CENTRAL OHIO ON-ROAD MOBILE EMISSION ESTIMATES PREPARED FOR '(OEPA) OHIO ENVIRONMENTAL PROTECTION AGENCY SIP (STATEWIDE IMPLEMENTATION PLAN)' 8-HOUR OZONE STANDARD

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1.0 Introduction & Background

1.1 Introduction

This Report documents the on-road mobile emission estimates for the Columbus and Central Ohio area, in conjunction with the OEPA (Ohio Environmental Protection Agency) SIP (Statewide Implementation Plan) requirement to analyze for the 8-hour ozone standards. A request for redesignation and maintenance plan for ozone attainment was submitted in December 2006, now as part of OEPA SIP submittal this report adds ozone analysis for the year 2008. This analysis presents the summary of current as well as future year emissions of VOC (volatile organic compounds, gaseous compounds made of carbon and hydrogen) and NOx (Oxides of Nitrogen). VOC and NOx interacting with sunlight in the lower atmosphere develops the primary constituent of smog, Ozone, a criteria pollutant. These emissions documented here are the emissions due to on-road vehicles for the counties in the nonattainment area of Central Ohio. The methodologies in computing emissions and forecasting models used are also summarized in this report.

1.2 Background

Under the 1990 Clean Air Act Amendments (CAAA), because of the 1997 eight-hour ozone standard, Franklin, Delaware, Licking, Madison, Fairfield and Knox counties were designated as a basic nonattainment area for ozone. The CAAA defines nonattainment areas as geographic regions of the country that do not meet the National Ambient Air Quality Standards (NAAQS). In nonattainment areas, air quality implementation plans must be developed that identify strategies and programs that nonattainment areas will implement to provide the emission reductions needed for the areas to meet the NAAQS. In Ohio, the Ohio Environmental Protection Agency (Ohio EPA) is the lead agency for coordinating development of the State Implementation Plan (SIP). The SIP includes actions done on a statewide basis as well as actions done within each specific nonattainment area of the state to achieve the air quality standards.

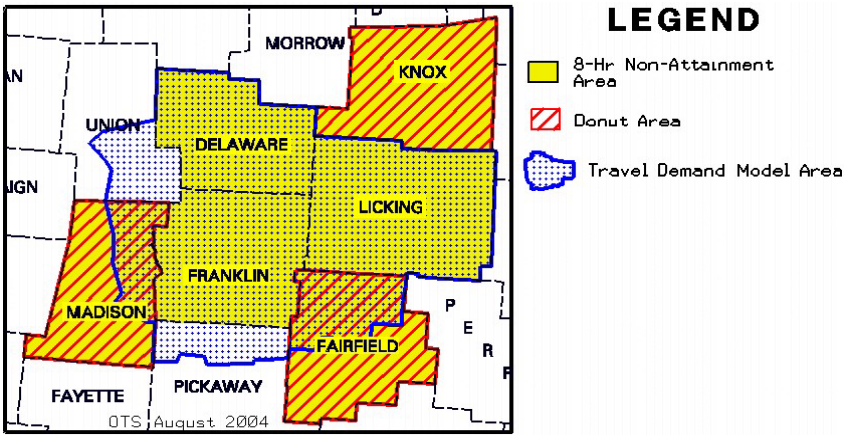
On April 15, 2004, U.S. EPA issued final designations with regard to the 8-hour ozone standard, designating the central Ohio basic non-attainment area to be the six counties, of Franklin, Delaware, Licking, Knox, Fairfield and Madison. The six county central Ohio nonattainment area is subject to the eight-hour ozone requirements, including development of a plan to reduce volatile organic compounds (VOCs) and oxides of nitrogen (NO_x) emissions and a demonstration that the area will meet the federal eight-hour air quality standard for ozone by June 2009.

Redesignation of an area from 'eight-hour ozone basic non-attainment' to attainment is based on criteria and guidance set forth by U.S. EPA. Redesignation requests to attainment include SIP revisions that document that the NAAQS have been met and provide a maintenance plan to ensure meeting the standards for the next ten years. One of the items of documentation contained in a redesignation request is three consecutive years of air quality monitoring data that meet the NAAQS. In addition, as part of the maintenance plan requirements, this report summarizes the analyses of the on-road mobile emissions for the years 2002, 2004, 2008, 2009, 2018 and 2030.

1.3 Geographic Area of Analysis

The six-county non-attainment areas consist of two metropolitan planning organizations (MPOs), MORPC and LCATS and also areas outside of the two MPO's in Fairfield, Madison, and Knox Counties, illustrated in Figure 1. The MORPC transportation planning area consists of Franklin County, Delaware County, Pataskala and Etna Township in Licking County, and Violet and Bloom Townships in Fairfield County. The LCATS transportation planning area covers the remainder of Licking County. The travel demand model area comprising MORPC and LCATS transportation planning areas is illustrated in Figure 1. Donut areas, referring to Figure 1, are the counties that are either partially or completely outside of the travel demand model area. As illustrated, these are Fairfield, Madison, and Knox counties. On-road mobile emissions analysis methodologies for counties within the travel demand area, as well as for counties outside the model area are discussed in the next sections. The geographic area of redesignation request for the Columbus, Central Ohio area, comprises of six-counties: Franklin county, Delaware county, Licking county, Fairfield county, Madison county, and Knox county.

FIGURE 1: COLUMBUS, CENTRAL OHIO, 8-HOUR NON-ATTAINMENT AREA



2.0 QUANTITATIVE ANALYSIS

The methodologies used and background information for estimating on-road mobile emissions are discussed in the foregoing sections for the geographic area of 8-hour ozone non-attainment area.

2.1 Analysis Years

Year 2002 is the base year of analysis. 2004 is an attainment year, being one of the three clean years showing attainment of the 8-hour ozone standard. Years 2009 and 2018 are future interim and maintenance years, which are being modeled for SIP development. Years 2009 and 2018 are budget years in the redesignation request. Year 2018 is more than 10 years beyond the expected date of redesignation. The Transportation Plan horizon year for MORPC and LCATS is 2030. 2030 is provided to determine the longer term emissions trend. Presently year 2008 analysis is included in this report to document current year analysis. Thus, the years 2002, 2004, 2008, 2009, 2018 and 2030 was used for these on-road mobile emissions estimates.

2.2 General Methodology

Evaluating emissions for current as well as future years requires several data inputs, discussed in the foregoing sections. Among these, vehicle travel characteristics data can be obtained from regionally maintained travel demand model. Travel demand model provides daily traffic volumes, congested travel times, speeds, v/c (volume to capacity ratios), VMT (vehicle miles traveled), VHT (vehicle hours traveled) among other input travel characteristics data used in evaluating emissions in this report. Areas that are not within the regional travel demand model boundary utilized HPMS (Highway Performance Monitoring Systems) based travel characteristics data. Thus, the travel demand model is used in evaluating emissions for Franklin county, Delaware county, and Licking county. Both the travel demand model as well as HPMS is used in evaluating emissions for Fairfield county and Madison county. HPMS only is used for the Knox county, in evaluating emissions. Each of the aforementioned process is detailed further in sections 2.5.1 and 2.5.2.

2.3 Travel Demand Model

For these analyses the latest planning assumptions available for the Central Ohio area were used. For the travel demand model, model validation is a joint process between MORPC, LCATS and the ODOT Office of Technical Services. In December 2004, a new complete validated model was accepted and installed for use at MORPC. The new model covers all of the MORPC and LCATS area including portions of Pickaway, Madison and Union Counties along with additional portions of Fairfield County outside of the MORPC MPO area. Further, MORPC continuously updates the highway and transit network information and maintains accurate networks for future year analysis. The new model used is a multi-step tour-based model, incorporating more advanced simulation methods than compared to traditional four step model. Thus model inputs were tested for quality control and quality assurance. Forecasted variables such as population, employment, traffic counts, roadway network, etc. were developed by MORPC in coordination with LCATS and used for the analysis.

Due to the advance simulation methods incorporated, there is some variation in model results from one complete model run to another with all of the same input data. MORPC performed a check on this variability with regard to on-road mobile emission estimates. The emission

estimates for several 2002 model runs were calculated. The variation in the emission estimates were less than one-tenth of one percent (0.1%). Thus it was determined that the variability due to the simulation is insignificant.

2.3.1 Independent Variables

Independent variables (land use/socio-economic data) were developed for each analysis year. Trip tables for the analysis years 2002, 2004, 2009, 2018 and 2030 were developed. MORPC continually monitors land use, population and employment information. MORPC performs complete land use inventories every five years. The complete documentation of the process and future forecasts is provided in *Land Use and Demographic Trends and Forecast*, a companion report to the Transportation Plan.

Figure 2 illustrates population growth trends for the travel demand model area, indicating a growth in population of 1.5 million from year 2002 to 2.0 million in the year 2030, with population estimates of 1.56, 1.64, and 1.8 million in the years 2004, 2009, and 2018 respectively.

Figure 3 illustrates employment growth trends for the travel demand model area, indicating a growth in employment of 851,000 from year 2002 to 1,270,000 in year 2030, with employment of 875,000 in year 2004, an estimated employment of 940,000 in year 2009, and projected employment of 1,112,000 in the year 2018.

2.3.2 Model Networks

MORPC staff in conjunction with LCATS and ODOT continuously update the model networks to accurately reflect projects in the current TIP and Long Range Plan which has a horizon year of 2030. The Transportation Plan horizon year for MORPC and LCATS is 2030. The model networks developed for this emission estimates were for the analysis years 2002, 2004, 2009, 2018 and 2030.

Figure 4 illustrates typical daily vehicle trips growth trends for the travel demand model area, indicating a growth of 4.4 million daily vehicle trips from year 2002 to 6.6 million daily vehicle trips in year 2030, with 4.6, 4.9, and 5.7 daily million vehicle trips in the years 2004, 2009, and 2018 respectively.

Figure 5 illustrates VMT (vehicle miles of travel) growth trends for the travel demand model area, indicating a growth of 46.9 million daily VMT from year 2002 to 70.5 million daily VMT in year 2030, with 49.8, 53.1, and 62.9 million daily VMT in the years 2004, 2009, and 2018 respectively.

FIGURE 2: POPULATION GROWTH – MORPC/LCATS MODEL AREA

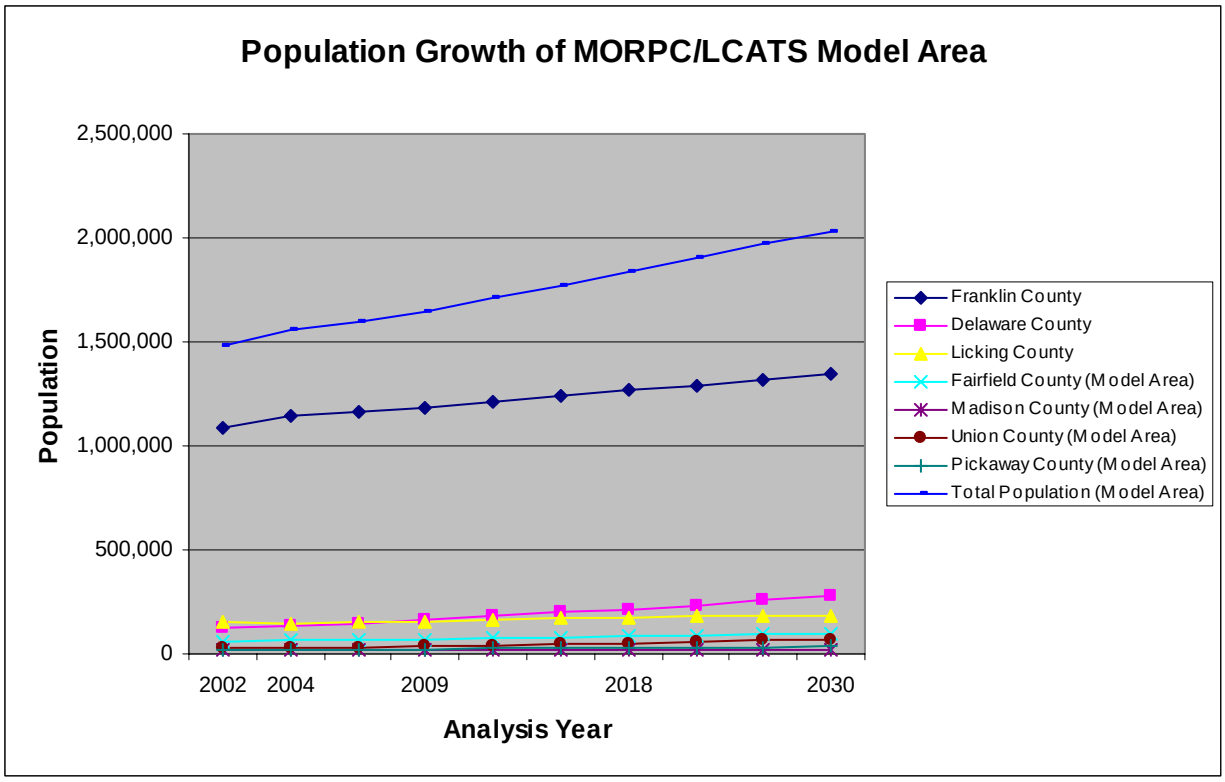


FIGURE 3: EMPLOYMENT GROWTH – MORPC/LCATS MODEL AREA

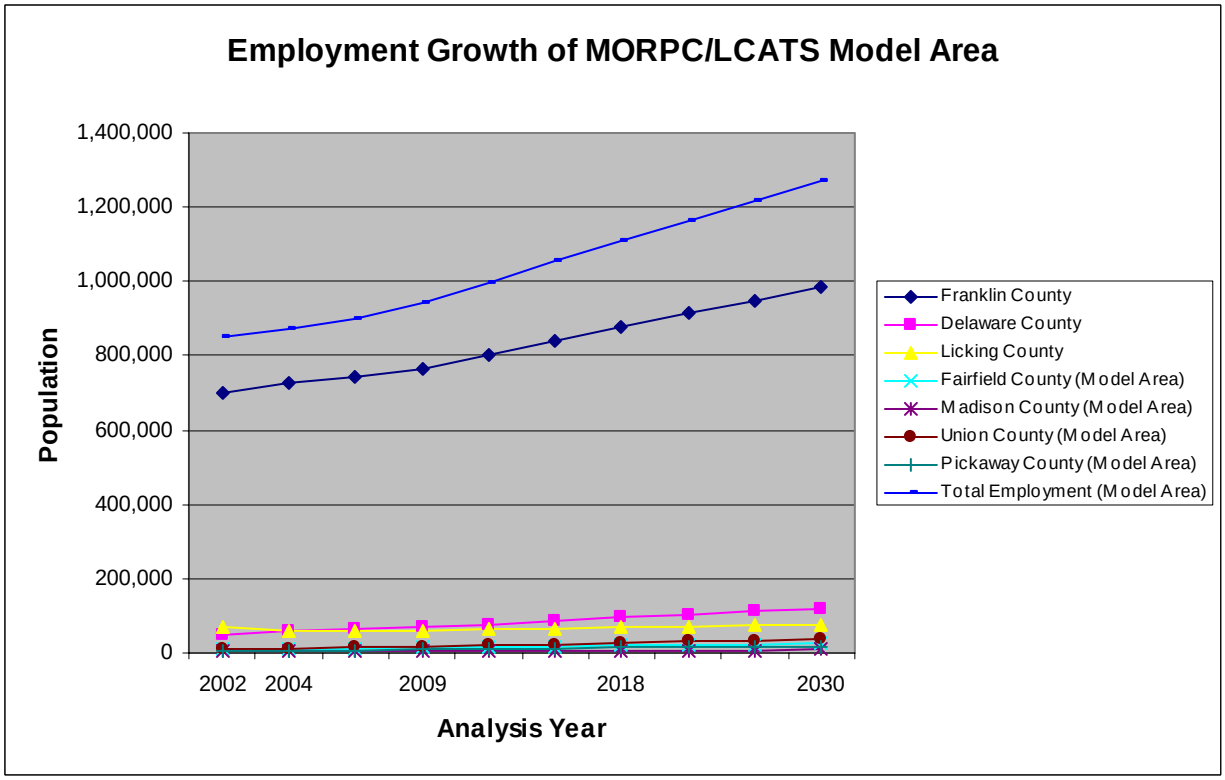


FIGURE 4: VEHICLE TRIPS (PER DAY) GROWTH– MORPC/LCATS MODEL AREA

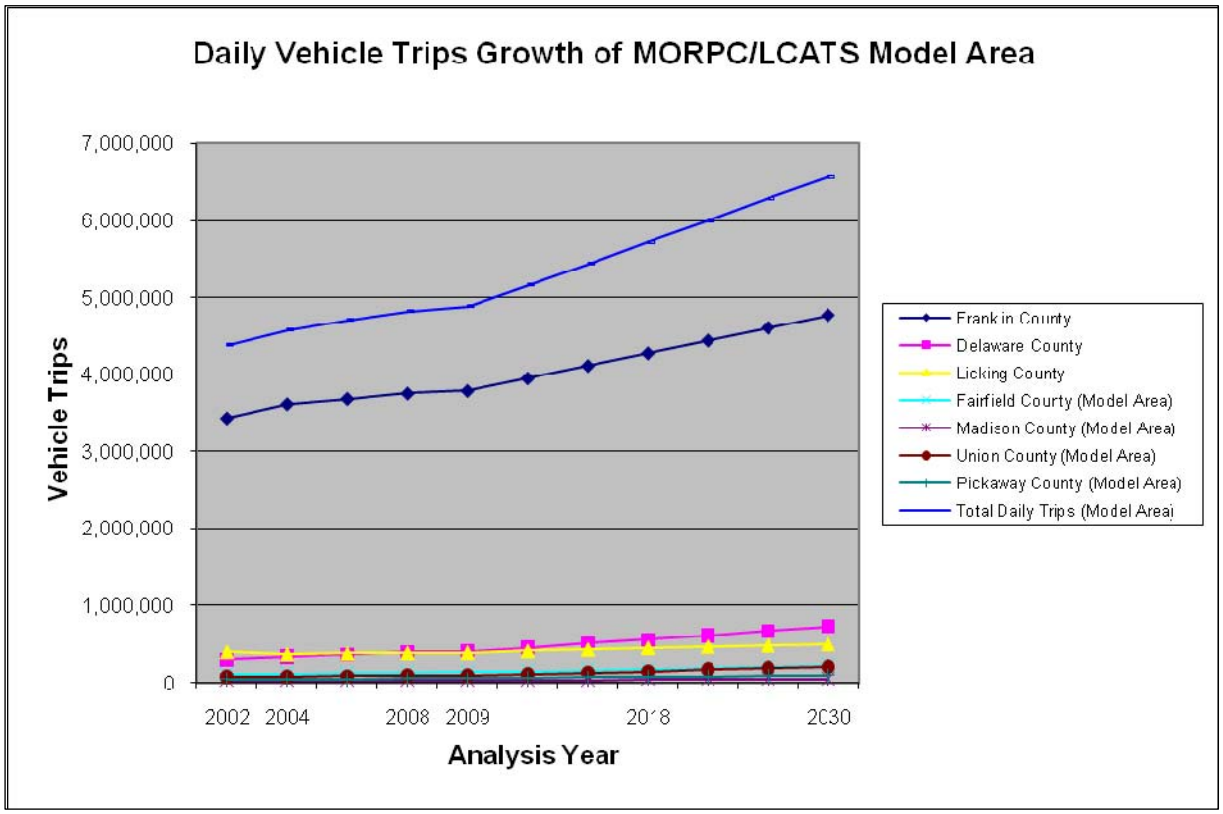
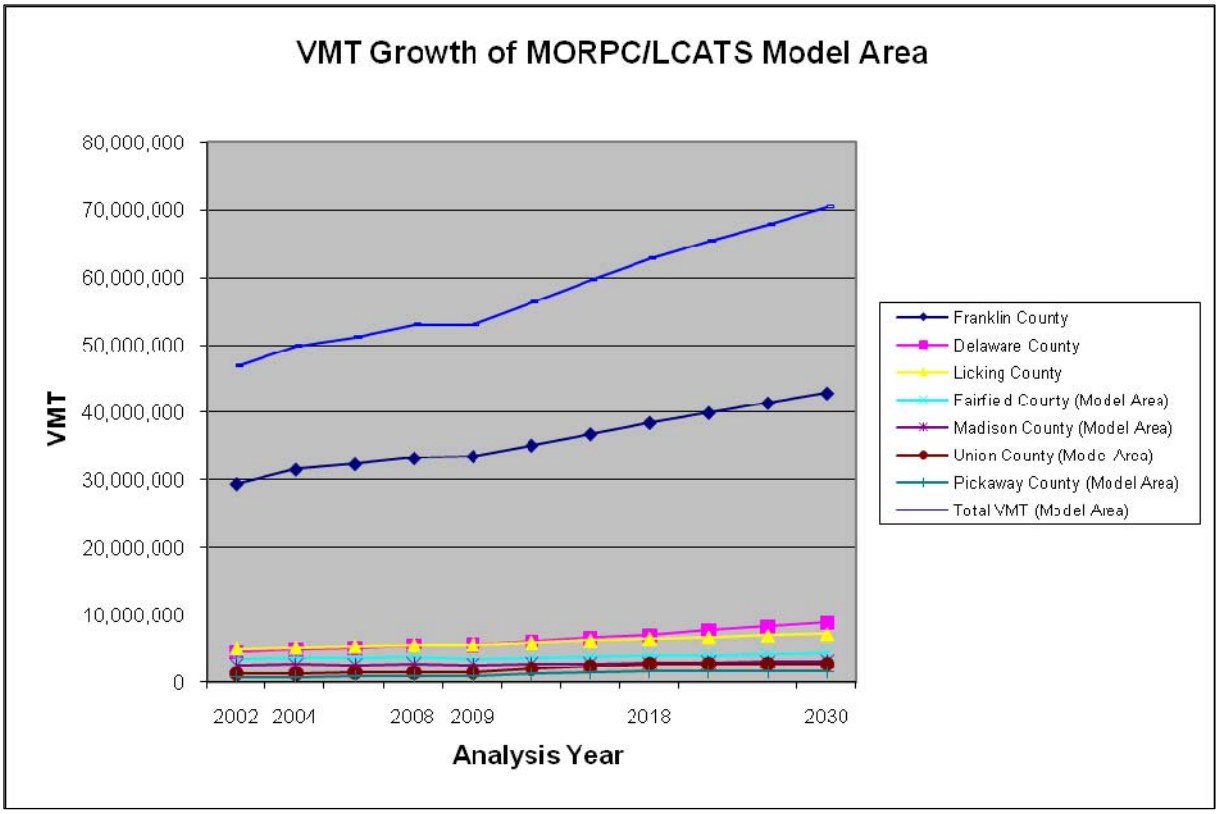


FIGURE 5: VMT (VEHICLE MILES OF TRAVEL) GROWTH – MORPC/LCATS MODEL AREA



2.3.3 Loaded Highway Networks

Trip assignment was run for 2002 baseline, 2004, 2009, 2018 and 2030 using CUBE. The assignments produced a loaded highway network for each analysis year. These loaded network files includes total volume for each link in the network. Programming scripts in CUBE (a model software), illustrated in Appendix A, incorporate ODOT's CMAQ process, discussed in more detail in Section 2.5.1. The loaded highway network for each year was split into separate files for each county. Each county network was run independently through the CMAQ process for each analysis year, which combined the volumes and emission factors for computing VOC and NOx emissions for the entire county.

2.3.4 IntraZonal Trips

Intrazonal trips are the trips that are generated within a traffic analysis zone (TAZ), that use local roads. Intrazonal trips do not get loaded onto the highway networks so Cube/Voyager emission calculation script requires a separate input file to account for these trips. Input files for evaluating intrazonal emissions are intrazonal trips file, intrazonal area file, and intrazonal emissions factor file. These input files for the areas within the travel demand model area are for Franklin county, Licking county, Madison county, as well as for partial areas of Fairfield county and Madison county. The intrazonal trips were extracted from the trip tables using a Cube/Voyager script.

2.4 Emission Factors

Emission factors were generated using MOBILE6.2. Emission factor files were generated for each analysis year. Each emission factor file involves multiple runs of MOBILE6.2. One run for arterials, one for freeways, one for evaporative factors, and one for intra-zonal trips. Emission factor results from the MOBILE6.2 runs are extracted and reformatted using a DOS batch file to run a set of FORTRAN PROGRAMS, M6FOR8A, M6FOR8B, M6FOR8C, M6FOR8D, M6EF24A, M6EF24B, M6EF24C, M6FOR8I, and M6FOR8J. The final emission factor file is in the same format as ODOT runs made for analyses under the one hour rule.

Appendix A shows a partial listing of the MOBILE6.2 input file for arterials that is used to generate emission factors by hour of day temperatures and by speed in 1 mph increments. A similar file is used for freeways. The MOBILE6.2 input file for evaporative emissions is shown in Appendix A, and the MOBILE6.2 input file for intrazonal trip emissions is shown in Appendix A. A partial listing of the 2002 final emission factor file is shown in Appendix A. Appendix A shows a list of values specified as inputs to MOBILE6.2 for all analysis years (source: OEPA correspondence dated 4/13/2006) all other inputs use default values. In all of these input files, the Diesel Sulfur card has a specified value that was originally needed for PM 2.5 analyses, but since it doesn't affect VOC or NOx, it was not removed.

2.4.1 Vehicle Age Distribution

OEPA provided vehicle age distribution information that was derived using USEPAs VIN decoder and Ohio Bureau of Motor Vehicle registration data. The registration data for Central Ohio area, Vehicle age distribution used to represent the MORPC/LCATS area is listed in Appendix A.

2.4.2 Temperatures

The low and high input temperatures used for MORPC area was given by OEPA. ODOT developed an average daily temperature distribution profile to derive the hourly temperature values. Temperature data input used is shown in Appendix A.

2.5 Computations Methodology

Emission factors, generated using MOBILE6.2, are used as inputs. MORPC travel demand model run volumes were obtained using CUBE. The emission factors were combined with the model volumes using ODOT's standard congestion management/air quality process (CMAQ) to compute total emissions. Since the travel demand model includes more than three counties Franklin, Delaware, and Licking counties (Figure 1), and portions of Fairfield, Union & Madison counties, HPMS VMT and VMT growth rates were applied per ODOT's standard "off-model" HPMS VMT growth methodology for the non-modeled portion of the counties and added to the model results. The final total emissions for the area is the sum of all individual link-hour emissions and HPMS based estimates. These are shown in the Appendix G. A summary of these emissions are tabulated in Sections 3.1.2 and 3.1.3

2.5.1 Areas with Regional Model

Total emissions were computed with ODOT's new CMAQ process. This process produces the same outputs as the old CMAQT, but uses newer data on daily and directional traffic distributions as well as more up to date volume/delay functions from the 2000 Highway Capacity Manual (HCM). This process also uses rewritten code able to handle the newer model network formats.

The process uses a combination of the MOBILE6.2 emission factors and the daily link volumes that come out of the travel demand model. Emissions are calculated for each link for each hour of the day. Hourly link volumes are based on a percentage of the daily volume determined by a link's facility type and area type. Link speeds from the travel demand model are not used in the analysis. The speeds are estimated as a post-process to the model based on HCM methods implemented through the process, using a link's volume-to-capacity ratio and link group code. The daily volume percentages and speed tables are included in the final report files.

The hourly volumes are multiplied by the MOBILE6.2 emission factor for the corresponding hour of day and speed to calculate emissions for every link for each hour. The final total emissions for an area is the sum of all individual link-hour emissions. The county total for each analysis year is shown in Appendix B through Appendix F, for all the analysis years. A summary of these emissions are tabulated in Sections 3.1.1 and 3.1.2

2.5.2 Areas without Regional Model

The travel demand forecasting model discussed in the preceding sections does not cover the entire non-attainment area. Therefore, a standard process based on HPMS VMT was employed for the rest of the area which includes Fairfield County, Madison County, and Knox County. This process first requires estimating the proportion of county VMT covered by the model and not covered by the model. This was accomplished using a GIS procedure whereby the

proportion of centerline miles by functional class inside and outside of the model boundary was calculated. This information was then combined with countywide average volumes by functional class to obtain the proportion of VMT inside and outside of the model. This computation yields 40% of the Fairfield county VMT, and 29% of Madison County VMT, being inside the model area. Thus 60% of the HPMS VMT is used as the basis of the off-model computation for Fairfield County. 71% of the HPMS VMT is used as the basis of the off-model computation for Madison County. To obtain forecast year emissions, the base year VMT is projected forward based on a series of standard growth rates as shown in the "HPMS Growth Rates Methodology" based on VMT forecasting procedures developed by ODOT. These growth rates are updated every 5 years using the latest count trends.

Correctly applying the VMT growth rates is not as straight forward as multiplying the % per year growth by most current year and the number of years. The growth rate is derived for use as a linear growth rate, constant slope. To make the forecast using the same slope, the percentage growth must first be applied to the year 2000 VMT to convert the percentage into a growth rate (VMT/year) which is the slope of the line. If the percentage growth is applied to any other years' VMT the resulting slope will be different than the derived growth. Unless there is a big change in VMT from one year to the next, directly applying the percentage to the most current year VMT would result in a very minor difference. However, to be consistent and mathematically correct, the growth rate percent is applied to the year 2000 VMT to get the growth in VMT/year and add that to the most current counted VMT. Separate emission factors are then calculated for use with the HPMS VMT's. Appendix G shows the forecasted HPMS VMT's and emissions.

3.0 SUMMARY OF RESULTS

Emission estimates summary of results is presented in the next sections.

3.1 Emission Estimates for Individual Counties

Tables 1 through 7 contain the results of the VOC and NOx emissions analysis, for the Columbus, Central Ohio area, for the years 2002, 2004, 2008, 2009, 2018, and 2030. Tables 1, 2, and 3 summarizes emissions estimates for Franklin county, Delaware county and Licking county respectively. Tables 4, 5, and 6 summarizes emissions estimates for Fairfield county, Madison county and Knox county respectively. Table 7 summarizes total emissions for all six counties.

3.1.1 Areas within The Regional Travel Demand Model

Table 1: Emission Estimations for On-Road Mobile Sources - Franklin County

Franklin County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	29,410,944	31,540,300	33,238,787	33,514,405	38,512,022	42,910,478
VOC (tons/day)	64.323	58.277	44.292	41.120	23.267	21.813
NOx (tons/day)	106.773	99.515	78.620	70.829	31.466	21.075

Table 2: Emission Estimations for On-Road Mobile Sources - Delaware County

Delaware County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	4,529,039	4,820,808	5,380,089	5,505,767	6,980,921	8,760,531
VOC (tons/day)	9.151	8.392	6.793	6.458	4.034	4.191
NOx (tons/day)	16.072	14.604	12.146	11.129	5.468	4.161

Table 3: Emission Estimations for On-Road Mobile Sources - Licking County

Licking County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	5,012,750	5,123,126	5,480,775	5,581,228	6,438,496	7,114,560
VOC (tons/day)	10.203	8.709	6.781	6.484	3.694	3.371
NOx (tons/day)	17.435	15.325	12.311	11.800	5.228	3.370

3.1.2 Areas partially within The Regional Travel Demand Model

Counties that are partially within regional travel demand model are Fairfield county, and Madison county.

Tables 4a, and 4b, summarize emissions estimates for Fairfield county, for the areas within and outside travel demand model area, respectively. Results presented in Table 4a is for the area covered by the travel demand model. Table 4b is for the area not covered by the travel demand model. These are derived by using 60% of the total county HPMS based VMT as described in

section 2.5.2. Table 4c presents the emissions for the entire Fairfield county, which is simply sum of emissions from Tables 4a, and 4b.

Table 4a: Emission Estimations for Fairfield County within the Travel Demand Model Area

Fairfield County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	1,941,444	1,831,733	2,020,264	2,041,355	2,547,119	2,979,212
VOC (tons/day)	4.031	3.251	2.571	2.425	1.474	1.448
NOx (tons/day)	6.541	5.406	4.452	4.074	2.046	1.410

Table 4b: Emission Estimations for Fairfield County outside of the Travel Demand Model Area- using HPMS data

Fairfield County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	1,557,916	1,823,867	1,773,165	1,919,712	2,092,239	2,322,273
VOC (tons/day)	3.103	3.025	2.013	1.972	1.124	1.031
NOx (tons/day)	4.666	4.766	3.293	3.245	1.330	0.938

Table 4c: Emission Estimations for Fairfield County
sum of emissions from both the Travel Demand Model area as well as the HPMS area

Fairfield County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	3,499,360	3,655,600	3,793,429	3,961,067	4,639,358	5,301,485
VOC (tons/day)	7.134	6.276	4.584	4.397	2.598	2.479
NOx (tons/day)	11.207	10.172	7.745	7.319	3.376	2.348

Tables 5a, and 5b, summarize emissions estimates for Madison county, for the areas within and outside travel demand area, respectively. Results presented in Table 5a is for the area covered by the travel demand model. Table 5b is for the area not covered by the travel demand model. These are derived by using 71% of the total county HPMS based VMT as described in section 2.5.2. Table 5c presents the emissions for the entire Madison county, which is simply sum of emissions from Tables 5a, and 5b.

Table 5a: Emission Estimations for Madison County within the Travel Demand Model Area

Madison County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	1,093,487	1,131,143	1,210,764	1,218,490	1,425,836	1,711,490
VOC (tons/day)	2.140	1.883	1.461	1.361	0.785	0.769
NOx (tons/day)	4.261	3.839	3.067	2.764	1.225	0.857

Table 5b: Emission Estimations for Madison County outside of the Travel Demand Model Area - using HPMS data

Madison County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	1,365,957	1,427,516	1,440,526	1,556,961	1,789,964	2,100,635
VOC (tons/day)	2.545	2.219	1.544	1.537	0.925	0.890
NOx (tons/day)	4.938	4.467	3.294	3.173	1.335	0.940

Table 5c: Emission Estimations for Madison County sum of emissions from both the Travel Demand Model area as well as the HPMS area

Madison County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	2,459,444	2,558,659	2,651,290	2,775,451	3,215,800	3,812,125
VOC (tons/day)	4.685	4.102	3.005	2.898	1.710	1.659
NOx (tons/day)	9.199	8.306	6.361	5.937	2.560	1.797

3.1.3 Area outside Regional Travel Demand Model

Tables 6, summarizes emissions estimates for Knox county, and the results presented in this Table used methodology based on HPMS data.

Table 6: Emission Estimations for Knox County – using only HPMS

Knox County	2002	2004	2008	2009	2018	2030
VMT (miles/day)	1,091,350	1,145,910	1,133,266	1,198,216	1,292,375	1,417,917
VOC (tons/day)	2.345	2.085	1.534	1.396	0.777	0.683
NOx (tons/day)	3.264	2.975	2.238	2.054	0.861	0.599

3.1.4 Total Emissions for the Columbus/Central Ohio area

Table 7, summarizes emissions estimates for the entire six county area. These emissions presented here is simply sum of all emissions in six counties summarized in Tables 1 through 6.

Table 7: Emission Estimations for On-Road Mobile Sources for Columbus/Central Ohio

Central Ohio Area	2002	2004	2008	2009	2018	2030
VMT (miles/day)	46,002,887	48,844,403	51,677,636	52,536,134	61,078,972	69,317,096
VOC (tons/day)	97.841	87.841	66.989	62.753	36.080	34.196
NOx (tons/day)	163.950	150.897	119.421	109.068	48.959	33.350

3.2 Emissions Summary for the Columbus/Central Ohio Area

Tables 8 and 9, summarize VOC and NOx emissions estimates respectively for the analysis years. The summary presented in the following tables is from the aforementioned in Tables 1 through 6.

Table 8: VOC Emission Inventory Summary
- Base Year 2002, Estimated 2004, 2008 and Projected 2009, 2018, and 2030 (tons/day)

VOC	2002 Base	2004 Attainment	2008	2009 Interim	2018 Maintenance	2030 Horizon Year
Franklin	64.323	58.277	44.292	41.120	23.267	21.813
Delaware	9.151	8.392	6.793	6.458	4.034	4.191
Licking	10.203	8.709	6.781	6.484	3.694	3.371
Fairfield	7.134	6.276	4.584	4.397	2.598	2.479
Madison	4.685	4.102	3.005	2.898	1.710	1.659
Knox	2.345	2.085	1.534	1.396	0.777	0.683
Total	**97.841**	**87.841**	**66.989**	**62.753**	**36.080**	**34.196**

Table 9: NOx Emission Inventory Summary
- Base Year 2002, Estimated 2004 and Projected 2009, 2018, and 2030 (tons/per day)

NOx	2002 Base	2004 Attainment	2008	2009 Interim	2018 Maintenance	2030 Horizon Year
Franklin	106.773	99.515	78.620	70.829	31.466	21.075
Delaware	16.072	14.604	12.146	11.129	5.468	4.161
Licking	17.435	15.325	12.311	11.800	5.228	3.370
Fairfield	11.207	10.172	7.745	7.319	3.376	2.348
Madison	9.199	8.306	6.361	5.937	2.560	1.797
Knox	3.264	2.975	2.238	2.054	0.861	0.599
Total	**163.950**	**150.897**	**119.421**	**109.068**	**48.959**	**33.350**

APPENDIX

- Appendix A –Model Script, Figures illustrating Data
- Appendix B – MORPC Travel Demand Model Emission Run Report for 2002
- Appendix C – MORPC Travel Demand Model Emission Run Report for 2004
- Appendix D – MORPC Travel Demand Model Emission Run Report for 2008
- Appendix E – MORPC Travel Demand Model Emission Run Report for 2009
- Appendix F – MORPC Travel Demand Model Emission Run Report for 2018
- Appendix G – MORPC Travel Demand Model Emission Run Report for 2030
- Appendix H – MORPC HPMS VMT and Emissions

Appendix A – Model Script, Figures illustrating Data

APPENDIX- FIGURE 1: CUBE VOYAGER PROGRAM SCRIPT FOR COMPUTING VOC & NOX EMISSIONS

```
;Input Network File: {neti,filename,"Input Network File Name",x,"","Network File (*.lod)|*.lod"}
;Input Emissions Factors: {effile,filename,"Input Emissions Factors",x,"","Emissions File (*.fac)|*.fac"}
;Input Intrazonal Emissions Factors: {ieffile,filename,"Input Intrazonal Emissions Factors",x,"","Emissions
File (*.crd; *.fac)|*.crd; *.fac"}
;Please Select County: {countyname,ComboList,"Select County Name"," ","Franklin County","Delaware
County","Licking County","Fairfield County","Madison County", "All of Model Area"}
;Sum Trip Table: {triptable, CheckBox, "Check to Sum Trip Table", 0}
;Summer Run: {summer, CheckBox, "Check for Summer Run, Uncheck for Winter Run", 1}
;Input County Data File: {ctyf,filename,"Input County Data
File",x,"N:\AQ\MORPC\2006_Redesignation\county.dat","Data File (*.dat)|*.dat"}
;Input Daily Data File: {dayf,filename,"Input Daily Data
File",x,"N:\AQ\MORPC\2006_Redesignation\daily.dat","Data File (*.dat)|*.dat"}

*COPY {ctyf.q}
*COPY {dayf.q}

; edited by cp, 11/2006

; Sums the trip table if needed
sumtt={triptable}
if (sumtt=1)
run pgm=matrix

;Trip Tables
;HWY
  id = "Merge vehicle trips by time: Daily

  mati[1] = veham.trp          ; AM
  mati[2] = vehmd.trp          ; Midday
  mati[3] = vehpm.trp          ; PM
  mati[4] = vehnt.trp          ; Night

; Adding all together

  mato[5] = vehday.trp,mo=1

  mw[1] = mi.1.1+mi.2.1+mi.3.1+mi.4.1 +
          mi.1.2+mi.2.2+mi.3.2+mi.4.2 +
```

```
          mi.1.3+mi.2.3+mi.3.3+mi.4.3 +
          mi.1.4+mi.2.4+mi.3.4+mi.4.4


endrun
endif



RUN PGM=network
NETI={neti.q}
NETO = hwy24WS.LOD
IF (AREATYPE=1)
IF (FUNCLASS = 10 | FUNCLASS=30)
VOL24W=VOL24*0.917
VOL24S=VOL24*1.083
ELSEIF (FUNCLASS = 20)
VOL24W=VOL24*0.929
VOL24S=VOL24*1.071
ELSEIF (FUNCLASS = 40)
VOL24W=VOL24*0.939
VOL24S=VOL24*1.061
ELSE
VOL24W=VOL24*0.935
VOL24S=VOL24*1.065
ENDIF
ELSE
IF (FUNCLASS = 10 | FUNCLASS=30)
VOL24W=VOL24*0.959
VOL24S=VOL24*1.041
ELSEIF (FUNCLASS = 20)
VOL24W=VOL24*0.956
VOL24S=VOL24*1.044
ELSEIF (FUNCLASS = 40)
VOL24W=VOL24*0.929
VOL24S=VOL24*1.071
ELSE
VOL24W=VOL24*0.955
VOL24S=VOL24*1.045
ENDIF
ENDIF

ENDRUN
```

```
*DEL tempcms.txt
*DEL summary.rpt
*DEL hourly.rpt
*DEL CMSTEXT.RPT

summr={summer}
IF (summr=1)

RUN PGM=network
  NETI="HWY24WS.LOD"
  LINKO=templnk.txt, format = TXT, include = a(6),b(6),junk1(1),mdist(4),junks(1),moffpspd(4),
         mpeakspd(4),junkb(1),lanes(1),twidth(2),junkb(1),terrain(1),junk1(1),junkb(1),
         cap(6),vol(6),oneway(1),boffpspd(4),bpeakspd(4),junkb(1),blanes(1),areatype(1),admclass(1),
         junkb(1),bterrain(1),junk1(1),junkb(1),bcap(6),bvol(6),medturn(1),pcttrk(2),junk1(2),
         funclass(2),lnkgrp(2),mpostspd(2),jurisdic(1),county(3),rtenumb(4),junk1(7),nhs(1),
         fedfunc(2),trkvol(5),junkp(1),junk1(30),junk1(30),junk1(22)
  NODEO=tempnod.txt, format = TXT, include = junkn(1),n(6),x(11),y(11)
  PHASE=NODEMERGE
   junkn='N'
  ENDPHASE
  PHASE=LINKMERGE
   junk1=0
   junks='S'
   junkp='P'
   junkb=' '
   mdist = LI.1.DIST*100
   moffpspd=li.1.offpspd*100
   mpeakspd=li.1.offpspd*100
   cap=li.1.CAP24
   vol=round(li.1.VOL24S/100)*100
   bcap=0
   bvol=0
   boffpspd=0
   bpeakspd=0
   blanes=0
   bterrain=0
   mpostspd=round(li.1.postspd)
   jurisdic=' '
   rtenumb=' '
   nhs=0
   fedfunc=' '
   trkvol=trk24
```

```
  ENDPHASE
ENDRUN

else

RUN PGM=network
  NETI="HWY24WS.LOD"
  LINKO=templnk.txt, format = TXT, include = a(6),b(6),junk1(1),mdist(4),junks(1),moffpspd(4),
         mpeakspd(4),junkb(1),lanes(1),twidth(2),junkb(1),terrain(1),junk1(1),junkb(1),
         cap(6),vol(6),oneway(1),boffpspd(4),bpeakspd(4),junkb(1),blanes(1),areatype(1),admclass(1),
         junkb(1),bterrain(1),junk1(1),junkb(1),bcap(6),bvol(6),medturn(1),pcttrk(2),junk1(2),
         funclass(2),lnkgrp(2),mpostspd(2),jurisdic(1),county(3),rtenumb(4),junk1(7),nhs(1),
         fedfunc(2),trkvol(5),junkp(1),junk1(30),junk1(30),junk1(22)
  NODEO=tempnod.txt, format = TXT, include = junkn(1),n(6),x(11),y(11)
  PHASE=NODEMERGE
   junkn='N'
  ENDPHASE
  PHASE=LINKMERGE
   junk1=0
   junks='S'
   junkp='P'
   junkb=' '
   mdist = LI.1.DIST*100
   moffpspd=li.1.offpspd*100
   mpeakspd=li.1.offpspd*100
   cap=li.1.CAP24
   vol=round(li.1.VOL24W/100)*100
   bcap=0
   bvol=0
   boffpspd=0
   bpeakspd=0
   blanes=0
   bterrain=0
   mpostspd=round(li.1.postspd)
   jurisdic=' '
   rtenumb=' '
   nhs=0
   fedfunc=' '
   trkvol=trk24
  ENDPHASE
ENDRUN

endif
```

```
*if exist {effile.q} copy {effile.q} tempef.txt
;*if exist {effile.q} N:\AQ\MORPC\2006_Redesignation\2002\VOC_NOx\postcms8a.exe templnk.txt tempcms.txt N
tempef.txt
 *POSTCMS8a.EXE templnk.txt tempcms.txt N tempef.txt

cntname='{countyname}'

if (cntname == 'Franklin County') ;***********intrazonal for county - begin IF
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
  MW[1]=MI.1.1

jloop
 if (j=1-854,882,919-925,928-939,943,945-950,1076,1225-1226,1231-1348,1350,1351-1374,1432)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun

elseif (cntname == 'Delaware County')
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
  MW[1]=MI.1.1

jloop
 if (j=855-871,875-878,906-918,940-942,951-1075,1077-1224)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun

elseif (cntname == 'Licking County')
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
  MW[1]=MI.1.1
```

```
jloop
 if (j=872-874,879-881,883-886,888,890-892,926,1224,1227-1230,1375-1395,1618-1805)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun

elseif (cntname == 'Fairfield County')
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
  MW[1]=MI.1.1

jloop
 if (j=887,889,893-905,927,944,1349,1396-1431,1434-1460)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun

elseif (cntname == 'Madison County')
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
  MW[1]=MI.1.1

jloop
 if (j=1497-1536)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun

elseif (cntname == 'All of Model Area')
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
```

```
  MW[1]=MI.1.1

jloop
 if (j<1806)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun
else
run pgm=matrix
  mati =vehday.trp   ;2030 trip table
  MW[1]=MI.1.1

jloop
 if (j<1806)
  If (j=i)
   int=MW[1]
    Print LIST=i(4.0), int(6.0) FILE=COLINT.DAT
  endif
 endif
endjloop
endrun

endif               ;***********intrazonal for county - end IF


*if exist {ieffile.q} copy {ieffile.q} tempief.txt
;*N:\AQ\SIP 06 ODOT\2006_Redesignation\2002\VOC_NOx\intracal2.exe COLINT.DAT summary.rpt colarea30.dat
tempief.txt
if (cntname == 'Franklin County')
 *intracal2.exe COLINT.dat summary.rpt colarea30fra.dat tempief.txt
elseif (cntname == 'Delaware County')
 *intracal2.exe COLINT.dat summary.rpt colarea30del.dat tempief.txt
elseif (cntname == 'Licking County')
 *intracal2.exe COLINT.dat summary.rpt colarea30lic.dat tempief.txt
elseif (cntname == 'Fairfield County')
 *intracal2.exe COLINT.dat summary.rpt colarea30fai.dat tempief.txt
elseif (cntname == 'Madison County')
 *intracal2.exe COLINT.dat summary.rpt colarea30mad.dat tempief.txt
else
```

```
 *intracal2.exe COLINT.dat summary.rpt colarea30.dat tempief.txt
endif



*del tempef.txt  ;
*del tempief.txt
*DEL tempcms.txt ;

*DEL tempnod.txt
*DEL templnk.txt
*DEL HOURLY.RPT
*DEL SUMMARY.RPT ;
*DEL *.bak
*DEL *.prj
*DEL *.var
```

APPENDIX- FIGURE 2: PARTIAL LISTING OF MOBILE 6.2 INPUT FILE FOR 2002 ARTERIAL EMISSION FACTORS

```
MOBILE6 INPUT FILE :
RUN DATA
EXPRESS HC AS VOC  :
EXPAND EVAPORATIVE :
EXPAND EXHAUST     :
Hourly Temperatures: 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6
                     69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6

OXYGENATED FUELS   : 0.00 0.42 0.00 0.036 2
FUEL RVP           : 9.0
REG DIST           : COLREGS.D

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 5.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 5 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 6.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 6 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 7.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 7 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 8.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 8 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 9.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 9 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 10.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 10 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL  2002 MODEL RUN - VOC - FREEWAY h0 - SPEED 11.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 11 FREEWAY 92.0 0.0 0.0 8.0

                                                                    .
                                                                    .
```

APPENDIX- FIGURE 3: MOBILE 6.2 INPUT FILE FOR EVAPORATIVE EMISSIONS

```
MOBILE6 INPUT FILE :
RUN DATA
EXPRESS HC AS VOC  :
EXPAND EVAPORATIVE :
EXPAND EXHAUST     :
HOURLY TEMPERATURES: 62.8 66.4 71.0 76.0 80.2 83.3 85.8 87.4 89.6 90.0 90.1 89.7
                     88.0 85.2 80.0 75.6 73.8 71.7 69.6 67.9 66.6 65.1 63.8 63.7
OXYGENATED FUELS   : 0.00 0.42 0.00 0.036 2
FUEL RVP           : 9.0
REG DIST           : COLREGS.D

SCENARIO REC       : COL 2002 MODEL RUN - EVA - FREEWAY H24 - SPEED 30.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 30 FREEWAY 92.0 0.0 0.0 8.0

SCENARIO REC       : COL 2002 MODEL RUN - EVA - ARTERIAL H24 - SPEED 30.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 30 ARTERIAL

END OF RUN
```

APPENDIX- FIGURE 4: MOBILE 6.2 INPUT FOR INTRA-ZONAL TRIP EMISSION FACTORS

```
MOBILE6 INPUT FILE :
RUN DATA
EXPRESS HC AS VOC  :
EXPAND EVAPORATIVE :
EXPAND EXHAUST     :
HOURLY TEMPERATURES: 62.8 66.4 71.0 76.0 80.2 83.3 85.8 87.4 89.6 90.0 90.1 89.7
                     88.0 85.2 80.0 75.6 73.8 71.7 69.6 67.9 66.6 65.1 63.8 63.7

OXYGENATED FUELS   : 0.00 0.42 0.00 0.036 2
FUEL RVP           : 9.0
REG DIST           : COLREGS.D

SCENARIO REC       : COL 2002 INTRA  - CENTROID H24 - SPEED 20.0
CALENDAR YEAR      : 2002
EVALUATION MONTH   : 7
AVERAGE SPEED      : 20 ARTERIAL

ENd OF RUN
```

APPENDIX- FIGURE 5: PARTIAL LISTING OF FINAL EMISSION FACTOR FILE

```
11 0      5.0  62.6 EXHAUST  HC:     2.513
11 0      5.0  62.6 RUNING L HC:     2.956
11 0      5.0  62.6 RSTING L HC:     0.126
11 0      5.0  62.6 EXHAUST  CO:    36.173
11 0      5.0  62.6 EXHAUST NOX:     4.087
11 0      6.0  62.6 EXHAUST  HC:     2.233
11 0      6.0  62.6 RUNING L HC:     2.149
11 0      6.0  62.6 RSTING L HC:     0.126
11 0      6.0  62.6 EXHAUST  CO:    32.041
11 0      6.0  62.6 EXHAUST NOX:     3.897
11 0      7.0  62.6 EXHAUST  HC:     2.007
11 0      7.0  62.6 RUNING L HC:     1.762
11 0      7.0  62.6 RSTING L HC:     0.126
11 0      7.0  62.6 EXHAUST  CO:    29.008
11 0      7.0  62.6 EXHAUST NOX:     3.703
11 0      8.0  62.6 EXHAUST  HC:     1.837
11 0      8.0  62.6 RUNING L HC:     1.471
11 0      8.0  62.6 RSTING L HC:     0.126
11 0      8.0  62.6 EXHAUST  CO:    26.733
11 0      8.0  62.6 EXHAUST NOX:     3.557
11 0      9.0  62.6 EXHAUST  HC:     1.705
11 0      9.0  62.6 RUNING L HC:     1.245
11 0      9.0  62.6 RSTING L HC:     0.126
11 0      9.0  62.6 EXHAUST  CO:    24.963
11 0      9.0  62.6 EXHAUST NOX:     3.444
11 0     10.0  62.6 EXHAUST  HC:     1.599
11 0     10.0  62.6 RUNING L HC:     1.064
11 0     10.0  62.6 RSTING L HC:     0.126
11 0     10.0  62.6 EXHAUST  CO:    23.547
11 0     10.0  62.6 EXHAUST NOX:     3.354
11 0     11.0  62.6 EXHAUST  HC:     1.507
11 0     11.0  62.6 RUNING L HC:     0.935
11 0     11.0  62.6 RSTING L HC:     0.126
11 0     11.0  62.6 EXHAUST  CO:    22.437
11 0     11.0  62.6 EXHAUST NOX:     3.263
11 0     12.0  62.6 EXHAUST  HC:     1.422
11 0     12.0  62.6 RUNING L HC:     0.854
11 0     12.0  62.6 RSTING L HC:     0.126
11 0     12.0  62.6 EXHAUST  CO:    21.577
11 0     12.0  62.6 EXHAUST NOX:     3.163
11 0     13.0  62.6 EXHAUST  HC:     1.349
11 0     13.0  62.6 RUNING L HC:     0.785
11 0     13.0  62.6 RSTING L HC:     0.126
11 0     13.0  62.6 EXHAUST  CO:    20.850
11 0     13.0  62.6 EXHAUST NOX:     3.078
11 0     14.0  62.6 EXHAUST  HC:     1.287
11 0     14.0  62.6 RUNING L HC:     0.726
11 0     14.0  62.6 RSTING L HC:     0.126
11 0     14.0  62.6 EXHAUST  CO:    20.227
```

```
11 0     14.0  62.6 EXHAUST NOX:     3.006
11 0     15.0  62.6 EXHAUST  HC:     1.234
11 0     15.0  62.6 RUNING L HC:     0.675
11 0     15.0  62.6 RSTING L HC:     0.126
11 0     15.0  62.6 EXHAUST  CO:    19.687
11 0     15.0  62.6 EXHAUST NOX:     2.943
11 0     16.0  62.6 EXHAUST  HC:     1.191
11 0     16.0  62.6 RUNING L HC:     0.628
11 0     16.0  62.6 RSTING L HC:     0.126
11 0     16.0  62.6 EXHAUST  CO:    19.270
11 0     16.0  62.6 EXHAUST NOX:     2.896
11 0     17.0  62.6 EXHAUST  HC:     1.166
11 0     17.0  62.6 RUNING L HC:     0.579
11 0     17.0  62.6 RSTING L HC:     0.126
11 0     17.0  62.6 EXHAUST  CO:    19.033
11 0     17.0  62.6 EXHAUST NOX:     2.873
11 0     18.0  62.6 EXHAUST  HC:     1.143
11 0     18.0  62.6 RUNING L HC:     0.536
11 0     18.0  62.6 RSTING L HC:     0.126
11 0     18.0  62.6 EXHAUST  CO:    18.822
```

APPENDIX- FIGURE 6: VEHICLE AGE DISTRIBUTION DATA

```
REG DIST
*LDV COL
1   0.031710 0.042279 0.046744 0.046064 0.099253 0.106159
    0.084622 0.085308 0.070781 0.071236 0.058102 0.050349
    0.041185 0.035039 0.028685 0.023634 0.019348 0.013876
    0.010898 0.007678 0.005196 0.002655 0.001613 0.001486 0.016100
*LDT1 COL
2   0.030779 0.041038 0.045581 0.029114 0.043103 0.052085
    0.047904 0.049968 0.073404 0.068035 0.088735 0.065506
    0.048420 0.057040 0.044858 0.051569 0.039180 0.038302
    0.029062 0.018377 0.010324 0.004904 0.004646 0.004491 0.013576
*LDT2 COL
3   0.030779 0.041038 0.045581 0.029114 0.043103 0.052085
    0.047904 0.049968 0.073404 0.068035 0.088735 0.065506
    0.048420 0.057040 0.044858 0.051569 0.039180 0.038302
    0.029062 0.018377 0.010324 0.004904 0.004646 0.004491 0.013576
*LDT3 COL
4   0.031699 0.042265 0.047158 0.037127 0.096212 0.150037
    0.067159 0.065569 0.052112 0.064040 0.055048 0.054559
    0.037861 0.023793 0.027341 0.029910 0.026179 0.020246
    0.014557 0.012416 0.008074 0.005444 0.002447 0.002202 0.026546
*LDT4 COL
5   0.041874 0.055833 0.061815 0.069392 0.122433 0.183450
    0.101496 0.096909 0.072383 0.058225 0.063809 0.009571
    0.010967 0.007577 0.003390 0.001795 0.003589 0.000997
    0.005982 0.003988 0.000798 0.000997 0.000598 0.000399 0.021735
```

APPENDIX- FIGURE 7: MOBILE 6.2 INPUT FOR HPMS BASED EMISSIONS

```
MOBILE6 INPUT FILE :
RUN DATA
EXPRESS HC AS VOC  :
EXPAND EVAPORATIVE :
EXPAND EXHAUST     :
HOURLY TEMPERATURES: 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6
                     69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6 69.6

OXYGENATED FUELS   : 0.00 0.42 0.00 0.036 2
FUEL RVP           : 9.0
REG DIST           : COLREGS.D

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 5.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 5 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 6.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 6 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 7.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 7 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 8.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 8 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 9.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 9 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 10.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 10 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 11.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 11 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 12.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 12 ARTERIAL
```

```
SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 13.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 13 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 14.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 14 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 15.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 15 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 16.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 16 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 17.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 17 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 18.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 18 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 19.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 19 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 20.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 20 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 21.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 21 ARTERIAL

SCENARIO REC       : COL  2005 MODEL RUN - VOC - ARTERIAL h0 - SPEED 22.0
CALENDAR YEAR      : 2005
EVALUATION MONTH   : 7
AVERAGE SPEED      : 22 ARTERIAL
```

APPENDIX- FIGURE 8: DAILY.DAT FILE

HOUR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PCTADT																								
URB FWY	0.9	0.6	0.5	0.5	0.9	2.5	5.5	7	5.8	5.8	4.7	5	5.4	5.4	6.4	7.5	8	8	5.6	4	3.4	2.9	2.2	1.5
URB ART	0.8	0.5	0.4	0.3	0.6	1.6	3.8	5.8	5.4	5.1	5.5	6.3	6.6	6.2	6.6	7.5	7.7	7.7	6.1	4.8	4.1	3.2	2.1	1.4
RUR FWY	1.6	1.2	1.1	1.1	1.3	2.5	3.9	4.8	4.8	5	5.5	5.7	5.6	6.1	6.7	7.1	7.1	6.8	5.4	4.4	3.9	3.4	2.9	2.2
RUR ART	0.9	0.7	0.6	0.5	0.9	2.6	3.7	6.4	5.3	5.2	5.3	5.8	5.9	5.8	6.4	7.8	8	7.7	5.8	4.4	3.7	3.1	2.2	1.6
PCTADT TRK																								
URB FWY	1.8	1.6	1.6	1.7	2.2	3	4.1	5.5	5.9	6.3	6.4	6.7	6.7	6.5	6.6	6	5.5	4.9	3.9	3.2	2.8	2.6	2.4	2
URB ART	1	0.9	1	1.1	1.5	2.1	3.8	6.1	6.9	7.1	7.7	8	7.6	7.3	7.2	7	5.9	4.8	3.5	2.7	2.2	1.9	1.5	1.2
RUR FWY	2.9	2.6	2.4	2.4	2.7	2.9	3.1	3.5	4.1	4.8	5.1	5.3	5.2	5.6	5.7	5.4	5.3	5	4.7	4.7	4.5	4.4	4.2	3.7
RUR ART	1.8	1.6	1.6	1.7	2.1	2.8	4	5.1	5.8	6.7	7	7.1	6.8	6.5	6.4	6.1	5.3	4.5	3.7	3.2	2.9	2.6	2.4	2.1
PCTDIR																								
URB FWY	38	40	40	46	56	64	70	70	68	62	58	52	52	52	50	46	38	38	46	52	46	42	42	40
URB ART	44	46	44	48	54	62	66	68	64	56	54	52	50	50	50	46	40	38	46	52	48	46	46	46
RUR FWY	44	46	48	54	60	68	68	64	58	54	52	50	50	52	52	48	42	40	44	48	48	44	46	44
RUR ART	40	42	44	48	58	66	72	68	60	56	54	50	50	50	50	46	40	38	46	50	46	44	44	44
LOS E VC	0	0.63	1.25	1.88	2.5	3.13	3.75	4.38	5	5.63	6.25	6.88	7.5	8.13	8.75	9.38	10	10.6	11.3	11.9	12.5	13.1	13.8	14.4
SPEEDVC																								
curve1	75	75	75	75	75	75	74.9	74.8	74.6	74.2	73.5	72.3	70.5	67.8	64.2	59.5	54	47.7	41.2	34.9	28.9	23.7	19.2	15.5
curve2	70	70	70	70	70	70	70	69.9	69.8	69.6	69.2	68.4	67.1	65.1	62.2	58.2	53	47	40.5	33.9	27.7	22.2	17.6	13.8
curve3	65	65	65	65	65	65	65	65	65	64.9	64.8	64.4	63.8	62.6	60.5	57	52	45.4	37.8	29.9	22.7	16.7	12.1	8.6
curve4	60	60	60	60	60	60	60	60	60	59.9	59.8	59.6	59.1	58.2	56.7	54.3	50.8	46.1	40.3	33.8	27.3	21.3	16.2	12.2
curve5	55	55	55	55	55	55	55	55	55	55	55	54.9	54.7	54.3	53.6	52.3	50	46.5	41.5	35.3	28.5	21.9	16.1	11.5
curve6	60	60	60	60	60	60	60	60	59.9	59.8	59.7	59.4	59.1	58.5	57.7	56.5	55	53.1	50.7	47.9	44.7	41.1	37.3	33.4
curve7	55	55	55	55	55	55	55	55	54.9	54.9	54.7	54.5	54.2	53.8	53.1	52.2	50.9	49.3	47.3	44.9	42.1	39	35.7	32.2
curve8	50	50	50	50	50	50	50	50	49.9	49.9	49.8	49.6	49.4	49	48.5	47.7	46.7	45.4	43.8	41.8	39.5	36.8	33.9	30.9
curve9	45	45	45	45	45	45	45	45	45	44.9	44.8	44.7	44.4	44.1	43.6	43	42.1	40.9	39.4	37.6	35.5	33.1	30.5	27.8
curve10	50	50	50	50	49.9	49.8	49.7	49.4	49	48.4	47.5	46.5	45.1	43.5	41.7	39.6	37.3	34.9	32.4	29.8	27.3	24.9	22.6	20.4
curve11	50	50	50	50	50	49.9	49.7	49.4	48.9	48	46.7	44.9	42.5	39.6	36.2	32.6	28.7	25	21.4	18.2	15.3	12.9	10.8	9
curve12	50	50	50	50	50	49.9	49.8	49.6	49.1	48.2	46.8	44.5	41.4	37.5	32.9	28	23.1	18.7	14.9	11.8	9.2	7.2	5.7	4.5
curve13	40	40	40	40	40	40	39.9	39.8	39.5	39.2	38.6	37.8	36.7	35.3	33.5	31.4	29	26.4	23.7	21.1	18.5	16.1	13.9	12
curve14	40	40	40	40	40	39.9	39.8	39.6	39.1	38.5	37.5	36.1	34.3	32.1	29.4	26.5	23.5	20.5	17.7	15.1	12.8	10.7	9	7.6
curve15	40	40	40	40	40	39.9	39.7	39.4	38.8	37.9	36.5	34.7	32.3	29.5	26.4	23.2	20	17	14.3	11.9	9.9	8.2	6.8	5.6

curve16	35	35	35	35	35	34.9	34.8	34.5	34	33.2	32.1	30.5	28.5	26.1	23.5	20.6	17.9	15.2	12.8	10.7	8.9	7.4	6.1	5.1
curve17	35	35	35	35	35	34.9	34.7	34.4	33.9	33.1	32	30.3	28.3	25.8	23.1	20.3	17.5	14.9	12.5	10.4	8.6	7.2	5.9	4.9
curve18	35	35	35	35	35	34.9	34.6	34.2	33.5	32.4	30.9	28.8	26.3	23.4	20.4	17.4	14.6	12.1	9.9	8.1	6.6	5.4	4.4	3.6
curve19	30	30	30	30	30	29.9	29.8	29.5	29	28.2	27.1	25.6	23.7	21.5	19.1	16.6	14.2	12	10	8.3	6.8	5.6	4.6	3.8
curve20	30	30	30	30	30	29.9	29.7	29.4	28.9	28.1	26.9	25.3	23.4	21.1	18.6	16.1	13.6	11.4	9.5	7.8	6.4	5.3	4.3	3.6
curve21	30	30	30	30	30	29.9	29.7	29.3	28.7	27.7	26.2	24.4	22.1	19.6	17	14.4	12	9.9	8.1	6.6	5.4	4.4	3.6	2.9

```
VC RATIO TO LOS CONVERSION (VALUE SHOWN IS LOWER LIMIT FOR THAT LOS)(URBAN ROADS USE SPEED BREAKS BELOW FOR LOS DETERMINATION) (ALL USE
THE BASE VC'S TO DETERMINE EXCEEDANCE)
    BASE  RUR2  FWY
A   0.00  0.00  0.00
B   0.30  0.00  0.25
C   0.50  0.10  0.40
D   0.70  0.30  0.60
E   0.90  0.50  0.80
F   1.00  1.00  1.00
F+  1.10  1.10  1.10
F++ 1.30  1.30  1.30

SPEED VC RATIO BREAKS FOR URBAN STREETS (HIGHEST SPEED FOR GIVEN LOS & FF SPEED)
FFS B   C   D   E   F
>47 42. 34. 27. 21. 16.
>37 35. 28. 22. 17. 13.
>32 30. 24. 18. 14. 10.
<33 25. 19. 13. 9.  7.

LEVEL OF SERVICE THRESHOLD BY AREA
NUM LOS DEFINITION
1   F   CINCINNATI,CLEVELAND,COLUMBUS CENTRAL MPO COUNTIES (CUY,FRA,HAM)
2   E   OTHER TMA MPOS (AKRON,CANTON,DAYTON,TOLEDO,YOUNGSTOWN + NON-CENTRAL COUNTIES FROM 1)
3   E   OTHER MPOS & PARTS OF AREAS 1 & 2 OUTSIDE URBANIZED AREA
4   E   RURAL NON MPO COUNTIES

PEAK SPREADING MODEL INFO (SET MAX ITERATIONS TO 0 TO DISABLE PEAK SPREADING)
MAX VC RATIO FWY: 1.30
MAX VC RATIO ART: 1.30
MAX ITERATIONS  : 1000

TRUCK PCE: 3.00

AQ SEASON FACTOR: 1.08
```

OEPA Temperature Data

To: "Mark Byram" mByram@dot.state.oh.us
From:

"Bill Spires" <bill.spires@epa.state.oh.us>

05/23/2006 08:02 AM

The base year for current state implementation work for both PM2.5 and ozone is 2002. This was also a significant ozone year with several 1-hour and 8-hour episodes of elevated ozone within the state. For the ozone day maximum and minimum temperatures, three episodes with statewide elevated ozone concentrations were chosen to determine the average maximum and minimum temperatures for these episode days.

June 21, July 8 and August 10, 2002 were the three episodes chosen. Local Climatic Data summaries from the National Climatic Data Center for National Weather Service sites in and around Ohio were reviewed to obtain the individual temperature values. The three day average maximum and minimum temperatures were developed for each of these sites. Each county was then assigned one of these surface stations in a manner consistent with the assignment of meteorological data sets for use in air quality modeling in the Division of Air Pollution Control Engineering Guide 69 (EG69) which provides guidance on the application of air quality models within Ohio. In cases where the surface station data were not available, the upper air station identified in EG69 was assigned for those counties.

MaxMin2002.xls

Excerpt from MaxMin2002.xls from OEPA

County	Max T	Min T
Delaware	90	62.7
Fairfield	90	62.7
Franklin	90	62.7
Knox	90	62.7
Licking	90	62.7
Madison	90	62.7

Appendix B – MORPC Travel Demand Model Emission Run Report for 2002

Year: 2002
County: Franklin County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	14717571.	15.494	3.008	2.495	4.379	3.223	28.598	61.079	417.613	48.693
ART	14670466.	17.834	7.760	2.509	4.357	3.207	35.667	45.625	334.252	100.298
TOT	29388022.	33.327	10.768	5.005	8.735	6.429	64.265	106.703	751.864	148.991
INTRA	22922.	0.029	0.014	0.003	0.006	0.005	0.058	0.070	0.497	0.000
FINAL	29410944.	33.356	10.782	5.008	8.741	6.434	64.323	106.773	752.361	148.991

Year: 2002
County: Delaware County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	1802524.	1.869	0.310	0.306	0.536	0.395	3.416	7.660	52.143	6.155
ART	2722790.	2.944	0.927	0.458	0.805	0.592	5.726	8.402	63.450	12.858
TOT	4525314.	4.813	1.237	0.763	1.341	0.987	9.142	16.061	115.593	19.013
INTRA	3725.	0.005	0.002	0.001	0.001	0.001	0.009	0.011	0.081	0.000
FINAL	4529039.	4.818	1.239	0.764	1.342	0.988	9.151	16.072	115.674	19.013

Year: 2002

County: Licking County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	1989426.	2.065	0.347	0.337	0.592	0.436	3.776	8.447	57.438	6.523
ART	3021266.	3.238	1.149	0.485	0.893	0.657	6.422	8.982	67.295	15.571
TOT	5010692.	5.302	1.496	0.822	1.485	1.093	10.198	17.429	124.734	22.094
INTRA	2058.	0.003	0.001	0.000	0.001	0.000	0.005	0.006	0.045	0.000
FINAL	5012751.	5.305	1.497	0.822	1.486	1.093	10.203	17.435	124.779	22.094

Year: 2002
County: Fairfield County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	250830.	0.262	0.046	0.043	0.075	0.055	0.480	1.089	7.319	0.929
ART	1683857.	1.835	0.545	0.287	0.499	0.368	3.534	5.431	41.143	7.808
TOT	1934687.	2.097	0.591	0.329	0.574	0.422	4.014	6.520	48.462	8.736
INTRA	6757.	0.009	0.004	0.001	0.002	0.001	0.017	0.021	0.147	0.000
FINAL	1941444.	2.106	0.595	0.330	0.576	0.423	4.031	6.541	48.609	8.736

Year: 2002
County: Madison County, OH

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	665988.	0.687	0.106	0.113	0.198	0.146	1.251	2.936	19.660	2.594
ART	425993.	0.459	0.136	0.072	0.126	0.093	0.885	1.319	10.038	1.888
TOT	1091981.	1.146	0.242	0.185	0.324	0.238	2.136	4.256	29.698	4.482
INTRA	1506.	0.002	0.001	0.000	0.000	0.000	0.004	0.005	0.033	0.000
FINAL	1093487.	1.148	0.243	0.185	0.324	0.238	2.140	4.261	29.731	4.482

Appendix C – MORPC Travel Demand Model Emission Run Report for 2004

```
  Year:   2004
County:  Franklin County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006



AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY        16070054.    13.307     2.939     2.452     4.724     3.060    26.481    57.724   373.827    55.188
ART        15446238.    14.801     7.098     2.376     4.533     2.936    31.744    41.728   289.688   104.604
TOT        31516314.    28.108    10.037     4.827     9.257     5.996    58.225    99.451   663.514   159.792

INTRA         23986.     0.024     0.013     0.003     0.007     0.004     0.052     0.064     0.165     0.000
FINAL      31540300.    28.132    10.050     4.830     9.264     6.000    58.277    99.515   663.679   159.792
```

```
  Year:   2004
County:  Delaware County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006


AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY         1377141.     1.121     0.208     0.210     0.405     0.262     2.206     5.137    32.821     5.026
ART         3439488.     2.969     1.024     0.526     1.006     0.652     6.177     9.456    67.525    16.174
TOT         4816629.     4.089     1.232     0.736     1.411     0.914     8.383    14.593   100.346    21.200

INTRA          4179.     0.004     0.002     0.001     0.001     0.001     0.009     0.011     0.029     0.000
FINAL       4820809.     4.093     1.234     0.737     1.412     0.915     8.392    14.604   100.375    21.200
```

Year: 2004
County: Licking County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	2082816.	1.696	0.319	0.318	0.612	0.397	3.342	7.712	49.421	7.049
ART	3039011.	2.495	0.981	0.426	0.888	0.575	5.364	7.610	53.989	15.011
TOT	5121827.	4.191	1.300	0.744	1.500	0.972	8.706	15.322	103.410	22.060
INTRA	1299.	0.001	0.001	0.000	0.000	0.000	0.003	0.003	0.009	0.000
FINAL	5123126.	4.192	1.301	0.744	1.500	0.972	8.709	15.325	103.419	22.060

Year: 2004
County: Fairfield County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	330252.	0.269	0.050	0.050	0.097	0.063	0.530	1.245	7.911	1.230
ART	1495057.	1.299	0.458	0.229	0.438	0.284	2.707	4.144	29.618	7.106
TOT	1825309.	1.568	0.508	0.279	0.535	0.346	3.237	5.389	37.529	8.335
INTRA	6424.	0.007	0.004	0.001	0.002	0.001	0.014	0.017	0.044	0.000
FINAL	1831733.	1.575	0.512	0.280	0.537	0.347	3.251	5.406	37.573	8.335

Year: 2004
County: Madison County, OH

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	689673.	0.559	0.099	0.105	0.203	0.131	1.098	2.623	16.601	2.686
ART	440155.	0.377	0.126	0.067	0.128	0.083	0.782	1.213	8.671	2.040
TOT	1129828.	0.936	0.226	0.172	0.331	0.215	1.880	3.836	25.272	4.725
INTRA	1315.	0.001	0.001	0.000	0.000	0.000	0.003	0.003	0.009	0.000
FINAL	1131143.	0.937	0.227	0.172	0.331	0.215	1.883	3.839	25.281	4.725

Appendix D – MORPC Travel Demand Model Emission Run Report for 2008

```
  Year:    2008
County:  Franklin County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:03/06/2008 TIME:11:35:26

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY        16897882.     9.307     2.175     2.064     4.364     2.252    20.163    45.312   280.193    57.726
ART        16316494.    10.491     5.216     2.006     4.207     2.172    24.092    33.259   222.084   110.430
TOT        33214338.    19.798     7.391     4.070     8.571     4.424    44.254    78.571   502.277   168.156

INTRA         24449.     0.017     0.009     0.003     0.006     0.003     0.038     0.049     0.050     0.000
FINAL      33238788.    19.815     7.400     4.073     8.577     4.427    44.292    78.620   502.327   168.156
```

```
  Year:    2008
County:  Delaware County, OH

CMS/AQ REPORT



AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY         1431754.     0.775     0.155     0.175     0.370     0.191     1.666     3.983    24.290     5.250
ART         3943221.     2.278     0.822     0.482     1.014     0.523     5.119     8.154    55.663    18.555
TOT         5374975.     3.053     0.976     0.657     1.384     0.714     6.785    12.136    79.953    23.805

INTRA          5114.     0.003     0.002     0.001     0.001     0.001     0.008     0.010     0.011     0.000
FINAL       5380089.     3.056     0.978     0.658     1.385     0.715     6.793    12.146    79.964    23.805
```

Year: 2008
County: Licking County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	2182559.	1.181	0.235	0.267	0.564	0.291	2.538	6.029	36.873	7.344
ART	3296750.	1.829	0.755	0.372	0.847	0.437	4.241	6.279	42.706	16.483
TOT	5479309.	3.010	0.991	0.639	1.411	0.728	6.779	12.308	79.579	23.827
INTRA	1466.	0.001	0.001	0.000	0.000	0.000	0.002	0.003	0.003	0.000
FINAL	5480775.	3.011	0.992	0.639	1.411	0.728	6.781	12.311	79.582	23.827

Year: 2008
County: Fairfield County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	351304.	0.191	0.039	0.043	0.091	0.047	0.410	0.989	6.000	1.296
ART	1661953.	0.958	0.340	0.203	0.428	0.221	2.150	3.449	23.563	7.719
TOT	2013257.	1.148	0.379	0.246	0.518	0.268	2.560	4.438	29.563	9.015
INTRA	7007.	0.005	0.003	0.001	0.002	0.001	0.011	0.014	0.014	0.000
FINAL	2020264.	1.153	0.382	0.247	0.520	0.269	2.571	4.452	29.577	9.015

Year: 2008
County: Madison County, OH

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	726475.	0.391	0.073	0.089	0.188	0.097	0.838	2.061	12.448	2.829
ART	482976.	0.277	0.097	0.059	0.124	0.064	0.620	1.003	6.856	2.234
TOT	1209451.	0.668	0.170	0.148	0.312	0.161	1.459	3.064	19.304	5.063
INTRA	1313.	0.001	0.001	0.000	0.000	0.000	0.002	0.003	0.003	0.000
FINAL	1210764.	0.669	0.171	0.148	0.312	0.161	1.461	3.067	19.307	5.063

Appendix E – MORPC Travel Demand Model Emission Run Report for 2009

```
  Year:    2009
County:  Franklin County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006


AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY        16995050.     8.746     1.952     1.940     4.146     2.002    18.788    40.463   263.717    57.932
ART        16494809.     9.804     4.641     1.894     4.018     1.940    22.298    30.322   210.271   110.401
TOT        33489844.    18.550     6.594     3.834     8.164     3.943    41.085    70.785   473.989   168.333

INTRA         24561.     0.015     0.008     0.003     0.006     0.003     0.035     0.044     0.301     0.000
FINAL      33514404.    18.565     6.602     3.837     8.170     3.946    41.120    70.829   474.290   168.333
```

```
  Year:    2009
County:  Delaware County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006


AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY         1399181.     0.708     0.133     0.160     0.341     0.165     1.507     3.478    22.272     5.170
ART         4101247.     2.215     0.780     0.469     0.997     0.481     4.942     7.642    54.222    19.482
TOT         5500428.     2.923     0.913     0.629     1.338     0.646     6.450    11.119    76.495    24.653

INTRA          5339.     0.003     0.002     0.001     0.001     0.001     0.008     0.010     0.065     0.000
FINAL       5505768.     2.926     0.915     0.630     1.339     0.647     6.458    11.129    76.560    24.653
```

Year: 2009
County: Licking County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	2552834.	1.292	0.244	0.292	0.623	0.301	2.751	6.300	40.466	9.090
ART	3026886.	1.651	0.655	0.337	0.734	0.354	3.732	5.496	38.740	16.110
TOT	5579720.	2.943	0.898	0.629	1.357	0.655	6.482	11.797	79.205	25.200
INTRA	1508.	0.001	0.001	0.000	0.000	0.000	0.002	0.003	0.018	0.000
FINAL	5581228.	2.944	0.899	0.629	1.357	0.655	6.484	11.800	79.223	25.200

Year: 2009
County: Fairfield County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	377725.	0.191	0.036	0.043	0.092	0.045	0.408	0.942	6.021	1.389
ART	1656475.	0.899	0.321	0.189	0.403	0.194	2.007	3.119	22.137	7.949
TOT	2034200.	1.091	0.357	0.233	0.495	0.239	2.415	4.061	28.158	9.338
INTRA	7155.	0.005	0.002	0.001	0.002	0.001	0.010	0.013	0.088	0.000
FINAL	2041355.	1.096	0.359	0.234	0.497	0.240	2.425	4.074	28.246	9.338

Year: 2009
County: Madison County, OH

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	734248.	0.370	0.066	0.084	0.179	0.087	0.786	1.856	11.783	2.860
ART	482928.	0.258	0.086	0.055	0.117	0.057	0.573	0.906	6.429	2.233
TOT	1217176.	0.628	0.152	0.139	0.296	0.143	1.359	2.762	18.212	5.093
INTRA	1314.	0.001	0.000	0.000	0.000	0.000	0.002	0.002	0.016	0.000
FINAL	1218490.	0.629	0.152	0.139	0.296	0.143	1.361	2.764	18.228	5.093

Appendix F – MORPC Travel Demand Model Emissions Run Report for 2018

```
  Year:     2018
County:  Franklin County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006



AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY        19199664.     6.073     0.980     0.742     1.896     0.800    10.491    17.174   202.810    65.296
ART        19285208.     6.838     2.464     0.749     1.903     0.802    12.757    14.273   169.739   128.901
TOT        38484968.    12.911     3.444     1.491     3.799     1.602    23.248    31.446   372.551   194.197

INTRA         27054.     0.010     0.004     0.001     0.002     0.001     0.019     0.020     0.231     0.000
FINAL      38512020.    12.921     3.448     1.492     3.801     1.603    23.267    31.466   372.782   194.197
```

```
  Year:     2018
County:  Delaware County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006


AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY         1487845.     0.465     0.062     0.058     0.147     0.062     0.793     1.379    16.118     5.479
ART         5485175.     1.790     0.465     0.213     0.541     0.228     3.236     4.082    49.716    26.219
TOT         6973020.     2.255     0.527     0.270     0.688     0.290     4.029     5.462    65.834    31.698

INTRA          7901.     0.003     0.001     0.000     0.001     0.000     0.005     0.006     0.067     0.000
FINAL       6980921.     2.258     0.528     0.270     0.689     0.290     4.034     5.468    65.901    31.698
```

Year: 2018
County: Licking County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	2848997.	0.890	0.117	0.110	0.281	0.119	1.517	2.630	30.761	10.139
ART	3587419.	1.180	0.359	0.135	0.353	0.149	2.175	2.596	31.402	19.571
TOT	6436416.	2.070	0.476	0.245	0.634	0.267	3.693	5.226	62.163	29.710
INTRA	2080.	0.001	0.000	0.000	0.000	0.000	0.001	0.002	0.018	0.000
FINAL	6438497.	2.071	0.476	0.245	0.634	0.267	3.694	5.228	62.181	29.710

Year: 2018
County: Fairfield County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	908717.	0.284	0.038	0.035	0.090	0.038	0.485	0.833	9.791	2.983
ART	1628692.	0.539	0.151	0.063	0.160	0.068	0.982	1.206	14.690	8.199
TOT	2537409.	0.824	0.189	0.098	0.250	0.105	1.467	2.039	24.480	11.182
INTRA	9710.	0.004	0.001	0.000	0.001	0.000	0.007	0.007	0.083	0.000
FINAL	2547119.	0.828	0.190	0.098	0.251	0.105	1.474	2.046	24.563	11.182

Year: 2018
County: Madison County, OH

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	819581.	0.256	0.032	0.032	0.081	0.034	0.434	0.772	8.961	3.192
ART	604701.	0.195	0.047	0.023	0.059	0.025	0.349	0.452	5.515	2.779
TOT	1424282.	0.450	0.079	0.055	0.140	0.059	0.784	1.224	14.476	5.971
INTRA	1554.	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.013	0.000
FINAL	1425836.	0.451	0.079	0.055	0.140	0.059	0.785	1.225	14.489	5.971

Appendix G – MORPC Travel Demand Model Emission Run Report for 2030

```
  Year:      2030
County:  Franklin County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006



AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY        20763814.     5.691     1.035     0.447     1.507     0.643     9.322    10.650   200.732    70.844
ART        22115028.     6.889     2.817     0.480     1.604     0.684    12.474    10.411   181.352   155.789
TOT        42878908.    12.580     3.852     0.926     3.112     1.326    21.796    21.061   382.082   226.633

INTRA         31570.     0.011     0.003     0.001     0.002     0.000     0.017     0.014     0.268     0.000
FINAL      42910476.    12.591     3.855     0.927     3.114     1.326    21.813    21.075   382.350   226.633
```

```
  Year:      2030
County:  Delaware County, OH

CMS/AQ REPORT
 POSTCMS8A, UPDATED FEB 10 2006, GTG
 DATE:11/21/2006


AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE     VMT       HC EX     HC RUN    HC REST   HC EVAP   HC REF    HC TOT    NOX       CO        PM2.5
FWY        1704739.     0.461     0.067     0.037     0.124     0.053     0.741     0.896    16.938     6.179
ART        7044850.     1.993     0.570     0.152     0.511     0.218     3.444     3.260    58.662    34.644
TOT        8749589.     2.454     0.637     0.189     0.635     0.270     4.185     4.156    75.599    40.823

INTRA        10942.     0.004     0.001     0.000     0.001     0.000     0.006     0.005     0.093     0.000
FINAL      8760531.     2.458     0.638     0.189     0.636     0.270     4.191     4.161    75.692    40.823
```

Year: 2030
County: Licking County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	2456768.	0.662	0.095	0.053	0.178	0.076	1.065	1.282	24.191	8.029
ART	4654975.	1.305	0.422	0.097	0.337	0.144	2.305	2.087	37.323	24.852
TOT	7111743.	1.967	0.518	0.150	0.515	0.220	3.370	3.369	61.514	32.882
INTRA	2817.	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.024	0.000
FINAL	7114561.	1.968	0.518	0.150	0.515	0.220	3.371	3.370	61.538	32.882

Year: 2030
County: Fairfield County, OH

CMS/AQ REPORT
POSTCMS8A, UPDATED FEB 10 2006, GTG
DATE:11/21/2006

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	414592.	0.112	0.018	0.009	0.030	0.013	0.182	0.215	4.051	1.387
ART	2552205.	0.728	0.212	0.055	0.185	0.079	1.259	1.189	21.479	12.747
TOT	2966797.	0.840	0.230	0.064	0.215	0.092	1.441	1.404	25.530	14.135
INTRA	12415.	0.004	0.001	0.000	0.001	0.000	0.007	0.006	0.105	0.000
FINAL	2979212.	0.844	0.231	0.064	0.216	0.092	1.448	1.410	25.635	14.135

Year: 2030
County: Madison County, OH

AIR QUALITY, EMISSIONS SUMMARY REPORT

FACTYPE	VMT	HC EX	HC RUN	HC REST	HC EVAP	HC REF	HC TOT	NOX	CO	PM2.5
FWY	923490.	0.249	0.033	0.020	0.067	0.029	0.397	0.492	9.287	3.592
ART	786128.	0.218	0.055	0.017	0.057	0.024	0.371	0.364	6.601	3.592
TOT	1709618.	0.467	0.088	0.037	0.124	0.053	0.768	0.856	15.888	7.184
INTRA	1872.	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.016	0.000
FINAL	1711490.	0.468	0.088	0.037	0.124	0.053	0.769	0.857	15.904	7.184

Appendix H – MORPC HPMS VMT and Emissions

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ID,HPMS Based Emissioins
ID,awu 10/06
ID,Fairfield County
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Fairfield County YEAR 2002

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	GROWTH FACTOR PER YEAR	2002 VMT	2002 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2002 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	0	1.000	0	1.601	0.000	3.658	0.000
02 PRINCIPAL ARTERIAL	484020	1.000	484020	1.641	0.876	2.823	1.506
06 MINOR ARTERIAL	172310	1.000	172310	1.641	0.312	2.823	0.536
07 MAJOR ARTERIAL	333490	1.000	333490	1.744	0.641	2.566	0.943
08 MINOR COLLECTOR	126360	1.000	126360	1.744	0.243	2.566	0.357
09 LOCAL	318520	1.000	318520	1.744	0.612	2.566	0.901
URBAN							
11 INTERSTATE	175400	1.000	175400	1.601	0.310	3.658	0.707
12 FREEWAY/EXPRESSWAY	52770	1.000	52770	1.601	0.093	3.658	0.213
14 PRINCIPAL ARTERIAL	278350	1.000	278350	1.980	0.608	2.511	0.770
16 MINOR ARTERIAL	240520	1.000	240520	1.980	0.525	2.511	0.666
17 COLLECTOR	165030	1.000	165030	1.982	0.361	2.513	0.457
19 LOCAL	254960	1.000	254960	2.145	0.603	2.616	0.735
TOTAL	2601730		2601730		5.182		7.793

FAIRFIELD COUNTY YEAR 2004

FUNCTIONAL CLASSIFICATION	HPMS 2004 VMT	GROWTH FACTOR PER YEAR	2004 VMT	2004 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2004 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	0	1.000	0	1.333	0.000	3.138	0.000
02 PRINCIPAL ARTERIAL	565230	1.000	565230	1.370	0.854	2.452	1.528
06 MINOR ARTERIAL	187620	1.000	187620	1.370	0.283	2.452	0.507
07 MAJOR ARTERIAL	394200	1.000	394200	1.457	0.633	2.216	0.963
08 MINOR COLLECTOR	125060	1.000	125060	1.457	0.201	2.216	0.305
09 LOCAL	300230	1.000	300230	1.457	0.482	2.216	0.733
URBAN							
11 INTERSTATE	198040	1.000	198040	1.333	0.291	3.138	0.685
12 FREEWAY/EXPRESSWAY	152990	1.000	152990	1.333	0.225	3.138	0.529
14 PRINCIPAL ARTERIAL	336940	1.000	336940	1.650	0.613	2.164	0.804
16 MINOR ARTERIAL	286450	1.000	286450	1.650	0.521	2.164	0.683
17 COLLECTOR	217480	1.000	217480	1.652	0.396	2.165	0.519
19 LOCAL	281630	1.000	281630	1.782	0.553	2.260	0.702
TOTAL	3045870		3045870		5.052		7.959

FAIRFIELD COUNTY YEAR 2005

FUNCTIONAL CLASSIFICATION	HPMS 2005 VMT	GROWTH FACTOR PER YEAR	2005 VMT	2005 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2005 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	0	1.000	0	1.190	0.000	2.909	0.000
02 PRINCIPAL ARTERIAL	516270	1.000	516270	1.224	0.697	2.282	1.299
06 MINOR ARTERIAL	185750	1.000	185750	1.224	0.251	2.282	0.467
07 MAJOR ARTERIAL	446270	1.000	446270	1.302	0.640	2.061	1.014
08 MINOR COLLECTOR	123800	1.000	123800	1.302	0.178	2.061	0.281
09 LOCAL	297230	1.000	297230	1.302	0.427	2.061	0.675
URBAN							
11 INTERSTATE	197460	1.000	197460	1.190	0.259	2.909	0.633
12 FREEWAY/EXPRESSWAY	40150	1.000	40150	1.190	0.053	2.909	0.129
14 PRINCIPAL ARTERIAL	209440	1.000	209440	1.476	0.341	2.012	0.465
16 MINOR ARTERIAL	284470	1.000	284470	1.476	0.463	2.012	0.631
17 COLLECTOR	478180	1.000	478180	1.478	0.779	2.013	1.061
19 LOCAL	281630	1.000	281630	1.596	0.495	2.103	0.653
TOTAL	3060650		3060650		4.582		7.308

FAIRFIELD COUNTY

YEAR 2008

FUNCTIONAL CLASSIFICATION	HPMS 2005 VMT	HPMS 2006 VMT	2005 GROWTH FACTOR	2008 VMT	2008 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2008 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.023	0	0.910	0.000	2.266	0.000
02 PRINCIPAL ARTERIAL	516270	436780	1.015	452268	0.933	0.465	1.771	0.883
06 MINOR ARTERIAL	185750	178520	1.001	178891	0.933	0.184	1.771	0.349
07 MAJOR ARTERIAL	446270	422580	1.005	427042	0.988	0.465	1.600	0.753
08 MINOR COLLECTOR	123800	121570	1.006	123055	0.988	0.134	1.600	0.217
09 LOCAL	297230	291870	1.003	293653	0.988	0.320	1.600	0.518
URBAN								
11 INTERSTATE	197460	199780	1.022	208468	0.910	0.209	2.266	0.521
12 FREEWAY/EXPRESSWAY	40150	46550	1.010	47353	0.910	0.048	2.266	0.118
14 PRINCIPAL ARTERIAL	209440	182520	1.000	182520	1.112	0.224	1.561	0.314
16 MINOR ARTERIAL	284470	302070	1.005	304914	1.112	0.374	1.561	0.525
17 COLLECTOR	478180	452990	1.007	459684	1.113	0.564	1.562	0.791
19 LOCAL	281630	281660	1.003	283349	1.199	0.374	1.631	0.509
TOTAL	3060650	2916890		2961197		3.361		5.499

Fairfield Cnty YEAR 2009

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2009 VMT	2009 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2009 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.027	0	0.838	0.000	2.004	0.000
02 PRINCIPAL ARTERIAL	487030	565230	1.028	633414	0.858	0.599	1.588	1.109
06 MINOR ARTERIAL	168780	187620	1.009	195215	0.858	0.185	1.588	0.342
07 MAJOR ARTERIAL	328690	394200	1.008	407347	0.906	0.407	1.432	0.643
08 MINOR COLLECTOR	125730	125060	1.011	131975	0.906	0.132	1.432	0.208
09 LOCAL	316940	300230	1.009	314492	0.906	0.314	1.432	0.496
URBAN								
11 INTERSTATE	173840	198040	1.024	218900	0.838	0.202	2.004	0.484
12 FREEWAY/EXPRESSWAY	52090	152990	1.030	160803	0.838	0.149	2.004	0.355
14 PRINCIPAL ARTERIAL	270980	336940	1.011	351843	1.016	0.394	1.397	0.542
16 MINOR ARTERIAL	23938	286450	1.011	287766	1.016	0.322	1.397	0.443
17 COLLECTOR	160880	217480	1.000	217480	1.017	0.244	1.398	0.335
19 LOCAL	253380	281630	1.004	286697	1.095	0.346	1.460	0.461
TOTAL	2362278	3045870		3205932		3.293		5.419

Fairfield Cnty YEAR 2018

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2018 VMT	2018 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2018 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.027	0	0.444	0.000	0.714	0.000
02 PRINCIPAL ARTERIAL	487030	565230	1.028	756145	0.451	0.376	0.593	0.494
06 MINOR ARTERIAL	168780	187620	1.009	208886	0.451	0.104	0.593	0.137
07 MAJOR ARTERIAL	328690	394200	1.008	431013	0.474	0.225	0.543	0.258
08 MINOR COLLECTOR	125730	125060	1.011	144422	0.474	0.075	0.543	0.086
09 LOCAL	316940	300230	1.009	340164	0.474	0.178	0.543	0.204
URBAN								
11 INTERSTATE	173840	198040	1.024	256450	0.444	0.126	0.714	0.202
12 FREEWAY/EXPRESSWAY	52090	152990	1.030	174867	0.444	0.086	0.714	0.138
14 PRINCIPAL ARTERIAL	270980	336940	1.011	378671	0.532	0.222	0.533	0.222
16 MINOR ARTERIAL	23938	286450	1.011	290136	0.532	0.170	0.533	0.170
17 COLLECTOR	160880	217480	1.000	217480	0.533	0.128	0.533	0.128
19 LOCAL	253380	281630	1.004	295819	0.576	0.188	0.558	0.182
TOTAL	2362278	3045870		3494053		1.877		2.221

Fairfield County YEAR 2030

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2030 VMT	2030 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2030 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.027	0	0.367	0.000	0.416	0.000
02 PRINCIPAL ARTERIAL	487030	565230	1.028	919787	0.372	0.377	0.373	0.378
06 MINOR ARTERIAL	168780	187620	1.009	227114	0.372	0.093	0.373	0.093
07 MAJOR ARTERIAL	328690	394200	1.008	462567	0.392	0.200	0.351	0.179
08 MINOR COLLECTOR	125730	125060	1.011	161018	0.392	0.070	0.351	0.062
09 LOCAL	316940	300230	1.009	374393	0.392	0.162	0.351	0.145
URBAN								
11 INTERSTATE	173840	198040	1.024	306516	0.367	0.124	0.416	0.141
12 FREEWAY/EXPRESSWAY	52090	152990	1.030	193620	0.367	0.078	0.416	0.089
14 PRINCIPAL ARTERIAL	270980	336940	1.011	414440	0.444	0.203	0.348	0.159
16 MINOR ARTERIAL	23938	286450	1.011	293296	0.444	0.144	0.348	0.113
17 COLLECTOR	160880	217480	1.000	217480	0.445	0.107	0.348	0.083
19 LOCAL	253380	281630	1.004	307981	0.483	0.164	0.365	0.124
TOTAL	2362278	3045870		3878212		1.721		1.566

Madison County YEAR 2002

FUNCTIONAL CLASSIFICATION	HPMS 2002 VMT	GROWTH FACTOR PER YEAR	2002 VMT	2002 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2002 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	1184750	1.000	1184750	1.628	2.126	3.676	4.801
02 PRINCIPAL ARTERIAL	0	1.000	0	1.670	0.000	2.836	0.000
06 MINOR ARTERIAL	205560	1.000	205560	1.670	0.378	2.836	0.643
07 MAJOR ARTERIAL	337180	1.000	337180	1.775	0.660	2.579	0.959
08 MINOR COLLECTOR	19610	1.000	19610	1.775	0.038	2.579	0.056
09 LOCAL	66110	1.000	66110	1.775	0.129	2.579	0.188
URBAN							
11 INTERSTATE	0	1.000	0	1.628	0.000	3.676	0.000
12 FREEWAY/EXPRESSWAY	0	1.000	0	1.628	0.000	3.676	0.000
14 PRINCIPAL ARTERIAL	40900	1.000	40900	2.015	0.091	2.523	0.114
16 MINOR ARTERIAL	23220	1.000	23220	2.015	0.052	2.523	0.065
17 COLLECTOR	21960	1.000	21960	2.018	0.049	2.525	0.061
19 LOCAL	27850	1.000	27850	2.183	0.067	2.629	0.081
TOTAL	1927140		1927140		3.590		6.966

MADISON COUNTY YEAR 2004

FUNCTIONAL CLASSIFICATION	HPMS 2004 VMT	GROWTH FACTOR PER YEAR	2004 VMT	2004 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2004 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	1244820	1.000	1244820	1.356	1.861	3.160	4.336
02 PRINCIPAL ARTERIAL	0	1.000	0	1.395	0.000	2.469	0.000
06 MINOR ARTERIAL	228160	1.000	228160	1.395	0.351	2.469	0.621
07 MAJOR ARTERIAL	298840	1.000	298840	1.484	0.489	2.232	0.735
08 MINOR COLLECTOR	19410	1.000	19410	1.484	0.032	2.232	0.048
09 LOCAL	62310	1.000	62310	1.484	0.102	2.232	0.153
URBAN							
11 INTERSTATE	18110	1.000	18110	1.356	0.027	3.160	0.063
12 FREEWAY/EXPRESSWAY	0	1.000	0	1.356	0.000	3.160	0.000
14 PRINCIPAL ARTERIAL	49990	1.000	49990	1.681	0.093	2.179	0.120
16 MINOR ARTERIAL	33900	1.000	33900	1.681	0.063	2.179	0.081
17 COLLECTOR	27680	1.000	27680	1.683	0.051	2.181	0.067
19 LOCAL	30770	1.000	30770	1.816	0.062	2.276	0.077
TOTAL	2013990		2013990		3.130		6.302

MADISON COUNTY

YEAR 2005

FUNCTIONAL CLASSIFICATION	HPMS 2005 VMT	GROWTH FACTOR PER YEAR	2005 VMT	2005 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2005 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	1211380	1.000	1211380	1.216	1.624	2.934	3.918
02 PRINCIPAL ARTERIAL	0	1.000	0	1.252	0.000	2.303	0.000
06 MINOR ARTERIAL	225870	1.000	225870	1.252	0.312	2.303	0.573
07 MAJOR ARTERIAL	294830	1.000	294830	1.332	0.433	2.080	0.676
08 MINOR COLLECTOR	19210	1.000	19210	1.332	0.028	2.080	0.044
09 LOCAL	61690	1.000	61690	1.332	0.091	2.080	0.141
URBAN							
11 INTERSTATE	18050	1.000	18050	1.216	0.024	2.934	0.058
12 FREEWAY/EXPRESSWAY	0	1.000	0	1.216	0.000	2.934	0.000
14 PRINCIPAL ARTERIAL	49090	1.000	49090	1.510	0.082	2.031	0.110
16 MINOR ARTERIAL	32920	1.000	32920	1.510	0.055	2.031	0.074
17 COLLECTOR	27680	1.000	27680	1.512	0.046	2.033	0.062
19 LOCAL	30770	1.000	30770	1.634	0.055	2.122	0.072
TOTAL	1971490		1971490		2.749		5.729

MADISON COUNTY

YEAR 2008

FUNCTIONAL CLASSIFICATION	HPMS 2005 VMT	HPMS 2006 VMT	2005 GROWTH FACTOR	2008 VMT	2008 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2008 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	1211380	1215550	1.023	1271272	0.939	1.316	2.302	3.226
02 PRINCIPAL ARTERIAL	0	0	1.015	0	0.964	0.000	1.803	0.000
06 MINOR ARTERIAL	225870	226790	1.001	227241	0.964	0.241	1.803	0.452
07 MAJOR ARTERIAL	294830	291380	1.005	294328	1.021	0.331	1.630	0.529
08 MINOR COLLECTOR	19210	18860	1.006	19090	1.021	0.021	1.630	0.034
09 LOCAL	61690	60580	1.003	60950	1.021	0.069	1.630	0.110
URBAN								
11 INTERSTATE	18050	18130	1.022	18924	0.939	0.020	2.302	0.048
12 FREEWAY/EXPRESSWAY	0	0	1.010	0	0.939	0.000	2.302	0.000
14 PRINCIPAL ARTERIAL	49090	48190	1.000	48190	1.149	0.061	1.592	0.085
16 MINOR ARTERIAL	32920	33020	1.005	33349	1.149	0.042	1.592	0.059
17 COLLECTOR	27680	27660	1.007	28047	1.150	0.036	1.593	0.049
19 LOCAL	30770	30770	1.003	30954	1.239	0.042	1.663	0.057
TOTAL	1971490	1970930		2032345		2.179		4.647

Madison Cnty YEAR 2009

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2009 VMT	2009 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2009 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	1122020	1244820	1.027	1396292	0.867	1.334	2.039	3.138
02 PRINCIPAL ARTERIAL	0	0	1.028	0	0.889	0.000	1.618	0.000
06 MINOR ARTERIAL	227660	228160	1.009	238404	0.889	0.234	1.618	0.425
07 MAJOR ARTERIAL	367600	298840	1.008	313544	0.939	0.325	1.461	0.505
08 MINOR COLLECTOR	19510	19410	1.011	20483	0.939	0.021	1.461	0.033
09 LOCAL	65780	62310	1.009	65270	0.939	0.068	1.461	0.105
URBAN								
11 INTERSTATE	0	18110	1.024	18110	0.867	0.017	2.039	0.041
12 FREEWAY/EXPRESSWAY	0	0	1.030	0	0.867	0.000	2.039	0.000
14 PRINCIPAL ARTERIAL	26970	49990	1.011	51473	1.053	0.060	1.426	0.081
16 MINOR ARTERIAL	2483	33900	1.011	34036	1.053	0.040	1.426	0.054
17 COLLECTOR	22850	27680	1.000	27680	1.054	0.032	1.427	0.044
19 LOCAL	27680	30770	1.004	31323	1.134	0.039	1.491	0.051
TOTAL	1882553	2013990		2196615		2.169		4.477

Madison Cnty YEAR 2018

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2018 VMT	2018 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2018 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	1122020	1244820	1.027	1668942	0.457	0.841	0.729	1.341
02 PRINCIPAL ARTERIAL	0	0	1.028	0	0.463	0.000	0.607	0.000
06 MINOR ARTERIAL	227660	228160	1.009	256844	0.463	0.131	0.607	0.172
07 MAJOR ARTERIAL	367600	298840	1.008	340011	0.487	0.183	0.557	0.209
08 MINOR COLLECTOR	19510	19410	1.011	22414	0.487	0.012	0.557	0.014
09 LOCAL	65780	62310	1.009	70598	0.487	0.038	0.557	0.043
URBAN								
11 INTERSTATE	0	18110	1.024	18110	0.457	0.009	0.729	0.015
12 FREEWAY/EXPRESSWAY	0	0	1.030	0	0.457	0.000	0.729	0.000
14 PRINCIPAL ARTERIAL	26970	49990	1.011	54143	0.547	0.033	0.547	0.033
16 MINOR ARTERIAL	2483	33900	1.011	34282	0.547	0.021	0.547	0.021
17 COLLECTOR	22850	27680	1.000	27680	0.548	0.017	0.547	0.017
19 LOCAL	27680	30770	1.004	32320	0.592	0.021	0.572	0.020
TOTAL	1882553	2013990		2525344		1.305		1.884

Madison County YEAR 2030

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2030 VMT	2030 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2030 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	1122020	1244820	1.027	2032476	0.375	0.840	0.424	0.950
02 PRINCIPAL ARTERIAL	0	0	1.028	0	0.381	0.000	0.381	0.000
06 MINOR ARTERIAL	227660	228160	1.009	281432	0.381	0.118	0.381	0.118
07 MAJOR ARTERIAL	367600	298840	1.008	375300	0.402	0.166	0.358	0.148
08 MINOR COLLECTOR	19510	19410	1.011	24989	0.402	0.011	0.358	0.010
09 LOCAL	65780	62310	1.009	77702	0.402	0.034	0.358	0.031
URBAN								
11 INTERSTATE	0	18110	1.024	18110	0.375	0.007	0.424	0.008
12 FREEWAY/EXPRESSWAY	0	0	1.030	0	0.375	0.000	0.424	0.000
14 PRINCIPAL ARTERIAL	26970	49990	1.011	57703	0.455	0.029	0.356	0.023
16 MINOR ARTERIAL	2483	33900	1.011	34610	0.455	0.017	0.356	0.014
17 COLLECTOR	22850	27680	1.000	27680	0.455	0.014	0.356	0.011
19 LOCAL	27680	30770	1.004	33648	0.494	0.018	0.373	0.014
TOTAL	1882553	2013990		2963650		1.256		1.326

Knox County YEAR 2002

FUNCTIONAL CLASSIFICATION	HPMS 2002 VMT	GROWTH FACTOR PER YEAR	2002 VMT	2002 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2002 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	0	1.000	0	1.742	0.000	3.769	0.000
02 PRINCIPAL ARTERIAL	82210	1.000	82210	1.791	0.162	2.911	0.264
06 MINOR ARTERIAL	212200	1.000	212200	1.791	0.419	2.911	0.681
07 MAJOR ARTERIAL	292500	1.000	292500	1.904	0.614	2.649	0.854
08 MINOR COLLECTOR	74970	1.000	74970	1.904	0.157	2.649	0.219
09 LOCAL	161770	1.000	161770	1.904	0.340	2.649	0.472
URBAN							
11 INTERSTATE	0	1.000	0	1.742	0.000	3.769	0.000
12 FREEWAY/EXPRESSWAY	0	1.000	0	1.742	0.000	3.769	0.000
14 PRINCIPAL ARTERIAL	107630	1.000	107630	2.163	0.257	2.592	0.308
16 MINOR ARTERIAL	56560	1.000	56560	2.163	0.135	2.592	0.162
17 COLLECTOR	32170	1.000	32170	2.166	0.077	2.594	0.092
19 LOCAL	71340	1.000	71340	2.343	0.184	2.700	0.212
TOTAL	1091350		1091350		2.345		3.264

KNOX COUNTY YEAR 2004

FUNCTIONAL CLASSIFICATION	HPMS 2004 VMT	GROWTH FACTOR PER YEAR	2004 VMT	2004 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2004 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	0	1.000	0	1.467	0.000	3.243	0.000
02 PRINCIPAL ARTERIAL	110870	1.000	110870	1.511	0.185	2.537	0.310
06 MINOR ARTERIAL	215410	1.000	215410	1.511	0.359	2.537	0.602
07 MAJOR ARTERIAL	270450	1.000	270450	1.608	0.479	2.294	0.684
08 MINOR COLLECTOR	74200	1.000	74200	1.608	0.132	2.294	0.188
09 LOCAL	152480	1.000	152480	1.608	0.270	2.294	0.386
URBAN							
11 INTERSTATE	0	1.000	0	1.467	0.000	3.243	0.000
12 FREEWAY/EXPRESSWAY	0	1.000	0	1.467	0.000	3.243	0.000
14 PRINCIPAL ARTERIAL	162590	1.000	162590	1.821	0.326	2.241	0.402
16 MINOR ARTERIAL	46460	1.000	46460	1.821	0.093	2.241	0.115
17 COLLECTOR	34640	1.000	34640	1.823	0.070	2.243	0.086
19 LOCAL	78810	1.000	78810	1.967	0.171	2.340	0.203
TOTAL	1145910		1145910		2.085		2.975

KNOX COUNTY YEAR 2005

FUNCTIONAL CLASSIFICATION	HPMS 2005 VMT	GROWTH FACTOR PER YEAR	2005 VMT	2005 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2005 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL							
01 INTERSTATE	0	1.000	0	1.317	0.000	3.012	0.000
02 PRINCIPAL ARTERIAL	109980	1.000	109980	1.357	0.165	2.367	0.287
06 MINOR ARTERIAL	212750	1.000	212750	1.357	0.318	2.367	0.555
07 MAJOR ARTERIAL	267160	1.000	267160	1.445	0.426	2.140	0.630
08 MINOR COLLECTOR	73460	1.000	73460	1.445	0.117	2.140	0.173
09 LOCAL	150960	1.000	150960	1.445	0.240	2.140	0.356
URBAN							
11 INTERSTATE	0	1.000	0	1.317	0.000	3.012	0.000
12 FREEWAY/EXPRESSWAY	0	1.000	0	1.317	0.000	3.012	0.000
14 PRINCIPAL ARTERIAL	160170	1.000	160170	1.638	0.289	2.090	0.369
16 MINOR ARTERIAL	45620	1.000	45620	1.638	0.082	2.090	0.105
17 COLLECTOR	34840	1.000	34840	1.640	0.063	2.091	0.080
19 LOCAL	78810	1.000	78810	1.771	0.154	2.183	0.190
TOTAL	1133750		1133750		1.854		2.746

KNOX COUNTY

YEAR 2008

FUNCTIONAL CLASSIFICATION	HPMS 2005 VMT	HPMS 2006 VMT	2005 GROWTH FACTOR	2008 VMT	2008 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2008 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.023	0	1.029	0.000	2.374	0.000
02 PRINCIPAL ARTERIAL	109980	110010	1.015	113309	1.058	0.132	1.862	0.233
06 MINOR ARTERIAL	212750	213590	1.001	214015	1.058	0.250	1.862	0.439
07 MAJOR ARTERIAL	267160	261540	1.005	264211	1.121	0.326	1.685	0.491
08 MINOR COLLECTOR	73460	72130	1.006	73011	1.121	0.090	1.685	0.136
09 LOCAL	150960	148240	1.003	149145	1.121	0.184	1.685	0.277
URBAN								
11 INTERSTATE	0	0	1.022	0	1.029	0.000	2.374	0.000
12 FREEWAY/EXPRESSWAY	0	0	1.010	0	1.029	0.000	2.374	0.000
14 PRINCIPAL ARTERIAL	160170	157240	1.000	157240	1.261	0.219	1.647	0.285
16 MINOR ARTERIAL	45620	47100	1.005	47556	1.261	0.066	1.647	0.086
17 COLLECTOR	34840	35010	1.007	35497	1.262	0.049	1.648	0.064
19 LOCAL	78810	78810	1.003	79282	1.358	0.119	1.719	0.150
TOTAL	1133750	1123670		1133266		1.435		2.162

Knox Cnty

YEAR 2009

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2009 VMT	2009 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2009 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.027	0	0.952	0.000	2.106	0.000
02 PRINCIPAL ARTERIAL	93850	110870	1.028	124008	0.977	0.134	1.675	0.229
06 MINOR ARTERIAL	193250	215410	1.009	224106	0.977	0.241	1.675	0.414
07 MAJOR ARTERIAL	279570	270450	1.008	281632	1.033	0.321	1.513	0.470
08 MINOR COLLECTOR	74600	74200	1.011	78303	1.033	0.089	1.513	0.131
09 LOCAL	160970	152480	1.009	159723	1.033	0.182	1.513	0.266
URBAN								
11 INTERSTATE	0	0	1.024	0	0.952	0.000	2.106	0.000
12 FREEWAY/EXPRESSWAY	0	0	1.030	0	0.952	0.000	2.106	0.000
14 PRINCIPAL ARTERIAL	112000	162590	1.011	168750	1.158	0.215	1.478	0.275
16 MINOR ARTERIAL	6677	46460	1.011	46827	1.158	0.060	1.478	0.076
17 COLLECTOR	31950	34640	1.000	34640	1.159	0.044	1.479	0.056
19 LOCAL	70900	78810	1.004	80227	1.246	0.110	1.545	0.137
TOTAL	1023767	1145910		1198216		1.396		2.054

Knox Cnty YEAR 2018

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2018 VMT	2018 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2018 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.027	0	0.499	0.000	0.769	0.000
02 PRINCIPAL ARTERIAL	93850	110870	1.028	147659	0.508	0.083	0.642	0.104
06 MINOR ARTERIAL	193250	215410	1.009	239759	0.508	0.134	0.642	0.170
07 MAJOR ARTERIAL	279570	270450	1.008	301761	0.533	0.177	0.590	0.196
08 MINOR COLLECTOR	74600	74200	1.011	85688	0.533	0.050	0.590	0.056
09 LOCAL	160970	152480	1.009	172762	0.533	0.102	0.590	0.112
URBAN								
11 INTERSTATE	0	0	1.024	0	0.499	0.000	0.769	0.000
12 FREEWAY/EXPRESSWAY	0	0	1.030	0	0.499	0.000	0.769	0.000
14 PRINCIPAL ARTERIAL	112000	162590	1.011	179838	0.597	0.118	0.580	0.115
16 MINOR ARTERIAL	6677	46460	1.011	47488	0.597	0.031	0.580	0.030
17 COLLECTOR	31950	34640	1.000	34640	0.598	0.023	0.581	0.022
19 LOCAL	70900	78810	1.004	82780	0.644	0.059	0.607	0.055
TOTAL	1023767	1145910		1292375		0.777		0.861

Knox County YEAR 2030

FUNCTIONAL CLASSIFICATION	HPMS 2000 VMT	HPMS 2004 VMT	2000 GROWTH FACTOR	2030 VMT	2030 VOC EF GM/MI	VOC POLLUTANT BURDEN TONS/DAY	2030 NOX EF GM/MI	NOX POLLUTANT BURDEN TONS/DAY
RURAL								
01 INTERSTATE	0	0	1.027	0	0.398	0.000	0.444	0.000
02 PRINCIPAL ARTERIAL	93850	110870	1.028	179192	0.405	0.080	0.399	0.079
06 MINOR ARTERIAL	193250	215410	1.009	260630	0.405	0.116	0.399	0.115
07 MAJOR ARTERIAL	279570	270450	1.008	328600	0.427	0.155	0.376	0.136
08 MINOR COLLECTOR	74600	74200	1.011	95535	0.427	0.045	0.376	0.040
09 LOCAL	160970	152480	1.009	190146	0.427	0.090	0.376	0.079
URBAN								
11 INTERSTATE	0	0	1.024	0	0.398	0.000	0.444	0.000
12 FREEWAY/EXPRESSWAY	0	0	1.030	0	0.398	0.000	0.444	0.000
14 PRINCIPAL ARTERIAL	112000	162590	1.011	194622	0.483	0.104	0.373	0.080
16 MINOR ARTERIAL	6677	46460	1.011	48369	0.483	0.026	0.373	0.020
17 COLLECTOR	31950	34640	1.000	34640	0.484	0.018	0.374	0.014
19 LOCAL	70900	78810	1.004	86183	0.524	0.050	0.392	0.037
TOTAL	1023767	1145910		1417917		0.683		0.599