



# Conformity Analysis and Determination Report

## 2030 Long Range Transportation Plans:

- **Burlington-Graham Metropolitan Planning Organization (Guilford County portion)**
- **Greensboro Urban Area Metropolitan Planning Organization (Guilford County portion)**
- **High Point Urban Area Metropolitan Planning Organization (Guilford and Davidson Counties)**
- **Winston-Salem Urban Area Metropolitan Planning Organization (Davidson County portion)**

## Projects from the FY 2006-2012 Transportation Improvement Program:

- **The portions of Davidson County within the Triad PM2.5 Non-Attainment Area but Outside the Metropolitan Planning Organization Areas**

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**Burlington-Graham Metropolitan Planning Organization,  
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High Point Metropolitan Planning Organization,  
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and

In cooperation with  
The North Carolina Department of Environment and Natural Resources  
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## List of Acronyms

<i>Acronym</i>	<i>Full Term</i>
BGMPO	Burlington-Graham Metropolitan Planning Organization.
Conformity Analysis	Demonstration that when the projects planned in the TIP and LRTP are implemented the area will not exceed allowable motor vehicle emissions thresholds (emissions budgets).
Conformity Finding	Statement that the projects contained in the MTIP are essentially consistent with those listed in the LRTP and that no new Conformity Analysis is needed to account for noted differences.
CMS	Congestion Management System. A program of strategies for monitoring, evaluating, and addressing traffic congestion. Required for Transportation Management Areas.
CMAQ	Congestion Mitigation and Air Quality Program. A federal highway fund category for projects that will improve air quality.
DAQ	Division of Air Quality.
DENR	North Carolina Department of Environment and Natural Resources.
Emissions Budget	See Conformity Analysis.
EIS	Environmental Impact Statement. Federally required environmental study for projects with potentially significant environmental effects.
FHWA	Federal Highway Administration (USDOT)
FCEAD	Forsyth County Environmental Affairs Department.
FTA	Federal Transit Administration (US Department of Transportation)
GUAMPO	Greensboro Urban Area Metropolitan Planning Organization.
HPMPO	High Point Metropolitan Planning Organization.
LRTP	Long Range Transportation Plan: 25 year planning document identifying long and short term transportation investment needs.
MAB	Metropolitan Area Boundary. The boundary of the area within the transportation planning jurisdiction of an MPO.
MPO	Metropolitan Planning Organization.
MTIP	Metropolitan Transportation Improvement Program.
MVEB	Motor Vehicle Emission Budgets.

### List of Acronyms (cont'd)

NCDOT	North Carolina Department of Transportation.
NEPA	National Environmental Policy Act. Federal law that requires consideration of environmental impacts for all major expenditures of federal funds.
NO <sub>x</sub>	Oxides of Nitrogen: key precursor to smog. According to DENR, roadway sources produce around 31% of total NC NO <sub>x</sub> emissions.
PART	Piedmont Authority for Regional Transportation.
Prospectus	Document outlining responsibilities and procedures for carrying out the cooperative transportation planning process. Defines ongoing work tasks cited in the Planning Work Program.
Planning Work Program	Accounting document for use of planning grant funds; lists approved activities that these funds may reimburse. The PWP thus guides transportation planning activities for the year.
RPO	Rural Planning Organization. RPOs are partnerships among non-MPO counties, established to provide rural areas a greater voice in state transportation decisions affecting those areas.
Section 104(f) PL	Funds distributed through the Federal Highway Administration for transportation planning tasks.
SIP	State Implementation Plan. The modeling analysis and the state and federal regulations demonstrating that the air in an area will meet National Ambient Air Quality Standards.
STIP	State Transportation Improvement Program
TCM	Transportation Control Measures. Specific projects or programs enumerated in the SIP that are designed to improve air quality are implemented in a timely fashion.
TDM	Travel Demand Model.
TMA	Transportation Management Area: urbanized area over 200,000 in population.
PTRM	Piedmont Triad Regional Model.
US EPA	United States Environmental Protection Agency.
WSMPO	Winston-Salem Metropolitan Planning Organization.



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## Conformity Analysis and Determination Report

### 2030 Long Range Transportation Plans:

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- **Greensboro Urban Area Metropolitan Planning Organization (Guilford County portion),**
- **High Point Urban Area Metropolitan Planning Organization (Guilford and Davidson County portion)**
- **Winston-Salem Urban Area Metropolitan Planning Organization (Davidson County portion)**

### Projects from the FY 2006-2012 Transportation Improvement Program:

- **The portion of Davidson County that is within the Triad PM 2.5 Non-Attainment Area but Outside the Metropolitan Planning Organization Areas**

## Overview

**Transportation Conformity** ("conformity") ensures that Federal funding and approval is distributed to those transportation activities that are consistent with air quality goals. Conformity applies to Long Range Transportation Plans (LRTPs), Transportation Improvement Programs (TIPs), and projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) in areas that do not meet or previously have not met air quality standards for ozone, carbon monoxide, particulate matter, or nitrogen dioxide. These areas are known as "non-attainment areas" or "maintenance areas," respectively.

A conformity determination demonstrates that the total emissions projected for a plan or program are within the emissions limits ("budgets") established by the air quality plan or State Implementation Plan (SIP) for air quality, and that transportation control measures (TCMs) – specific projects or programs enumerated in the SIP that are designed to improve air quality – are implemented in a timely fashion. Davidson and Guilford Counties were designated non-attainment for the PM 2.5 standard and the effective date of the designation was April 5, 2005. The conformity rule (40 CFR Part 93) requires that a conformity determination must be made by April 6, 2006.

### Conformity Determination

Regional emissions are estimated based on highway and transit usage according to LRTPs and TIPs. The projected emissions for the LRTPs and the TIPs must not exceed the emissions limits (or "budgets") established by the SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate). Where TCMs are included, responsible Metropolitan Planning Organizations (MPO) and the North Carolina Department Of Transportation (NCDOT) are required to demonstrate that TCMs are implemented in a timely fashion to obtain conformity.

## **The Decision Process**

A formal interagency consultation process involving the Environmental Protection Agency (EPA), FHWA, FTA and State and Local transportation and air quality agencies is required in developing SIPs, TIPs, LRTPs, and in making conformity determinations. MPO policy boards make initial conformity determinations in metropolitan areas, while NCDOT makes this determination in areas outside of MPOs, in consultation with affected Rural Planning Organizations (RPOs).

Five organizations are responsible for making the conformity determinations in five distinct parts of the Triad PM2.5 Non-attainment Area:

- a. the Burlington-Graham Urban Area MPO (BGMPO) within its portion of the metropolitan area boundary in eastern Guilford County;
- b. the Greensboro Urban Area MPO (GUAMPO) within the metropolitan area boundary currently Guilford County;
- c. the High Point Urban Area MPO (HPMPO) within its metropolitan area boundary part in Guilford County and part in Davidson county;
- d. the Winston-Salem Urban Area MPO (WSMPO) within its portion of the metropolitan area boundary in northern Davidson County; and
- e. the NCDOT in a donut area that is comprised of those portions of Davidson County that remain outside of any MPO metropolitan area boundary.

Each of these responsible organizations must make a conformity determination for its respective area in order for all of the areas to be designated in conformity.

Conformity determinations must also be made at the Federal level by FHWA and FTA. These determinations must be made at least every four years, or with the updating of LRTPs or TIPs, or within one year of the effective date of a non-attainment designation.

Conformity analysis is made available to the public as part of the MPO and/or State DOT planning processes. MPOs are required to make LRTPs, TIPs, and conformity determinations available to the public, accept and respond to public comments, and provide adequate notice of relevant public meetings. Project sponsors of specific transportation projects within the LRTPs and TIPs must also include appropriate public involvement during project development.

## **Emissions Budget**

The SIP places limits on emissions of each pollutant for each source type (mobile, stationary, and area sources). Projected emissions from highway and transit usage must be less than or equal to the emissions limits for on-road mobile vehicles that are established by the SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate). These emissions limits for motor vehicle emissions sources are called "budgets." Budgets are developed as part of the air quality planning process by State air quality/environmental agencies, and approved by EPA. Transportation agencies participate in this process.

## **Transportation Control Measures (TCMs)**

Areas can include TCMs in their SIPs. TCMs are specific programs designed to reduce emissions from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions.

These programs can include:

- developing high occupancy vehicle (HOV) facilities
- ordinances to promote non-motor vehicle travel
- transit improvements
- signal timing
- bicycle and pedestrian facilities
- land use planning

## Executive Summary

The purpose of this report is to comply with the provisions of the Clean Air Act Amendments of 1990, the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) of 1998 and the Safe Accountable Flexible Efficient Transportation Equity Act-Legacy for Users (SAFETEA-LU) of 2005 (both transportation bills are included because provisions from both bills still apply). This report demonstrates that the activities resulting from the implementation of the fiscally constrained long-range transportation plans (LRTPs) and the transportation improvement programs (TIPs) will not “cause or contribute to any new violation of any standard in any area, increase the frequency or severity of any existing violation of any standard in any area, or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.” of the following jurisdictions:

- The portion of Guilford County within the Burlington-Graham Urban Area Metropolitan Planning Organization (BGMPO)
- The portion of Guilford County within the Greensboro Urban Area Metropolitan Planning Organization (GUAMPO)
- The portions of Guilford and Davidson Counties within the High Point Urban Area Metropolitan Planning Organization (HPMPO)
- The portions of Davidson County within the Winston-Salem Urban Area Metropolitan Planning Organization (WSMPO)
- The portions of Davidson County outside the MPO boundary that are in the Triad PM2.5 Non-Attainment Area.

This conformity determination is based on a regional emissions analysis that uses the transportation network approved by the above-named Metropolitan Planning Organizations (MPOs) for the 2030 LRTPs, VMT and Speed input data developed by NCDOT, and emissions factors developed by the Forsyth County Environmental Affairs (FCEAD) in cooperation with the North Carolina Department of Environment and Natural Resources (DENR).

Based on this analysis, the 2030 LRTPs for the Piedmont Triad Region (BGMPO, GUAMPO, HPMPO, WSMPO and the relevant portion of the Davidson County) and their respective TIPs are consistent with the intent of Conformity requirement. The FY 2006-2012 TIPs are subsets of the 2030 LRTPs. The conformity analysis for the relevant portion of the Piedmont Triad Rural Planning Organization (RPO) during the TIP years is specifically addressed by the North Carolina Department of Transportation (NCDOT). The NCDOT’s analysis also shows the TIP conforms to the purpose of the North Carolina SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate).

The USEPA designated Davidson and Guilford Counties, in their entirety, as a non-attainment area for the PM 2.5 Standard with an effective date of April 5, 2005.

The non-attainment designation covers the following geographic areas:

- Davidson County
- Guilford County

The conformity determination is based on the interim emission test for each county utilizing two primary sources:

- *Piedmont Triad Travel Development Model*
- *Rural Spreadsheet (off-modeled areas of the non-attainment area)*

The conformity determination is based on the following 2030 Long-Range Transportation Plans (LRTP) produced by:

- Burlington-Graham Urban Area MPO (Guilford County portion),
- Greensboro Urban Area MPO (Guilford County portion),
- High Point Urban Area MPO (Guilford and Davidson County portion),
- Winston-Salem Urban Area MPO (Davidson County portion)

This air quality conformity study is based on three transportation analysis horizon years: 2010, 2020, and 2030. Each analysis year includes anticipated population, employment data, and roadway projects that are expected open. The LRTPs are fiscally constrained: funding sources for roadway projects are identified.

FCEAD prepared base and future emission rates for the vehicle fleet using Mobile 6.2. These rates were applied to VMT from the Piedmont Triad Regional Travel Demand Model and the rural spreadsheet. Davidson County and Guilford County do not have emission budgets for PM 2.5. The conformity analysis will be based on an interim emissions test.

Table 1 summarizes the conformity requirements of 40 CFR Part 51 and 93 and gives the status of the LRTPs in relation to each of these requirements. Tables 2 & 3 contain results from the interim emission tests for Davidson and Guilford Counties. In every horizon year for every pollutant in each geographic area, the emissions expected from the implementation of the LRTP and TIP are less than the emissions budgets established in the SIP (or less than baseline emissions where no SIP budgets have been approved or found adequate). Table 4 contains a cross-reference index for the report.

**Table 1. Status of Conformity Requirements**

<b>Criteria</b> (√ indicates the criterion is met)	<b>Burlington-Graham MPO</b>	<b>Greensboro MPO</b>	<b>Forsyth MPO</b>	<b>High Point MPO</b>	<b>Donut Portion of Davidson County</b>
Less Than Emissions Budget(s) or Baseline	√	√	√	√	√
TCM Implementation	N/A	N/A	N/A	N/A	N/A
Interagency Consultation	√	√	√	√	√
Latest Emissions Model	√	√	√	√	**
Latest Planning Assumptions	√	√	√	√	√
Fiscal Constraint	√	√	√	√	√

\*\* Rural spreadsheet was used

**Table 2. Davidson County Emissions Comparison Summary (kg/day)**

Year	PM2.5			NOx		
	MPO Portions	Donut Portion	County Total	MPO Portions	Donut Portion	County Total
2002 <sup>1</sup>	72	163	235	4,155	9523	13,678
2010	43	94	137	2,288	5116	7,404
2020	28	59	88	872	1953	2,825
2030	31	62	93	565	1164	1,728

**Table 3. Guilford County Emissions Comparison Summary (kg/day)**

Year	PM2.5			NOx		
	Model	Off-Model	Comparison	Model	Off-Model	Comparison
2002 <sup>1</sup>	643	3	640	38,863	251	38,612
2010	393	3	390	18,758	142	18,616
2020	225	3	222	6,684	105	6,579
2030	246	3	242	5,105	41	5,063

1. Baseline year.

**Table 4. Cross-reference Index**

Conformity Determination Report for the Long-Range Transportation Plan and TIP in the Triad Urban Area  
PM 2.5 Non-Attainment Area

<b>Conformity Requirement</b>	<b>Page # or Appendix</b>
Formal findings of conformity.	to be added
Table of Contents.	iii
The purpose of this report is to comply with the requirements of the CAAA, TEA-21, and 40 CFR 51 and 93.	p. 9
The former and current classification of the air shed and the pollutants for which the air shed was classified as non-attainment.	p. 12
The date the region was designated non-Attainment under the PM 2.5 standard.	p. 13
The emissions expected from implementation of the long-range plan are equal to, or less than, the base year emissions generated	p.27
The adopted long-range plan is fiscally constrained (§93.108).	p. 14
The latest planning assumptions were used in the conformity analysis (§93.110).	p. 14
The latest emissions model was used in the conformity analysis (§93.111).	p. 24
The list of federally funded T.C.M. activities included. (§93.113).	p. 26
Conformity determined according to §93.105 and the adopted public involvement procedures.	p. 28
Dates of the Technical Coordinating Committee reviews of the conformity determination and the recommendation.	to be added
SIP emissions budget test or baseline comparison demonstrates conformity of the adopted long-range transportation plan.	p. 29
Listing of projects in each analysis year (highway).	p. 16, Appendix D
VMT & Summary	p. 24, Appendix G
Analysis of “donut area” projects.	Appendix I
Off-model analysis performed.	p. 18, Appendix H
Significant comments of reviewing agencies addressed by the MPO, or a statement that no significant comments were received.	to be added
Emissions Calculations.	Appendix I
Mobile input files.	Appendix F



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## 2030 Long Range Transportation Plans:

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- **Greensboro Urban Area Metropolitan Planning Organization (Guilford County portion)**
- **High Point Urban Area Metropolitan Planning Organization (Guilford and Davidson Counties)**
- **Winston-Salem Urban Area Metropolitan Planning Organization (Davidson County portion)**

## Projects from the FY 2006-2012 Transportation Improvement Program:

- **The portions of Davidson County that are within the Triad PM2.5 Non-Attainment Area but Outside the Metropolitan Planning Organization Areas**

### 1 Introduction

The Clean Air Act requires the United States Environmental Protection Agency (USEPA) to set limits on how much of a particular pollutant can be in the air anywhere in the United States. National Ambient Air Quality Standards (NAAQS) are the pollutant limits set by the USEPA; they define the allowable concentration of pollution in the air for six different pollutants – Carbon Monoxide, Lead, Nitrogen Dioxide, Particulate Matter, Ozone, and Sulfur Dioxide.

The Clean Air Act specifies how areas within the country are designated as either “attainment” or “non-attainment” of an air quality standard, and provides USEPA the authority to define the boundaries of non-attainment areas. For areas designated as non-attainment for one or more NAAQS, the Clean Air Act defines a specific timetable to attain the standard and requires that non-attainment areas demonstrate reasonable and steady progress in reducing air pollution emissions until such time that an area can demonstrate attainment. Each state must develop and submit a State Implementation Plan (SIP) that addresses each pollutant for which it fails to meet the NAAQS. Individual State air quality agencies are responsible for defining the overall regional plan to reduce air pollution emissions to levels that will enable attainment and maintenance of the NAAQS. This strategy is articulated through the SIP.

In North Carolina, the agency responsible for SIP development is the North Carolina Department of Environment and Natural Resources, Division of Air Quality (NC DENR/DAQ). The delineation and implementation of strategies to control emissions from on-road mobile sources is a significant element of the state plan to improve air quality, thereby creating a direct link between transportation and air quality planning activities within a non-attainment area. The process of ensuring that a region’s transportation planning activities contribute to attainment of the NAAQS, or “conform” to the purposes of the SIP, is referred to as transportation conformity. In order to receive federal transportation funds within the non-attainment area, the area must demonstrate through a federally mandated conformity process that the transportation investments, strategies and programs, taken as a whole, contribute to the air quality goals defined in the state air quality plan.

In order to ensure the conformity requirements are met, Section 176 (c) of the Clean Air Act authorizes the USEPA Administrator to “promulgate criteria and procedures for demonstrating and assuring conformity in the case of transportation plans, programs, and projects.” This is accomplished through the Transportation Conformity Rule; developed by the USEPA to outline all federal requirements associated with transportation conformity. The Transportation Conformity Rule in conjunction with the Metropolitan Planning Regulations direct transportation plans and program development as well as the conformity process.

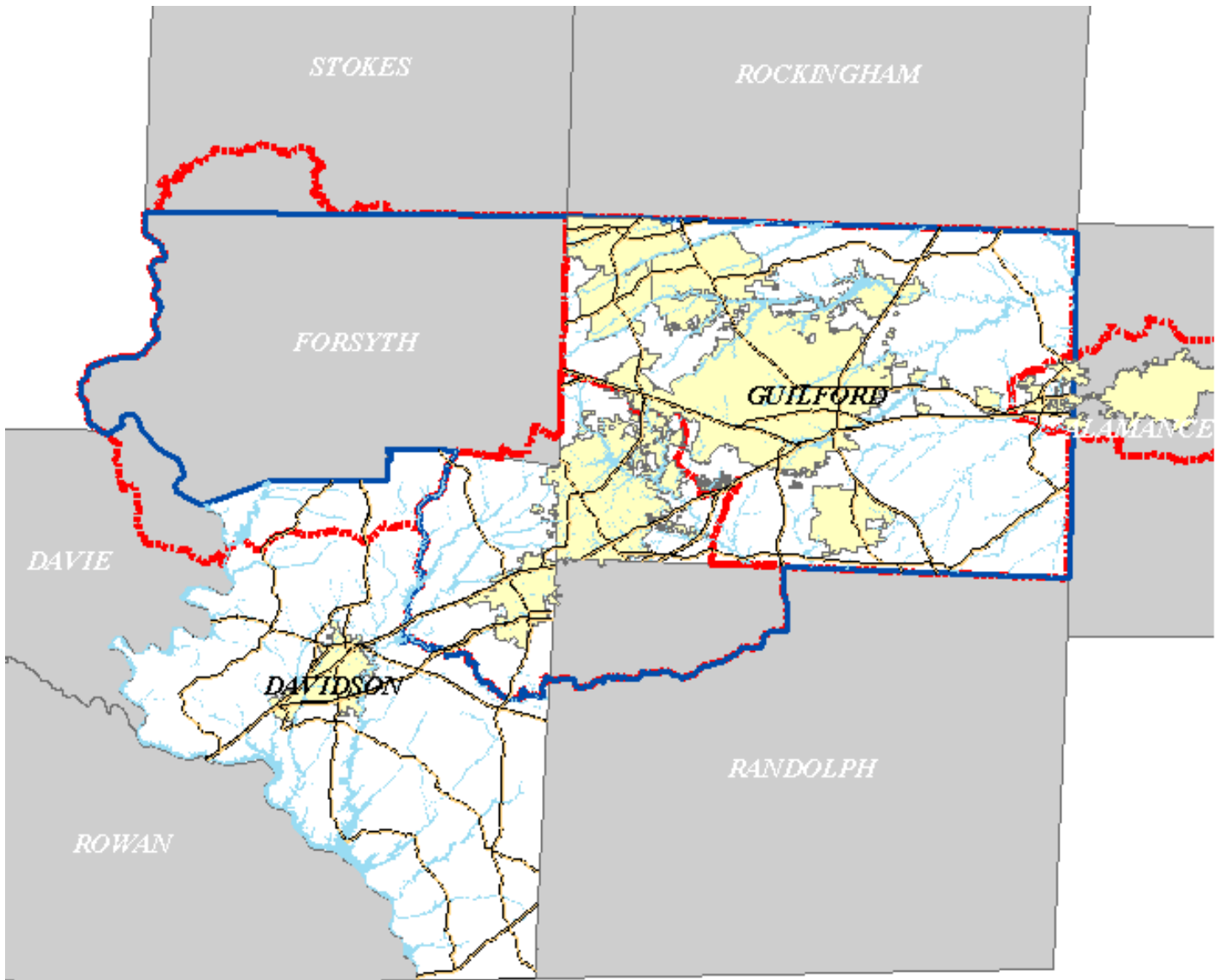
The purpose of this report is to comply with the provisions of the Clean Air Act Amendments of 1990, the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) of 1998 and the Safe Accountable Flexible Efficient Transportation Equity Act-Legacy for Users (SAFETEA-LU). This report demonstrates that the activities resulting from the implementation of the fiscally constrained long-range transportation plans (LRTPs) and the transportation improvement programs (TIPs) will not “cause or contribute to any new violation of any standard in any area, increase the frequency or severity of any existing violation of any standard in any area, or delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.” The following jurisdictions apply:

- The portion of Guilford County within the Burlington-Graham Urban Area Metropolitan Planning Organization (BGMPO)
- The portion of Guilford County within the Greensboro Urban Area Metropolitan Planning Organization (GUAMPO)
- The portions of Guilford and Davidson Counties within the High Point Urban Area Metropolitan Planning Organization (HPMPO)
- The portions of Davidson County within the Winston-Salem Urban Area Metropolitan Planning Organization (WSMPO)
- The portions of Davidson County outside the MPO boundary that are in the Triad PM<sub>2.5</sub> Non-Attainment Area.

This conformity determination is based on a regional emissions analysis that uses the transportation network approved by the above-named Metropolitan Planning Organizations (MPOs) for the 2030 LRTPs, VMT and Speed input data developed by NCDOT, and emissions factors developed by the Forsyth County Environmental Affairs (FCEAD) in cooperation with the North Carolina Department of Environment and Natural Resources (DENR). The Triad non-attainment areas for Guilford and Davidson Counties for PM 2.5 are shown as a map on Figure 1.

All Federally funded projects in areas designated by the United States Environmental Protection Agency (USEPA) as air quality non-attainment or maintenance areas must come from a conforming long-range transportation plan and transportation improvement program (TIP). Triad MPOs affected by the PM designation are required by 40 CFR 51 and 93 to make a conformity determination on any adopted or amended fiscally constrained long-range transportation plan and related TIP. In addition, the United States Department of Transportation (USDOT), specifically, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) must make a conformity determination on four MPO Plans in the Triad region and the related TIPs for the non-attainment and maintenance areas.

Figure 1. Triad Area PM 2.5 Non-attainment Areas



**Legend**

- Triad PM 2.5 Non Attainment Area
- MunicipalBoundaries\_polys selection selection
- Triad Modeled Area boundary
- MPO Boundaries
- Surrounding County Boundaries
- Streams and Rivers



In order to assist the Triad Area in making a conformity determination on the adopted 2030 fiscally constrained long-range transportation plans, the following agencies shared leading roles composing substantial portions of this document:

**Table 5. Agency Area Responsibilities**

<i>Agency</i>	<i>Counties</i>
BGMPO	Guilford (part)
Greensboro MPO	Guilford (part)
High Point MPO	Guilford (part), Davidson (part)
Winston-Salem MPO	Davidson (part)
NCDOT	Davidson and Guilford
PART	Regional Coordination and Report Distribution

This analysis is consistent with the set of amendments to 40 CFR Part 93, published in the July 1, 2004 **Federal Register**, *Transportation Conformity Rule Amendments for the New 8-hour Ozone and PM2.5 National Ambient Air Quality Standards and Miscellaneous Revisions for Existing Areas; Transportation Conformity Rule Amendments: Response to Court Decision and Additional Rule Changes; Final Rule*, effective on August 2, 2004. Based on the regional emissions budget test and interim tests documented in this report, the following Transportation Plan conforms to the purpose of the North Carolina SIP:

- Greensboro Urban Area MPO 2030 LRTP & 2006-2012 TIP Projects
- High Point Urban Area MPO 2030 LRTP & 2006-2012 TIP Projects
- Winston-Salem Urban Area MPO 2030 LRTP & 2006-2012 TIP Projects
- Burlington-Graham Urban Area MPO 2030 LRTP & 2006-2012 TIP Projects
- Donut Portion of Davidson County 2006-2012 TIP Projects outside of MPOs

This report documents the regional emissions budget test, the interim emissions test, interagency consultation process, public involvement process, and analysis methodology used to demonstrate transportation conformity for each MPO and the donut portion of each county outside the MPOs.

40 CFR Part 93 requires that a conforming transportation plan satisfy five conditions:

- The transportation plan must be consistent with the motor vehicle emissions budget(s) in an area where the applicable implementation plan or implementation plan submission contains a budget (*40 CFR Part 93.118*).
- The transportation plan, TIP, or FHWA/FTA project not from a conforming plan must provide for the timely implementation of TCMs from the applicable implementation plan (*40 CFR Part 93.113b*).
- The MPO must make the conformity determination according to the consultation procedures of *40 CFR Part 93.105* and the implementation plan revision required by *40 CFR Part 93.390* (*40 CFR Part 416*).
- The conformity determination must be based on the latest emissions estimation model available (*40 CFR Part 93.111*).
- The conformity determination must be based on the latest planning assumptions (*40 CFR Part 93.110*).
- The transportation Plan, TIP, or FHWA/FTA project must meet the interim emissions tests where applicable (*40 CFR Part 93.119*).

This report shows that the MPOs 2030 Transportation Plan and the TIP in the donut area outside of the MPO meets each condition. Each condition is discussed in the following sections of this report.

## **2 Air Quality Planning**

USEPA designated Guilford, Davidson and Catawba Counties non-attainment areas for the PM<sub>2.5</sub> Fine Particle National Air Quality Standards on January 5, 2005. Fine particle pollution is a mixture of microscopic solids and liquid droplets suspended in air. Fine particles can be emitted directly (such as smoke from a fire) or formed in the atmosphere from power plant, industrial and mobile source emissions of gases such as sulfur dioxide and nitrogen oxides. Fine particles less than or equal to 2.5 micrometers in diameter (called PM<sub>2.5</sub> and measuring about one-thirtieth the diameter of an average human hair) pose the greatest risk. These particles can get deep into the lungs, and some may even get into the bloodstream. States and tribes with designated non-attainment areas must submit plans that outline how they will meet the PM<sub>2.5</sub> standards. Areas are required to attain clean air as soon as possible but no later than 2010. EPA may grant attainment date extensions of up to five years in areas with more severe PM<sub>2.5</sub> problems and where emissions control measures are not available or feasible. The USEPA direct final rule for PM 2.5 is provided in Appendix A.

### **2.1 Emissions Baseline**

NCDOT performed less than the base year (2002) analysis as the interim emissions tests for PM<sub>2.5</sub> and NO<sub>x</sub>. SIPs for the PM<sub>2.5</sub> non-attainment areas have not yet been submitted by the State. Therefore, in the areas of the Triad non-attainment area (Davidson and Guilford Counties), future long range transportation plan and TIP emissions can not be compared to a budget, but are instead compared to emissions estimated from Travel Demand and Rural spreadsheet models for the 2002 baseline year. The following requirements have been addressed as part of this conformity determination. Section 4 of this report provides these comparisons.

## **3 Long Range Transportation Plans**

The 2030 Transportation Plans were developed between 2004 and 2005. Federal law *40 CFR part 93.104(b)(3)* requires a conformity determination on transportation plans no less frequently than every three years. As required in *40 CFR 93.106*, the horizon years for the transportation plan are no more than ten years apart.

The BGMPO includes a small portion of eastern Guilford County. The GUAMPO includes the majority portion of Guilford County. The HPMPO includes a southeast portion Guilford County and the northwest portion of Davidson County. WSMPO includes a small portion of north Davidson County. The remaining portions of the non-attainment area are rural areas of Davidson County west outside the MPO boundaries.

### **3.1 Consultation**

The 2030 Transportation Plan is consistent with consultation requirements discussed in *40 CFR 93.105*.

Consultation on the development of this conformity determination was accomplished through interagency consultation meetings held on July 12, 2005, August 31, 2005 and September 19, 2005. A copy of the agenda, summary of the topics discussed, and a list of the attendees at each of these meetings is included in Appendix C.

### **3.2 Financial Constraint Assumptions**

The Transportation Plans are fiscally constrained as discussed in *40 CFR 93.108*. The Greensboro Urban Area MPO, High Point Urban Area MPO, Winston-Salem Urban Area MPO and Burlington-Graham Long-Range Transportation Plans are fiscally constrained to the year 2030. All projects included in the current 2006-2012 TIP are fiscally constrained, and funding sources have been identified for construction and operation. The estimates of available funds are based on historic funding availability and include federal, state, private, and local funding sources. Additional detail on fiscal constraint is included in each MPO's long-range transportation plan. It is assumed that the projects listed for each horizon year will be completed and providing service by the end of the indicated calendar year (December 31). These transportation networks are described in the respective 2030 Long-Range Transportation Plans. They are also described in greater detail in Appendix D.

### **3.3 Latest Planning Assumptions**

The 2030 Transportation Plans were developed with the latest planning assumptions as discussed in *40 CFR 93.110*. The Piedmont Travel Demand Model was developed by NCDOT for the urbanized portion of the Triad non-attainment area. The MPOs provided housing, employment, and population projections, and a set of highway and transit projects consistent across jurisdictional boundaries was developed through regional MPO coordination. Additional detail on these planning assumptions is provided below. The conformity analysis began on 10/27/05. This date was defined through interagency consultation process and documented in the conformity process schedule provided in Appendix C.

Land use and demographic data were collected by regional planning agencies and staff members of BGMPO, GUAMPO, HPMPO and WSMPO. A regional methodology was agreed upon that included updating residential and employment data to the end of 2002, and preparing growth forecasts to 2030.

Residential data included population, dwelling units, households, median income and university-related group quarters population (dormitories, fraternities and sororities). Residential data was based on Census 2000 data from Summary File 1, except that median income data was based on the Census Transportation Planning Package part 1.

Forecasts were prepared by local planning department staff with guidance from staff at the four MPOs. A regional methodology was applied to maintain consistency between residential and employment forecasts and adopted land use plans. Data and forecasts were submitted for public review by each MPO, and adopted for use in developing travel demand and air quality forecasts by each MPOs Transportation Advisory Committee.

The Triad Regional Travel Demand Model (TDM) uses the basic four-step process (trip generation, trip distribution, mode choice and assignment). All four steps of the process are discussed in greater detail in the sections below.

The Triad Regional Model's TRANPLAN model was developed Transportation Planning Branch and is housed at NCDOT. The TRANPLAN model covers the contiguous boundaries of Guilford and Forsyth Counties (including the portions within the BG MPO) and a portion of Davidson County (including the portion within the HPMPO, and WSMPO).

Outside of the modeled area, NCDOT utilizes a spreadsheet that incorporates the vehicle-miles traveled (VMT) universe file and historical trends to project the VMT in future years at the county level. The

spreadsheet calculates speed based on a model originally developed by the Texas Transportation Institute (TTI) but modified by NCDOT. Speeds generated by the spreadsheet are incorporated into the MOBILE6.2 emissions program. Then, emission factors developed by MOBILE6.2 are imported into the spreadsheet and multiplied by forecasted VMT to generate emissions. The rural spreadsheet model is used for the rural area of Davidson County and is factored based on population percentage for those portions of non-attainment counties not covered by the TRANPLAN model. This methodology has been used to demonstrate conformity in other areas and has received approval from interagency partners.

There are no court orders or special agreements that apply to conformity (40 CFR 93.109).

### 3.4 Future Year Roadway Projects

Roadway improvements used for conformity modeling were developed in the 2030 Transportation Plan process in each MPO. Outside of the MPO boundaries, TIP projects from the 2006-2012 TIP served as the future year roadway projects. For the 2030 Plans, lists of needed projects were developed based on modeled congestion and identified local needs. Improvements were coded into the TDM and analyzed. Intermediate analyses for the years 2014, and 2020 were performed to assist in prioritizing the 2030 roadway needs. The output data from year 2002 and 2014 network were used to interpolate the 2010 transportation data. The final transportation year network data for 2010, 2020, and 2030 are fiscally constrained. Projects were added from MPO priority lists until estimated project costs equaled the expected funding available. In the air quality analysis, the base network (2002) and the three future networks (2010, 2020, and 2030) were used for the conformity determination are the same as the networks used for the 2030 Long Range Transportation Plans. The Throughout the process to develop the roadway networks, the MPOs and NCDOT identified any initial inconsistencies in project timing and characteristics (e.g. cross-section) for those projects crossing jurisdictional boundaries and reached consensus on consistent solutions.

### Figure 2. Regional Significance

The following criteria is used to identify major existing and future regional roadway systems that may produce significant impacts to air quality emissions with respect to the Triad region.

#### **Regional Significance Criteria**

1. The facility serves regional transportation needs (i.e. facilities that provide access to and from the region or that provide access to major destinations in the region);
2. The facility is functionally classified higher than a minor arterial (minor arterials may be regionally significant if their main purpose is to provide access to major facilities in the region);
3. The facility is a fixed guideway transit facility; and
4. The facility is included in the travel model for the region (In many cases collector streets are modeled that are not regionally significant).

To be regionally significant a facility should meet one or more of the criteria in this checklist. 40 CFR Part 93.101

Appendix D includes lists of the future year roadway projects in the Triad area as indicated below, including indications of which projects are regionally significant and which projects are exempt. There are no future roadway projects within the portion of Guilford County and the Burlington-Graham MPO, therefore no list of projects is included.



**Table 6. MPO Roadway Projects List (Appendix D)**

Area	Transit Project List
Greensboro Urban Area MPO	2030 LRTP & Exempt Projects
High Point Urban Area MPO	2030 LRTP & Exempt Projects
Winston-Salem Urban Area MPO	2030 LRTP & Exempt Projects
Burlington-Graham MPO	No future year projects in 2030 LRTP or its TIP subset
Guilford County	2006-2012 TIP Projects
Davidson County (Donut portion)	2006-2012 TIP Projects
Forsyth County	2006-2012 TIP Projects

The exempt projects listed in Appendix D, both highway and transit, will serve as the Long Range Transportation Plans (LRTPs) for the region in the event of a conformity lapse. A conformity lapse is when an area develops a LRTP that does not pass the conformity test. The TAC must adopt a LRTP of exempt projects (*40 CFR 93.126, 127 & 128*) that will serve as the LRTP/TIP for the area in the event of conformity lapse. This will allow exempt projects to receive federal funding. A planning lapse is when an area has missed their required LRTP update date. During a planning lapse new Federal aid funds are stopped for all projects **INCLUDING** exempt projects (*40 CFR 93.126, 127 & 128*).

### 3.5 Transit Networks

As with the roadway projects, each MPO developed transit projects for its LRTP. The base year network was modeled from existing routes and fares for the transit systems in 2002. Future year networks were based on fiscally-constrained projected new or expanded services from regional transit plans, local bus system short range plans, corridor transit plans and other projected bus service expansion estimates, where available. As with the roadway networks, the MPOs and NCDOT identified and rectified any initial inconsistencies in project characteristics or implementation years where transit projects crossed jurisdictional boundaries.

**Table 7. MPO Transit Project List (Appendix D)**

Area	Transit Project List
Greensboro Urban Area MPO	2030 LRTP & Exempt Projects
High Point Urban Area MPO	2030 LRTP & Exempt Projects
Winston-Salem Urban Area MPO	2030 LRTP & Exempt Projects
Burlington-Graham MPO	No future year projects in 2030 LRTP or its TIP subset
Guilford County	2006-2012 TIP Projects
Davidson County (Donut portion)	2006-2012 TIP Projects
Forsyth County	2006-2012 TIP Projects

### **3.6 Congestion Mitigation/Air Quality (CMAQ) Projects**

The NC Department of Transportation has established an allocation and review process for CMAQ projects. Each MPO and RPO in a non-attainment or maintenance area receives an allocation of CMAQ funds based on population and air quality status. In addition, a statewide pool of CMAQ funds will be allocated to projects serving more than one non-attainment area on a competitive basis. MPO and RPO project priorities and project applications for statewide funding. This conformity report includes a listing of funded CMAQ projects in the Triad Area in Appendix E, for those projects within the non-attainment area for PM2.5.

### **3.7 Trip Generation**

Trip generation is a module of the TDM performed using the NCDOT's Internal Data Summary (IDS) program. "IDS" is a regression type trip generation model that estimates trip productions using five housing classifications per analysis zone and one trip rate per housing classification. Housing Classifications have been updated from 1994 surveys and projected from the applied 2000 census data.

The travel behavior survey was used to determine where the trips would be 'attracted to'. Regression coefficients were developed for industrial, retail, highway retail, office and service employment, as well as total dwelling units. Trip attractions are estimated based on the number and type of employees in an analysis zone and the number of commercial vehicles garaged in the analysis zone.

The Triad Regional Travel Demand Model uses four urban and rural trip purposes: home based work (HBW), home based other (HBO), and non-home-based (NHB), external-internal (EI), truck (TK), and external-external (EE) or through trips. Productions and attractions are individually constrained with productions balanced to match attractions by both IDS and later in the gravity model. For the latest model, more extensive data gathering and analysis was conducted by the MPOs and NCDOT to include home based shopping (HBSH) into the home-based other (HBO) trip purpose.

Several employment types were identified as special generators for the Triad Region. This classification was based on employment centers that exhibited unique trip attraction characteristics as demonstrated by the travel behavior survey data. Universities, regional shopping centers, regional hospitals and the PTI airport were all identified as special generators. Special generator rates were developed for those groups. Trip tables were also built for commercial vehicles

### **3.8 Trip Distribution**

The TDM uses a standard gravity model to distribute trips. The model builds zone-to-zone trip tables (by purpose) using a weighted-sum of travel time and distance. For assignment purposes the individual trip tables are aggregated into a single trip table for each LRTP analysis year (2002, 2014, 2020, and 2030).

### **3.9 Mode Choice and Transit Assignment**

The TRANPLAN travel model for the Triad does not have a Mode Choice component.

### **3.10 Highway Assignment and Vehicle Miles Traveled**

Once the total number of trips has been determined, and the mode by which the trip is made has been chosen, the trips are assigned to the network. For the TDM, this is done using an equilibrium loading. In an equilibrium loading, trips are loaded in a series of "All or Nothing" loading iterations (which identifies the shortest travel time path) After each 'all or nothing' loading, travel times are recalculated. This process continues until the network is in equilibrium. The network is considered to

be in equilibrium when further travel time reductions for an individual traveler cannot be achieved by changing the selected path. To better capture the effects of congestion, the Triad model was loaded separately for the a.m., p.m. and off-peak time periods. Peak periods are 4-hour periods.

### **3.11 Method of Reporting VMT and Speed**

The Triad Regional Travel Demand Model was developed in 1994, then updated in 2004 with 2002 ground counts and projected to 2004 model counts using an equilibrium loading method. This method assigns vehicle trips based on equalizing the capacity on the network links. After the vehicle trips are assigned, the TDM must be separated by designated non-attainment region to be analyzed independently.

For each designated non-attainment area, the TDM has the capability to provide daily VMT and Speed output for each fiscally constrained analysis year network corresponding to programmed TIP construction projects and post year construction projects. VMT and average speeds by functional classification derived directly from model link data are essential inputs required to the run the MOBILE6.2 emissions model. The fiscally constrained year networks are used as inputs into a link analysis tool called "Truspeed". "Truspeed" is a post processor that calculates link travel speeds based on assigned traffic volume, number of through lanes, and number of signals per mile. "Truspeed" is based on Chapters 3 and 11 of The Highway Capacity Manual. Truspeed calculates and aggregates the vehicle miles traveled (VMT) and travel speeds by functional classification for each analysis year network.

Since the TDM transportation networks are in NAD83 meters, the Truspeed travel units were in vehicle kilometers of travel (VKT), but then converted to vehicle miles of travel (VMT). All VMT and Speed data used in the conformity determination are from the last iteration of the TDM. The VMT for each functional class is then multiplied by emissions factors from the MOBILE6.2 model (See Appendices F& H) to determine the total emissions for each fiscally constrained network year. The VMT and Speed data summary are found in Appendix G.

### **3.12 Emissions Analysis for Davidson County portion outside the Travel Demand Model (also called Rural Analysis)**

This portion of the report describes the emissions analysis for the portion of Davidson County outside the Travel Demand Area and uses the transportation plan approved for the donut portion of Davidson County which is the 2006 – 2012 Transportation Improvement Program for Davidson County, and the emissions factors developed by the North Carolina Department of Environment and Natural Resources (NCDENR), as detailed in Appendix F. The analysis documented in this report covers the donut portion of Davidson County outside the High Point Urban Area Metropolitan Planning Organization (MPO).

The emissions from this analysis are combined with emission from the modeled portion of Davidson County and compared to the total budget for Davidson County non-attainment area.

The donut portion of Davidson County's future transportation system includes all fiscally constrained transportation improvements to be implemented by 2030. The system is composed of the existing transportation network plus all projects in the 2006-2012 Transportation Improvement Program for the area.

An initial interagency consultation meeting for this analysis was held on *July 12, 2005*. Representatives from the North Carolina Department of Transportation (NCDOT), NCDENR, Environmental Protection Agency (EPA), and the Federal Highway Administration (FHWA) were physically present at these meetings. The Federal Transit Administration (FTA) participated by video and/ or conference call. Documentation of this meeting and all agency comments are included in Appendix C.

### **3.12.1 Financial Constraint**

The Davidson County Transportation Improvement Program is fiscally constrained to the year 2012. The programmed funds include federal and state funding sources. The transportation networks assumed in each analysis year are balanced with available funds. These transportation networks are described in detail in Appendix D.

### **3.12.2 Latest Planning Assumptions**

The 2010 Davidson County transportation plan was developed with the latest planning assumptions as discussed in 40 CFR Part 93.110. The transportation plan for the donut portion of Davidson County is the 2006 – 2012 Transportation Improvement Program. Refer to Section 5 for explanations of speed estimates and Appendix H for a summary by horizon year. There are no court orders or special agreements that apply to conformity in the Davidson County (40 CFR Part 93.109).

### **3.12.3 Future Year Roadway Networks**

The future year roadway networks used in the conformity analysis were developed by adding the 2006 - 2012 Transportation Improvement Program projects to the existing roadway network in the appropriate horizon years.

### **3.12.4 Vehicle Miles Traveled (VMT) and Estimation Procedures for Davidson County**

The Transportation Planning Branch of the NCDOT provides the VMT for Davidson County. The 1992-2003 VMT data is expressed as Daily Vehicle Miles of Travel (DVMT). This data is based upon the Annual Average Daily Traffic (AADT) in universe file. The annual Highway Performance Monitoring System (HPMS) VMT reported to the Federal Highway Administration (FHWA) is derived from a subset of the universe file. North Carolina records AADT data for all roads in all functional classifications. However, only 73.8% of the local functionally classed road mileage were covered by actual counts. For links without counts, an Average Daily Traffic (ADT) count of 400 vehicles per day was assumed.

The projection of VMT was based on trend line using an ordinary least squares linear regression extrapolation of a 10-year period 1995-2004 for Davidson County. The total VMT, including rural and urban road types, was used to perform statistical analysis. This approach will compensate for the reclassification of VMT from year to year due to the expansion of urbanized boundaries or other reasons. Therefore a regression analysis was performed to determine the correlation of data and predicted VMT values for the specific years of interest. Finally, 2004 VMT by functional classes (using the ratio of each functional class's VMT to the total VMT) was used to disaggregate of projected VMTs. Results were evaluated for reasonable growth and consistency. This VMT projection methodology was based on the EPA document Section 187, VMT Forecasting and Tracking Guidance, January 1991. This task was completed by August 31, 2005. Table 8 provides a summary of vehicle miles traveled for each horizon year.

**Table 8: Forecast of the Vehicle Miles Traveled for the Donut Portion of Davidson County**

Horizon Year	Daily VMT	Population	Employment
2002 <sup>1</sup>	2,881,770	103,137	50,000
2010	3,319,110	109,198	62,350
2020	3,861,540	117,432	76,004
2030	4,403,980	123,921	92,649

### 3.12.5 Emissions Results

The results of the emissions analysis for each pollutant are shown in Table 9 below. NCDENR provided the emissions factors used in this analysis.

**Table 9: Daily PM 2.5 and NOx Emissions:**

Year	PM 2.5 (kg/day)	NOx (kg/day)
	Donut portion of Davidson Co	Donut portion of Davidson Co
<b>2002</b>	<b>163</b>	<b>9523</b>
<b>2010</b>	<b>94</b>	<b>5116</b>
<b>2020</b>	<b>59</b>	<b>1953</b>
<b>2030</b>	<b>62</b>	<b>1164</b>

### 3.12.6 Method of Calculating Speed

Volume/delay relationships are based on the speed model originally developed by the North Central Texas Council of Governments (NCTCOG) for the Dallas/Fort Worth area and used for El Paso County (Texas Transportation Institute [TTI] Research Report 1375-5) and the Jefferson-Orange-Hardin Regional Transportation Study (JOHRTS) (TTI Research Report 1375-6). Speed is a function of roadway capacity and traffic volume. Speed estimates are developed using the hourly volumes and capacities by roadway functional classification, along with free flow speeds derived from the three speed studies in Mecklenburg County, the Triad, and Wake County. Off-peak speeds from each study were used since the free flow speeds represent the uncongested speeds on the facilities. Total capacity for a road type is assumed to be the per lane capacity times the number of lanes. Signals, grades, heavy vehicles, and a number of other factors are assumed to be at the midpoint of the Highway Capacity Manual typical ranges.

The TTI method uses the following equations in Figure 2 to estimate speed.

- Delay: congestion delay (in minutes/mile);
- A & B: volume/delay equation coefficients;
- M: maximum minutes of delay per mile;
- V/C: time of day directional V/C ratio
- For  $C > 3,400$ :  $A=0.015$ ,  $B=3.5$  and  $M=5.0$

- For  $C < 3,400$ :  $A=0.050$ ,  $B=3.0$  and  $M=10$

$$Delay = \text{Min} \left[ Ae^{B\left(\frac{V}{C}\right)}, M \right]$$

$$\text{Congested speed} = \frac{60}{\left[ \frac{60}{\text{Freeflow Speed}} \right] + Delay}$$

### 3.12.7 Capacity

Total capacity for a functional classification is determined by multiplying the per lane capacity times the number of lanes. The number of lanes is calculated by dividing lane miles by centerline miles. The capacity in the delay equations represents level of service E. Based on Highway Capacity Manual, capacities for all facility types range from about 200 passenger cars per lane per hour to over 2300 passenger cars per lane per hour. Signals, grades, heavy vehicles, and a number of other factors are assumed to be at the midpoint of the Highway Capacity Manual typical ranges, in order to develop the capacities in Table 10.

**Table 10: Capacity by Functional Class:**

<b>Functional Class</b>	<b>Capacity (passenger cars per lane per hour)</b>
Urban Interstate	2200
Urban Expressway	2100
Urban PA	670
Urban Minor Arterial	620
Urban Collector	560
Urban Local	340
Rural Interstate	2200
Rural PA	1000
Rural Minor Arterial	920
Rural Major Collector	840
Rural Minor Collector	670
Rural Urban Local	500

### 3.12.8 Free flow Speed

Free flow speed is the speed at which the average vehicle will travel on a facility without the influence of other vehicles. The rural spreadsheet deals with the uncongested conditions, i.e. level of service A. Over the past five years NCDOT and the MPOs, have performed speed studies in Mecklenburg County, the Triangle, and the Triad. While the data was collected by differing methods and at different times, the data agrees generally. Given that free flow speeds are supposed to represent the uncongested speeds on the facilities, NCDOT has chosen to work only with the off-peak speeds from each travel time study. Table 11 shows the off-peak speeds reported in each study.

**Table 11: NC Regional Area Free Flow Speeds**

<b>Functional Class</b>	<b>Mecklenburg</b>	<b>Triangle</b>	<b>Triad</b>	<b>Avg.</b>
Urban Interstate	62.7	62.8	65.2	64
Urban Expressway	50.8	60.6	58.5	57
Urban PA	30.9	31.9	27.8	30
Urban Minor Arterial	28.7	34.0	36.3	33
Urban Collector	34.8	33.5	28.7	32
Urban Local	36.9	36.9	23.5	32
Rural Interstate	67.0	67.2	67.7	67
Rural PA	47.0	42.4	54.0	48
Rural Minor Arterial	40.8	52.8	43.8	46
Major Collector	42.3	45.7	46.9	45
Minor Collector	41.7	43.6	47.6	44
Rural Local	42.2	42.2	47.6	44

#### **4 Interim Emissions Test**

Baseline and action scenarios were developed to use in the emissions tests. The Baseline and action scenarios were agreed to through the interagency consultation process. The Baseline scenario is the set of highway, transit, pedestrian/bicycle and travel demand management facilities and services, and accompanying socioeconomic conditions, in place as of December 2002. The Baseline scenario includes the 2002 highway and transit networks as described in the previous section. The action scenarios include all of the Baseline scenario components, plus those facilities and services resulting from implementation of the transportation plans in each analysis year, 2010, 2020 interim years and the 2030 horizon year.

One county in the non-attainment area is completely within the TDM boundary (Guilford County). (Portions of Davidson County are outside of the TDM boundary).

##### **4.0.1 Emissions analysis source**

VMT and speeds for the emissions analysis will be derived from the TDM where it is available. VMT and speeds for the area outside of the TDM for Davidson County will come from the NCDOT rural spreadsheet.

##### **4.0.2 Emission comparison years**

Emissions must be calculated for a baseline year (2002), an interim year not more than 5 years from the year in which conformity is determined for areas without budgets (i.e., within 5 years if 2006) and at further intervals not exceeding 10 years, including the LRTP’s horizon year (2030). Proposal: the entire area will be analyzed for 2002 baseline, 2010 (LRTP intermediate year/also attainment year), 2020 (LRTP intermediate year) and 2030 (LRTP horizon year).

The following is a list of Specific Conformity Years (PM2.5):

- a. Baseline: 2002
- b. Horizon: 2030



In summary, the entire area was analyzed for 2002 baseline, 2010 and 2030 (LRTP intermediate years), and 2030 (LRTP horizon year).

**Table 12. Triad Area Transportation Conformity Analysis Matrix**

Triad PM2.5 Non-Attainment Area Transportation Conformity								
County	Area model status	Area emissions budget	Conformity Test	Emission Analysis Source	Emission Comparison Years			
					2002 <sup>1</sup>	2010	2020	2030
Davidson	modeled area	No budget	Interim emission test	TDM	✓	✓	✓	✓
Guilford	modeled area	No budget	Interim emission test	TDM	✓	✓	✓	✓
Davidson	donut area	No budget	Interim emission test	rural spreadsheet	✓	✓	✓	✓

<sup>1</sup> 2002 shall be used as the baseline year since no budgets are established for PM 2.5 emissions comparison.

**Note:** Areas without budgets must have one analysis year within 5 years of the conformity determination (which will occur in 2006). No area will have a gap larger than 10 years. The baseline and horizon years must be analyzed.

**Area:** The non-attainment area of Guilford County is within the TDM boundary. Davidson County has a part within the modeled area and a part outside of the modeled area.

The use of different analysis methods in different parts of the non-attainment area does not preclude future unified conformity efforts in the region.

#### 4.1 Emissions Model

MOBILE6.2 was used to develop the emissions factors. Motor vehicle emission controls considered in the MOBILE6.2 model include the following:

**Control Strategies:** Emission reduction credits will be taken for the following on-road mobile SIP commitments or Federal programs.

**Strategy**

- I/M Program*
- Tier 2 vehicle's Emission Standards*
- Low Sulfur Gasoline and Diesel fuels*
- Heavy Duty Vehicle Rules 2004 and 2007*
- Low RVP Gasoline*
- On board vapor recovery*

**Methodology/Approach**

- Accounted for in MOBILE6.2 model*
- Accounted for in MOBILE6.2 model*
- Accounted for in MOBILE6.2 model*
- Accounted for in MOBILE6.2 model*
- Accounted for in MOBILE6.2 model*
- Accounted for in MOBILE6.2 model*

Also, area specific information is used for such items as vehicle age distribution and vehicle type distribution rather than national default values, as documented below.

#### 4.2 Development of Emissions Factors

A critical element of any emissions analysis or estimate is the development and utilization of the emissions factors applied to the travel estimates. FCEAD provided emission factors under the guidance of NCDAQ and NCDOT. NCDOT provided model inputs (both Speed & VMT) for each PM 2.5 non-attainment area tested. The MOBILE 6.2 emissions factor model was used to develop the emissions factors in October 2005 Guilford and Davidson Counties. These factors are shown in Appendix F.

FCEAD provided motor vehicle emissions factors by federal functional classification of the roadway system. In addition the percentage of motor vehicles subject to the inspection and maintenance program is estimated from current accident data. The scope of North Carolina's motor vehicle inspection and maintenance program is set to expand from nine counties to forty-eight counties by 2007. The phasing in of the I&M program is reflected in Table 13.

**Table 13. Percentage of Vehicles Subject to Inspection and Maintenance Programs**

Location	2002	2010-2030
Davidson County	0%	95%
Guilford County	76%	94%

#### 4.3 Development of VMT Mix by Vehicle Type

The North Carolina Department of Transportation (NCDOT) provides the VMT and average speed for six urban and six rural road types for each analysis year (See Appendix G); vehicle mix data are available for the same road types. Automatic traffic recording stations and selected Highway Performance Monitoring System (HPMS) locations were used and counts taken throughout 1999 - 2001 are used to determine the percentage of vehicles, by vehicle type, for various road types. Vehicle classification data was used in conjunction with Mobile6 default vehicle mix to estimate fleet distribution by functional class. The calculation follows the August 2004 USEPA Guidance. The final numbers reflect the change in the mix (i.e. increase in the number of SUVs and pick-ups) for each year using Mobile6 projection and variation of mix across the different road type using NC data. This reflects 16 vehicle classes per road type.

#### 4.4 Vehicle Age Distributions

The vehicle age distribution is based on the North Carolina Department of Motor Vehicles' 2002 (DMV) registration records for the in-use fleet in the Guilford and Davidson Counties. DMV provided the information. The data was modified and arranged to comply with Mobile6.2

#### 4.5 Transportation Control Measures

There is no transportation control measures pertaining to the Triad Area.

#### 4.6 Comparison Test by Location and Pollutant

The non-attainment designation covers the following geographic areas:

- Davidson County
- Guilford County

Five organizations are responsible for conformity determinations; each must make a conformity determination for its respective area in order for all of the areas to be designated in conformity:

- Burlington-Graham MPO
- Greensboro Urban Area MPO
- High Point Urban Area MPO
- Winston-Salem Urban Area MPO
- NCDOT (donut area of Davidson outside of the MPO area boundary)

For this report, emissions were calculated and reported at the County level. 40 CFR Part 93.106 requires that transportation emissions be estimated at, minimum, ten-year intervals beginning with the base year of the travel demand model. Refer to Table 12 earlier in this section for details on emission budgets and comparison years. Table 12 summarizes the emissions test used and decision-making responsibility for conformity findings in each County.

**Table 14. Emissions Test and Responsibility for Conformity Findings**

Location	Pollutant(s)	Emissions Test	Conformity Finding Responsibility
Davidson County	<i>PM 2.5 &amp; NOx</i>	less-than-baseline	High Point Urban Area MPO Winston-Salem Urban Area MPO (In consultation with Piedmont Triad RPO)
Guilford County	<i>PM 2.5 &amp; NOx</i>	less-than-baseline	Greensboro Urban Area MPO High Point Urban Area MPO Burlington-Graham MPO

The results of the emission comparisons are summarized by County in Tables 15 through 16. Detailed emissions analysis results by county are contained in Appendix H.

**Table 15. Davidson County Emissions Comparison Summary (kg/day)<sup>1</sup>**

Year	PM2.5			NOx		
	MPO Portions	Donut Portion	County Total	MPO Portions	Donut Portion	County Total
2002 <sup>2</sup>	72	163	235	4,155	9523	13,678
2010	43	94	137	2,288	5116	7,404
2020	28	59	87	872	1953	2,825
2030	31	62	93	565	1164	1,729

**Table 16. Guilford County Emissions Comparison Summary (kg/day)<sup>1</sup>**

Year	PM2.5			NOx		
	Model	Off-Model	Comparison	Model	Off-Model	Comparison
2002 <sup>2</sup>	643	3	640	38,863	251	38,612
2010	393	3	390	18,758	142	18,616
2020	225	3	222	6,684	105	6,579
2030	246	3	242	5,105	41	5,064

<sup>1</sup> To obtain tons per day, divide kilograms per day by 907.1847

<sup>2</sup> Baseline year.

## **5 Public Involvement and Interagency Consultation**

The 2030 Transportation Plans are consistent with consultation requirements discussed in *40 CFR 93.105*. Interagency consultation was a cooperative effort on the part of the Burlington-Graham MPO, the Greensboro Urban Area MPO, the High Point Urban Area MPO, the Winston-Salem Urban Area MPO, the Piedmont Triad Area RPO, the North Carolina Department of Transportation and the Federal Highway Administration. The process was administered by the Piedmont Authority for Regional Transportation (PART) on behalf of the partners and was organized according to the sections in the document titled *Triad Region Transportation Conformity*:

*Pre-Analysis Consensus Plan, a document agreed to at the initial interagency consultation meeting on July 12, 2005 and updated periodically. Subsequent interagency consultation meetings were held on August 31, 2005 and September 19, 2005. A copy of the latest version of the Consensus Plan, written agency comments and agendas and summaries of the interagency consultation meetings are included in Appendix C.*

Public review of this report was handled in accordance with each MPO, PART and RPO public participation policy for Transportation Plans. Copies of all public participation policies are included in Appendix I. Comments from the general public participation process and interagency review are incorporated into the final Conformity Analysis and Determination Report. All written comments on the draft report from the general public and interagency review are included in Appendix J and Appendix K respectively of the final report.

## 6 Conclusion

Based on the analysis and consultation discussed above the following transportation plans and TIPs conform to the purpose of the North Carolina State Implementation Plan. In every horizon year for every pollutant in each geographic area, the emissions expected from the implementation of the long-range plans and TIPs are less than the emissions budgets established in the SIP or the baseline emissions where no SIP budget is available.

**Table 17: Summary of Conformity Status of Triad Transportation Plans**

<b>Criteria</b> (√ indicates the criterion is met)	<b>Burlington-Graham MPO</b> 2030 LRTP & 2006-12 TIP*	<b>Greensboro Urban Area MPO</b> 2030 LRTP & 2006-12 TIP*	<b>High Point Urban Area MPO</b> 2030 LRTP & 2006-12 TIP*	<b>Winston-Salem Urban Area MPO</b> 2030 LRTP & 2006-12	<b>Davidson County Rural Area of the Triad</b> 2006-12 TIP
<b>Less Than Emissions Budget(s) or Baseline</b>	√	√	√	√	√
<b>TCM Implementation</b>	The NC SIP includes no Transportation Control Measures in the Triad Area				
<b>Interagency Consultation</b>	√	√	√	√	√
<b>Latest Emissions Model</b>	√	√	√	√	√
<b>Latest Planning Assumptions</b>	√	√	√	√	√
<b>Fiscal Constraint</b>	√	√	√	√	√

\* The 2006-12 TIPs are subsets of the 2030 LRTPs: Appendix D.

In the final Air Quality Conformity Analysis and Determination Report, please refer to resolutions of conformity finding and approval in Appendix L, and conformity determination endorsement in Appendix B.