

AIR QUALITY CONFORMITY

The Nile Transportation Study Area is included in two air quality conformity areas, Berrien County and Cass County. Those projects located in Berrien County are included in the Berrien County Air Quality Conformity, see appendix O. The projects located in Cass County are included in the Cass County Air Quality Conformity, see below. Both Counties must conform for the transportation study area to conform.

Cass- MI Air Quality Conformity

The 1990 Federal Clean Air Act Amendments (CAAA) identified six pollutants for which air quality standards were established: Ozone (O₃), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), "respirable" or breathable particulate matter (PM), and lead (Pb). Each one of these pollutants has benchmark levels that are considered allowable for public exposure. Beyond those benchmark levels, the air quality for that constituent pollutant is considered dangerous. The EPA has termed these national standards as "national ambient air quality standards," or NAAQS. Transportation contributes to four of the six criteria pollutants: O₃, CO, PM, and NO₂.

In addition to establishing benchmark levels of exposure to pollutants, the CAAA of 1990 required that transportation plans and TIPs in non-attainment areas demonstrate "conformity" to the State Implementation Plan (SIP), which is intended to ensure that the state meets the National Ambient Air Quality Standards (NAAQS). In other words, transportation projects, such as the construction of highways and transit rail lines cannot be Federally funded or approved unless they are consistent with state air quality goals. In addition, transportation projects must not cause or contribute to new violations of the air quality standards, worsen existing violations, or delay attainment of air quality standards.

Since 1990, the EPA's method of measuring ambient air quality has been studied and revised. In 1997, the standard for fine breathable particulate matter (PM) was increased to 2.5 microns (PM_{2.5}), and a more rigorous 8-hour ozone testing standard replaced the previous 1-hour ozone testing standard. The new standards were challenged in court and their adoption was postponed as the EPA awaited adjudication. In 2001, the U.S. Supreme Court upheld the constitutionality of the new EPA standards. Upon

implementation of the new standards, Cass County (including parts of the NATS area) was found to be in "non-attainment" for 8-hour ozone, meaning that the benchmark level for ozone was exceeded by the average measurement within the 8-hour testing period. On May 16, 2007, the EPA approved a request from the State of Michigan to redesignate Cass County, among others, to attainment of the 8-hour ozone NAAQS. While the redesignation changes Cass County's area non-attainment status to attainment-maintenance, air quality conformity procedures must continue to be followed. It is worthwhile to note that on March 12, 2008, the EPA announced a new primary 8-hour ozone standard of 0.075 parts per million (ppm), down from the previous .085 ppm. With this change, it is possible that Cass County will return to non-attainment status. For more information on transportation and air quality, visit the EPA online at <http://www.epa.gov/oms/>.

Ozone is formed when volatile organic compounds (VOC) and oxides of nitrogen (NOx) combine with sunlight and high temperatures. One way to reduce the amount of Ozone is to reduce the amount of VOC and NOx which are produced in the region. VOC and NOx emissions originate, in part, from highway motor vehicles and can be reduced by decreasing congestion such as ridesharing and/or providing for alternatives to the automobile, such as public transit.

Air quality analysis was performed in January, 2009 on the 2035 Long Range Transportation Plan for NATS, Niles FY 2008 - 2011 TIP and on the State Transportation Improvement Program (STIP) for the non-urban portion of the maintenance area in order to determine the impact of the transportation system improvements on vehicle emissions. The FHWA and the United States EPA require that the implementation of projects in the Transportation Plans and TIPs do not result in mobile source emissions greater than the emissions budget. The conformity determination conducted for the Transportation Plans and 2008-2011 TIPs were prepared in accordance with EPA's transportation conformity rule. The conformity demonstration was performed by comparing emissions from year 2013, 2018, 2025, and 2035 to the emission budget.

AIR QUALITY ASSESSMENT CRITERIA

Niles' 2035 Transportation Plan and 2008-2011 TIP and the rural Cass County proportion of the STIP conformity demonstration was made in compliance with all applicable conformity requirements and have been determined to satisfy the following conformity criteria and procedures set forth in the EPA's Transportation Conformity Rule:

1. The conformity demonstration was based on the latest planning assumptions.
2. The conformity demonstration was based on the latest emission model available.
3. The conformity demonstration was made according to the consultation procedures of the final conformity rule and the SIP conformity procedures.
4. The demonstration was made that the LRTP and TIP do not increase the frequency or severity of the existing violation of the NAAQS for which the area is designated in non-attainment. Completing the components of the LRTPs and TIPs do not exceed the approved 8-hour conformity budget.
5. Each project contained in the LRTP and TIP was reviewed by the Interagency Work Group (IAWG), being consistent with the consultation procedures established in the SIP. During the review, a determination was made by the IAWG on each project as to whether it needed to be modeled or was exempt from emission modeling.

BACKGROUND

The following describes the procedures used to estimate and analyze travel demand for the Cass - MI Maintenance Area. The NATS and the MDOT developed socio-economic data for 2006, 2013, 2018, 2025 and 2035. These data are the basis for forecasting in the travel demand models which, in turn, generate the inputs required for the air quality conformity analysis. These inputs are the amount of travel expressed as VMT and average speed by NFC by county. Individual NFCs by county are then grouped to provide the needed data structure required for EPA's Mobile6.2.

Air quality conformity analysis must be performed on a countywide basis. The urban travel demand forecast models do not cover the whole of the county. In Cass County, the NATS urban travel demand model covers the cities of Niles, Buchanan, Edwardsburg and the townships of Buchanan, Niles, Howard, Bertrand, Milton and Ontwa. For the portion of Cass County not covered by an urban travel demand model, the MDOT statewide model is used to estimate travel.

The VMT and speed data generated by the NATS model, and the statewide model are normalized using county Highway Performance Monitoring System (HPMS) VMT figures to provide the basis for the estimation of present and future VMT and speeds by NFC for the county. The air quality conformity analysis performed assumes that transportation projects are included in the milestone year they are presumed to be open to traffic. The following table demonstrates and summarizes the data resulting in the conformity determination for the NATS 2035 Transportation Plan and FY 2008-2011 TIP, and the rural Cass County portion in the STIP.

**RESULTS OF THE CASS - MI MAINTENANCE AREA
8 HOUR OZONE STANDARD**

Scenario	Emissions in kilograms/day	
	VOC	NO _x
Attainment Budget	2503.87	3084.48
2013 Action	889.7150	1204.7259
2018 Action	695.591839	773.0092
2025 Action	554.0069	60.0078
2035 Action	533.7297	468.7738

The remainder of this report provides additional technical details and documentation as necessary to support this determination.

MODELING PROCEDURES

MDOT developed and calibrated the travel demand models used in this analysis. An Urban travel demand model was developed for part of Cass County and the remainder was modeled with the statewide model. The travel demand models use the standard four-step transportation modeling process.

- 1- Trip generation model
- 2- Trip distribution model
- 3- Mode choice model
- 4- Highway assignment model

NATS Urban Travel Demand Model

The *trip generation model* uses trip generation rates developed from the 2005 Michigan Household Travel Survey. The trip generation model was enhanced with the use of area type. The trip generation variables used in the model are population (not in group quarters), households, retail, service, and other employment, auto ownership, K-12 enrollment, and student population. The *trip distribution model* uses the standard gravity model to estimate origin/destination tables. It also uses friction factors for trip attractiveness. The *mode choice model* is a single mode model. It uses vehicle occupancy rates to convert person trips to vehicle trips. The *trip assignment model* uses an equilibrium algorithm. The model was calibrated according to the calibration standards used by MDOT and suggested by FHWA. The model included 241 traffic analysis zones. The network is coded to output information based on area type, facility type, number-of-lanes, speeds, NFC, capacity, street names, and vehicle assignment.

Statewide Travel Demand Model

The statewide model was used for the non-urban parts of Berrien County. The model was developed in TransCAD and calibrated for year 2005. The model covers all counties of the state and includes NFC collectors and above; local roads are excluded. *Trip generation* employs a cross classification lookup table with trip rates developed from a combination of local models, National Cooperative Highway Research Program Report 187, Nationwide Personal Transportation Survey (NPTS), and the Transportation Management Area (TMA) model trip generation rates. The trip generation variables used in the model are households by three income groups and five size categories along with six categories of employment. The *trip distribution model* uses a gravity model to estimate origin/destination tables. The *mode choice model* converts person trips to vehicle trips by removing transit trips and applying auto occupancy factors, which are sensitive to the length of the trip (longer trips having higher occupancies). The *trip assignment model* uses an all-or-nothing algorithm. The model was calibrated according to the strict calibration standards used by MDOT and suggested by FHWA. The model includes 2,392 traffic analysis zones and the network is coded to provide as output VMT, VHT, and speeds by NFC.

HIGHWAY PERFORMANCE MONITORING SYSTEM (HPMS) DATA

The EPA and the United States Department of Transportation (USDOT) have both endorsed HPMS as the appropriate source of VMT estimates. HPMS is the FHWA's annual program to collect roadway data in all 50 states to assess the condition of the highway system in terms of traffic congestion, accessibility, and pavement condition. The FHWA requires counts to determine the area wide VMT for all Federal Aid Urban Areas (FAUA). MDOT supplements the counts outside the FAUA with additional counts in small cities, rural areas, and especially in rural areas of counties with nonattainment status. These supplemental counts follow the same random selection procedures as those inside the FAUA.

The HPMS data used is from MDOT's Universe file and is stratified by NFC. MDOT is currently undertaking a data improvement process to update the HPMS Universe, non-sample traffic data.

MODEL VEHICLE MILES OF TRAVEL (VMT)

HPMS Universe data provides the VMT estimates for the calibration year of the travel demand model, 2006 for Niles model, and 2005 for the statewide model. To maintain consistency between HPMS and modeled VMT and among milestone years model VMT is scaled. The 2006 HPMS VMT distribution was used to scale the 2013, 2018, 2025, and 2035 VMT. Thus, the 2006 total HPMS VMT remained the same while future modeled VMT distributions changed to reflect the HPMS distribution. Then the scaled VMT by NFC are collapsed into four groups, to meet the requirements of Mobile6.2. These groups are: 1) rural interstate, 2) rural major and minor arterials/collectors/local streets, 3) urban interstate/freeway, and 4) urban principal and minor arterials/collectors/local streets. This is done for all interim and future analysis years. This same process is used for vehicle hours of travel (VHT). The following are the scaled travel demand modeled VMT for each county.

CASS COUNTY VEHICLE MILES OF TRAVEL

NFC	HPMS 2006	2006	2013	2018	2025	2035
Rural Interstate/Freeway	0	0	0	0	0	0
Rural Major & Minor Arterial/Collector/L ocal Street	1,031,154	1,031,154	1,086,470	1,120,135	1,152,511	1,172,707
Urban Interstate/Freeway	0	0	0	0	0	0
Urban Principal & Minor Arterial/Collector/L ocal Street	261,588	261,588	275,780	285,800	307,755	318,147
Total	1,292,742	1,292,742	1,362,250	1,405,936	1,460,267	1,490,854

MODEL SPEED

The modeled speed is derived by dividing the total aggregated scaled VMT by the total aggregated scaled VHT, except for local roads estimated by the statewide model. Rural Cass County speeds for local roads were estimated by speeds generated by the urban model. The speeds are summarized below:

CASS COUNTY SPEED

NFC	2006	2013	2018	2025	2035
Rural Interstate/Freeway	0	0	0	0	0
Rural Major & Minor Arterial/Collector/Local Street	45.9	45.8	45.7	45.6	45.5
Urban Interstate/Freeway	0	0	0	0	0
Urban Principal & Minor Arterial/Collector/Local Street	36.6	36.5	36.4	36.1	36.0

CONFORMITY ANALYSIS

The conformity analysis was performed using the Mobile6.2 program. Mobile6.2 is a computer program that estimates VOC and NOx emission factors for gasoline and diesel -fuels for on road motor vehicles. The model was developed by the USEPA.

Mobile6.2 calculates emission factors for eight individual vehicle types in two regions of the country. Mobile6.2 emission factor estimates depend on various conditions such as ambient temperatures, average travel speed, operating modes, fuel volatility, and mileage accrual rates. Many of the variables affecting vehicle emissions can be specified by the user. The analysis is based on comparing the emissions budget to the analysis years 2013, 2018, 2025, and 2035.

A summary of critical Mobile6.2 inputs assumptions are shown below:

- Temperature:
 - Ambient temperature = 86.8° F
 - Maximum temperature = 95.0° F
 - Minimum temperature = 65.0° F

- The Reid Vapor Pressure (RVP) value = 9.0
- Emission factors are based on an average day during the month of July.

Mobile6.2 - Inputs

The inputs to the Mobile6.2 emissions factor model are VMT and average speed by NFC grouped as shown in the previous tables.

Mobile6.2 - Results

The following table provides the results of Mobile6.2 emissions. The emission impact for each analysis year 2013, 2018, 2025, and 2035 is compared to the emission budget. To attain conformity, the emissions for the county must be less than the emission budget. Mobile6.2 result files are shown in the appendix section M.

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CONFORMITY DEMONSTRATION

The above table clearly demonstrates that the Transportation Plans, the TIPs, and regionally significant projects result in lower emissions in each of the milestone years than the approved maintenance budget, consistent with USDOT/EPA conformity

rules. These results support the determination of conformity with applicable requirements of the SIP following and in accordance with the Clean Air Act and TEA21, as amended and SAFETEA-LU.

MPO ACTION

A summary of the results was presented and considered by the NATS Technical Committee and was also considered by the Policy Committee. Based on the materials contained in this document, the NATS committees have determination that the 2035 Transportation Plan and 2008 - 2011 TIP, and the rural Cass County portion of the STIP, demonstrate conformity with the SIP.