9 | 100 |
| Watauga | 524 | 82 | 91 | 119 |
| Wayne | 1,864 | 169 | 103 | 328 |
| Wilkes | 709 | 77 | 74 | 219 |
| Wilson | 1,211 | 115 | 33 | 182 |
| Yadkin | 444 | 51 | 43 | 141 |
| Yancey | 203 | 32 | 35 | 69 |
| **Total Emissions** | **109,745** | **13,030** | **8,336** | **19,557** |

# Appendix B.3

# On-Road Mobile Sources
# Emission Inventory Documentation

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## TABLE OF CONTENTS

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# 1.0 INTRODUCTION AND SCOPE

This document outlines the on-road mobile source documentation for the Regional Haze mid-course review. This appendix covers the procedures associated with the emissions inventory development of on-road mobile sources. On-road mobile source emission inventories were developed for 2010 for the pollutants NOx, VOC, $SO_2$, and $PM_{2.5}$.

# 2.0 OVERALL METHODOLOGY

## 2.1 EMISSION ESTIMATION APPROACH

Mobile source emissions are estimated by the methodologies suggested in the following United States Environmental Protection Agency (USEPA) documents: Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations, Policy Guidance on the Use of MOVES2010 for State Implementation Plan Development, Transportation Conformity, and Other Purposes (EPA-420-B-09-046, December 2009), and Technical Guidance on the Use of MOVES2010 for Emission Inventory Preparation in State Implementation Plans and Transportation Conformity (EPA-420-B-10-023, April 2010).

In December 2009, the USEPA released a new model for mobile sources. MOVES (MOtor Vehicle Emissions Simulator) is a computer program designed by the USEPA to estimate air pollution emissions from mobile sources. MOVES2010a (hereafter referred to as MOVES) replaces the USEPA's previous emissions model for on-road mobile sources, MOBILE6.2. MOVES can be used to estimate exhaust and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles.

One important new feature of MOVES is the option to calculate emissions either as inventory estimates (total emissions in units of mass) or emission rates (emissions per unit of distance for running emissions or per vehicle for starts, extended idle and resting evaporative emissions) in a look-up table format.

Use of the inventory option simplifies the post-processing of MOVES output, but it requires vehicle miles traveled (VMT) and vehicle population data as an input to MOVES. When using the emission rates option, VMT and vehicle population are applied during post-processing external to MOVES. Either approach can be used to develop emissions estimates for state implementation plans (SIPs). If inventory option is selected, MOVES provides emissions estimates as mass, using VMT and vehicle population entered by the user. If emission rate option

is selected, MOVES provides emission rates as mass per unit of activity. The emission rates option produces a look-up table of emission rates that must be post-processed to produce an inventory. The North Carolina Division of Air Quality (NCDAQ) elected to run the model in the inventory mode due to faster model run times and fewer post-processing requirements.

# 3.0 QUALITY ASSURANCE MEASURES

The quality assurance (QA) for the highway mobile source category can be broken into two components: 1) input files and 2) MOVES outputs/summaries. Each of these components is detailed in the paragraphs below.

After the speed and VMT information is acquired from the North Carolina Department of Transportation (NCDOT), the speed information is checked for reasonableness against previous sets of speeds for the areas. Once the speeds are deemed reasonable, the NCDAQ enters the speed information into MOVES input files. In addition to the speed information, the user enters data to characterize local meteorology, fleet and activity information. All input files are checked against a "key" with the original source of the information. This QA step is always performed by a person other than the one who generated the files. If any discrepancies are found, they are noted back to the person who generated the input files for correction. Additionally, a report is kept that identifies the person who produced the input file, the person that QA'd the file, and where the data originated. Once the input files have passed through the QA procedure, MOVES is run to generate emissions.

# 4.0 DISCUSSION OF ON-ROAD MOBILE SOURCES

On-road mobile sources produce emissions of a host of pollutants. For the purpose of this mid-course review, NOx, VOC, $SO_2$, and $PM_{2.5}$ emissions are estimated. Emissions of these pollutants are estimated in the on-road mobile source inventory for the mid-course review. The objective of this section is to describe the source category, the input files, and the emissions estimation procedures.

## 4.1 INTRODUCTION AND SCOPE

On-road highway mobile sources are considered as those vehicles that travel on the roadways. On-road mobile sources are a major contributor to NOx emissions in North Carolina and a less significant contributor to primary $PM_{2.5}$, $SO_2$, and VOC emissions. Emissions from motor vehicles occur throughout the day while the vehicle is in motion, at idle, parked, and during

refueling. All of these emissions processes need to be estimated in order to properly reflect the total emissions from this source category.

On-road mobile source emissions comprise a small percentage of the total fine particulate matter emissions for all of North Carolina. Particulate emissions from motor vehicles only occur while the vehicle is moving or idling. These emissions are direct tailpipe (from both gas and diesel fuel vehicles), sulfate formation, tire wear, and brake wear. Only direct particulate emissions processes will be estimated in order to properly reflect the total fine particulate matter emissions from this source category.

## 4.2 MOVES INPUT ASSUMPTIONS

The following documents the data used to create the MOVES input files. Due to the size and the complexity of the MOVES input and output files, the MOVES input files and output files are provided electronically.

### 4.2.1 Speed Assumptions

Vehicle power, speed, and acceleration have a significant effect on vehicle emissions. MOVES models those emission effects by assigning activity to specific drive cycles or operating mode distributions. The distribution of vehicle hours traveled (VHT) by average speed was used to determine an appropriate operating mode distribution. The Average Speed Distribution importer in MOVES calls for a speed distribution in VHT in 16 speed bins, by each road type, source type, and hour of the day included in the analysis. The methodology used to develop the average speed distribution inputs is documented below.

The 2010 speeds were generated from both the travel demand model (modeled speeds) and non-travel demand models (non-modeled speeds). Travel demand model speeds were used in those counties where it was available. Some of the more urban areas' speeds are modeled with four time periods per day: AM Peak, Midday, PM Peak, and Night. For counties that have non-modeled speeds, the speeds were calculated using the NCDOT rural spreadsheet. For these counties, the speeds are provided as average daily speeds. For the remaining counties that are not modeled using TDM or the rural spreadsheet, the speeds are obtained from the average daily off-peak hours speeds from Guilford County. All of the speeds are in miles per hour (mph). Tables 4.2.1-1 – 4.2.1-2 provide a summary of the counties with modeled speeds and Table 4.2.1-3 provides a summary of the counties with non-modeled speeds.

**Table 4-1 4.2.1-1 Modeled Speeds with Time Periods (mph) per County**

| Road Type | AM Peak Speeds | Midday Speeds | PM Peak Speeds | Night Speeds |
|---|---|---|---|---|
| **CABARRUS** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 48.0 | 53.0 | 49.0 | 57.0 |
| Rural Minor Arterial | 52.0 | 58.0 | 48.0 | 60.0 |
| Rural Major Collector | 42.0 | 47.0 | 40.0 | 52.0 |
| Rural Minor Collector | 40.0 | 44.0 | 39.0 | 47.0 |
| Rural Local | 28.0 | 28.0 | 28.0 | 28.0 |
| Urban Interstate | 41.0 | 66.0 | 37.0 | 68.0 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 31.0 | 34.0 | 28.0 | 42.0 |
| Urban Minor Arterial | 30.0 | 31.0 | 28.0 | 39.0 |
| Urban Collector | 29.0 | 31.0 | 27.0 | 38.0 |
| Urban Local | 24.0 | 22.0 | 22.0 | 26.0 |
| **GASTON** | | | | |
| Rural Interstate | 61.0 | 63.0 | 56.0 | 63.0 |
| Rural Principal Arterial | 57.0 | 58.0 | 57.0 | 58.0 |
| Rural Minor Arterial | 43.0 | 54.0 | 45.0 | 57.0 |
| Rural Major Collector | 42.0 | 49.0 | 41.0 | 51.0 |
| Rural Minor Collector | 40.0 | 40.0 | 39.0 | 41.0 |
| Rural Local | 28.0 | 28.0 | 29.0 | 28.0 |
| Urban Interstate | 43.0 | 63.0 | 43.0 | 63.0 |
| Urban Other Freeway/Expressway | 52.0 | 55.0 | 52.0 | 56.0 |
| Urban Principal Arterial | 30.0 | 34.0 | 29.0 | 39.0 |
| Urban Minor Arterial | 31.0 | 35.0 | 30.0 | 40.0 |
| Urban Collector | 29.0 | 29.0 | 25.0 | 33.0 |
| Urban Local | 24.0 | 24.0 | 24.0 | 24.0 |
| **IREDELL** | | | | |
| Rural Interstate | 59.0 | 68.0 | 61.0 | 68.0 |
| Rural Principal Arterial | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Minor Arterial | 16.0 | 16.0 | 12.0 | 33.0 |
| Rural Major Collector | 30.0 | 34.0 | 26.0 | 43.0 |
| Rural Minor Collector | 26.0 | 28.0 | 27.0 | 39.0 |
| Rural Local | 30.0 | 30.0 | 29.0 | 31.0 |
| Urban Interstate | 53.0 | 65.0 | 53.0 | 68.0 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 25.0 | 25.0 | 21.0 | 36.0 |
| Urban Minor Arterial | 26.0 | 26.0 | 23.0 | 36.0 |

| | | | | |
|---|---|---|---|---|
| **IREDELL** | | | | |
| Urban Collector | 17.0 | 17.0 | 16.0 | 35.0 |
| Urban Local | 24.0 | 25.0 | 24.0 | 26.0 |
| **LINCOLN** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 57.0 | 62.0 | 57.0 | 66.0 |
| Rural Minor Arterial | 42.0 | 44.0 | 35.0 | 51.0 |
| Rural Major Collector | 56.0 | 57.0 | 56.0 | 58.0 |
| Rural Minor Collector | 43.0 | 46.0 | 43.0 | 47.0 |
| Rural Local | 28.0 | 28.0 | 29.0 | 28.0 |
| Urban Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Other Freeway/Expressway | 68.0 | 68.0 | 68.0 | 68.0 |
| Urban Principal Arterial | 32.0 | 36.0 | 30.0 | 43.0 |
| Urban Minor Arterial | 34.0 | 38.0 | 33.0 | 44.0 |
| Urban Collector | 35.0 | 37.0 | 34.0 | 39.0 |
| Urban Local | 26.0 | 26.0 | 25.0 | 27.0 |
| **MECKLENBURG** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 36.0 | 45.0 | 37.0 | 49.0 |
| Rural Minor Arterial | 32.0 | 43.0 | 38.0 | 45.0 |
| Rural Major Collector | 30.0 | 40.0 | 31.0 | 46.0 |
| Rural Minor Collector | 37.0 | 42.0 | 36.0 | 45.0 |
| Rural Local | 30.0 | 29.0 | 30.0 | 29.0 |
| Urban Interstate | 46.0 | 58.0 | 42.0 | 62.0 |
| Urban Other Freeway/Expressway | 49.0 | 55.0 | 47.0 | 58.0 |
| Urban HOV | 63.0 | 65.0 | 66.0 | 0.0 |
| Urban Principal Arterial | 24.0 | 28.0 | 22.0 | 37.0 |
| Urban Minor Arterial | 24.0 | 28.0 | 23.0 | 37.0 |
| Urban Collector | 22.0 | 27.0 | 21.0 | 36.0 |
| Urban Local | 22.0 | 21.0 | 19.0 | 24.0 |
| **ROWAN** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 33.0 | 51.0 | 42.0 | 59.0 |
| Rural Minor Arterial | 55.0 | 58.0 | 54.0 | 60.0 |
| Rural Major Collector | 52.0 | 55.0 | 51.0 | 58.0 |
| Rural Minor Collector | 46.0 | 49.0 | 46.0 | 50.0 |
| Rural Local | 29.0 | 29.0 | 29.0 | 29.0 |
| Urban Interstate | 60.0 | 65.0 | 59.0 | 67.0 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 39.0 | 39.0 | 37.0 | 45.0 |

| | | | | |
|---|---|---|---|---|
| **ROWAN** | | | | |
| Urban Minor Arterial | 35.0 | 35.0 | 33.0 | 41.0 |
| Urban Collector | 33.0 | 31.0 | 28.0 | 38.0 |
| Urban Local | 24.0 | 23.0 | 22.0 | 25.0 |
| **UNION** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 50.0 | 52.0 | 51.0 | 53.0 |
| Rural Minor Arterial | 48.0 | 51.0 | 47.0 | 56.0 |
| Rural Major Collector | 45.0 | 48.0 | 45.0 | 52.0 |
| Rural Minor Collector | 45.0 | 47.0 | 45.0 | 48.0 |
| Rural Local | 31.0 | 30.0 | 31.0 | 31.0 |
| Urban Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Other Freeway/Expressway | 29.0 | 38.0 | 28.0 | 47.0 |
| Urban Principal Arterial | 34.0 | 38.0 | 32.0 | 44.0 |
| Urban Minor Arterial | 28.0 | 31.0 | 26.0 | 39.0 |
| Urban Collector | 33.0 | 36.0 | 30.0 | 43.0 |
| Urban Local | 26.0 | 27.0 | 26.0 | 28.0 |
| **CHATHAM** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 57.3 | 57.6 | 56.8 | 57.6 |
| Rural Minor Arterial | 45.5 | 46.2 | 45.1 | 46.2 |
| Rural Major Collector | 44.7 | 45.6 | 43.6 | 45.6 |
| Rural Minor Collector | 42.9 | 43.5 | 43.1 | 43.5 |
| Rural Local | 20.0 | 19.6 | 20.3 | 19.6 |
| Urban Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 50.3 | 52.9 | 49.0 | 52.9 |
| Urban Minor Arterial | 42.3 | 42.2 | 41.5 | 42.2 |
| Urban Collector | 49.8 | 50.3 | 46.1 | 50.3 |
| Urban Local | 41.3 | 41.3 | 40.9 | 41.3 |
| **DURHAM** | | | | |
| Rural Interstate | 64.7 | 69.7 | 58.7 | 69.7 |
| Rural Principal Arterial | 42.9 | 44.1 | 40.3 | 44.1 |
| Rural Minor Arterial | 46.2 | 53.1 | 38.0 | 53.1 |
| Rural Major Collector | 49.4 | 50.1 | 46.7 | 50.1 |
| Rural Minor Collector | 40.7 | 40.7 | 39.2 | 40.7 |
| Rural Local | 27.5 | 26.6 | 26.7 | 26.6 |
| Urban Interstate | 63.5 | 64.0 | 55.8 | 64.0 |
| Urban Other Freeway/Expressway | 53.8 | 53.5 | 48.5 | 53.5 |
| Urban Principal Arterial | 40.6 | 39.6 | 34.1 | 39.6 |

| | | | | |
|---|---|---|---|---|
| **DURHAM** | | | | |
| Urban Minor Arterial | 39.3 | 39.1 | 34.5 | 39.1 |
| Urban Collector | 40.4 | 40.0 | 36.5 | 40.0 |
| Urban Local | 21.8 | 21.5 | 21.7 | 21.5 |
| **ORANGE** | | | | |
| Rural Interstate | 68.9 | 69.0 | 67.0 | 69.0 |
| Rural Principal Arterial | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Minor Arterial | 51.2 | 51.7 | 50.7 | 51.7 |
| Rural Major Collector | 48.7 | 49.3 | 47.9 | 49.3 |
| Rural Minor Collector | 41.4 | 41.5 | 40.8 | 41.5 |
| Rural Local | 21.4 | 21.0 | 21.3 | 21.0 |
| Urban Interstate | 67.9 | 68.5 | 62.9 | 68.5 |
| Urban Other Freeway/Expressway | 40.9 | 42.0 | 35.6 | 42.0 |
| Urban Principal Arterial | 37.4 | 37.8 | 32.7 | 37.8 |
| Urban Minor Arterial | 35.7 | 35.8 | 32.4 | 35.8 |
| Urban Collector | 35.8 | 36.0 | 34.5 | 36.0 |
| Urban Local | 19.3 | 19.0 | 19.4 | 19.0 |
| **WAKE** | | | | |
| Rural Interstate | 64.3 | 63.8 | 47.7 | 63.8 |
| Rural Principal Arterial | 60.7 | 60.7 | 58.2 | 60.7 |
| Rural Minor Arterial | 47.6 | 48.9 | 45.2 | 48.9 |
| Rural Major Collector | 47.5 | 48.1 | 46.1 | 48.1 |
| Rural Minor Collector | 36.8 | 37.9 | 35.7 | 37.9 |
| Rural Local | 24.7 | 23.2 | 24.7 | 23.2 |
| Urban Interstate | 60.0 | 64.1 | 52.8 | 64.1 |
| Urban Other Freeway/Expressway | 57.5 | 58.6 | 49.8 | 58.6 |
| Urban Principal Arterial | 43.8 | 45.3 | 36.6 | 45.3 |
| Urban Minor Arterial | 39.6 | 41.2 | 33.8 | 41.2 |
| Urban Collector | 38.8 | 39.8 | 34.3 | 39.8 |
| Urban Local | 25.1 | 23.9 | 24.2 | 23.9 |
| **FRANKLIN** | | | | |
| Rural Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Principal Arterial | 60.0 | 60.0 | 59.0 | 60.0 |
| Rural Minor Arterial | 51.0 | 52.0 | 50.0 | 52.0 |
| Rural Major Collector | 49.0 | 50.0 | 48.0 | 50.0 |
| Rural Minor Collector | 44.0 | 44.0 | 43.0 | 44.0 |
| Rural Local | 18.0 | 17.0 | 18.0 | 17.0 |
| Urban Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 54.0 | 55.0 | 53.0 | 55.0 |

| | | | | |
|---|---|---|---|---|
| **FRANKLIN** | | | | |
| Urban Minor Arterial | 40.0 | 42.0 | 36.0 | 42.0 |
| Urban Collector | 52.0 | 52.0 | 51.0 | 52.0 |
| Urban Local | 22.0 | 22.0 | 23.0 | 22.0 |
| **GRANVILLE** | | | | |
| Rural Interstate | 69.3 | 70.3 | 67.3 | 70.3 |
| Rural Principal Arterial | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Minor Arterial | 0.0 | 0.0 | 0.0 | 0.0 |
| Rural Major Collector | 43.2 | 46.1 | 41.9 | 46.1 |
| Rural Minor Collector | 37.6 | 38.2 | 36.0 | 38.2 |
| Rural Local | 17.2 | 16.9 | 17.1 | 16.9 |
| Urban Interstate | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Minor Arterial | 35.8 | 37.2 | 33.1 | 37.2 |
| Urban Collector | 32.4 | 33.2 | 26.7 | 33.2 |
| Urban Local | 0.0 | 0.0 | 0.0 | 0.0 |
| **JOHNSTON** | | | | |
| Rural Interstate | 72.2 | 73.7 | 69.2 | 73.7 |
| Rural Principal Arterial | 65.4 | 66.0 | 55.9 | 66.0 |
| Rural Minor Arterial | 47.8 | 48.3 | 47.1 | 48.3 |
| Rural Major Collector | 50.6 | 52.1 | 48.4 | 52.1 |
| Rural Minor Collector | 44.6 | 45.0 | 43.2 | 45.0 |
| Rural Local | 23.9 | 22.9 | 23.4 | 22.9 |
| Urban Interstate | 67.8 | 68.6 | 62.1 | 68.6 |
| Urban Other Freeway/Expressway | 0.0 | 0.0 | 0.0 | 0.0 |
| Urban Principal Arterial | 37.5 | 41.1 | 29.0 | 41.1 |
| Urban Minor Arterial | 41.9 | 45.5 | 38.3 | 45.5 |
| Urban Collector | 43.8 | 44.9 | 39.7 | 44.9 |
| Urban Local | 30.9 | 29.6 | 28.6 | 29.6 |

**Table 4.2.1-2 Modeled Average Daily Speeds (mph) per County**

| Road Type | Average Daily Speeds |
|---|---|
| **CATAWBA** | |
| Rural Interstate | 62.4 |
| Rural Other Principal Arterial | 58.3 |
| Rural Minor Arterial | 40.5 |
| Rural Major Collector | 42.4 |
| Rural Minor Collector | 35.6 |
| Rural Local | 41.5 |
| Urban Interstate | 57.8 |
| Urban Freeway or Expressway | 45.6 |
| Urban Other Principal Arterial | 32.2 |
| Urban Minor Arterial | 31.9 |
| Urban Collector | 34.1 |
| Urban Local | 35.9 |
| **DAVIDSON** | |
| Rural Interstate | 68.5 |
| Rural Other Principal Arterial | 0.0 |
| Rural Minor Arterial | 50.9 |
| Rural Major Collector | 43.4 |
| Rural Minor Collector | 48.6 |
| Rural Local | 48.8 |
| Urban Interstate | 68.1 |
| Urban Freeway or Expressway | 56.9 |
| Urban Other Principal Arterial | 39.3 |
| Urban Minor Arterial | 40.3 |
| Urban Collector | 41.6 |
| Urban Local | 45.6 |
| **EDCOMBE** | |
| Rural Interstate | 0.0 |
| Rural Other Principal Arterial | 62.9 |
| Rural Minor Arterial | 0.0 |
| Rural Major Collector | 47.5 |
| Rural Minor Collector | 46.0 |

| | |
|---|---|
| **EDCOMBE** | |
| Rural Local | 45.4 |
| Urban Interstate | 0.0 |
| Urban Freeway or Expressway | 55.9 |
| Urban Other Principal Arterial | 38.0 |
| Urban Minor Arterial | 39.6 |
| Urban Collector | 40.4 |
| Urban Local | 36.4 |
| **FORSYTH** | |
| Rural Interstate | 0.0 |
| Rural Other Principal Arterial | 54.3 |
| Rural Minor Arterial | 49.3 |
| Rural Major Collector | 44.6 |
| Rural Minor Collector | 45.4 |
| Rural Local | 44.2 |
| Urban Interstate | 60.6 |
| Urban Freeway or Expressway | 50.3 |
| Urban Other Principal Arterial | 41.5 |
| Urban Minor Arterial | 41.8 |
| Urban Collector | 38.0 |
| Urban Local | 36.4 |
| **GUILFORD** | |
| Rural Interstate | 60.7 |
| Rural Other Principal Arterial | 47.6 |
| Rural Minor Arterial | 43.1 |
| Rural Major Collector | 46.4 |
| Rural Minor Collector | 47.5 |
| Rural Local | 42.8 |
| Urban Interstate | 55.3 |
| Urban Freeway or Expressway | 50.9 |
| Urban Other Principal Arterial | 39.5 |
| Urban Minor Arterial | 37.4 |
| Urban Collector | 37.1 |
| Urban Local | 34.5 |

| NASH | |
|---|---|
| Rural Interstate | 64.6 |
| Rural Other Principal Arterial | 59.7 |
| Rural Minor Arterial | 50.5 |
| Rural Major Collector | 43.7 |
| Rural Minor Collector | 42.8 |
| Rural Local | 40.3 |
| Urban Interstate | 64.4 |
| Urban Freeway or Expressway | 54.6 |
| Urban Other Principal Arterial | 41.9 |
| Urban Minor Arterial | 40.5 |
| Urban Collector | 36.3 |
| Urban Local | 34.1 |

**Table 4.2.1-3 Non-Modeled Speeds (mph) per County**

| Road Type | Average Daily Speeds |
|---|---|
| **FRANKLIN** | |
| Rural Interstate | 0.0 |
| Rural Principal Arterial | 47.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |
| Urban Interstate | 0.0 |
| Urban Other Freeway/Expressway | 0.0 |
| Urban Principal Arterial | 29.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 0.0 |
| Urban Local | 31.0 |
| **GRANVILLE** | |
| Rural Interstate | 65.0 |
| Rural Principal Arterial | 46.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |

| | |
|---|---|
| **GRANVILLE** | |
| Urban Interstate | 63.0 |
| Urban Other Freeway/Expressway | 0.0 |
| Urban Principal Arterial | 29.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 31.0 |
| Urban Local | 31.0 |
| **JOHNSTON** | |
| Rural Interstate | 65.4 |
| Rural Principal Arterial | 47.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |
| Urban Interstate | 63.0 |
| Urban Other Freeway/Expressway | 0.0 |
| Urban Principal Arterial | 29.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 31.0 |
| Urban Local | 31.0 |
| Rural Interstate | 63.0 |
| Rural Other Principal Arterial | 46.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |
| Urban Interstate | 63.0 |
| Urban Freeway or Expressway | 56.0 |
| Urban Other Principal Arterial | 29.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 31.0 |
| Urban Local | 31.0 |
| **DAVIDSON** | |
| Rural Interstate | 66.0 |
| Rural Other Principal Arterial | 46.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |

| | |
|---|---|
| **DAVIDSON** | |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |
| Urban Interstate | 63.0 |
| Urban Freeway or Expressway | 56.0 |
| Urban Other Principal Arterial | 29.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 31.0 |
| Urban Local | 31.0 |
| **EDCOMBE** | |
| Rural Interstate | 0.0 |
| Rural Other Principal Arterial | 45.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |
| Urban Interstate | 0.0 |
| Urban Freeway or Expressway | 56.0 |
| Urban Other Principal Arterial | 30.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 31.0 |
| Urban Local | 31.0 |
| **NASH** | |
| Rural Interstate | 66.0 |
| Rural Other Principal Arterial | 47.0 |
| Rural Minor Arterial | 44.0 |
| Rural Major Collector | 43.0 |
| Rural Minor Collector | 42.0 |
| Rural Local | 42.0 |
| Urban Interstate | 0.0 |
| Urban Freeway or Expressway | 56.0 |
| Urban Other Principal Arterial | 29.0 |
| Urban Minor Arterial | 32.0 |
| Urban Collector | 31.0 |
| Urban Local | 31.0 |

| REMAINING COUNTIES | |
|---|---|
| Rural Interstate | 60.7 |
| Rural Other Principal Arterial | 47.6 |
| Rural Minor Arterial | 43.1 |
| Rural Major Collector | 46.4 |
| Rural Minor Collector | 47.5 |
| Rural Local | 42.8 |
| Urban Interstate | 55.3 |
| Urban Freeway or Expressway | 50.9 |
| Urban Other Principal Arterial | 39.5 |
| Urban Minor Arterial | 37.4 |
| Urban Collector | 37.1 |
| Urban Local | 34.5 |

MOVES uses four different roadway type categories that are affected by the average speed distribution input: rural restricted access, rural unrestricted access, urban restricted access, and urban unrestricted access (these road types are discussed in more detail in Section 4.2.6). In MOVES, local roadways are included with arterials and collectors in the urban and rural unrestricted access roads category. The USEPA recommends that the average speed distribution for local roadway activity be included as part of a weighted distribution of average speed across all unrestricted roads along with the distribution of average speeds for arterials and connectors.

When only a single average speed is available for a specific road type and that average speed is not identical to the average speed in a particular speed bin, MOVES guidance stipulates that users should apply the following formula for creating the appropriate speed distribution among two adjacent speed bins.

The general formula is:

VHT Fraction A in Speed Bin with closest average speed lower than observed average speed + VHT Fraction B in Speed Bin with closest average speed higher that observed average speed = 1

VHT Fraction $A_{(\text{low bin})}$ = 1 – [(observed average speed – average speed of lower speed bin) / (average speed of higher speed bin – average speed of lower speed bin)]

VHT Fraction $B_{(high\ bin)}$ = 1- [(average speed of higher speed bin – observed average speed) / (average speed of higher speed bin – average speed of lower speed bin)]

Or more simply: VHT Fraction B = 1 – VHT Fraction A

The following is an example of applying the above equations. If the single average speed for a roadway is 58 miles per hour, the average speed distribution will be split between the 55 and 60 mph speed bins. The appropriate VHT fractions are found with the following equations:

VHT fraction $A_{(low\ bin)}$ = 1 – [(58 mph Avg. Speed – 55 mph (Bin Speed)) / (60 mph (Bin Speed) – 55 mph (Bin Speed)] = 0.4

VHT fraction $B_{(high\ bin)}$ = 1 – [(60 mph (Bin Speed) – 58 mph Avg. Speed) / (60 mph (Bin Speed) – 55 mph (Bin Speed)] = 0.6

VHT Fraction $A_{(low\ bin)}$ + VHT Fraction $B_{(high\ bin)}$ = 1

0.4 + 0.6 = 1

As stated above, MOVES uses only four different roadway types: rural restricted access, rural unrestricted access, urban restricted access and urban unrestricted access. This means that the speeds for multiple roadway types need to be combined into the appropriate speed bins. To create the speed bin fractions for combined roadways, the VMT for each road way is used to weight the speed bin fraction. For example, below are speeds and VMT for urban restricted access road types:

| Road type | Speed (miles/hour) | VMT (hourly miles) |
|---|---|---|
| Urban Interstate | 63 | 250,000 |
| Urban Freeway | 56 | 100,000 |

The first step is to determine the speed bin fractions for each road type separately. For the urban interstate road type, the speed 63 is split between the MOVES speed bins of 60 and 65 as described above, which results in the VHT fractions of 0.4 and 0.6 for speed bins 60 and 65, respectively. Similarly, the speed for the urban freeway road type (56 miles/hour) is split between the MOVES speed bins of 55 and 60 and results in the VHT fractions of 0.8 and 0.2, respectively.

The next step requires road type VMT to weigh the VHT Fractions so that the final MOVES speed bin fractions can be developed. The VHT Fraction, specific to the road type and speed bin, are multiplied by the corresponding hourly VMT. These hourly totals are divided by the total VMT for that hour for the road type category (in this example, urban restricted access includes urban interstate and urban freeway). The following equation is used to calculate the combined speed bin fractions:

$$VHT_{(Speed\ Bin\ X)} = \left[\sum (VHT\ Fraction_{(RT)} \times hourly\ VMT_{(RT)})\right] \div \left[\sum hourly\ VMT_{(RT)}\right]$$

where:

RT = the Highway Performance Monitoring System (HPMS) road type

In this example, the HPMS road types are urban interstate (UI) and urban freeway (UF) and the speed bins are 55, 60 and 65. The table below summarizes the speed bin fractions for this example.

| HPMS Road Type | Speed Bin 55 | Speed Bin 60 | Speed Bin 65 |
|---|---|---|---|
| Urban Interstate | 0.0 | 0.4 | 0.6 |
| Urban Freeway | 0.8 | 0.2 | 0.0 |

Using the equation below, the final MOVES speed bin fractions are calculated for the urban restricted access road type.

$$VHT_{(Speed\ Bin\ X)} = \frac{[(VHT\ Fraction_{(UI)} * hourly\ VMT_{(UI)}) + (VHT\ Fraction_{(UF)} * hourly\ VMT_{(UF)})]}{(hourly\ VMT_{(UI)} + hourly\ VMT_{(UF)})}$$

$$VHT_{(Speed\ Bin\ 55)} = \frac{[(0.0 * 250{,}000) + (0.8 * 100{,}000)]}{(250{,}000 + 100{,}000)}$$

$$VHT_{(Speed\ Bin\ 55)} = 0.2286$$

$$VHT_{(Speed\ Bin\ 60)} = \frac{[(0.4 * 250{,}000) + (0.2 * 100{,}000)]}{(250{,}000 + 100{,}000)}$$

$$VHT_{(Speed\ Bin\ 60)} = 0.3428$$

$$VHT_{(Speed\ Bin\ 65)} = \frac{[(0.6 * 250{,}000) + (0.0 * 100{,}000)]}{(250{,}000 + 100{,}000)}$$

$$VHT_{(Speed\ Bin\ 65)} = 0.4286$$

The sum of the VHT fractions for all speed bins within a road type category must add up to 1.0. The hourly VHT fractions by speed bin and road type are then processed through a MOVES supplied converter to develop the speed distribution file by hour and road type.

### 4.2.2 Vehicle Age Distribution

The age distribution of vehicle fleets can vary significantly from area to area. Fleets with a higher percentage of older vehicles will have higher emissions for two reasons. Older vehicles have typically been driven more miles and have experienced more deterioration in emission control systems. Additionally, a higher percentage of older vehicles also implies that there are more vehicles in the fleet that do not meet newer, more stringent emissions standards. Surveys of registration data indicate considerable local variability in vehicle age distributions.

For SIP and conformity purposes, the USEPA recommends and encourages states to develop local age distributions. A typical vehicle fleet includes a mix of vehicles of different ages. MOVES covers a 31 year range of vehicle ages, with vehicles 30 years and older grouped together. MOVES allows the user to specify the fraction of vehicles in each of 30 vehicle ages for each of the 13 source types in the model.

Local age distributions can be estimated from local vehicle registration data. The vehicle age distribution comes from annual registration data for North Carolina from the NCDOT. For this analysis, the age distribution was generated based on the 2010 data. The NCDOT provided the data based on the number of vehicle types per year from 1974 through 2010. Since MOVES categorizes the vehicle fleet into different vehicle classes and more model years, EPA has created data converters that take registration distribution input files created for MOBILE6.2 and converts them to the appropriate age distribution input tables for MOVES. Vehicles greater than 25 years old were combined and included as the $25^{th}$ model year. The vehicle count information is provided for nine vehicle types; light duty gas vehicles (LDGV), light duty diesel vehicles (LDDV), light duty gas trucks 1 (LDGT1), light duty gas trucks 2 (LDGT2), light duty diesel trucks 1 (LDDT1), light duty diesel trucks 2 (LDDT2), heavy duty gas vehicles (HDGV), heavy duty diesel vehicles (HDDV) and motorcycles (MC). LDDT1 and LDDT2 are combined and labeled as light duty diesel trucks (LDDT).

### 4.2.3 Vehicle Mix Assumptions

Vehicle mix or VMT mix is used by MOVES to convert annual VMT to VMT by HPMS class, VMT fractions by hour, and VMT by road type distribution. The vehicle mix is developed by the same method used in MOBILE6.2, as outlined below. The resulting file is used in a MOVES

supplied converter to develop the VMT by HPMS class, VMT fractions by hour, and VMT by road type distribution.

The vehicle mix refers to the percentage of different vehicle types on each of the 12 FHWA road types. These road types are listed above in the speed assumptions section. It is critical for estimating on-road mobile emissions in an area to use data that accurately reflects the vehicles types traveling on each of these different road types.

In August 2004, the USEPA released the guidance document EPA420-R-04-013, Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation, which outlines how to convert the HPMS traffic count data to MOBILE6.2 vehicle mix data. Outlined below is the methodology used to convert the 13 HPMS vehicle types count data reported to FHWA and generate a state specific vehicle mix.

The North Carolina HPMS data used to generate the statewide vehicle mix was based on 2009. The use of the 2009 data for 2010 is described below. Table 4.2.3-1 shows the percent of vehicles per vehicle type for each of the 12 road classes.

**Table 4.2.3-1 2009 North Carolina HPMS Data**

| FC | Functional Classification | Samples | MC | Cars | 2A4T | Bus | 2ASU | 3ASU | 4ASU | 4AST | 5AST | 6AST | 5AMT | 6AMT | 7AMT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Rural Principal Arterial - Interstate | 33 | 0.0036 | 0.6500 | 0.1340 | 0.0066 | 0.0245 | 0.0077 | 0.0004 | 0.0129 | 0.1529 | 0.0017 | 0.0038 | 0.0017 | 0.0004 |
| 2 | Rural Principal Arterial | 80 | 0.0070 | 0.6669 | 0.1851 | 0.0085 | 0.0348 | 0.0114 | 0.0009 | 0.0154 | 0.0646 | 0.0029 | 0.0014 | 0.0006 | 0.0005 |
| 6 | Rural Minor Arterial | 23 | 0.0054 | 0.7099 | 0.1774 | 0.0079 | 0.0307 | 0.0105 | 0.0009 | 0.0091 | 0.0450 | 0.0023 | 0.0002 | 0.0000 | 0.0005 |
| 7 | Rural Major Collector | 22 | 0.0046 | 0.6629 | 0.2215 | 0.0079 | 0.0392 | 0.0098 | 0.0004 | 0.0125 | 0.0390 | 0.0018 | 0.0001 | 0.0001 | 0.0002 |
| 8 | Rural Minor Collector | 22 | 0.0076 | 0.6990 | 0.2030 | 0.0077 | 0.0408 | 0.0088 | 0.0007 | 0.0102 | 0.0199 | 0.0019 | 0.0001 | 0.0000 | 0.0003 |
| 9 | Rural Local System | 30 | 0.0105 | 0.6611 | 0.2231 | 0.0179 | 0.0537 | 0.0133 | 0.0012 | 0.0096 | 0.0081 | 0.0012 | 0.0000 | 0.0000 | 0.0003 |
| 11 | Urban Principal Arterial - Interstate | 80 | 0.0040 | 0.7167 | 0.1507 | 0.0063 | 0.0237 | 0.0073 | 0.0004 | 0.0069 | 0.0803 | 0.0009 | 0.0018 | 0.0008 | 0.0002 |
| 12 | Urban Principal Arterial - Frwy/Expwy | 54 | 0.0055 | 0.7194 | 0.1711 | 0.0066 | 0.0272 | 0.0085 | 0.0007 | 0.0121 | 0.0454 | 0.0011 | 0.0017 | 0.0005 | 0.0001 |
| 14 | Urban Principal Arterial | 59 | 0.0048 | 0.7303 | 0.1787 | 0.0064 | 0.0282 | 0.0085 | 0.0012 | 0.0089 | 0.0297 | 0.0021 | 0.0004 | 0.0004 | 0.0003 |
| 16 | Urban Minor Arterial | 29 | 0.0053 | 0.7647 | 0.1622 | 0.0073 | 0.0268 | 0.0095 | 0.0012 | 0.0081 | 0.0118 | 0.0013 | 0.0016 | 0.0000 | 0.0003 |
| 17 | Urban Collector | 32 | 0.0065 | 0.7659 | 0.1720 | 0.0073 | 0.0274 | 0.0083 | 0.0005 | 0.0051 | 0.0062 | 0.0006 | 0.0000 | 0.0000 | 0.0001 |
| 19 | Urban Local System | 16 | 0.0095 | 0.7321 | 0.1814 | 0.0209 | 0.0353 | 0.0087 | 0.0003 | 0.0049 | 0.0060 | 0.0009 | 0.0000 | 0.0001 | 0.0000 |

### 4.2.4 Disaggregating State Specific Information

Section 4.1.5 of Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation, illustrates how to map the HPMS statewide vehicle data to general MOBILE6.2 vehicle categories. This mapping is outlined below:

**Table 4.2.4-1 Mapping of HPMS data to MOBILE6.2 Categories**

| HPMS Category | General Category |
|---|---|
| Motorcycle | Motorcycle (MC) |
| Passenger Car | Passenger Car (LDV) |
| Other 2-Axel, 4-Tire Vehicles | Light Truck (LDT) |
| Busses | Bus (HDB) |
| All Other Trucks:<br>Single unit, 2-axel, 6-tire<br>Single unit, 3-axel<br>Single unit, 4 or more axel<br>Single trailer, 4 or fewer axel<br>Single trailer, 5-axel<br>Single trailer, 6 or more axel<br>Multi-trailer, 5 or fewer axel<br>Multi-trailer, 6-axel<br>Multi-trailer, 7 or more axel | Heavy Duty Truck (HDV) |

The HPMS data in Table 4.2.3-1 was grouped into these five general categories for each road type. In order to expand the five general categories to the 16 vehicle types used in MOBILE6.2, the national average VMT fractions by each vehicle class were used. The 2009 fractions were used since the state specific data is from 2009. The national average data was obtained from Table 4.1.2 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation. An example for rural interstates is illustrated below:

From Table 4.2.3-1 above:

| | | | | | |
|---|---|---|---|---|---|
| Passenger Cars | = | 65.00% | 5 axel Trailer | = | 15.29% |
| Pickup Trucks | = | 13.40% | 6 axel Trailer | = | 0.17% |
| Bus | = | 0.66% | 5 axel Multi Trailer | = | 0.38% |
| 2 axel Trucks | = | 2.45% | 6 axel Multi Trailer | = | 0.17% |
| 3 axel Trucks | = | 0.77% | 7 axel Multi Trailer | = | 0.04% |
| 4 axel Trucks | = | 0.04% | Motorcycles | = | 0.36% |
| 4 axel Trailer | = | 1.29% | | | |

Therefore, the five general categories are:

| | | |
|---|---|---|
| Motorcycles | = | 0.36% |
| Light Duty Vehicles | = | 65.00% |
| Light Duty Trucks | = | 13.40% |
| Heavy Duty Buses | = | 0.66% |
| Heavy Duty Vehicles | = | 20.60% |

From Table 4.1.2 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation, the 2009 national average vehicle mix for light duty vehicles is 0.3669, and the light duty trucks, buses and heavy duty trucks are listed below:

Light Duty Trucks

| | | |
|---|---|---|
| LDT1 | = | 0.0869 |
| LDT2 | = | 0.2894 |
| LDT3 | = | 0.0892 |
| LDT4 | = | 0.0410 |
| **Total** | **=** | **0.5065** |

Busses

| | | |
|---|---|---|
| HDBS | = | 0.0020 |
| HDBT | = | 0.0010 |
| **Total** | **=** | **0.0030** |

Heavy Duty Trucks

| | | |
|---|---|---|
| HDV2B | = | 0.0389 |
| HDV3 | = | 0.0038 |
| HDV4 | = | 0.0032 |
| HDV5 | = | 0.0024 |
| HDV6 | = | 0.0087 |
| HDV7 | = | 0.0103 |
| HDV8A | = | 0.0112 |
| HDV8B | = | 0.0398 |
| **Total** | **=** | **0.1183** |

Using the methodology described in Section 4.1.5 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation the new 2009 North Carolina statewide mix was developed. The one deviation from the guidance was that the NCDAQ grouped the light duty vehicles with the light duty trucks to normalize the vehicle mix. This was done because it is difficult to distinguish between light duty vehicles from light duty trucks in the count data. The basic formula for developing the mix is shown below,

$$\text{Vehicle Type} = \frac{(\text{2009 M6.2 fraction for vehicle}) * (\text{2009 State total for group})}{(\text{2009 M6.2 total for subcategory})}$$

Table 4.2.4-2 displays the calculation for each vehicle type for the 2009 rural interstate vehicle mix.

**Table 4.2.4-2 Calculation of New 2009 Statewide Rural Interstate Vehicle Mix**

| Vehicle Type | | Calculation | | New 2009 Mix |
|---|---|---|---|---|
| MC | = | MC | = | 0.0036 |
| Light Duty Vehicles and Trucks | | | | |
| LDV | = | 0.3669 x (0.7840/0.8734) | = | 0.3293 |
| LDT1 | = | 0.0869 x (0.7840/0.8734) | = | 0.0780 |
| LDT2 | = | 0.2894 x (0.7840/0.8734) | = | 0.2598 |
| LDT3 | = | 0.0892 x (0.7840/0.8734) | = | 0.0801 |
| LDT4 | = | 0.0410 x (0.7840/0.8734) | = | 0.0368 |
| Heavy Duty Vehicles | | | | |
| HDV2B | = | 0.0389 x (0.2060/0.1183) | = | 0.0677 |
| HDV3 | = | 0.0038 x (0.2060/0.1183) | = | 0.0066 |
| HDV4 | = | 0.0032 x (0.2060/0.1183) | = | 0.0056 |
| HDV5 | = | 0.0024 x (0.2060/0.1183) | = | 0.0042 |
| HDV6 | = | 0.0087 x (0.2060/0.1183) | = | 0.0151 |
| HDV7 | = | 0.0103 x (0.2060/0.1183) | = | 0.0179 |
| HDV8A | = | 0.0112 x (0.2060/0.1183) | = | 0.0195 |
| HDV8B | = | 0.0398 x (0.2060/0.1183) | = | 0.0693 |
| Buses | | | | |
| HDBS | = | 0.0020 x (0.0066/0.0030) | = | 0.0044 |
| HDBT | = | 0.0010 x (0.0066/0.0030) | = | 0.0022 |

2010 Statewide Vehicle Mix

Once the 2009 new vehicle mix was generated, the other years were created using the methodology described in Section 4.1.4 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation. This method grouped light duty vehicles, light duty trucks and motorcycles together and heavy duty buses, heavy duty trucks and heavy duty vehicles together. The combined percentages for these groupings are listed below.

Light Duty Vehicles = 78.75%
Heavy Duty Vehicles = 21.25%

The MOBILE6.2 vehicle mix fractions for the year being developed were obtained from Table 4.1.2 in Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation. The MOBILE6.2 vehicle fractions for 2010 are listed below.

| Light Duty Vehicles | | | Heavy Duty Vehicles | | |
|---|---|---|---|---|---|
| LDV | = | 0.3544 | HDV2B | = | 0.0390 |
| LDT1 | = | 0.0891 | HDV3 | = | 0.0038 |
| LDT2 | = | 0.2965 | HDV4 | = | 0.0032 |
| LDT3 | = | 0.0914 | HDV5 | = | 0.0024 |
| LDT4 | = | 0.0420 | HDV6 | = | 0.0087 |
| MC | = | 0.0054 | HDV7 | = | 0.0103 |
| **Total** | **=** | **0.8788** | HDV8A | = | 0.0112 |
| | | | HDV8B | = | 0.0399 |
| | | | HDBS | = | 0.0020 |
| | | | HDBT | = | 0.0010 |
| | | | **Total** | **=** | **0.1215** |

The North Carolina 2010 vehicle mix was created using the MOBILE6.2 fractions using the following formula:

$$\text{Vehicle Type} = (\text{2010 M6 fraction for vehicle}) \times \frac{\text{(2009 State total for group)}}{\text{(2010 M6 total for group)}}$$

Table 4.2.4-3 below displays the calculations used to generate the 2010 North Carolina vehicle mix for rural interstate.

**Table 4.2.4-3 Calculation of 2010 Statewide Rural Interstate Vehicle Mix**

| Vehicle Type | | Calculation | | 2010 State Mix |
|---|---|---|---|---|
| Light Duty Vehicles | | | | |
| LDV | = | 0.3544 x (0.7875/0.8788) | = | 0.3176 |
| LDT1 | = | 0.0891 x (0.7875/0.8788) | = | 0.0798 |
| LDT2 | = | 0.2965 x (0.7875/0.8788) | = | 0.2657 |
| LDT3 | = | 0.0914 x (0.7875/0.8788) | = | 0.0819 |
| LDT4 | = | 0.0420 x (0.7875/0.8788) | = | 0.0376 |
| MC | = | 0.0054 x (0.7875/0.8788) | | 0.0048 |

**Table 4.2.4-3 Calculation of 2010 Statewide Rural Interstate Vehicle Mix**

| Vehicle Type | | Calculation | | 2010 State Mix |
|---|---|---|---|---|
| Heavy Duty Vehicles | | | | |
| HDV2B | = | 0.0390 x (0.2125/0.1215) | = | 0.0682 |
| HDV3 | = | 0.0038 x (0.2125/0.1215) | = | 0.0066 |
| HDV4 | = | 0.0032 x (0.2125/0.1215) | = | 0.0056 |
| HDV5 | = | 0.0024 x (0.2125/0.1215) | = | 0.0042 |
| HDV6 | = | 0.0087 x (0.2125/0.1215) | = | 0.0152 |
| HDV7 | = | 0.0103 x (0.2125/0.1215) | = | 0.0180 |
| HDV8A | = | 0.0112 x (0.2125/0.1215) | = | 0.0196 |
| HDV8B | = | 0.0399 x (0.2125/0.1215) | = | 0.0698 |
| HDBS | = | 0.0020 x (0.2125/0.1215) | = | 0.0035 |
| HDBT | = | 0.0010 x (0.2125/0.1215) | = | 0.0017 |

This method was used to generate the other years vehicle mixes as well. The MOVES model requires that the total vehicle mix equals 1.0000, therefore when the mix totals slightly more than or less than 1.0000, the vehicle mix for LDV is adjusted to account for the difference. For example, the following 2010 mix sums to 0.9998, therefore the final vehicle mix fraction for LDV will be 0.3178 so that the total vehicle mix for rural interstates will be 1.0000. The vehicle mixes for all years can be found in Section 5.1 of this appendix.

As stated earlier in this section, vehicle mix or VMT mix is used in MOVES converters to develop VMT by HPMS class, VMT fractions by hour, and VMT by road type distribution, which are inputs to the model.

### 4.2.5 Vehicles/Equipment: On-Road Vehicle Equipment

The Vehicles/Equipment menu item and panel is used to specify the vehicle types that are included in the MOVES run. MOVES allows the user to select from among 13 "source use types" (the terminology that MOVES uses to describe vehicle types), and four different fuel types (gasoline, diesel, compressed natural gas (CNG), and electricity).

Users must select the appropriate fuel and vehicle type combinations in the On Road Vehicle Equipment panel to reflect the full range of vehicles that will operate in the county. In general, users should simply select all valid diesel, gasoline, and Compressed Natural Gas (CNG) (only

transit buses) vehicle and fuel combinations, unless data is available showing that some vehicles or fuels are not used in the area of analysis.

### 4.2.6 Road Type

The Road Type Panel is used to define the types of roads that are included in the run. MOVES defines five different Road Types:

- Off-Network (roadtype 1) – all locations where the predominant activity is vehicle starts, parking and idling (parking lots, truck stops, rest areas, freight or bus terminals)
- Rural Restricted Access (2) – rural highways that can only be accessed by an on-ramp
- Rural Unrestricted Access (3) – all other rural roads (arterials, connectors, and local streets)
- Urban Restricted Access (4) – urban highways or freeways that can only be accessed by an on-ramp
- Urban Unrestricted Access (5) – all other urban roads (arterials, connectors, and local streets)

Users should select the road types present in the area being analyzed. The determination of rural or urban road types should be based on the HPMS classification of the roads in the county being analyzed.

The NCDAQ followed the USEPA guidance that states that all SIP and regional conformity analyses must include the Off-Network road type in order to account for emissions from vehicle starts, extended idle activity, and evaporative emissions (for VOCs). The Off-Network road type is automatically selected when start or extended idle pollutant processes are chosen and must be selected for all evaporative emissions to be quantified. Off-Network activity in MOVES is primarily determined by the Source Type Population input, which is described in Section 4.2.9 of this document. Some evaporative emissions are estimated on roadways (i.e., roadtypes 2, 3, 4, and 5) to account for evaporative emissions that occur when vehicles are driving. All roads types are automatically selected when Refueling emission processes are selected.

MOVES uses Road Type to assign default drive cycles to activity on road types 2, 3, 4, and 5. For example, for unrestricted access road types, MOVES uses drive cycles that assume stop and go driving, including multiple accelerations, decelerations, and short periods of idling. For restricted access road types, MOVES uses drive cycles that include a higher fraction of cruise activity with less time spent accelerating or idling, although some ramp activity is also included.

### 4.2.7 Pollutants and Processes

In MOVES, pollutant refers to particular types of pollutants or precursors of the pollutant, such as NOx or VOCs, while process refers to the mechanism by which emissions are created, such as running exhaust or start exhaust. Users must select all processes associated with a particular pollutant in order to account for all emissions of that pollutant. For example, there are 11 separate pollutant processes in MOVES for VOC, i.e. hydrocarbon emissions; all 11 must be selected when estimating VOC emissions. For this plan the pollutants under consideration were NOx, $PM_{2.5}$, $SO_2$, and VOC.

### 4.2.8 Temperature and Relative Humidity Assumptions

Local temperature and humidity data are required inputs for MOVES. Ambient temperature is a key factor in estimating emission rates for on-road vehicles with substantial effects on most pollutant processes. Relative humidity is also important for estimating NOx emissions from motor vehicles. MOVES requires a temperature (in degrees Fahrenheit) and relative humidity (in percent – 0 to 100 scale) for each hour selected in the Run Spec. For example, MOVES requires a 24-hour temperature and humidity profile to model a full day of emissions on an hourly basis. For mobile source emission estimates, the NCDAQ used 2010 July monthly averages for the 24-hour temperature and relative humidity profiles from the Charlotte-Douglas International Airport (KCLT). Data were obtained North Carolina State Climate Retrieval and Observations Network of the Southeast Database (CRONOS). The temperature and relative humidity profiles as presented in the MOVES input files are listed in Section 5.2.

### 4.2.9 Source Type Population

Source type (i.e., vehicle type) population is used by MOVES to calculate start and evaporative emissions. In MOVES, start and resting evaporative emissions are related to the population of vehicles in an area. Since vehicle type population directly determines start and evaporative emission, users must develop local data for this input.

MOVES uses a vehicle classification system based on the way vehicles are classified in the Federal Highway Administration's HPMS rather than on the way they are classified in the USEPA emissions regulations; thus making it easier for users to develop local data for MOVES. MOVES categorizes vehicles into 13 source types, which are subsets of 6 HPMS vehicle types in MOVES, as shown in the crosswalk in Table 4.2.9-1. The USEPA believes that states should be able to develop population data for many of these source type categories from state motor vehicle registration data (e.g., motorcycles, passenger cars, passenger trucks, light commercial trucks) and from local transit agencies, school districts, bus companies, and refuse haulers (intercity, transit, and school

buses, and refuse trucks). The NCDOT supplied the NCDAQ with source population data as described in the following section.

**Table 4.2.9-1 MOVES Source Types and HPMS Vehicle Types**

| Source Type ID | Source Types | HPMS Vehicle Type ID | HPMS Vehicle Type |
|---|---|---|---|
| 11 | Motorcycle | 10 | Motorcycles |
| 21 | Passenger Car | 20 | Passenger Cars |
| 31 | Passenger Truck | 30 | Other 2 axle-4 tire vehicles |
| 32 | Light Commercial Truck | 30 | Other 2 axle-4 tire vehicles |
| 41 | Intercity Bus | 40 | Buses |
| 42 | Transit Bus | 40 | Buses |
| 43 | School Bus | 40 | Buses |
| 51 | Refuse Truck | 50 | Single Unit Trucks |
| 52 | Single Unit Short-haul Truck | 50 | Single Unit Trucks |
| 53 | Single Unit Long-haul Truck | 50 | Single Unit Trucks |
| 54 | Motor Home | 50 | Single Unit Trucks |
| 61 | Combination Short-haul Truck | 60 | Combination Trucks |
| 62 | Combination Long-haul Truck | 60 | Combination Trucks |

Source Type Population – Local Data

MOVES uses allocation factors to distribute emissions and activity (such as vehicle type populations) to individual counties. The NCDAQ is committed to using representative local data which will over ride MOVES default values through the County Data Manager. This decision was based on the fact that default allocation factors used in MOVES are derived from the VMT. Since the allocations are based on VMT, the vehicle populations allocated to counties are proportional to the VMT being allocated to that county. The NCDAQ corresponded with the USEPA Office of Transportation and Air Quality (OTAQ) to arrive at an acceptable method to allocate current year as well as to project future year vehicle populations to source type populations. The NCDAQ believes that using MOVES default vehicle population to estimate a fraction is the best method of taking state specific vehicle registration data and allocating county total vehicles to specific vehicle source types.

MOVES categorize vehicles into 13 source types, which are subsets of 6 HPMS vehicle types. Presently NCDAQ is unable to develop county source type population data for many of these source type categories based on how NCDOT collect vehicle registration data. The latest vehicle registration data broken down by county and towns is available by January of each year. Since the vehicle types database available from NCDOT differs from what MOVES2010a expects, the

NCDAQ relies on MOVES default fractions and applies these fractions to county total vehicle population, minus trailers. It is assumed that trailers do not have engines and do not generate VMT.

For future year MOVES runs, the NCDAQ needed to be able to grow the vehicle population reflective of the county of interest. From FHWA Highway Statistics graph of Licensed Drivers, Vehicle Registrations, and Resident Population, the NCDAQ has determined that growth in human population is a better indicator of growth in vehicle ownership as compared to VMT growth. Figure 4.2.9-1 shows the relationship of vehicle registration to resident population below.

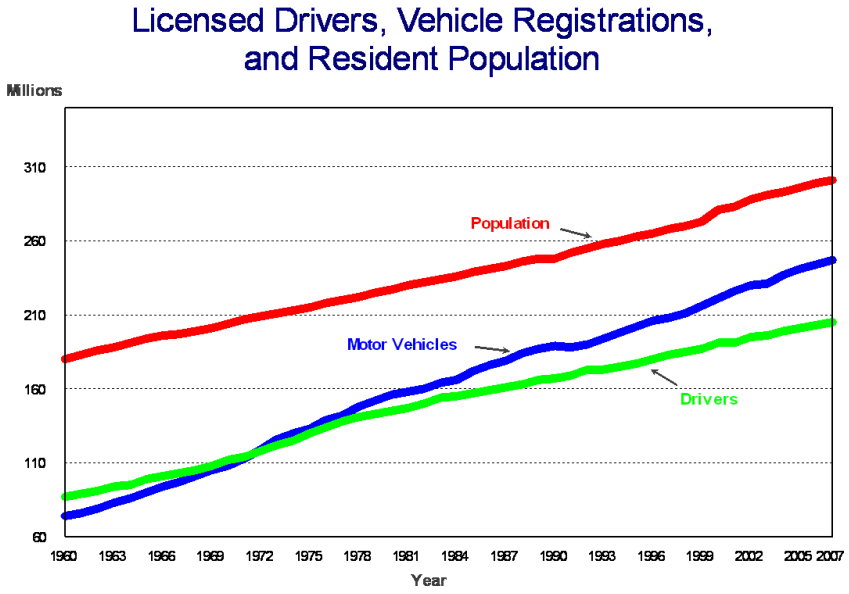


**Figure 4.2.9-1 Federal Highway Association Statistics Graph**

In order to forecast future year vehicle population and disaggregate to the appropriate source type, a reliable source of county population is needed. The North Carolina Office of State Budget and Management (OSBM) coordinates with the Census in the Federal State Cooperative Program for population estimates for all state government data, with special emphasis on a consistent set of population projections. On OSBM website are annual certified county population estimates which account for births, deaths and natural growth representing a net migration populous at the county level.

Population data is updated annually in May and certified by September for the previous year's data. Projected annual county population estimates are available to adjust future year county

vehicle populations as needed. The USEPA has indicated that using human population growth as a surrogate to project vehicle population growth is an acceptable option.

### 4.2.10 Vehicle Inspection and Maintenance Program Assumptions

In 2002, North Carolina implemented a new vehicle emissions inspection program referred to as onboard diagnostics (OBDII). This program covers all light duty gasoline powered vehicles that are model year 1996 and newer. The program was initially implemented in 9 counties and was expanded to include a total of 48 counties between July 2002 and January 2006. Cabarrus, Gaston, Mecklenburg and Union Counties were phased in July 2002, Iredell and Rowan were phased-in July 1, 2003 and Lincoln was phased in January 2004.

Inspection and maintenance programs continue to be important local control programs in many nonattainment areas. MOVES includes the capability of modeling all the aspects of an I/M program that have a significant impact on vehicle emissions. The USEPA recommends that users modeling an existing I/M program in MOVES begin by examining the default I/M program description included in MOVES for the particular county in question. The NCDAQ modified the default data in MOVES to reflect county specific compliance factors.

### 4.2.11 Reid Vapor Pressure and Fuel Assumptions

In general, users should first review the MOVES default fuel formulation and fuel supply data, and then make changes only where local volumetric fuel property information is available. The lone exception to this guidance is in the case of Reid Vapor Pressure (RVP) where a user should change the value to reflect the regulatory requirements and differences between ethanol- and non-ethanol blended gasolines. The current version of MOVES does not allow the user to create new fuel identification numbers. Thus, per current the USEPA guidance, the NCDAQ edited the default fuel supply tables for the individual counties to reflect the county-specific monthly RVP data.

The RVP reflects a gasoline's volatility. Lower RVP leads to lower VOC emissions from gasoline handling and lowers vapor losses from motor vehicles. An RVP of 7.8 pounds per square inch (psi) is required during May through September for Davidson, Durham, Forsyth, Gaston, Guilford, Mecklenburg, Wake, the Dutchville Township in Granville, and part of Davie Counties. An RVP of 9.0 psi is required for all remaining counties.

### 4.2.12 Diesel Sulfur Content Assumptions

The diesel fuel sulfur content for conventional diesel fuel is required in MOVES to generate fine particulate matter emission factors because the amount of sulfur in diesel fuel directly correlates to sulfate particulate emissions. The USEPA recommends a diesel fuel sulfur content of 43 parts per million (ppm) for the period June 2006-May 2010 and 11 ppm for June 2010 -2015. The default fuelSubtypeId for conventional diesel fuel in MOVES was used for all years.

### 4.2.13 VMT Assumptions

As input, MOVES requires *annual* VMT by HPMS vehicle class. The USEPA has created a tool that allows users to input average annual daily VMT as well as monthly and weekend day adjustment factors to create the annual VMT by HPMS class and appropriate monthly and daily adjustments needed by MOVES. The USEPA has also created a set of software tools that can import VMT tables by MOBILE6.2 vehicle types (either 8, 12, 16, or 28 MOBILE6.2 vehicle types) and facility types, as well as MOBILE6.2 hourly VMT fractions, VMT mix, and ramp fractions and convert these to the equivalent MOVES tables of VMT by HPMS class, VMT fractions by hour, and road type distribution. Mapping MOBILE6.2 vehicle types to their equivalent MOVES source types is a complex process. The USEPA strongly encourages states to use the converter tools to create the appropriate MOVES input tables from MOBILE6.2 data to avoid errors.

The VMT data were provided for each county for 2010. Table 4.2.13-1 through Table 4.2.13-3 list the VMT used in the emissions calculations.

**Table 4.2.13-1 Modeled VMT with Time Periods per County**

| Road Type | AM Peak | Midday | PM Peak | Night |
|---|---|---|---|---|
| **ALAMANCE** | | | | |
| Rural Interstate | 29,680 | 56,729 | 49,188 | 38,747 |
| Rural Principal Arterial | 1 | 1 | 1 | 1 |
| Rural Minor Arterial | 39,297 | 75,110 | 65,127 | 51,303 |
| Rural Major Collector | 56,842 | 108,646 | 94,205 | 74,209 |
| Rural Minor Collector | 35,838 | 68,500 | 59,395 | 46,787 |
| Rural Local | 91,017 | 173,966 | 150,843 | 118,824 |
| Urban Interstate | 352,380 | 613,220 | 552,513 | 462,200 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 51,812 | 90,164 | 81,238 | 67,959 |
| Urban Minor Arterial | 139,173 | 242,192 | 218,216 | 182,547 |

| | | | | |
|---|---|---|---|---|
| **ALAMANCE** | | | | |
| Urban Collector | 92,975 | 161,798 | 145,780 | 121,951 |
| Urban Local | 65,608 | 114,173 | 102,870 | 86,055 |
| **ALEXANDER** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 47,660 | 91,096 | 78,988 | 62,221 |
| Rural Major Collector | 8,036 | 15,359 | 13,318 | 10,491 |
| Rural Minor Collector | 19,096 | 36,500 | 31,649 | 24,931 |
| Rural Local | 38,228 | 73,067 | 63,355 | 49,907 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 5,530 | 9,624 | 8,671 | 7,254 |
| Urban Collector | 3,423 | 5,956 | 5,367 | 4,489 |
| Urban Local | 1,006 | 1,750 | 1,577 | 1,319 |
| **ALLEGHANY** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 13,432 | 25,673 | 22,260 | 17,535 |
| Rural Major Collector | 14,380 | 27,486 | 23,833 | 18,774 |
| Rural Minor Collector | 658 | 1,258 | 1,091 | 860 |
| Rural Local | 11,919 | 22,781 | 19,753 | 15,560 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 555 | 966 | 870 | 728 |
| **ANSON** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 56,469 | 107,933 | 93,587 | 73,722 |
| Rural Minor Arterial | 8,408 | 16,070 | 13,934 | 10,976 |
| Rural Major Collector | 22,067 | 42,179 | 36,572 | 28,809 |
| Rural Minor Collector | 8,054 | 15,394 | 13,348 | 10,515 |
| Rural Local | 18,914 | 36,152 | 31,347 | 24,693 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| **ANSON** | | | | |
| Urban Principal Arterial | 21,191 | 36,877 | 33,226 | 27,795 |
| Urban Minor Arterial | 2,986 | 5,197 | 4,682 | 3,917 |
| Urban Collector | 1,425 | 2,479 | 2,234 | 1,869 |
| Urban Local | 2,759 | 4,801 | 4,326 | 3,619 |
| **ASHE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 32,965 | 63,007 | 54,632 | 43,036 |
| Rural Major Collector | 49,108 | 93,863 | 81,387 | 64,111 |
| Rural Minor Collector | 4,804 | 9,182 | 7,961 | 6,271 |
| Rural Local | 42,031 | 80,337 | 69,659 | 54,872 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,789 | 3,113 | 2,805 | 2,347 |
| **AVERY** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 25,734 | 49,187 | 42,649 | 33,596 |
| Rural Minor Arterial | 15,206 | 29,064 | 25,201 | 19,852 |
| Rural Major Collector | 21,843 | 41,749 | 36,200 | 28,516 |
| Rural Minor Collector | 3,849 | 7,357 | 6,379 | 5,025 |
| Rural Local | 15,217 | 29,085 | 25,219 | 19,866 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 3,263 | 5,678 | 5,116 | 4,279 |
| **BEAUFORT** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 34,744 | 66,408 | 57,582 | 45,359 |
| Rural Minor Arterial | 27,589 | 52,733 | 45,724 | 36,018 |
| Rural Major Collector | 61,720 | 117,968 | 102,288 | 80,576 |
| Rural Minor Collector | 11,398 | 21,787 | 18,891 | 14,881 |
| Rural Local | 34,248 | 65,459 | 56,759 | 44,711 |

| | | | | |
|---|---|---|---|---|
| **BEAUFORT** | | | | |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 31,873 | 55,466 | 49,975 | 41,806 |
| Urban Minor Arterial | 18,514 | 32,219 | 29,030 | 24,285 |
| Urban Collector | 4,116 | 7,163 | 6,453 | 5,399 |
| Urban Local | 5,477 | 9,531 | 8,587 | 7,183 |
| **BERTIE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 43,202 | 82,574 | 71,598 | 56,400 |
| Rural Minor Arterial | 38,770 | 74,103 | 64,253 | 50,614 |
| Rural Major Collector | 32,930 | 62,940 | 54,574 | 42,990 |
| Rural Minor Collector | 11,126 | 21,265 | 18,439 | 14,525 |
| Rural Local | 22,169 | 42,373 | 36,741 | 28,942 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 18 | 32 | 29 | 24 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 2,162 | 3,763 | 3,391 | 2,836 |
| **BLADEN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 66,383 | 126,881 | 110,017 | 86,664 |
| Rural Major Collector | 79,013 | 151,022 | 130,948 | 103,152 |
| Rural Minor Collector | 15,993 | 30,569 | 26,506 | 20,879 |
| Rural Local | 27,108 | 51,813 | 44,926 | 35,390 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 3,460 | 6,020 | 5,424 | 4,538 |
| **BRUNSWICK** | | | | |
| Rural Interstate | 29 | 56 | 49 | 38 |
| Rural Principal Arterial | 176,279 | 336,933 | 292,148 | 230,135 |
| Rural Minor Arterial | 39,674 | 75,830 | 65,751 | 51,794 |

| | | | | |
|---|---|---|---|---|
| **BRUNSWICK** | | | | |
| Rural Major Collector | 125,325 | 239,541 | 207,702 | 163,614 |
| Rural Minor Collector | 6,863 | 13,119 | 11,375 | 8,960 |
| Rural Local | 98,040 | 187,389 | 162,481 | 127,992 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 57,330 | 99,768 | 89,891 | 75,197 |
| Urban Principal Arterial | 28,161 | 49,006 | 44,154 | 36,937 |
| Urban Minor Arterial | 24,139 | 42,007 | 37,848 | 31,661 |
| Urban Collector | 49,376 | 85,926 | 77,419 | 64,764 |
| Urban Local | 81,872 | 142,475 | 128,370 | 107,387 |
| **BUNCOMBE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 61 | 116 | 101 | 79 |
| Rural Minor Arterial | 4,285 | 8,189 | 7,101 | 5,594 |
| Rural Major Collector | 23,576 | 45,063 | 39,073 | 30,779 |
| Rural Minor Collector | 10,650 | 20,356 | 17,650 | 13,904 |
| Rural Local | 171,693 | 328,167 | 284,547 | 224,148 |
| Urban Interstate | 475,765 | 827,938 | 745,975 | 624,038 |
| Urban Other Freeway/Expressway | 105,711 | 183,961 | 165,750 | 138,656 |
| Urban Principal Arterial | 196,094 | 341,247 | 307,465 | 257,207 |
| Urban Minor Arterial | 141,937 | 247,001 | 222,549 | 186,171 |
| Urban Collector | 72,490 | 126,149 | 113,661 | 95,082 |
| Urban Local | 103,785 | 180,608 | 162,729 | 136,129 |
| **BURKE** | | | | |
| Rural Interstate | 15,547 | 29,716 | 25,766 | 20,297 |
| Rural Principal Arterial | 204 | 389 | 338 | 266 |
| Rural Minor Arterial | 36,624 | 70,002 | 60,697 | 47,813 |
| Rural Major Collector | 10,358 | 19,798 | 17,166 | 13,522 |
| Rural Minor Collector | 20,599 | 39,373 | 34,140 | 26,893 |
| Rural Local | 65,866 | 125,893 | 109,160 | 85,989 |
| Urban Interstate | 161,268 | 280,642 | 252,860 | 211,527 |
| Urban Other Freeway/Expressway | 2,025 | 3,524 | 3,175 | 2,656 |
| Urban Principal Arterial | 41,232 | 71,753 | 64,650 | 54,082 |
| Urban Minor Arterial | 79,157 | 137,752 | 124,115 | 103,827 |
| Urban Collector | 23,521 | 40,932 | 36,880 | 30,851 |
| Urban Local | 23,236 | 40,437 | 36,434 | 30,478 |

| | | | | |
|---|---|---|---|---|
| **CALDWELL** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 20,085 | 38,389 | 33,286 | 26,221 |
| Rural Minor Arterial | 14,634 | 27,971 | 24,253 | 19,105 |
| Rural Major Collector | 8,184 | 15,642 | 13,563 | 10,684 |
| Rural Minor Collector | 10,080 | 19,266 | 16,706 | 13,160 |
| Rural Local | 87,580 | 167,398 | 145,147 | 114,338 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 11,818 | 20,566 | 18,530 | 15,501 |
| Urban Principal Arterial | 105,012 | 182,744 | 164,653 | 137,739 |
| Urban Minor Arterial | 45,798 | 79,699 | 71,809 | 60,071 |
| Urban Collector | 25,053 | 43,597 | 39,281 | 32,860 |
| Urban Local | 39,841 | 69,332 | 62,468 | 52,257 |
| **CAMDEN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 19,984 | 38,198 | 33,120 | 26,090 |
| Rural Minor Arterial | 14,528 | 27,768 | 24,077 | 18,966 |
| Rural Major Collector | 12,600 | 24,082 | 20,881 | 16,449 |
| Rural Minor Collector | 3,482 | 6,656 | 5,771 | 4,546 |
| Rural Local | 8,786 | 16,793 | 14,561 | 11,470 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 0 | 0 | 0 | 0 |
| **CARTERET** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 52,509 | 100,364 | 87,024 | 68,552 |
| Rural Minor Arterial | 8,647 | 16,528 | 14,331 | 11,289 |
| Rural Major Collector | 51,663 | 98,747 | 85,622 | 67,447 |
| Rural Minor Collector | 1,643 | 3,141 | 2,723 | 2,145 |
| Rural Local | 23,127 | 44,204 | 38,328 | 30,192 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 105,173 | 183,024 | 164,906 | 137,950 |
| Urban Minor Arterial | 39,913 | 69,457 | 62,581 | 52,351 |

| | | | | |
|---|---|---|---|---|
| **CARTERET** | | | | |
| Urban Collector | 10,603 | 18,452 | 16,625 | 13,908 |
| Urban Local | 20,749 | 36,108 | 32,533 | 27,215 |
| **CASWELL** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 27,935 | 53,394 | 46,297 | 36,470 |
| Rural Minor Arterial | 20,552 | 39,283 | 34,061 | 26,831 |
| Rural Major Collector | 22,080 | 42,202 | 36,592 | 28,825 |
| Rural Minor Collector | 9,576 | 18,303 | 15,870 | 12,501 |
| Rural Local | 21,481 | 41,057 | 35,600 | 28,043 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 3 | 6 | 5 | 4 |
| **CHEROKEE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 59,096 | 112,953 | 97,940 | 77,150 |
| Rural Minor Arterial | 5,313 | 10,155 | 8,806 | 6,936 |
| Rural Major Collector | 36,293 | 69,368 | 60,148 | 47,380 |
| Rural Minor Collector | 9,276 | 17,730 | 15,373 | 12,110 |
| Rural Local | 28,120 | 53,748 | 46,604 | 36,711 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 2,015 | 3,507 | 3,160 | 2,643 |
| **CHOWAN** | | | | |
| Rural Interstate | 15 | 28 | 24 | 19 |
| Rural Principal Arterial | 4,435 | 8,476 | 7,349 | 5,789 |
| Rural Minor Arterial | 12,125 | 23,175 | 20,095 | 15,829 |
| Rural Major Collector | 5,401 | 10,323 | 8,951 | 7,051 |
| Rural Minor Collector | 9,993 | 19,100 | 16,561 | 13,046 |
| Rural Local | 8,478 | 16,204 | 14,050 | 11,068 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 9,513 | 16,555 | 14,916 | 12,478 |

| | | | | |
|---|---|---|---|---|
| **CHOWAN** | | | | |
| Urban Principal Arterial | 314 | 546 | 492 | 411 |
| Urban Minor Arterial | 8,015 | 13,948 | 12,568 | 10,513 |
| Urban Collector | 1,064 | 1,852 | 1,669 | 1,396 |
| Urban Local | 1,349 | 2,348 | 2,116 | 1,770 |
| **CLAY** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 27,461 | 52,487 | 45,511 | 35,850 |
| Rural Major Collector | 6,817 | 13,030 | 11,298 | 8,900 |
| Rural Minor Collector | 3,744 | 7,156 | 6,205 | 4,888 |
| Rural Local | 8,128 | 15,535 | 13,470 | 10,611 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 173 | 301 | 272 | 227 |
| **CLEVELAND** | | | | |
| Rural Interstate | 75,079 | 143,503 | 124,429 | 98,017 |
| Rural Principal Arterial | 66,708 | 127,503 | 110,556 | 87,089 |
| Rural Minor Arterial | 40,139 | 76,719 | 66,522 | 52,402 |
| Rural Major Collector | 75,238 | 143,808 | 124,693 | 98,225 |
| Rural Minor Collector | 27,134 | 51,862 | 44,969 | 35,423 |
| Rural Local | 91,392 | 174,682 | 151,464 | 119,313 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 74,906 | 130,354 | 117,449 | 98,251 |
| Urban Principal Arterial | 65,876 | 114,639 | 103,291 | 86,407 |
| Urban Minor Arterial | 60,316 | 104,964 | 94,573 | 79,114 |
| Urban Collector | 13,470 | 23,441 | 21,121 | 17,668 |
| Urban Local | 24,576 | 42,767 | 38,534 | 32,235 |
| **COLUMBUS** | | | | |
| Rural Interstate | 1 | 2 | 2 | 1 |
| Rural Principal Arterial | 104,517 | 199,769 | 173,216 | 136,448 |
| Rural Minor Arterial | 51,670 | 98,759 | 85,632 | 67,455 |
| Rural Major Collector | 73,165 | 139,845 | 121,257 | 95,518 |
| Rural Minor Collector | 26,820 | 51,263 | 44,450 | 35,014 |
| Rural Local | 51,566 | 98,562 | 85,461 | 67,321 |

| | | | | |
|---|---|---|---|---|
| **COLUMBUS** | | | | |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 5,049 | 8,787 | 7,917 | 6,623 |
| Urban Principal Arterial | 17,101 | 29,759 | 26,813 | 22,430 |
| Urban Minor Arterial | 9,584 | 16,679 | 15,028 | 12,571 |
| Urban Collector | 6,333 | 11,021 | 9,930 | 8,307 |
| Urban Local | 7,656 | 13,324 | 12,005 | 10,043 |
| **CRAVEN** | | | | |
| Rural Interstate | 14,476 | 27,668 | 23,991 | 18,898 |
| Rural Principal Arterial | 66,225 | 126,580 | 109,755 | 86,458 |
| Rural Minor Arterial | 77 | 147 | 128 | 100 |
| Rural Major Collector | 96,717 | 184,860 | 160,289 | 126,265 |
| Rural Minor Collector | 10,345 | 19,773 | 17,145 | 13,505 |
| Rural Local | 52,674 | 100,678 | 87,296 | 68,766 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 45,203 | 78,663 | 70,876 | 59,291 |
| Urban Principal Arterial | 131,569 | 228,959 | 206,293 | 172,573 |
| Urban Minor Arterial | 29,697 | 51,680 | 46,564 | 38,952 |
| Urban Collector | 13,971 | 24,312 | 21,905 | 18,325 |
| Urban Local | 27,678 | 48,167 | 43,398 | 36,304 |
| **CUMBERLAND** | | | | |
| Rural Interstate | 107,564 | 205,593 | 178,266 | 140,426 |
| Rural Principal Arterial | 21,128 | 40,382 | 35,015 | 27,582 |
| Rural Minor Arterial | 27,141 | 51,876 | 44,981 | 35,433 |
| Rural Major Collector | 30,668 | 58,617 | 50,825 | 40,037 |
| Rural Minor Collector | 22,497 | 43,000 | 37,284 | 29,370 |
| Rural Local | 160,754 | 307,259 | 266,418 | 209,867 |
| Urban Interstate | 119,538 | 208,023 | 187,429 | 156,792 |
| Urban Other Freeway/Expressway | 92,666 | 161,259 | 145,295 | 121,545 |
| Urban Principal Arterial | 343,643 | 598,016 | 538,815 | 450,740 |
| Urban Minor Arterial | 232,045 | 403,810 | 363,835 | 304,362 |
| Urban Collector | 39,802 | 69,264 | 62,407 | 52,206 |
| Urban Local | 201,361 | 350,414 | 315,724 | 264,116 |
| **CURRITUCK** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 114,452 | 218,759 | 189,682 | 149,419 |

| | | | | |
|---|---|---|---|---|
| **CURRITUCK** | | | | |
| Rural Major Collector | 12,618 | 24,117 | 20,911 | 16,472 |
| Rural Minor Collector | 14,061 | 26,876 | 23,303 | 18,357 |
| Rural Local | 13,555 | 25,909 | 22,465 | 17,697 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 0 | 0 | 0 | 0 |
| **DARE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 19,187 | 36,674 | 31,799 | 25,050 |
| Rural Minor Arterial | 11,239 | 21,481 | 18,626 | 14,672 |
| Rural Major Collector | 58,828 | 112,441 | 97,495 | 76,800 |
| Rural Minor Collector | 5,160 | 9,863 | 8,552 | 6,737 |
| Rural Local | 11,218 | 21,442 | 18,592 | 14,645 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 75,901 | 132,084 | 119,008 | 99,555 |
| Urban Minor Arterial | 25,776 | 44,856 | 40,416 | 33,809 |
| Urban Collector | 2,400 | 4,177 | 3,763 | 3,148 |
| Urban Local | 14,665 | 25,520 | 22,994 | 19,235 |
| **DAVIE** | | | | |
| Rural Interstate | 83,660 | 159,904 | 138,650 | 109,219 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 61,317 | 117,199 | 101,621 | 80,050 |
| Rural Major Collector | 22,617 | 43,229 | 37,483 | 29,527 |
| Rural Minor Collector | 18,974 | 36,266 | 31,446 | 24,771 |
| Rural Local | 24,164 | 46,186 | 40,047 | 31,546 |
| Urban Interstate | 23,358 | 40,648 | 36,624 | 30,638 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 8,938 | 15,555 | 14,015 | 11,724 |
| Urban Collector | 950 | 1,653 | 1,489 | 1,246 |
| Urban Local | 2,621 | 4,561 | 4,110 | 3,438 |

| | | | | |
|---|---|---|---|---|
| **DUPLIN** | | | | |
| Rural Interstate | 99,139 | 189,491 | 164,304 | 129,428 |
| Rural Principal Arterial | 52,550 | 100,442 | 87,091 | 68,605 |
| Rural Minor Arterial | 109 | 208 | 180 | 142 |
| Rural Major Collector | 112,103 | 214,269 | 185,788 | 146,352 |
| Rural Minor Collector | 29,293 | 55,990 | 48,548 | 38,243 |
| Rural Local | 50,176 | 95,905 | 83,157 | 65,506 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 6,946 | 12,088 | 10,891 | 9,111 |
| **GATES** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 23,604 | 45,115 | 39,119 | 30,815 |
| Rural Minor Arterial | 8,119 | 15,519 | 13,456 | 10,600 |
| Rural Major Collector | 8,673 | 16,576 | 14,373 | 11,322 |
| Rural Minor Collector | 7,578 | 14,485 | 12,559 | 9,893 |
| Rural Local | 8,101 | 15,484 | 13,426 | 10,576 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 85 | 147 | 133 | 111 |
| **GRAHAM** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 3,123 | 5,969 | 5,176 | 4,077 |
| Rural Minor Arterial | 3,155 | 6,030 | 5,229 | 4,119 |
| Rural Major Collector | 21,310 | 40,731 | 35,317 | 27,821 |
| Rural Minor Collector | 729 | 1,393 | 1,208 | 952 |
| Rural Local | 7,253 | 13,863 | 12,021 | 9,469 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **GRAHAM** | | | | |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 380 | 662 | 596 | 499 |
| **GREENE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 11,499 | 21,979 | 19,057 | 15,012 |
| Rural Minor Arterial | 30,018 | 57,375 | 49,749 | 39,189 |
| Rural Major Collector | 32,723 | 62,545 | 54,232 | 42,720 |
| Rural Minor Collector | 7,901 | 15,101 | 13,094 | 10,314 |
| Rural Local | 14,693 | 28,084 | 24,352 | 19,183 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 724 | 1,260 | 1,135 | 950 |
| **HALIFAX** | | | | |
| Rural Interstate | 140,542 | 268,627 | 232,921 | 183,480 |
| Rural Principal Arterial | 13,312 | 25,445 | 22,063 | 17,380 |
| Rural Minor Arterial | 29,631 | 56,636 | 49,108 | 38,684 |
| Rural Major Collector | 39,291 | 75,099 | 65,117 | 51,295 |
| Rural Minor Collector | 7,625 | 14,575 | 12,638 | 9,955 |
| Rural Local | 38,444 | 73,479 | 63,713 | 50,189 |
| Urban Interstate | 12,587 | 21,904 | 19,735 | 16,509 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 15,130 | 26,330 | 23,724 | 19,846 |
| Urban Minor Arterial | 15,936 | 27,732 | 24,987 | 20,902 |
| Urban Collector | 5,270 | 9,171 | 8,263 | 6,913 |
| Urban Local | 11,369 | 19,784 | 17,825 | 14,912 |
| **HARNETT** | | | | |
| Rural Interstate | 48,319 | 92,355 | 80,079 | 63,081 |
| Rural Principal Arterial | 84,247 | 161,026 | 139,622 | 109,985 |
| Rural Minor Arterial | 38,655 | 73,884 | 64,064 | 50,465 |
| Rural Major Collector | 108,681 | 207,728 | 180,117 | 141,884 |
| Rural Minor Collector | 41,847 | 79,984 | 69,352 | 54,631 |
| Rural Local | 75,940 | 145,149 | 125,856 | 99,141 |
| Urban Interstate | 27,014 | 47,010 | 42,357 | 35,433 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **HARNETT** | | | | |
| Urban Principal Arterial | 26,691 | 46,448 | 41,850 | 35,009 |
| Urban Minor Arterial | 16,105 | 28,026 | 25,251 | 21,124 |
| Urban Collector | 15,741 | 27,394 | 24,682 | 20,647 |
| Urban Local | 15,846 | 27,576 | 24,846 | 20,785 |
| **HAYWOOD** | | | | |
| Rural Interstate | 80,352 | 153,582 | 133,168 | 104,901 |
| Rural Principal Arterial | 1 | 1 | 1 | 1 |
| Rural Minor Arterial | 24,626 | 47,070 | 40,813 | 32,150 |
| Rural Major Collector | 10,576 | 20,214 | 17,527 | 13,807 |
| Rural Minor Collector | 3,077 | 5,882 | 5,100 | 4,017 |
| Rural Local | 56,966 | 108,882 | 94,410 | 74,370 |
| Urban Interstate | 88,028 | 153,189 | 138,024 | 115,462 |
| Urban Other Freeway/Expressway | 60,159 | 104,690 | 94,326 | 78,907 |
| Urban Principal Arterial | 30,611 | 53,269 | 47,996 | 40,150 |
| Urban Minor Arterial | 42,791 | 74,465 | 67,093 | 56,126 |
| Urban Collector | 6,816 | 11,861 | 10,687 | 8,940 |
| Urban Local | 19,182 | 33,380 | 30,076 | 25,159 |
| **HENDERSON** | | | | |
| Rural Interstate | 24,634 | 47,085 | 40,827 | 32,161 |
| Rural Principal Arterial | 15,280 | 29,205 | 25,323 | 19,948 |
| Rural Minor Arterial | 34,172 | 65,314 | 56,633 | 44,612 |
| Rural Major Collector | 14,050 | 26,855 | 23,285 | 18,343 |
| Rural Minor Collector | 6,188 | 11,828 | 10,256 | 8,079 |
| Rural Local | 118,360 | 226,228 | 196,158 | 154,520 |
| Urban Interstate | 118,547 | 206,298 | 185,875 | 155,492 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 72,588 | 126,319 | 113,814 | 95,210 |
| Urban Minor Arterial | 46,076 | 80,182 | 72,244 | 60,435 |
| Urban Collector | 52,156 | 90,762 | 81,777 | 68,410 |
| Urban Local | 21,527 | 37,462 | 33,753 | 28,236 |
| **HERTFORD** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 7,136 | 13,640 | 11,827 | 9,317 |
| Rural Minor Arterial | 21,338 | 40,784 | 35,363 | 27,856 |
| Rural Major Collector | 43,071 | 82,324 | 71,382 | 56,230 |
| Rural Minor Collector | 10,241 | 19,573 | 16,972 | 13,369 |
| Rural Local | 24,161 | 46,181 | 40,043 | 31,543 |

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|---|---|---|---|---|
| **HERTFORD** | | | | |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 5,018 | 8,732 | 7,868 | 6,582 |
| **HOKE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 9,734 | 18,605 | 16,132 | 12,708 |
| Rural Minor Arterial | 26,829 | 51,280 | 44,464 | 35,026 |
| Rural Major Collector | 6,921 | 13,228 | 11,470 | 9,035 |
| Rural Minor Collector | 16,838 | 32,184 | 27,906 | 21,983 |
| Rural Local | 44,901 | 85,823 | 74,415 | 58,619 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 30,651 | 53,339 | 48,058 | 40,203 |
| Urban Minor Arterial | 8,911 | 15,507 | 13,972 | 11,688 |
| Urban Collector | 11,143 | 19,391 | 17,472 | 14,616 |
| Urban Local | 4,186 | 7,285 | 6,563 | 5,491 |
| **HYDE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 11,509 | 21,998 | 19,074 | 15,025 |
| Rural Major Collector | 6,024 | 11,513 | 9,983 | 7,864 |
| Rural Minor Collector | 3,848 | 7,355 | 6,378 | 5,024 |
| Rural Local | 2,801 | 5,353 | 4,642 | 3,656 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 0 | 0 | 0 | 0 |
| **JACKSON** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 85,622 | 163,655 | 141,902 | 111,781 |
| Rural Minor Arterial | 49,258 | 94,150 | 81,636 | 64,307 |

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|---|---|---|---|---|
| **JACKSON** | | | | |
| Rural Major Collector | 5,627 | 10,755 | 9,325 | 7,346 |
| Rural Minor Collector | 6,922 | 13,230 | 11,472 | 9,037 |
| Rural Local | 39,373 | 75,256 | 65,253 | 51,402 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 46,368 | 80,690 | 72,702 | 60,818 |
| Urban Minor Arterial | 6,286 | 10,939 | 9,856 | 8,245 |
| Urban Collector | 7,311 | 12,723 | 11,464 | 9,590 |
| Urban Local | 1,483 | 2,581 | 2,325 | 1,945 |
| **JONES** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 41,193 | 78,735 | 68,270 | 53,779 |
| Rural Minor Arterial | 3,387 | 6,474 | 5,614 | 4,422 |
| Rural Major Collector | 27,889 | 53,306 | 46,221 | 36,410 |
| Rural Minor Collector | 7,039 | 13,455 | 11,666 | 9,190 |
| Rural Local | 7,595 | 14,517 | 12,587 | 9,915 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 566 | 985 | 887 | 742 |
| **LEE** | | | | |
| Rural Interstate | 6 | 12 | 10 | 8 |
| Rural Principal Arterial | 71,472 | 136,609 | 118,451 | 93,308 |
| Rural Minor Arterial | 6,865 | 13,122 | 11,378 | 8,963 |
| Rural Major Collector | 26,582 | 50,808 | 44,055 | 34,703 |
| Rural Minor Collector | 11,164 | 21,339 | 18,503 | 14,575 |
| Rural Local | 28,091 | 53,691 | 46,555 | 36,673 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 26,282 | 45,737 | 41,209 | 34,473 |
| Urban Principal Arterial | 40,726 | 70,872 | 63,856 | 53,418 |
| Urban Minor Arterial | 38,436 | 66,887 | 60,265 | 50,414 |
| Urban Collector | 12,258 | 21,332 | 19,220 | 16,078 |
| Urban Local | 13,959 | 24,293 | 21,888 | 18,310 |

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|---|---|---|---|---|
| **LENOIR** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 48,185 | 92,099 | 79,858 | 62,907 |
| Rural Minor Arterial | 32,743 | 62,584 | 54,265 | 42,747 |
| Rural Major Collector | 48,551 | 92,798 | 80,463 | 63,383 |
| Rural Minor Collector | 16,528 | 31,592 | 27,393 | 21,578 |
| Rural Local | 44,762 | 85,557 | 74,185 | 58,438 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 56,416 | 98,177 | 88,458 | 73,998 |
| Urban Minor Arterial | 19,218 | 33,443 | 30,133 | 25,207 |
| Urban Collector | 27,146 | 47,240 | 42,563 | 35,606 |
| Urban Local | 13,294 | 23,134 | 20,844 | 17,437 |
| **MCDOWELL** | | | | |
| Rural Interstate | 88,131 | 168,449 | 146,059 | 115,056 |
| Rural Principal Arterial | 35,053 | 66,998 | 58,093 | 45,762 |
| Rural Minor Arterial | 1,882 | 3,597 | 3,119 | 2,457 |
| Rural Major Collector | 43,102 | 82,384 | 71,434 | 56,271 |
| Rural Minor Collector | 10,674 | 20,402 | 17,690 | 13,935 |
| Rural Local | 34,175 | 65,321 | 56,638 | 44,616 |
| Urban Interstate | 37,300 | 64,910 | 58,484 | 48,925 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 17,618 | 30,659 | 27,624 | 23,108 |
| Urban Minor Arterial | 19,008 | 33,079 | 29,804 | 24,932 |
| Urban Collector | 16,608 | 28,902 | 26,041 | 21,784 |
| Urban Local | 3,641 | 6,336 | 5,709 | 4,776 |
| **MACON** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 38,191 | 72,997 | 63,295 | 49,859 |
| Rural Minor Arterial | 25,745 | 49,208 | 42,668 | 33,611 |
| Rural Major Collector | 21,964 | 41,981 | 36,401 | 28,674 |
| Rural Minor Collector | 9,229 | 17,639 | 15,294 | 12,048 |
| Rural Local | 34,059 | 65,098 | 56,446 | 44,464 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 22,576 | 39,287 | 35,398 | 29,612 |
| Urban Minor Arterial | 15,124 | 26,320 | 23,714 | 19,838 |

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|---|---|---|---|---|
| **MACON** | | | | |
| Urban Collector | 3,919 | 6,820 | 6,145 | 5,141 |
| Urban Local | 3,831 | 6,667 | 6,007 | 5,025 |
| **MADISON** | | | | |
| Rural Interstate | 27,008 | 51,622 | 44,760 | 35,259 |
| Rural Principal Arterial | 10,988 | 21,003 | 18,211 | 14,346 |
| Rural Minor Arterial | 23,034 | 44,027 | 38,175 | 30,072 |
| Rural Major Collector | 19,811 | 37,865 | 32,832 | 25,863 |
| Rural Minor Collector | 7,200 | 13,761 | 11,932 | 9,399 |
| Rural Local | 19,865 | 37,969 | 32,922 | 25,934 |
| Urban Interstate | 1 | 2 | 2 | 1 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,140 | 1,983 | 1,787 | 1,495 |
| **MARTIN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 57,627 | 110,146 | 95,505 | 75,233 |
| Rural Minor Arterial | 12,779 | 24,426 | 21,179 | 16,684 |
| Rural Major Collector | 31,367 | 59,953 | 51,984 | 40,950 |
| Rural Minor Collector | 8,664 | 16,561 | 14,360 | 11,312 |
| Rural Local | 19,847 | 37,934 | 32,892 | 25,910 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 2,445 | 4,255 | 3,834 | 3,207 |
| Urban Minor Arterial | 8,095 | 14,088 | 12,693 | 10,618 |
| Urban Collector | 289 | 504 | 454 | 380 |
| Urban Local | 3,778 | 6,574 | 5,923 | 4,955 |
| **MITCHELL** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 14,760 | 28,212 | 24,462 | 19,269 |
| Rural Minor Arterial | 2 | 3 | 3 | 2 |
| Rural Major Collector | 27,381 | 52,335 | 45,379 | 35,746 |
| Rural Minor Collector | 3,055 | 5,840 | 5,064 | 3,989 |
| Rural Local | 19,108 | 36,522 | 31,668 | 24,946 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **MITCHELL** | | | | |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 2,264 | 3,940 | 3,550 | 2,969 |
| **MONTGOMERY** | | | | |
| Rural Interstate | 8,399 | 16,054 | 13,920 | 10,965 |
| Rural Principal Arterial | 1,036 | 1,981 | 1,718 | 1,353 |
| Rural Minor Arterial | 39,806 | 76,083 | 65,970 | 51,967 |
| Rural Major Collector | 67,839 | 129,665 | 112,430 | 88,565 |
| Rural Minor Collector | 4,719 | 9,019 | 7,820 | 6,160 |
| Rural Local | 24,403 | 46,642 | 40,443 | 31,858 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 2,749 | 4,783 | 4,310 | 3,605 |
| **MOORE** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 30,558 | 58,408 | 50,644 | 39,894 |
| Rural Minor Arterial | 38,220 | 73,052 | 63,342 | 49,897 |
| Rural Major Collector | 76,159 | 145,568 | 126,219 | 99,427 |
| Rural Minor Collector | 24,051 | 45,969 | 39,859 | 31,398 |
| Rural Local | 47,664 | 91,103 | 78,994 | 62,226 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 19,859 | 34,559 | 31,138 | 26,048 |
| Urban Principal Arterial | 76,896 | 133,816 | 120,569 | 100,860 |
| Urban Minor Arterial | 65,655 | 114,255 | 102,944 | 86,117 |
| Urban Collector | 14,152 | 24,628 | 22,190 | 18,563 |
| Urban Local | 22,558 | 39,256 | 35,370 | 29,589 |
| **NEW HANOVER** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 29 | 56 | 48 | 38 |
| Rural Minor Arterial | 3,787 | 7,238 | 6,276 | 4,944 |
| Rural Major Collector | 1 | 2 | 2 | 1 |
| Rural Minor Collector | 3,301 | 6,310 | 5,472 | 4,310 |
| Rural Local | 74,248 | 141,914 | 123,051 | 96,931 |

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|---|---|---|---|---|
| **NEW HANOVER** | | | | |
| Urban Interstate | 52,100 | 90,665 | 81,690 | 68,337 |
| Urban Other Freeway/Expressway | 17,898 | 31,146 | 28,063 | 23,476 |
| Urban Principal Arterial | 367,676 | 639,839 | 576,497 | 482,263 |
| Urban Minor Arterial | 110,770 | 192,764 | 173,681 | 145,291 |
| Urban Collector | 24,140 | 42,010 | 37,851 | 31,664 |
| Urban Local | 119,731 | 208,358 | 187,731 | 157,045 |
| **NORTHAMPTON** | | | | |
| Rural Interstate | 32,754 | 62,604 | 54,283 | 42,761 |
| Rural Principal Arterial | 18,309 | 34,995 | 30,343 | 23,902 |
| Rural Minor Arterial | 16,515 | 31,565 | 27,370 | 21,560 |
| Rural Major Collector | 30,162 | 57,650 | 49,987 | 39,377 |
| Rural Minor Collector | 8,447 | 16,145 | 13,999 | 11,028 |
| Rural Local | 13,225 | 25,278 | 21,918 | 17,266 |
| Urban Interstate | 12,941 | 22,521 | 20,291 | 16,975 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 11,337 | 19,729 | 17,776 | 14,870 |
| Urban Minor Arterial | 4,049 | 7,047 | 6,349 | 5,311 |
| Urban Collector | 1 | 2 | 2 | 1 |
| Urban Local | 1,744 | 3,034 | 2,734 | 2,287 |
| **ONSLOW** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 108,411 | 207,212 | 179,670 | 141,532 |
| Rural Minor Arterial | 3,851 | 7,361 | 6,382 | 5,028 |
| Rural Major Collector | 71,143 | 135,980 | 117,906 | 92,878 |
| Rural Minor Collector | 18,052 | 34,504 | 29,918 | 23,567 |
| Rural Local | 138,507 | 264,736 | 229,548 | 180,823 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 32,647 | 56,812 | 51,188 | 42,821 |
| Urban Principal Arterial | 170,403 | 296,540 | 267,183 | 223,510 |
| Urban Minor Arterial | 95,166 | 165,611 | 149,216 | 124,825 |
| Urban Collector | 29,682 | 51,653 | 46,539 | 38,932 |
| Urban Local | 49,037 | 85,336 | 76,888 | 64,320 |
| **PAMLICO** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **PAMLICO** | | | | |
| Rural Major Collector | 43,379 | 82,913 | 71,893 | 56,632 |
| Rural Minor Collector | 6,484 | 12,393 | 10,745 | 8,465 |
| Rural Local | 8,880 | 16,972 | 14,716 | 11,593 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,547 | 2,691 | 2,425 | 2,029 |
| **PASQUOTANK** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 49,495 | 94,603 | 82,029 | 64,617 |
| Rural Minor Arterial | 5,324 | 10,176 | 8,823 | 6,950 |
| Rural Major Collector | 5,309 | 10,147 | 8,798 | 6,931 |
| Rural Minor Collector | 15,729 | 30,064 | 26,068 | 20,535 |
| Rural Local | 21,918 | 41,893 | 36,325 | 28,614 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 20,468 | 35,619 | 32,093 | 26,847 |
| Urban Minor Arterial | 23,829 | 41,468 | 37,363 | 31,256 |
| Urban Collector | 12,099 | 21,055 | 18,971 | 15,870 |
| Urban Local | 6,856 | 11,930 | 10,749 | 8,992 |
| **PENDER** | | | | |
| Rural Interstate | 96,683 | 184,795 | 160,232 | 126,220 |
| Rural Principal Arterial | 62,997 | 120,410 | 104,405 | 82,244 |
| Rural Minor Arterial | 17,896 | 34,206 | 29,660 | 23,364 |
| Rural Major Collector | 91,336 | 174,577 | 151,372 | 119,241 |
| Rural Minor Collector | 14,779 | 28,247 | 24,493 | 19,294 |
| Rural Local | 35,779 | 68,387 | 59,297 | 46,710 |
| Urban Interstate | 7 | 12 | 11 | 9 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 125 | 218 | 196 | 164 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 24 | 42 | 38 | 32 |
| Urban Local | 3,289 | 5,723 | 5,157 | 4,314 |

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|---|---|---|---|---|
| **PERQUIMANS** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 39,209 | 74,943 | 64,981 | 51,188 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |
| Rural Major Collector | 5,631 | 10,762 | 9,332 | 7,351 |
| Rural Minor Collector | 16,095 | 30,764 | 26,674 | 21,012 |
| Rural Local | 12,784 | 24,435 | 21,188 | 16,690 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 888 | 1,546 | 1,393 | 1,165 |
| **PERSON** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 9,808 | 18,746 | 16,254 | 12,804 |
| Rural Minor Arterial | 25,633 | 48,994 | 42,482 | 33,465 |
| Rural Major Collector | 24,839 | 47,476 | 41,165 | 32,427 |
| Rural Minor Collector | 19,249 | 36,792 | 31,902 | 25,130 |
| Rural Local | 34,981 | 66,861 | 57,974 | 45,668 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 25,768 | 44,841 | 40,402 | 33,798 |
| Urban Minor Arterial | 5,845 | 10,172 | 9,165 | 7,667 |
| Urban Collector | 6,312 | 10,985 | 9,898 | 8,280 |
| Urban Local | 2,802 | 4,877 | 4,394 | 3,676 |
| **PITT** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 54,288 | 103,764 | 89,972 | 70,874 |
| Rural Minor Arterial | 46,140 | 88,190 | 76,468 | 60,236 |
| Rural Major Collector | 92,098 | 176,032 | 152,634 | 120,235 |
| Rural Minor Collector | 25,067 | 47,912 | 41,544 | 32,726 |
| Rural Local | 73,338 | 140,176 | 121,544 | 95,744 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 16,396 | 28,532 | 25,708 | 21,505 |
| Urban Principal Arterial | 147,165 | 256,100 | 230,747 | 193,029 |
| Urban Minor Arterial | 128,756 | 224,064 | 201,882 | 168,883 |

| | | | | |
|---|---|---|---|---|
| **PITT** | | | | |
| Urban Collector | 20,938 | 36,436 | 32,829 | 27,463 |
| Urban Local | 43,427 | 75,573 | 68,091 | 56,961 |
| **POLK** | | | | |
| Rural Interstate | 71,102 | 135,900 | 117,837 | 92,824 |
| Rural Principal Arterial | 26,424 | 50,506 | 43,793 | 34,497 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |
| Rural Major Collector | 26,791 | 51,207 | 44,401 | 34,976 |
| Rural Minor Collector | 9,645 | 18,434 | 15,984 | 12,591 |
| Rural Local | 15,417 | 29,467 | 25,550 | 20,127 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,938 | 3,372 | 3,038 | 2,542 |
| **RANDOLPH** | | | | |
| Rural Interstate | 25,063 | 47,904 | 41,537 | 32,720 |
| Rural Principal Arterial | 127,035 | 242,810 | 210,536 | 165,846 |
| Rural Minor Arterial | 30,119 | 57,568 | 49,916 | 39,321 |
| Rural Major Collector | 93,344 | 178,413 | 154,699 | 121,862 |
| Rural Minor Collector | 37,184 | 71,072 | 61,625 | 48,544 |
| Rural Local | 131,767 | 251,855 | 218,379 | 172,024 |
| Urban Interstate | 88,245 | 153,566 | 138,364 | 115,747 |
| Urban Other Freeway/Expressway | 102,571 | 178,496 | 160,826 | 134,537 |
| Urban Principal Arterial | 119,194 | 207,423 | 186,889 | 156,340 |
| Urban Minor Arterial | 74,391 | 129,457 | 116,642 | 97,575 |
| Urban Collector | 27,400 | 47,683 | 42,963 | 35,940 |
| Urban Local | 26,953 | 46,905 | 42,262 | 35,353 |
| **RICHMOND** | | | | |
| Rural Interstate | 6 | 11 | 10 | 8 |
| Rural Principal Arterial | 39,404 | 75,314 | 65,304 | 51,442 |
| Rural Minor Arterial | 12,783 | 24,433 | 21,185 | 16,688 |
| Rural Major Collector | 15,348 | 29,336 | 25,437 | 20,037 |
| Rural Minor Collector | 2,343 | 4,479 | 3,883 | 3,059 |
| Rural Local | 32,875 | 62,835 | 54,483 | 42,918 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 39,115 | 68,068 | 61,330 | 51,305 |

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|---|---|---|---|---|
| **RICHMOND** | | | | |
| Urban Principal Arterial | 40,385 | 70,279 | 63,322 | 52,971 |
| Urban Minor Arterial | 19,430 | 33,812 | 30,465 | 25,485 |
| Urban Collector | 12,323 | 21,445 | 19,322 | 16,163 |
| Urban Local | 7,728 | 13,449 | 12,117 | 10,137 |
| **ROBESON** | | | | |
| Rural Interstate | 162,186 | 309,995 | 268,791 | 211,736 |
| Rural Principal Arterial | 46,689 | 89,240 | 77,378 | 60,954 |
| Rural Minor Arterial | 20,066 | 38,354 | 33,256 | 26,197 |
| Rural Major Collector | 165,227 | 315,809 | 273,832 | 215,707 |
| Rural Minor Collector | 51,893 | 99,186 | 86,003 | 67,747 |
| Rural Local | 89,605 | 171,268 | 148,503 | 116,981 |
| Urban Interstate | 82,591 | 143,727 | 129,499 | 108,331 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 52,926 | 92,102 | 82,985 | 69,420 |
| Urban Minor Arterial | 22,965 | 39,964 | 36,008 | 30,122 |
| Urban Collector | 20,129 | 35,029 | 31,561 | 26,402 |
| Urban Local | 20,915 | 36,397 | 32,794 | 27,434 |
| **ROCKINGHAM** | | | | |
| Rural Interstate | 1,217 | 2,326 | 2,016 | 1,588 |
| Rural Principal Arterial | 93,549 | 178,806 | 155,039 | 122,130 |
| Rural Minor Arterial | 41,423 | 79,175 | 68,651 | 54,079 |
| Rural Major Collector | 75,213 | 143,758 | 124,650 | 98,191 |
| Rural Minor Collector | 33,668 | 64,352 | 55,798 | 43,954 |
| Rural Local | 60,553 | 115,738 | 100,354 | 79,053 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 10,957 | 19,068 | 17,180 | 14,372 |
| Urban Principal Arterial | 36,254 | 63,091 | 56,845 | 47,553 |
| Urban Minor Arterial | 49,882 | 86,806 | 78,212 | 65,428 |
| Urban Collector | 4,645 | 8,084 | 7,284 | 6,093 |
| Urban Local | 18,573 | 32,321 | 29,121 | 24,361 |
| **RUTHERFORD** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 34,288 | 65,536 | 56,825 | 44,763 |
| Rural Minor Arterial | 27,792 | 53,121 | 46,060 | 36,283 |
| Rural Major Collector | 14,442 | 27,604 | 23,935 | 18,855 |
| Rural Minor Collector | 20,342 | 38,882 | 33,713 | 26,557 |
| Rural Local | 87,343 | 166,944 | 144,754 | 114,027 |

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|---|---|---|---|---|
| **RUTHERFORD** | | | | |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 37,609 | 65,449 | 58,970 | 49,330 |
| Urban Minor Arterial | 39,067 | 67,986 | 61,255 | 51,242 |
| Urban Collector | 14,902 | 25,933 | 23,366 | 19,546 |
| Urban Local | 17,380 | 30,245 | 27,251 | 22,796 |
| **SAMPSON** | | | | |
| Rural Interstate | 68,911 | 131,713 | 114,206 | 89,964 |
| Rural Principal Arterial | 36,955 | 70,634 | 61,245 | 48,245 |
| Rural Minor Arterial | 72,661 | 138,881 | 120,421 | 94,860 |
| Rural Major Collector | 44,135 | 84,357 | 73,144 | 57,618 |
| Rural Minor Collector | 36,270 | 69,325 | 60,111 | 47,351 |
| Rural Local | 56,535 | 108,058 | 93,695 | 73,807 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 7,755 | 13,496 | 12,160 | 10,172 |
| Urban Principal Arterial | 18,004 | 31,331 | 28,229 | 23,615 |
| Urban Minor Arterial | 6,795 | 11,825 | 10,654 | 8,913 |
| Urban Collector | 9,904 | 17,236 | 15,529 | 12,991 |
| Urban Local | 5,348 | 9,306 | 8,385 | 7,014 |
| **SCOTLAND** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 49,364 | 94,353 | 81,812 | 64,446 |
| Rural Minor Arterial | 23,976 | 45,826 | 39,735 | 31,301 |
| Rural Major Collector | 15,845 | 30,286 | 26,260 | 20,686 |
| Rural Minor Collector | 10,962 | 20,953 | 18,168 | 14,312 |
| Rural Local | 20,553 | 39,284 | 34,063 | 26,832 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 14,064 | 24,475 | 22,052 | 18,447 |
| Urban Principal Arterial | 26,639 | 46,359 | 41,769 | 34,942 |
| Urban Minor Arterial | 8,390 | 14,601 | 13,155 | 11,005 |
| Urban Collector | 6,787 | 11,810 | 10,641 | 8,902 |
| Urban Local | 7,133 | 12,413 | 11,184 | 9,356 |
| **STANLY** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 32,784 | 62,662 | 54,333 | 42,800 |
| Rural Minor Arterial | 28,436 | 54,352 | 47,127 | 37,124 |

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|---|---|---|---|---|
| **STANLY** | | | | |
| Rural Major Collector | 45,050 | 86,107 | 74,662 | 58,814 |
| Rural Minor Collector | 16,636 | 31,797 | 27,571 | 21,718 |
| Rural Local | 38,784 | 74,130 | 64,277 | 50,633 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 31,529 | 54,868 | 49,436 | 41,355 |
| Urban Minor Arterial | 17,363 | 30,215 | 27,224 | 22,774 |
| Urban Collector | 7,505 | 13,060 | 11,767 | 9,843 |
| Urban Local | 14,410 | 25,077 | 22,595 | 18,901 |
| **STOKES** | | | | |
| Rural Interstate | 15 | 28 | 24 | 19 |
| Rural Principal Arterial | 21,379 | 40,863 | 35,431 | 27,910 |
| Rural Minor Arterial | 15,516 | 29,657 | 25,715 | 20,257 |
| Rural Major Collector | 35,744 | 68,320 | 59,239 | 46,664 |
| Rural Minor Collector | 22,291 | 42,607 | 36,943 | 29,102 |
| Rural Local | 59,615 | 113,946 | 98,801 | 77,829 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 11,172 | 19,442 | 17,518 | 14,654 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 5,471 | 9,521 | 8,578 | 7,176 |
| Urban Collector | 11,251 | 19,580 | 17,641 | 14,758 |
| Urban Local | 4,439 | 7,726 | 6,961 | 5,823 |
| **SURRY** | | | | |
| Rural Interstate | 130,836 | 250,075 | 216,836 | 170,809 |
| Rural Principal Arterial | 59,860 | 114,413 | 99,205 | 78,148 |
| Rural Minor Arterial | 43,793 | 83,705 | 72,579 | 57,173 |
| Rural Major Collector | 49,057 | 93,766 | 81,302 | 64,045 |
| Rural Minor Collector | 26,784 | 51,193 | 44,389 | 34,966 |
| Rural Local | 98,705 | 188,662 | 163,585 | 128,861 |
| Urban Interstate | 2,134 | 3,714 | 3,346 | 2,799 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 20,870 | 36,318 | 32,723 | 27,374 |
| Urban Minor Arterial | 32,499 | 56,555 | 50,956 | 42,627 |
| Urban Collector | 11,410 | 19,856 | 17,890 | 14,966 |
| Urban Local | 14,567 | 25,350 | 22,841 | 19,107 |

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|---|---|---|---|---|
| **SWAIN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 22,021 | 42,090 | 36,496 | 28,749 |
| Rural Minor Arterial | 24,699 | 47,208 | 40,933 | 32,244 |
| Rural Major Collector | 24,304 | 46,453 | 40,278 | 31,729 |
| Rural Minor Collector | 1,445 | 2,761 | 2,394 | 1,886 |
| Rural Local | 28,876 | 55,193 | 47,857 | 37,699 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,924 | 3,348 | 3,016 | 2,523 |
| **TRANSYLVANIA** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 385 | 736 | 639 | 503 |
| Rural Minor Arterial | 33,070 | 63,208 | 54,807 | 43,173 |
| Rural Major Collector | 8,591 | 16,421 | 14,239 | 11,216 |
| Rural Minor Collector | 4,076 | 7,790 | 6,754 | 5,321 |
| Rural Local | 16,544 | 31,622 | 27,419 | 21,599 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 33,945 | 59,072 | 53,224 | 44,524 |
| Urban Minor Arterial | 9,203 | 16,015 | 14,429 | 12,071 |
| Urban Collector | 5,110 | 8,892 | 8,012 | 6,702 |
| Urban Local | 2,804 | 4,880 | 4,397 | 3,678 |
| **TYRRELL** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 21,903 | 41,864 | 36,299 | 28,594 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |
| Rural Major Collector | 4,469 | 8,542 | 7,407 | 5,835 |
| Rural Minor Collector | 1,971 | 3,767 | 3,266 | 2,573 |
| Rural Local | 4,509 | 8,618 | 7,472 | 5,886 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **TYRRELL** | | | | |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 166 | 289 | 260 | 218 |
| **VANCE** | | | | |
| Rural Interstate | 52,869 | 101,051 | 87,619 | 69,021 |
| Rural Principal Arterial | 18,473 | 35,309 | 30,616 | 24,117 |
| Rural Minor Arterial | 3,357 | 6,417 | 5,564 | 4,383 |
| Rural Major Collector | 33,921 | 64,836 | 56,218 | 44,285 |
| Rural Minor Collector | 14,232 | 27,202 | 23,586 | 18,580 |
| Rural Local | 25,551 | 48,836 | 42,345 | 33,357 |
| Urban Interstate | 22,729 | 39,554 | 35,639 | 29,813 |
| Urban Other Freeway/Expressway | 10,340 | 17,993 | 16,212 | 13,562 |
| Urban Principal Arterial | 17,508 | 30,467 | 27,451 | 22,964 |
| Urban Minor Arterial | 19,805 | 34,465 | 31,053 | 25,977 |
| Urban Collector | 13,334 | 23,204 | 20,907 | 17,489 |
| Urban Local | 8,918 | 15,520 | 13,984 | 11,698 |
| **WARREN** | | | | |
| Rural Interstate | 40,656 | 77,709 | 67,380 | 53,077 |
| Rural Principal Arterial | 15,664 | 29,940 | 25,961 | 20,450 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |
| Rural Major Collector | 29,534 | 56,450 | 48,947 | 38,557 |
| Rural Minor Collector | 4,399 | 8,408 | 7,291 | 5,743 |
| Rural Local | 23,442 | 44,806 | 38,850 | 30,604 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 825 | 1,436 | 1,294 | 1,083 |
| **WASHINGTON** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 32,541 | 62,197 | 53,930 | 42,483 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |
| Rural Major Collector | 26,460 | 50,574 | 43,852 | 34,544 |
| Rural Minor Collector | 5,075 | 9,700 | 8,410 | 6,625 |
| Rural Local | 7,454 | 14,247 | 12,353 | 9,731 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **WASHINGTON** | | | | |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,210 | 2,106 | 1,897 | 1,587 |
| **WATAUGA** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 58,433 | 111,687 | 96,842 | 76,286 |
| Rural Minor Arterial | 11,273 | 21,547 | 18,683 | 14,717 |
| Rural Major Collector | 10,904 | 20,841 | 18,071 | 14,235 |
| Rural Minor Collector | 2,871 | 5,488 | 4,759 | 3,749 |
| Rural Local | 63,206 | 120,809 | 104,751 | 82,516 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 45,427 | 79,054 | 71,228 | 59,585 |
| Urban Minor Arterial | 3,008 | 5,234 | 4,716 | 3,945 |
| Urban Collector | 7,772 | 13,525 | 12,186 | 10,194 |
| Urban Local | 19,014 | 33,089 | 29,813 | 24,940 |
| **WAYNE** | | | | |
| Rural Interstate | 16,789 | 32,090 | 27,825 | 21,918 |
| Rural Principal Arterial | 38,514 | 73,614 | 63,829 | 50,281 |
| Rural Minor Arterial | 19,616 | 37,493 | 32,510 | 25,609 |
| Rural Major Collector | 57,339 | 109,595 | 95,028 | 74,857 |
| Rural Minor Collector | 28,339 | 54,165 | 46,966 | 36,996 |
| Rural Local | 76,537 | 146,290 | 126,846 | 99,921 |
| Urban Interstate | 9,877 | 17,188 | 15,487 | 12,955 |
| Urban Other Freeway/Expressway | 43,081 | 74,971 | 67,549 | 56,508 |
| Urban Principal Arterial | 64,687 | 112,571 | 101,427 | 84,847 |
| Urban Minor Arterial | 92,764 | 161,431 | 145,450 | 121,674 |
| Urban Collector | 22,369 | 38,927 | 35,073 | 29,340 |
| Urban Local | 26,017 | 45,275 | 40,793 | 34,125 |
| **WILKES** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 38,417 | 73,429 | 63,669 | 50,154 |
| Rural Minor Arterial | 24,877 | 47,549 | 41,229 | 32,477 |
| Rural Major Collector | 43,448 | 83,044 | 72,006 | 56,722 |
| Rural Minor Collector | 24,240 | 46,331 | 40,173 | 31,645 |
| Rural Local | 83,625 | 159,838 | 138,593 | 109,174 |

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|---|---|---|---|---|
| **WILKES** | | | | |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 17,350 | 30,194 | 27,205 | 22,758 |
| Urban Principal Arterial | 31,772 | 55,290 | 49,816 | 41,673 |
| Urban Minor Arterial | 38,125 | 66,346 | 59,778 | 50,006 |
| Urban Collector | 14,381 | 25,025 | 22,548 | 18,862 |
| Urban Local | 5,782 | 10,062 | 9,066 | 7,584 |
| **WILSON** | | | | |
| Rural Interstate | 124,437 | 237,844 | 206,230 | 162,455 |
| Rural Principal Arterial | 96,242 | 183,952 | 159,502 | 125,645 |
| Rural Minor Arterial | 30,046 | 57,430 | 49,796 | 39,226 |
| Rural Major Collector | 45,101 | 86,203 | 74,745 | 58,879 |
| Rural Minor Collector | 17,393 | 33,244 | 28,825 | 22,707 |
| Rural Local | 29,432 | 56,255 | 48,778 | 38,424 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 3,338 | 5,808 | 5,233 | 4,378 |
| Urban Principal Arterial | 61,001 | 106,155 | 95,646 | 80,012 |
| Urban Minor Arterial | 41,546 | 72,299 | 65,142 | 54,494 |
| Urban Collector | 8,338 | 14,511 | 13,074 | 10,937 |
| Urban Local | 18,217 | 31,701 | 28,563 | 23,894 |
| **YADKIN** | | | | |
| Rural Interstate | 62,472 | 119,407 | 103,536 | 81,559 |
| Rural Principal Arterial | 60,570 | 115,771 | 100,383 | 79,075 |
| Rural Minor Arterial | 17,433 | 33,321 | 28,892 | 22,759 |
| Rural Major Collector | 30,221 | 57,762 | 50,085 | 39,453 |
| Rural Minor Collector | 32,689 | 62,481 | 54,176 | 42,676 |
| Rural Local | 44,646 | 85,334 | 73,991 | 58,286 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 2,687 | 4,676 | 4,213 | 3,524 |
| Urban Collector | 934 | 1,625 | 1,464 | 1,225 |
| Urban Local | 4,586 | 7,980 | 7,190 | 6,015 |
| **YANCEY** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 34,190 | 65,349 | 56,663 | 44,635 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |

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|---|---|---|---|---|
| **YANCEY** | | | | |
| Rural Major Collector | 14,384 | 27,493 | 23,839 | 18,778 |
| Rural Minor Collector | 6,302 | 12,044 | 10,444 | 8,227 |
| Rural Local | 24,648 | 47,111 | 40,849 | 32,178 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 0 | 0 | 0 | 0 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,107 | 1,926 | 1,736 | 1,452 |
| **CABARRUS** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 35,590 | 45,488 | 39,921 | 27,589 |
| Rural Minor Arterial | 55,153 | 60,964 | 60,239 | 37,029 |
| Rural Major Collector | 88,577 | 109,884 | 97,705 | 61,841 |
| Rural Minor Collector | 54,612 | 66,600 | 68,885 | 34,980 |
| Rural Local | 101,446 | 143,465 | 121,634 | 76,834 |
| Urban Interstate | 283,042 | 367,096 | 303,343 | 210,124 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 185,520 | 271,057 | 215,244 | 159,960 |
| Urban Minor Arterial | 184,188 | 275,476 | 209,216 | 153,644 |
| Urban Collector | 138,778 | 208,125 | 167,772 | 97,350 |
| Urban Local | 192,063 | 303,586 | 226,183 | 149,993 |
| **GASTON** | | | | |
| Rural Interstate | 38,049 | 43,969 | 40,960 | 25,380 |
| Rural Principal Arterial | 56,191 | 58,932 | 59,554 | 36,764 |
| Rural Minor Arterial | 64,646 | 77,620 | 70,228 | 42,629 |
| Rural Major Collector | 79,524 | 99,964 | 94,267 | 59,854 |
| Rural Minor Collector | 40,572 | 46,092 | 49,579 | 24,774 |
| Rural Local | 71,279 | 99,584 | 87,569 | 53,901 |
| Urban Interstate | 461,227 | 554,059 | 495,307 | 338,729 |
| Urban Other Freeway/Expressway | 24,176 | 28,961 | 25,039 | 17,693 |
| Urban Principal Arterial | 274,039 | 380,351 | 311,777 | 218,210 |
| Urban Minor Arterial | 209,453 | 302,066 | 247,573 | 170,942 |
| Urban Collector | 57,397 | 78,510 | 70,128 | 40,842 |
| Urban Local | 203,415 | 324,067 | 238,718 | 168,607 |

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|---|---|---|---|---|
| **IREDELL** | | | | |
| Rural Interstate | 57,107 | 73,775 | 58,830 | 38,418 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 17,581 | 27,805 | 19,409 | 17,810 |
| Rural Major Collector | 38,351 | 56,035 | 43,800 | 31,757 |
| Rural Minor Collector | 48,689 | 67,453 | 56,490 | 32,699 |
| Rural Local | 101,262 | 152,561 | 118,678 | 77,971 |
| Urban Interstate | 214,263 | 297,168 | 228,933 | 168,484 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 31,526 | 51,921 | 36,821 | 29,673 |
| Urban Minor Arterial | 41,103 | 65,287 | 46,496 | 36,750 |
| Urban Collector | 46,316 | 77,174 | 53,670 | 40,775 |
| Urban Local | 85,967 | 147,751 | 103,374 | 67,503 |
| **LINCOLN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 21,699 | 27,686 | 23,150 | 15,289 |
| Rural Minor Arterial | 73,615 | 99,011 | 75,993 | 59,912 |
| Rural Major Collector | 50,912 | 64,500 | 58,065 | 36,492 |
| Rural Minor Collector | 55,394 | 62,958 | 63,791 | 33,620 |
| Rural Local | 146,290 | 205,018 | 171,165 | 106,525 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 53,403 | 61,079 | 57,768 | 33,509 |
| Urban Principal Arterial | 16,751 | 24,721 | 18,224 | 15,245 |
| Urban Minor Arterial | 71,910 | 102,964 | 78,198 | 63,088 |
| Urban Collector | 17,557 | 24,771 | 21,089 | 13,039 |
| Urban Local | 41,412 | 65,887 | 48,569 | 34,905 |
| **MECKLENBURG** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 37,607 | 45,986 | 42,338 | 27,117 |
| Rural Minor Arterial | 17,023 | 20,700 | 19,749 | 13,711 |
| Rural Major Collector | 16,862 | 22,570 | 19,703 | 10,535 |
| Rural Minor Collector | 32,474 | 40,495 | 41,432 | 20,832 |
| Rural Local | 66,263 | 89,945 | 81,369 | 42,693 |
| Urban Interstate | 1,736,609 | 2,268,124 | 1,919,704 | 1,315,657 |
| Urban Other Freeway/Expressway | 1,110,226 | 1,389,995 | 1,282,080 | 723,369 |
| Urban HOV | 17,763 | 374 | 7,595 | 0 |
| Urban Principal Arterial | 1,111,629 | 1,680,204 | 1,284,698 | 944,660 |

| | | | | |
|---|---|---|---|---|
| **MECKLENBURG** | | | | |
| Urban Minor Arterial | 1,024,878 | 1,553,321 | 1,202,756 | 841,426 |
| Urban Collector | 806,596 | 1,207,264 | 941,722 | 642,619 |
| Urban Local | 1,459,707 | 2,340,210 | 1,736,882 | 1,126,041 |
| **ROWAN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 36,101 | 45,300 | 39,563 | 24,517 |
| Rural Minor Arterial | 22,610 | 30,033 | 24,912 | 18,409 |
| Rural Major Collector | 123,341 | 144,775 | 135,528 | 88,766 |
| Rural Minor Collector | 84,315 | 93,772 | 95,299 | 48,814 |
| Rural Local | 121,685 | 163,400 | 140,307 | 91,899 |
| Urban Interstate | 341,925 | 417,675 | 370,880 | 240,733 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 111,275 | 161,461 | 125,307 | 90,514 |
| Urban Minor Arterial | 123,333 | 186,268 | 141,648 | 104,011 |
| Urban Collector | 120,897 | 168,487 | 141,612 | 89,811 |
| Urban Local | 165,261 | 261,977 | 193,655 | 132,090 |
| **UNION** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 66,095 | 90,044 | 70,912 | 50,153 |
| Rural Minor Arterial | 23,799 | 29,708 | 26,926 | 16,955 |
| Rural Major Collector | 234,097 | 321,432 | 262,696 | 180,874 |
| Rural Minor Collector | 70,306 | 90,025 | 80,488 | 47,643 |
| Rural Local | 256,808 | 348,000 | 301,414 | 176,137 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 21,816 | 28,689 | 21,557 | 15,528 |
| Urban Principal Arterial | 140,826 | 202,346 | 155,696 | 114,362 |
| Urban Minor Arterial | 95,737 | 145,234 | 110,355 | 87,736 |
| Urban Collector | 112,734 | 161,729 | 129,913 | 81,712 |
| Urban Local | 204,051 | 314,213 | 240,419 | 163,392 |
| **CHATHAM** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 125,210 | 135,021 | 166,674 | 92,223 |
| Rural Minor Arterial | 10,836 | 14,501 | 17,329 | 9,905 |
| Rural Major Collector | 66,671 | 78,539 | 104,132 | 53,645 |
| Rural Minor Collector | 7,237 | 10,355 | 11,828 | 7,073 |
| Rural Local | 50,821 | 64,116 | 85,532 | 43,793 |
| Urban Interstate | 0 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| **CHATHAM** | | | | |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 7,006 | 7,590 | 9,162 | 5,721 |
| Urban Minor Arterial | 833 | 1,057 | 1,376 | 796 |
| Urban Collector | 2,666 | 2,994 | 4,542 | 2,256 |
| Urban Local | 139 | 221 | 222 | 166 |
| **DURHAM** | | | | |
| Rural Interstate | 41,255 | 43,151 | 53,589 | 29,473 |
| Rural Principal Arterial | 8,453 | 10,436 | 11,066 | 7,128 |
| Rural Minor Arterial | 40,171 | 40,499 | 50,640 | 27,662 |
| Rural Major Collector | 55,109 | 59,130 | 80,109 | 40,387 |
| Rural Minor Collector | 22,082 | 24,656 | 32,599 | 16,841 |
| Rural Local | 26,544 | 31,106 | 47,274 | 21,246 |
| Urban Interstate | 493,549 | 610,545 | 671,976 | 460,183 |
| Urban Other Freeway/Expressway | 320,433 | 380,894 | 453,358 | 287,090 |
| Urban Principal Arterial | 245,321 | 297,721 | 340,152 | 224,400 |
| Urban Minor Arterial | 315,625 | 422,133 | 518,730 | 318,173 |
| Urban Collector | 119,318 | 156,312 | 209,844 | 117,816 |
| Urban Local | 225,973 | 334,128 | 418,299 | 251,841 |
| **ORANGE** | | | | |
| Rural Interstate | 243,886 | 326,052 | 331,100 | 222,703 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 36,470 | 39,163 | 48,320 | 26,750 |
| Rural Major Collector | 67,019 | 86,551 | 108,613 | 59,117 |
| Rural Minor Collector | 50,636 | 61,950 | 79,140 | 42,314 |
| Rural Local | 44,585 | 57,085 | 75,284 | 38,991 |
| Urban Interstate | 179,972 | 219,332 | 257,383 | 165,316 |
| Urban Other Freeway/Expressway | 42,238 | 51,965 | 58,160 | 39,168 |
| Urban Principal Arterial | 110,515 | 141,068 | 153,976 | 106,327 |
| Urban Minor Arterial | 99,413 | 126,898 | 164,598 | 95,646 |
| Urban Collector | 22,844 | 33,097 | 44,377 | 24,946 |
| Urban Local | 58,822 | 86,029 | 109,683 | 64,842 |
| **WAKE** | | | | |
| Rural Interstate | 14,672 | 17,632 | 29,275 | 12,043 |
| Rural Principal Arterial | 53,465 | 55,119 | 70,992 | 37,648 |
| Rural Minor Arterial | 23,839 | 26,477 | 38,804 | 18,085 |
| Rural Major Collector | 39,049 | 41,609 | 51,064 | 28,420 |

| | | | | |
|---|---|---|---|---|
| **WAKE** | | | | |
| Rural Minor Collector | 18,482 | 19,586 | 31,274 | 13,378 |
| Rural Local | 52,333 | 60,374 | 96,970 | 41,238 |
| Urban Interstate | 1,544,267 | 1,807,044 | 2,108,059 | 1,362,016 |
| Urban Other Freeway/Expressway | 499,329 | 539,117 | 710,404 | 406,346 |
| Urban Principal Arterial | 1,152,837 | 1,433,478 | 1,665,360 | 1,080,450 |
| Urban Minor Arterial | 1,212,659 | 1,540,702 | 1,947,914 | 1,161,268 |
| Urban Collector | 500,159 | 602,157 | 836,279 | 453,861 |
| Urban Local | 1,021,962 | 1,349,670 | 1,838,887 | 1,017,281 |
| **FRANKLIN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 54,899 | 56,677 | 71,892 | 38,712 |
| Rural Minor Arterial | 51,759 | 55,563 | 68,482 | 37,951 |
| Rural Major Collector | 47,318 | 52,780 | 71,618 | 36,050 |
| Rural Minor Collector | 42,990 | 48,262 | 60,686 | 32,965 |
| Rural Local | 34,632 | 44,771 | 57,872 | 30,580 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 29,262 | 32,269 | 39,469 | 24,322 |
| Urban Minor Arterial | 19,099 | 23,737 | 28,514 | 17,891 |
| Urban Collector | 4,179 | 4,914 | 5,904 | 3,704 |
| Urban Local | 11,355 | 14,961 | 19,893 | 11,277 |
| **GRANVILLE** | | | | |
| Rural Interstate | 121,583 | 121,881 | 151,963 | 83,248 |
| Rural Principal Arterial | 0 | 0 | 0 | 0 |
| Rural Minor Arterial | 0 | 0 | 0 | 0 |
| Rural Major Collector | 83,247 | 92,249 | 113,607 | 63,009 |
| Rural Minor Collector | 31,255 | 28,241 | 46,005 | 19,290 |
| Rural Local | 29,251 | 35,123 | 46,477 | 23,990 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 0 | 0 | 0 | 0 |
| Urban Minor Arterial | 2,214 | 2,127 | 2,423 | 1,603 |
| Urban Collector | 11,060 | 11,818 | 14,619 | 8,907 |
| Urban Local | 0 | 0 | 0 | 0 |
| **JOHNSTON** | | | | |
| Rural Interstate | 136,204 | 160,349 | 181,776 | 109,523 |

| | | | | |
|---|---|---|---|---|
| **JOHNSTON** | | | | |
| Rural Principal Arterial | 87,457 | 102,534 | 110,709 | 70,034 |
| Rural Minor Arterial | 13,346 | 15,155 | 16,834 | 10,352 |
| Rural Major Collector | 154,204 | 170,403 | 223,614 | 116,391 |
| Rural Minor Collector | 39,517 | 45,501 | 62,911 | 31,079 |
| Rural Local | 124,434 | 150,015 | 203,442 | 102,464 |
| Urban Interstate | 40,954 | 46,134 | 53,997 | 34,773 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 49,997 | 58,650 | 62,525 | 44,206 |
| Urban Minor Arterial | 36,248 | 44,415 | 50,855 | 33,477 |
| Urban Collector | 21,441 | 24,869 | 35,864 | 18,744 |
| Urban Local | 50,363 | 63,465 | 90,365 | 47,836 |
| **FRANKLIN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 13,286 | 25,395 | 22,019 | 17,345 |
| Rural Minor Arterial | 15,242 | 29,132 | 25,260 | 19,898 |
| Rural Major Collector | 16,545 | 31,623 | 27,420 | 21,599 |
| Rural Minor Collector | 7,783 | 14,876 | 12,899 | 10,161 |
| Rural Local | 5,776 | 11,040 | 9,573 | 7,541 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Expressway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 1,990 | 3,464 | 3,121 | 2,611 |
| Urban Minor Arterial | 2,277 | 3,962 | 3,570 | 2,986 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,104 | 1,922 | 1,732 | 1,449 |

**Table 4.2.13-2 Non-Modeled VMT with Time Periods per County**

| Road Type | AM Peak | Midday | PM Peak | Night |
|---|---|---|---|---|
| **FRANKLIN** | | | | |
| Rural Interstate | 0 | 0 | 0 | 0 |
| Rural Principal Arterial | 13,286 | 25,395 | 22,019 | 17,345 |
| Rural Minor Arterial | 15,242 | 29,132 | 25,260 | 19,898 |
| Rural Major Collector | 16,545 | 31,623 | 27,420 | 21,599 |
| Rural Minor Collector | 7,783 | 14,876 | 12,899 | 10,161 |
| Rural Local | 5,776 | 11,040 | 9,573 | 7,541 |
| Urban Interstate | 0 | 0 | 0 | 0 |
| Urban Other Freeway/Xprway | 0 | 0 | 0 | 0 |

| | | | | |
|---|---|---|---|---|
| **FRANKLIN** | | | | |
| Urban Principal Arterial | 1,990 | 3,464 | 3,121 | 2,611 |
| Urban Minor Arterial | 2,277 | 3,962 | 3,570 | 2,986 |
| Urban Collector | 0 | 0 | 0 | 0 |
| Urban Local | 1,104 | 1,922 | 1,732 | 1,449 |
| **GRANVILLE** | | | | |
| Rural Interstate | 54,227 | 103,647 | 89,870 | 70,794 |
| Rural Principal Arterial | 2,783 | 5,319 | 4,612 | 3,633 |
| Rural Minor Arterial | 6,135 | 11,726 | 10,167 | 8,009 |
| Rural Major Collector | 38,725 | 74,017 | 64,179 | 50,556 |
| Rural Minor Collector | 11,783 | 22,522 | 19,528 | 15,383 |
| Rural Local | 8,811 | 16,841 | 14,603 | 11,503 |
| Urban Interstate | 9,853 | 17,146 | 15,448 | 12,923 |
| Urban Other Freeway/Xprway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 7,064 | 12,293 | 11,076 | 9,265 |
| Urban Minor Arterial | 7,499 | 13,051 | 11,759 | 9,837 |
| Urban Collector | 4,883 | 8,497 | 7,656 | 6,405 |
| Urban Local | 2,220 | 3,863 | 3,480 | 2,911 |
| **JOHNSTON** | | | | |
| Rural Interstate | 139,607 | 266,839 | 231,371 | 182,259 |
| Rural Principal Arterial | 52,339 | 100,039 | 86,742 | 68,330 |
| Rural Minor Arterial | 16,589 | 31,708 | 27,494 | 21,658 |
| Rural Major Collector | 65,622 | 125,426 | 108,755 | 85,670 |
| Rural Minor Collector | 16,915 | 32,331 | 28,034 | 22,083 |
| Rural Local | 33,282 | 63,615 | 55,159 | 43,451 |
| Urban Interstate | 25,349 | 44,113 | 39,746 | 33,249 |
| Urban Other Freeway/Xprway | 0 | 0 | 0 | 0 |
| Urban Principal Arterial | 13,849 | 24,101 | 21,715 | 18,166 |
| Urban Minor Arterial | 4,864 | 8,465 | 7,627 | 6,380 |
| Urban Collector | 6,156 | 10,713 | 9,652 | 8,074 |
| Urban Local | 4,059 | 7,063 | 6,364 | 5,324 |

**Table 4.2.13-3 Non-Modeled Average Daily VMT per County**

| Road Type | Non-Modeled VMT |
|---|---|
| **CATAWBA** | |
| Rural Interstate | 26,332 |
| Rural Other Principal Arterial | 41,066 |
| Rural Minor Arterial | 66,500 |
| Rural Major Collector | 33,481 |
| Rural Minor Collector | 56,032 |
| Rural Local | 35,332 |
| Urban Interstate | 126,953 |
| Urban Freeway or Expressway | 40,958 |
| Urban Other Principal Arterial | 134,218 |
| Urban Minor Arterial | 107,192 |
| Urban Collector | 26,045 |
| Urban Local | 93,110 |
| **DAVIDSON** | |
| Rural Interstate | 218,923 |
| Rural Other Principal Arterial | 36,407 |
| Rural Minor Arterial | 174,147 |
| Rural Major Collector | 219,915 |
| Rural Minor Collector | 145,533 |
| Rural Local | 86,258 |
| Urban Interstate | 301,290 |
| Urban Freeway or Expressway | 263,615 |
| Urban Other Principal Arterial | 237,961 |
| Urban Minor Arterial | 221,497 |
| Urban Collector | 98,917 |
| Urban Local | 85,688 |
| **EDCOMBE** | |
| Rural Interstate | 0 |
| Rural Other Principal Arterial | 384,949 |
| Rural Minor Arterial | 134,831 |
| Rural Major Collector | 341,156 |
| Rural Minor Collector | 183,171 |
| Rural Local | 104,923 |
| Urban Interstate | 0 |
| Urban Freeway or Expressway | 50,445 |
| Urban Other Principal Arterial | 55,124 |

| | |
|---|---|
| **EDCOMBE** | |
| Urban Minor Arterial | 82,859 |
| Urban Collector | 14,030 |
| Urban Local | 41,738 |
| **NASH** | |
| Rural Interstate | 311,128 |
| Rural Other Principal Arterial | 219,409 |
| Rural Minor Arterial | 33,975 |
| Rural Major Collector | 189,596 |
| Rural Minor Collector | 97,188 |
| Rural Local | 44,107 |
| Urban Interstate | 0 |
| Urban Freeway or Expressway | 95,897 |
| Urban Other Principal Arterial | 109,221 |
| Urban Minor Arterial | 120,816 |
| Urban Collector | 27,326 |
| Urban Local | 28,102 |
| **FORSYTH** | |
| Rural Interstate | 0 |
| Rural Other Principal Arterial | 123,182 |
| Rural Minor Arterial | 160,403 |
| Rural Major Collector | 53,612 |
| Rural Minor Collector | 124,168 |
| Rural Local | 133,503 |
| Urban Interstate | 2,008,312 |
| Urban Freeway or Expressway | 3,393,797 |
| Urban Other Principal Arterial | 380,472 |
| Urban Minor Arterial | 1,677,609 |
| Urban Collector | 1,544,519 |
| Urban Local | 1,131,387 |
| **GUILFORD** | |
| Rural Interstate | 1,042,110 |
| Rural Other Principal Arterial | 547,246 |
| Rural Minor Arterial | 268,204 |
| Rural Major Collector | 806,169 |
| Rural Minor Collector | 378,622 |
| Rural Local | 419,300 |
| Urban Interstate | 4,185,911 |
| Urban Freeway or Expressway | 2,359,534 |
| Urban Other Principal Arterial | 2,405,197 |

| | |
|---|---|
| **GUILFORD** | |
| Urban Minor Arterial | 2,787,368 |
| Urban Collector | 1,417,364 |
| Urban Local | 801,681 |
| **CATAWBA** | |
| Rural Interstate | 58,874 |
| Rural Other Principal Arterial | 220,146 |
| Rural Minor Arterial | 126,461 |
| Rural Major Collector | 108,835 |
| Rural Minor Collector | 227,258 |
| Rural Local | 92,339 |
| Urban Interstate | 1,164,903 |
| Urban Freeway or Expressway | 359,189 |
| Urban Other Principal Arterial | 906,399 |
| Urban Minor Arterial | 980,124 |
| Urban Collector | 338,483 |
| Urban Local | 295,525 |
| **DAVIDSON** | |
| Rural Interstate | 216,655 |
| Rural Other Principal Arterial | 0 |
| Rural Minor Arterial | 219,712 |
| Rural Major Collector | 171,335 |
| Rural Minor Collector | 139,298 |
| Rural Local | 292,564 |
| Urban Interstate | 416,389 |
| Urban Freeway or Expressway | 428,034 |
| Urban Other Principal Arterial | 411,235 |
| Urban Minor Arterial | 325,845 |
| Urban Collector | 182,327 |
| Urban Local | 275,166 |

## 5.0 ESTIMATED EMISSIONS FROM ON-ROAD MOBILE SOURCES

Due to the size and the complexity of the MOVES input and output files, the MOVES input files and output files will be provided electronically. Using the inventory approach in the MOVES model gives a summary of annual emissions in tons per year, by county. Table 5-1 summarizes the emissions in tons/year.

**Table 5-1 Total County On-Road Mobile Source 2010 Emissions (tons/year)**

| County | NOx | VOC | $PM_{2.5}$ | $SO_2$ |
|---|---|---|---|---|
| Alexander | 689 | 443 | 22 | 3 |
| Alleghany | 236 | 146 | 8 | 1 |
| Anson | 744 | 270 | 24 | 3 |
| Ashe | 712 | 317 | 25 | 3 |
| Avery | 472 | 201 | 17 | 2 |
| Camden | 315 | 148 | 10 | 1 |
| Caswell | 572 | 305 | 19 | 2 |
| Cherokee | 774 | 377 | 27 | 3 |
| Chowan | 313 | 140 | 10 | 1 |
| Clay | 253 | 112 | 9 | 1 |
| Columbus | 1,804 | 819 | 59 | 8 |
| Currituck | 783 | 295 | 26 | 4 |
| Dare | 1,077 | 436 | 36 | 5 |
| Davie | 1,411 | 494 | 47 | 6 |
| Duplin | 1,928 | 632 | 64 | 8 |
| Gates | 305 | 123 | 10 | 1 |
| Graham | 200 | 88 | 7 | 1 |
| Greene | 515 | 251 | 17 | 2 |
| Hertford | 572 | 226 | 19 | 3 |
| Hoke | 838 | 380 | 26 | 4 |
| Hyde | 127 | 53 | 4 | 1 |
| Jackson | 1,270 | 449 | 44 | 6 |
| Jones | 452 | 145 | 15 | 2 |
| McDowell | 1,656 | 682 | 56 | 7 |
| Macon | 926 | 395 | 32 | 4 |
| Madison | 625 | 243 | 22 | 3 |
| Martin | 754 | 281 | 25 | 3 |
| Mitchell | 377 | 210 | 13 | 2 |
| Montgomery | 793 | 298 | 26 | 3 |
| Northampton | 808 | 265 | 27 | 4 |
| Pamlico | 319 | 133 | 10 | 1 |
| Pasquotank | 821 | 358 | 27 | 4 |
| Pender | 1,806 | 596 | 59 | 8 |
| Beaufort | 1,185 | 501 | 39 | 5 |
| Bertie | 766 | 263 | 26 | 3 |
| Halifax | 1,875 | 766 | 63 | 8 |
| Scotland | 933 | 345 | 30 | 4 |
| Perquimans | 398 | 149 | 13 | 2 |

| County | NOx | VOC | $PM_{2.5}$ | $SO_2$ |
|---|---|---|---|---|
| Person | 843 | 397 | 27 | 4 |
| Polk | 876 | 268 | 30 | 4 |
| Richmond | 1,122 | 457 | 37 | 5 |
| Sampson | 1,943 | 709 | 64 | 9 |
| Swain | 541 | 190 | 19 | 2 |
| Transylvania | 601 | 307 | 21 | 3 |
| Tyrrell | 171 | 52 | 6 | 1 |
| Vance | 1,297 | 589 | 43 | 6 |
| Warren | 663 | 222 | 22 | 3 |
| Washington | 385 | 140 | 13 | 2 |
| Watauga | 1,152 | 474 | 41 | 5 |
| Yadkin | 1,428 | 497 | 49 | 6 |
| Yancey | 461 | 206 | 16 | 2 |
| Bladen | 982 | 372 | 32 | 4 |
| Brunswick | 3,288 | 1,203 | 112 | 16 |
| Buncombe | 6,161 | 2,464 | 227 | 29 |
| Burke | 2,312 | 919 | 81 | 11 |
| Caldwell | 1,763 | 808 | 61 | 8 |
| Carteret | 1,511 | 852 | 51 | 7 |
| Craven | 2,353 | 948 | 81 | 11 |
| Cumberland | 6,693 | 3,535 | 226 | 32 |
| Harnett | 2,600 | 990 | 87 | 12 |
| Haywood | 2,117 | 887 | 78 | 10 |
| Henderson | 2,564 | 1,079 | 93 | 12 |
| Lee | 1,355 | 546 | 45 | 6 |
| Lenoir | 1,472 | 582 | 50 | 7 |
| Moore | 2,051 | 906 | 68 | 10 |
| New Hanover | 3,543 | 2,102 | 119 | 17 |
| Onslow | 3,405 | 1,418 | 115 | 16 |
| Pitt | 3,060 | 1,292 | 104 | 15 |
| Robeson | 3,798 | 1,247 | 128 | 17 |
| Rockingham | 2,188 | 924 | 74 | 10 |
| Rutherford | 1,432 | 619 | 49 | 7 |
| Stanly | 1,205 | 712 | 40 | 5 |
| Stokes | 996 | 460 | 33 | 4 |
| Surry | 2,597 | 1,150 | 92 | 12 |
| Wayne | 2,427 | 1,050 | 83 | 11 |
| Wilkes | 1,604 | 706 | 56 | 7 |
| Wilson | 2,490 | 838 | 86 | 11 |
| Alamance | 4,524 | 1,657 | 156 | 21 |
| Catawba | 4,889 | 1,940 | 170 | 23 |
| Cleveland | 3,048 | 1,086 | 105 | 14 |

| County | NOx | VOC | $PM_{2.5}$ | $SO_2$ |
|---|---|---|---|---|
| Davidson | 4,509 | 1,744 | 151 | 21 |
| Edgecombe | 1,579 | 559 | 55 | 7 |
| Forsyth | 8,698 | 3,355 | 301 | 42 |
| Nash | 3,629 | 1,161 | 123 | 17 |
| Randolph | 4,340 | 1,616 | 150 | 20 |
| Cabarrus | 4,990 | 2,046 | 180 | 24 |
| Gaston | 5,819 | 2,257 | 211 | 28 |
| Iredell | 3,101 | 1,503 | 110 | 14 |
| Rowan | 4,509 | 1,724 | 155 | 22 |
| Union | 4,657 | 2,040 | 167 | 22 |
| Lincoln | 2,059 | 881 | 72 | 10 |
| Mecklenburg | 28,425 | 10,858 | 1,064 | 144 |
| Chatham | 1,236 | 562 | 41 | 5 |
| Durham | 7,510 | 2,667 | 260 | 37 |
| Orange | 4,181 | 1,360 | 143 | 19 |
| Wake | 23,828 | 9,269 | 817 | 117 |
| Franklin | 1,508 | 586 | 50 | 7 |
| Granville | 2,012 | 642 | 69 | 9 |
| Johnston | 5,308 | 1,781 | 180 | 24 |
| **Total Emissions** | **256,559** | **101,819** | **8,905** | **1,205** |

# Appendix B.4

# Nonroad Mobile Sources
# Emission Inventory Documentation

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# List of Tables

# 1.0 INTRODUCTION AND SCOPE

Nonroad mobile sources are equipment that can move but are not licensed to use the public roads and highways. The nonroad mobile source category includes a diverse collection of equipment such as lawn mowers, chain saws, tractors, all terrain vehicles, forklifts and construction equipment. Emissions from this type of equipment are calculated using the National Mobile Inventory Model (NMIM) developed by the United States Environmental Protection Agency (USEPA). This category also includes emissions from aircraft, railroad locomotives, and commercial marine vessels which are calculated outside of NMIM. For this mid-course review, emissions nitrogen oxides (NOx), sulfur dioxide ($SO_2$), particulate matter ($PM_{2.5}$) and volatile organic compouns (VOC) are estimated for the year of 2010.

# 2.0 OVERALL METHODOLOGY

## 2.1 SOURCE CATEGORY IDENTIFICATION

Nonroad mobile sources were identified from the USEPA guidance document EPA-450/4-91-016, Procedures for the Preparation of Emissions Inventories for Carbon Monoxide and Precursors of Ozone (Procedures document). Nonroad mobile source emissions are estimated by the methodologies suggested in the USEPA document, EPA-454/R-05-001, Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations; EPA-450/4-81-026d (Revised) Procedures for Emission Inventory Preparation, Volume IV; Mobile Sources (Mobile Source Procedures); from the USEPA's NMIM model (incorporating NONROAD2008a released July 6, 2009); and from the Emissions and Dispersion Modeling System version 5.1.3 (EDMS5.1.3) model developed by the USEPA and the Federal Aviation Administration (FAA).

## 2.2 EMISSION ESTIMATION APPROACH

For the majority of nonroad mobile categories, emissions were estimated using the USEPA's NMIM model. Model runs were performed for each county.

Aircraft emissions were calculated by downloading the 2008 National Emission Inventory (NEI) data from the USEPA and growing it to 2010 using data obtained from the FAA Terminal Area Forecast (TAF). The aircraft emissions in the 2008 NEI were calculated for the USEPA by a contractor using the EDMS 5.1.3 model where the the number of landings and takeoffs for specific aircraft and engine combinations are entered. For air taxi activity and general aviation, not calculated with the EDMS 5.1.3 model, methods and emission factors described in

Documentation for Aircraft Component of the National Emission Inventory Methodology (ERG No.: 0245.03.402.001, January 27, 2011) were employed. Emission factors developed for military aircraft at military airports in North Carolina as part of the 2008 National Emission Inventory (NEI) were used to calculate emissions for military aircraft operating at civilian airports. North Carolina also had supplemented the 2008 NEI with military aircraft emissions data for military airports. These emissions were developed from surveys of military airports and calculations using EDMS 5.1.3.

Railroad emissions from the 2008 National Emission Inventory (NEI) including passenger railroad emissions developed by the North Carolina Division of Air Quality (NCDAQ) for the NEI were used as the starting point for developing 2010 emissions. Growth factors were based on projected railroad fuel use. Future emission reductions due to emission control measures were calculated based on future emission factors published in the USEPA document Emission Factors for Locomotives, EPA-420-F-09-025.

For the commercial marine vessels (CMV), the 2008 NEI emissions were considered to be suitable to be used for 2010.

# 3.0 QUALITY ASSURANCE MEASURES

For the NMIM model run for nonroad , the run specification file (file that displays the variables used to setup a model run) was reviewed by a second person who did not perform the actual runs. The model results were also evaluated for completeness and comparability to previous annual runs.

The original emission estimates for the railroad locomotives and aircraft were carefully reviewed when they were developed in accordance with normal procedures for preparing components for the NEI. They also received additional evaluation before being projected to 2010. Projection and control factors were also reviewed before use.

# 4.0 EMISSIONS AND DETAILED METHODOLOGY

## 4.1 CATEGORIES FROM THE NONROAD MODEL

The USEPA included more than 80 different types of equipment in the NMIM - NONROAD model. To facilitate analysis and reporting, the USEPA grouped the equipment types into twelve equipment categories. These include:

| | |
|---|---|
| Agricultural equipment | Lawn and garden equipment, residential |
| Airport ground support equipment | Logging equipment |
| Commercial equipment | Railroad maintenance equipment |
| Construction and mining equipment | Recreational marine equipment |
| Industrial equipment | Recreational equipment |
| Lawn and garden equipment, commercial | Underground mining quipment |

Additionally, the emissions are estimated for five different engine types. These include: 2-stroke and 4-stroke spark ignition engines, diesel engines, liquid propane gas and compressed natural gas fueled engines. Although the model generates airport ground support equipment emission estimates, these estimates were not used. Rather, ground support equipment emissions were taken from the EDMS model results that are believed to be more accurate. Underground mining is not conducted in North Carolina.

The NMIM model containing the NONROAD2008a model version was used to estimate emissions. NONROAD2008a is the latest release of the USEPA NONROAD model that was first released in June 2000, and incorporates many revisions to improve the model's predictive ability. Compared to NONROAD2005c, this model revision accounts for emission reductions from the Diesel Recreational Marine standards in the Loco/Marine final rule published in the Federal Register (FR) (73FR 25098) and the Small Spark Ignition and Spark Ignition Recreational Marine final rule (FR 59034). There are a number of additional improvements including the ability to model the effects of ethanol blends on fuel tank and hose permeation losses.

The seasonal file for the NONROAD2008a model was modified to place North Carolina in the Southeast states group rather than the Mid-Atlantic group. This change was made because the NCDAQ had reviewed temperature data of North Carolina compared to states in the Southeast and the Mid-Atlantic. The results of this comparison indicated that North Carolina temperatures are more in-line with the Southeast States. Meterological data specific for the year 2010 was incorporated in the NMIM model by modification of the model's CountyYearMonthHour table. Fot the purposes of this document the NMIM results were combined with the other nonroad emissions. If more detail is wanted emissions are available totaled for each equipment category by county.

The NMIM model was operated through the graphic user interface (GUI). A runspec file was created which directed the running of the NONROAD2008a model.

## 4.2 AIRCRAFT ENGINES AND AIRPORT GROUND SUPPORT

Aircraft engines, like other engines, emit pollutants whenever the engines are in operation. However, the only emissions that are of concern for this inventory are the portion of the operation that occurs below the mixing layer. This is because the emissions tend to disperse whenever the aircraft is above the mixing layer and therefore have little or no effect on ground level air pollutants.

The aircraft operations of interest are produced during the landing and takeoff (LTO) cycle. The cycle begins when the aircraft approaches the airport, descending below the mixing layer, lands and taxis to the gate. It continues as the aircraft idles at the gate and then taxis back out to the runway for the subsequent takeoff and climbout as it heads back to cruising altitudes, above the mixing layer.

Aircraft can be categorized by use into four classifications: commercial, air taxis, general aviation and military. Commercial aircraft include those used for scheduled service transporting passengers, freight or both. Air taxis and commuter aircraft also fly scheduled service carrying passengers and/or freight but usually are smaller aircraft and operate on a more limited basis than commercial carriers. Air taxis may also be used for unscheduled on-demand flights. General aviation includes all other non-military aircraft used for recreational flying, personal transportation, and various other activities. Military aircraft cover a wide range of sizes, uses, and operating missions. Military operations at civilian airports are often associated with National Guard, Army Reserve, and Air Force Reserve training.

Emission estimates were developed for 2008 for all airports in North Carolina as part of the NEI. Most of the work was done by USEPA contractors as previously mentioned. Military aircraft emissions at military airports were developed from surveys of activity developed by NCDAQ personnel. Emission calculations were made using the EDMS5.1.3 model developed by the USEPA and the Federal Aviation Administration (FAA). Emissions for aircraft operations were projected from 2008 to 2010 using growth factors developed from the FAA's Terminal Area Forecast for North Carolina. The EDMS model calculates emissions from ground support equipment associated with certain aircraft and emissions from auxiliary power units (APU). Ground support equipment consists of equipment such as tractors used to tow airplanes to the gate or catering trucks that bring food to large airliners. APUs are typically smaller engines on aircraft that provide power for electricity or air conditioning when the main engines are shut off.

The USEPA contractor who developed the 2008 NEI airport emissions assigned some general aviation emissions to military airports surveyed by NCDAQ. It was determined that general aviation typically doesn't use military airports. Therefore, these emissions were zeroed. It was this adjustment to the "Data Origin" column in the "Aircraft Growth Factors" table.

### 4.3 RAILROAD LOCOMOTIVES

Railroad companies are categorized by size (Class I, Class II, or Class III) and passenger service (Amtrak and NCDOT Rail Division). Class I railroad companies are long haul operations, consisting of Norfolk Southern Corporation and CSX Corporation. Class II and Class III railroad companies are short lines serving localized markets. Amtrak and the NCDOT Rail Division provide passenger service. These entities lease trackage from Class I railroad companies.

Railroad locomotive emissions were calculated for all of North Carolina for 2008 as part of the NEI. This inventory was prepared by the Eastern Regional Technical Advisory Committee (ERTAC) Rail Subgroup for the USEPA. Some of the details of the ERTAC work are based on proprietary information provided by the railroad companies. The calculation methodologies followed procedures acceptable to the USEPA.

Passenger railroad emissions were developed by NCDAQ for 2008. This was done using information supplied by the NCDOT and emission factors from Emission Factors for Locomotives, EPA-420-F-09-025. This data was added into the 2008 NEI as the ERTAC work did not include passenger railroads.

The projection from 2008 to 2010 was made using growth factors generated from statistics of domestic railroad fuel usage. Reductions of NOx, VOC, and $PM_{2.5}$ were estimated based on future USEPA control requirements. $SO_2$ reductions were based on future fuel sulfur allowances.

## 5.0 PROJECTION AND CONTROL FACTORS

Emissions for aircraft were grown using factors calculated from estimates of future operations produced with the FAA's Terminal Area Forecast Model. Projections were made from 2008 NEI data. Total operations of aircraft (based and itinerant) for the North Carolina airports included in the model were used to produce the factors.

Railroad growth factors were calculated using national fuel use estimates for freight and for intercity passenger service found on table 46 of the Energy Information Administration's Annual Energy Outlook, 2011.

Future year railroad emission factors for NOx, hudrocarbons, and $PM_{10}$ from Emission Factors for Locomotives (EPA-420-F-09-025, April 2009) were used to produce control factors for NOx,VOC, and $PM_{2.5}$. About 97% of locomotive emissions of $PM_{10}$ are considered $PM_{2.5}$. Future year allowances for sulfur in locomotive diesel fuel were used to produce $SO_2$ reduction factors.

The following tables are the growth and control factors used to develop the 2010 aircraft and railroad emissions.

**Table 5-1 Aircraft Growth Factors**

| Equipment | Growth Factor | DataOrigin |
|---|---|---|
| AirCarrier | 1.041756966 | 2008EPA_AIR |
| APU | 1.041756966 | 2008EPA_AIR |
| Air Taxi Piston | 0.847711718 | 2008EPA_AIR |
| Air Taxi Turbine | 0.847711718 | 2008EPA_AIR |
| Gen Aviation Piston | 0.951086827 | 2008EPA_AIR |
| Gen Aviation turbine | 0.951086827 | 2008EPA_AIR |
| Military | 0.990333211 | 2008NCDAQ |
| GSE, Gasoline | 1.041756966 | 2008EPA_AIR |
| GSE, LPG | 1.041756966 | 2008EPA_AIR |
| GSE, CNG | 1.041756966 | 2008EPA_AIR |
| GSE, Diesel | 1.041756966 | 2008EPA_AIR |
| GSE, Diesel for Military | 0.990333211 | 2008NCDAQ |
| Gen Aviation Piston | 1 | 2008NCDAQ |
| Gen Aviation turbine | 1 | 2008NCDAQ |
| Military | 0.990333211 | 2008EPA_AIR |

**Table 5-2 Railroad Growth Factors**

| Equipment | Growth Factor |
|---|---|
| Railroad Equipment /Diesel /Line Haul Locomotives: Class I Operations | 0.918868646 |
| Railroad Equipment /Diesel /Line Haul Locomotives: Class II / III Operations | 0.918868646 |
| Railroad Equipment /Diesel /Line Haul Locomotives: Passenger Trains (Amtrak) | 1.005665722 |
| Railroad Equip /Diesel /Yard Locomotives | 0.918868646 |

**Table 5-3 Railroad Control Factors**

| Equipment | NOx | $PM_{2.5}$ | $SO_2$ | VOC |
|---|---|---|---|---|
| Railroad Equipment /Diesel /Line Haul Locomotives: Class I Operations | 0.928994 | 0.921569 | 0.470085 | 0.922222 |
| Railroad Equipment /Diesel /Line Haul Locomotives: Class II / III Operations | 1 | 1 | 0.470085 | 1 |
| Railroad Equipment /Diesel /Line Haul Locomotives: Passenger Trains (Amtrak) | 0.855140 | 0.941176 | 0.470085 | 0.924731 |
| Railroad Equip /Diesel /Yard Locomotives | 0.971193 | 0.981818 | 0.470085 | 0.972414 |

## 6.0 SUMMARY OF NONROAD MOBILE SOURCE EMISSIONS

The total nonroad mobile source emissions per county are summarized in the table below. All of the emissions are in tons per year.

**Table 6-1 Total County Nonroad Mobile Source 2010 Emissions (tons/year)**

| County | NOx | VOC | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Alamance | 634 | 589 | 6 | 58 |
| Alexander | 169 | 211 | 2 | 16 |
| Alleghany | 67 | 43 | 1 | 6 |
| Anson | 359 | 94 | 2 | 16 |
| Ashe | 128 | 148 | 2 | 13 |
| Avery | 119 | 265 | 1 | 17 |
| Beaufort | 586 | 1205 | 8 | 59 |
| Bertie | 228 | 274 | 2 | 20 |
| Bladen | 293 | 307 | 3 | 24 |
| Brunswick | 1060 | 934 | 701 | 85 |
| Buncombe | 1097 | 1569 | 14 | 109 |

| County | NOx | VOC | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Burke | 369 | 251 | 3 | 25 |
| Cabarrus | 867 | 509 | 10 | 72 |
| Caldwell | 368 | 390 | 3 | 30 |
| Camden | 183 | 371 | 2 | 17 |
| Carteret | 1690 | 3938 | 159 | 134 |
| Caswell | 104 | 56 | 1 | 8 |
| Catawba | 975 | 736 | 8 | 69 |
| Chatham | 420 | 314 | 5 | 36 |
| Cherokee | 136 | 274 | 1 | 15 |
| Chowan | 153 | 356 | 2 | 14 |
| Clay | 56 | 212 | 1 | 9 |
| Cleveland | 533 | 338 | 5 | 36 |
| Columbus | 348 | 486 | 3 | 35 |
| Craven | 458 | 652 | 8 | 41 |
| Cumberland | 1348 | 1063 | 23 | 137 |
| Currituck | 496 | 1355 | 5 | 52 |
| Dare | 1775 | 5655 | 410 | 177 |
| Davidson | 939 | 525 | 7 | 57 |
| Davie | 193 | 374 | 2 | 24 |
| Duplin | 334 | 123 | 4 | 28 |
| Durham | 1651 | 973 | 18 | 141 |
| Edgecombe | 613 | 178 | 4 | 34 |
| Forsyth | 1282 | 940 | 14 | 109 |
| Franklin | 208 | 167 | 3 | 20 |
| Gaston | 886 | 603 | 8 | 65 |
| Gates | 99 | 59 | 1 | 9 |
| Graham | 33 | 70 | 0 | 3 |
| Granville | 391 | 204 | 4 | 33 |
| Greene | 143 | 52 | 2 | 13 |
| Guilford | 3188 | 2100 | 50 | 256 |
| Halifax | 596 | 287 | 5 | 38 |
| Harnett | 422 | 320 | 5 | 37 |
| Haywood | 245 | 640 | 3 | 35 |
| Henderson | 457 | 1484 | 5 | 72 |
| Hertford | 159 | 184 | 2 | 16 |
| Hoke | 187 | 149 | 2 | 16 |
| Hyde | 757 | 3972 | 6 | 73 |
| Iredell | 847 | 615 | 9 | 69 |
| Jackson | 228 | 311 | 3 | 26 |
| Johnston | 1127 | 601 | 10 | 82 |
| Jones | 95 | 42 | 1 | 9 |
| Lee | 392 | 189 | 4 | 29 |
| Lenoir | 292 | 266 | 4 | 30 |
| Lincoln | 369 | 297 | 4 | 28 |

| County | NOx | VOC | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Macon | 172 | 478 | 2 | 26 |
| Madison | 158 | 140 | 1 | 11 |
| Martin | 171 | 196 | 2 | 19 |
| McDowell | 813 | 354 | 5 | 38 |
| Mecklenburg | 7948 | 4939 | 267 | 598 |
| Mitchell | 519 | 298 | 3 | 25 |
| Montgomery | 178 | 211 | 2 | 15 |
| Moore | 427 | 334 | 4 | 36 |
| Nash | 612 | 260 | 5 | 40 |
| New Hanover | 3382 | 1086 | 644 | 207 |
| Northampton | 376 | 144 | 3 | 23 |
| Onslow | 500 | 1067 | 10 | 59 |
| Orange | 651 | 814 | 8 | 72 |
| Pamlico | 326 | 1554 | 4 | 38 |
| Pasquotank | 368 | 534 | 10 | 59 |
| Pender | 226 | 243 | 3 | 22 |
| Perquimans | 234 | 470 | 2 | 21 |
| Person | 198 | 178 | 2 | 18 |
| Pitt | 733 | 400 | 10 | 62 |
| Polk | 73 | 96 | 1 | 9 |
| Randolph | 576 | 477 | 6 | 47 |
| Richmond | 539 | 252 | 7 | 44 |
| Robeson | 1000 | 300 | 8 | 62 |
| Rockingham | 490 | 392 | 4 | 34 |
| Rowan | 806 | 614 | 7 | 57 |
| Rutherford | 607 | 365 | 4 | 35 |
| Sampson | 378 | 146 | 4 | 33 |
| Scotland | 336 | 115 | 4 | 21 |
| Stanly | 332 | 468 | 4 | 34 |
| Stokes | 170 | 252 | 2 | 17 |
| Surry | 372 | 376 | 4 | 34 |
| Swain | 125 | 953 | 1 | 33 |
| Transylvania | 175 | 1198 | 2 | 46 |
| Tyrrell | 288 | 1122 | 2 | 27 |
| Union | 1588 | 915 | 16 | 134 |
| Vance | 184 | 367 | 2 | 21 |
| Wake | 5103 | 3434 | 126 | 445 |
| Warren | 96 | 122 | 1 | 9 |
| Washington | 256 | 443 | 3 | 23 |
| Watauga | 335 | 672 | 4 | 45 |
| Wayne | 1028 | 658 | 49 | 67 |
| Wilkes | 250 | 282 | 3 | 24 |
| Wilson | 807 | 373 | 6 | 51 |
| Yadkin | 172 | 110 | 2 | 16 |

| County | NOx | VOC | $SO_2$ | $PM_{2.5}$ |
|---|---|---|---|---|
| Yancey | 118 | 249 | 1 | 13 |
| **Total Emissisons** | **65,353** | **66,773** | **2,829** | **5,455** |