Chapter IV Air Quality Conformity

An air quality analysis is performed on the Long Range Transportation Plan (LRTP) and the Transportation Improvement Program (TIP) in order to determine the impact of major transportation system improvements on vehicle emissions. The Federal Highway Administration (FHWA) and the United States Environmental Protection Agency (USEPA) require that the implementation of projects in the TIP and the LRTP do not result in mobile source emissions greater than the current emission budget assigned for the Grand Rapids Metro Area in the State Implementation Plan (SIP).

The Grand Rapids Metropolitan Area was previously designated as a Maintenance Area for Ozone under the one-hour rule. The new 8-hour designations administered by the USEPA have tied both Kent and Ottawa counties under the more lenient sub-part 1 "Basic" non-attainment classification. The new designation still requires careful monitoring of air quality in the region. Therefore, the TIP and LRTP air quality conformity analysis examines changes in Volatile Organic Compounds (VOC) and Oxides of Nitrogen (NOx). The emission levels are then compared to numerical emission budgets developed by the state in the regional maintenance plan.

Air Quality Assessment Criteria

The Transportation plan conformity determination finding was made in compliance with all applicable conformity requirements. The Transportation plan satisfies the following conformity criteria and procedures set forth in the USEPA's Transportation Conformity Rule:

1. The conformity determination was based on the latest planning assumptions.

2. The conformity determination was based on the latest emission model available.

3. The conformity determination was made according to the consultation procedures of the final conformity rule and the implementation plan revision.

4. The determination was made that the Transportation Plan does not increase the frequency or severity of the existing violation of the National Ambient Air Quality Standards (NAAQS) for which the area is designated in non-attainment. Completing the components of the Transportation Plan does not increase emissions over the option of not building during the same time period.

Background

The following documentation describes the best practices available for the travel demand estimation and analysis in Kent and Ottawa Counties. The Grand Valley Metropolitan Council (GVMC) and the Macatawa Area Coordinating Council (MACC) have approved socioeconomic data for 2000, 2002, 2005, 2009, 2015, 2025 and 2030. These data are the basis for forecasting travel demand in the respective study areas,

which in turn generates the inputs required for air quality conformity analysis. These inputs are the amount of travel expressed as vehicle miles of travel (VMT) and average speed by National Functional Classification (NFC) or a combination of similar functional classified facilities grouped together to address the new Mobile 6 model input data structure. One of the latest travel demand forecasting technologies available, the TransCad model has been used in all urban area travel demand forecasting efforts. However, air quality conformity analysis must be performed on a county wide basis, and the urban area travel demand forecast models cover all of Kent and portion of Ottawa Counties. Procedures must therefore be employed to estimate VMT and speed for the portion of Ottawa County which is not covered by a travel demand model.

The VMT and speed data generated by the TransCad model for the GVMC and MACC areas, and county wide Highway Performance Monitoring System (HPMS) VMT figures provide the basis for the estimation of present and future VMT and speeds by NFC for the entire counties. The air quality conformity analysis performed for the 2030 Long Range Transportation Plan includes the following assumptions:

1- Emission budget for VOC of 64 tons/day or 58,058.5 Kg/day based on MOBILE5
2- Emission budget for NOx of 61 tons/day or 55,337.0 Kg/day based on MOBILE5
3- Emission budget for VOC of 48.8 tons/day or 44,247.9 Kg/day based on Mobile 6
4- Emission budget for NOx of 58.3 tons/day or 52,899.0 Kg/day based on Mobile 6
5- Projects are included in year 2009, 2015, 2025, or 2030 depending when they could be built, and open to traffic.
6- Include off model credits from 1995-2000 approved CMAQ projects and Transit fleet turnover.
7- No Inspection/Maintenance (I/M) program.

Modeling Procedures

GVMC has developed and calibrated the travel demand model (TransCad) which covers all of Kent and eastern part of Ottawa Counties. The travel demand model uses the standard four-step transportation planning process.

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

The *trip generation model* uses a combination of local and QRS (NCHRP 187) trip generation rates. The trip generation variables used in the model are Dwelling units, Retail Employment, and Non-retail Employment. The *trip distribution model* uses the standard 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 rate to estimate vehicle trips on the network. Transit trips are estimated separately using different post processing methods. The *trip assignment model* uses two different techniques, all-or- nothing and capacity restrained algorithms. The model

was calibrated according to the strict calibration standards used by MDOT and suggested by FHWA. The model includes 783 traffic analysis zones and 11,644 roadway links. The network is coded to output information based on area type, facility type, number of lanes, speeds, national functional classification, capacity, street names, and vehicle assignment. The MACC has a similar model which was developed and calibrated by the Michigan Department of Transportation (MDOT).

Model Data

The modeled VMT and speeds for the portions of each study area within Kent and Ottawa Counties are summarized in Tables 1 thru 12. The overall modeled speed by NFC is determined by dividing total VMT by total VHT generated by the travel demand models.

Table 4 **Kent County Year 2002 Vehicle Miles of Travel & Speed**

KENT COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2002
2002	**2000 VMT**	**2000 VMT**	**2002 VMT**	**2002 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	698,481	691,383	629,657	**631,614**	**56.25**
Rural Major & Minor Arterial/Collector/Local Street	2,186,004	2,475,598	2,620,639	**2,132,114**	**34.87**
Urban Interstate/Freeway	3,353,463	4,493,660	4,332,637	**3,242,300**	**53.88**
Urban Principal & Minor Arterial/Collector/Local Street	7,863,924	8,723,593	9,839,788	**8,957,407**	**30.44**
TOTALS	**14,101,872**	**16,384,234**	**17,422,721**	**14,963,436**	

Table 5 **Kent County Year 2005 Vehicle Miles of Travel & Speed**

KENT COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2005
2005	**2000 VMT**	**2000 VMT**	**2005 VMT**	**2005 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	698,481	691,383	647,533	**650,050**	**55.99**
Rural Major & Minor Arterial/Collector/Local Street	2,186,004	2,475,598	2,677,216	**2,180,461**	**34.74**
Urban Interstate/Freeway	3,353,463	4,493,660	4,576,638	**3,434,352**	**54.12**
Urban Principal & Minor Arterial/Collector/Local Street	7,863,924	8,723,593	9,932,918	**9,003,947**	**30.09**
TOTALS	**14,101,872**	**16,384,234**	**17,834,306**	**15,268,811**	

Table 6 **Kent County Year 2009 Vehicle Miles of Travel & Speed**

KENT COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2009
2009	**2000 VMT**	**2000 VMT**	**2009 VMT**	**2009 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	698,481	691,383	671,368	**674,631**	**54.95**
Rural Major & Minor Arterial/Collector/Local Street	2,186,004	2,475,598	2,752,652	**2,244,925**	**33.67**
Urban Interstate/Freeway	3,353,463	4,493,660	4,901,973	**3,690,422**	**48.45**
Urban Principal & Minor Arterial/Collector/Local Street	7,863,924	8,723,593	10,057,092	**9,066,000**	**30.19**
TOTALS	**14,101,872**	**16,384,234**	**18,383,085**	**15,675,977**	

Table 7 **Kent County Year 2015 Vehicle Miles of Travel & Speed**

KENT COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2015
2015	**2000 VMT**	**2000 VMT**	**2015 VMT**	**2015 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	698,481	691,383	686,877	**689,634**	**54.15**
Rural Major & Minor Arterial/Collector/Local Street	2,186,004	2,475,598	2,895,467	**2,361,159**	**33.33**
Urban Interstate/Freeway	3,353,463	4,493,660	4,982,315	**3,751,887**	**52.45**
Urban Principal & Minor Arterial/Collector/Local Street	7,863,924	8,723,593	10,719,886	**9,620,507**	**29.46**
TOTALS	**14,101,872**	**16,384,234**	**19,284,545**	**16,423,187**	

Table 8 **Kent County Year 2025 Vehicle Miles of Travel & Speed**

KENT COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2025
2025	**2000 VMT**	**2000 VMT**	**2025 VMT**	**2025 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	698,481	691,383	716,796	**719,278**	**54.10**
Rural Major & Minor Arterial/Collector/Local Street	2,186,004	2,475,598	3,161,560	**2,573,330**	**33.15**
Urban Interstate/Freeway	3,353,463	4,493,660	5,212,536	**3,925,574**	**52.40**
Urban Principal & Minor Arterial/Collector/Local Street	7,863,924	8,723,593	11,575,514	**10,337,957**	**29.29**
TOTALS	**14,101,872**	**16,384,234**	**20,666,406**	**17,556,138**	

Table 9 **Kent County Year 2030 Vehicle Miles of Travel & Speed**

KENT COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2030
2030	**2000 VMT**	**2000 VMT**	**2030 VMT**	**2030 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	698,481	691,383	739,658	**741,055**	**54.00**
Rural Major & Minor Arterial/Collector/Local Street	2,186,004	2,475,598	3,298,906	**2,693,794**	**32.83**
Urban Interstate/Freeway	3,353,463	4,493,660	5,345,343	**4,031,158**	**52.20**
Urban Principal & Minor Arterial/Collector/Local Street	7,863,924	8,723,593	12,191,566	**10,904,258**	**28.84**
TOTALS	**14,101,872**	**16,384,234**	**21,575,473**	**18,370,265**	

Table 10 Ottawa **County Year 2002 Vehicle Miles of Travel & Speed**

OTTAWA COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2002
2002	**2000 VMT**	**2000 VMT**	**2002 VMT**	**2002 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	1,172,996	404,029	1,211,502	**1,211,502**	**67.00**
Rural Major & Minor Arterial/Collector/Local Street	948,229	949,041	994,959	**994,959**	**32.62**
Urban Interstate/Freeway	376,165	414,156	351,306	**351,306**	**49.01**
Urban Principal & Minor Arterial/Collector/Local Street	2,640,317	2,514,191	2,814,935	**2,814,935**	**32.41**
TOTALS	**5,137,707**	**4,281,417**	**5,372,702**	**5,372,702**	

Table 11 Ottawa **County Year 2005 Vehicle Miles of Travel & Speed**

OTTAWA COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2005
2005	**2000 VMT**	**2000 VMT**	**2005 VMT**	**2005 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	1,172,996	404,029	1,267,931	**1,267,931**	**63.56**
Rural Major & Minor Arterial/Collector/Local Street	948,229	949,041	1,025,744	**1,025,744**	**45.16**
Urban Interstate/Freeway	376,165	414,156	382,743	**382,743**	**61.04**
Urban Principal & Minor Arterial/Collector/Local Street	2,640,317	2,514,191	2,882,324	**2,882,324**	**33.61**
TOTALS	**5,137,707**	**4,281,417**	**5,558,742**	**5,558,742**	

***Table 12 Ottawa* County Year 2009 Vehicle Miles of Travel & Speed**

OTTAWA COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2009
2009	**2000 VMT**	**2000 VMT**	**2009 VMT**	**2009 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	1,172,996	404,029	1,343,169	**1,343,169**	**63.70**
Rural Major & Minor Arterial/Collector/Local Street	948,229	949,041	1,066,791	**1,066,791**	**44.90**
Urban Interstate/Freeway	376,165	414,156	424,659	**424,659**	**57.95**
Urban Principal & Minor Arterial/Collector/Local Street	2,640,317	2,514,191	2,972,177	**2,972,177**	**33.85**
TOTALS	**5,137,707**	**4,281,417**	**5,806,796**	**5,806,796**	

***Table 13 Ottawa* County Year 2015 Vehicle Miles of Travel & Speed**

OTTAWA COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2015
2015	**2000 VMT**	**2000 VMT**	**2015 VMT**	**2015 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	1,172,996	404,029	1,469,732	**1,469,732**	**63.70**
Rural Major & Minor Arterial/Collector/Local Street	948,229	949,041	1,162,066	**1,162,066**	**44.33**
Urban Interstate/Freeway	376,165	414,156	436,912	**436,912**	**59.90**
Urban Principal & Minor Arterial/Collector/Local Street	2,640,317	2,514,191	3,187,429	**3,187,429**	**35.68**
TOTALS	**5,137,707**	**4,281,417**	**6,256,139**	**6,256,139**	

***Table 14 Ottawa* County Year 2025 Vehicle Miles of Travel & Speed**

OTTAWA COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2025
2025	**2000 VMT**	**2000 VMT**	**2025 VMT**	**2025 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	1,172,996	404,029	1,653,972	**1,653,972**	**62.75**
Rural Major & Minor Arterial/Collector/Local Street	948,229	949,041	1,330,300	**1,330,300**	**42.78**
Urban Interstate/Freeway	376,165	414,156	464,204	**464,204**	**63.85**
Urban Principal & Minor Arterial/Collector/Local Street	2,640,317	2,514,191	3,443,047	**3,443,047**	**33.90**
TOTALS	**5,137,707**	**4,281,417**	**6,891,523**	**6,891,523**	

***Table 15 Ottawa* County Year 2030 Vehicle Miles of Travel & Speed**

OTTAWA COUNTY	HPMS	MODELED	MODELED	NORMALIZED	2030
2030	**2000 VMT**	**2000 VMT**	**2030 VMT**	**2030 VMT**	**SPEED**
NFC					
Rural Interstate/Freeway	1,172,996	404,029	1,753,193	**1,753,193**	**62.05**
Rural Major & Minor Arterial/Collector/Local Street	948,229	949,041	1,412,764	**1,412,764**	**41.90**
Urban Interstate/Freeway	376,165	414,156	481,934	**481,934**	**63.70**
Urban Principal & Minor Arterial/Collector/Local Street	2,640,317	2,514,191	3,591,950	**3,591,950**	**32.88**
TOTALS	**5,137,707**	**4,281,417**	**7,239,841**	**7,239,841**	

Highway Performance Monitoring System (HPMS) Data

HPMS data provides statistically valid estimates of 2000 VMT for the entire Kent and Ottawa counties, stratified by NFC. Between 1990 and 2000, the NFC coding used to tabulate HPMS data changed due to the expanding urban boundaries of the urbanized areas. To maintain consistency between HPMS and modeled VMT, and among the milestone years, the 2000 HPMS VMT distribution was normalized to 2002, 2005, 2009, 2015, 2025, and 2030 distribution among the functional classes. Thus, the 2000 total HPMS VMT remained the same while the distribution changed to reflect what it would have been had the 2000 NFC coding been identical in the model. Shown in Tables 1 thru 10 are the original 2000 HPMS VMT estimates for Kent and Ottawa Counties.

Rural (Donut) VMT

Since only portions of Ottawa County is covered by an urban travel demand model, the VMT for the modeled areas is subtracted from total 'donut' HPMS VMT to determine the magnitude of the county-wide VMT outside of the modeled areas. This is referred to as the 2000 "non-urban model" rural VMT.

The VMT by NFC for the non-urban model rural portion of each county is estimated by the statewide model. The 2000 model VMT is expanded to the 2000 HPMS VMT, and the expansion factors are applied to all future years. This process is employed as the statewide model network does not represent all links, and the VMT estimates it provides are only for the incorporated links. Local roads are not incorporated into the statewide model, so HPMS figures are used as a default. Growth for those functional classes is assumed to parallel growth on collectors, and future year VMT figures are calculated accordingly.

The VMT for the non-urban portion of the urban model, and the expanded statewide VMT are then combined to represent all non-urbanized area VMT.

Since only a portion of Ottawa County is covered by the urban travel demand models, the VMT for the modeled areas is subtracted from total 2000 factored HPMS VMT to determine the magnitude of county wide VMT not accounted for by the models.

Growth factors for the analysis years 2002, 2005, 2009, 2015, 2025, and 2030 are calculated based on the modeled growth in VMT on the rural links contained within the urban models. The growth factors represent the compound nature of VMT growth, since the socioeconomic forecasts which drive the VMT forecasts have been developed using compound growth formulas.

Reviews of local area and statewide statistics have indicated that VMT growth in rural areas is approximately half that of urbanized areas, so the calculated growth factors are halved. The calculated, adjusted growth factors are applied to the 2000 un-modeled rural VMT to estimate 2002, 2005, 2009, 2015, 2025, and 2030 un-modeled rural VMT. Where the modeled VMT exceeds the HPMS VMT, the growth rates are applied to this difference, so the appropriate amount of VMT will be subtracted from the modeled VMT for the future years.

Modeled VMT

The modeled urban VMT from the GVMC and MACC models is combined and compared to the urbanized area 2000 HPMS VMT for each urban functional class. Adjustment factors are calculated for each urban NFC to fit the modeled VMT estimate to the HPMS VMT estimate. The adjustment factors are then applied to all forecast years to appropriately scale the forecasts.

The modeled urban VMT from the GVMC and MACC models is combined, and compared to the factored 2000 HPMS VMT for each urban functional class. In several instances, the 2000 modeled VMT estimate for a particular urban NFC exceeds the 2000 factored HPMS VMT estimate for the same class. In other cases, the modeled urban VMT estimate is lower than the HPMS estimate. Adjustment factors are calculated for each urban NFC to "fit" the modeled VMT estimate to the HPMS VMT estimate. These factors are then applied to all forecast years to appropriately scale the forecasts.

Methodology to Scale Total Model VMT to HPMS VMT

This new process will be used for all non-attainment areas, and each county within a non-attainment area will be analyzed separately. HPMS data by NFC by county for the base year (calibrated year) of the travel demand model or models is obtained. The VMT by NFC from the urban model or urban models base year and the VMT from the statewide model are added together. This provides a “county-wide” travel demand model VMT by NFC for the base year. The combination of models being aggregated vary from a county covered by two urban travel demand models and the statewide model to a rural county only covered by the statewide model. Then, the base year HPMS VMT by NFC is divided by the base year “county-wide” travel demand model VMT for corresponding NFC. These divisions produce ratios, proportions, or “factors” for

each NFC. For each conformity analysis year, these factors are multiplied to each travel demand model's VMT to produce a scaled VMT by NFC. For each year, the scaled travel demand model's VMT by NFC are aggregated to a "county-wide" total. Thus the VMT is aggregated so each NFC has a county-wide total. 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 & minor arterials/collectors/local streets, 3) urban interstate/freeway, and 4) urban principal & minor arterials/collectors/ local streets. This is done for all interim and future analysis years. To get scaled VHT (vehicle hours of travel) the factors developed above are applied to each travel demand model's VHT by NFC. The process follows the same steps and arrives at VHT by NFC collapsed into four groups. Next, to arrive at a speed, each individual group VMT is divided by the corresponding VHT. Thus, achieving the variables needed to express demand for travel within a county, VMT and speed, as required for input into MOBILE6.2.

For the rural links contained within each urban travel demand model, speeds are based on the urban models. The speeds for the non-urban model rural portion of each county are based on the statewide model. The speeds from the urban and statewide models are weighted by VMT and averaged to provide one speed per NFC. As local roads are not incorporated in the statewide model network, the speeds for these classes are estimated as the average of the speeds generated by all of the small urban area models.

The speeds on un-modeled rural links are assumed to be the same as the speeds on modeled rural links. In addition, these speeds in rural Ottawa County are assumed to be constant over time, as substantial excess capacity generally exists on rural roads. The VMT for all rural links is combined, as well as the VHT. Dividing the total VMT by total VHT provides the total rural link speed estimates. Average speed for each urban NFC is calculated by dividing the total VMT by the total VHT for that NFC.

Conformity Analysis

GVMC staff combined estimates of VMT and Speed from the Kent and Ottawa Counties to use with the emissions output from MOBILE6.2. The conformity is performed using the MOBILE6.2 program. MOBILE6.2 is a computer program that estimates volatile organic compounds (VOC), carbon monoxide (CO), and oxides of nitrogen (NOx) emission factors for gasoline-fueled and diesel highway motor vehicles. The model was developed by the United States Environmental Protection Agency (USEPA). MOBILE6.2 calculates emission factors for eight individual vehicle types in two regions of the country. MOBILE6 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 analyses cover 2002, 2005, 2007, 2009, 2015, 2025, and 2030. The emissions analysis for year 2007 was interpolated from years 2005 and 2009 MOBLIE6.2 output per our agreement with EPA and FHWA. The analysis is based on comparing the total emissions from the Long Range Transportation Plan and the Transportation Improvement Program projects to the official emission budget in the SIP

and a calculated budget by Mobile6.2 and the analysis does not include an I/M Program. Tables 11 thru 18 reflect the emissions of VOC and NOx with the implementation of projects included in the Long Range Transportation Plan and the Transportation Improvement Program.

Table 16 **Kent Year 2002, 2005, 2007, 2009, 2015, 2025 & 2030 VOC & NOX Emissions**

Functional		VOC	Nox
Classification	**Budget Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2002**	**1,001.01**	**1,959.28**
Rural Major & Minor Arterial/Collector/Local Street	**2002**	**3,816.35**	**5,037.03**
Urban Interstate/Freeway	**2002**	**5,242.48**	**9,933.93**
Urban Principal & Minor Arterial/Collector/Local Street	**2002**	**16,856.48**	**21,387.17**
TOTALS		**26,916.317**	**38,317.411**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2005**	**766.92**	**1,581.65**
Rural Major & Minor Arterial/Collector/Local Street	**2005**	**2,894.71**	**4,320.39**
Urban Interstate/Freeway	**2005**	**4,020.99**	**7,904.62**
Urban Principal & Minor Arterial/Collector/Local Street	**2005**	**12,573.91**	**17,906.68**
TOTALS		**20,256.543**	**31,713.336**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2007**	**665.992**	**1,328.624**
Rural Major & Minor Arterial/Collector/Local Street	**2007**	**2,519.197**	**3,610.689**
Urban Interstate/Freeway	**2007**	**3,615.216**	**6,701.020**
Urban Principal & Minor Arterial/Collector/Local Street	**2007**	**10,780.899**	**14,861.596**
TOTALS		**17,581.304**	**26,501.928**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2009**	**565.061**	**1,075.597**

Rural Major & Minor Arterial/Collector/Local Street	**2009**	**2,143.679**	**2,900.989**
Urban Interstate/Freeway	**2009**	**3,209.440**	**5,497.420**
Urban Principal & Minor Arterial/Collector/Local Street	**2009**	**8,987.887**	**11,816.515**
TOTALS		**14,906.066**	**21,290.521**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2015**	**377.702**	**563.986**
Rural Major & Minor Arterial/Collector/Local Street	**2015**	**1,458.144**	**1,631.734**
Urban Interstate/Freeway	**2015**	**2,077.350**	**3,065.565**
Urban Principal & Minor Arterial/Collector/Local Street	**2015**	**6,181.531**	**6,729.036**
TOTALS		**10,094.727**	**11,990.323**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2025**	**257.403**	**298.279**
Rural Major & Minor Arterial/Collector/Local Street	**2025**	**1,057.223**	**959.539**
Urban Interstate/Freeway	**2025**	**1,422.626**	**1,637.047**
Urban Principal & Minor Arterial/Collector/Local Street	**2025**	**4,451.199**	**3,917.496**
TOTALS		**7,188.451**	**6,812.360**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2030**	**257.102**	**263.596**
Rural Major & Minor Arterial/Collector/Local Street	**2030**	**1,079.460**	**879.061**
Urban Interstate/Freeway	**2030**	**1,416.986**	**1,443.360**
Urban Principal & Minor Arterial/Collector/Local Street	**2030**	**4,589.764**	**3,630.240**
TOTALS		**7,343.312**	**6,216.257**

Table 17 **Ottawa Year 2002, 2005, 2007, 2009, 2015, 2025 & 2030 VOC & NOX Emissions**

Functional		VOC	Nox
Classification	**Budget Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2002**	**1,869.349**	**4,377.663**
Rural Major & Minor Arterial/Collector/Local Street	**2002**	**1,824.472**	**2,362.510**
Urban Interstate/Freeway	**2002**	**581.253**	**1,004.353**
Urban Principal & Minor Arterial/Collector/Local Street	**2002**	**5,173.366**	**6,687.018**
TOTALS		**9,448.440**	**14,431.544**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2005**	**1,430.485**	**3,477.083**
Rural Major & Minor Arterial/Collector/Local Street	**2005**	**1,264.787**	**2,003.618**
Urban Interstate/Freeway	**2005**	**435.522**	**991.917**
Urban Principal & Minor Arterial/Collector/Local Street	**2005**	**3,869.994**	**5,346.882**
TOTALS		**7,000.787**	**11,819.499**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2007**	**1,261.024**	**3,009.651**
Rural Major & Minor Arterial/Collector/Local Street	**2007**	**1,103.996**	**1,725.262**
Urban Interstate/Freeway	**2007**	**394.606**	**872.724**
Urban Principal & Minor Arterial/Collector/Local Street	**2007**	**3,351.274**	**4,592.986**
TOTALS		**6,110.900**	**10,200.622**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2009**	**1,091.564**	**2,542.219**

Rural Major & Minor Arterial/Collector/Local Street	**2009**	**943.206**	**1,446.906**
Urban Interstate/Freeway	**2009**	**353.690**	**753.532**
Urban Principal & Minor Arterial/Collector/Local Street	**2009**	**2,832.554**	**3,839.089**
TOTALS		**5,221.013**	**8,581.746**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2015**	**785.118**	**1,403.108**
Rural Major & Minor Arterial/Collector/Local Street	**2015**	**667.177**	**834.160**
Urban Interstate/Freeway	**2015**	**237.069**	**411.368**
Urban Principal & Minor Arterial/Collector/Local Street	**2015**	**1,928.195**	**2,199.417**
TOTALS		**3,617.559**	**4,848.052**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2025**	**578.722**	**756.390**
Rural Major & Minor Arterial/Collector/Local Street	**2025**	**506.374**	**507.063**
Urban Interstate/Freeway	**2025**	**164.710**	**216.450**
Urban Principal & Minor Arterial/Collector/Local Street	**2025**	**1,403.771**	**1,280.902**
TOTALS		**2,653.577**	**2,760.804**
Functional		**VOC**	**Nox**
Classification	**Year**	**Kg/Day**	**Kg/Day**
Rural Interstate/Freeway	**2030**	**595.009**	**674.016**
Rural Major & Minor Arterial/Collector/Local Street	**2030**	**524.767**	**467.646**
Urban Interstate/Freeway	**2030**	**165.676**	**190.066**
Urban Principal & Minor Arterial/Collector/Local Street	**2030**	**1,436.223**	**1,166.295**
TOTALS		**2,721.675**	**2,498.024**

Table 18 Conformity Analysis Total Results Ton/Day (MOBILE5 Budget)

	Total VOC	Total NOx	VOC	NOx			VOC Emission	Nox Emission
	Before Credit	Before Credit	Credits	Credits	Adjusted VOC	Adjusted NOx	MOBILE5 Budget	MOBILE5 Budget
Model Year	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day
2002 W/O IM	40.086	58.147	-0.19	-0.17	39.90	57.98	**64**	**61**
2005 W/O IM	30.047	47.988	-0.19	-0.17	29.86	47.82	**64**	**61**
2007 W/O IM	26.117	40.459	-0.19	-0.17	25.93	40.29	**64**	**61**
2009 W/O IM	22.187	32.929	-0.19	-0.17	22.00	32.76	**64**	**61**
2015 W/O IM	15.116	18.562	-0.19	-0.17	14.93	18.39	**64**	**61**
2025 W/O IM	10.849	10.553	-0.19	-0.17	10.66	10.38	**64**	**61**
2030 W/O IM	11.095	9.606	-0.19	-0.17	10.91	9.44	**64**	**61**

Table 19 Conformity Analysis Total Results Kg/Day (MOBILE5 Budget)

	Total VOC	Total NOx	VOC	NOx			VOC Emission	Nox Emission
	Before Credit	Before Credit	Credits	Credits	Adjusted VOC	Adjusted NOx	MOBILE5 Budget	MOBILE5 Budget
Model Year	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day
2002 W/O IM	36,364.756	52,748.955	-168.73	-154.22	36,196.03	52,594.74	**58,058.50**	**55,337.00**
2005 W/O IM	27,257.330	43,532.835	-168.73	-154.22	27,088.60	43,378.61	**58,058.50**	**55,337.00**
2007 W/O IM	23,692.204	36,702.550	-168.73	-154.22	23,523.47	36,548.33	**58,058.50**	**55,337.00**
2009 W/O IM	20,127.079	29,872.266	-168.73	-154.22	19,958.35	29,718.05	**58,058.50**	**55,337.00**
2015 W/O IM	13,712.286	16,838.375	-168.73	-154.22	13,543.56	16,684.15	**58,058.50**	**55,337.00**
2025 W/O IM	9,842.029	9,573.165	-168.73	-154.22	9,673.30	9,418.94	**58,058.50**	**55,337.00**
2030 W/O IM	10,064.986	8,714.281	-168.73	-154.22	9,896.26	8,560.06	**58,058.50**	**55,337.00**

Table 20 Conformity Analysis Total Results Ton/Day (Mobile 6 Budget)

	Total VOC	Total NOx	VOC	NOx			VOC Emission	Nox Emission
	Before Credit	Before Credit	Credits	Credits	Adjusted VOC	Adjusted NOx	MOBILE6.2 Budget	MOBILE6.2 Budget
Model Year	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day	Tons/Day
2002 W/O IM	40.086	58.147	-0.19	-0.17	39.90	57.98	**48.80**	**58.30**
2005 W/O IM	30.047	47.988	-0.19	-0.17	29.86	47.82	**48.80**	**58.30**
2007 W/O IM	26.117	40.459	-0.19	-0.17	25.93	40.29	**48.80**	**58.30**
2009 W/O IM	22.187	32.929	-0.19	-0.17	22.00	32.76	**48.80**	**58.30**
2015 W/O IM	15.116	18.562	-0.19	-0.17	14.93	18.39	**48.80**	**58.30**
2025 W/O IM	10.849	10.553	-0.19	-0.17	10.66	10.38	**48.80**	**58.30**
2030 W/O IM	11.095	9.606	-0.19	-0.17	10.91	9.44	**48.80**	**58.30**

Table 21 Conformity Analysis Total Results Kg/Day (Mobile 6 Budget)

	Total VOC	Total NOx	VOC	NOx			VOC Emission	Nox Emission
	Before Credit	Before Credit	Credits	Credits	Adjusted VOC	Adjusted NOx	MOBILE6.2 Budget	MOBILE6.2 Budget
Model Year	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day	Kg/Day
2002 W/O IM	36,364.756	52,748.955	-168.73	-154.22	36,196.03	52,594.74	**44,247.90**	**52,899.00**
2005 W/O IM	27,257.330	43,532.835	-168.73	-154.22	27,088.60	43,378.61	**44,247.90**	**52,899.00**
2007 W/O IM	23,692.204	36,702.550	-168.73	-154.22	23,523.47	36,548.33	**44,247.90**	**52,899.00**
2009 W/O IM	20,127.079	29,872.266	-168.73	-154.22	19,958.35	29,718.05	**44,247.90**	**52,899.00**
2015 W/O IM	13,712.286	16,838.375	-168.73	-154.22	13,543.56	16,684.15	**44,247.90**	**52,899.00**
2025 W/O IM	9,842.029	9,573.165	-168.73	-154.22	9,673.30	9,418.94	**44,247.90**	**52,899.00**
2030 W/O IM	10,064.986	8,714.281	-168.73	-154.22	9,896.26	8,560.06	**44,247.90**	**52,899.00**

Conclusion

Tables 16 thru 21 clearly indicate that implementing the Transportation Improvement Program and the Long Range Transportation Plan projects will result in lower emissions than the emission budgets from MOBILE5 and 6. Consequently, the Grand Valley Metro Council and the Macatawa Area Coordinating Council's 2006-2008 TIP and 2030 LRTP complies with the transportation plan conformity criteria contained in the USDOT/USEPA Conformity Guidance, and therefore meet the requirement of the CAAA and related TEA-21 provisions.