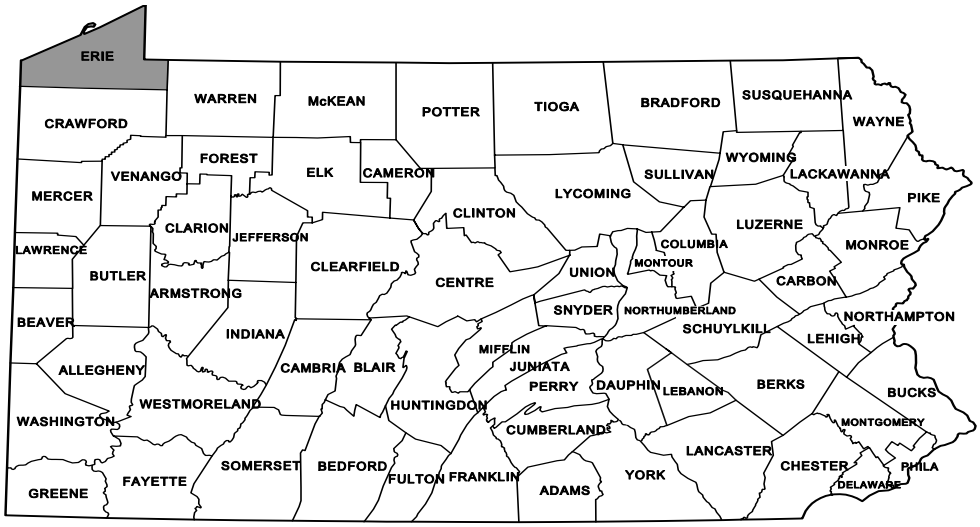
AIR QUALITY
CONFORMITY ANALYSIS REPORT
FOR THE ERIE OZONE MAINTENANCE AREA
(8-hour Ozone NAAQS)

VOLUME II – TECHNICAL ANALYSIS

FFY 2011-2014 TIP and 2030 LRTP



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Pennsylvania Department of Transportation

DRAFT

PUBLIC REVIEW:

PLANNING PARTNER APPROVAL:

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OZONE CONFORMITY

2015 TIP
Summer Weekday Emission Summary
ERIE COUNTY MPO

	Vehicle Mile of Travel (VMT)	Vehicle Hours of Travel (VHT)	Average Speed (mph)	VOC Emissions (kg/day)	NOX Emissions (kg/day)
Rural					
Interstate	1,636,318	30,860	53.02	574.20	1,369.88
Other Prin. Art.	256,762	5,417	47.40	91.97	179.48
Minor Arterials	766,702	19,066	40.21	283.89	437.70
Major Collectors	289,536	7,481	38.70	108.74	149.75
Minor Collectors	165,244	4,120	40.11	61.51	85.86
Local	469,989	21,813	21.55	296.77	263.28
Small Urban					
Interstate					
Expressway					
Other Prin. Art.					
Minor Arterials					
Collector					
Local					
Urban					
Interstate	754,455	15,678	48.12	272.84	547.26
Expressway					
Other Prin. Art.	1,173,843	30,839	38.06	442.80	604.10
Minor Arterials	1,168,703	43,542	26.84	488.25	595.52
Collector	497,064	18,868	26.34	209.36	255.47
Local	384,256	16,890	22.75	242.46	206.70
Off Network Emission Benefits				0.00	0.00
COUNTY TOTAL	7,562,872	214,574	35.25	3,072.78	4,694.99

2018 TIP
Summer Weekday Emission Summary
ERIE COUNTY MPO

	Vehicle Mile of Travel (VMT)	Vehicle Hours of Travel (VHT)	Average Speed (mph)	VOC Emissions (kg/day)	NOX Emissions (kg/day)
Rural					
Interstate	1,725,980	33,352	51.75	523.08	1,059.90
Other Prin. Art.	270,907	5,757	47.06	83.66	141.00
Minor Arterials	794,236	19,875	39.96	254.21	347.91
Major Collectors	294,734	7,620	38.68	95.54	118.79
Minor Collectors	171,224	4,268	40.12	54.95	69.37
Local	483,394	22,947	21.07	271.12	210.71
Small Urban					
Interstate					
Expressway					
Other Prin. Art.					
Minor Arterials					
Collector					
Local					
Urban					
Interstate	783,636	16,338	47.96	244.47	426.31
Expressway					
Other Prin. Art.	1,198,519	31,541	38.00	390.36	480.66
Minor Arterials	1,189,605	44,970	26.45	433.97	475.20
Collector	504,781	19,378	26.05	185.56	203.04
Local	390,994	17,279	22.63	219.10	164.54
Off Network Emission Benefits				0.00	0.00
COUNTY TOTAL	7,808,010	223,325	34.96	2,756.02	3,697.45

2025 LRP
Summer Weekday Emission Summary
ERIE COUNTY MPO

	Vehicle Mile of Travel (VMT)	Vehicle Hours of Travel (VHT)	Average Speed (mph)	VOC Emissions (kg/day)	NOX Emissions (kg/day)
Rural					
Interstate	1,933,369	40,440	47.81	500.65	769.07
Other Prin. Art.	303,182	6,568	46.16	79.87	106.47
Minor Arterials	856,064	21,754	39.35	234.65	270.98
Major Collectors	316,342	8,235	38.41	87.99	95.35
Minor Collectors	186,181	4,645	40.08	51.08	56.48
Local	515,868	26,085	19.78	258.03	165.66
Small Urban					
Interstate					
Expressway					
Other Prin. Art.					
Minor Arterials					
Collector					
Local					
Urban					
Interstate	852,356	17,805	47.87	226.20	316.71
Expressway					
Other Prin. Art.	1,250,963	33,091	37.80	349.72	377.62
Minor Arterials	1,228,382	47,543	25.84	391.46	373.94
Collector	540,318	20,936	25.81	171.99	164.38
Local	404,744	18,016	22.47	202.49	127.44
Off Network Emission Benefits				0.00	0.00
COUNTY TOTAL	8,387,769	245,118	34.22	2,554.12	2,824.10

2030 LRP
Summer Weekday Emission Summary
ERIE COUNTY MPO

	Vehicle Mile of Travel (VMT)	Vehicle Hours of Travel (VHT)	Average Speed (mph)	VOC Emissions (kg/day)	NOX Emissions (kg/day)
Rural					
Interstate	2,083,134	46,898	44.42	536.63	715.98
Other Prin. Art.	327,851	7,247	45.24	85.85	101.64
Minor Arterials	899,150	23,203	38.75	244.43	259.71
Major Collectors	330,571	8,644	38.24	91.17	92.58
Minor Collectors	197,840	4,955	39.93	53.77	55.67
Local	537,439	28,686	18.74	266.47	159.07
Small Urban					
Interstate					
Expressway					
Other Prin. Art.					
Minor Arterials					
Collector					
Local					
Urban					
Interstate	904,611	19,063	47.45	238.12	298.67
Expressway					
Other Prin. Art.	1,292,223	34,436	37.53	358.84	363.80
Minor Arterials	1,261,438	49,593	25.44	400.33	360.07
Collector	557,228	21,956	25.38	177.48	158.71
Local	415,471	18,634	22.30	206.23	121.67
Off Network Emission Benefits				0.00	0.00
COUNTY TOTAL	8,806,956	263,315	33.45	2,659.30	2,687.58

APPENDICES

APPENDIX A1

ERIE COUNTY
LONG RANGE PLAN/
TRANSPORTATION IMPROVEMENT PROGRAM
FOR HIGHWAYS

APPENDIX A2

ERIE COUNTY
LONG RANGE PLAN/
TRANSPORTATION IMPROVEMENT PROGRAM
FOR TRANSIT

APPENDIX B

ERIE COUNTY
MOBILE6.2 PROGRAM PARAMETERS

APPENDIX B1

MOBILE6.2 PROGRAM SETUP FILES
For
Ozone Conformity Analysis

MOBILE6.2 INPUT FILE SETTINGS
Erie County

```
MOBILE6.2 INPUT FILE
REPORT FILE        :  M6OUTPUT.OUT  REPLACE
DATABASE OUTPUT    :
WITH FIELDNAMES    :
EMISSIONS TABLE    :  M6OUTPUT.TB1  REPLACE
POLLUTANTS         :  HC CO NOX
AGGREGATED OUTPUT  :
```

(Runs are Repeated for Urban, Small Urban, and Rural)

```
RUN DATA           : 0001
EXPRESS HC AS VOC  :
EXPAND EXHAUST     :
EXPAND EVAPORATIVE :
NO REFUELING       :
FUEL RVP           : 8.7
MIN/MAX TEMPERATURE: 69.5  87.7
94+ LDG IMP        : NLEVNE.D
T2 EXH PHASE-IN    : pal2exh.08
T2 EVAP PHASE-IN   : pal2evp.08
T2 CERT            : leviistd.d
REG DISTRIBUTION   : ERIE05ag.dat
```

CALLEVII Phase-In Files

(2005 ages used for all future years)

(Gascap and ATP Programs <u>Only</u> Apply to 2004 and Later Analysis Years)

```
I/M PROGRAM        : 1 2004 2050 1 TRC GC
I/M MODEL YEARS    : 1 1975 2050
I/M VEHICLES       : 1 22222 11111111 1
I/M COMPLIANCE     : 1 96.0
I/M WAIVER RATES   : 1 3.0 3.0
I/M EFFECTIVENESS  : 1.00 1.00 1.00

ANTI-TAMP PROGRAM  : 04 75 95 22222 11111111 1  11 096. 22212222
```

(Scenarios are Repeated for Each Functional Class)

```
SCENARIO RECORD    :
CALENDAR YEAR      : 2009
```

(Analysis year depends on year being run)

```
EVALUATION MONTH   : 7
ABSOLUTE HUMIDITY  : 61.3
SEASON             : 1
VMT FRACTIONS      :
.333874 .074180 .247058 .076106 .035010 .073550 .007209 .005883
.004557 .016505 .019344 .021061 .075289 .003800 .001717 .004857
```

(VMT mix varies for each year, run/scenario combination)

(Speed, hourly, and facility distributions prepared by PPSUITE post processor for each Run/Scenario combination)

```
VMT BY FACILITY    :V000101F.def
VMT BY HOUR        :V000101H.def
SPEED VMT          :V000101S.def
```

(Assumption of 10% (3.5% by volume) ethanol in Pennsylvania fuel)

```
OXYGENATED FUELS   : 0.000 1.000 0.000 0.035 1
```

ATTACHMENT: 1
Erie County Vehicle Age Distributions Input to MOBILE6.2

2005 Age Distribution:

```
REG DIST
1  0.0361  0.0648  0.0751  0.0785  0.0757  0.0892  0.0802  0.0771  0.0694  0.0602
   0.0608  0.0516  0.0434  0.0333  0.0254  0.0199  0.0172  0.0116  0.0084  0.0062
   0.0041  0.0030  0.0016  0.0011  0.0060
2  0.0356  0.0730  0.0713  0.0625  0.0749  0.0789  0.0758  0.0582  0.0682  0.0454
   0.0571  0.0521  0.0420  0.0336  0.0268  0.0236  0.0247  0.0222  0.0152  0.0132
   0.0098  0.0061  0.0037  0.0032  0.0231
3  0.0356  0.0730  0.0713  0.0625  0.0749  0.0789  0.0758  0.0582  0.0682  0.0454
   0.0571  0.0521  0.0420  0.0336  0.0268  0.0236  0.0247  0.0222  0.0152  0.0132
   0.0098  0.0061  0.0037  0.0032  0.0231
4  0.0390  0.0994  0.0950  0.0739  0.0839  0.0814  0.0725  0.0592  0.0715  0.0432
   0.0584  0.0441  0.0331  0.0247  0.0169  0.0160  0.0166  0.0122  0.0104  0.0104
   0.0089  0.0054  0.0027  0.0021  0.0189
5  0.0390  0.0994  0.0950  0.0739  0.0839  0.0814  0.0725  0.0592  0.0715  0.0432
   0.0584  0.0441  0.0331  0.0247  0.0169  0.0160  0.0166  0.0122  0.0104  0.0104
   0.0089  0.0054  0.0027  0.0021  0.0189
16 0.0678  0.0966  0.1039  0.0927  0.0685  0.0549  0.0433  0.0350  0.0296  0.0281
   0.0250  0.0212  0.0161  0.0134  0.0125  0.0083  0.0131  0.0120  0.0167  0.0221
   0.0252  0.0209  0.0283  0.0314  0.1133
```

(Truck Age Distributions Assume MOBILE6.2 National Defaults)

APPENDIX B2

INSPECTION AND MAINTENANCE MODELING PARAMETERS FOR LRTP/TIP CONFORMITY ANALYSIS

Pennsylvania I/M Program

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 test requirements vary by region and include on-board diagnostics (OBD) technology that uses the vehicle's computer for model years 1996 and newer to download potential engine problems that could effect emissions. The program, named PAOBDII, is implemented in the Philadelphia, Pittsburgh, and South Central and Lehigh Valley Regions. The Northern Region receives gas cap and visual inspections and the other 42 counties in the Commonwealth receive a visual inspection. For all of projected analysis years beyond 2004, the upgraded I/M program was modeled.

Vehicles subject to the program include 1975 and newer model year gasoline cars and light duty trucks up to 9,000 pounds GVW. New model years are exempt for the first year. The county of registration determines which inspections are required. Details of the program by region are provided below.

Philadelphia 5-County Area

The five counties include Bucks, Chester, Delaware, Montgomery and Philadelphia. The previous PA97 program with ASM was upgraded in final ASM cutpoints in September 2003 and OBD implemented in between April and June 2004. The program parameters for Philadelphia include:

Model Years	Program Parameters
1996 & newer	PAOBDII Gas Cap
1981-1995 (LDGV) 1984-1995 (LDGT)	ASM Gas Cap ATP
1975-1980 (LDGV) 1975-1983 (LDGT)	Idle Test Gas Cap ATP

Pittsburgh 4-County Area

The four counties include Allegheny, Beaver, Washington and Westmoreland. The previous PA97 program was upgraded to OBD between January and March 2004. The program parameters include:

Model Years	Program Parameters
1996 & newer	PAOBDII Gas Cap
1975-1995	2-speed Idle Gas Cap ATP

South Central and Lehigh Valley Region

The eight counties in the region include Berks, Cumberland, Dauphin, Lancaster, Lebanon, Lehigh, Northampton, and York. The new program expanded to these counties during December 2003 to February 2004. There was not prior inspection program. The program parameters include:

Model Years	Program Parameters
1996 & newer	PAOBDII Gas Cap
1975-1995	Gas Cap ATP

Northern Region

The eight counties in the region include Blair, Cambria, Centre, Erie, Lackawanna, Luzerne, Lycoming, and Mercer. The new program expanded to these counties during January and March 2004, which did not have a prior program. The program parameters include:

Model Years	Program Parameters
1975 & newer	Gas Cap ATP

42-County Region

The remaining 42 counties in the Commonwealth will receive an anti-tampering program for all 1975 and newer subject vehicles as part of their Safety Inspection starting in December 2003. The program consists of seven visual inspections of key emissions control components. They include: air pump system, catalytic converter, fuel inlet restrictor, EGR, evaporative system, PCV system, and gas cap. The seven inspections are the same for all areas for vehicles receiving the ATP inspection.

APPENDIX B3

MOBILE6.2 OZONE Summer Weekday Temperature and Humidity Inputs

MOBILE6 Summer Daily Temperatures and Humidity

Air Quality District	Maximum	Minimum	Absolute Humidity
1. Bucks, Chester, Delaware, Montgomery, Philadelphia	93.1	68.7	52.2
2. Berks	94.4	68.8	75.0
3. Lancaster	94.0	66.7	57.2
4. Carbon, Lehigh, Northampton	92.0	62.8	59.2
5. Adams, Franklin, York	94.0	66.7	57.2
6. Cumberland, Dauphin, Lebanon, Perry	94.0	66.7	57.2
7. Columbia, Lackawanna, Luzerne, Schuylkill, Susquehanna, Wayne, Wyoming	89.4	62.5	42.1
8. Bedford, Blair, Fulton, Huntingdon, Juniata, Mifflin	88.3	62.1	42.3
9. Cameron, Centre, Clearfield, Clinton	88.3	62.1	42.3
10. Bradford, Lycoming, Potter, Sullivan, Tioga	89.4	62.5	42.1
11. Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Washington, Westmoreland	89.4*	68.8*	78.0*
12. Clarion, Lawrence, Mercer, Venango	88.3	62.1	42.3
13. Crawford, Elk, Erie, Forest, McKean, Warren	87.7	69.5	61.3
14. Cambria, Indiana, Somerset	88.3	62.1	42.3

* *Temperatures based on 10 highest ozone exceedence days from 2000-2002 consistent with their respective maintenance plans.*

APPENDIX B4

MOBILE6.2 OZONE Summer Weekday Fuel Volatility Inputs

MVMA Fuel Volatility Survey Results

Nonattainment Area	MVMA Surveyed City	RVP		
		1990	2002	Beyond 2002
Allentown-Bethlehem-Easton	Philadelphia	8.4	8.7	8.7
Altoona	Philadelphia	8.4	8.7	8.7
Erie	Cleveland	9.7	8.7	8.7
Harrisburg-Lebanon-Carlisle	Philadelphia	8.4	8.7	8.7
Johnstown	Philadelphia	8.4	8.7	8.7
Lancaster	Philadelphia	8.4	8.7	8.7
Philadelphia-Wilmington-Trenton	Philadelphia	8.4	8.7	8.7
Pittsburgh-Beaver Valley	Philadelphia	8.4	7.8	7.8
Reading	Philadelphia	8.4	8.7	8.7
Scranton-Wilkes Barre	Philadelphia	8.4	8.7	8.7
York	Philadelphia	8.4	8.7	8.7
Youngstown-Warren-Sharon	Cleveland	9.7	8.7	8.7

APPENDIX C

ERIE COUNTY
PUBLIC PARTICIPATION

APPENDIX D

CLEAN AIR ACRONYMS

ACRONYMS

ACRONYMS

AADT	Annual Average Daily Traffic (July 1 and seasonally adjusted)
AASHTO	American Association of State and Highway Transportation Officials
ACT	Alternative Control Technique Documents
ADA	Americans with Disabilities Act of 1990
ADT	Average Daily Traffic
ADTT	Average Daily Truck Traffic
AFV	Alternative Fuel Vehicle
AIRS	Aerometric Information Retrieval Systems
APCA	Air Pollution Control Act of 1992 (Pennsylvania)
APO	Average Passenger Occupancy
AQ	Air Quality
AQP	Air Quality Program
AQTF	Air Quality Task Force
AQRV	Air Quality Related Values
AVI	Automatic Vehicle Identification
AVO	Average Vehicle Occupancy
AVR	Average Vehicle Ridership
BEQ	Bureau of Environmental Quality (PENNDOT)
BMS	Bridge Management System
BMV	Bureau of Motor Vehicles
CAA70	Clean Air Act of 1970
CAA77	Clean Air Act Amendments of 1977
CAA90	Clean Air Act Amendments of 1990
CAAA	Clean Air Act Amendments of 1990
CARB	California Air Resources Board
CBD	Central Business District
CE	Categorical Exclusion
CEE	Categorical Exclusion Evaluation
CFF	Clean Fuel Fleet
CFFV	Clean Fuel Fleets Vehicles
CFR	Code of Federal Regulations
CFV	Clean Fuel Vehicle
CMAQ	Congestion Mitigation and Air Quality
CMP	Congestion Management Plan
CMS	Congestion Management System OR Contract Management System
CMSA	Consolidated Metropolitan Statistical Area
CNG	Compressed Natural Gas
CO	Carbon Monoxide (ppm) OR Central Office
CO_2	Carbon Dioxide (ppm)
CPI	Consumer Price Index
CTG	Control Technique Guidance
CV	Conventional Vehicle
DEIS	Draft Environmental Impact Statement
DEP	Department of Environmental Protection
DOI	Department of Interior
DOT	Department of Transportation
DVMT	Daily Vehicle Miles of Travel
DVRPC	Delaware Valley Regional Planning Commission
EA	Environmental Assessment
ECO	Employee Commute Option

ECONS	Energy Conservation and Safety
EDD	Economic Development District
E I/M	Enhanced Inspection/Maintenance
EIS	Environmental Impact Statement
EKMA	Empirical Kinetic Measurement Assessment
EPA	Environmental Protection Agency (United States)
EPACT	Energy Policy Act of 1992
EPS	Emissions Pre-Processor Systems
EQB	Environmental Quality Board (PA)
ERC	Emission Reduction Credit
ETC	Employer Trip Coordinator OR Employee Transportation Coordination
ETRP	Employer Trip Reduction Program
ETTM	Electronic Toll and Traffic Management
FEIS	Final Environmental Impact Statement
FFY	Federal Fiscal Year
FHWA	Federal Highway Administration
FIP	Federal Implementation Plan
FIPS	Federal Information Processor Systems
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
FTP	Federal Test Procedure
GM/BHP-HR	Grams per Brake Horsepower Hour
GIS	Geographic Information System
GVWR	Gross Vehicle Weight Rating
HBW	Home-Based Work
HC	Hydrocarbons (Kg/day, Tons/yr)
HCM	Highway Capacity Manual
HDDV	Heavy Duty Diesel Vehicle
HDGV	Heavy Duty Gasoline Vehicle
HDV	Heavy Duty Vehicle
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
HP&R	Highway Planning and Research Funds (Federal)
ILEV	Inherently Low Emission Vehicles
I/M	Inspection/Maintenance
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
IVHS	Intelligent Vehicle Highway Systems
LAER	Lowest Achievable Emission Rate
LDD	Local Development District
LDDT	Light Duty Diesel Truck
LDDV	Light Duty Diesel Vehicle
LDGT	Light Duty Gasoline Truck
LDGV	Light Duty Gasoline Vehicle
LDT	Light Duty Truck
LDV	Light Duty Vehicle
LEV	Low Emission Vehicle
LOS	Level of Service
LPG	Liquid Petroleum Gas
LPO	Lead Planning Organization
MACT	Maximum Achievable Control Technology
MOBILE	EPA's computer program used to run conformity -- latest version is number 5A
MPO	Metropolitan Planning Organization
MPH	Miles Per Hour
MSA	Metropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards

NARC	National Association of Regional Councils
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act of 1969, as amended
NHB	Non-Home Based
NHS	National Highway System
NH_3	Ammonia
NO_2	Nitrogen Dioxide
No_x	Nitrogen Oxides
NO_xRACT	Nitrous Oxides Reasonable Available Control Technology
NPRM	Notice of Proposed Rulemaking
NSPS	New Source Performance Standards
NSR	New Source Review
O_3	Ozone (ppm)
OEM	Original Equipment Manufacturer
OMB	Office of Management and Budget (US)
OTC	Ozone Transport Commission
OTR	Ozone Transport Region
PADEP	Pennsylvania Department of Environmental Protection
PENNDOT	Pennsylvania Department of Transportation
PAMPTA	Pennsylvania Association of Mass Transit Authorities
P&R	Park and Ride
PERC	Perchloroethylene
PHF	Peak Hour Factor
PI&E	Public Information and Education
PL	Metropolitan Planning Funds
$PM_{2.5}$	Fine Particulate Matter (ug/m^3)
PM_{10}	Particulate Matter (ug/m^3)
PMS	Pavement Management System OR Project Management System
PPAQ	Post Processor for Air Quality
PPM	Parts Per Million
RACT	Reasonable Available Control Technology
RFA	Regulatory Flexibility Analysis
RFG	Reformulated Federal Gasoline
RFP	Reasonable Further Progress
RMS	Roadway Management System
RMSE	Route Mean Square Error
ROD	Record of Decision
ROG	Reactive Organic Gases
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RVP	Reid Vapor Pressure
SAMI	Safety and Mobility Initiative (PENNDOT)
SIP	State Implementation Plan
SMA	Statistical Metropolitan Area
SO_x	Sulfates
SO_2	Sulfur Dioxide
SOL	Strike-Off-Letter (PENNDOT)
SOV	Single Occupancy Vehicle
SOVCAP	Single Occupancy Vehicle Capacity Adding Project
SPRPC	Southwestern Pennsylvania Regional Planning Commission
STAMPP	Systematic Technique to Analyze & Manage Pennsylvania's Pavement (PENNDOT)
STC	State Transportation Commission
STEP	Short-range Transportation Evaluation Program
STIP	Statewide Transportation Improvement Plan
STP	Surface Transportation Program
TAC	Technical Advisory Committee

TAZ	Traffic Analysis Zone
TCM	Transportation Control Measure
TCP	Traffic Control Plan
TDM	Travel Demand Management
TDR	Travel Demand Reduction
TIP	Transportation Improvement Program
TLEV	Transitional Low Emission Vehicle
TMA	Transportation Management Association OR Transportation Management Area
TODF	Time of Day Factor
TPD	Tons Per Day
TPY	Tons Per Year
TR	Traffic Route
TRB	Transportation Research Board
TRO	Trip Reduction Ordinance
TSM	Transportation System Management
TYP	Twelve-Year Program (PADOT)
UAM	Urban Air Shed Model
UG/M^3	Micrograms per Cubic Meter
ULEV	Ultra Low Emission Vehicles
UMTA	Urban Mass Transportation Administration (renamed FTA--Federal Transit Administration)
USC	United States Code
VHT	Vehicle Hours Travelled
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compounds
VPH	Vehicles Per Hour
ZEV	Zero Emission Vehicles