Chapter 8: Conformity Analysis

Overview

The Dover / Kent County MPO is the federally-designated Metropolitan Planning Organization for Kent County, Delaware; therefore it is required by law to show that the Long-range Transportation Plan conforms to the requirements of the 1990 Clean Air Act Amendments (CAAA of 1990). These air quality plans set specific emission targets called emission budgets for specific milestone years. If emissions generated from the transportation plan are equal or less than these emission budgets, the transportation plan conforms to the State Implementation Plan (SIP).

In an attempt to reduce harmful emissions nationwide, the CAAA of 1990 classified metropolitan areas that did not comply with federal air quality standards under the 1-hour ozone standard from marginal to extreme, based on the severity of the pollution problem. The Dover / Kent County MPO region, as part of the Philadelphia-Wilmington-Trenton nonattainment area was classified as severe. The CAAA of 1990 required severe nonattainment areas to develop an Attainment Plan to describe how they would achieve the National Ambient Air Quality Standard (NAAQS) for ozone by the year 2005. A Rate of Progress Plan showing overall emission reductions of three percent per year between 1996 and 2005 was required to ensure that proper strategies were being employed to step down emissions.

Effective June 15, 2004, the United States Environmental Protection Agency (US EPA) finalized ground-level ozone designations under the new 8-hour ozone NAAQS. These new standards replaced the 1-hour ozone NAAQS.

To comply with the 8-hour standards, transportation conformity of the TIP and Plan must be approved by USDOT by June 15, 2005, when the 1-hour ozone standards are revoked. Kent County, still part of the Philadelphia-Wilmington-Trenton nonattainment area is classified as moderate under the 8-hour standard. For Kent County, the 8-hour ozone nonattainment area boundary is the same as the 1-hour nonattainment area boundary. Based on this designation, transportation conformity must be based on the existing 1-hour attainment budget for all applicable analysis years until the new 8-hour ozone SIPs are implemented. Attainment of the new federal ozone standards is required by the year 2010, which becomes a new milestone year for the conformity analysis.

The emissions targeted for the Dover / Kent County MPO region are the two major ozone precursors, Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx). While naturally produced ozone in the upper atmosphere protects life on earth by filtering out ultraviolet radiation from the sun, ozone at ground level is a noxious pollutant. Ground level ozone is the major component of smog and can damage lung tissue, aggravate respiratory disease, and make people more susceptible to respiratory infections.

Automobile emissions are one of the major contributors to ozone formation. Both VOCs – or hydrocarbons – and NOx are the result of "imperfect" combustion within a vehicle's engine. VOC and NOx emissions, when combined with sunlight form ground-level ozone.1

This chapter demonstrates transportation conformity of the 2030 Long - Range Transportation Plan to the 8-hour NAAQS. This document replaces the previously approved conformity demonstration and the 2025 Plan and ensures that the findings meet all current and imminent conformity criteria established by US EPA.

This determination is transitional, in that it addresses both the 1 and 8 hour ozone NAAQS. Ozone-related conformity determinations after June 15, 2005, the date on which the 1 hour ozone NAAQS is no longer effective, will demonstrate conformity solely on the 8 hour ozone NAAQS.

Methodology

The air quality analysis conducted for the 2030 LRTP uses a series of computer-based modeling techniques which are briefly described below. These techniques are consistent with methods the Dover/Kent County MPO and Delaware DOT have used in conducting air quality analyses required by the CAAA of 1990, and are similar to those used by other state and regional transportation agencies in preparing air quality analyses. They are also consistent with the modeling procedures the Dover/Kent County MPO and Delaware DOT have used assisting in the preparation of various SIP documents with the Delaware Department of Natural Resources and Environmental Control (DNREC).

Travel Demand Modeling

A travel demand model for Kent County is maintained by the Delaware DOT. The model applies a variety of data regarding roadway network conditions, vehicular travel patterns, automobile ownership, and the location of population and employment sites. The model follows the "traditional four-step process" of trip generation, distribution, mode split, and assignment that is commonly used throughout the transportation planning industry. The model components were processed through the Tranplan software package. The primary products of the model used in the air quality analysis were estimated volumes and average speeds for each segment or "link" of the roadway system.

The modeling process developed for the 2030 LRTP used a 2002 base year network validated against DelDOT traffic counts. Model networks were developed for the years 2010, 2020, and 2030 for Kent County. The networks included the major capacity improvement projects which will be in place and open to service during these years. The

1 EPA 400-F-92-006, January 1993, Fact Sheet OMS-4

types of projects that were tested, shown in Table 8.1, included corridor and intersection improvements, highway widening (1 lane or more) and new construction. Each project was added to the network concurrent to when it would be in place according to the 2010, 2020, and 2030 intervals. Socioeconomic projections, including employment, households, and population, were developed for each of the horizon years. These forecasts adopted the Dover/Kent County MPO Council on January 5, 2005.

Table 8.1 Dover/Kent County MPO Conformity Analysis Build Scenario Projects
2005 – 2010
Construct a traffic circle at the intersection of Loockerman, Forest and West Sts. and complete Loockerman St. gateway improvements.
Complete Governors Avenue corridor and intersection improvements from Water St. to Webbs Ln.
Complete the Harrington Truck Route.
Complete the SR 1/Thompsonville Rd. intersection improvement.
Complete the SR 1 Frederica intersection improvement.
Complete the SR 1 Little Heaven intersection improvement.
Complete the SR 1/DE 9 intersection improvement.
Upgrade College Rd. to an urban standard, including sidewalks and bike lanes from Kenton Rd. to Saulsbury Rd.
Complete Carter Road (RD 137) improvements in Smyrna from DE 300 to Sunnyside Rd.
Complete the downtown Dover signal upgrade.
Complete the South State Street (US 113 Alt.) intersection improvements.
Construct Bassett Street intersection and bicycle/pedestrian improvements in Clayton.
Complete corridor and intersection improvements on DE 300 in Smyrna, including the intersection of DE6 and DE 300, and access management at the Glenwood Shopping Center, from the RR tracks to US 13.
Realign Wyoming Mill Rd. with the entrance to the Village of Westover and signalize.
Construct a connector road between the Garrison Tract and DE 8 to provide access to SR 1.
Improve the intersection of US 13 and DE 8.
Upgrade DE 15 between DE 10 and DE 14 with curbing, shoulders, turn lanes and sidewalks; identify bus stops for transit service.
Improve the Lynnbury Woods/Morton Rd. intersection to handle commercial and residential traffic.
2010 – 2015
Upgrade Duck Creek Parkway (RD 486) and install curb and bicycle/pedestrian facilities from US 13 to DE 300 in Smyrna.
Improve shoulders, construct sidewalks and institute traffic calming on N. Main St. in Smyrna.
Complete Kenton Road corridor and intersection improvements from DE 8 to Chestnut Grove Rd.
Upgrade SR 36 West of US 113 in Milford: construct shoulders, turn lanes, signage, lighting and intersections.
Upgrade DE 14 from DE 15 to Church St. and from Washington St. to SR 1.
Upgrade DE 42 between Kenton and US 13 in Cheswold
Upgrade New Burton Rd. between Wyoming and Dover.
Implement the West Dover Connector Study recommendations.
Upgrade McKee Rd./Saulsbury Rd./Morton Rd. from Denneys Rd. to Lynnbury Woods Rd.
Upgrade Messina Hill Rd. with curbing, shoulders, turn lanes and sidewalks; identify bus stops for transit service.
Upgrade Lynnbury Woods Rd. with curbing, shoulders, turn lanes and sidewalks; identify bus stops for transit service.
Extend Crawford Carroll Ave. south to Delaware State University and US 13 across from the north entrance to the Dover Mall.
Improve the intersection of Airport and Bowman Rds. in Milford.

Table 8.1 Dover/Kent County MPO Conformity Analysis Build Scenario Projects
Complete the extension of Clarence St. from North St. to Loockerman St. in Dover.
Construct a connection between Carter Rd. and SR 1 in Smyrna.
Upgrade Sunnyside Rd. in Smyrna to an urban standard with shoulder and bicycle and pedestrian facilities.
Upgrade Carpenter Br. Rd. (Rd 35) from Frederica to DE 15 with curbing, shoulders, turn lanes and sidewalks; identify bus stops for transit service.
Upgrade DE 12 from SR 1 to US 13 with curbing, shoulders, turn lanes and sidewalks; identify bus stops for transit service.
Upgrade Irish Hill Rd. from US Alt. 113 and US 13 with curbing, shoulders, turn lanes and sidewalks; identify bus stops for transit service.
Create community transportation services in the region's municipalities and better links to trunk services.
Construct a park and ride lot at S. Carter Rd. and US in Smyrna.
Expand transit service in the greater Dover area to south of Camden and Wyoming .
2015-2020
Construct recommendations of the US 113 study.
Upgrade Joe Goldsboro Rd. from Duck Creek Rd. to US 13 with sidewalks, curbing, shoulders and turn lanes.
Upgrade Paddock Rd. from US 13 to SR 1 with sidewalks, curbing, shoulders and turn lanes.
Upgrade Brick Store Landing Rd. from Paddock Rd. to SR 1 with sidewalks, curbing, shoulders and turn lanes.
2020-2025
Widen US 13 to 6 lanes between the Scarborough Rd. and South Smyrna SR Interchanges.
Upgrade DE 15 west of Smyrna and Clayton as a western bypass.
Implement recommendations from the DE 8 study.
Complete conversion of SR 1 south of DAFB to a limited access highway.
2025-2030
Operate passenger rail service between Dover and Wilmington

The network horizon years were selected in accordance with EPA guidelines. The first year, 2010, relates to the 8-hour milestone year. As plan's horizon year, 2030 is a required analysis year. Since the horizon year test scenarios can be no greater than 10 years apart, 2020 was selected as an interim test year.

Emissions Factor Model

The second major software used in this air quality analysis was MOBILE6, a program developed by the EPA to calculate mobile source emission rates for each one-mile per hour increment up to 65 miles per hour. The factors determined the emission rates for various vehicle classifications such as cars, light trucks, heavy trucks, etc. at different speeds. Emissions factors were needed for each of these increments because speed is a critical element in determining the total amount of mobile source emissions.

The overall structure of the MOBILE6 program is defined by EPA. The Delaware Department of Natural Resources and Environmental Control (DNREC) uses this model to estimate the expected emissions of the projected horizon years. The input file for the modeling process reflects air quality strategies anticipated according to the SIP and its amendments as submitted by DNREC to the EPA.

Mobile Source Emissions

The estimates of emissions for Kent County are generated jointly by the Delaware DOT and DNREC. The post-processor takes data produced by the TRANPLAN model output for Kent County and adjusts it for input into the mobile emissions model. This process links the estimated speeds and volumes generated by the travel demand model with emission factors derived from MOBILE5b. The program simply multiplies the estimated volume for each segment of roadway network by the appropriate emission factor corresponding to each segment's average speed. Once emissions for each segment are calculated, they are summed to identify the countywide totals that are presented in this document.

The vehicle miles traveled (VMT) and emissions data for Kent County were adjusted to be compatible with the data contained in the current SIP. The adjustments represent factors to account for seasonal traffic variations and to align the travel demand estimates with the Delaware DOT's HPMS traffic level reporting system. They were used to standardize the VMT data so that direct comparisons can be made among different years and modeling scenarios.

Mobile Source Emissions Data

Both NOx and VOC emissions were tested in Kent County for 2010, 2020, and 2030 against the MOBILE5b 1–Hour Ozone Standard Attainment Plan budgets. These attainment budgets mirror the budgets set in the latest revision to the Kent County attainment plan, which was approved by EPA on October 27, 2003 (68 FR 61103). For all years tested, NOx and VOC emissions were below the applicable 2005 budget. Table 8.2 summarizes Kent County's conformity status:

Table 8.2
Mobile Source Emissions Calculations – Kent County Emissions Summary

	Kent County				
Year	**VMT**	**VOC**	**Budget**	**Nox**	**Budget**
2005			5.14		8.42
2010	5,371,546	4.46	--	5.33	--
2020	5,888,382	2.60	--	2.01	--
2030	6,669,658	2.53	--	1.60	--

Source: DelDOT 2005

*2004 Fleet Data Currently Used
*2000 Census demographic Data Used
*Percent Vehicle Registration Used

Conclusions

The Dover/Kent County MPO Long-Range Transportation Plan meets conformity criteria established by the EPA and the Federal Highway Administration (FHWA). According to the analysis, the plan contributes to required emissions reductions in comparison to each of the 2002 and 2005 budgets for VOCs and NOx.