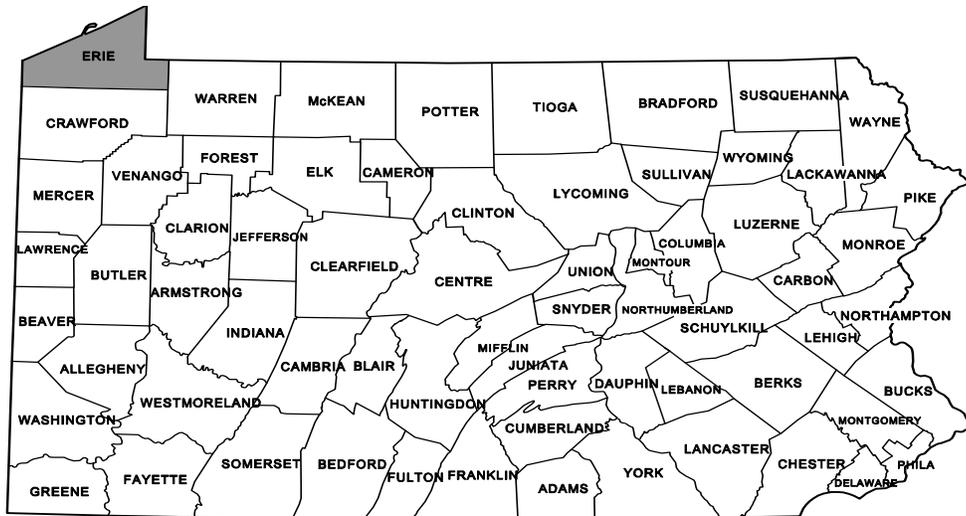


**AIR QUALITY
CONFORMITY ANALYSIS REPORT
FOR THE ERIE OZONE MAINTENANCE AREA
(8-hour Ozone NAAQS)**

VOLUME I - EXECUTIVE SUMMARY

FFY 2011-2014 TIP and 2040 LRTP



Prepared by:
Pennsylvania Department of Transportation

DRAFT

PUBLIC REVIEW:

PLANNING PARTNER APPROVAL:

TABLE OF CONTENTS

1.	INTRODUCTION.....	1
1.1	Purpose.....	1
1.2	Coverage.....	1
1.3	Analysis Overview.....	2
1.4	Limitations.....	2
1.5	Document Contents.....	2
2.	SUMMARY.....	3
3.	ANALYSIS.....	3
3.1	Overview.....	3
3.2	Background.....	4
3.3	Long Range Plan/Transportation Improvement Program.....	5
3.4	Traffic Parameters.....	7
3.5	Other Parameters.....	8
3.6	Transportation Control Measures.....	9
3.7	Emissions.....	9
3.8	Discussion.....	9
4.	FINANCIAL CONSTRAINT.....	9
5.	PUBLIC PARTICIPATION.....	10
6.	CONFORMITY STATEMENT.....	10

MAPS

Figure 1 – Erie Ozone Maintenance Area.....		12
---	--	----

TABLES

1	Summary of Total Daily Highway VMT - Ozone.....	14
2	Summary of Total Daily Highway VOC Emissions - Ozone.....	14
3	Summary of Total Daily Highway NO _x Emissions - Ozone.....	14

CHARTS

1	VOC & NO _x Graph.....	16
---	----------------------------------	----

1. INTRODUCTION

This document provides an analysis of the air quality implications of the Erie Metropolitan Planning Organization's (MPO) FFY 2011-2014 Transportation Improvement Program (TIP) and 2040 Long-Range Transportation Plan (LRTP). The analysis demonstrates transportation conformity to the 8-hour ozone National Ambient Air Quality Standards (NAAQS).

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). This update includes projects related to the new LRTP. There have been no changes to the TIP project list from the previous submission.

Since vehicular emissions contribute to ozone violations, the Clean Air 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.

Erie County is an 8-hour ozone maintenance area and must make a conformity determination for ozone precursors. An affirmative conformity determination by the Erie MPO is necessary to demonstrate conformity and thereby allow the TIP/LRTP to be approved by the U.S. Department of Transportation (US 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. Erie County was originally designated as part of a marginal nonattainment area under the 1-hour ozone NAAQS. Effective June 15, 2004, the EPA finalized ground-level ozone designations under the 8-hour ozone NAAQS. The standard replaced the pre-existing 1-hour ozone NAAQS. Erie County was originally designated as a "Basic" ozone nonattainment area under the 8-hour standard.

On October 9, 2007, EPA approved a State Implementation Plan (SIP) revision requesting that the Erie 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 (note: budgets were corrected and approved in March 4, 2008 federal register). Emission budgets are provided 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 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 VOC and NO_x.

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 TIP and LRTP for Erie 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.

1.2 Coverage

This report considers the impact of emissions within the Erie County ozone maintenance area.

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. VOC and 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 NO_x 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. EPA has recently released a new emissions model (MOVES2010). States are currently reviewing the model for future application to SIP and transportation conformity analyses. A two-year grace period allows for the continued use of EPA's MOBILE6.2 model until March 2012. 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 April 2009.

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 Erie County maintenance plan. Ozone emissions are analyzed for a summer weekday.

Analysis years are for 2018, 2025, 2030, and 2040. The 2018 year is an emission budget year established in the ozone maintenance plan. The 2040 year is the last year of the LRTP. 2025 and 2030 are interim years 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 utilize 2008 related data. Other inputs, including the travel model, socioeconomic data, and roadway network data represent the latest information adopted by the MPO. Examples of key tools and input data are presented below:

- MOBILE6.2 is used to determine emission factors for the region.
- Travel Demand Model – Uses latest regional travel model validated to 2000 conditions.
- Socioeconomic Forecasts – Latest MPO adopted household and employment forecasts are used within the travel model to develop future year VMT estimates for roadways within the counties.
- HPMS Adjustments – Missing local roadway VMT is reconciled to the 2008 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 Erie 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 TIP and LRTP 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) developed during the analysis, and presenting the implications of these results.

The fourth section of this report discusses the "financial constraints" of the TIP and LRTP.

Section five discusses the public participation process of the conformity analysis. This process includes the advertisements of availability of the TIP/LRTP 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 TIP and LRTP 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 TIP/LRTP 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 Erie County 8-hour ozone maintenance area. 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 2018 MVEBs 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 2018, 2025, and 2030 analysis years, the VOC and NO_x 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 calculate the impact of regional population and employment growth, TIP/LRTP transportation projects, and travel diversions on total emission estimates. 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 using the travel demand model network volumes for base and future years. The model network contains roadways broken into 10 separate facility types which are then grouped into three categories for emissions reporting (Freeways, Arterials, Collectors/Locals) in four area settings:

rural, small urban, urban, and central business district.

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 2008 HPMS.

This existing DVMT was then projected to the future years utilizing future projected population and employment growth within the regional travel demand forecasting model. The latest planning assumptions, population growth, employment growth, and land use trends have been considered in the analyses to as great an extent as 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 TIP and/or LRTP 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.

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. Erie 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, 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 (CO) 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 (mph).

For NO_x, however, the emissions rate is a more gradual decline with increasing speed up to approximately 25 mph. 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 TIP and LRTP with a mix of strategies that reduce the NO_x 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 pollution 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 have been implemented between 2004 and 2010, and additional vehicle programs will be phased-in through 2016. 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 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 (MY) 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 (PCV) 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. Beginning with MY 2008, "new" passenger cars and light-duty trucks with a gross vehicle weight rating (GVWR) of 8,500 pounds or less that are sold or leased and titled in Pennsylvania must be certified by the California Air Resources Board (CARB) or be certified for sale in all 50 states. For this program, a "new" vehicle is a qualified vehicle with an odometer reading less than 7,500 miles. DEP and PennDOT worked with the automobile manufacturers, dealers and other interested business partners and finalized procedures for complying with these new requirements. DEP is focusing on its outreach with the manufacturers and dealers on what they can offer for sale and how to certify that the vehicles are compliant. PennDOT's role is to ensure paperwork procedures for title and registrations include these certifications of compliance or that the vehicle owner qualifies for an exemption to the requirements. In all cases, DEP will use information obtained during PennDOT's title and registration process to oversee and audit, as needed, certain vehicle title transactions to determine compliance to the program. The impacts of this program are modeled for all analysis years beyond 2008.

3.3 Transportation Improvement Program/ Long Range Transportation Plan

The complete TIP and LRTP for Erie County are included in Volume II, Appendix A, for highways and transit service projects.

Detailed assessments were only performed for those projects on the TIP and LRTP 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 TIP/LRTP list, have been excluded from consideration since they are not expected to significantly alter the volume or speed of traffic.

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

Erie County:

1. Millfair Road Bridge – The construction of a new bridge on Millfair Road to eliminate an existing at-grade railroad crossing. This is the only air quality significant project on the updated MPO LRTP. Project Location: Millcreek and Fairview Townships, Completion Year: 2018.
2. Peak Street at I-90 Interchange - Widening of SR 19 (Peach Street) and reconfiguration of the I-90 interchange to accommodate dual left-turn lanes to I-90 East/Westbound. Project will improve traffic operation at 5 signalized intersections and relieve congestion. Project location: Summit Township, Completion year: 2025.
3. US 6N, Erie Rural-Urban Corridor - Improve vertical curve alignment, resurface and add turn lane at Conelway Road intersection. US 6 reconstruction will affect over 2 miles of roadway in Wayne and Concord Townships. Completion year: 2015.
4. I-90 Widening (Phases I, II, and III) - Project includes interstate widening on a total of 21 miles within Summit, Fairview, McKean, Greene, Millcreek and Harborcreek Townships. Widen I-90 from four-lane to six-lane facility on three segments: I-79 to PA 97 (Completion Year 2020); PA 98 to I-79 (Completion Year 2030); PA 97 to I-86 (Completion Year 2030).
5. Robinson Road Corridor - Extend Robinson Road on new alignment from Old Waterford Road to PA 8 for 1.14 miles to provide direct access from local area to PA 8. Project location: Green Township, Completion year: 2015.
6. South Hill Road Corridor (Phase I, II, and II) - Extend existing South Hill Road in Millcreek and Summit Townships on new road alignment to provide direct travel path and to reduce congestion. Minor Arterial will be extended in three phases with the following sections: US 19 to Kuntz Road (Completion Year 2015); Cherry Street to PA 97 (Completion Year 2015); PA 97 to PA 8 (Completion Year 2025); Project boundary: Millcreek and Summit Townships, PA. Completion year: 2015.
7. Hershey Road Corridor - Extend existing minor arterial for 1.92 miles from Grubb Road to PA 832 within Millcreek and McKean Townships to improve local access and reduce congestion. Completion year: 2025.
8. 18th Street Extension - Extend existing 18th Street from Cranberry Street to Greengarden Road. Construction of minor arterial segment will extend city greed, provide local access, and relieve congestion on 12th Street corridor. Project location: City of Erie. Completion year: 2025.
9. 38th Street between PA 832 and US 19 - Restriping of existing 38th Street to widen travel lanes and provide center left-turn lane. Project will improve capacity and operation of major arterial, including three signalized intersections, between PA 832 and US 19. Project boundary: Millcreek Township and the City of Erie, Completion year: 2015.
10. West Lake Road - Widening West Lake Road to include center left-turn lane on 2.77 mile between Asbury Road and Peninsula Drive. Proposed minor arterial upgrading will increase capacity and improve operation of 6 existing traffic signals. Project location: Millcreek Township. Completion year: 2025.
11. PA 99 Traffic Flow Improvement - Improve traffic flow for over 5 miles of PA 99 in the Borough of Edinboro and in Washington, McKean, Summit and Millcreek Townships with additional turning lanes at the intersections and by creating center left-turn lane. This project will improve operation

and safety on PA 99 between Grubb Road and US 19. Completion year: 2020.

12. PA 5 from Asbury Rd to Pittsburgh Ave. - Existing road improvement to add center turning lanes, resurface, drainage upgrades, and intersection improvements. Project will increase capacity on 6.77 miles of 12th Street and provide operational improvement on 4 signalized intersections. Project location: City of Erie and Millcreek Township. Completion year: 2015.
13. US 6 in city of Corry, Corry Traffic Signals - Upgrade 5 existing traffic signals to increase capacity and provide moderate progression for thru traffic. Project location: City of Corry. Completion year: 2015.

There are no air quality significant transit projects in Erie County.

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.

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).

Travel Demand Model:

Travel data was generated by the Erie County regional travel demand forecasting model. The regional model was developed to estimate future travel throughout Erie County. The model was developed using TP+(CUBE Voyager), a software package that uses the widely practiced traditional four step forecasting methods. The Erie County model is made up of 1,091 traffic analysis zones (TAZs), approximately 13,245 links. The network contains attributes such as distance, number of lanes, area type, facility type, free flow speed, capacity of lanes, and location of signals.

Traffic forecasts are projected based upon the socioeconomic and land use data projections

developed by the Erie MPO. Specific data items included household population, retail employment, non-retail employment, and school enrollment.

The roadway network consists of nodes that are attached by links, with nodes representing intersections and links representing roads. Each link is given a facility designation. There are a total of ten facility type designations in the model – interstate, expressway, divided arterial, undivided arterial, secondary arterial, collector, local, centroid connector, high-speed ramp, and low speed ramp. The model also contains five distinct area designations – central business district (CBD), urban, urban fringe, suburban, and rural. For reporting purposes, the facility types were combined into the PennDOT functional and area group categories. Tables provided in Volume Two of this report show the tabulation of daily vehicles miles of travel (DVMT) for each facility group and area setting. The DVMT for a facility group is generated by multiplying the projected traffic volume for a link and the length of that link, then summing the products for all links in that facility group. In addition, PennDOT has developed temporal variation data that describes the hourly variation of traffic volumes within a day as well as the daily variation within a week and the monthly variation within a year. The projected traffic volumes were adjusted to reflect average weekday conditions in July, the peak ozone season, and were also disaggregated to hourly volumes within the day to support detailed speed estimation.

Speed Post Processing:

Speeds were calculated for each year using the PPSUITE post processing software. PPSUITE contains procedures to calculate the capacity of each highway segment, giving consideration to the physical attributes of the highway (facility type, number of lanes, geographic setting). The effects of traffic congestion are accounted for by comparing traffic volumes to this capacity for each hour of the day, then by calculating the speeds that will result.

Speeds are estimated based on traffic volumes and capacities. The model forecasts traffic volumes by adjusting the link attributes to reflect future physical improvements, adjusting the input to the transit network to reflect the changes in transit service, 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 that affect congestion and speed.

Future Year Traffic Data:

The future roadway networks input to the regional traffic model were created by using the base year model road and transit networks and adding the planned improvements to those networks based on the completion year of each project. The socio-economic and land use data were also projected for each future analysis year. This procedure was used to develop emissions characteristics for each analysis year using the model. The results of the model were used as inputs into the PPSUITE software.

The Erie county travel demand-forecasting model was updated in 2003 for the calibration year 2000. Using the projected data from the model, conditions were evaluated for the years 2018, 2025, 2030, and 2040.

The roadways affected by the TIP/LRTP projects as listed were further analyzed to determine operational changes, which may result from implementation of the TIP/LRTP. In this way, emission characteristics were developed for the region.

The future air quality analysis networks were created by using the base year (2000) model and adding planned major road improvements to that network. For example, for the air quality analysis year of 2018, the highway projects likely to affect air quality in 2018 from the 2011–2014 TIP and the 2040 LRTP were added to the base year model road network in addition to all projects completed between 2000-2017. The socio-economic and land use data was also projected for the year 2018. The combination was used to project travel conditions in 2018 that result from the addition of new projects. This was the procedure used to develop emissions estimates for each of the analysis years. The results of the model runs were then used as inputs for the post-processing software

The traffic data for this conformity analysis, including the regional population, employment, travel, and congestion estimates, use the region's latest planning assumptions as required by the CAAA. Travel, represented by VMT, reflects population and employment trends. The speed estimation procedure serves as a measure of congestion, and is consistent with ongoing,

established monitoring programs. The estimates were coordinated with other data resources, such as local planning departments and information from the HPMS. The PennDOT-coordinated 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 MOBILE6.2 computer model were then multiplied by the appropriate VMT for each facility group / area type / time period to calculate the total emissions in tons and kilograms per day.

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. DEP includes refueling emissions 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 Erie 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 the 2018 emission budgets established in the Erie County maintenance plan. Emissions are produced for the following analysis scenarios:

- 1- Budget Year - 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.
- 2- 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.
- 3- Interim Year - 2030 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by 2030. This year is included to ensure that no analysis year is more than 10 years apart.
- 4- End Year of LRTP –2040 summer traffic volumes and the base highway network, plus those AQ significant projects that are scheduled for completion by end of Plan. This year satisfies the conformity requirement for at least a 20-year horizon.

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 Erie County indicate that forecasted 2018 VOC and NO_x emission estimates (including TIP & LRTP) are lower than the 2018 MVEBs established in the Erie County 8-hour ozone maintenance plan. Forecasted 2025, 2030 and 2040 emissions are also lower than the 2018 VOC and NO_x MVEBs. 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 TIP and the LRTP 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 Erie MPO, in conjunction with PennDOT, has developed an estimate of the cost to maintain and operate the existing roads and bridges in Erie County and have

compared that with the estimated revenues and maintenance needs of the new roads.

5. PUBLIC PARTICIPATION

This TIP and LRTP 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 Transportation Improvement Program (TIP) and Long Range Transportation Plan (LRTP) conform with the applicable State Implementation Plan (SIP), or other tests as defined in the EPA's Conformity Rule, before the TIP and LRTP are adopted. No Federal agency may approve, accept, or fund a TIP/LRTP or its component projects unless the TIP/LRTP 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 TIP/LRTP must be found to conform before they are approved by the MPO/ RPO or accepted by US DOT.

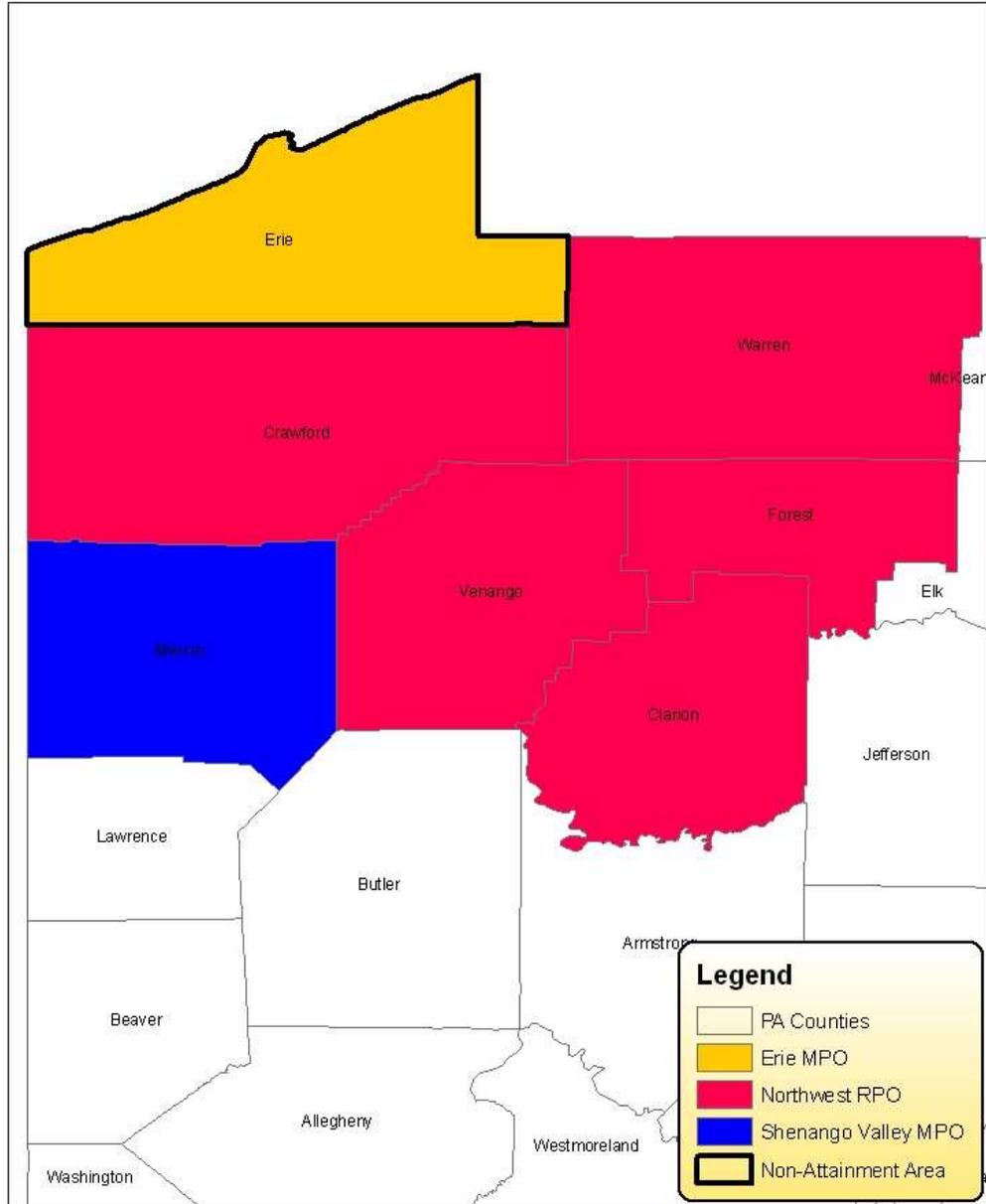
As specified under the first item, the most recent estimates of highway emissions for Erie County have been developed as a part of this study. The analysis results indicate that the forecast ozone precursors, VOC and NO_x, are lower than the 2018 emission budgets established in the Erie County maintenance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

Erie 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 CAAA. No transportation control measures for this area exist in a state implementation plan. Consequently, the second criterion (above) is not applicable.

Therefore, the TIP and LRTP for Erie County area are found to satisfy the regional transportation conformity requirements for the 8-hour ozone standard for the Erie 8-hour ozone maintenance area under the Clean Air Act.

MAPS

Erie Ozone Maintenance Area



TABLES

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

County	2018	2025	2030	2040
Erie	7,808,013	8,387,768	8,806,965	9,647,302

TABLE 2
OZONE Conformity
Summary of Total Highway VOC Emissions (tons/day)
Average Summer Weekday
Erie County Ozone Maintenance Area

County	2018	2025	2030	2040
Erie	3.04 (2,756 kg/day)	2.82 (2,554 kg/day)	2.93 (2,659 kg/day)	3.21 (2,912 kg/day)
Emission Budget*	4.50 (2018 Budget)	<i>Same as 2018</i>	<i>Same as 2018</i>	<i>Same as 2018</i>

TABLE 3
OZONE Conformity
Summary of Total Highway NO_x Emissions (tons/day)
Average Summer Weekday
Erie County Ozone Maintenance Area

County	2018	2025	2030	2040
Erie	4.08 (3,697 kg/day)	3.11 (2,824 kg/day)	2.96 (2,688 kg/day)	3.15 (2,854 kg/day)
Emission Budget*	7.30 (2018 Budget)	<i>Same as 2018</i>	<i>Same as 2018</i>	<i>Same as 2018</i>

* Emission budgets from March 4, 2008 revision to October 9, 2007 Erie County 8-hour Ozone maintenance plan

** All analysis years are lower than applicable budget years

CHARTS

MOBILE6 VOC and NOx Speed vs. Emissions

