AIR QUALITY
CONFORMITY ANALYSIS REPORT
FOR THE STATE COLLEGE, PA OZONE MAINTENANCE AREA
(8-hour Ozone NAAQS)

VOLUME I - EXECUTIVE SUMMARY

FFY 2009 TIP and 2030 LRTP
(August 2009 Amendments)

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1. INTRODUCTION

This document provides an analysis of the air quality implications of the Centre County Metropolitan Planning Organization's (MPO) FFY 2009-2012 Transportation Improvement Program (TIP) and 2030 Regional Transportation Plan (LRTP). The analysis demonstrates transportation conformity to the 8-hour ozone National Ambient Air Quality Standards (NAAQS)**.** This document updates the previous conformity determination to include the Old Gatesburg Road Extension project in Ferguson Township.

This document replaces the previous approved conformity demonstration of the TIP and LRTP and ensures that the findings meet all current ozone criteria established by the U.S. Environmental Protection Agency (EPA).

Since vehicular emissions contribute to ozone violations, the Act requires transportation planners in nonattainment and maintenance areas to consider the air quality impacts of their proposed plans, programs, and projects. These activities, if subject to federal involvement, must be shown to conform based on the requirements for each pollutant.

The State College 8-hour ozone maintenance area, which encompasses Centre County, must make a conformity determination for ozone precursors. An affirmative conformity determination by the Centre County MPO is necessary to demonstrate conformity; and thereby allow the regional TIP/LRTPs to be approved by U.S. DOT.

In an attempt to reduce harmful emissions nationwide, the Clean Air Act Amendments (CAAA) of 1990 classified certain metropolitan areas as nonattainment if they did not comply with federal air quality standards under the 1-hour ozone standard. Centre County was originally designated as an attainment area under the 1-hour ozone NAAQS.

Effective June 15, 2004, the United States Environmental Protection Agency (US EPA) finalized ground-level ozone designations under the 8-hour ozone NAAQS. The standard replaced the pre-existing 1-hour ozone NAAQS and the 1-hour ozone NAAQS was withdrawn on June 15, 2005. The State College area (Centre County) was originally designated as a *Basic ozone* nonattainment area under the 8-hour standard.

On November 14, 2007, EPA approved a State Implementation Plan (SIP) revision requesting that the State College ozone nonattainment area be redesignated as *attainment* for the 8-hour ozone standard. In conjunction with its redesignation request, the Pennsylvania Department of Environmental Protection (DEP) submitted a SIP revision consisting of a maintenance plan for the region that provides for continued attainment of the 8-hour ozone NAAQS for at least 10 years after the redesignation.

EPA approved the adequacy determination for motor vehicle emission budgets (MVEBs) that are identified in the maintenance plan for purposes of transportation conformity. Emission budgets are provided for Centre County for the 2009 and 2018 analysis years. Based on the approved maintenance plan MVEBs, transportation conformity for the 8-hour ozone standard must demonstrate that future year emissions are no greater than the established 2009 and 2018 emission budgets.

Pollutants subject to conformity determination in ozone nonattainment and maintenance areas include Volatile Organic Compounds (VOC) and Nitrogen Oxides (NO_x).

1.1 Purpose

The CAAA directs the EPA to implement regulations providing for reductions in pollutant emissions. This conformity demonstration is based on the current final conformity guidance, 40 CFR Parts 51 and 93 as revised, and adheres to all requirements in the 8-hour ozone NAAQS. Pollutants addressed include volatile organic compounds (VOC) and nitrogen oxides (NOx).

Transportation conformity for ozone includes a demonstration that emission forecasts do not exceed the emission budgets established in the maintenance plan. Ozone analyses are for emissions during a *summer day*

This report evaluates the Highway and Transit Transportation Improvement Program (TIP) and the Long Range Regional Transportation Plan (LTRP) for Centre County. It presents the most recent estimates of highway mobile source emissions for the region, including consideration of significant projects on the TIP and LRTP. It provides the basis for

determining if the conformity criteria have been satisfied for both ozone and fine particulates.

1.2 Coverage

This report considers the impact of emissions within Centre County, PA.

Ozone is a secondary pollutant; it is not directly discharged into the atmosphere. Instead, it is produced by the reaction of several precursor chemical compounds in the presence of sunlight. Volatile organic compounds (VOC) and nitrogen oxides (NO_x) are primary reactants. VOCs are alternately classified as non-methane hydrocarbons (NMHC), since methane is less reactive and therefore not considered. Under the EPA conformity regulations, both VOC and NOx must be analyzed for regional transportation conformity.

1.3 Analysis Overview

Emissions from highway vehicles within the area have been analyzed using EPA's MOBILE6.2, the agency's currently approved computer model. The modeling procedures are described in more detail later in this report.

Certain projects were excluded if it was determined that they would not impact regional emissions (e.g., reconstructing bridges, resurfacing projects, etc.) in accordance with 40 CFR Parts 51 and 93. These projects are noted as "Exempt" (X) in Volume II, Appendices A and B. Other projects are noted as "Not Significant" (NS), and include those projects which are not exempt by definition, but whose air quality impacts are too small to quantify through current modeling practice. All decisions on project significance were made using the guidelines in the report, "PENNDOT Project Review & Classification Guidelines for Regional Air Quality Conformity", dated March of 2008.

This conformity test was conducted under the requirements of 40 CFR Parts 51 and 93. For ozone, forecast emissions are demonstrated to be no greater than the 2009 and 2018 emission budgets in the State College Area maintenance plan. Ozone emissions are analyzed are for a summer weekday.

Analysis years are for 2009, 2018, 2025, and 2030. The 2009 and 2018 years are emission budget years established in the ozone maintenance plan. The 2030 year is the last year of the LRTP, and 2025 is an interim year to ensure there is not more than 10 years between any two analysis years.

1.4 Analysis Limitations

The Final Conformity Rule asserts that the conformity process must include an evaluation of proposed capital facility investments. This is required to assure that such expenditures, which are typically irreversible, are not made without consideration of air quality consequences and that CAAA requirements are being implemented.

In order to proceed with its planned projects, each MPO must adopt a conformity resolution. This study has proceeded with reasonable assumptions and the best available data to provide a valid comparison within these limitations, applying the same assumptions to each of the milestone scenarios within any given year. A reasonable effort has been extended to provide an evaluation of future year emissions.

The planning assumptions used for this conformity submission have been updated as compared to past submissions. Many of the traffic related assumptions are updated on a "triennial" basis to satisfy EPA's latest planning assumption requirements. The last update was based on 2005 data and future efforts will be required in the preparation of 2008 related data. Examples of key tools and input data are presented below:

- MOBILE6.2 is used to determine emission factors for the region.
- Roadway Traffic Data – Uses PENNDOT's 2005 Roadway Management System (RMS) data.
- VMT growth rates based on PENNDOT's VMT forecasting system. Growth rates based on historic HPMS VMT through 2005 and socioeconomic forecasts by county.
- HPMS Adjustments – Missing local roadway VMT is reconciled to the 2005 HPMS to ensure consistency. These adjustments are carried forward to future years.
- Vehicle Mix Patterns – Vehicle mix patterns have been developed for the county based on 2005 PENNDOT RMS truck percentages.
- Vehicle Fleet Ages – Updated 2005 vehicle fleet age data was prepared from the state motor vehicle registration database.

1.5 Document Contents

The conformity analysis for Centre County is divided into two volumes. Volume I is the executive

summary of the analysis. It consists of six sub-sections:

Section one provides introductory material and defines the purpose of the report. Further, it describes the scope of the study: its geographical coverage, the time frame considered, and the pollutant emissions analyzed. The limitations of the study, primarily related to constraints affecting the analysis, are also presented here.

Section two provides a summary of the analysis. This information is also presented in graphic form in Tables 1 through 6 at the end of this report.

A more detailed discussion of the analysis is presented in section three. It provides an overview of the study process and background information on the relation between vehicular emissions and ozone. The Long Range Plan and Transportation Improvement Programs are discussed, with a focus on projects that might significantly affect emissions. Traffic and other parameters used in the modeling process are presented and discussed. This section also includes a discussion of the emission tables (Tables 2, 3, 5, 6) developed during the analysis, and presenting the implications of these results.

The fourth section of this report discusses the "financial constraints" of the Long Range Plan and Transportation Improvement Programs.

Section five discusses the public participation process of the conformity analysis. This process includes the advertisements of availability of the LRTP/TIP and accompanying conformity documents, as well as any comments received and associated responses.

The sixth section concludes this report by summarizing the results of the analysis and stating a conclusion regarding the conformity of the Long Range Plan and Transportation Improvement Programs to the applicable State Implementation Plan, and the Clean Air Act, as amended.

Volume II of this report contains the technical data used to conduct the conformity determination. Key variables, such as vehicle miles traveled (VMT), vehicle hours traveled (VHT), average speed, and daily VOC and NO_X emissions (ozone) are shown. In addition, the LRTP/TIP for the region, MOBILE6.2 set-up files, and other variables are shown. Copies of Volume II are available from PENNDOT's Air Quality Section upon request.

2. SUMMARY

As required by the Clean Air Act Amendments of 1990 (CAAA), a study of vehicle emissions was performed for the State College 8-hour ozone maintenance area, which encompasses Centre County. State and federal emissions control measures are included in the analysis for the relevant analysis year.

The study compared the ozone emission forecasts for VOC and NO_x to the 2009 and 2018 mobile emission budgets established in the maintenance plan. The future emission projections include the implementation of the TIP and LRTP. These projects are listed in section 3.3. The regional evaluation of the projects indicates an overall increase in mobility and a decrease in VOC and NO_X emissions.

For the ozone analysis year of 2009, the VOC and NOx emissions are less than the 2009 budget (for each respective pollutant). For the 2018, 2025, and 2030 analysis years, the VOC and NOx emissions are less than the 2018 budgets.

To further address VOC and NO_x reductions in the later years after the TIP (LRTP years), strategies such as reduction in VMT, speed changes, smoothness of traffic flows, use of alternative fuels, and other factors will be key to further reducing air pollution levels. Some of these have been mandated by the CAAA, and the state has committed to executing others.

3. ANALYSIS

This section of the report presents the premises for the analysis, background information supporting the modeling, and the results of the analyses.

3.1 Overview

This study used a set of computer programs and databases to estimate vehicle miles of travel and operating speeds, and to subsequently calculate emission factors and total emissions. The programs rely on a variety of input factors, which are discussed in more detail below.

Key traffic parameters include daily vehicle miles of travel (DVMT), average speeds, and vehicle type mix. These input factors are calculated by the PPSUITE Post Processor for Air Quality computer program from highway databases containing traffic volumes and descriptions of physical characteristics. In addition, roads are categorized into six functional classifications (Interstate, Other Principal Arterials, Minor Arterials, Major Collectors, Minor Collectors and Local Roads) in three settings: urbanized area, small urban area, and rural area.

The existing DVMT was determined for each roadway class/setting by multiplying the length of road by the number of vehicles using the road per day. Additional adjustments to VMT included:

- Seasonal adjustments to reflect summer weekday conditions.
- Adjustments of daily VMT to align with 2005 HPMS.

The 2005 VMT was then projected to the future years by applying local growth factors derived from both historic traffic volume growth trends and trip-end growth, as related to past and future projected population and employment growth. Using the latest planning assumptions, population growth, employment growth, and land use trends have been considered in the analyses to as great an extent possible.

Speed data was calculated, using the post processing software, for each highway segment and hour of the day, based on the roadway's capacity and traffic volume. Thus, average speeds reflect physical highway conditions, the effects of traffic signals, and congestion caused by traffic volume. For future conditions, congestion (and thereby speed) is affected by traffic growth and other changes in physical conditions due to LRTP and/or TIP improvement projects.

Other input parameters include information regarding vehicle types using the roads and environmental factors. Since local data provides a useful distinction for this comparative analysis, county-specific data was used to describe the vehicle fleet on the highway. The environmental factors used in this analysis (e.g., ambient temperatures) were established based on historic records for peak ozone events within the county (ozone).

This conformity analysis, performed according to the Final Conformity Rules for ozone, indicates that future year emission estimates, including the impacts of planned TIP and LRTP projects, are less than emissions provided in the maintenance plan

3.2 Background

National Ambient Air Quality Standards (NAAQS) have been established by EPA for a number of pollutants considered harmful to public health and the environment. Centre County is in maintenance for ozone.

Ozone is a strong irritant to the eyes and upper respiratory system. It hampers breathing and damages crops and rubberized materials. It is the main component of smog. A region is in nonattainment of the 8 hour ozone standard if the 3 year average of the individual fourth highest air quality monitor readings, averaged over 8 hours throughout the day, exceeds the NAAQS of 0.08 parts per million (ppm).

Ozone is formed by chemical reactions occurring under specific atmospheric conditions. Two of the important classes of compounds in these reactions are hydrocarbons (including VOC) and oxides of nitrogen. Both of these are components of vehicular exhaust. Additionally, the hydrocarbons may be produced by evaporation from vehicle fuel system components, and by displacement of vapors in the gas tank during refueling. By controlling these emissions, ozone formation can be controlled.

The actual reactions occurring in the atmosphere are complex and the subject of ongoing research. However, it is known that the formation of ground level ozone is a photochemical oxidation process activated by sunlight. Higher ozone concentrations are associated with warm temperatures, and high pressure systems involving temperature inversions and low wind speeds. Under these stagnant conditions, emissions and ozone tend to accumulate rather than disperse.

The role that each component plays in formation of ozone is also complex. Increases in NO_x could lead to an increase in ozone, depending on the time of suspension in the atmosphere and its transport to other polluted areas. Reductions in NO_x emissions may achieve regional ozone reductions. On the other hand, reductions in VOC are often most important for local ozone reduction.

Transportation accounts for significant portions of man-made emissions. On average, mobile sources contribute approximately 36% of the hydrocarbons, 45% of the oxides of nitrogen, and 78% of the carbon monoxide emissions from man-made sources. For VOCs, the rate of emissions (expressed in grams per mile for motor vehicles) generally decreases with an increase of vehicle speed. This trend is most dramatic for VOC and CO at low speeds. However, both VOC and CO exhibit a slight increase in emission rates as vehicles travel above 40 miles per hour.

For NO_x, however, the emissions rate is a more gradual decline with increasing speed up to approximately 25 miles per hour. Above that speed, vehicle NO_x emissions increase gradually. At 40 mph, the NO_x emissions begin to increase rapidly, due, in part, to the higher engine temperatures associated with higher speeds. Thus, while increasing speeds generally reduces VOC emissions, increasing speeds may cause NO_x emissions increases (see Chart 1). There is no simple way to solve both issues without producing an overall LRTP and TIP with a mix of strategies that reduce the NOx increases.

Emission Control Strategies:

Recognizing the contribution of transportation sources to air pollution, the federal government initiated an emission control program in 1968. These requirements are periodically revised, based on the effectiveness of existing controls in meeting pollutions challenges. In addition, cleaner burning fuels have decreased emissions rates of gasoline powered cars, and to some extent, diesel vehicles. Additional new federal vehicle and fuel control programs are planned for the period 2004-2010. Increasing VMT, however, tends to counteract a portion of reductions from cleaner vehicles and fuels.

In order to assure that emission controls are working properly, vehicle inspection and maintenance (I/M) programs have been adopted in some nonattainment areas. These programs have the added benefit of improving the fuel efficiency of vehicles on the road. The Pennsylvania inspection and maintenance (I/M) program was upgraded and expanded throughout the state with a phase-in period starting in September 2003 and fully implemented by June 2004.

The program requirements vary by region and include on-board diagnostics (OBD) technology that uses the vehicle's computer for model years 1996 and newer to identify potential engine and exhaust system problems that could effect emissions. The program, named PAOBDII, is implemented by Region, as follows:

- Philadelphia Region - Bucks, Chester, Delaware, Montgomery and Philadelphia Counties,
- Pittsburgh Region - Allegheny, Beaver, Washington and Westmoreland Counties,
- South Central and Lehigh Valley Region - Berks, Cumberland, Dauphin, Lancaster, Lebanon, Lehigh, Northampton and York Counties.

Other elements of the Pennsylvania I/M program include a gas cap test and visual inspections of subject vehicles in the North Region (Blair, Cambria, Centre, Erie, Lackawanna, Luzerne, Lycoming, and Mercer Counties), and a visual inspection as part of the annual safety inspection in the other 42 counties.

The Pennsylvania Clean Vehicles Program adopted in 1998 incorporated the California Low Emission Vehicle Program (CA LEV II) by reference although it allowed automakers to comply with the NLEV program as an alternative to this Pennsylvania program until MY 2006. A rulemaking was approved in December 2006 postponing compliance with the Pennsylvania Clean Vehicles program until model year 2008. The impacts of this program are modeled for all analysis years beyond 2008.

3.3 Long Range Plan/Transportation Improvement Program

The complete Transportation Improvement Program and Long Range Plan for Centre County are included in Volume II, Appendix A, for highways and transit service projects.

Detailed assessments were only performed for those projects on the LRTP and TIP which may have a significant effect on emissions in accordance with 40 CFR Parts 51 and 93. Essentially, only those projects which would increase capacity or significantly impact vehicular speeds were considered. Projects such as bridge replacements and roadway restoration projects, which constitute the majority of the LRTP/TIP list, have been excluded from consideration since they are not expected to significantly alter the volume or speed of traffic.

The following LRTP/TIP AQ significant highway projects are included in this analysis.

1. Route 550 (Bishop Street) Center Turn Lane – Widen existing two lane road to three lanes from just north of School Street in Bellefonte Borough to the I-99/Route 550 Interchange in Spring Township.

2. Route 45 (Old Fort) Center Turn Lane – Widen existing two lane road to three lanes from just east of Williams Road to Route 144 at the Old Fort intersection.

3. Whitehall Road/University Drive Extension Corridor – Widen existing two lane road to three lanes between Route 26 (West College Avenue) and SR 3014 (South Atherton Street) in Ferguson Township, State College Borough, and College Township. Install traffic signal and turning lanes at Blue Course Drive. The project is approximately 3 miles in length.

4. North Atherton Street Corridor Signal Coordination [Congestion Mitigation and Air Quality (CMAQ) funding] – Improve coordination of signal operations by implementing closed-loop and/or hard-wire interconnections to augment existing closed-loop, hard-wire, and time-based systems within the corridor. The project area encompasses approximately 4 miles of roadway, including SR 3014 (North Atherton Street) between Route 26 (Beaver Avenue) and Douglas Drive. The project may also include Vairo Boulevard between North Atherton Street and Waddle Road, Waddle Road between Vairo Boulevard and the Route 322 westbound ramps, and the Lowe's Boulevard/Colonnade Way intersection. The project area is within State College Borough, Ferguson Township, and Patton Township.

5. Old Fort Park-and-Ride Lot (CMAQ funding) – Construct a park-and-ride lot near the northeast corner of the intersection of Routes 45 and 144 in the Village of Old Fort, Potter Township.

6. Route 150 (Benner Pike) Improvements – Widen existing two and three lane road to five lanes between Route 26 and Shiloh Road, and install traffic signal at Nittany Mall entrance. Widen existing two lane road to three lanes between Shiloh Road and the College Township/Benner Township boundary. Widen existing two lane road to three lanes between Paradise Road and Valentine Hill Road, and install traffic signal at Rolling Ridge Drive. All sections of the project total approximately 2.2 miles in length.

7. Route 150/144 Corridor (I-99 to Milesburg) – Implement roadway and traffic signal improvements on Routes 150/144 between the I-99/Route 150 Interchange in Benner Township and Alternate Route 220 near Milesburg. The project will initially focus on signal improvements and potential turning lanes at signalized and unsignalized intersections in the corridor. The Route 150 Congested Corridors Improvement Program feasibility study is evaluating improvements in the corridor between the Route150/550 intersection and the Route 150/144 intersection.

8. Cold Stream Dam Park and Ride Lot - Construct a park-and-ride lot near the Cold Stream Dam adjacent to Route 322 in Philipsburg Borough.

9. Route 150 (Rockview) Park and Ride Lot - Construct a park-and-ride lot near the I-99/Route 150 Interchange in Benner Township.

10. Route 150 Widening (I-99 to Bellefonte) – Widen Route 150 between the I-99/Route 150 Interchange in Benner Township and Myrtle Street in Spring Township just south of Bellefonte Borough to five lanes (two travel lanes in each direction and a center turn lane). The project is approximately 2.3 miles in length.

11. SR 3007 (Park Avenue) Widening – Widen existing three lane road to five lanes between Bigler Road and the Route 322 eastbound ramps at the Park Avenue Interchange. The project is approximately 1.5 miles in length.

12. US 322 corridor – Safety improvements along route 322.

13. Old Gatesburg Road Extension - Construct a new two-lane road with turning lanes and one roundabout on a new alignment between Science Park Road and Blue Course Drive.

The following LRTP/TIP AQ significant transit projects are included in this analysis.

1. CATA – Purchase accessible buses to maintain and update CATA's transit fleet. Accessible buses are used to meet ADA requirements and increase mobility.

2. CATA Rideshare Vanpool Vans – Purchase vans to be utilized for the new vanpool program, and to facilitate rides through the existing Regional Rideshare Office.

3. CATA Transit Service to University Park Airport – Extend fixed-route service to the University Park Airport area in Patton and Benner Townships.

4. CATA Transit Service to Grays Woods – Extend fixed-route service to the Grays Woods Planned Community in Patton Township, including service to other trip generators in the Grays Woods Boulevard corridor.

5. CATA Transit Service to Milesburg – Extend fixed-route service to the Milesburg area, including service to other trip generators in the Route 150 corrridor.

6. CATA Transit Service to Moshannon Valley – Implement commuter bus service in peak hours and mid-day between downtown State College and the Philipsburg area along the Route 322/220 corridors.

7. CATA Transit Service to Penns Valley – Implement commuter bus service in peak hours and mid-day between downtown State College and the Penns Valley area along the Route 45/322 corridors.

8. CATA Transit Service to Blanchard – Implement commuter bus service in peak hours and mid-day between downtown State College and the Blanchard/Howard area along the Route 150 corridor.

9. CATA Transit Service to Snow Shoe – Implement commuter bus service in peak hours and mid-day between downtown State College and the Snow Shoe area along the Route 144 corridor.

3.4 Traffic Parameters

Traffic parameters within the emissions modeling provide the basis for the conformity emission test comparisons. For ozone, data is compiled for an average summer day. The following summarizes the data sources, compilation and processing to produce VMT, speeds and emissions by pollutant / precursor. State traffic databases are used to calculate regional VMT and speeds and available travel model outputs are used to estimate project impacts.

Emission factors vary with average speed and vehicle type mix. Daily emissions are calculated by multiplying the emission factor (expressed in grams per vehicle mile) and traffic volumes (expressed in daily vehicle miles of travel for ozone).

Annual Average Daily Traffic (AADT) volumes on individual roadway segments were generated from 2005 PENNDOT HPMS and Roadway Management System (RMS) databases. Actual traffic counts are completed at thousands of sites around the state at least once every three years. Separate from the HPMS, there are 60 permanent counting stations, which provide data on growth trends and periodic fluctuations in traffic volumes (e.g., seasonal variations). Adjustment factors developed from these permanent station records are applied to the HPMS data.

Individual roadway segments are designated within RMS to one of the six (6) functional classifications and to one of the three settings. RMS also records the length of roadway for each segment, the number of lanes, and the traffic volume. A computerized tabulation of daily vehicle miles of travel (DVMT) for each roadway class and setting is generated by multiplying the ADT and the length for each segment, and summing the products. In addition, PENNDOT has developed temporal variation data, which describe both the hourly variation of traffic volumes within a day, the daily variation within a week, and the monthly variation over the year. The AADT volumes were adjusted to reflect average summer weekday conditions in the peak ozone season, and were also disaggregated to hourly volumes within the day to support detailed speed estimation.

VMT forecast growth rates are based on PENNDOT's VMT forecasting system as documented in the report "Statistical Evaluation of Projected Traffic Growth, Traffic Growth Forecasting System: Final Report, March 14, 2005". The resulting forecasting system includes the development of VMT forecasts and growth rates for four functional classifications in each Pennsylvania county: urban interstate, urban non-interstate, rural interstate, and rural non-interstate. The forecasts use statistical relationships based on historic HPMS VMT trends

and future county socioeconomic projections from Woods and Poole Economics, Inc. The statistical models incorporate historical VMT trends, socio and economic data (households, mean household income), and a relative measure of transportation capacity (lane miles per capita). The results of the study have been shared between PENNDOT, DEP, and other Interagency Consultation Group members, including the PA Conformity Work Group (which includes EPA, FHWA, FTA and representatives from larger MPOs within the state).

Speeds were calculated for 2005 and future years by the PPSUITE post processor computer system, and were validated against data from PENNDOT's ongoing speed monitoring program. The PPSUITE software contains procedures to calculate the capacity of each highway segment, giving consideration to the physical attributes of the highway (functional class, number of lanes, geographic setting), the effects of traffic congestion are then accounted for by comparing traffic volumes to this capacity for each hour of the day, and calculating the speeds which will result.

Speeds are forecast by adjusting the link attributes to reflect future physical improvements, changing the traffic volumes to reflect growth or other actions, and recalculating capacities and speeds. This approach has proven to be appropriately sensitive to the variety of factors, which affect congestion and speed.

The traffic data was developed using the projection process described above. Conditions were evaluated for the years 2002, 2009, 2018, 2025 and 2030 for ozone precursors. The roadways affected by the LRTP/TIP projects listed were further analyzed to determine operational changes, which may result from implementation of the LRTP/TIPs. In this way, emission characteristics were developed for the region.

The traffic data serves as the regional population, employment, travel, and congestion estimates required by the CAAA, and uses the area's latest planning assumptions. Travel, represented by DVMT, reflects population and employment trends. The speed estimation procedure serves as a measure of congestion, and is consistent with on-going, established monitoring programs. The estimates were coordinated with other data resources, such as the local planning departments. The RMS and HPMS data are available in published formats.

With supplemental analysis performed by PPSUITE, both speed and vehicle type mix data were used in application of the MOBILE6.2 computer model. The emission factors (expressed in grams per vehicle mile) derived by the model were then multiplied by the appropriate VMT for each functional class / setting / time period to calculate the total emissions (in kilograms per day). Off-system adjustments were made using the Congestion Mitigation and Air Quality (CMAQ) methodologies and the PAQONE emissions model developed by the consulting firm of Michael Baker Jr., Inc. for PENNDOT.

3.5 Other Parameters

MOBILE6.2 includes a variety of input parameters which characterize the environmental setting, the vehicle fleet, the condition of emission controls, and the volatility of gasoline. A set of sample input files has been provided in Volume II, Appendix C, of this document. Separate runs of the program were performed for each year and improvement scenario, as described in Section 3.7, to produce summer weekday VOC and NOx.

The sample input file shows a number of the parameters indicate use of MOBILE6.2 default or uncorrected values. A combination of default assumptions and site-specific data were determined through the interagency consultation process. For all data, assumptions were applied uniformly to the baseline, TIP and LRTP cases, providing an unbiased comparison.

MOBILE6.2 allows a calculation for refueling losses. This analysis is used for estimating the effectiveness of vapor recovery systems at fueling stations, where such equipment exists. The PA Department of Environmental Protection (DEP) includes these sources as area sources, not as part of the mobile source category. Therefore the emissions from refueling have not been calculated for this conformity analysis.

Emissions from fuel evaporation from vehicles depend on the age of the vehicle, fuel used, length of time the vehicle was operating, and whether the engine was cold or hot when it was started. The effect of the start condition also varies with the emissions control system on the particular vehicle. This study used national average percentages for fuel evaporation from highway motor vehicles.

Minimum and maximum temperature and humidity data in the local area parameter and scenario records have been developed from historic temperature records in 14 regions across the state (see Volume II, Appendix C3). These temperatures represent conditions consistent with the development of the region's maintenance plan.

An in-use Reid vapor pressure (RVP) of 8.7 pounds per square inch (see Volume II, Appendix C4) has been used for all analysis summer weekday analysis scenarios.

3.6 Transportation Control Measures

No Transportation Control Measures (TCMs) have been adopted for the Centre County area because existing and planned emissions controls are sufficient for attainment and maintenance purposes.

3.7 Emissions

The results of the computer modeling are used to demonstrate conformity for ozone. For ozone, emission forecasts are compared against 2009 and 2018 emission budgets established in the State College area maintenance plan. Emissions are produced for the following analysis scenarios:

1- Budget Year 1 - 2009 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2009. This year is an emission budget year established in the maintenance plan and satisfies the requirements for the inclusion of a year within the TIP timeframe.

2- Budget Year 2 - 2018 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2018. This year is an emission budget year established in the maintenance plan.

3- Interim Year - 2025 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2025. This year is included to ensure that no analysis year is more than 10 years apart.

4- Long-Range Plan End Years –2030 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by end of Plan. The end of the LRTP is a required ozone analysis year.

Based on this analysis and the summary emission tables provided at the end of this report, the conformity results for the 8-hour ozone standard are described below.

Ozone Conformity Test Results:

Results for Centre County indicates that forecasted 2009 VOC and NOx emission estimates (including TIP & LRTP) are lower than the 2009 emission budgets established in the maintenance plan. Forecasted 2018, 2025, and 2030 emissions are lower than the 2018 VOC and NOx emission budgets. The decreases reflected in the historic trend may change in future years beyond the study horizon. These issues must be addressed in the state's air quality implementation planning, considering all sources, stationary and mobile.

The TIP and LRTP are expected to provide a favorable increase in travel speeds, which reduces the VOC emission rates. The favorable mix of projects contributes to a reduction in NO_X emissions.

3.8 Discussion

This analysis demonstrates that the forecast summer day VOC and NO_X satisfy the applicable conformity tests for the ozone standards. Therefore, implementation of the TIP and LRTP as defined in the study will not adversely affect air quality goals.

Further measures directed at reducing vehicle trips may become increasingly important in future transportation plans and programs. Transit and intermodal alternatives may serve as a means for achieving these reductions. The current plan and program present several appropriate means of achieving this. Additionally, transit and intermodal alternatives can be incorporated into preliminary engineering for highway projects.

4. FINANCIAL CONSTRAINT

The Planning Regulations, Sections 450.322 (b) (11) and 450.324 (e) require the LRTP and the TIP to be financially constrained while the existing transportation system is being adequately operated and maintained. Only projects for which construction and operating funds are reasonably expected to be available are included. The Centre County MPO, in conjunction with PENNDOT, has developed an

estimate of the cost to maintain and operate the existing roads and bridges in Centre County and have compared that with the estimated revenues and maintenance needs of the new roads.

5. PUBLIC PARTICIPATION

This LRTP and TIP have undergone the public participation requirements and the comment and response requirements set forth in the Final Conformity Rule, the Final Statewide/Metropolitan Planning Rule, and Pennsylvania's Conformity SIP. A public meeting was held, pursuant to public notice, on ___(date)_____. The documentation of the public notice for the hearings, comments, and the responses to comments can be found in Volume II, Appendix C.

6. CONFORMITY STATEMENT

The Clean Air Act Amendments of 1990 (CAAA) require that a Metropolitan Planning Organization (MPO) determine that a Long Range Plan (LRTP) and Transportation Improvement Program (TIP) conform with the applicable State Implementation Plan (SIP), or other tests as defined in the EPA's Conformity Rule, before the LRTP and TIP are adopted. No Federal agency may approve, accept, or fund a LRTP/TIP or its component projects unless the LRTP/TIP have been found to conform to the SIP. Under the Act, conformity is determined by applying three criteria; that "the transportation plans and programs--

(i) Are consistent with the most recent estimates of mobile source emissions;

(ii) Provide for the expeditious implementation of transportation control measures in the applicable implementation plan; and

(iii) With respect to ozone and carbon monoxide non-attainment areas, contribute to annual emissions reductions consistent with sections 182(b)(1) and 187(a)(7)"

Each new transportation plan and TIP must be found to conform before the transportation plan/TIP are approved by the MPO/ RPO or accepted by DOT.

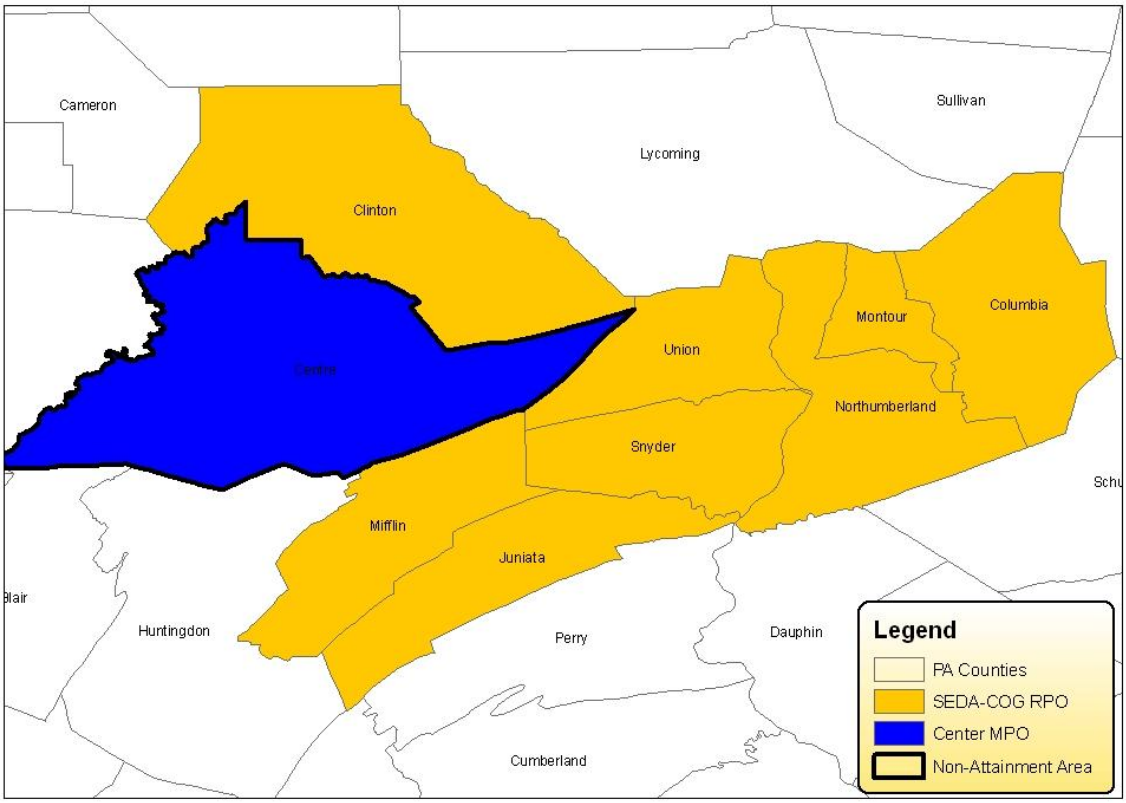
As specified under the first item, the most recent estimates of highway emissions for Centre County has been developed as a part of this study. The analysis results indicate that the forecast ozone precursors, VOC and NO_X, are lower than the 2009 and 2018 emission budgets established in the State College area maintenance plan for the 8-hour ozone standard.

Centre County was not considered to be nonattainment for ozone (prior to the CAAA of 1990) and has not submitted a SIP including TCMs under the 1990 CAA Amendments. No transportation control measures for this area exist in a state implementation plan. Consequently, the second criterion (above) is not applicable.

Therefore, the Long Range Plan and Transportation Improvement Programs for the Centre County area are found to satisfy the regional transportation conformity requirements for the 8 hour ozone standard for the State College 8-hour ozone maintenance area (Centre County) under the U.S. Clean Air Act.

MAPS

Centre Ozone Maintenance Area



TABLES

TABLE 1
OZONE Conformity
Summary of Total Highway Vehicle Miles Traveled (VMT)
Average Summer Weekday
State College Ozone Maintenance Area

County	2009	2018	2025	2030
Centre	5,219,454	6,173,426	6,960,420	7,574,063

TABLE 2
OZONE Conformity
Summary of Total Highway VOC Emissions (kg/day)
Average Summer Weekday
State College Ozone Maintenance Area

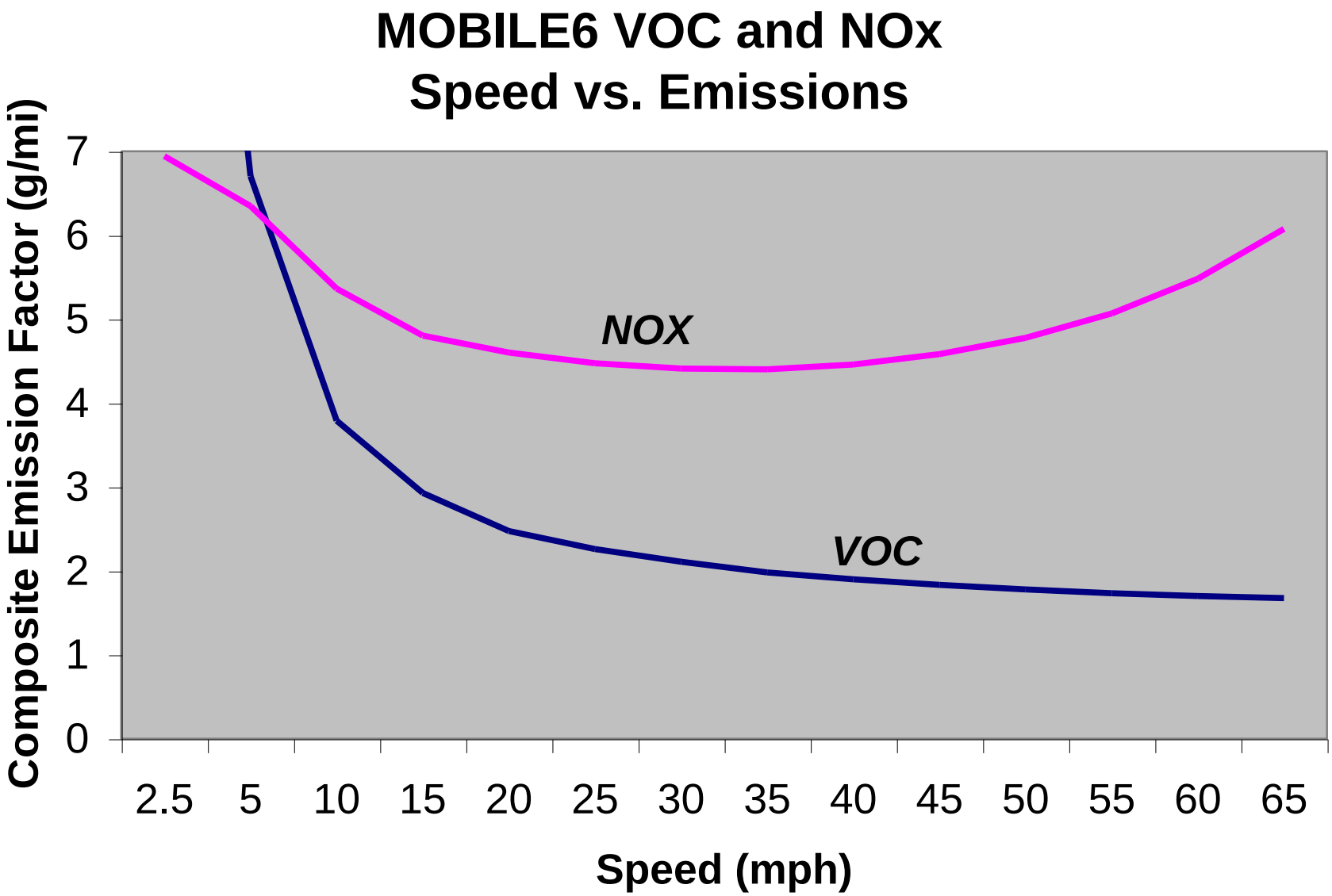
County	2009	2018	2025	2030
Centre	4,245 (4.68 tons/day)	2,791 (3.08 tons/day)	2,521 (2.78 tons/day)	2,726 (3.00 tons/day)
Emission Budget*	**5.40 tons/day**	**3.70 tons/day**	***Same as 2018***	***Same as 2018***

TABLE 3
OZONE Conformity
Summary of Total Highway NO_X Emissions (kg/day)
Average Summer Weekday
State College Ozone Maintenance Area

County	2009	2018	2025	2030
Centre	10,033 (11.06 tons/day)	4,550 (5.02 tons/day)	3,297 (3.63 tons/day)	3,079 (3.39 tons/day)
Emission Budget*	**12.50 tons/day**	**6.00 tons/day**	***Same as 2018***	***Same as 2018***

* Emission Budgets Established in November 19, 2007 State College Area Maintenance Plan

CHARTS


MOBILE6 VOC and NOx
Speed vs. Emissions
Composite Emission Factor (g/mi)
0
1
2
3
4
5
6
7
NOX
VOC
2.5
5
10
15
20
25
30
35
40
45
50
55
60
65
Speed (mph)