

Air Quality Conformity Determination Statement for the Poughkeepsie Ozone Non-attainment Area

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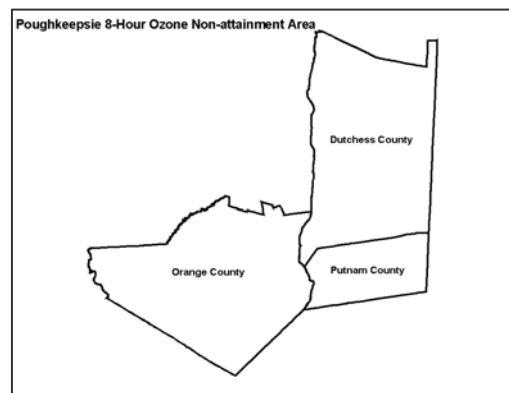
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1. INTRODUCTION The New York Metropolitan Transportation Council (NYMTC), the Orange County Transportation Council (OCTC) and the Poughkeepsie-Dutchess County Transportation Council (PDCTC), have completed this Draft Air Quality Conformity Determination as the result of the proposed OCTC and PDCTC 2011-2015 Transportation Improvement Program (TIP). This Draft Conformity Determination covers the PDCTC and OCTC Metropolitan Transportation Plans (MTP) and 2011-2015 TIP and the MTP and 2008-2012 TIP for NYMTC.

2. OVERVIEW

2.1. Background In recognition of the close relationship between air quality and transportation, Federal legislation – the Clean Air Act Amendments of 1990 (CAAA) and the Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA) – require that transportation activities conform to State air quality implementation plans before receiving federal transportation funding. Specifically, the CAAA establishes air quality standards through the designation of National Ambient Air Quality Standards (NAAQS). These standards set limits on the levels of air pollution (e.g. ozone, Particulate Matter, Carbon Monoxide, and Nitrogen Dioxide) that can exist in a region. In regions where these standards are not met (i.e. in non-attainment), it must be demonstrated that all future transportation plans and projects do not produce new air quality violations, worsen existing conditions, or delay timely attainment of the NAAQS. The CAAA further requires that a conformity determination must be less than four years old in non-attainment areas. If a conformity determination does expire, the region goes into a conformity lapse and restrictions are placed on the use of federal transportation funds; exceptions to this rule include funding for safety, mass transit, and air quality improvement projects that are exempt. The lapse would occur one year after the previous determination expires.

Three separate MPOs serve the Mid-Hudson Valley: NYMTC, OCTC, and PDCTC. Federal regulations require that all Urbanized Areas, metropolitan areas with over 50,000 people, be represented by a MPO – which is responsible for ensuring that Federal transportation dollars (highway and transit) are committed through a locally driven, comprehensive planning process. To guide this transportation planning process, each MPO must regularly develop three critical documents: a Metropolitan Transportation Plan (MTP) (usually a twenty-five year plan), a Transportation Improvement Program (TIP), and a Unified Planning Work Program (UPWP).



2.2. Attainment/Non-Attainment History and Status In 1991, Dutchess County, Putnam County, and Upper Orange County were classified as a Moderate Non-attainment Area under the 1-hour ozone standard, while in attainment for all other Clean Air Act criteria pollutants. The Lower Orange County Metropolitan Area (LOCMA), consisting of the Towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, and Woodbury were classified as a Severe Ozone Non-attainment Area, falling within the New York Metropolitan Ozone Non-attainment Area.

On July 16, 1997, the U.S. Environmental Protection Agency (USEPA) concluded that the 1-hour standard did not adequately protect the public from the adverse health effects of ground level ozone. In establishing a new "concentration based" 8-hour standard, the USEPA set the standard at 0.08 parts per million (ppm). Specifically, the design value for 8-hour ozone is the 3-year average of the annual 4th-highest daily maximum 8-hour ozone concentrations. An area attains the standard when the 3-year average of the annual 4th-highest daily maximum 8-hour concentrations is less than or equal to 0.08 ppm.

Effective June 15, 2004, the USEPA designated Dutchess, Orange, and Putnam County to be a Non-attainment Area under the 8-hour ozone standard. Based on 2001-2003 data, the 8-hour ozone design value for the Poughkeepsie Ozone Non-attainment Area was 0.094 ppm, and Dutchess, Orange and Putnam County were classified as a Moderate Ozone Non-attainment Area under the 8-hour ozone standard. The current ozone design value for the area based on 2005-2008 monitoring data is 0.080 ppm as monitored at the Valley Central Monitor in Orange County. The Mt. Ninham monitor in Putnam County has a 2005-2008 design value of 0.079 ppm. On March 12, 2008, EPA once again strengthened the 8-hour ozone NAAQS to a level of 0.075 ppm. It is likely that the Poughkeepsie, NY area will be classified non-attainment under the new standard. However, USEPA has not made final area designations for the new ozone standard and the conformity requirements for the new standard do not yet apply.

On December 22, 2006, the U.S. Court of Appeals for the District of Columbia Circuit both upheld and rejected certain aspects of EPA's framework for implementing the State Implementation Plan (SIP) requirements under Clean Air Act (CAA) Title I Part D for 8-hour ozone non-attainment areas. A key result of the court decision involved the continued implementation of emission control strategies in areas that were previously designated non-attainment for the 1-hour ozone standard under CAA Part D Subpart II and are now designated non-attainment for the 8-hour ozone standard under CAA Part D Subpart I.

Generally speaking, SIP requirements under Subpart I are less stringent than those under Subpart II. The "anti-backsliding" provision, CAA Section 172(e), provides that in the event "[EPA] relaxes a [primary National Ambient Air Quality Standard] after November 15, 1990, [EPA] shall...provide for controls applicable to areas designated non-attainment before such relaxation."

In the subject court case, the DC Circuit Court specifically concluded that transportation conformity requirements for areas designated non-attainment for the 1-hour ozone standard under Subpart II constitute "controls" under Section 172(e). The DC Circuit Court decision states that "EPA is required by statute to keep in place measures intended to constrain ozone levels – even ones that apply to outdated standards – in order to prevent backsliding."

Therefore, the transportation conformity requirements that previously applied to 1-hour ozone non-attainment areas may remain "applicable requirements." Therefore, this conformity determination and associated analyses address the transportation conformity requirements that apply to the New York Metropolitan 1-hour severe ozone non-attainment area, the Poughkeepsie 1-hour moderate ozone non-attainment area, and the Poughkeepsie 8-hour moderate ozone non-attainment area.

2.3. Process To complete the conformity determination, interagency consultation is required. The Interagency Consultation Group (ICG) includes representatives from the USDOT (Federal Highway and Transit Administrations), USEPA – Region 2, NYS Department of Environmental Conservation (NYSDEC) – Main Office, NYSDOT Environmental Science Bureau (ESB), and the Metropolitan Planning Organizations (MPOs). The group provides multi-agency concurrence on the assumptions and methodologies used in the NYMTC, OCTC and the PDCTC Travel Demand Models; the results of which formed the basis of the regional emissions analysis. In general terms, the model outputs are used to forecast the amount of air pollution created when the projects in the MTPs and TIPs are expected to be operational.

This statement details the conformity determination process that the NYMTC, OCTC and the PDCTC undertook for their respective MTPs and TIPs, by addressing each of the regulatory criteria stipulated in the federal transportation conformity regulation, 40 CFR Part 93, as amended January 24, 2008, which forms the basis of this determination statement. The State requirements under 6 NYCRR Part 240, especially 240.6 consultation process have been met as well.

3. FORMAT The USEPA requires that the following information or conditions be submitted or met in a conformity determination statement:

- ✓ Latest Planning Assumptions
- ✓ Latest Emissions Model
- ✓ Consistency with each Metropolitan Transportation Plan
- ✓ Identification of Exempt/Non-Exempt & Regionally Significant Projects
- ✓ Timely Implementation of Transportation Control Measures (TCMs)
- ✓ Documentation of Interagency Consultation Requirements
- ✓ Public Involvement
- ✓ Results of Emissions Analysis
- ✓ Evidence of MPO resolutions
- ✓ Statement of Conformity with SIP

4. LATEST PLANNING ASSUMPTIONS Federal and State regulations require that a conformity determination be based on the latest planning assumptions available at the time. Specifically, information on five general areas must be provided: demographic data, transit operating policies, transit service levels, transportation control measures, and key assumptions. The importance of providing this information relates to the fact that Travel Demand Modeling depends on such data to accurately forecast future amounts of Vehicle Miles of Travel (VMT). The forecasted VMT calculations for Dutchess, Orange, and Putnam Counties, as calculated by each MPOs travel demand model, formed the basis of the regional emissions analysis.

Vehicle Miles of Travel:

Unit of measure for vehicle travel made by a private vehicle (car, van, pickup truck, or motorcycle) Each mile traveled is counted as one vehicle mile, regardless of the number of persons in the vehicle.

4.1. Demographic Data In order to accurately forecast future VMT, the Travel Demand Models rely on demographic data – related to population, employment, housing, and vehicles – to measure how the transportation systems envisioned by the MTPs and TIPs will be used. Simply put, the models do this by first replicating the key components of the existing transportation system into the software: road networks,

functional classifications, turning lanes, vehicle speeds, and traffic control devices. Then, the models incorporate the required demographic data to simulate current and forecasted travel patterns, recognizing that certain population characteristics impact the transportation network in different ways. (Table 1 shows forecast data for Dutchess, Orange, and Putnam Counties)

Table 1. Demographic Forecasts for Dutchess, Orange, and Putnam Counties

Dutchess	2000	2012	2020	2030	2035	% Annual Growth	% Total Growth
Population ¹	261,951	288,132	310,850	344,429	358,590	1.1%	37%
Employment	114,099	124,743	132,651	142,168	146,964	0.8%	29%
Housing Units	106,103	121,130	130,020	140,562	146,379	1.1%	38%
Households	99,536	113,146	127,456	132,971	138,486	1.1%	39%
Vehicles	180,155	207,057	235,794	252,645	264,508	1.3%	47%

Orange	2000	2012	2020	2030	2035	% Annual Growth	% Total Growth
Population ¹	341,367	395,026	421,133	465,125	482,045	1.2%	41%
Employment ²	110,242	144,878	155,362	173,293	182,259	1.9%	65%
Housing Units	122,754	142,896	154,317	171,000	177,417	1.3%	45%
Households	114,788	133,623	144,303	159,903	165,903	1.3%	45%
Vehicles	200,879	233,840	266,180	279,830	290,330	1.3%	45%

Putnam	2000	2012	2020	2030	2035	% Annual Growth	% Total Growth
Population	95,745	103,904	110,571	120,699	125,019	0.9%	31%
Employment	32,889	41,656	45,270	48,758	50,293	1.5%	53%
Households	32,700	36,633	39,919	43,530	44,798	1.1%	37%

¹ Total population excludes group quarters (e.g. colleges, correctional facilities).

² Employment = people working in Orange County.

Most demographic data are based on census tract or Minor Civil Division (MCD) level, but the analysis units of travel demand models are Traffic Analysis Zones (TAZs). In order to provide the travel demand model a way to relate the transportation system with available demographic data, it is important to identify and create TAZs within each county. A TAZ is a geographical area, often based on U.S. Census geographies (tracts, block groups, and blocks), that represents a land use pattern with significant or unique travel characteristics. More information on the TAZs can be found in section 5.3.

4.1.1. Population

4.1.1.1. Dutchess County The base for population is the Census 2000, Summary File 1. The PDCTC Model uses those population counts to calculate the Average Household Size or Persons per Household (PPH) for each TAZ; the PPH by TAZ, are used to generate Trip Productions in TransCAD. Population forecasts were obtained by extrapolating historic annual growth rates from the last 15 years; these forecasts were then adjusted by the Dutchess Country Department of Planning and Development in March 2005, based on known future development projects in each municipality. They were then divided into forecasted household data (see 4.2.4) to determine PPH counts for each municipality

in Dutchess County. When looking at total population in Dutchess County, note that well over six percent reside in group quarters (primarily three colleges and three State correctional facilities).

- 4.1.1.2. Orange County** Source: Census 2000, Summary File 1. Population and housing information from the 2000 Census together with Census population and housing estimates (July, 2006), building permit data and population growth trends over the past 20 years were used as the basis for determining the population and housing forecasts in the OC Travel Demand Model for future analysis years.
- 4.1.1.3. Putnam County** Source: Census 2005 Population Estimates. Population data from the 2005 Census Population Estimates along with [Socioeconomic and Demographic \(SED\)](#) forecasts from the NYMTC 2035 Forecasts adopted by NYMTC's Program Finance and Administration Committee (PFAC) in February 2009 were used in the NYMTC Best Practice Model. Group Quarters Population was also derived from Census 2005 Population Estimates. Population in households was derived by subtracting the group quarter population estimate from the total population estimate for all areas.
- 4.1.2. Employment**
- 4.1.2.1. Dutchess County** Employment by TAZ serves as an important travel attraction component in the Model. To account for variations in travel patterns, the PDCTC categorized employment as either being retail or non-retail based. Employment forecasts were obtained by taking annual employment growth rates from the Dutchess County Forecasting Project (1996) and revising them based on the knowledge of the planning staff at the Dutchess County Department of Planning and Development; staff analyzed the forecasts for each TAZ, ensuring the data accurately reflected expected land use conditions. The revised growth rates were then applied to Census Transportation Planning Package 2000 (CTPP 2000), Part 2: Data by Place of Work which formed the base data. These revisions were completed in March 2005.
- 4.1.2.2. Orange County** Source: NYS Department of Labor. Employment information indicating the type and location of all businesses in Orange County, along with the number of employed persons in each business, was obtained from the NYS Department of Labor for the year 2002. This information was separated into six categories (retail, non-retail, mall, office, school, and institutional), and then aggregated by type and location to determine peak hour trips by Traffic Analysis Zone (TAZ) in the OC Travel Demand Model. Employment projections were first based upon expected employment from approved development projects yet to be constructed, and then upon average growth rates in commerce by municipality throughout the county. The basic underlying assumption is that growth in employment will be directly related to the influx of new people and increased demand for products and services by future growth in population.
- 4.1.2.3. Putnam County** Source: 1. Census Transportation Planning Package

2000 (CTPP 2000), Part 2: Data by Place of Work. 2. Department of Labor's ES-202 data 2000-2005.

2000 CTPP Employment estimates were used as the basis for 2005 employment estimates by applying yearly growth rates from the Department of Labor's ES-202 data for year 2000-2005. Employment estimates for 2005 along with the SED forecasts from the NYMTC 2035 Forecasts adopted by NYMTC's Program Finance and Administration Committee (February, 2009) were used in the NYMTC Best Practice Model.

4.1.3. Housing Units

4.1.3.1. Dutchess County Source: Census 2000, Summary File 3. Housing unit data serves as another important traffic generator in the PDCTC Model. In this case, housing units refer to the total number of occupied and vacant units in a location. For the Model, the PDCTC used the annual housing unit growth rates from the Dutchess County Forecasting Project (1996) and revised them based on observations from the planning staff at the Dutchess County Department of Planning and Development; this was done for each TAZ. The revised growth rates were then applied to Census 2000 data. The revised housing forecasts were completed in March 2005.

4.1.3.2. Orange County Source: NYS Office for Real Property Services (RPS). Land use information for each parcel in Orange County was obtained from the NYS Office for Real Property Services for the year 2000, and aggregated by type and location to determine peak hour trips generated for both single-family and multifamily housing in each TAZ of the OC Model. Future single-family and multifamily housing units were projected based upon proposed residential projects yet to be constructed in each TAZ, average growth rates in housing by municipality, and the availability of sewer and water facilities.

4.1.3.3. Putnam County NYMTC forecasts the number of occupied housing units, defined as households. The Best Practice Model is person based micro simulation model. Trip generation in BPM is a choice model instead of traditional regression or cross classification method.

4.1.4. Households

4.1.4.1. Dutchess County Source: Census 2000, Summary File 3. The PDCTC used household data to complement traffic generation factors in the Model. As defined by the U.S. Census Bureau, a household refers to an occupied housing unit. For the Model, the PDCTC used the revised housing unit growth rates from the Dutchess County Forecasting Project (1996) and applied them to Census 2000 household data, maintaining the 2000 distribution of households through the forecasted years. This was accomplished for each TAZ and completed in March 2005.

4.1.4.2. Orange County Source: Census 2000, Summary File 3. Household information from the 2000 Census was used as a means of checking and verifying the housing data from the NYS Office of Real Property.

4.1.4.3. Putnam County Source: 2005 American Community Survey New York's census tract households were distributed from the 2005 American Community Survey county totals using the 2000 decennial census tract to county proportion of total households. Connecticut's total number of households by county subdivision was gathered from 2005 town profiles prepared by the State of Connecticut. In view of the fact that no such data were available for New Jersey, that state's total number of households was determined by dividing population in households by the average household size.

4.1.5. Vehicles Available

4.1.5.1. Dutchess County Source: Census 2000, Summary File 3 and NYS Department of Motor Vehicles. The forecast of the number of vehicles available for each TAZ represents another important component of the Travel Demand Model. The PDCTC calculated vehicle forecasts by applying historical vehicle registration growth rates (1990-2005) from NYS DMV to Census 2000 vehicle availability data.

4.1.5.2. Orange County Source: Census 2000, Summary File 3. Information from the 2000 Census indicating the average number of vehicles available per housing unit was used to further refine the number of trips generated in each TAZ. This was done for TAZs primarily in urban areas, where high numbers of housing units exist without a corresponding high number of vehicular trips generated, because people there tend to rely more on mass transit for travel than in other areas of Orange County.

4.1.5.3. Putnam County The NYMTC Best Practice Model has a sub model which forecasts vehicle ownership.

4.2. Transit Operating Policies

4.2.1.1. Dutchess County Three mass transit providers serve Dutchess County: the Dutchess County Mass Transit (LOOP) bus system, the City of Poughkeepsie bus system, and Metro-North Railroad and among the three, the Dutchess County Mass Transit (LOOP) and Metro-North Railroad recorded some changes in their operating policies, fares, service levels, and ridership since the previous conformity determination statement completed in 2009. These changes include marginal service changes for Metro-North commuter rail services, and a schedule changes for Dutchess County Mass Transit LOOP. And according to Census 2000 Journey-to-Work data, mass transit accounts for just over four percent of all commuter trips taken by Dutchess County workers. Given this low rate transit service is not modeled given the low rate of utilization in the county

4.2.1.2. Orange County Coach USA, MTA-Metro North Railroad, the Newburgh-Beacon Bus Company, Middletown Transit, the Monroe Bus Company, and Kiryas Joel Transit provide the majority of mass transit services in Orange County, along with nine local dial-a-bus operators. According to Census 2000 Journey-to-Work information, only 4.7% of work related travel had a mass transit component, with a majority of this travel involving vehicular trips to park-and-rides throughout Orange County.

Although park-and-rides are included as traffic generators in the OCTC Travel Demand Model, transit service is not modeled given the low rate of utilization in the county.

- 4.2.1.3. Putnam County** Putnam Area Rapid Transit (PART), MTA-Metro North Railroad, and a number of private operators provide the majority of mass transit services in Putnam County. According to Census 2000 Journey-to-Work information, 7.2 % of work related travel by Putnam County workers had a mass transit component. The NYMTC Best Practice Model includes a mode split component for mass transit travel. The Transit fares for Metro North Railroad were updated as part of this analysis.

4.2.2. Transit Service Levels

- 4.2.2.1. Dutchess County** On June 28, 2010 Dutchess County implemented a schedule change to the LOOP bus system. Renaming several routes and implementing recommendation from the PDCTC Transit Development Plan. These changes focused on serving the areas of greatest usage and provide more consistent reliable service on nine 9 routes.

- 4.2.2.2. Orange County** OCTC does not anticipate significant changes in future transit service within Orange County. This position may change as economic or environmental conditions unexpectedly influence travel behavior and patterns. Though at a minimum, projected transit funding is expected to allow the transit systems to expand to meet increases in future demand.

- 4.2.2.3. Putnam County** NYMTC does not anticipate significant changes in future transit service within Putnam County. This position may change as economic or environmental conditions unexpectedly influence travel behavior and patterns. Though at a minimum, projected transit funding is expected to allow the transit systems to expand to meet increases in future demand.

- 4.2.3. Transportation Control Measures.** No transportation control measures (TCMs) are identified for Dutchess, Orange, and Putnam Counties as part of the applicable State Implementation Plan. Therefore, the TCM implementation conformity criterion does not apply to these MPOs. Nothing in the NYMTC 2008-2012 TIP and MTP, or the OCTC and the PDCTC 2011-2015 TIPs and MTPs will interfere with the timely implementation of TCMs in other areas.

4.3. Key Assumptions

- 4.3.1. Demographics.** All three models assume that Dutchess, Orange, and Putnam Counties will experience near constant levels of growth over the next twenty-five years. This growth will be greatest with respect to population and housing and less so with respect to employment, which is reflective of recent development patterns in the three counties. For example, between 1990 and 2000, the total population for Dutchess County grew by eight percent, whereas the total number of workers working in the county decreased by five percent. This disparity is partly due to the economic downturn of the early-nineties, but is also reflective of the region's growing attraction as a residential hub. Though the MPOs expect

this trend to continue, it will likely not occur to the extent experienced so far – especially when looking at future employment. Economic growth seems likely, given the expansion plans of some major employers in the region. It should also be noted that the amount of developable land is slowly evaporating, which will impact the rate of population growth.

4.3.2. Transportation System. The three models further assume that the regional transportation network will retain its ability to adjust to changes in travel patterns, specifically with regard to vehicle traffic. This naturally assumes that future transportation funding rates will maintain current apportionment levels, as adjusted for inflation. This assumption is also aided by the ever-expanding use of technology in transportation, as evidenced by the proliferation of Intelligent Transportation Systems (ITS) in the Mid- and Lower-Hudson Valley. It seems reasonable to expect that advances in ITS will improve upon the efficiency of the network.

5. LATEST EMISSIONS MODEL As stated earlier, the goal of the conformity process is to ensure that the transportation system envisioned by the NYMTC, OCTC, and PDCTC do not create new air quality violations or worsen existing violations. Modeling provides a quantifiable method of proving that and requires the use of two programs: a Travel Demand Model (e.g. TransCAD, Visum) to calculate future Vehicle Miles of Travel (VMT) and average speeds, and a second model (MOBILE6.2) to conduct the actual emissions analysis. Determining VMT and Average Speeds represent the most important products of a Travel Demand Model, because forecasted VMT and speeds, combined with pollution rates per mile traveled, provide an estimate of the total amount of vehicle pollution in a given time period.

5.1. Travel Demand Models

5.1.1. Dutchess County To determine the impact of future transportation projects, the PDCTC uses a three-step gravity model without the mode split component. The PDCTC uses TransCAD software for its travel demand model. The model requires replicating the existing and proposed transportation networks through spatially accurate digital mapping - GIS (Geographic Information Systems). This is also done to replicate current and predicted land use conditions. The base network then incorporates demographic data, along with trip generation, trip distribution, and trip assignment data to simulate travel patterns.

5.1.2. Orange County The traditional gravity modeling process incorporated within VISUM software by PTV of America was utilized to forecast future travel demand and the impact of transportation projects in the OCTC TIP and MTP on air quality. The OC Travel Demand Model incorporates housing, employment, highway, along with trip generation and Census 2000 Journey-to-Work information to replicate existing travel patterns in OC. Trips are distributed and assigned to the least time travel paths between traffic analysis zones based primarily on the methodology recommended in [National Cooperative Highway Research Program Report 365 \(NCHRP 365\)](#), Travel Estimation Techniques for Urban Planning. Using the trip generation and trip length parameters of the calibrated base year (2002) model, future travel conditions, vehicle miles traveled (VMT) and vehicular emissions were forecast using projected increases in housing, employment and vehicle trips in OC for each analysis year being evaluated. Transit was not modeled given that transit service does not comprise

a significant portion of travel in OC.

The four time period approach was utilized to calculate vehicle miles traveled (VMT) for each analysis year being evaluated. With this approach, VMT for the morning, midday and nighttime hours is estimated as a proportion of that occurring during the PM peak hour and then factored into VMT by time period based upon the VMT percentages used in the OC portion of NY SIP to determine emissions budgets. This methodology differs from previous conformity determinations in that VMT was calculated using hourly percentages determined from traffic counts taken in OC. In June 2007, the NYSICG concurred that this change in methodology is a more accurate means to estimate VMT.

5.1.3. Putnam County To determine the impact of future transportation projects, NYMTC uses the third generation of travel demand models which are commonly referred to as activity based models. This model, known as the New York Best Practice Model (NYBPM), attempts to predict and simulate detailed travel patterns for every individual residing inside the study area over a 24-hour period. The model uses journeys (travel between two primary locations including stops) as a unit of travel rather than just home-to-work trips. The model also looks at the daily activity agenda of each household member and intra-household interactions between them, and other constraints that affect the choice of travel with respect to time and space. The model requires replicating the existing and proposed transportation networks through spatially accurate digital mapping - GIS (Geographic Information Systems). The model uses the digitizes networks and demographic data, along with journey generation, destination and mode choice, time of day travel, and trip assignment data to simulate travel patterns. For more information on the NYBPM please visit: http://www.nymtc.org/project/BPM/model/bpm_finalrpt.pdf.

5.2. Road Network The simulated road network consists of two components: links, which represent roads, and nodes, which represent intersections. Each of these components is characterized by relevant data concerning the number of lanes, traffic control devices, turning lanes, and speed limits; these characteristics help determine the vehicle capacity of each link and node. Furthermore, the models assign a functional classification to all roads; in accordance with the National Highway Classification System (see Appendix A).

5.2.1. Dutchess County The highway network in the PDCTC Travel Demand Model includes all roadways that have a functional classification of Collector or above. Local roads that act as essential connectors have been included where appropriate; especially in places such as the City of Poughkeepsie, where local roads carry a significant amount of traffic. The 2002 base street network is based upon the NYS Data Product GIS Street Centerline files from New York Cyber Security and Critical Infrastructure Coordination (NYCSCIC). PDCTC staff also used aerial imagery from 2000 to verify intersection configurations (turning lanes, signalization). Link capacities are shown in Appendix B.

5.2.2. Orange County The highway network in the OCTC Travel Demand Model includes all roadways that have a functional classification of interstate, arterial or collector. Not every local road is included, however, only those that facilitate the through movement of vehicles and feed and augment collectors, arterials and interstates in OC. For example, roads to regional shopping malls, office parks

and major residential developments are included because they are important locations where traffic enters and leaves OC's primary road network. Information concerning intersection signalization and number of turning lanes was collected in the field and from aerial imagery to determine capacity. Link capacities are shown in Appendix B.

The functional classification of roads in the OC Travel Demand Model was updated, reflecting changes in area (urban/rural) and function of roads as depicted on the functional classification maps approved by the Federal Highway Administration on June 26, 2006. The urban/rural split of roads under the old classification was 38% urban and 62% rural. With the new classification, 30% of the roads in OC are classified as rural while 70% are classified as urban.

5.2.3. Putnam County The NYBPM highway network is maintained and applied with TransCAD, which features a GIS (Geographic Information Systems) framework that provides a realistic representation of highway route system. The highway network has more than 53,000 links and includes most minor arterial and above roadway facilities. The database includes information on number of lanes, functional class, speed, parking restriction, and truck usage.

5.3. Land Use Patterns Traffic Analysis Zones (TAZs) act as the basis for replicating land use patterns in the Model. These zones represent areas with significant or unique travel characteristics and are often based on U.S. Census geographies (tracts, block groups, and blocks).

5.3.1. Dutchess County The PDCTC model incorporates a total of 190 TAZ's: 156 TAZs within Dutchess County (internal), 20 outside the county (external), and 14 special generators. A special generator refers to a distinctive land use, such as a college or regional shopping mall, with atypical travel characteristics.

5.3.2. Orange County Traffic Analysis Zones (TAZs) divide OC geographically into areas describing different land use types and intensities. Centroids are the points within TAZs where trips commence and terminate based upon the land use activities therein. To accurately replicate base year traffic conditions, it is necessary to accurately describe the location of land use activities relative to where traffic actually enters and leaves the highway network. Not every driveway need be represented, however, only the significant local and collector roads channeling traffic to roads and intersections being analyzed. The OCTC model incorporates a total of 550 TAZs, 515 internal zones and 35 external zones connecting OC with surrounding counties. The 515 internal TAZs were created by first delineating limited access highways, rail and power line rights-of-way, federal, state and county preserves and parklands, as well as natural features such as rivers and mountains which serve to restrict directional traffic flow. These districts were then further subdivided into TAZs bounding residential neighborhoods and activity centers such as malls, major residential neighborhoods and central business districts where vehicular trips commence and terminate.

5.3.3. Putnam County The NYBPM Transportation Analysis Zone (TAZs) system is the underlying data structure for the socioeconomic and demographic inputs to the BPM zonal files for its transportation networks and trip tables, and for the framework of reporting model results on a geographic basis. Supporting a fully

multi-modal integrated regional modeling system, the BPM system of TAZs is common to both the Highway and Transit networks.

The total number of zones used for regional modeling should not be excessive, given the many large matrices used in the model and the computational resources needed to run it (disk storage and processing time) increases exponentially with the number of zones. For the 28-county modeling area 3,583 zones were created. These zones were based on Census tracts and varied from 1 census tract per zone to several tracts per zone. In Putnam County there are 14 zones with an average of 1.39 tracts per zone. In 1996, a land use data collection was undertaken for model development. For Putnam County 86 % floor space was found to be occupied by residential buildings and 14 % by non residential buildings.

5.4. Analysis Years Consistent with 40 CFR Part 93, vehicle miles traveled (VMT) and vehicular speeds were forecast by functional classification for the years 2012, 2020, 2030 and 2035, complying with the federal transportation conformity regulations that: the first analysis year be no more than five years from the year a conformity determination is made (2012), consecutive analysis years be no more than ten years apart (2020 and 2030), and that the horizon year (2035) of each MPO's Metropolitan Transportation Plan (MTP) be analyzed. The 2002 base year is also required to be analyzed for areas without emissions budgets to demonstrate that vehicle emissions in future analysis years are less than vehicle emissions for the year 2002. In addition, the transportation conformity regulations state that the full ozone season before a required attainment date (2009 ozone season for July 1, 2010 attainment date) be incorporated into a regional emissions analysis. Previous regional emissions analyses for PONA have included the 2009 analysis year. However, since this conformity determination is anticipated to be approved after the end of the 2009 ozone season, the ICG concurred on April 2, 2009 that 2009 is no longer required to be analyzed.

5.5. Trip Generation The goal of trip generation is to predict the number of trips that are generated by and attracted to each TAZ. In trip generation, methods are applied to predict productions and attractions. The zone that contains the home end of home-based trips or the origin end of non-home-based trips is considered to have produced the trip, while the destination zone where an out-of-home activity will be undertaken is considered to have attracted the trip.

5.5.1. Dutchess County The PDCTC uses traditional trip production and attraction rates as explained in sections 5.6.1 and 5.7.1.

5.5.2. Orange County Trip generation is the means of quantifying the number and type of trips in a model based upon the amount and type of land uses in each TAZ. The overall purpose is to quantify the number of trips made for a specific time period such as a day or peak hour. Trip generation rates from the [Institute of Transportation Engineers, Trip Generation Guide, 7th Edition](#) were used to estimate trips for commercial, office and industrial land uses. For residential land uses, trip generation rates were derived from traffic counts taken at the driveways of residential developments throughout OC.

5.5.3. Putnam County The NYMTC Best Practice Model does this through a special Household, Auto-Ownership and Journey-Frequency (HAJ) Model.

5.6. Trip Production

5.6.1. Dutchess County Trip Production rates for the PDCTC were obtained from the New York Metropolitan Transportation Council [1997/1998 Regional Travel - Household Interview Survey \(RT-HIS\)](#). Those rates were compared with those from the [2001 National Household Travel Survey](#) and found to still be consistent with regional travel patterns. PDCTC is cooperating with NYMTC to supplement their upcoming Household Travel Survey with additional surveys in Dutchess County to update our trip production rates. The Model uses the Cross-classification method, where the population is separated into demographically homogenous groups, to determine the number of person trips produced. Average trip production rates per household are then estimated for each classification, which creates forecasted trip productions (Table 2).

Table 2 Dutchess County Trip Production Rates

Number of Vehicles	Household Size				Total
	1 Person	2 Person	3 Person	4+ Person	
Zero Vehicles	2.9	4.7	8.5	9.6	4.2
1 Vehicle	3.9	6.9	7.5	11.3	6.1
2 Vehicle	4.4	7.1	10.6	14.4	10.5
3 Vehicle	3.4	5.7	13.2	13.1	11.8
4+ Vehicles	4.0	9.9	8.7	14.2	13.8
Total	3.5	6.9	10.3	14.2	

5.6.2. Orange County Trip production rates were obtained from the Institute of Transportation Engineers, Trip Generation Guide, 7th Edition for commercial, office and industrial land uses while origin rates for residential land uses were calculated from traffic counts taken at the entrances to major residential development throughout OC. Trip productions in the OC Model were then separated by purpose to account for variable trip length characteristics of drivers as documented in NCHRP 365, Travel Estimation Techniques for Urban Planning. Trip length is important because it influences traffic volumes, vehicle miles traveled and vehicular emissions.

Table 3. Orange County Trip Production Rates

Type	Origins	Destinations	Total Trips
Single-Family	0.30	0.55	0.85
Multi-Family	0.21	0.39	0.60
Retail	1.38	1.25	2.63
Mall	1.22	1.10	2.32
Non-Retail	0.54	0.07	0.61
Office	0.50	0.07	0.57
School	0.35	0.33	0.68
Institutional	0.13	0.05	0.18

5.6.3. Putnam County The NYBPM generates trips by applying a set of models called the Household, Auto-Ownership and Journey-Frequency (HAJ) Model that simulates total journeys for every household for all travel purposes over a 24-hour period. A journey is defined as travel between two primary locations, where one end is always home and the other end is work, school or other primary location. Market segmentation is used to group households by income, auto availability, household-size, and type of person (children, workers, and non working adults). A multinomial logit model, combined with Monte Carlo technique is used to generate discrete journeys for individual member of the households after evaluating interaction between household members in combination with time and space constraints that each person experiences in view of multiple-journey daily activity pattern.

This HAJ model comprises of a set of sub-models applied in sequence: 1) household-synthesizing model, 2) auto-ownership model, and 3) journey production (frequency) model.

- a. Household Model. This model forecasts the number and distribution of households in each zone. Using Census data, the model calculates probability for each possible combination of the household characteristics, including income, size, number of workers, non-working adults, and number of children. These probabilities are then used in combination with the aggregate demographic forecasts in order to produce a number of households of each category, for each zone, for target years.
- b. Auto-Ownership Model. This model determines the number of automobiles available in each household. The model considers the influence of household income and composition, vehicle-maintenance cost, parking availability, transit and highway accessibility and density as well as residential area type.
- c. Journey-Frequency Model. This model determines the daily number of paired journeys (outbound and inbound) each person in each household makes for each purpose. Each person is categorized as a worker, non-working adult, or a child. This model evaluates intra-household interrelationships among different household members, transit accessibility, and auto availability to come up with journey frequency for each person. Linkage of journey-frequency models across different household members allows for forecasting a realistic set of journeys made by each household.

5.7. Trip Attraction

5.7.1. Dutchess County Trip Attraction rates were generated from *National Cooperative Highway Research Program (NCHRP) Report 187*. For attractions, the Models use a regression equation that estimates the number of person-trips attracted to a zone based on employment (retail and non-retail) and households in the zone.

5.7.2. Orange County Trip attraction rates were obtained from the Institute of Transportation Engineers, Trip Generation Guide, 7th Edition for commercial, office and industrial land uses while origin rates for residential land uses were calculated from traffic counts taken at the entrances to major residential

development throughout OC. Trip attractions in the OC Model were then separated by purpose to account for variable trip length characteristics of drivers as documented in NCHRP 365, Travel Estimation Techniques for Urban Planning. Trip length is important because it influences traffic volumes, vehicle miles traveled and vehicular emissions.

5.7.3. Putnam County The journey attraction model for NYBPM uses linear regression equations with contributing land use variables such as population, households, total employment, retail employment, office employment, school enrollment, and university enrollment. The attraction model is segmented by land use type for six travel purposes resulting in a set of journey attraction rates that are used for destination choice model.

5.8. External Trips The Models use external loading links to account for traffic that enters from an area outside of each county. These links represent the first link of an existing road where the external traffic can enter into the area. External trips include those that start in the model area but leave it (Internal-External trips), start outside the model but end in it (External-Internal trips), or pass through on their way between two external points (External-External trips).

5.9. Trip Distribution Trip distribution is the process where trip origins are apportioned throughout the study area, based on the number of trip destinations in each TAZ and the distance/travel time impedance involved. In the gravity model, the assumption is that people tend to interact more when the travel time between them is less – the shorter the travel time, then the higher the frequency of interactions.

5.9.1. Dutchess County Accordingly, TransCAD routes vehicles on the fastest, shortest routes first, and then onto other routes as congestion makes those paths less desirable.

5.9.2. Orange County Accordingly, Visum routes vehicles on the fastest, shortest routes first, and then onto other routes as congestion makes those paths less desirable.

5.9.3. Putnam County In NYBPM, the Mode, Destination and Stop Choice (MDSC) model replaces the traditional trip distribution and mode choice model. The two steps are combined together as most choices regarding destination and mode are co-dependent. The travel purposes forecasted are work (low, medium, high income), school, university, maintenance, discretionary, and at work journeys.

This model comprises pre-mode choice, destination and mode choice, intermediate stop frequency and location choices modeled in sequence. In addition to combining the destination and the mode choice model this step also introduces the concept of intermediate stops in a journey. Explicitly modeling the number and location of the stops on a journey enables for a realistic representation of the interrelated decisions made by the traveler regarding all destinations (primary and secondary) and modes.

- a. Pre-Mode Choice Model. This model distinguishes between motorized and non-motorized travel based on the person and household characteristics and land-use densities around the journey origin.

- b. Destination Choice Model. Different destination-choice models are applied to motorized and non-motorized subsets of journeys. They take into account available attractions for each zone in retail, office and other employment categories along with school and university enrollments and then distribute journeys to the destination zones.
- c. Motorized Mode Choice Model. The motorized mode-choice model predicts traveler decisions based on various time and cost factors as well as person and household characteristics. This model includes nine modes: drive alone; shared ride - 2 (driver and passenger); shared ride - 3 (driver and two passengers); shared ride - 4+ (driver and three or more passengers); walk to transit (including bus, subway and ferry); drive to transit; walk to commuter rail; drive to commuter rail; and taxi.
- d. Stop-Frequency Choice Model. The stop-frequency model considers four combinations: direct journeys without stops, stop on the inbound journey only, stop on the outbound journey only, and stops on both inbound and outbound journeys.
- e. Stop-Location Choice Model. The stop-location choice model predicts a location zone for each modeled stop based on the density of potential attractions along the journey route from origin to destination and the deviation (relative additional impedance) from the base journey route that is associated with visiting the stop zone.

The choice models are either multinomial or nested logit constructs. Multinomial logit models are applied for journey frequency, pre-mode, and destination choices. They are based on the assumption that all choice alternatives are equally similar and thus choice can be made according to their utility functions. Nested logit models are applied for mode and car-ownership choice where choice alternatives have a differential degree of similarity and should be grouped by characteristics in the choice modeling procedure (for example transit modes are grouped together while drive alone and shared ride choices form a separate group).

5.10. Calibration

5.10.1. Dutchess County To test the validity of the models, the PDCTC calibrated its model through an analysis of the road network, land-use data, and gravity model factors. This effort included a reasonableness test, to ascertain whether the models accurately represented known traffic flows; in this case, the known data came from 2002 Average Daily Traffic directional counts from Dutchess County and NYSDOT. Specifically, two calibration tests were used: a screen line analysis and a scatter gram analysis. For the former, PDCTC staff verified that the simulated traffic flowed in generally plausible directions, using screen lines to measure the flow of traffic from North to South and West to East.

5.10.2. Orange County The travel parameters of OC Model were adjusted to reflect traffic counts and travel characteristics of drivers in OC for the 2002 base year. Traffic volumes assigned by the OC Model were compared to actual traffic counts through regression analysis. The differences between traffic counts and traffic volumes were used as the basis to modify trip generation rates, trip length exponents and, in some instances, land use quantities where errors were

evident. One or two variables were modified followed by a model run to determine the effect of such modifications. This was repeated, iteratively, until volumes assigned by the model meet acceptable error deviation levels as defined in National Cooperative Highway Research Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design.

5.10.3. Putnam County Based on the revised full set of input data and new calibration target data developed as part of the BPM 2002 Update, and using the improved application procedures implemented in this update, the BPM was re-calibrated, with a marked improvement in the model's demonstrated ability to replicate observed highway and transit travel in the region's 28 county model area, and to provide reliable future year forecasts.

5.11. Seasonal Adjustment Seasonal adjustment of daily vehicle miles traveled from Travel Demand Model results is required to account for increases in traffic volumes and vehicle miles traveled during the ozone season (May through September). Seasonal or monthly adjustment factors convert average daily traffic (ADT) to annual average daily traffic (AADT). The work week seasonal factors are developed from NYSDOT continuous counter data collected for a three year period. Factor Group 30 is characteristic of highways carrying heavy commuter traffic with only a small variance of traffic throughout the year. Factor Group 60 is characterized by large seasonal traffic variations. Factor Group 40 highways lie between these two extremes.

The New York State Implementation Plan developed by the NYSDEC designates the following seasonal Adjustment factors Table 4.

Table 4 Seasonal Adjustment Factors

	Summer Conditions	Winter Conditions
Factor Group 30	1.12	1.00
Factor Group 40	1.16	0.87
Factor Group 60	1.21	0.80

Source: NYSDEC – SIP

5.11.1. Dutchess County To produce emissions analysis for Dutchess County each link is assigned a functional classification and based upon that classification it is adjusted based on seasonality factors to account for the summer season. The adjustment factors represent the ozone season (May through September).

5.11.2. Orange County Seasonal adjustment of daily vehicle miles traveled from the OC Travel Demand Model is required to account for increases in traffic volumes and vehicle miles traveled during the ozone season (May through September). A list of State and County Roads by Factor Group was obtained from NYSDOT Region 8. The 9,400+ street segments in the OCTC Travel Demand Model were then coded with the appropriate factor group category. Local roads not listed were assumed to exhibit FG 30 characteristics. DVMT and vehicle emissions were seasonally adjusted on a link by link basis accordingly.

5.11.3. Putnam County To produce emission analysis, the output from NYBPM is fed into a post processor PPSUITE. PPSUITE processes the trip assignment

files from NYBPM to reconcile with HPMS data and seasonal factors followed by speed adjustments for intersection approaches. After these adjustments, the data is converted into appropriate format to run Mobile 6.2 to produce desired emission analysis.

- 5.12. MOBILE6.2** The USEPA developed the MOBILE emissions model, with the latest revision occurring on January 27, 2002 through the official release of MOBILE6.2; this version has been required of all states (except California) since January 27, 2004. The emissions model predicts gram per mile emissions of Hydrocarbons (HC), Carbon Monoxide (CO), Nitrogen Oxides (NOx), Carbon Dioxide (CO₂), and Particulate Matter (PM) under various seasonal and operating conditions. Emission factor tables developed by NYSDOT-EAB based on MOBILE 6.2 were used to measure the air quality impacts of implementing the proposed projects in the MTPs and TIPs. The modeling inputs used to develop the emission factor tables are the most recent inputs that have been established in consultation with the New York State Department of Environmental Conservation (NYSDEC) and the New York State Air Quality Conformity Interagency Consultation Group (ICG). These model inputs include the latest existing and future emissions control programs included in the SIP, and the latest MOBILE 6.2 input assumptions on characteristics of the existing and future vehicle fleets traveling on roadways.

In order to conduct the required regional emissions analyses for Dutchess and Orange Counties, emission factor tables developed by the NYSDOT Environmental Science Bureau in April 2008 were used. In order to conduct the required regional emissions analysis for Putnam County, NYMTC generated its own emission factors. All of the emission factors were generated using the EPA motor vehicle emissions model, MOBILE6.2. The modeling inputs and parameters used to develop the emission factor tables are the most recent inputs for Dutchess, Orange and Putnam Counties established in consultation with the New York State Department of Environmental Conservation (NYSDEC) and the New York State Air Quality Conformity Interagency Consultation Group (ICG). The MOBILE6.2 input files and modeling parameters used for this regional emissions analysis are the most recent inputs that were available for use at the time the NYMTC modeling process began. Specific modeling inputs and parameters used to develop the emission factors for Dutchess, Orange and Putnam Counties are described below:

- 5.12.1.1. Evaluation Month** The month of July (i.e., summertime conditions) was specified in the VOC and NOx emission factor input files.
- 5.12.1.2. Vehicle Registration Distribution** Year 2002 registration data were used to model the 2002 base year. Year 2007 registration data were used to model all future analysis years.
- 5.12.1.3. Vehicle Mileage Accumulation Rate** The EPA default mileage accumulation rate data (provided with the MOBILE6.2 model) was used for all modeling years.
- 5.12.1.4. I/M Programs** NYSDEC inspection and maintenance (I/M) program data were used in the emission modeling. The NYSDEC file, NYVIPup.d, contains data for the Upstate NY I/M program. This file was used for modeling all future analysis years. No I/M program was in place in

Dutchess, Orange, and Putnam Counties in the 2002 base year.

5.12.1.5. Anti-Tampering Program The anti-tampering program data described in the table below was used to model all analysis years:

ANTI-TAMPERING PROGRAM DATA	
Parameter	Years 2002 – 2035
Beginning calendar year	1984
Earliest model year	(Current yr – 25 yrs)
Final model year	(Current yr – 2 yrs)
Light-duty vehicles subject to inspection	LDGV, LDGT1, LDGT2, LDGT3, LDGT4
Heavy-duty vehicles subject to inspection	HDGV2B, HDGV3, HDGV4
Annual or biennial	Annual
Compliance rate	98%
Component inspections (see MOBILE6.2 User's Guide)	All except tailpipe lead deposit test

5.12.2. Fuel Program and Fuel RVP. Average and maximum fuel sulfur levels and fuel Reid Vapor Pressure (RVP) levels were specified in the input files (as listed in the below).

Fuel Sulfur and RVP Levels				
Dutchess, Orange and Putnam Counties				
Year(s)	Season	Fuel Sulfur Levels (ppm)		RVP (psi)
		Average	Maximum	
2002 - 2003	Summer	85.0	1000.0	6.8
	Winter	137.0	1000.0	12.5
2004	Summer	85.0	303.0	6.8
	Winter	120.0	303.0	12.5
2005	Summer	90.0	303.0	6.8
	Winter	90.0	303.0	12.5
2006 - 2007	Summer	30.0	87.0	6.8
	Winter	30.0	87.0	12.5
2008 - 2009	Summer	30.0	80.0	6.8
	Winter	30.0	87.0	12.5
2010 - 2035	Summer	30.0	80.0	6.8
	Winter	30.0	80.0	12.5
	Winter	30.0	80.0	12.5

Gasoline fuel oxygenate data were also specified in the input files (as listed in the Table below).

Gasoline Fuel Oxygenate Data				
Dutchess, Orange and Putnam Counties (Reformulated Gasoline Program)				
Year(s)	Season	Oxygenate Type	Oxygenate Content (% by volume)	Market Share Fraction of Oxygenate
2002 - 2003	Summer	MTBE	10.4%	0.98
		TAME	1.01%	0.02
	Winter	MTBE	8.7%	0.96
		TAME	0.3%	0.04
2004 - 2035	Summer/Winter	Ethanol	10%	1.00

5.12.3. Temperature and Humidity For the summer season, county-specific hourly temperatures and relative humidity levels as verified by NYSDEC in May 2009 were used in the modeling.

5.12.4. Diesel Sale Fractions Diesel sale fractions for NYSDOT Region 8 were used in the modeling. Year 2002 diesel fractions were used to model the 2002 base year. Year 2007 diesel sale fractions were used to model all future analysis years.

5.12.5. Vehicle Start Distribution County-specific vehicle start distribution data as received from NYSDEC in spring 2007 were used in the modeling.

5.12.6. VMT by Hour County-specific VMT data (allocated by hour of day) as verified by NYSDEC in May 2009 were used in the modeling.

5.12.7. Low-Emission Vehicle (LEV) Standards The following files were used to model the effects of implementing California's LEV I/LEV II programs in New York State:

- L2CERT.d – Specifies the LEV II 50,000-mile certification standards
- L2EVAP.d – Specifies the phase-in schedule for the LEV II evaporative emission standards
- L2EXH.d – Specifies the phase-in schedule for the LEV II exhaust emission standards
- LEV2.d – Provides fleet penetration fractions for light-duty gasoline vehicles under the LEV I/LEV II programs.

5.12.8. Weighted emissions by vehicle type The emission factors for each individual vehicle type were weighted according to the NYSDOT Region 8 vehicle distributions by roadway functional class and then summed to obtain composite emission factors. NYSDOT developed the vehicle distribution data in 2004 using the most recently available traffic count data.

These model inputs include the latest existing and future emissions control programs included in NYSDEC's statewide mobile source emission inventory, and the latest MOBILE6.2 input assumptions for the existing and future vehicle fleets traveling on roadways in the PONA. The MOBILE6.2 input and external data files are available by contacting the NYSDOT Environmental Science Bureau.

5.13. Mobile 6.2 and PPSUITE To produce the emission analysis, the output from NYBPM is fed into a post processor PPSuite. PPSuite processes the trip assignment files from NYBPM to reconcile Vehicle miles traveled (VMT) with HPMS data and seasonal factors, followed by speed estimates for intersection approaches. After these adjustments, the data is converted into appropriate format to run Mobile 6.2 to produce the emission rates. In August 2005, the ICG concurred that the PPSUITE process is an appropriate method to estimate emissions for use in NYMTC conformity determinations. The following are the major steps of post processing before running Mobile 6.2:

5.13.1.1. Expand assigned 24 hour volumes (daily volume, minus transit buses) from the NYBPM output to 24 one-hour volumes. PPSuite applies VMT hourly distribution data (NY_HourPat_03A.dat) to the daily and peak period volumes from the BPM.

5.13.1.2. Adjust the 24 one-hour volumes to match Assigned Peak Volumes and to account for the impacts of off-peak Spreading.

5.13.1.3. Disaggregate to Vehicle Types – The vehicle pattern files were created using the NYSDOT 'Vehicle Mix 2002D.xls' file to breakdown the one hour traffic volume into five vehicle classes.

- 5.13.1.4. **Apply VMT Adjustments to Hourly Link Volumes** - The assigned traffic volumes input from the network are adjusted to account for a variety of factors, such as accounting for daily/seasonal variation, reconciling VMT totals with totals reported by the Highway Performance Monitoring System (HPMS), and accounting for off-model projects (including TDM) which change VMT.
- 5.13.1.5. **Calculate Link and Approach Capacities** - Link (mid-block) carrying capacities are calculated off-line by the user, reflecting the facility type, area type, and number of lanes, and then a lookup table is built.
- 5.13.1.6. **Calculate Link (mid-block) Delay** - Using the above capacity and hourly volumes as input, link speeds are calculated.
- 5.13.1.7. **Calculate Approach Delay** - On those links where control devices (signals, stop signs) are either coded or implied by defaults, intersection approach delay is calculated.
- 5.13.1.8. **Calculate VMT, Aggregate Link Speed** - Once mid-block and intersection approach V/C ratios and speeds are finalized, the delays that result on both the link and the intersection approach, are summed. The average link speed is calculated from the combination of link and intersection delay.
- 5.13.1.9. **Accumulate VMT, VHT, Average Speed** - Vehicle miles traveled (VMT) and vehicle hours traveled (VHT) are accumulated by area type, facility type, and time period.
- 5.13.1.10. **Apply Post-Speed VMT Adjustments** - Similar to the VMT adjustments performed before speed calculations (Step 5 above), additional VMT adjustments are applied after the speed calculations (to account for such items as local street VMT not in the model).
- 5.13.1.11. **MOBILE Input Vehicle Types** – Calculated in step 3, five vehicle type classes are expanded to 16 classes using the 16-Vehicle Composite which is based on 2002 Vehicle Mix file. In the MOBILE module of the PPSuite, these 16 classes (after the appropriate number of express and local buses are added to represent the HDBT class), are further expanded to 28 classes by using the Diesel Fractions provided by NYSDOT.
- 5.13.1.12. **Prepare and Run MOBILE6.2 to calculate emission rates.** PPSuite assembles VMT, speed, vehicle type fractions, meteorological, I/M, and other related data into a MOBILE input file. This file contains several run scenarios for each area (county) and facility group. Input data also varies for the downstate and upstate counties.
- 5.13.1.13. **Emission Estimates.** PPSuite applies emission rates to the VMT by county and facility group to calculate area and regional emissions.

6. CONSISTENCY WITH METROPOLITAN TRANSPORTATION PLANS The projects proposed in the 2008-2012 TIP for NYMTC, 2011-2015 TIP for OCTC and PDCTC adhere to the goals and objectives of the MTPs for the New York City metropolitan area [2010-2035 Regional Transportation Plan](#), Orange County [OCTC Long Range Transportation Plan \(2007-2035\)](#), and Dutchess County [New Connections](#) respectively. The proposed projects follow through with the three main areas of each plan: 1) maintaining infrastructure and improving safety; 2) meeting future needs by increasing capacity, reducing demand, and expanding travel options; and 3) ensuring that the future transportation system complements and reinforces the land use goals of local communities and their respective county. On September 24, 2009, NYMTC adopted its updated plan, the OCTC adopted its plan on November 28, 2007 and the PDCTC adopted its plan on November 29, 2007. FHWA/FTA approved the NYMTC Plan on October 01, 2009, the PDCTC and OCTC Plans were approved on December 19, 2007.

7. IDENTIFICATION OF EXEMPT/NON-EXEMPT AND REGIONALLY SIGNIFICANT PROJECTS A crucial step in the modeling process involves identifying which projects might affect regional air quality. In most instances, projects such as safety improvements, resurfacing, bridge repairs, and bus replacements, which maintain current levels of service or capacity, are considered Exempt from the conformity analysis. Similarly, projects that result in operations improvements, but do not increase capacity - an intersection widening - are also excluded from the analysis. Inversely, there are two types of projects (Non-exempt and Regionally Significant) that have the potential to affect air quality:

- **Non-exempt:** highway and road projects that change capacity by at least one travel lane or transit projects that change capacity on a fixed route system. A non-exempt determination is made if the project type is not found in the list of exempt projects derived from "Table 2- Exempt Projects" in 40 CFR Part 93.126, 93.127 and NYCRR Part 240.27.
- **Regionally Significant:** any project, regardless of funding source, on a facility that serves regional transportation needs and that would normally be included in the modeling of a metropolitan area's transportation network. Includes, at a minimum, all principal arterial highways and all fixed guide way transit facilities that offer an alternative to regional highway travel.

7.1. Project Listing. All of the projects in the MTPs and TIPs were first evaluated for applicability using the guidance contained in Appendices B and C of The Air Quality Conformity Determination Process, issued by NYSDOT-EAB on December 10, 2003 and updated on April 23, 2010.

7.1.1. Dutchess County PDCTC staff developed the list of Non-exempt and Regionally Significant projects and forwarded it to NYSDOT-EAB on May 28, 2010 for dissemination to the ICG. On June 17, 2010 the PDCTC received concurrence from the ICG on the list of Non-exempt and Regionally Significant projects to be included in the Regional Emissions Analysis (Table 5). There have been no changes to the project list since that time.

7.1.2. Orange County OCTC staff developed the list of Non-exempt and Regionally Significant projects and forwarded it to NYSDOT-EAB on June 28, 2010 for dissemination to the ICG. On July 1, 2010 the OCTC received concurrence from the ICG on the list of Non-exempt and Regionally Significant projects to be

included in the Regional Emissions Analysis (Table 3). There have been no changes to the project list since that time.

- 7.1.3. Putnam County** NYMTC staff developed the list of Non-exempt and Regionally Significant projects and forwarded it to NYSDOT for dissemination to the ICG. NYMTC received concurrence from the ICG on the list of Non-exempt and Regionally Significant projects based upon their reviews at various meeting in the Spring of 2010. (Table 5).

Table 5. Non-exempt and Regionally Significant Projects

Dutchess County

PIN	Project	Agency
806207	I-84 @ NY 9D - Reconstruction	NYSDOT
875739	US 9 Service road: Construction - Hollowbrook Dr. to Imperial Blvd.	DCDPW
881053	Ozone Action Days	NYSDOT
882038	Enhanced Regional Commuter Choice	NYSDOT
M502-03-01	Wassaic Train Station – Parking improvements	MNR
M502-03-BC	Beacon Train Station – Parking improvements	MNR
MTP	I-84 - Widening, NY 9D to US 9	NYSDOT
MTP	US 9 - Widening, CR 93 (Myers Corners Rd.) to Meseir Ave.	NYSDOT
MTP	US 9 - Widening, NY 52 to CR 93 (Myers Corners Rd.)	NYSDOT

Orange County

PIN	Project	Agency
814522	Schutt Rd. – Construction, Dunning Rd. to North Galleria Dr.	T/Walkill
881054	Ozone Action Days	NYSDOT
882038	Metropool Ridesharing Program to Van & Carpool Commuters	NYSDOT
882383	Enhanced Commuter Choice	NYSDOT
8T0397	I-86: Widening, I-84 (Exit 129) to I-87 (Exit 131)	NYSDOT
MTP	NYS Thruway (I-87) – Construction of interchange at Route 17A	NYSTA
MTP	Route 17A – Widening, Route 17 to Route 94	NYSDOT
MTP	Route 17(Future I86) - Widening, Exit 131(NYS Thruway) to Exit 120 (Route 211)	NYSDOT
MTP	Route 17M – Widening, Route 17 (Exit 123) to I-84	NYSDOT
MTP	Route 17M – Widening, Route 17 to Route 208	NYSDOT
MTP	Route 17M – Widening, South St. to CR13 (Kings Highway)	NYSDOT
MTP	Route 9W – Widening, I-84 to Ulster County Line	NYSDOT
MTP	CR 67 (East Main St.) – Widening, Route 17 to Dunning Rd	OCDPW
MTP	Broadway St. – Widening, West St. to Newburgh Town/City Line	C/Newburgh
MTP	Construction of new arterial road, Route 17M to Main St.	C/Middletown

Putnam County

PIN	Project	Agency
808804	Integrated 511/ Regional Branding	NYSDOT
811356	Advanced Transportation Management Systems (ATMS) - I-684: Exit 2 to I-84	NYSDOT
813064	Route 22 - Reconstruction, from I-84 to CR 65	NYSDOT
880546	Variable message signs - regional highways- interstate 684.	NYSDOT
880697	Park & Ride lots expansion, 100 spaces at I-84 and Route 311. Construct new park & ride lots at various locations along I-84 and Route 6.	PUTNAM
881030	Ozone Action Days	NYSDOT
882038	Metropool TDM services	NYSDOT
882384	Trips 123	NYSDOT
I0096	ITS Equipment Expansion	NYSTA
M402-02	South- East Parking Expansion	MNR
M502-03	Parking improvements at locations to be determined	MNR

7.2. Other Projects. Completing the air quality analysis on the MTPs and TIPs meant analyzing some projects that are still in the conceptual stage. In accordance with the final transportation conformity rules issued by the USEPA, if adequate information was available to produce reasonable assumptions, then forecasts of the project impacts on vehicle miles traveled and average vehicle speeds could be produced.

7.2.1. Dutchess County Future projects with insufficient data to model include those still in the early development stages, such as the Taconic State Parkway and CR 29 (Carpenter Rd.) Interchange and the Route 9-Route 44/55 interchange.

7.2.2. Orange County No such projects in Orange County.

7.2.3. Putnam County No such projects in Putnam County.

8. TIMELY IMPLEMENTATION OF TRANSPORTATION CONTROL MEASURES (TCMS) No TCMs are identified for Dutchess, Orange, or Putnam County as part of the applicable State Implementation Plan (SIP). Therefore, the TCM implementation conformity criterion does not apply to these MPOs. Nothing in the NYMTC, OCTC, and PDCTC MTPs or TIPs will interfere with the timely implementation of TCMs in other areas.

9. DOCUMENTATION OF INTERAGENCY CONSULTATION REQUIREMENTS This conformity determination relied on a high degree of coordination between federal, state, and local agencies. The Interagency Consultation Group (ICG) facilitated this need by ensuring that the appropriate agencies were involved at the required steps. Throughout the development of each Travel Demand Model and the entire conformity determination process, NYMTC, OCTC and the PDCTC routinely updated the ICG on the status and methodologies being used. ICG feedback was sought on any issue that MPO staff believed potentially problematic.

10. PUBLIC INVOLVEMENT Recognizing the importance of public involvement in the transportation planning process, NYMTC, OCTC, and PDCTC Operating Procedures stipulate that private citizens, including public and private agencies, be afforded the opportunity to review and comment on an Air Quality Conformity Determination Statement prior to its adoption. Accordingly, NYMTC, OCTC, and PDCTC are seeking public input on this Conformity Statement during their public comment periods:

- NYMTC began on July 8, 2010 and will end on August 6, 2010,
- OCTC will begin on July 6, 2010 and will end on August 5, 2010,
- PDCTC will begin on July 6, 2010 and will end on August 5, 2010.

11. RESULTS OF EMISSIONS ANALYSIS The OCTC and PDCTC estimated the emissions impacts of their TIPs and applicable MTPs using NYSDOT's MOBILE 6.2 Emission Factor Tables dated April 2008. On May 21, 2008 the air quality transportation conformity Interagency Consultation Group (consisting of representatives of FHWA, FTA, EPA, NYSDEC, and NYSDOT) concurred that use of these emission factor tables in the Mid Hudson Area constitutes use of the latest USEPA approved motor vehicle emissions model, MOBILE 6.2. Methodology. Emission estimates were determined using the MOBILE6.2 Emission Factors Tables dated April 2008.

11.1. Dutchess County PDCTC began its analysis on June 9th, 2010. As described previously the model output VMT is adjusted to reflect the ozone season using factors. That adjusted VMT, average speed and functional classification are used in a lookup table of Emission Factors described above to produce emissions on a link by link basis

and by direction. The individual link emissions were then grouped by Functional Classification for summary purposes.

11.2. Orange County The OCTC portion of the regional emissions analyses was initiated on June 1, 2010. The emissions analysis was based on speed dependent emissions rates calculated by the NYSDEC using MOBILE 6.2. Each link in the OC Travel Demand Model network was analyzed for the morning peak hour, midday peak hour, evening peak hour and night off-peak hour. Hourly vehicle miles traveled (VMT) and vehicular emissions were then factored using percentages for each time period from the NYS SIP and adjusted to account for seasonal fluxes in traffic to establish total daily VMT and vehicular emissions for the summer ozone season (June, July & August).

11.3. Putnam County NYMTC began its regional emissions analysis on December 02, 2009. To produce the emissions analysis for Putnam County, MOBILE 6.2 was used to generate vehicle emissions factors which were applied to the Putnam County portion of the NYMTC Best Practices Model (BPM) network generated vehicle miles of travel. A post processor, PPSUITE, was employed to link the BPM to the MOBILE 6.2 model. In June 2005, the ICG concurred that the MOBILE 6.2 input parameters used in PPSUITE are appropriate for use in conformity determinations for the NYMTC planning area. Revised MOBILE6.2 input files provided to NYMTC by NYSDOT ESB in May 07, 2009 were used for the regional emissions analysis for the 2008-2012 TIP and 2035 MTP.

Emissions tests for the Poughkeepsie 8-hour ozone non-attainment area. The boundary of the Poughkeepsie moderate eight hour ozone non-attainment area encompasses the entire former Poughkeepsie one hour ozone non-attainment area boundary and partially covers the former one hour New York Metropolitan Area non-attainment area boundary.

An on road motor vehicle emissions budget was not established in the State Implementation Plan (SIP) for the 1-hour Poughkeepsie non-attainment area. However, the Lower Orange County Metropolitan Area (LOCMA) which consists of the Towns of Blooming Grove, Chester, Highlands, Monroe, Tuxedo, Warwick, and Woodbury in Orange County was part of the former New York Metropolitan Area (NYMA) severe non-attainment area under the one hour ozone standard. Since the NYMA SIP for 1-hour ozone includes a motor vehicle emission budget for LOCMA portion of the 1-hour NYMA, the emission reduction test prescribed by 40 CFR Part 93.109(e)(iv)(A) and (B) apply to the PONA.

In accordance with 40 CFR Part 93.109(e)(iv), until a new MVEB for the 8-hour PONA is found to be adequate by USEPA, a demonstration that 1) the entire area's VOC and NOx "Action" scenario emissions are less than 2002 baseline emissions, and 2) the area's "Action" scenario emissions are less than the "No-Action" scenario in each future conformity analysis year scenario and 3) the VOC and NOx "action" scenario emissions in LOCMA are less than those allowed in future analysis years for the LOCMA portion of the former NYMA 1-hour severe ozone non-attainment area, is required for the PONA Conformity Determination Statement.

Table 6 shows the regional emissions analyses for entire Poughkeepsie 8-hour ozone non-attainment area (Orange, Putnam, and Dutchess counties). Table 7 shows the results for the "LOCMA budget" emissions test for the Poughkeepsie 8-hour ozone non-attainment area.

In previous transportation conformity determinations for the NYMA, LOCMA emissions were combined into the area-wide regional emissions analysis for the 1-hour severe ozone non-attainment area. Per the previously discussed December 22, 2006 DC Circuit Court decision, a demonstration that on-road emissions in the entire former 1-hour severe ozone non-attainment area are less than the motor vehicle emission budget established for the former 1-hour severe non-attainment area may also be required. Table 8 shows the results for the emission test for the former New York Metro Area severe 1-hour ozone non-attainment area for informational purposes only.

On June 2, 2008, the USEPA posted the proposed Motor Vehicle Emissions Budget for the 8-hour PONA for public review. Upon completion of the 30 day public comment period and resolution of any public comments that are submitted, USEPA will deem the proposed MVEB adequate for use in future PONA transportation conformity determinations. When this process is complete, the various interim emissions reductions tests and tests to demonstrate conformity to the previous 1-hour ozone MVEB's (described above) will no longer be required. The entire PONA will be required to pass a single budget test under the current 8-hour ozone standard. Furthermore, if USEPA issues the MVEB adequacy determination prior to FHWA/FTA approval of this conformity determination, a demonstration that the PONA area passes the new budget test for the 8-hour PONA will be required. To plan for this contingency, Table 9 demonstrates that the three-county 8-hour PONA passes the budget test for the proposed MVEB that is currently undergoing USEPA and public review.

**Table 6. Poughkeepsie 8-hour ozone non-attainment area interim emissions reduction tests
 (Build < No-Build and Build < 2002) (tons/day)**

Volatile Organic Compounds (VOC)									
MPO	Base Year 2002	Future Analysis Years							
		2012		2020		2030		2035	
		Build	No-Build	Build	No-Build	Build	No-Build	Build	No-Build
PDCTC (Dutchess County)	6.90	2.65	2.73	1.60	1.67	1.33	1.39	1.43	1.50
OCTC (Orange County)	13.62	5.78	5.93	3.91	4.01	3.51	3.60	3.82	3.94
NYMTC (Putnam County)	6.75	2.84	2.91	2.05	2.13	2.09	2.17	2.25	2.55
TOTALS:	27.27	11.28	11.56	7.56	7.80	6.92	7.16	7.51	7.99
Conclusion		Pass		Pass		Pass		Pass	

Oxides of Nitrogen (Nox)									
MPO	Base Year 2002	Future Analysis Years							
		2012		2020		2030		2035	
		Build	No-Build	Build	No-Build	Build	No-Build	Build	No-Build
PDCTC (Dutchess County)	10.30	4.00	4.12	1.73	1.82	1.13	1.19	1.15	1.20
OCTC (Orange County)	24.80	10.52	10.78	4.99	5.09	3.18	3.24	3.13	3.17
NYMTC (Putnam County)	13.94	6.66	6.87	3.32	3.41	2.00	2.06	1.84	2.09
TOTALS:	49.04	21.18	21.78	10.04	10.32	6.31	6.49	6.12	6.46
Conclusion		Pass		Pass		Pass		Pass	

Table 7. Emission Budget Test for LOCMA portion of Poughkeepsie 8-hour ozone non-attainment area (tons/day)

OCTC (LOCMA)					
Ozone Precursor	2007 Budget	Future Analysis Years			
		2012	2020	2030	2035
		Build	Build	Build	Build
VOC	3.00	1.82	1.24	1.10	1.17
NOx	5.60	3.69	1.73	1.04	1.01
Conclusion		Pass	Pass	Pass	Pass

Table 8. Emission Budget Test for the former NYMA severe 1-hour ozone non-attainment area (tons/day)

OCTC (LOCMA) + NYMTC (9 Counties)					
Ozone Precursor	2007 Budget	Future Analysis Years			
		2012	2020	2030	2035
		Build	Build	Build	Build
VOC	179.30	88.64	54.58	50.85	52.06
NOx	233.40	112.82	53.00	36.42	34.04
Conclusion		Pass	Pass	Pass	Pass

Table 9. Proposed Emission Budget Test for PONA 8-hour ozone non-attainment area (tons/day)

PONA					
Ozone Precursor	2009 Budget	Future Analysis Years			
		2012	2020	2030	2035
		Build	Build	Build	Build
VOC	17.63	11.28	7.56	6.92	7.51
NOx	29.77	21.18	10.04	6.31	6.12
Conclusion		Pass	Pass	Pass	Pass

An examination of Table 6, which summarizes the emission test results for the entire Poughkeepsie moderate 8-hour Ozone Non-attainment Area, provide a comparison of total Base Year 2002 emissions with “Action” and “No-Action” scenario totals. The tables show that “Action” scenario emissions of VOC and NO_x generated by on-road motor vehicles in the Moderate 8-hour Ozone Non-attainment Area will be lower than the Base Year 2002 and “No Action” scenario levels in all future conformity analysis years. An examination of Table 7, which summarizes the budget test for the LOCMA portion of the Poughkeepsie moderate 8-hour ozone non-attainment area, shows how all of the action scenarios are less than the LOCMA portion of the budget for the New York Metro Area. An examination of Table 8, which summarizes the budget test for the entire former NYMA severe 1-hour ozone non-attainment area, shows how all of the action scenarios are less than the NYMA 1-hour budget. An examination of Table 9, which summarizes the budget test for the new 8-hour PONA MVEB, shows that all the action scenarios are less than the PONA 8-hour budget currently under review by the public and USEPA. Therefore, we have determined that all of the TIPs and MTPs in the Poughkeepsie Ozone Non-attainment Area meet the applicable emissions reduction tests and budget tests and conform to the both the 1-hour ozone standard and the 8-hour ozone standard.

The satisfactory regional emissions analysis results for the build less than base year 2002, the build less than no-build emissions reduction test, and budget tests presented below quantitatively demonstrate that implementation of the NYMTC, OCTC, and PDCTC 2008-2012 TIPs and MTPs will not: cause or contribute to any new violation of the ozone standard; increase the frequency or severity of any existing violation of the ozone standard; or delay timely attainment of any standard or any required interim emissions reductions or other milestones in any area.

Appendix C contains further detailed Regional Emissions Analysis results.

Conclusions In conclusion, conformity of the current NYMTC, OCTC, and PDCTC TIPs and MTPs has been demonstrated for the New York Metro Severe 1-hour Ozone Non-attainment Area, Poughkeepsie Moderate 1-hour Ozone Non-attainment Area and the Poughkeepsie Moderate 8-hour Ozone Non-attainment Area. The quantitative analysis of forecasted regional emissions demonstrates that the 2008-2012 TIP and Metropolitan Transportation Plan for each MPO will result in net emission reductions in all actions years, as compared to the 2002 base year and in the build versus non-build scenarios. In addition, future year emissions in the action years will remain below the budgeted emissions level prescribed by the SIP. Given that there are no Transportation Control Measures applicable, this satisfies the conformity review requirement. The NYMTC, OCTC, and PDCTC therefore determine that the 2008-2012 TIPs and MTPs are in conformance with the existing State Implementation Plan for air quality (SIP), and meet the requirements of the Clean Air Act Amendments of 1990 and the EPA's Transportation conformity rule.

12. EVIDENCE OF MPO RESOLUTIONS The NYMTC, OCTC, and PDCTC Executive Committees expect to approve this Air Quality Conformity Determination Statement in April 2010. Copies of the resolutions have been forwarded to the NYSDOT-EAB for ICG and USDOT concurrence and are included in appendix 6 of the NYMTC document.

Table 10. Specific MPO conformity actions to be included for finalization of this conformity analysis

MPO Product	MPO Approval Date	FHWA/FTA Approval Date
NYMTC MTP and 2008-2012 TIP	August 6, 2010*	TBD
OCTC MTP	November 29, 2007	December 19, 2007
OCTC 2011-2015 TIP	August 24, 2010*	TBD
PDCTC MTP	November 29, 2007	December 19, 2007
PDCTC 2011-2015	August 20, 2010*	TBD

**Anticipated Approval date.*

Conformity Determination Statement:

The results of the regional emissions analysis demonstrate that the MTPs and 2011-2015 TIPs of the Orange County Transportation Council, and the Poughkeepsie-Dutchess County Transportation Council and the MTP and 2008-2012 TIP of the New York Metropolitan Transportation Council, achieve and maintain National Ambient Air Quality Standards (NAAQS), as required by the Clean Air Act Amendments of 1990 and the New York State Implementation Plan (SIP) for air quality.

Appendix A

2002 Base Year Mileage by Functional Classification

NYMTC Best Practice Model (Putnam County)

Functional Class	Area	Centerline Miles	Lane Miles
11 Interstate	Urban	32	108
12 Principal Arterial Expressway	Urban	27	55
14 Principal Arterial Streets	Urban	32	72
16 Minor Arterial	Urban	70	150
17 Collector	Urban	110	219
1 Rural Interstate	Rural	1	3
2 Rural Principal Arterial	Rural	10	20
6 Rural Minor Arterial	Rural	21	42
7 Rural Major Collector	Rural	17	33
8 Rural Minor Collector	Rural	22	43
20 Ramp	All	8	13
998 Premium Transit Station "Zone" Connector	All	2	3
999 Centroid Connector	All	76	153
Total		427	916

OCTC Travel Demand Model (Orange County)

Functional Class	Area	Centerline Miles
11 Interstate	Urban	104
12 Principal Arterial (Expressway)	Urban	20
14 Principal Arterial (Street)	Urban	143
16 Minor Arterial	Urban	122
17 Collector	Urban	190
19 Local	Urban	39
1 Interstate	Rural	160
2 Principal Arterial	Rural	16
6 Minor Arterial	Rural	135
7 Major Collector	Rural	149
8 Minor Collector	Rural	172
9 Local	Rural	353
Total		1,603

PDCTC Travel Demand Model (Dutchess County)

Functional Class	Area	Centerline Miles	Lane Miles
11 Interstate	Urban	38	79
12 Principal Arterial (Expressway)	Urban	28	56
14 Principal Arterial (Street)	Urban	89	228
16 Minor Arterial	Urban	72	149
17 Collector	Urban	163	331
19 Local	Urban	334	651
1 Interstate	Rural	0	0
2 Principal Arterial	Rural	135	280
6 Minor Arterial	Rural	23	46
7 Major Collector	Rural	81	163
8 Minor Collector	Rural	106	212
9 Local	Rural	214	425
TOTAL		1,285	2,621

Appendix B

NYMTC Best Practice Model - Link Capacities (hourly by lane)

Physical Link Type	Area Type										
	1	2	3	4	5	6	7	8	9	10	11
1	350	400	450	450	500	500	550	600	650	700	700
2	1,850	1,900	2,000	2,050	2,200	2,250	2,200	2,300	2,350	2,350	2,400
3	1,850	1,900	2,000	2,050	2,200	2,250	2,200	2,300	2,350	2,350	2,400
4	2,250	2,300	2,300	2,350	2,300	2,350	2,250	2,350	2,400	2,400	2,450
5	2,200	2,250	2,250	2,300	2,250	2,300	2,200	2,300	2,350	2,350	2,400
6	2,200	2,250	2,250	2,300	2,250	2,300	2,200	2,300	2,350	2,350	2,400
7	2,000	2,050	2,100	2,150	2,150	2,200	2,100	2,200	2,250	2,300	2,350
8	1,800	1,850	1,850	1,900	2,000	2,050	2,000	2,100	2,150	2,250	2,300
9	1,800	1,850	1,850	1,900	2,000	2,050	2,000	2,100	2,150	2,250	2,300
10	1,700	1,750	1,800	1,850	1,950	2,000	1,950	2,050	2,100	2,200	2,250
11	1,650	1,700	1,800	1,850	1,900	1,950	2,000	2,100	2,200	2,300	2,350
12	1,300	1,350	1,500	1,550	1,750	1,800	2,000	2,100	2,200	2,100	2,150
13	1,100	1,150	1,300	1,350	1,500	1,550	1,750	1,850	1,950	1,900	1,950
14	1,000	1,050	1,200	1,250	1,400	1,450	1,600	1,700	1,800	1,850	1,900
15	900	950	1,100	1,150	1,350	1,400	1,500	1,600	1,700	1,750	1,800
16	800	850	1,000	1,050	1,250	1,300	1,450	1,550	1,650	1,700	1,750
17	1,200	1,200	1,200	1,200	1,200	1,200	1,300	1,300	1,300	1,500	1,500
18	700	700	750	750	800	800	900	900	900	1,050	1,050
19	400	400	450	450	500	500	600	600	600	750	750
20	400	500	550	550	600	600	700	700	700	850	850
21	100	100	100	100	100	100	100	100	100	100	100

OCTC Travel Demand Model - Link Capacities

Link Type	Link Capacities
Interstate	2,100
Arterial	1,400
Collector	1,100
Local	850

PDCTC Travel Demand Model-Link Capacities

Functional Class	Rural	Commercial	Village	Area		
				Suburban	City of Poughkeepsie	City of Beacon
11 Interstate	na	1,900	1,900	1,900	1,900	1,900
12 Principal Arterial (Expressway)	na	1,400	1,400	1,400	1,400	1,400
14 Principal Arterial (Street)	na	1,400	1,400	1,400	1,400	1,400
16 Minor Arterial	na	1,100	1,200	1,200	1,000	1,000
17 Collector	na	1,000	1,100	1,100	800	800
19 Local	na	900	900	900	800	800
01 Interstate	1,900	1,900	1,900	1,900	na	na
02 Principal Arterial	1,400	1,400	1,400	1,400	na	na
06 Minor Arterial	1,200	1,100	1,200	1,200	na	na
07 Major Collector	1,100	1,000	1,100	1,100	na	na
08 Minor Collector	1,100	1,000	1,100	1,100	na	na
09 Local	900	900	900	900	na	na
20 On-Ramp	1,100	1,000	1,100	1,100	na	na
25 Ramp	1,100	1,000	1,100	1,100	na	na
30 Off-Ramp	1,100	1,000	1,100	1,100	na	na
40 Centroid Connector	800	800	800	800	na	na

Appendix C

NYMTC Emission Tables

Putnam County Summer Emission Report for the Build Scenario (B)

2002 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	2,165,108	37,082	58.4	2.39	8.49
2) Arterials	1,462,573	61,700	23.7	2.04	2.86
3) Locals	1,777,160	46,853	37.9	2.33	2.59
Total	5,404,841	145,635	37.1	6.75	13.94

2012 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	2,512,162	44,228	56.8	1.07	4.37
2) Arterials	1,680,342	79,637	21.1	0.85	1.30
3) Locals	1,997,177	53,400	37.4	0.92	0.99
Total	6,189,681	177,265	34.9	2.84	6.66

2020 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	2,962,451	53,863	55.0	0.79	2.12
2) Arterials	1,899,882	94,521	20.1	0.61	0.67
3) Locals	2,324,548	62,826	37.0	0.65	0.53
Total	7,186,881	211,210	34.0	2.05	3.32

2030 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	3,419,363	68,115	50.2	0.72	0.97
2) Arterials	2,431,247	139,727	17.4	0.69	0.54
3) Locals	2,920,426	83,920	34.8	0.68	0.49
Total	8,771,036	291,762	30.1	2.09	2.00

2035 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	3,562,294	72,404	49.2	0.74	0.82
2) Arterials	2,654,228	167,989	15.8	0.78	0.53
3) Locals	3,159,076	93,741	33.7	0.73	0.49
Total	9,375,598	334,134	28.1	2.25	1.84

Putnam County Summer Emission Report for the No-Build Scenario (NB)

2012 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	2,594,471	45,758	56.7	1.10	4.52
2) Arterials	1,724,329	81,722	21.1	0.87	1.33
3) Locals	2,057,650	55,165	37.3	0.94	1.02
Total	6,376,450	182,645	34.9	2.91	6.87

2020 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	3,028,458	56,291	53.8	0.81	2.16
2) Arterials	1,995,509	102,334	19.5	0.65	0.71
3) Locals	2,381,507	64,891	36.7	0.67	0.54
Total	7,405,474	223,516	33.1	2.13	3.41

2030 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	3,511,291	73,458	47.8	0.74	1.00
2) Arterials	2,529,735	153,317	16.5	0.73	0.56
3) Locals	2,998,086	87,408	34.3	0.70	0.50
Total	9,039,112	314,183	28.8	2.17	2.06

2035 Summer Emissions Report

FACILITY	DAILY VMT	VHT	SPEED	VOC	NOx
1) Freeways	3,773,125	84,599	44.6	0.82	0.91
2) Arterials	2,919,640	207,067	14.1	0.91	0.62
3) Locals	3,483,296	107,509	32.4	0.82	0.56
Total	10,176,061	399,175	25.5	2.55	2.09

OCTC Emission Tables

OC TC Enhanced Commuter Choice Emission Credits by Functional Classification & Area Type, July 6, 2010

Functional Classification	1	2	6	7	8	9	11	12	14	16	17	19	Total	OC Total
Analysis Year 2012														
LOCMA	330	72	108	19	28	20	129	311	24	291	270	104	1,707	
DVMT Speed	59.7	45.5	45.2	50.6	44.4	34.6	64.1	55.1	41.8	41.3	38.9	30.2		
VOC tons/day	0.000119378	2.67803E-05	3.99342E-05	7.05062E-06	1.0482E-05	7.836E-06	4.5665E-05	0.00011239	9.0302E-06	0.00010971	0.00010302	4.2266E-05	0.0005	
NOX tons/day	0.000127021	2.59856E-05	3.87492E-05	7.20018E-06	1.011E-05	6.9949E-06	5.0928E-05	0.0001165	8.5021E-06	0.00010329	9.4983E-05	3.6294E-05	0.0005	
UOC	226	22	125	194	137	65	766	233	246	801	647	269	3,733	5,440
DVMT Speed	59.7	53.7	49.8	49.2	48.9	33.4	60.0	58.1	36.0	42.6	39.8	31.5		
VOC tons/day	8.17896E-05	7.97841E-06	4.61651E-05	7.17202E-05	5.072E-05	2.5847E-05	0.00027698	8.4315E-05	9.5172E-05	0.0003011	0.00024539	0.00010808	0.0013	0.0018
NOX tons/day	8.70262E-05	8.22091E-06	4.64415E-05	7.17202E-05	5.0568E-05	2.2815E-05	0.00029556	8.8942E-05	8.5953E-05	0.0002852	0.00022827	9.3825E-05	0.0013	0.0018
Analysis Year 2020														
LOCMA	330	72	108	19	28	20	129	311	24	291	270	104	1,707	
DVMT Speed	56.3	44.1	40.2	50.3	43.0	34.4	63.9	57.5	40.6	40.9	36.8	30.1		
VOC tons/day	6.80598E-05	1.57344E-05	2.34628E-05	4.10218E-06	6.1406E-06	4.6042E-06	2.5891E-05	6.3392E-05	5.228E-06	6.3514E-05	6.0742E-05	2.4694E-05	0.0003	
NOX tons/day	5.71411E-05	1.192E-05	1.71824E-05	3.24756E-06	4.6209E-06	3.1654E-06	2.3046E-05	5.414E-05	3.855E-06	4.6834E-05	4.2579E-05	1.6884E-05	0.0002	
UOC	226	22	125	194	137	65	766	233	246	801	647	269	3,733	5,440
DVMT Speed	59.0	53.6	49.4	48.9	48.9	33.4	59.6	57.5	29.9	41.6	39.2	31.5		
VOC tons/day	4.56326E-05	4.58334E-06	2.66762E-05	4.13194E-05	2.9221E-05	1.5162E-05	0.00015454	4.7556E-05	5.8296E-05	0.00017483	0.00014267	6.3243E-05	0.0008	0.0011
NOX tons/day	4.01467E-05	3.73457E-06	2.10093E-05	3.25417E-05	2.3013E-05	1.0397E-05	0.00013596	4.0615E-05	4.0129E-05	0.0001298	0.00010272	4.335E-05	0.0006	0.0008
Analysis Year 2030														
LOCMA	330	72	108	19	28	20	129	311	24	291	270	104	1,707	
DVMT Speed	50.5	41.6	28.6	49.6	38.7	33.8	63.4	55.9	38.4	39.6	33.5	29.5		
VOC tons/day	5.45934E-05	1.24763E-05	2.05004E-05	3.22619E-06	4.9621E-06	3.6081E-06	2.0485E-05	4.9343E-05	4.2246E-06	5.1004E-05	4.8831E-05	1.964E-05	0.0002	
NOX tons/day	4.44026E-05	9.37708E-06	1.36274E-05	2.60659E-06	3.5665E-06	2.5456E-06	1.8636E-05	4.3175E-05	3.0365E-06	3.721E-05	3.4242E-05	1.3208E-05	0.0002	
UOC	226	22	125	194	137	65	766	233	246	801	647	269	3,733	5,440
DVMT Speed	57.6	53.1	48.7	48.2	48.7	33.3	58.9	56.8	18.2	39.2	37.6	31.2		
VOC tons/day	3.59076E-05	3.54057E-06	2.10093E-05	3.25417E-05	2.3013E-05	1.1841E-05	0.0001216	3.7016E-05	5.6127E-05	0.00014039	0.00011414	4.9882E-05	0.0006	0.0008
NOX tons/day	3.14192E-05	3.03131E-06	1.68627E-05	2.6119E-05	1.8471E-05	8.3029E-06	0.0001064	3.2389E-05	3.0368E-05	0.00010154	8.2036E-05	3.4145E-05	0.0005	0.0006
Analysis Year 2035														
LOCMA	330	72	108	19	28	20	129	311	24	291	270	104	1,707	
DVMT Speed	51.2	38.5	20.1	29.4	35.9	32.6	63.1	56.6	37.3	38.7	36.3	28.9		
VOC tons/day	5.38655E-05	1.27147E-05	2.32258E-05	3.63214E-06	4.9931E-06	3.6524E-06	2.0485E-05	4.9343E-05	4.2246E-06	5.1325E-05	4.764E-05	1.964E-05	0.0002	
NOX tons/day	4.47666E-05	9.05922E-06	1.32719E-05	2.43567E-06	3.4735E-06	2.5013E-06	1.7924E-05	4.2832E-05	2.9836E-06	3.6569E-05	3.3646E-05	1.3093E-05	0.0002	
UOC	226	22	125	194	137	65	766	233	246	801	647	269	3,733	5,440
DVMT Speed	56.7	52.6	48.4	47.7	48.7	33.2	58.6	57.9	12.6	37.2	37.0	30.7		
VOC tons/day	3.59076E-05	3.56482E-06	2.07328E-05	3.21135E-05	2.271E-05	1.1841E-05	0.0001216	3.7016E-05	7.0227E-05	0.00014128	0.00011414	4.9882E-05	0.0006	0.0009
NOX tons/day	3.11698E-05	2.98281E-06	1.65863E-05	2.54767E-05	1.8168E-05	8.1585E-06	0.00010556	3.2132E-05	3.5791E-05	9.9777E-05	8.0609E-05	3.3848E-05	0.0005	0.0006

OCTC 2011-2015 TIP Analysis Summary: Base Year 2002 No-Build Scenario, July 6, 2010

Assignment Postprocessor Run

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

VMOT	NYS DOT_Class										Total Daily by Area	
OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19
LOCMA	793,791	178,121	204,808	42,290	44,351	36,587	14,349	657,952	57,707	640,677	567,350	219,540
UOC	480,488	48,624	301,531	553,136	284,898	163,922	2,077,040	550,139	567,512	1,848,188	1,404,623	568,209
	1,274,279	226,745	506,339	595,426	329,249	200,510	2,091,389	1,208,091	625,219	2,488,865	1,971,972	787,749
												12,305,835

VHT_op	NYS DOT_Class										Total Daily by Area	
OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19
LOCMA	12,784	3,903	4,304	828	959	1,052	229	11,378	1,344	14,781	13,813	6,940
UOC	7,948	903	6,009	11,434	5,822	4,915	34,401	9,308	14,436	42,710	34,610	17,685
	20,731	4,805	10,313	12,262	6,782	5,967	34,630	20,686	15,780	57,491	48,422	24,625
												72,316
												190,180
												262,496

VOC	NYS DOT_Class										Total Daily by Area	
OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19
LOCMA	769,326	180,008	204,170	41,496	44,435	39,697	13,704	635,445	58,987	651,027	583,932	244,157
UOC	464,732	47,294	297,651	549,520	282,763	180,594	1,990,410	529,105	590,399	1,877,231	1,453,782	629,082
	1,234,057	227,302	501,821	591,016	327,198	220,291	2,004,114	1,164,550	649,387	2,528,258	2,037,714	873,239
												12,358,947
												3,466,383
												8,892,563

NOx	NYS DOT_Class										Total Daily by Area	
OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19
LOCMA	2,783,832	282,282	314,490	58,150	59,385	47,823	33,936	1,463,309	83,215	894,975	725,457	276,682
UOC	1,676,268	74,838	457,401	743,792	386,026	214,507	4,795,979	1,244,999	783,190	2,580,851	1,801,051	713,965
	4,460,099	357,120	771,891	801,943	445,410	262,329	4,829,915	2,708,309	866,405	3,475,826	2,526,509	990,647
												22,496,403
												7,023,536
												15,472,867

Ave. Speed	NYS DOT_Class										Total Ave. Speed	
OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19
LOCMA	62.09	45.64	47.58	51.05	46.23	34.78	62.58	57.83	42.93	43.34	41.07	31.63
UOC	60.46	53.87	50.18	48.38	48.93	33.35	60.38	59.11	39.31	43.27	40.58	32.13
	61.47	47.18	49.10	48.56	48.55	33.60	60.39	58.40	39.62	43.29	40.72	31.99
												47.81
												46.53
												46.88

LOCMA=Lower Orange County Metropolitan Area
 UOC=Upper Orange County

VMT = Vehicle Miles Traveled
 VHT=Vehicle Hours Traveled

VOC= Volatile Organic Compounds
 NOx=Nitrogen Oxides

OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2012 Build Scenario, July 6, 2010

Assignment Postprocessor Run

LOCMA 2007 Budget Model 2012 Build

DVMT 4,077,000 4,405,680
 VOC 2,721,554 1,649,840 grams
 Nox 5,080,235 3,346,792 grams
 VOC 3.0 1.82 tons
 Nox 5.6 3.69 tons

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

VMT	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	191,567	263,571	49,289	61,604	49,658	348,461	768,725	63,718	762,261	697,788	275,912	4,405,680
LOCMA	1	2	873,127	315,582	495,950	339,369	166,844	2,002,021	625,097	635,302	2,104,936	1,665,659	707,368	9,681,091
UOC	1	2	1,440,320	579,153	545,239	400,973	216,503	2,350,483	1,393,822	699,020	2,867,196	2,363,447	983,280	14,086,771

VHT_op	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	4,214	5,826	975	1,388	1,435	5,438	13,943	1,526	18,454	17,952	9,128	94,919
LOCMA	1	2	14,637	6,335	10,078	6,938	4,989	33,381	10,755	17,671	49,467	41,876	22,429	214,460
UOC	1	2	24,142	12,161	11,053	8,326	6,424	38,819	24,698	19,197	67,922	59,828	31,558	309,378

VOC	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	70,695	98,112	17,631	22,489	19,373	125,493	279,818	23,793	285,279	262,032	110,671	1,649,840
LOCMA	1	2	334,453	115,063	178,531	122,522	65,874	721,320	225,727	246,292	780,811	624,161	279,821	3,596,037
UOC	1	2	215,795	213,175	196,162	145,011	85,247	846,812	505,545	270,085	1,066,090	886,193	390,492	5,245,877

NOx	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	111,692	149,130	24,634	29,629	23,211	322,953	637,361	33,540	387,356	320,743	124,510	3,346,792
LOCMA	1	2	1,182,033	175,162	243,642	166,752	78,213	1,740,040	532,513	321,185	1,066,869	767,166	317,021	6,199,317
UOC	1	2	759,373	324,291	268,276	196,381	101,424	2,062,993	1,169,874	354,725	1,454,225	1,087,909	441,531	9,546,108

Ave. Speed	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
OZON_ATT	1	2	45.46	45.24	50.57	44.37	34.60	64.07	55.13	41.76	41.31	38.87	30.23	46.42
LOCMA	1	2	59.65	49.82	49.21	48.92	33.44	59.98	58.12	35.95	42.55	39.78	31.54	45.14
UOC	1	2	59.66	47.62	49.33	48.16	33.70	60.55	56.43	36.41	42.21	39.50	31.16	45.53

LOCMA=Lower Orange County Metropolitan Area
 UOC=Upper Orange County
 VMT = Vehicle Miles Traveled
 VHT=Vehicle Hours Traveled
 VOC=Volatile Organic Compounds
 Nox=Nitrogen Oxides

OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2012 No-Build Scenario, July 6, 2010

Assignment Postprocessor Run

LOCMA 2007 Budget Model 2012 No-Build

DVMT 4,077,000 4,519,061
 VOC 2,721,554 1,691,771 grams
 Nox 5,080,235 3,428,407 grams
 VOC 3.0 1.86 tons
 Nox 5.6 3.78 tons

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

VMT	OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
LOCMA	893,963	197,540	270,870	51,925	64,913	51,258	357,037	787,943	65,988	778,504	716,067	283,052	4,519,061	
UOC	581,317	57,054	322,188	508,289	347,613	171,221	2,058,773	639,844	650,066	2,163,296	1,715,290	710,147	9,925,098	
	1,475,280	254,594	593,058	560,214	412,526	222,479	2,415,810	1,427,787	716,054	2,941,800	2,431,357	993,199	14,444,159	

VHT_op	OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
LOCMA	15,063	4,192	6,027	1,032	1,487	1,481	5,574	14,332	1,565	18,902	18,487	9,391	97,535	
UOC	9,749	1,062	6,469	10,336	7,107	5,119	34,357	11,011	18,316	51,123	43,296	22,514	220,460	
	24,812	5,254	12,496	11,368	8,595	6,601	39,931	25,343	19,880	70,026	61,784	31,906	317,995	

VOC	OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
LOCMA	342,144	72,345	101,477	18,577	23,767	19,992	128,533	286,757	24,537	291,294	268,754	113,594	1,691,771	
UOC	221,077	20,576	117,429	182,927	125,447	67,568	741,525	230,961	251,931	802,924	642,844	280,789	3,685,998	
	563,221	92,921	218,906	201,504	149,214	87,561	870,058	517,718	276,468	1,094,218	911,599	394,383	5,377,770	

NOx	OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
LOCMA	1,210,270	113,773	153,441	25,902	31,162	23,952	330,847	652,182	34,664	395,496	328,978	127,741	3,428,407	
UOC	778,347	32,092	178,760	249,531	170,737	80,227	1,788,595	545,056	328,580	1,095,872	789,666	318,070	6,355,532	
	1,988,617	145,864	332,201	275,433	201,899	104,179	2,119,442	1,197,237	363,244	1,491,367	1,118,644	445,812	9,783,939	

Ave. Speed	OZON_ATT	1	2	6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
LOCMA	59.35	47.12	44.94	50.31	43.64	34.60	64.05	54.98	42.18	41.19	38.73	30.14	46.33	
UOC	59.63	53.73	49.80	49.18	48.91	33.45	59.92	58.11	35.49	42.32	39.62	31.54	45.02	
	59.46	48.45	47.46	49.28	48.00	33.71	60.50	56.34	36.02	42.01	39.35	31.13	45.42	

LOCMA=Lower Orange County Metropolitan Area
 UOC=Upper Orange County

VMT = Vehicle Miles Traveled
 VHT=Vehicle Hours Traveled

VOC= Volatile Organic Compounds
 Nox=Nitrogen Oxides

OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2020 Build Scenario, July 6, 2010

Assignment Postprocessor Run

LOCMA 2007 Budget Model 2020 Build

DVMT 4,077,000 4,891,296
 VOC 2,721,554 1,125,241 grams
 Nox 5,080,235 1,568,751 grams
 VOC 3.0 1.24 tons
 Nox 5.6 1.73 tons

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

VMT	NYS DOT_Class	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	946,349	206,628	308,119	55,554	80,639	57,557	369,895	890,970	68,655	834,080	774,209	298,642	4,891,296
LOCMA		648,376	63,055	359,393	556,672	393,672	187,730	2,195,728	668,397	705,025	2,295,910	1,854,851	772,030	10,700,840
UOC		1,594,725	269,683	667,512	612,226	474,311	245,286	2,565,623	1,559,367	773,680	3,129,991	2,629,061	1,070,671	15,592,136

VHT_op	NYS DOT_Class	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	16,817	4,687	7,665	1,105	1,876	1,671	5,792	15,495	1,689	20,389	21,016	9,926	108,129
LOCMA		10,981	1,177	7,269	11,392	8,050	5,615	36,841	11,615	23,562	55,245	47,350	24,500	243,596
UOC		27,798	5,864	14,934	12,498	9,927	7,287	42,632	27,109	25,251	75,634	68,366	34,426	351,726

VOC	NYS DOT_Class	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	230,625	46,293	73,031	11,904	17,770	13,599	81,405	196,531	15,354	186,518	178,804	73,407	1,125,241
LOCMA		155,665	13,614	78,584	119,509	84,506	44,934	483,229	147,476	175,795	510,250	421,156	187,123	2,421,841
UOC		386,290	59,907	151,615	131,414	102,276	58,533	564,634	344,007	191,149	696,768	599,960	260,530	3,547,081

NOx	NYS DOT_Class	1	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	511,261	52,385	77,211	12,279	17,138	12,041	144,237	318,576	15,974	187,278	160,157	60,213	1,568,751
LOCMA		351,396	15,662	87,870	121,405	86,367	39,338	806,874	240,373	161,844	513,598	382,511	154,448	2,961,686
UOC		862,656	68,047	165,081	133,684	103,506	51,379	951,111	558,950	177,819	700,876	542,668	214,661	4,530,437

Ave. Speed	NYS DOT_Class	1	2	6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
OZON_ATT	1	56.27	44.08	40.20	50.26	42.98	34.43	63.86	57.50	40.65	40.91	36.84	30.09	45.24
LOCMA		59.05	53.58	49.44	48.86	48.90	33.43	59.60	57.55	29.92	41.56	39.17	31.51	43.93
UOC		57.37	45.99	44.70	48.99	47.78	33.66	60.18	57.52	30.64	41.38	38.46	31.10	44.33

LOCMA=Lower Orange County Metropolitan Area
 UOC=Upper Orange County

VMT = Vehicle Miles Traveled
 VHT=Vehicle Hours Traveled

VOC=Volatile Organic Compounds
 Nox=Nitrogen Oxides

OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2020 No-Build Scenario, July 6, 2010

Assignment Postprocessor Run

LOCMA 2007 Budget Model 2020 No-Build

DVMT 4,077,000 4,977,159
 VOC 2,721,554 1,148,007 grams
 Nox 5,080,235 1,577,909 grams

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

VOC 3.0 1.27 tons
 Nox 5.6 1.74 tons

VMT	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	317,582	56,923	83,996	59,695	384,101	857,562	70,232	859,561	797,384	310,975	4,977,159
LOCMA	968,647	210,500	367,503	569,298	403,046	192,393	2,266,673	680,191	715,729	2,361,564	1,911,994	788,005	10,986,911
UOC	1,634,632	275,029	685,085	626,221	487,042	252,089	2,650,774	1,537,753	785,961	3,221,125	2,709,378	1,098,979	15,964,069

VHT_op	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	8,022	1,133	1,959	1,736	6,025	16,001	1,703	21,265	21,590	10,472	111,800
LOCMA	17,394	4,500	7,439	11,660	8,244	5,756	38,090	11,791	24,686	57,252	49,224	25,195	251,834
UOC	11,293	1,205	15,460	12,792	10,203	7,492	44,115	27,792	26,389	78,517	70,814	35,667	363,633

VOC	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	75,216	12,186	18,496	14,103	84,502	191,255	15,774	193,164	184,001	76,716	1,148,007
LOCMA	235,993	46,599	80,514	122,207	86,489	46,033	498,668	150,020	178,694	525,564	434,657	191,387	2,487,996
UOC	159,836	13,927	155,731	134,393	104,985	60,136	583,170	341,275	194,468	718,728	618,658	268,103	3,636,003

NOx	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	79,543	12,588	17,857	12,483	149,793	296,992	16,342	192,980	164,832	62,824	1,577,909
LOCMA	518,655	53,021	89,270	124,117	88,394	40,300	829,453	244,526	164,379	528,217	394,296	157,783	3,036,784
UOC	360,026	16,022	168,813	136,705	106,251	52,783	979,246	541,518	180,722	721,197	559,128	220,607	4,614,693

Ave. Speed	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
OZON_ATT	1	2	39.59	50.25	42.88	34.39	63.76	53.59	41.24	40.42	36.93	29.70	44.52
LOCMA	55.69	46.78	49.41	48.83	48.89	33.42	59.51	57.69	28.99	41.25	38.84	31.28	43.63
UOC	58.97	53.55	44.31	48.95	47.74	33.65	60.09	55.33	29.78	41.02	38.26	30.81	43.90

LOCMA=Lower Orange County Metropolitan Area
 UOC=Upper Orange County

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 VHT=Vehicle Hours Traveled

VOC= Volatile Organic Compounds
 Nox=Nitrogen Oxides

OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2030 Build Scenario, July 6, 2010

Assignment Postprocessor Run

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

LOCMA 2007 Budget Model 2030 Build

DVMT	4,077,000	5,601,419
VOC	2,721,554	994,528 grams
Nox	5,080,235	941,169 grams
VOC	3.0	1.10 tons
Nox	5.6	1.04 tons

VMT	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	227,330	379,739	65,278	111,698	72,810	404,882	1,022,193	76,339	904,710	342,724	5,601,419		
LOCMA	1,042,231	74,257	423,739	644,090	475,247	218,666	2,492,290	740,809	801,976	2,150,124	881,993	12,255,284		
UOC	766,005	301,587	803,478	709,368	586,944	291,476	2,897,172	1,763,002	878,315	3,054,835	1,224,716	17,856,703		

VHT_op	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	5,469	13,260	1,315	2,887	2,155	6,386	18,276	1,989	26,998	11,622	135,047		
LOCMA	20,649	8,693	8,693	13,373	9,750	6,565	42,316	13,045	43,969	57,165	28,257	303,865		
UOC	13,291	33,939	21,953	14,688	12,637	8,721	48,702	31,322	45,958	84,163	39,879	438,912		

VOC	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	39,881	74,303	10,739	19,563	13,454	64,802	165,982	13,750	167,088	172,242	67,127	994,528	
LOCMA	185,598	11,978	69,786	106,339	78,159	40,741	400,361	120,071	222,530	453,946	384,946	167,547	2,187,293	
UOC	130,889	316,487	144,088	117,077	97,722	54,195	465,163	286,053	236,280	621,034	557,188	234,673	3,181,821	

NOx	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	35,291	57,918	9,449	15,691	10,107	77,223	180,235	11,468	137,892	127,331	46,877	941,169	
LOCMA	231,687	11,087	62,481	91,204	67,720	30,439	451,471	131,970	128,326	375,552	300,311	118,981	1,938,935	
UOC	169,392	401,080	120,399	100,653	83,411	40,545	528,694	312,205	139,794	513,444	427,641	165,858	2,880,103	

Ave. Speed	NYS DOT_Class		2	6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
OZON_ATT	1	41.57	28.64	49.64	38.70	33.78	63.41	55.93	38.38	39.58	33.51	29.49	41.48	
LOCMA	50.47	53.07	48.75	48.16	48.74	33.31	58.90	56.79	18.24	39.16	37.61	31.21	40.33	
UOC	57.63	53.28	36.60	48.30	46.45	33.42	59.49	56.29	19.11	39.27	36.30	30.71	40.68	

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OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2030 No-Build Scenario, July 6, 2010

Assignment Postprocessor Run

LOCMA 2007 Budget Model 2030 No-Build

DVMT 4,077,000 5,686,723
 VOC 2,721,554 1,015,416 grams
 Nox 5,080,235 949,046 grams
 VOC 3.0 1.12 tons
 Nox 5.6 1.05 tons

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

VMT	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	387,685	66,807	116,252	75,742	426,410	967,274	77,313	976,776	933,972	359,441	5,686,723
LOCMA	1,067,200	231,853	434,713	659,520	487,733	225,150	2,566,193	753,052	813,990	2,649,943	2,214,143	913,630	12,575,235
UOC	1,848,373	307,849	822,397	726,326	603,984	300,892	2,992,603	1,720,326	891,302	3,626,719	3,148,115	1,273,071	18,261,958

VHT_op	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	14,026	1,345	3,020	2,247	6,741	19,174	2,012	25,064	27,779	12,380	140,877
LOCMA	21,660	5,430	8,935	13,703	10,014	6,764	43,671	13,324	47,207	68,728	59,696	29,784	316,822
UOC	35,224	6,864	22,961	15,048	13,034	9,011	50,412	32,497	49,219	93,792	87,474	42,164	457,699

VOC	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	75,898	10,986	20,364	13,996	68,226	161,886	13,791	172,189	177,635	70,723	1,015,416
LOCMA	189,990	39,732	71,587	108,868	80,199	41,949	412,678	122,078	228,781	469,812	397,745	174,906	2,254,298
UOC	323,423	51,994	147,485	119,854	100,564	55,945	480,904	283,964	242,572	642,001	575,380	245,629	3,269,713

NOx	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	2	59,161	9,668	16,343	10,511	81,406	166,548	11,572	141,692	131,217	49,292	949,046
LOCMA	236,076	35,562	64,083	93,349	69,473	31,329	463,760	133,576	130,483	386,082	309,402	123,820	1,989,537
UOC	408,913	46,906	123,244	103,017	85,815	41,840	545,165	300,124	142,055	527,774	440,618	173,112	2,938,584

Ave. Speed	NYS DOT_Class		6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
OZON_ATT	1	2	27.64	49.68	38.50	33.70	63.26	50.45	38.43	38.97	33.62	29.03	40.37
LOCMA	49.27	42.70	48.65	48.13	48.71	33.29	58.76	56.52	17.24	38.56	37.09	30.68	39.69
UOC	57.59	53.02	35.82	48.27	46.34	33.39	59.36	52.94	18.11	38.67	35.99	30.19	39.90

LOCMA=Lower Orange County Metropolitan Area
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VMT = Vehicle Miles Traveled
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VOC= Volatile Organic Compounds
 Nox=Nitrogen Oxides

OCTC 2011-2015 TIP Analysis Summary: Analysis Year 2035 Build Scenario, July 6, 2010

Assignment Postprocessor Run

Emission rates from sheet
 Disaggregated link results into sheet
 VISUM network and assignment in file

LOCMA 2007 Budget Model 2035 Build

DVMT 4,077,000 5,988,972
 VOC 2,721,554 1,061,717 grams
 Nox 5,080,235 911,973 grams
 VOC 3.0 1.17 tons
 Nox 5.6 1.01 tons

VTM	NYS DOT_Class	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	253,039	420,244	80,248	135,451	83,282	483,807	1,107,604	81,781	1,017,259	900,574	357,005	5,988,972
LOCMA		1,068,679	420,244	80,248	135,451	83,282	483,807	1,107,604	81,781	1,017,259	900,574	357,005	5,988,972
UOC		846,856	451,292	689,926	515,575	232,063	2,730,956	836,108	845,405	2,722,776	2,267,901	945,054	13,163,576
		1,915,535	332,702	871,536	651,027	315,345	3,214,763	1,943,713	927,186	3,740,035	3,168,475	1,302,059	19,152,548

VHT_op	NYS DOT_Class	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	6,571	20,954	2,729	3,771	2,558	7,670	19,580	2,194	26,297	24,789	12,352	150,348
LOCMA		20,883	20,954	2,729	3,771	2,558	7,670	19,580	2,194	26,297	24,789	12,352	150,348
UOC		14,935	9,327	14,462	10,596	6,990	46,641	14,447	67,076	73,251	61,297	30,817	351,353
		35,817	30,281	17,191	14,367	9,548	54,311	34,026	69,270	99,548	86,087	43,168	501,701

VOC	NYS DOT_Class	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	45,106	88,242	15,699	24,292	15,729	77,430	179,624	14,774	179,862	162,110	70,248	1,061,717
LOCMA		188,602	88,242	15,699	24,292	15,729	77,430	179,624	14,774	179,862	162,110	70,248	1,061,717
UOC		144,441	74,218	114,120	84,771	43,284	439,363	134,789	285,721	484,507	408,055	180,562	2,406,679
		333,043	162,460	129,819	109,064	59,013	516,793	314,413	300,495	664,369	570,166	250,810	3,468,396

NOx	NYS DOT_Class	2	6	7	8	9	11	12	14	16	17	19	Total Daily by Area
OZON_ATT	1	37,094	61,245	11,282	18,360	11,174	79,003	174,112	11,553	138,779	119,566	47,155	911,973
LOCMA		202,650	61,245	11,282	18,360	11,174	79,003	174,112	11,553	138,779	119,566	47,155	911,973
UOC		158,423	62,011	93,960	70,666	31,008	434,399	132,867	131,761	373,222	300,524	122,984	1,922,922
		361,074	123,257	105,242	89,027	42,182	513,402	306,979	143,314	512,001	420,090	170,139	2,834,895

Ave. Speed	NYS DOT_Class	2	6	7	8	9	11	12	14	16	17	19	Total Ave. Speed
OZON_ATT	1	38.51	20.06	29.40	35.92	32.56	63.08	56.57	37.27	38.68	36.33	28.90	39.83
LOCMA		51.18	20.06	29.40	35.92	32.56	63.08	56.57	37.27	38.68	36.33	28.90	39.83
UOC		56.70	48.39	47.71	48.66	33.20	58.55	57.88	12.60	37.17	37.00	30.67	37.47
		53.48	28.78	44.80	45.31	33.03	59.19	57.12	13.39	37.57	36.81	30.16	38.18

LOCMA=Lower Orange County Metropolitan Area
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ORANGE COUNTY COMMUTER MODEL RESULTS

SCENARIO INFORMATION

Description	Commuter Choice Poughkeepsie
Scenario Filename	Orange CC June 2010 FINAL.vme
Emission Factor File	
Performing Agency	NYS DOT
Analyst	Patrick Lentlie
Metropolitan Area	
Area Size	3 - Small (under 750,000)
Analysis Scope	1 - Area-Wide (e.g., MSA, county)
Analysis Area/Site	Poughkeepsie
Total Employment	1,558

PROGRAMS EVALUATED

<input type="checkbox"/>	Site Walk Access Improvements
<input type="checkbox"/>	Transit Service Improvements
<input checked="" type="checkbox"/>	Financial Incentives
<input type="checkbox"/>	Employer Support Programs
<input type="checkbox"/>	Alternative Work Schedules
<input type="checkbox"/>	User-Supplied Final Mode Shares

MODE SHARE IMPACTS

Mode	Baseline	Final	%Change
Drive Alone	78.2%	69.7%	-8.6%
Carpool	12.1%	10.8%	-1.3%
Vanpool	0.5%	2.4%	+2.0%
Transit	4.9%	13.3%	+8.4%
Bicycle	0.4%	0.4%	-0.0%
Pedestrian	3.0%	2.7%	-0.3%
Other	0.8%	0.7%	-0.1%
No Trip	-	0.0%	+0.0%
Total	100.0%	100.0%	-

Shifted from Peak to Off-Peak	0.0%
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TRAVEL IMPACTS (relative to affected employment)

Quantity	Peak	Off-Peak	Total
Baseline VMT	31,429	19,758	51,187
Final VMT	28,089	17,658	45,747
VMT Reduction	3,340	2,100	5,440
% VMT Reduction	10.6%	10.6%	10.6%
Baseline Trips	1,601	1,007	2,608
Final Trips	1,431	899	2,330
Trip Reduction	171	107	278
% Trip Reduction	10.6%	10.6%	10.6%

2002 DVMT 12,305,835
 % Reductio 0.04%

Orange Scenario Inputs:

Commuter saves \$3.10 per day for mode change to vanpool or transit

\$3.10 corresponds to slightly less than a \$65/month benefit of federally allowable pretax benefit of \$230 per month (0.28 tax rate * \$230 allowable = \$65 monthly benefit)

100% participation = 1,558 employee participants, based on OCTC population-based corrected MHSTCC SOV diversion rate in Commuter Choice Business Plan 19 mile SOV and Vanpool trip length

All other inputs were default

This is the 2007 diversion rate, due to limits in analysis years in COMMUTER model

Local emission factors will be applied to the trip reduction calculated by the COMMUTER Model

Enhanced Commuter Choice Emissions Credits

Countywide

OCTC benefits

Year/Scenario	2012 Build	2020 Build	2030 Build	2035 Build
VOC tpd	0.0018	0.0011	0.0008	0.0009

OCTC benefits

Year/Scenario	2012 Build	2020 Build	2030 Build	2035 Build
NOx tpd	0.0018	0.0008	0.0006	0.0006

LOCMA

OCTC benefits

Year/Scenario	2012 Build	2020 Build	2030 Build	2035 Build
VOC tpd	0.0005	0.0003	0.0002	0.0002
NOx tpd	0.0005	0.0002	0.0002	0.0002

PDCTC Emission Tables

2002 PDCTC Base

Functional Class		Centerline Miles	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01	Interstate	0	0	0	0	0.0%	0.0	0	0	0
02	Principal Arterial	135	280	527,454	611,847	10.2%	51.6	600,792	933,469	18,622,021
06	Minor Arterial	23	46	56,138	65,120	1.1%	51.5	63,427	100,449	1,997,233
07	Major Collector	81	163	374,519	434,442	7.2%	49.7	422,254	601,365	13,417,944
08	Minor Collector	106	212	106,750	123,829	2.1%	44.3	124,135	162,639	3,679,473
09	Local	214	425	254,999	295,399	4.9%	31.6	334,939	384,427	8,440,030
11	Interstate	38	79	950,137	1,064,154	17.7%	58.0	1,024,165	2,423,730	33,495,177
12	Principal Arterial (Expressway)	28	56	168,969	189,246	3.1%	53.1	185,964	388,416	5,675,891
14	Principal Arterial (Street)	89	228	1,035,410	1,160,215	19.3%	43.3	1,173,785	1,597,756	34,216,694
16	Minor Arterial	72	149	573,918	643,649	10.7%	40.3	662,630	873,701	18,719,536
17	Collector	163	331	784,944	879,300	14.6%	39.9	900,928	1,095,862	25,748,923
19	Local	334	651	487,333	547,231	9.1%	19.5	764,080	786,509	16,996,285
TOTAL		1,285	2,621	5,320,572	6,014,432	100%		6,257,100	9,348,322	181,009,207
								6.897	10.305	199.525 tons/day

2012 PDCTC Scenarios

No-Build Scenario 2012

Functional Class	Centerline Miles	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	803,336	931,870	14.2%	51.6	339,641	524,292	12,016,752
06 Minor Arterial	23	46	97,586	113,200	1.7%	51.5	41,074	64,568	1,471,959
07 Major Collector	81	163	455,845	528,780	8.1%	49.6	186,847	267,427	6,903,530
08 Minor Collector	106	212	124,268	144,151	2.2%	44.3	51,981	68,060	1,813,285
09 Local	214	425	296,418	343,443	5.2%	31.6	136,259	160,344	4,122,463
11 Interstate	38	79	924,311	1,035,229	15.8%	58.1	374,342	892,609	13,636,343
12 Principal Arterial (Expressway)	28	56	244,286	273,600	4.2%	53.1	99,481	212,459	3,458,670
14 Principal Arterial (Street)	89	228	992,697	1,112,661	16.9%	43.3	410,071	556,577	13,964,143
16 Minor Arterial	72	149	588,231	659,998	10.1%	40.3	246,317	324,198	8,165,184
17 Collector	163	331	775,030	888,289	13.2%	39.9	318,964	386,904	10,835,920
19 Local	334	651	494,647	555,547	8.5%	19.5	268,369	283,848	7,161,095
TOTAL	1,285	2,621	5,796,656	6,566,769	100%		2,473,347	3,741,286	83,549,344
							2.726	4.124	92.096 tons/day

Scenario 1 : 2012 Build Model (TransCAD) results)

Functional Class	Centerline Mileage	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	803,563	932,133	14.2%	51.6	339,735	524,447	12,020,236
06 Minor Arterial	23	46	97,616	113,235	1.7%	51.5	41,087	64,588	1,472,416
07 Major Collector	86	172	470,960	546,313	8.3%	49.5	193,085	276,035	7,129,068
08 Minor Collector	106	212	116,735	135,413	2.1%	44.3	48,836	63,953	1,703,431
09 Local	211	420	294,937	341,725	5.2%	31.5	135,639	159,537	4,100,912
11 Interstate	38	79	923,986	1,034,864	15.8%	58.1	374,211	892,290	13,631,501
12 Principal Arterial (Expressway)	28	56	249,177	279,078	4.3%	53.0	101,457	216,772	3,528,443
14 Principal Arterial (Street)	89	228	991,722	1,111,568	16.9%	43.3	409,688	555,992	13,949,693
16 Minor Arterial	70	142	563,156	631,336	9.6%	39.8	236,106	309,377	7,795,668
17 Collector	169	344	797,122	893,354	13.6%	40.1	328,042	398,430	11,155,695
19 Local	328	638	485,748	545,601	8.3%	19.1	264,817	279,320	7,033,450
TOTAL	1,285	2,618	5,794,723	6,564,621	100%		2,472,703	3,740,741	83,520,512
							2.726	4.123	92.064 tons/day

Scenario 2 - Seasonally Adjusted Model Output & Ozone Action Days

Ozone Action Days

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: 1.39% reduction in daily VMT **1.39%**
 Calculated reduction in VMT **91,248**

Functional Class	TransCAD ADJ DVMT	% of Total VMT	Reduction in VMT	New Adjusted VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	VOC Sum g/day	NOx Emission Factor g/mi	NOx Sum g/day	CO Emission Factor g/mi	CO Sum g/day
01 Interstate	0	0.0%	0	0	0.0	0.00	0	0.00	0	0.00	0
02 Principal Arterial	932,133	14.2%	12,957	919,176	51.6	0.36	330,903	0.55	505,547	12.80	11,765,455
06 Minor Arterial	113,235	1.7%	1,574	111,661	51.5	0.36	40,198	0.55	61,414	12.80	1,429,260
07 Major Collector	546,313	8.3%	7,594	538,719	49.5	0.35	188,552	0.49	263,973	12.91	6,954,869
08 Minor Collector	135,413	2.1%	1,882	133,531	44.3	0.36	48,071	0.47	62,759	12.57	1,678,483
09 Local	341,725	5.2%	4,750	336,975	31.5	0.39	131,420	0.46	155,009	11.89	4,006,633
11 Interstate	1,034,864	15.8%	14,385	1,020,480	58.1	0.36	367,373	0.85	867,408	13.17	13,439,716
12 Principal Arterial (Expressway)	279,078	4.3%	3,879	275,199	53.0	0.36	99,072	0.79	217,407	12.76	3,511,541
14 Principal Arterial (Street)	1,111,568	16.9%	15,451	1,096,118	43.3	0.37	405,563	0.50	548,059	12.57	13,778,197
16 Minor Arterial	631,336	9.6%	8,776	622,561	39.8	0.37	230,348	0.48	298,829	12.24	7,620,145
17 Collector	893,354	13.6%	12,418	880,936	40.1	0.37	325,946	0.44	387,612	12.35	10,879,565
19 Local	545,601	8.3%	7,584	538,017	19.1	0.45	242,108	0.48	258,248	12.46	6,703,691
Total	6,564,621	100%	91,248	6,473,373			2,409,554		3,626,264		81,767,556
							2.656 tons/day		3.997 tons/day		90.132 tons/day

Scenario 3 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: Reduction of 3,486 VMT over entire day. **3,486**

	Change in VOC	Change in NOx	Change in CO
	-0.001 tons/day	-0.001 tons/day	-0.051 tons/day
Total	2.655 tons/day	3.996 tons/day	90.081 tons/day

2020 PDCTC Scenarios

No-Build Scenario 2020

Functional Class	Centerline Miles	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	554,608	643,345	9.7%	51.6	138,021	161,327	7,120,245
06 Minor Arterial	23	46	65,995	76,554	1.2%	51.5	16,271	19,424	852,436
07 Major Collector	81	163	362,780	420,825	6.4%	49.6	89,275	94,748	4,722,567
08 Minor Collector	106	212	120,508	139,790	2.1%	44.3	30,778	29,461	1,508,121
09 Local	214	425	283,708	328,679	5.0%	31.6	80,691	66,998	3,383,751
11 Interstate	38	79	1,063,800	1,191,456	18.0%	57.1	263,063	434,642	13,446,784
12 Principal Arterial (Expressway)	28	56	192,188	215,251	3.3%	53.1	48,109	71,066	2,323,138
14 Principal Arterial (Street)	89	228	1,172,569	1,313,810	19.9%	43.2	288,769	288,342	14,132,146
16 Minor Arterial	72	149	615,631	690,427	10.5%	40.2	153,834	148,580	7,326,252
17 Collector	163	331	858,289	959,226	14.5%	39.9	213,683	191,688	10,271,076
19 Local	334	651	553,509	621,527	9.4%	19.5	188,420	144,343	6,856,451
TOTAL	1,285	2,621	5,841,586	6,600,890	100%		1,510,915	1,650,619	71,942,967
							1.665	1.819	79.302 tons/day

Scenario 1 : 2020 Build Model (TransCAD) results)

Functional Class	Centerline Mileage	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	555,256	644,097	9.8%	51.6	138,173	161,539	7,129,055
06 Minor Arterial	23	46	66,019	76,582	1.2%	51.5	16,277	19,431	852,746
07 Major Collector	86	172	374,162	434,028	6.6%	49.5	92,129	97,622	4,867,897
08 Minor Collector	106	212	115,436	133,906	2.0%	44.3	29,486	28,224	1,444,635
09 Local	212	421	283,719	328,691	5.0%	31.5	80,728	66,977	3,382,726
11 Interstate	38	79	1,069,386	1,197,712	18.1%	57.1	264,440	436,780	13,515,499
12 Principal Arterial (Expressway)	28	56	198,039	221,804	3.4%	53.1	49,553	73,286	2,394,773
14 Principal Arterial (Street)	89	228	1,170,346	1,311,320	19.9%	43.2	288,236	287,861	14,107,020
16 Minor Arterial	70	142	592,634	664,250	10.1%	39.7	148,264	142,705	7,039,266
17 Collector	170	345	872,882	978,049	14.8%	40.1	217,748	195,590	10,479,262
19 Local	329	641	543,601	610,372	9.2%	19.2	185,965	142,086	6,734,523
TOTAL	1,287	2,623	5,841,480	6,600,810	100%		1,510,999	1,652,104	71,947,403
							1.666	1.821	79.307 tons/day

Scenario 2 - Seasonally Adjusted Model Output & Ozone Action Days

Ozone Action Days

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: 1.39% reduction in daily VMT
 Calculated reduction in VMT **1.39%**
91,751

Functional Class	TransCAD ADJ DVMT	% of Total VMT	Reduction in VMT	New Adjusted VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	VOC Sum g/day	NOx Emission Factor g/mi	NOx Sum g/day	CO Emission Factor g/mi	CO Sum g/day
01 Interstate	0	0%	0	0	0.0	0.00	0	0.00	0	0.00	0
02 Principal Arterial	644,097	10%	8,953	635,144	51.6	0.22	139,732	0.24	152,434	10.98	6,973,878
06 Minor Arterial	76,582	1%	1,064	75,518	51.5	0.22	16,614	0.24	18,124	10.98	829,183
07 Major Collector	434,028	7%	6,033	427,995	49.5	0.21	89,879	0.22	94,159	11.07	4,737,900
08 Minor Collector	133,906	2%	1,861	132,044	44.3	0.22	29,050	0.21	27,729	10.78	1,423,437
09 Local	328,691	5%	4,569	324,122	31.5	0.24	77,789	0.20	64,824	10.20	3,306,047
11 Interstate	1,197,712	18%	16,648	1,181,064	57.1	0.22	259,834	0.34	401,562	11.31	13,357,834
12 Principal Arterial (Expressway)	221,804	3%	3,083	218,721	53.1	0.22	48,119	0.34	74,365	10.95	2,394,990
14 Principal Arterial (Street)	1,311,320	20%	18,227	1,293,093	43.2	0.22	284,480	0.22	284,480	10.79	13,952,471
16 Minor Arterial	664,250	10%	9,233	655,017	39.7	0.22	144,104	0.21	137,553	10.51	6,884,225
17 Collector	978,049	15%	13,595	964,454	40.1	0.22	212,180	0.20	192,891	10.61	10,232,862
19 Local	610,372	9%	8,484	601,888	19.2	0.28	168,529	0.22	132,415	10.67	6,422,142
Total	6,600,810	100%	91,751	6,509,059			1,470,309		1,580,538		70,514,968
							1.621 tons/day		1.742 tons/day		77.728 tons/day

Scenario 3 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: Reduction of 3,486 VMT over entire day. **3,486**

	Change in VOC	Change in NOx	Change in CO
	-0.001 tons/day	-0.001 tons/day	-0.043 tons/day
Total	1.620 tons/day	1.742 tons/day	77.685 tons/day

Scenario 4 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice & Wassaic Station Parking Expansion

Methods: The emissions reductions are subtracted from the total daily emissions.
 Assumptions: PDCTC analysis June 2010.

	Change in VOC	Change in NOx	Change in CO
	-0.009 tons/day	-0.005 tons/day	-0.404 tons/day
Total	1.611 tons/day	1.736 tons/day	77.280 tons/day

Scenario 5 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice & Wassaic Station Parking Expansion & Beacon Station Parking Expansion

Methods: The emissions reductions are subtracted from the total daily emissions.
 Assumptions: PDCTC analysis June 2010.

	Change in VOC	Change in NOx	Change in CO
	-0.010 tons/day	-0.006 tons/day	-0.481 tons/day
Total	1.601 tons/day	1.730 tons/day	76.800 tons/day

2030 PDCTC Scenarios

No-Build Scenario 2030

Functional Class	Centerline Miles	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	620,653	719,957	10.1%	51.6	118,053	106,014	7,791,216
06 Minor Arterial	23	46	71,212	82,606	1.2%	51.5	13,433	12,233	899,144
07 Major Collector	81	163	405,272	470,116	6.6%	49.6	76,196	69,192	5,152,997
08 Minor Collector	106	212	133,418	154,764	2.2%	44.3	26,324	21,733	1,631,232
09 Local	214	425	322,207	373,316	5.2%	31.6	72,535	52,919	3,753,990
11 Interstate	38	79	1,171,077	1,311,607	18.3%	56.1	210,905	231,389	14,335,592
12 Principal Arterial (Expressway)	28	56	205,171	229,791	3.2%	53.0	37,589	38,242	2,425,160
14 Principal Arterial (Street)	89	228	1,251,575	1,402,344	19.6%	43.1	238,351	198,608	14,745,023
16 Minor Arterial	72	149	679,742	762,312	10.7%	40.0	131,942	107,097	7,906,922
17 Collector	163	331	879,241	984,948	13.8%	39.9	170,092	132,747	10,302,611
19 Local	334	651	584,223	656,057	9.2%	19.5	165,923	106,324	7,084,522
TOTAL	1,285	2,621	6,323,791	7,147,819	100%		1,261,342	1,076,499	76,028,408
							1.390	1.187	83.806 tons/day

Scenario 1 : 2030 Build Model (TransCAD) results)

Functional Class	Centerline Mileage	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	620,872	720,212	10.1%	51.6	118,093	106,053	7,794,099
06 Minor Arterial	23	46	71,226	82,622	1.2%	51.5	13,435	12,235	899,324
07 Major Collector	86	172	417,394	484,177	6.8%	49.5	78,535	71,212	5,304,013
08 Minor Collector	106	212	127,896	148,359	2.1%	44.3	25,237	20,836	1,563,721
09 Local	212	421	322,520	373,680	5.2%	31.5	72,637	52,964	3,756,515
11 Interstate	38	88	1,175,966	1,317,081	18.4%	56.7	211,782	232,323	14,394,323
12 Principal Arterial (Expressway)	28	56	210,831	236,131	3.3%	53.0	38,605	39,318	2,492,937
14 Principal Arterial (Street)	89	236	1,252,086	1,402,916	19.6%	43.1	238,448	198,685	14,751,028
16 Minor Arterial	70	142	654,652	733,754	10.3%	39.5	127,179	102,965	7,599,321
17 Collector	170	345	896,231	1,004,235	14.0%	40.1	173,379	135,476	10,510,663
19 Local	330	642	575,134	645,800	9.0%	19.2	164,185	104,904	6,975,780
TOTAL	1,287	2,641	6,324,807	7,148,968	100%		1,261,516	1,076,970	76,041,723
							1.391	1.187	83.820 tons/day

Scenario 2 - Seasonally Adjusted Model Output & Ozone Action Days

Ozone Action Days

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: 1.39% reduction in daily VMT
 Calculated reduction in VMT **1.39%**
99,371

Functional Class	TransCAD ADJ DVMT	% of Total VMT	Reduction in VMT	New Adjusted VMT	Avg Speed mi/hour	VOC Factor g/mi	VOC Sum g/day	NOx Factor g/mi	NOx Sum g/day	CO Factor g/mi	CO Sum g/day
01 Interstate	0	0%	0	0	0.0	0.00	0	0.00	0	0.00	0
02 Principal Arterial	720,212	10%	10,011	710,201	51.6	0.16	113,632	0.15	106,530	10.74	7,627,558
06 Minor Arterial	82,622	1%	1,148	81,474	51.5	0.16	13,036	0.15	12,221	10.74	875,031
07 Major Collector	484,177	7%	6,730	477,447	49.5	0.16	76,392	0.14	66,843	10.81	5,161,206
08 Minor Collector	148,359	2%	2,062	146,297	44.3	0.17	24,870	0.14	20,482	10.53	1,540,506
09 Local	373,680	5%	5,194	368,486	31.5	0.19	70,012	0.14	51,588	9.97	3,673,803
11 Interstate	1,317,081	18%	18,307	1,298,774	56.7	0.16	207,804	0.17	220,792	10.71	13,909,869
12 Principal Arterial (Expressway)	236,131	3%	3,282	232,849	53.0	0.16	37,256	0.17	39,584	10.71	2,493,810
14 Principal Arterial (Street)	1,402,916	20%	19,501	1,383,415	43.1	0.17	235,181	0.14	193,678	10.55	14,595,029
16 Minor Arterial	733,754	10%	10,199	723,555	39.5	0.17	123,004	0.14	101,298	10.28	7,438,144
17 Collector	1,004,235	14%	13,959	990,276	40.1	0.17	168,347	0.13	128,736	10.37	10,269,161
19 Local	645,800	9%	8,977	636,824	19.2	0.23	146,469	0.15	95,524	10.44	6,648,441
Total	7,148,968	100%	99,371	7,049,597			1,216,003		1,037,275		74,232,559
							1.340 tons/day		1.143 tons/day		81.826 tons/day

Scenario 3 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: Reduction of 3,486 VMT over entire day. **3,486**

Change in VOC	Change in NOx	Change in CO
-0.001 tons/day	-0.001 tons/day	-0.043 tons/day
Total	1.340 tons/day	1.143 tons/day
		81.783 tons/day

Scenario 4 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice & Wassaic Station Parking Expansion

Methods: The emissions reductions are subtracted from the total daily emissions.
 Assumptions: PDCTC analysis June 2010.

Change in VOC	Change in NOx	Change in CO
-0.007 tons/day	-0.004 tons/day	-0.400 tons/day
Total	1.333 tons/day	1.138 tons/day
		81.383 tons/day

Scenario 5 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice & Wassaic Station Parking Expansion & Beacon Station Parking Expansion

Methods: The emissions reductions are subtracted from the total daily emissions.
 Assumptions: PDCTC analysis June 2010.

Change in VOC	Change in NOx	Change in CO
-0.008 tons/day	-0.005 tons/day	-0.475 tons/day
Total	1.325 tons/day	1.133 tons/day
		80.908 tons/day

2035 PDCTC Scenarios

No-Build Scenario 2035

Functional Class	Centerline Miles	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	1,007,650	1,168,874	15.0%	51.5	189,475	161,804	12,750,623
06 Minor Arterial	23	46	96,658	112,124	1.4%	51.4	18,199	15,504	1,222,273
07 Major Collector	81	163	409,549	475,077	6.1%	49.5	76,897	65,461	5,213,467
08 Minor Collector	106	212	138,362	160,500	2.1%	44.3	27,259	20,948	1,693,226
09 Local	214	425	335,123	388,289	5.0%	31.6	75,348	51,271	3,907,007
11 Interstate	38	79	934,248	1,046,358	13.5%	58.0	168,147	168,690	11,617,244
12 Principal Arterial (Expressway)	28	56	396,205	443,749	5.7%	52.6	71,816	66,066	4,716,756
14 Principal Arterial (Street)	89	228	1,372,797	1,538,492	19.8%	42.9	260,957	203,194	16,204,424
16 Minor Arterial	72	149	690,473	774,564	10.0%	40.0	133,824	101,537	8,055,869
17 Collector	163	331	880,447	986,390	12.7%	39.9	170,150	127,836	10,328,615
19 Local	334	651	600,569	674,637	8.7%	19.5	170,891	104,127	7,284,542
TOTAL	1,285	2,621	6,862,082	7,769,054	100%		1,362,962	1,086,438	82,994,047
							1.502	1.198	91.484 tons/day

Scenario 1 : 2035 Build Model (TransCAD) results)

Functional Class	Centerline Mileage	Lane Miles	TOTAL DVMT	TOTAL ADJ DVMT*	% of Total VMT	Avg. Speed mi/hr	VOC g/day	NOx g/day	CO g/day
01 Interstate	0	0	0	0	0.0%	0.0	0	0	0
02 Principal Arterial	135	280	1,007,699	1,168,931	15.0%	51.5	189,482	161,813	12,751,356
06 Minor Arterial	23	46	96,655	112,119	1.4%	51.4	18,198	15,503	1,222,222
07 Major Collector	86	172	424,187	492,057	6.3%	49.4	79,701	67,750	5,396,911
08 Minor Collector	106	212	132,749	153,989	2.0%	44.3	26,153	20,102	1,624,635
09 Local	212	421	335,733	388,996	5.0%	31.5	75,510	51,364	3,913,132
11 Interstate	38	88	937,069	1,049,517	13.5%	58.2	168,653	169,185	11,651,813
12 Principal Arterial (Expressway)	28	56	401,670	449,871	5.8%	52.5	72,799	66,982	4,782,174
14 Principal Arterial (Street)	89	236	1,371,525	1,537,066	19.8%	42.9	260,729	202,989	16,188,873
16 Minor Arterial	70	142	661,179	741,087	9.5%	39.6	128,420	96,993	7,693,499
17 Collector	170	345	900,337	1,009,046	13.0%	40.1	173,879	130,885	10,574,814
19 Local	330	642	592,980	666,047	8.6%	19.2	169,401	103,000	7,193,304
TOTAL	1,287	2,641	6,861,782	7,768,726	100%		1,362,924	1,086,566	82,992,733
							1.502	1.198	91.482 tons/day

Scenario 2 - Seasonally Adjusted Model Output & Ozone Action Days

Ozone Action Days

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: 1.39% reduction in daily VMT
 Calculated reduction in VMT **1.39%**
107,985

Functional Class	TransCAD ADJ DVMT	% of Total VMT	Reduction in VMT	New Adjusted VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	VOC Sum g/day	NOx Emission Factor g/mi	NOx Sum g/day	CO Emission Factor g/mi	CO Sum g/day
01 Interstate	0	0%	0	0	0.0	0.00	0	0.00	0	0.00	0
02 Principal Arterial	1,168,931	15%	16,248	1,152,683	51.5	0.16	184,429	0.14	161,376	10.74	12,379,818
06 Minor Arterial	112,119	1%	1,558	110,561	51.4	0.16	17,690	0.14	15,479	10.74	1,187,423
07 Major Collector	492,057	6%	6,840	485,217	49.4	0.16	77,635	0.13	63,078	10.81	5,245,195
08 Minor Collector	153,989	2%	2,140	151,849	44.3	0.17	25,814	0.13	19,740	10.53	1,598,968
09 Local	388,996	5%	5,407	383,589	31.5	0.19	72,882	0.13	49,867	9.98	3,828,217
11 Interstate	1,049,517	14%	14,588	1,034,929	58.2	0.16	165,589	0.16	165,589	11.06	11,446,311
12 Principal Arterial (Expressway)	449,871	6%	6,253	443,617	52.5	0.17	75,415	0.15	66,543	10.71	4,751,141
14 Principal Arterial (Street)	1,537,066	20%	21,365	1,515,701	42.9	0.17	257,669	0.13	197,041	10.56	16,005,805
16 Minor Arterial	741,087	10%	10,301	730,786	39.6	0.17	124,234	0.13	95,002	10.29	7,519,783
17 Collector	1,009,046	13%	14,026	995,020	40.1	0.17	169,153	0.13	129,353	10.38	10,328,312
19 Local	666,047	9%	9,258	656,789	19.2	0.22	144,494	0.14	91,950	10.44	6,856,880
Total	7,768,726	100%	107,985	7,660,741			1,315,003		1,055,017		81,147,854
							1.450 tons/day		1.163 tons/day		89.449 tons/day

Scenario 3 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice

Methods: The reduction in VMT is distributed based on the percentage of VMT in each functional class from the model results.
 Assumptions: Reduction of 3,486 VMT over entire day. **3,486**

Change in VOC	Change in NOx	Change in CO
-0.001 tons/day	-0.001 tons/day	-0.043 tons/day
Total	1.449 tons/day	1.162 tons/day
		89.405 tons/day

Scenario 4 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice & Wassaic Station Parking Expansion

Methods: The emissions reductions are subtracted from the total daily emissions.
 Assumptions: PDCTC analysis June 2010.

Change in VOC	Change in NOx	Change in CO
-0.007 tons/day	-0.004 tons/day	-0.400 tons/day
Total	1.442 tons/day	1.158 tons/day
		89.006 tons/day

Scenario 5 - Seasonally Adjusted Model Output & Ozone Action Days & Enhanced Commuter Choice & Wassaic Station Parking Expansion & Beacon Station Parking Expansion

Methods: The emissions reductions are subtracted from the total daily emissions.
 Assumptions: PDCTC analysis June 2010.

Change in VOC	Change in NOx	Change in CO
-0.008 tons/day	-0.005 tons/day	-0.475 tons/day
Total	1.435 tons/day	1.154 tons/day
		88.531 tons/day

Background

Within TransCAD individual emissions were calculated on a link by link basis using the functional classification, VMT and directional speed. This table is a summation of those values. Average Speed is a weighted average based on length.

VMT and Speed model output	PDCTC, June 2010.
DVMT	Daily VMT by link was summed by Functional Class to produce a total daily VMT
Seasonal Adjustment Factors	The models output of VMT needs to be adjusted to reflect the ozone season. To do this the VMT is factored based on factor groups. Urban facilities are factored by 1.12 and rural facilities are factored by 1.16.
ADJ VMT	Seasonal Adjustment Factor multiplied by VMT from model.
Emission Factors	NYSDOT ESB MOBILE 6.2 Emission Factor Tables dated April, 2008

PIN 881053 Ozone Action Days

Description:	PDCTC participation in the on-going Ozone Action Days program established by NYMTC and NYSDOT in the Downstate region, also known as Clean Air New York. These programs alert the public when air quality levels are expected to be unhealthy and seek their cooperation to change travel and other behaviors to reduce emissions on those days and throughout the year. Messages are broadcast by various media sources, employer organizations, and roadside variable message signs.
Timeframe:	Participation began in 2005-2006.
Assumptions:	Based on previous ICG concurrence, PDCTC is estimating a daily 1.39% reduction in VMT.

PIN m502-03-01 Wassaic Parking Expansion

Description:	Add 200 spaces to the existing 342 space lot.
Timeframe:	Construction is scheduled to begin in 2018. Benefits will be taken beginning in the 2020 analysis year.
Parking Spaces Created:	Approximately 200 additional spaces
Assumptions:	Every new parking space generates .34 additional riders Of the new riders, 80% are auto diverted Average vehicle occupancy is 1.08 passengers per car Average auto trip length is 164 miles (weighted average including intermediate trips) Average speed is 30.0 mph Life of project is 25-30 years Project benefits realized in 2020.

ANALYSIS YEAR	Veh Type	FC	# vehicles	trip length	DVMT	Speed	VOC Emission Factor g/mi	NOx Emission Factor g/mi	CO Emission Factor g/mi	VOC tons/day	NOX tons/day	CO tons/day
2020	LDGV	14	200	164	32,800	30	0.24	0.15	11.18	0.009	0.005	0.404
2030	LDGV	14	200	164	32,800	30	0.18	0.12	11.05	0.007	0.004	0.400
2035	LDGV	14	200	164	32,800	30	0.18	0.11	11.05	0.007	0.004	0.400

Assumptions and Sources of Data

Travel Data - CMAQ application dated 10/5/2005, ESB completeness determination 10/14/05

Emission Factors - NYSDOT ESB emission factor tables dated April 2008

Note: Dutchess County is only non-attainment for ozone, therefore, only VOC and NOx benefits should be counted toward conformity credit

PIN m502-03-BC Beacon Parking Expansion

Description:	Add 300 spaces to the existing 250 space lot on the east side of the tracks, install additional signage and lighting for the expanded lot.
Timeframe:	Construction is scheduled to begin in 2012. Benefits will be taken beginning in the 2020 analysis year.
Parking Spaces Created:	Approximately 300 additional spaces
Assumptions:	Every new parking space generates .34 additional riders Of the new riders, 80% are auto diverted Average vehicle occupancy is 1.08 passengers per car Average auto trip length is 65 miles (weighted average including intermediate trips) Average speed is 30.0 mph Life of project is 25-30 years Project benefits realized in 2020.

ANALYSIS YEAR	Veh Type	FC	# vehicles	trip length	DVMT	Speed	VOC Emission Factor g/mi	NOx Emission Factor g/mi	CO Emission Factor g/mi	VOC tons/day	NOX tons/day	CO tons/day
2020	LDGV	14	300	130	39,000	30	0.24	0.15	11.18	0.010	0.006	0.481
2030	LDGV	14	300	130	39,000	30	0.18	0.12	11.05	0.008	0.005	0.475
2035	LDGV	14	300	130	39,000	30	0.18	0.11	11.05	0.008	0.005	0.475

Assumptions and Sources of Data

Travel Data - CMAQ application dated 10/5/2005, ESB completeness determination 10/14/05

Emission Factors - NYSDOT ESB emission factor tables dated April 2008

Note: Dutchess County is only non-attainment for ozone, therefore, only VOC and NOx benefits should be counted toward conformity credit

PIN 882382 Enhanced Commuter Choice (ECC)

Description:	Enhanced Commuter Choice is a program being used by NYMTC, OCTC, PDCTC and NYS DOT in the Downstate region to increase awareness and use of commuting alternatives such as carpooling, vanpooling and walking. The program also looks to increase "employer support" for programs such as alternative work schedules and the use of pre-tax income to pay for transportation expenses such as Transit Chek.
Timeframe:	Participation began in 2005-2006.
Assumptions:	In the Westchester-Rockland portion of NYMTC, approximately 5,000 SOV trips would be targeted for diversion to other modes from this program. Based on this previously accepted diversion rate, PDCTC calculated a comparable level of program scale for Dutchess County. Using a combined 2000 population of 1,210,212, the rate of diversions is 4.1 trips per 1,000 population. Applying that rate to the Dutchess County population of 280,150 yields an estimated target diversion of 1,150 trips. PDCTC's model project a one-way trip length of 16.5 miles, which corresponds with survey results from the NHTS and the NYMTC HIS.
Calculations:	Those assumptions were then entered into the EPA COMMUTER model which estimated a VMT reduction of 3,486 miles per day (see detail below). This VMT was then distributed to roadways in Dutchess County proportionally to the VMT percentage by functional class in the PDCTC travel demand model "build condition" networks. This VMT was then split among the four main commuting vehicle types (LDGV, LDGT1, LDGT2, and LDGT3) in proportion to the SIP default VMT mix in NYS DOT Region 8. The NYS DOT MOBILE6 vehicle-specific emission factor look-up tables (Part B) dated April 2008 were used to generate emission factors for these vehicle types for the corresponding average speeds on each roadway type. These factors were then multiplied by VMT to estimate the total emissions reductions achieved by the program.

COMMUTER MODEL RESULTS

SCENARIO INFORMATION

Description	Commuter Choice Poughkeepsie
Scenario Filename	Poughkeepsie CC June 2010 Test 3.vme
Emission Factor File	
Performing Agency	NYS DOT
Analyst	Patrick Lentile
Metropolitan Area	
Area Size	3 - Small (under 750,000)
Analysis Scope	1 - Area-Wide (e.g., MSA, county)
Analysis Area/Site	Poughkeepsie
Total Employment	1,150

PROGRAMS EVALUATED

<input type="checkbox"/>	Site Walk Access Improvements
<input type="checkbox"/>	Transit Service Improvements
<input checked="" type="checkbox"/>	Financial Incentives
<input type="checkbox"/>	Employer Support Programs
<input type="checkbox"/>	Alternative Work Schedules
<input type="checkbox"/>	User-Supplied Final Mode Shares

MODE SHARE IMPACTS

Mode	Baseline	Final	%Change
Drive Alone	78.2%	69.7%	-8.6%
Carpool	12.1%	10.8%	-1.3%
Vanpool	0.5%	2.4%	+2.0%
Transit	4.9%	13.3%	+8.4%
Bicycle	0.4%	0.4%	-0.0%
Pedestrian	3.0%	2.7%	-0.3%
Other	0.8%	0.7%	-0.1%
No Trip	-	0.0%	+0.0%
Total	100.0%	100.0%	-

TRAVEL IMPACTS (relative to affected employment)

Quantity	Peak	Off-Peak	Total
Baseline VMT	20,139	12,661	32,800
Final VMT	17,999	11,315	29,314
VMT Reduction	2,140	1,346	3,486
% VMT Reduction	10.6%	10.6%	10.6%
Baseline Trips	1,182	743	1,925
Final Trips	1,056	664	1,720
Trip Reduction	126	79	205
% Trip Reduction	10.6%	10.6%	10.6%

Shifted from Peak to Off-Peak	0.0%
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Poughkeepsie Scenario Inputs:

Commuter saves \$3.10 per day for mode change to vanpool or transit
 \$3.10 savings corresponds to slightly less than a \$65/month benefit of federally allowable pretax benefit of \$230 per month (0.28 tax rate * \$230 allowable = \$65 monthly benefit)
 1,150 participant target level, based on PDCTC population-based corrected MHSTCC SOV diversion rate in Commuter Choice Business Plan
 16.5 mile SOV and Vanpool trip length
 All other inputs were default
 Local emission factors for each conformtly analysis year are applied to the trip reduction calculated by the COMMUTER Model
 (<https://www.nysdot.gov/divisions/engineering/environmental-analysis/repository/mobile6/cmaqbc/cmaqduc.html>)

Light duty vehicle mix of Commuter Choice participants - Region 8

LDGV	54.71%
LDGT1	8.23%
LDGT2	27.40%
LDGT3	9.66%
	<hr/> 100.00%

ECC Emissions Analysis with DVMT reductions estimated by EPA COMMUTER model V2.0 June 22, 2010 for PDCTC
 VMT reduced is from COMMUTER model runs

2012

Functional Class	ECC DVMT	% of Total VMT	Reduction in VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	NOx Emission Factor g/mi	CO Emission Factor g/mi	VOC tons/day	NOX tons/day	CO tons/day	
01	Interstate	3,486	0%	0	0.0	0.00	0.00	0.00	0.00	0.00	
02	Principal Arterial	3,486	14%	495	51.6	0.332	0.334	13.613	0.000	0.000	0.007
06	Minor Arterial	3,486	2%	60	51.5	0.332	0.334	13.605	0.000	0.000	0.001
07	Major Collector	3,486	8%	290	49.5	0.334	0.330	13.461	0.000	0.000	0.004
08	Minor Collector	3,486	2%	72	44.3	0.339	0.325	13.090	0.000	0.000	0.001
09	Local	3,486	5%	181	31.5	0.364	0.316	12.371	0.000	0.000	0.002
11	Interstate	3,486	16%	550	58.1	0.328	0.346	14.077	0.000	0.000	0.009
12	Principal Arterial (Expre	3,486	4%	148	53.0	0.330	0.336	13.714	0.000	0.000	0.002
14	Principal Arterial (Stree	3,486	17%	590	43.3	0.340	0.324	13.019	0.000	0.000	0.008
16	Minor Arterial	3,486	10%	335	39.8	0.344	0.319	12.770	0.000	0.000	0.005
17	Collector	3,486	14%	474	40.1	0.344	0.319	12.791	0.000	0.000	0.007
19	Local	3,486	8%	290	19.1	0.413	0.315	12.539	0.000	0.000	0.004
Total		100%	3,486					0.0013	0.0013	0.0508	

2020

Functional Class	ECC DVMT	% of Total VMT	Reduction in VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	NOx Emission Factor g/mi	CO Emission Factor g/mi	VOC tons/day	NOX tons/day	CO tons/day	
01	Interstate	3,486	0%	0	0.0	0.00	0.00	0.00	0.00	0.00	
02	Principal Arterial	3,486	10%	340	51.6	0.191	0.153	11.685	0.000	0.000	0.004
06	Minor Arterial	3,486	1%	40	51.5	0.191	0.153	11.679	0.000	0.000	0.001
07	Major Collector	3,486	7%	229	49.5	0.193	0.152	11.557	0.000	0.000	0.003
08	Minor Collector	3,486	2%	71	44.3	0.198	0.150	11.244	0.000	0.000	0.001
09	Local	3,486	5%	174	31.5	0.213	0.142	10.641	0.000	0.000	0.002
11	Interstate	3,486	18%	633	57.1	0.186	0.158	12.019	0.000	0.000	0.008
12	Principal Arterial (Expre	3,486	3%	117	53.1	0.190	0.154	11.777	0.000	0.000	0.002
14	Principal Arterial (Stree	3,486	20%	693	43.2	0.198	0.148	11.177	0.000	0.000	0.009
16	Minor Arterial	3,486	10%	351	39.7	0.199	0.145	10.966	0.000	0.000	0.004
17	Collector	3,486	15%	517	40.1	0.198	0.145	10.991	0.000	0.000	0.006
19	Local	3,486	9%	322	19.2	0.249	0.147	10.747	0.000	0.000	0.004
Total		100%	3,486					0.0008	0.0006	0.0435	

2030

Functional Class	ECC DVMT	% of Total VMT	Reduction in VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	NOx Emission Factor g/mi	CO Emission Factor g/mi	VOC tons/day	NOX tons/day	CO tons/day	
01	Interstate	3,486	0%	0	0.0	0.000	0.000	0.000	0.00	0.00	0.00
02	Principal Arterial	3,486	10%	351	51.6	0.149	0.123	11.426	0.000	0.000	0.004
06	Minor Arterial	3,486	1%	40	51.5	0.149	0.123	11.420	0.000	0.000	0.001
07	Major Collector	3,486	7%	236	49.5	0.151	0.122	11.303	0.000	0.000	0.003
08	Minor Collector	3,486	2%	72	44.3	0.154	0.121	10.998	0.000	0.000	0.001
09	Local	3,486	5%	182	31.5	0.167	0.115	10.410	0.000	0.000	0.002
11	Interstate	3,486	18%	642	56.7	0.144	0.126	11.727	0.000	0.000	0.008
12	Principal Arterial (Expre	3,486	3%	115	53.0	0.147	0.124	11.509	0.000	0.000	0.001
14	Principal Arterial (Stree	3,486	20%	684	43.1	0.156	0.120	10.927	0.000	0.000	0.008
16	Minor Arterial	3,486	10%	358	39.5	0.159	0.116	10.715	0.000	0.000	0.004
17	Collector	3,486	14%	490	40.1	0.159	0.116	10.750	0.000	0.000	0.006
19	Local	3,486	9%	315	19.2	0.201	0.112	10.512	0.000	0.000	0.004
Total		100%	3,486					0.0006	0.0005	0.0425	

2035

Functional Class	ECC DVMT	% of Total VMT	Reduction in VMT	Avg Speed mi/hour	VOC Emission Factor g/mi	NOx Emission Factor g/mi	CO Emission Factor g/mi	VOC tons/day	NOX tons/day	CO tons/day	
01	Interstate	3,486	0%	0	0.0	0.000	0.000	0.000	0.00	0.00	0.00
02	Principal Arterial	3,486	15%	525	51.5	0.148	0.123	11.421	0.000	0.000	0.007
06	Minor Arterial	3,486	1%	50	51.4	0.148	0.123	11.415	0.000	0.000	0.001
07	Major Collector	3,486	6%	221	49.4	0.150	0.121	11.298	0.000	0.000	0.003
08	Minor Collector	3,486	2%	69	44.3	0.152	0.115	11.000	0.000	0.000	0.001
09	Local	3,486	5%	175	31.5	0.167	0.112	10.419	0.000	0.000	0.002
11	Interstate	3,486	14%	471	58.2	0.144	0.125	11.816	0.000	0.000	0.006
12	Principal Arterial (Expre	3,486	6%	202	52.5	0.147	0.123	11.480	0.000	0.000	0.003
14	Principal Arterial (Stree	3,486	20%	690	42.9	0.154	0.115	10.919	0.000	0.000	0.008
16	Minor Arterial	3,486	10%	333	39.6	0.159	0.114	10.727	0.000	0.000	0.004
17	Collector	3,486	13%	453	40.1	0.159	0.115	10.757	0.000	0.000	0.005
19	Local	3,486	9%	299	19.2	0.200	0.111	10.514	0.000	0.000	0.003
Total		100%	3,486					0.0006	0.0005	0.0426	