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16. Abstract The report describes the process used to develop emissions estimates and an emissions index for use with the Texas Metropolitan Mobility Plan (TMMP) process. The index is only designed to make relative comparisons between various TMMP scenarios. The emissions are only estimated for six hours of the peak periods, and several simplifying assumptions are made during the process. These estimates do not replace the need for more detailed analysis of alternatives that are selected for more study nor are they intended to replicate or serve as emissions inventories for use in conformity determinations or state implementation plans (SIPs).					
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**DEVELOPING AN EMISSIONS INDEX FOR THE
TEXAS METROPOLITAN MOBILITY PLAN**

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DISCLAIMER AND ACKNOWLEDGMENTS

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Federal Highway Administration (FHWA) or the Texas Department of Transportation (TxDOT). This report does not constitute a standard, specification, or regulation. In addition, this report is not intended for construction, bidding, or permit purposes. Dennis G. Perkinson, Ph.D., Brian S. Bochner, P.E., Martin Boardman, and Teresa Qu, P.E., prepared this report.

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TEXAS METROPOLITAN MOBILITY PLAN EVALUATION EMISSIONS INDEX

SUMMARY

As part of the evaluation and comparison of the various Texas Metropolitan Mobility Plan (TMMP) scenarios, researchers developed an emissions index. Following a brief summary, a detailed description of the assumptions and procedures used to generate the emissions rates and the preparation of the emissions index is provided.

- Oxides of nitrogen (NO_x) and volatile organic compound (VOC) emissions rates are provided for 2000 and 2025 morning and evening peak periods.
- Order of magnitude peak period emissions indices are generated using vehicle miles traveled (VMT) for each of the eight urbanized area transportation networks.
- Morning and evening peak-hour vehicle miles traveled for freeway and arterial functional classifications are used. Rates are based on MOBILE6 data for 7-8 a.m. and 5-6 p.m..
- Vehicle fleet mix is by Texas Department of Transportation (TxDOT) district.
- Travel speeds are a function of volume-to-capacity ratio and coded freeflow speed (as represented by the so-called Dallas speed model).
- MOBILE6 setups are the same as used for emissions inventories in the respective areas except for the use of TxDOT district level input parameters.
- The actual index is the ratio of future-year scenario emissions to base-year emissions, either for each pollutant or for VOC and NO_x combined. It is not an estimate of emissions; rather, it is an area-specific comparison of relative emissions across scenarios.

DEVELOPMENT OF FLEET COMPOSITE EMISSIONS

The emissions index used to evaluate and compare the various TMMP scenarios is based on a speed-specific fleet composite emissions factor for the two peak periods. The assumptions and input details are described below.

Overview of Fleet Composite Emissions Factors Development

1. Methodology: Composite emission factors are generated from a Highway Performance Monitoring System (HPMS) based “Virtual Link” method used to develop emissions factors over a range of speeds for each of the 28 MOBILE6 vehicle classes. Texas Department of Transportation (TxDOT) District-level vehicle classification count data are used to represent the local vehicle-miles traveled (VMT) mix. TxDOT registration distributions aggregated at the district level are used to develop vehicle age distributions and at the state level to estimate diesel fractions. The general methodology and procedures are described in “Development of On-Road Mobile Source Episode Emissions Inventories for All 254 Counties in Texas” (Texas Transportation Institute [TTI], February 2004).

2. Geographic Coverage: Eight areas are included: Austin, Corpus Christi, Dallas-Fort Worth, El Paso, Lubbock, Hidalgo County, Houston-Galveston, San Antonio. Table 1 lists the TxDOT districts that cover these eight metropolitan areas.

Table 1. Corresponding TxDOT Districts for the Metropolitan Areas.

Metropolitan Area	TxDOT District Used to Create Emissions Estimate
<i>Austin Area</i>	Austin District
<i>Corpus Christi Area</i>	Corpus Christi District
<i>Dallas-Fort Worth Area</i>	Dallas District
<i>El Paso Area</i>	El Paso District
<i>Lubbock Area</i>	Lubbock District
<i>Hidalgo County Area</i>	Pharr District
<i>Houston-Galveston Area</i>	Houston District
<i>San Antonio Area</i>	San Antonio District

3. Temporal Coverage: Morning peak hour, 7-8 a.m.; evening peak hour, 5-6 p.m.

4. Pollutants: Volatile organic compounds (VOC), oxides of nitrogen (NO_x).

5. Sources: 28 EPA on-road vehicle classes.

6. Analysis Years: 2000, 2025.

7. Ozone Episode Day-Type Specificity:

- Ozone episode period: Pertinent inputs were based on the 20 day series, August 18 through September 6, 2000.
- Climatic inputs: Ozone episode period average hourly temperature and relative humidity and average daily barometric pressure values, as provided by the Texas Commission on Environmental Quality (TCEQ) (December 2003) for each of eight Texas climate zones were used. The eight metropolitan areas were geographically correlated to the climate zones to select the appropriate climate inputs for each metropolitan area.
- Activity inputs (VMT): Hourly weekday (average Monday through Thursday) VMT distributions input to MOBILE6 were developed based on TxDOT district-level multi-year, episode period Automatic Traffic Recorder (ATR) data.

8. MOBILE6 Drive Cycle-Specific Emissions Factors: Freeway and arterial drive cycle emissions factors were applied to corresponding freeway and arterial functional class groups.

9. Emissions Factors Tables: The district-level hourly emissions factors were developed for both analysis years using the TTI POLFAC62 program built on the MOBILE6 program. The emissions factors from POLFAC62 were output by 5 mph speed intervals and interpolated to the 1 mph speed interval using the method suggested by the U.S. Environmental Protection Agency (EPA) ([Section 5.3.4, MOBILE6 User's Guide, January 2002](#)). VMT mix by area and functional class were used to develop fleet composite emissions factors by freeway and arterial functional class groups. The fleet composite emissions factors tables are provided by area, functional class, morning and evening peak hour, and 1 mph speed intervals (see [Appendix A](#)).

Development of VMT Mix

10. VMT Mix: VMT mix was estimated using TxDOT 1997 - 2002 vehicle classification data, TxDOT registrations data (latest available, i.e., 2003), and MOBILE6 default diesel fractions. The vehicle classification data were aggregated to the TxDOT district level. For each evaluation year, 24-hour period VMT mix estimates were developed by two functional classification groups for each of the eight TxDOT districts. TxDOT classification counts classify vehicles into the standard Federal Highway Administration (FHWA) vehicle classifications (based on vehicle length/number of axles):

- C Passenger vehicles,
- P Two-axle, four-tire single-unit trucks,
- B Buses,
- SU2 Six-tire, two-axle single-unit vehicles,
- SU3 Three-axle single-unit vehicles,
- SU4 Four or more axle single-unit vehicles,
- SE4 Three or four axle single-trailer vehicles,
- SE5 Five-axle single-trailer vehicles,
- SE6 Six or more axle single-trailer vehicles,
- SD5 Five or less axle multi-trailer vehicles,
- SD6 Six-axle multi-trailer vehicles, and
- SD7 Seven or more axle multi-trailer vehicles.

EPA and MOBILE6 use a different vehicle classification scheme than the FHWA categories. The 28 EPA vehicle categories are defined as a function of gross vehicle weight rating (GVWR) and fuel type (see [Table 2](#)). The FHWA axle/vehicle length-based classification categories were converted into 28 MOBILE GVWR/fuel type-based categories.

The FHWA vehicle classification counts were first aggregated into three intermediate groups:

Passenger Vehicles (PVs)	C + P,
Heavy-Duty Vehicles (HDVs)	SU2 + SU3 + SU4 + SE4, and
HDDV8b (HDX)	SE5 + SE6 + SD5 + SD6 + SD7

This was followed by a second intermediate allocation that separated light-duty vehicles (LDV) into PVs and light-duty trucks (LDT) based on TxDOT registration data:

$$\begin{aligned} \text{LDV} &= 0.747 \times \text{PV (by district, 2002 El Paso District registration data shown), and} \\ \text{LDT} &= 0.253 \times \text{PV (by district, 2002 El Paso District registration data shown).} \end{aligned}$$

A third intermediate allocation further separated LDTs into LDT1 and HLDT (note that LDT1 is itself intermediate and was further divided into LDGT1 and LDDT):

$$\begin{aligned} \text{LDT1} &= 0.893 \times \text{LDT (by district, 2002 El Paso District registration data shown), and} \\ \text{HLDT} &= 0.107 \times \text{LDT (by district, 2002 El Paso District registration data shown).} \end{aligned}$$

Next, the remaining FHWA categories were disaggregated into EPA vehicle groups, as shown. Note that TxDOT vehicle classification count procedures do not distinguish between gasoline and diesel LDTs. Consequently, MOBILE defaults for the year of interest were used. As before, actual TxDOT vehicle registration data were used to separate gasoline from diesel heavy-duty trucks. Note also that motorcycles were not counted separately and were included as a default (subtracted from LDGV):

$$\begin{aligned} \text{LDGV} &= 0.9983579 \times \text{LDV (MOBILE6 default for 2002 shown),} \\ \text{LDDV} &= 0.0016421 \times \text{LDV (MOBILE6 default for 2002 shown),} \\ \text{LLDT} &= 0.9945513 \times \text{LDT1 (MOBILE6 default for 2002 shown),} \\ \text{LDDT} &= 0.0054487 \times \text{LDT1 (MOBILE6 default for 2002 shown),} \\ \text{HDGV} &= 0.484 \times \text{HDV (by district, 2002 El Paso District registration data shown),} \\ \text{HDDV} &= 0.516 \times \text{HDV (by district, 2002 El Paso District registration data shown), and} \\ \text{MC} &= 0.001 \text{ of total (subtracted from LDGV).} \end{aligned}$$

This process converted the FHWA axle count-based categories into GVWR categories. This part of the conversion procedure is summarized schematically in [Table 3](#). Starting with the TxDOT vehicle classification data, these data themselves provided sufficient information to complete the first step in the conversion process, the allocation of vehicles into PVs, HDVs, HDDV8bs, and buses (B). Steps 2 and 3 further allocated these categories using TxDOT registration data. Finally, Step 4 allocated LDVs by fuel type using EPA MOBILE diesel fractions, and motorcycles were separated from LDGVs using a nominal constant.

The MOBILE6 28-category typology is a subset of this typology. A combination of EPA MOBILE6 defaults and area vehicle registration data were used to expand these intermediate categories. For the 28-category EPA scheme, HDVs — HDGV and HDDV — were separated into eight and seven categories, respectively. HDDV8b vehicles were counted directly. The 15 HDV categories were separated from total HDV, which were separated by fuel type using TxDOT registration data by county. Each HDV category (HDGV and HDDV) was then divided into subcategories based on TxDOT area vehicle registration data. Buses were treated separately.

The 28-category EPA scheme further divides the two LDT categories based in part on assumed loading. The previous LDGT1 and LDGT2 categories (previously defined as $GVWR \leq 6,000$ and $GVWR > 6,000$ to 8,500, respectively) were separated into subcategories in terms of adjusted loaded vehicle weight (ALVW). ALVW is the average of vehicle curb weight and GVWR. Thus, two new intermediate categories were introduced. These are light light-duty trucks (LLDTs) and heavy light-duty trucks (HLDTs), which are defined as:

LLDT - any light-duty truck rated through 6,000 pounds GVWR, and

HLDT - any light-duty truck rated greater than 6,000 pounds GVWR.

These two new intermediate categories were then used to define the four LDT categories using EPA MOBILE6 defaults for the year of interest. The four LDT categories are:

LDGT1 - light light-duty trucks through 3,750 pounds loaded vehicle weight (LVW),

LDGT2 - light light-duty trucks greater than 3,750 pounds LVW,

LDGT3 - heavy light-duty trucks to 5,750 pounds ALVW, and

LDGT4 - heavy light-duty trucks greater than 5,750 pounds ALVW.

Similarly, the LDDT category was sub-divided into two categories based on GVWR (less than or equal to 6,000 GVWR and 6,000 to 8,500 GVWR). This was accomplished using EPA MOBILE6 default values for the year of interest.

Finally, the three bus categories were separated from the TxDOT classification counts bus category using EPA MOBILE6 default values. (Under MOBILE6 the HDV category does not include buses.) [Table 4](#) shows the VMT mix estimation procedure summary followed by explanatory notes.

For future VMT mix estimates, the MOBILE6 default values consistent with the future evaluation year are used. No other adjustments were made to alter the count data and conversion procedure to accommodate future years. For this analysis, VMT mix estimates were developed for the two functional classification groups, freeway and arterial.

Table 2. EPA Vehicle Types - 28 Categories.

Category	Description	GVWR
LDGV	Light-duty gasoline vehicle	≤ 6,000
LDGT1	Light-duty gasoline truck	≤ 6,000
LDGT2	Light-duty gasoline truck	≤ 6,000
LDGT3	Light-duty gasoline truck	6,001 - 8,500
LDGT4	Light-duty gasoline truck	6,001 - 8,500
HDGV2b	Heavy-duty gasoline vehicle	8,501 - 10,000
HDGV3	Heavy-duty gasoline vehicle	10,001 - 14,000
HDGV4	Heavy-duty gasoline vehicle	14,001 - 16,000
HDGV5	Heavy-duty gasoline vehicle	16,001 - 19,500
HDGV6	Heavy-duty gasoline vehicle	19,501 - 26,000
HDGV7	Heavy-duty gasoline vehicle	26,001 - 33,000
HDGV8a	Heavy-duty gasoline vehicle	33,001 - 60,000
HDGV8b	Heavy-duty gasoline vehicle	> 60,000
HDGB	Heavy-duty gasoline bus	all
LDDV	Light-duty diesel vehicle	≤ 6,000
LDDT12	Light-duty diesel truck	≤ 6,000
LDDT34	Light-duty diesel truck	6,001 - 8,500
HDDV2b	Heavy-duty diesel vehicle	8,501 - 10,000
HDDV3	Heavy-duty diesel vehicle	10,001 - 14,000
HDDV4	Heavy-duty diesel vehicle	14,001 - 16,000
HDDV5	Heavy-duty diesel vehicle	16,001 - 19,500
HDDV6	Heavy-duty diesel vehicle	19,501 - 26,000
HDDV7	Heavy-duty diesel vehicle	26,001 - 33,000
HDDV8a	Heavy-duty diesel vehicle	33,001 - 60,000
HDDV8b	Heavy-duty diesel vehicle	> 60,000
HDDBS	Heavy-duty diesel school bus	all
HDDBT	Heavy-duty diesel transit bus	all
MC	Motorcycle	all

Table 3. Initial Vehicle Classification Conversion Procedure.

Start	Step 1	Step 2	Step 3	Step 4
Total Vehicles	PV	LDV	LDGV	MC
				LDGV
			LDDV	
		LDT	LDT1	LLDT
				LDDT
	HLDT			
	HDV	HDGV		
		HDDV		
		HDDV8b		
	B			

Table 4. VMT Mix Estimation Procedure Summary.

EPA-8	EPA-28	Conversion
LDGV	LDGV	.9984 × LDV
LDGT1	LDGT1	.2310 × LLDT
	LDGT2	.7690 × LLDT
LDGT2	LDGT3	.6850 × HLDT
	LDGT4	.3150 × HLDT
HDGV	HDGV2b	.436 × HDGV
	HDGV3	.200 × HDGV
	HDGV4	.085 × HDGV
	HDGV5	.053 × HDGV
	HDGV6	.137 × HDGV
	HDGV7	.047 × HDGV
	HDGV8a	.038 × HDGV
	HDGV8b	.004 × HDGV
	HDGB	.1689 × B
LDDV	LDDV	.0016 × LDV
LDDT	LDDT12	.1222 × LDDT
	LDDT34	.8778 × LDDT
HDDV	HDDV2b	.330 × HDDV
	HDDV3	.125 × HDDV
	HDDV4	.071 × HDDV
	HDDV5	.048 × HDDV
	HDDV6	.165 × HDDV
	HDDV7	.099 × HDDV
	HDDV8a	.162 × HDDV
	HDDV8b	HDX
	HDDBT	.3245 × B
	HDDBS	.5066 × B
MC	MC	MC

Notes to VMT Mix Estimation Procedure Summary

Intermediate category factors and sources:

LDV	$.747 \times PV$ (by district, 2002 El Paso District registration data shown)
LDT	$.253 \times PV$ (by district, 2002 El Paso District registration data shown)
LDT1	$.893 \times LDT$ (by district, 2002 El Paso District registration data shown)
HLDT	$.107 \times LDT$ (by district, 2002 El Paso District registration data shown)
LLDT	$.9945 \times LDT1$ (EPA MOBILE6 default for 2002)
LDDT	$.0055 \times LDT1$ (EPA MOBILE6 default for 2002)
HDV	SU2+SU3+SU4+SE3+SE4
HDX	SE5+SE6+SD5+SD6+SD7
HDGV	$.484 \times HDV$ (by district, 2002 El Paso District registration data shown)
HDDV	$.516 \times HDV$ (by district, 2002 El Paso District registration data shown)

Category conversion factors and sources:

LDGV	$.9984 \times LDV$ (EPA MOBILE6 default for 2002)
LDGT1	$.2310 \times LLDT$ (EPA MOBILE6 default for 2002)
LDGT2	$.7690 \times LLDT$ (EPA MOBILE6 default for 2002)
LDGT3	$.6850 \times HLDT$ (EPA MOBILE6 default for 2002)
LDGT4	$.3150 \times HLDT$ (EPA MOBILE6 default for 2002)
HDGV2a	$.436 \times HDGV$ (State 2002 registration data shown)
HDGV3	$.200 \times HDGV$ (State 2002 registration data shown)
HDGV4	$.085 \times HDGV$ (State 2002 registration data shown)
HDGV5	$.053 \times HDGV$ (State 2002 registration data shown)
HDGV6	$.137 \times HDGV$ (State 2002 registration data shown)
HDGV7	$.047 \times HDGV$ (State 2002 registration data shown)
HDGV8a	$.038 \times HDGV$ (State 2002 registration data shown)
HDGV8b	$.004 \times HDGV$ (State 2002 registration data shown)
HDGB	$.1689 \times B$ (EPA MOBILE6 default for 2002)
LDDV	$.0016 \times LDV$ (EPA MOBILE6 default for 2002)
LDDT12	$.1222 \times LDDT$ (EPA MOBILE6 default for 2002)
LDDT34	$.8778 \times LDDT$ (EPA MOBILE6 default for 2002)
HDDV2b	$.330 \times HDDV$ (State 2002 registration data shown)
HDDV3	$.125 \times HDDV$ (State 2002 registration data shown)
HDDV4	$.071 \times HDDV$ (State 2002 registration data shown)
HDDV5	$.048 \times HDDV$ (State 2002 registration data shown)
HDDV6	$.165 \times HDDV$ (State 2002 registration data shown)
HDDV7	$.099 \times HDDV$ (State 2002 registration data shown)
HDDV8a	$.162 \times HDDV$ (State 2002 registration data shown)
HDDV8b	HDX (TxDOT District classification counts)
HDDBT	$.3245 \times B$ (EPA MOBILE6 default for 2002)
HDDBS	$.5066 \times B$ (EPA MOBILE6 default for 2002)
MC	MC (default subtracted from LDGV, no conversion)

Development of Emissions Factors

11. MOBILE model inputs: Emissions factors were developed by speed, emissions type, hour and road type for each evaluation year using inputs as outlined below. For subject districts, MOBILE6 diesel vehicle NO_x emissions factors were post-processed (see [Item 14](#)) to model the effects of Texas LED. See [Appendix B](#) for an expanded list of MOBILE6 commands, their functions, and details on their use in this analysis.

Parameter	Description	Data Source
Temperature	Hourly, by climate zone	TCEQ (December 2003)
Sunrise/Sunset	Nearest hour, by climate zone	TCEQ (per prior analysis)
Relative Humidity	Hourly, by climate zone	TCEQ (December 2003)
Barometric Pressure	Average daily	TCEQ (December 2003)
Registration Distributions	Latest TxDOT data (July 2003 for both years); all at TxDOT district-level, except national default for bus	TxDOT/MOBILE6 defaults
Diesel Fractions	Analysis year-specific; heavy-duty vehicles at state level, all else national default	TxDOT/MOBILE6 defaults
VMT by Hour	By TxDOT district for each day type, same for all evaluation years	TxDOT ATR/TTI
Trip Length Distributions	National default except for Houston and Dallas	MOBILE6 defaults, HGAC and NCTCOG estimates
Anti-Tampering Program (ATP)	For all counties with inspection/maintenance (I/M) programs	TCEQ (per prior analysis)
I/M Program	For subject counties	TCEQ (per prior analysis)
Fuel Program	Reformulated gasoline (RFG) for Houston and Dallas and conventional gasoline for other areas	MOBILE6 command options
Fuel Reid Vapor Pressure	Pounds per square inch (psi) for conventional gasoline and RFG	Regulated limits with compliance safety margin, RFG default value
Rebuild Effects	0.90 effective rate, begins in 2001	MOBILE6 default

12. Emissions Factor Post-Processing Requirements and Procedures: The only emissions factor post-processing performed was to include the effects of the Texas LED program. For 2025 analysis year, TTI developed a set of vehicle class-specific LED program NO_x reduction factors (i.e., region-wide defaults) for the five districts under the program

(Austin, Corpus Christi, Dallas, Houston, and San Antonio). For 2000 analysis year, the LED program is not applicable.

Texas LED – Emissions Factor Post-Processing Requirement

MOBILE6 does not have an alternate diesel fuel modeling feature that affects NO_x emissions factors. Thus, to model the impacts of Texas LED fuel, MOBILE6 diesel vehicle emissions factors were post-processed. TTI developed and applied NO_x adjustment factors specific to each diesel vehicle class. These LED NO_x adjustment factors were developed using the EPA's best estimate for Texas LED NO_x reductions: 4.8 percent for 2002 and newer diesel vehicles (assumption is that all are EGR-equipped), and 6.2 percent for 2001 and older diesel vehicles (assumed that none are EGR-equipped) (see "Texas Low Emissions Diesel Fuel Benefits," EPA Memorandum, September 27, 2001). Application of these two percent reductions on a by-model-year basis results in various NO_x reductions within the 4.8 through 6.2 percent range (the equivalent of the adjustment factor range of 0.952 through 0.938) for each average vehicle class, depending on the evaluation year and diesel vehicle class-specific registration distributions.

The 4.8 percent NO_x reduction factor was applied to the 2002 and later model year diesel vehicle freeway and arterial drive-cycle NO_x emissions factors, and the 6.2 percent NO_x reduction factor was applied to the 2001 and earlier model year diesel vehicle freeway and arterial drive-cycle NO_x emissions factors. The vehicle class- and model year-specific freeway and arterial NO_x-adjusted emissions factors were then combined into "all road types" emissions factors. This was performed using freeway and non-freeway 24-hour, statewide VMT fractions based on TxDOT's 2002 RIFCREC HPMS VMT estimate. Next, the "all road types" NO_x-adjusted by-model-year emissions factors for each vehicle class were combined into average vehicle class LED-adjusted emissions factors weighted by their corresponding travel fractions. The travel fractions were developed using MOBILE6 by-model-year mileage accumulation rates and TxDOT statewide by-model-year age distribution fractions for the HDVs and MOBILE6 defaults for the light-duty classes. The overall LED NO_x adjustment factors for each average diesel vehicle class were then calculated by dividing LED-adjusted, all road types, average vehicle class NO_x emissions factors by the corresponding unadjusted average vehicle class NO_x emissions factors.

The above procedure used MOBILE6 daily by-model-year database emissions factor output. Freeway and arterial drive-cycle speed VMT input to MOBILE6 were based on statewide virtual link-VMT and link-speed estimates developed with the latest 2002 TxDOT RIFCREC data set under the Virtual Link-based methodology.

Control Strategies

13. SIP Emissions Reductions Strategy Commitments Modeled:

Strategy	Methodology/Approach
All Federal Motor Vehicle Control Program Standards through each evaluation year	MOBILE6 defaults
RFG (both years)	MOBILE6 default RFG, for counties subject to federal RFG
Summer conventional gasoline Reid Vapor Pressure (RVP) limits	MOBILE6 input. Use regulated limits with assumed refiner compliance safety margins, 8.7 psi (for 9.0 limit counties), 7.6 psi (for 7.8 limit counties), and the 7.0 psi limit for El Paso
Texas Low Emissions Diesel (LED)	Post-process diesel vehicle emissions factors for subject counties using evaluation year-specific NOx reduction factors developed by TTI
ATP*	MOBILE6 descriptive input, for I/M-subject counties (no emissions factor post-processing)
IM Program*	MOBILE6 descriptive input, for I/M subject counties (no post-processing performed for “May I/M start” counties)

* See [Appendix B](#) for ATP and I/M input descriptions (Table B-8 through Table B-11).

14. Mobile Source Emissions Reduction Strategies: No emissions reductions were taken for Mobile Source Emissions Reduction Strategies.

Emissions Index

The emissions index is a ratio of the peak-period emissions. For any scenario, the peak-period emissions are estimated and then combined in a ratio to the base year peak-period emissions. If emissions decrease, the index value will be less than 1.0. Separate indices may be developed for each pollutant, or a composite emissions index may be developed for both pollutants or each peak period and both peaks.

CONCLUSIONS

The following assumptions and procedures used to derive the emissions rates and their use in preparing an emissions index for use in comparing emissions impacts of alternative TMMP networks are as follows.

- NO_x and VOC emissions rates are provided for 2000 and 2025 morning and evening peak periods, applicable to peak traffic periods in each of the eight Texas transportation management areas (TMAs) included in the TMMP effort.
- The process described in the report develops an emissions index for the morning and evening peak periods. This index provides a relative comparison of the effect of the transportation investments on emissions levels against a 2000 base. It is not an inventory or emissions estimate. Nor should the emissions index be confused with the Texas Congestion Index (TCI) itself (which is the ratio of congested VHT to freeflow VHT).
- The TCI spreadsheet is used to calculate the tons of peak period emissions for each year. These outputs for each year are used to create a morning and evening peak-period emissions index. The peak periods include travel for 6-9 a.m. and 4-7 p.m.
- Order of magnitude peak-period emissions are generated using vehicle-miles of travel by functional classification for each of the eight urbanized area transportation networks. The NO_x and VOC emissions rates are added and then used to estimate the amount of annual emissions. The combined emissions index is calculated by dividing estimated emissions for a given year by the emissions for 2000. This provides an indication of the change in emissions that might result from the modeled transportation system. For example,

$$I_{2025} = (E_{\text{voc}2025} + E_{\text{nox}2025}) / (E_{\text{voc}2000} + E_{\text{nox}2000}),$$

Where:

I_{2025} is the combined emissions index for 2025, and

$E_{\text{voc}2025}$ is the estimated VOC emissions for peak periods in 2025, etc.

- Morning and evening peak period vehicle-miles of travel are calculated for freeway and arterial functional classifications (rates are based on MOBILE6 data for 7-8 a.m. and 5-6 p.m.).
- Vehicle fleet mix is for the TxDOT district in which each TMA is located.
- MOBILE6 setups are the same as used for emissions inventories in the respective areas except TxDOT district level input parameters are used.
- Data provided for each network scenario is used to create an index value for each TMA morning peak period and evening peak period.
- Typical scenarios are:
 - 2000 baseline;
 - 2025 financially constrained metropolitan transportation plan (MTP); and
 - 2025 TMMP (all MTP capacity deficiencies alleviated to target level of congestion).

REFERENCES

1. Procedures for Emissions Inventory Preparation, Volume IV: Mobile Sources (U.S. Environmental Protection Agency, Office of Air and Radiation, Emission Planning and Strategy Division, Office of Mobile Sources and Technical Support Division, Office of Air Quality Planning and Standards, EPA-450/4-81-026d Revised, 1992).
2. Technical Guidance on the Use of MOBILE6 for Emissions Inventory Preparation (U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Transportation and Air Quality, January 2002).
3. User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emissions Factor Model (U.S. Environmental Protection Agency, Assessment and Standards Division, Office of Transportation and Air Quality, EPA420-R-03-010, August 2003).
4. Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division, Emission Factor and Inventory Group, Draft, June 2003).
5. Texas Mobile Source Emissions Software User's Guide: MOBILE6 (Texas Transportation Institute, under Texas Commission on Environmental Quality, Umbrella Contract 60200-03-02, Task 1, Final, May 2003).
6. VMT Mix Estimation Method Refinement for MOBILE6 (Texas Transportation Institute, under Texas Commission on Environmental Quality, Umbrella Contract 60200-03-06, Task 2, Final, August 2003).
7. Development of On-Road Mobile Source Episode Emissions Inventories for All 254 Counties in Texas (Texas Transportation Institute under Texas Commission on Environmental Quality, Umbrella Contract 60200-04-10, Task 1, Review Draft, February 2004).

APPENDIX A: FLEET COMPOSITE EMISSIONS FACTORS

Fleet Composite Emissions Factors for Austin 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	8.25656	5.10659	8.47942	3.51739	13.13359	5.72954	13.52475	4.16149
3	6.72629	4.95385	6.89908	3.38642	10.49665	5.53399	10.79956	3.98624
4	4.81347	4.76293	4.92365	3.22270	7.20047	5.28954	7.39307	3.76718
5	3.66577	4.64837	3.73839	3.12447	5.22276	5.14288	5.34917	3.63575
6	3.14521	4.38038	3.23438	2.95132	4.42131	4.81627	4.55459	3.41706
7	2.77338	4.18895	2.87437	2.82764	3.84885	4.58298	3.98703	3.26085
8	2.49450	4.04538	2.60437	2.73487	3.41950	4.40802	3.56136	3.14369
9	2.27760	3.93372	2.39436	2.66273	3.08557	4.27193	3.23029	3.05256
10	2.10408	3.84438	2.22636	2.60501	2.81842	4.16306	2.96543	2.97967
11	1.97669	3.72416	2.10216	2.51546	2.63137	4.02081	2.77951	2.86965
12	1.87053	3.62397	1.99866	2.44083	2.47549	3.90226	2.62458	2.77796
13	1.78071	3.53920	1.91109	2.37769	2.34359	3.80195	2.49348	2.70038
14	1.70372	3.46654	1.83603	2.32357	2.23054	3.71597	2.38112	2.63389
15	1.63699	3.40356	1.77097	2.27666	2.13256	3.64146	2.28373	2.57626
16	1.58834	3.37165	1.70764	2.23010	2.04691	3.60616	2.18212	2.51940
17	1.54541	3.34349	1.65176	2.18902	1.97133	3.57502	2.09246	2.46923
18	1.50725	3.31846	1.60209	2.15251	1.90414	3.54734	2.01276	2.42464
19	1.47311	3.29606	1.55765	2.11984	1.84403	3.52257	1.94145	2.38474
20	1.44238	3.27591	1.51766	2.09044	1.78993	3.50027	1.87727	2.34883
21	1.41844	3.25646	1.48565	2.06330	1.75465	3.47803	1.83353	2.31529
22	1.39667	3.23878	1.45656	2.03864	1.72257	3.45780	1.79377	2.28480
23	1.37679	3.22264	1.43000	2.01611	1.69328	3.43933	1.75746	2.25696
24	1.35857	3.20784	1.40565	1.99547	1.66644	3.42240	1.72418	2.23144
25	1.34181	3.19423	1.38324	1.97647	1.64174	3.40683	1.69356	2.20796
26	1.32577	3.18439	1.36409	1.96080	1.61771	3.39462	1.66614	2.18781
27	1.31092	3.17528	1.34635	1.94629	1.59547	3.38332	1.64075	2.16915
28	1.29713	3.16681	1.32988	1.93281	1.57481	3.37282	1.61718	2.15182
29	1.28428	3.15893	1.31454	1.92027	1.55558	3.36305	1.59523	2.13568
30	1.27230	3.15158	1.30023	1.90856	1.53763	3.35393	1.57474	2.12063
31	1.25839	3.14887	1.28540	1.90297	1.51723	3.34902	1.55321	2.11210

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
32	1.24535	3.14634	1.27150	1.89774	1.49811	3.34441	1.53302	2.10411
33	1.23309	3.14395	1.25844	1.89282	1.48015	3.34009	1.51405	2.09661
34	1.22156	3.14171	1.24615	1.88819	1.46324	3.33602	1.49620	2.08954
35	1.21069	3.13959	1.23456	1.88382	1.44730	3.33218	1.47937	2.08288
36	1.20362	3.14831	1.22766	1.89049	1.43534	3.33953	1.46740	2.08813
37	1.19694	3.15656	1.22112	1.89679	1.42403	3.34648	1.45607	2.09310
38	1.19061	3.16438	1.21493	1.90277	1.41331	3.35307	1.44534	2.09780
39	1.18460	3.17179	1.20905	1.90844	1.40314	3.35932	1.43516	2.10226
40	1.17889	3.17883	1.20347	1.91382	1.39348	3.36525	1.42549	2.10650
41	1.17309	3.19675	1.19777	1.92662	1.38345	3.38211	1.41540	2.11822
42	1.16757	3.21381	1.19233	1.93882	1.37389	3.39817	1.40579	2.12937
43	1.16231	3.23007	1.18714	1.95044	1.36478	3.41349	1.39662	2.14001
44	1.15729	3.24560	1.18220	1.96154	1.35608	3.42810	1.38787	2.15017
45	1.15248	3.26044	1.17747	1.97215	1.34776	3.44207	1.37951	2.15987
46	1.14758	3.28802	1.17259	1.99100	1.33957	3.46870	1.37123	2.17774
47	1.14288	3.31443	1.16792	2.00905	1.33172	3.49420	1.36330	2.19486
48	1.13838	3.33974	1.16345	2.02635	1.32420	3.51864	1.35571	2.21125
49	1.13406	3.36401	1.15916	2.04295	1.31699	3.54207	1.34842	2.22698
50	1.12992	3.38731	1.15504	2.05887	1.31007	3.56457	1.34142	2.24208
51	1.12610	3.42737	1.15121	2.08560	1.30431	3.60379	1.33560	2.26794
52	1.12243	3.46589	1.14754	2.11129	1.29878	3.64151	1.32999	2.29280
53	1.11890	3.50295	1.14400	2.13602	1.29346	3.67779	1.32460	2.31673
54	1.11550	3.53864	1.14059	2.15983	1.28834	3.71274	1.31941	2.33977
55	1.11222	3.57303	1.13731	2.18278	1.28340	3.74641	1.31441	2.36197
56	1.10947	3.62986	1.13452	2.22002	1.27930	3.80249	1.31023	2.39843
57	1.10682	3.68470	1.13183	2.25595	1.27535	3.85659	1.30620	2.43361
58	1.10426	3.73764	1.12923	2.29065	1.27153	3.90883	1.30230	2.46757
59	1.10178	3.78879	1.12673	2.32416	1.26785	3.95930	1.29854	2.50039
60	1.09939	3.83824	1.12430	2.35657	1.26428	4.00809	1.29490	2.53211
61	1.09739	3.91878	1.12223	2.40861	1.26135	4.08793	1.29187	2.58342
62	1.09546	3.99673	1.12023	2.45898	1.25852	4.16519	1.28893	2.63308
63	1.09359	4.07221	1.11830	2.50775	1.25577	4.24000	1.28609	2.68116
64	1.09178	4.14532	1.11642	2.55499	1.25311	4.31248	1.28334	2.72774
65	1.09002	4.21619	1.11460	2.60078	1.25053	4.38272	1.28067	2.77289

Fleet Composite Emissions Factors for Austin 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	1.88129	0.47625	1.89596	0.46692	2.76200	0.62749	2.79283	0.62031
3	1.52319	0.45442	1.53232	0.44534	2.20669	0.59514	2.22840	0.58806
4	1.07556	0.42713	1.07776	0.41837	1.51256	0.55469	1.52286	0.54776
5	0.80698	0.41075	0.80503	0.40219	1.09608	0.53043	1.09954	0.52357
6	0.69241	0.37056	0.69637	0.37506	0.92899	0.47515	0.93740	0.48515
7	0.61057	0.34184	0.61877	0.35568	0.80964	0.43566	0.82159	0.45770
8	0.54919	0.32031	0.56056	0.34114	0.72012	0.40604	0.73473	0.43712
9	0.50145	0.30356	0.51529	0.32984	0.65050	0.38301	0.66717	0.42111
10	0.46326	0.29016	0.47907	0.32079	0.59480	0.36458	0.61312	0.40830
11	0.43482	0.27399	0.45195	0.30719	0.55304	0.34283	0.57244	0.38962
12	0.41112	0.26050	0.42936	0.29585	0.51824	0.32471	0.53854	0.37406
13	0.39106	0.24910	0.41024	0.28626	0.48879	0.30937	0.50985	0.36089
14	0.37387	0.23932	0.39385	0.27804	0.46355	0.29623	0.48527	0.34960
15	0.35897	0.23084	0.37965	0.27092	0.44168	0.28483	0.46396	0.33982
16	0.34732	0.22950	0.36499	0.26425	0.42056	0.28277	0.43965	0.33063
17	0.33704	0.22831	0.35206	0.25836	0.40193	0.28095	0.41820	0.32252
18	0.32791	0.22725	0.34056	0.25312	0.38536	0.27933	0.39914	0.31532
19	0.31973	0.22631	0.33027	0.24844	0.37054	0.27789	0.38208	0.30887
20	0.31238	0.22546	0.32102	0.24423	0.35721	0.27658	0.36673	0.30307
21	0.30692	0.22450	0.31393	0.24032	0.34953	0.27501	0.35738	0.29762
22	0.30197	0.22363	0.30748	0.23678	0.34255	0.27358	0.34887	0.29267
23	0.29744	0.22284	0.30160	0.23354	0.33618	0.27227	0.34110	0.28814
24	0.29330	0.22211	0.29620	0.23057	0.33034	0.27107	0.33398	0.28400
25	0.28948	0.22144	0.29124	0.22783	0.32497	0.26997	0.32744	0.28018
26	0.28565	0.22087	0.28684	0.22539	0.31938	0.26886	0.32126	0.27667
27	0.28210	0.22033	0.28277	0.22312	0.31421	0.26784	0.31554	0.27341
28	0.27880	0.21984	0.27899	0.22101	0.30941	0.26689	0.31022	0.27039
29	0.27573	0.21938	0.27547	0.21905	0.30494	0.26600	0.30528	0.26757
30	0.27287	0.21895	0.27219	0.21723	0.30076	0.26518	0.30066	0.26494
31	0.26965	0.21851	0.26888	0.21617	0.29606	0.26423	0.29584	0.26318
32	0.26664	0.21811	0.26578	0.21519	0.29166	0.26334	0.29132	0.26153
33	0.26381	0.21772	0.26287	0.21426	0.28751	0.26250	0.28707	0.25998
34	0.26114	0.21736	0.26013	0.21339	0.28362	0.26171	0.28308	0.25852
35	0.25863	0.21702	0.25755	0.21257	0.27994	0.26097	0.27931	0.25714

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
36	0.25659	0.21769	0.25559	0.21321	0.27658	0.26137	0.27601	0.25751
37	0.25467	0.21833	0.25374	0.21382	0.27340	0.26175	0.27288	0.25786
38	0.25284	0.21893	0.25199	0.21439	0.27039	0.26211	0.26992	0.25818
39	0.25111	0.21950	0.25033	0.21494	0.26753	0.26245	0.26711	0.25850
40	0.24946	0.22004	0.24875	0.21546	0.26482	0.26277	0.26444	0.25879
41	0.24777	0.22133	0.24711	0.21665	0.26191	0.26386	0.26157	0.25979
42	0.24616	0.22256	0.24555	0.21779	0.25915	0.26490	0.25883	0.26073
43	0.24463	0.22373	0.24407	0.21887	0.25651	0.26589	0.25622	0.26163
44	0.24316	0.22484	0.24265	0.21991	0.25399	0.26683	0.25373	0.26250
45	0.24176	0.22591	0.24129	0.22090	0.25158	0.26773	0.25135	0.26332
46	0.24038	0.22766	0.23994	0.22248	0.24933	0.26931	0.24912	0.26472
47	0.23905	0.22934	0.23865	0.22400	0.24717	0.27081	0.24698	0.26607
48	0.23778	0.23095	0.23741	0.22545	0.24511	0.27226	0.24493	0.26735
49	0.23656	0.23249	0.23622	0.22685	0.24313	0.27364	0.24296	0.26859
50	0.23539	0.23397	0.23507	0.22819	0.24122	0.27497	0.24107	0.26977
51	0.23438	0.23632	0.23408	0.23028	0.23983	0.27716	0.23969	0.27170
52	0.23340	0.23858	0.23312	0.23229	0.23849	0.27927	0.23837	0.27355
53	0.23246	0.24076	0.23221	0.23422	0.23720	0.28130	0.23709	0.27534
54	0.23156	0.24286	0.23132	0.23608	0.23596	0.28326	0.23586	0.27705
55	0.23069	0.24488	0.23047	0.23787	0.23477	0.28514	0.23467	0.27871
56	0.23002	0.24802	0.22980	0.24062	0.23381	0.28813	0.23371	0.28130
57	0.22937	0.25104	0.22915	0.24326	0.23288	0.29102	0.23279	0.28381
58	0.22874	0.25397	0.22852	0.24582	0.23199	0.29381	0.23190	0.28623
59	0.22813	0.25679	0.22792	0.24829	0.23113	0.29650	0.23103	0.28857
60	0.22754	0.25952	0.22734	0.25068	0.23029	0.29911	0.23020	0.29082
61	0.22707	0.26377	0.22686	0.25434	0.22960	0.30322	0.22950	0.29435
62	0.22661	0.26787	0.22639	0.25788	0.22894	0.30719	0.22882	0.29776
63	0.22617	0.27185	0.22594	0.26131	0.22829	0.31104	0.22816	0.30106
64	0.22574	0.27570	0.22551	0.26464	0.22767	0.31477	0.22753	0.30426
65	0.22533	0.27943	0.22508	0.26786	0.22706	0.31838	0.22691	0.30736

Fleet Composite Emissions Factors for Corpus Christi 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	9.90968	4.03976	9.33581	5.90580	12.28892	4.33721	11.54231	6.16666
3	8.02983	3.90112	7.60812	5.71442	9.83126	4.17375	9.28142	5.95330
4	5.68002	3.72781	5.44850	5.47520	6.75919	3.96942	6.45531	5.68660
5	4.27013	3.62383	4.15272	5.33167	4.91594	3.84682	4.75964	5.52658
6	3.64551	3.37675	3.58926	5.06713	4.14728	3.56621	4.06275	5.23934
7	3.19934	3.20026	3.18678	4.87818	3.59823	3.36577	3.56498	5.03416
8	2.86472	3.06789	2.88493	4.73646	3.18644	3.21545	3.19165	4.88028
9	2.60446	2.96494	2.65015	4.62623	2.86616	3.09853	2.90128	4.76059
10	2.39625	2.88258	2.46233	4.53805	2.60994	3.00499	2.66898	4.66484
11	2.24628	2.77664	2.31732	4.39760	2.43097	2.88660	2.49687	4.51429
12	2.12131	2.68836	2.19648	4.28056	2.28183	2.78794	2.35345	4.38884
13	2.01556	2.61367	2.09424	4.18152	2.15563	2.70445	2.23209	4.28268
14	1.92492	2.54964	2.00659	4.09663	2.04746	2.63290	2.12807	4.19169
15	1.84636	2.49415	1.93064	4.02306	1.95372	2.57088	2.03792	4.11283
16	1.78770	2.47388	1.85483	3.94498	1.87788	2.54842	1.94608	4.02962
17	1.73594	2.45600	1.78794	3.87610	1.81096	2.52861	1.86505	3.95619
18	1.68993	2.44011	1.72848	3.81486	1.75148	2.51099	1.79302	3.89093
19	1.64877	2.42588	1.67528	3.76007	1.69826	2.49524	1.72857	3.83253
20	1.61172	2.41308	1.62740	3.71077	1.65036	2.48105	1.67057	3.77998
21	1.58345	2.40052	1.58803	3.66509	1.61648	2.46666	1.62586	3.73107
22	1.55776	2.38910	1.55224	3.62356	1.58568	2.45357	1.58520	3.68660
23	1.53430	2.37867	1.51956	3.58565	1.55756	2.44162	1.54809	3.64601
24	1.51279	2.36912	1.48960	3.55090	1.53178	2.43067	1.51407	3.60879
25	1.49301	2.36032	1.46205	3.51892	1.50807	2.42059	1.48276	3.57456
26	1.47422	2.35389	1.43793	3.49444	1.48548	2.41260	1.45504	3.54779
27	1.45682	2.34792	1.41560	3.47177	1.46456	2.40520	1.42936	3.52301
28	1.44066	2.34239	1.39487	3.45073	1.44513	2.39833	1.40552	3.49999
29	1.42562	2.33724	1.37557	3.43113	1.42705	2.39193	1.38333	3.47857
30	1.41158	2.33243	1.35755	3.41284	1.41017	2.38596	1.36261	3.45857
31	1.39500	2.33019	1.33893	3.40647	1.39059	2.38227	1.34115	3.45057
32	1.37946	2.32809	1.32147	3.40050	1.37223	2.37881	1.32104	3.44308
33	1.36486	2.32612	1.30507	3.39489	1.35499	2.37556	1.30214	3.43604
34	1.35111	2.32426	1.28963	3.38961	1.33876	2.37250	1.28436	3.42941
35	1.33816	2.32251	1.27507	3.38463	1.32345	2.36961	1.26759	3.42317

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
36	1.32963	2.32919	1.26533	3.39763	1.31280	2.37540	1.25583	3.43535
37	1.32157	2.33552	1.25611	3.40992	1.30272	2.38088	1.24471	3.44687
38	1.31393	2.34150	1.24738	3.42157	1.29318	2.38607	1.23417	3.45778
39	1.30668	2.34719	1.23910	3.43261	1.28412	2.39100	1.22418	3.46813
40	1.29980	2.35259	1.23123	3.44311	1.27551	2.39567	1.21468	3.47797
41	1.29272	2.36567	1.22343	3.47044	1.26666	2.40804	1.20521	3.50463
42	1.28598	2.37814	1.21601	3.49646	1.25823	2.41981	1.19619	3.53002
43	1.27956	2.39002	1.20893	3.52128	1.25019	2.43104	1.18759	3.55422
44	1.27343	2.40136	1.20217	3.54496	1.24251	2.44175	1.17938	3.57733
45	1.26757	2.41220	1.19571	3.56760	1.23518	2.45199	1.17154	3.59941
46	1.26143	2.43160	1.18923	3.61066	1.22763	2.47072	1.16373	3.64186
47	1.25555	2.45017	1.18303	3.65190	1.22040	2.48865	1.15626	3.68251
48	1.24992	2.46796	1.17708	3.69141	1.21348	2.50584	1.14909	3.72146
49	1.24451	2.48503	1.17138	3.72932	1.20683	2.52233	1.14222	3.75882
50	1.23932	2.50142	1.16590	3.76570	1.20045	2.53815	1.13562	3.79469
51	1.23435	2.52900	1.16085	3.82896	1.19461	2.56511	1.12974	3.85738
52	1.22958	2.55552	1.15600	3.88979	1.18899	2.59104	1.12409	3.91765
53	1.22498	2.58104	1.15133	3.94832	1.18359	2.61598	1.11865	3.97565
54	1.22055	2.60561	1.14684	4.00468	1.17838	2.64000	1.11342	4.03150
55	1.21628	2.62929	1.14250	4.05900	1.17336	2.66315	1.10837	4.08532
56	1.21253	2.66782	1.13891	4.14952	1.16906	2.70109	1.10424	4.17530
57	1.20892	2.70499	1.13544	4.23687	1.16491	2.73770	1.10026	4.26213
58	1.20543	2.74088	1.13208	4.32121	1.16090	2.77305	1.09641	4.34595
59	1.20205	2.77555	1.12884	4.40268	1.15702	2.80719	1.09269	4.42694
60	1.19879	2.80907	1.12571	4.48144	1.15328	2.84020	1.08910	4.50523
61	1.19591	2.86301	1.12321	4.61063	1.15006	2.89358	1.08628	4.63390
62	1.19313	2.91520	1.12080	4.73566	1.14695	2.94524	1.08355	4.75842
63	1.19043	2.96574	1.11845	4.85671	1.14393	2.99525	1.08091	4.87899
64	1.18781	3.01470	1.11618	4.97398	1.14102	3.04371	1.07835	4.99579
65	1.18528	3.06215	1.11398	5.08765	1.13819	3.09067	1.07587	5.10900

Fleet Composite Emissions Factors for Corpus Christi 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	2.14252	0.50726	2.01375	0.55827	2.53347	0.58514	2.36889	0.62729
3	1.72591	0.48317	1.63404	0.53343	2.02089	0.55469	1.90221	0.59682
4	1.20514	0.45306	1.15941	0.50238	1.38016	0.51664	1.31886	0.55873
5	0.89267	0.43499	0.87464	0.48375	0.99573	0.49380	0.96885	0.53588
6	0.76156	0.39101	0.75794	0.45192	0.83995	0.44112	0.82977	0.49820
7	0.66791	0.35960	0.67458	0.42919	0.72868	0.40348	0.73043	0.47129
8	0.59767	0.33605	0.61207	0.41214	0.64523	0.37526	0.65593	0.45110
9	0.54304	0.31772	0.56344	0.39888	0.58032	0.35331	0.59798	0.43540
10	0.49934	0.30306	0.52455	0.38827	0.52840	0.33575	0.55162	0.42284
11	0.46744	0.28561	0.49391	0.37211	0.49064	0.31512	0.51566	0.40410
12	0.44087	0.27106	0.46838	0.35864	0.45918	0.29793	0.48569	0.38849
13	0.41838	0.25875	0.44678	0.34724	0.43256	0.28338	0.46033	0.37527
14	0.39910	0.24820	0.42826	0.33748	0.40974	0.27092	0.43859	0.36395
15	0.38240	0.23905	0.41222	0.32901	0.38997	0.26011	0.41976	0.35413
16	0.36949	0.23789	0.39527	0.32075	0.37303	0.25845	0.39915	0.34458
17	0.35809	0.23687	0.38032	0.31346	0.35809	0.25698	0.38097	0.33616
18	0.34796	0.23596	0.36702	0.30699	0.34481	0.25567	0.36480	0.32867
19	0.33890	0.23514	0.35513	0.30119	0.33292	0.25450	0.35034	0.32197
20	0.33075	0.23441	0.34443	0.29597	0.32223	0.25345	0.33733	0.31594
21	0.32500	0.23353	0.33597	0.29113	0.31546	0.25214	0.32793	0.31030
22	0.31978	0.23273	0.32827	0.28673	0.30930	0.25095	0.31939	0.30518
23	0.31501	0.23201	0.32125	0.28270	0.30368	0.24987	0.31160	0.30050
24	0.31064	0.23134	0.31481	0.27902	0.29853	0.24887	0.30445	0.29620
25	0.30662	0.23072	0.30888	0.27563	0.29379	0.24796	0.29788	0.29226
26	0.30260	0.23015	0.30353	0.27272	0.28899	0.24702	0.29181	0.28879
27	0.29888	0.22963	0.29857	0.27003	0.28455	0.24616	0.28619	0.28559
28	0.29543	0.22914	0.29397	0.26754	0.28042	0.24536	0.28098	0.28262
29	0.29221	0.22868	0.28969	0.26521	0.27657	0.24461	0.27612	0.27985
30	0.28921	0.22826	0.28569	0.26304	0.27298	0.24391	0.27159	0.27726
31	0.28579	0.22775	0.28167	0.26193	0.26891	0.24306	0.26699	0.27577
32	0.28258	0.22727	0.27791	0.26089	0.26509	0.24226	0.26267	0.27437
33	0.27956	0.22683	0.27438	0.25992	0.26150	0.24151	0.25862	0.27306
34	0.27673	0.22641	0.27106	0.25900	0.25812	0.24081	0.25481	0.27182
35	0.27405	0.22601	0.26792	0.25813	0.25494	0.24014	0.25121	0.27066

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
36	0.27191	0.22663	0.26545	0.25904	0.25223	0.24056	0.24822	0.27138
37	0.26988	0.22721	0.26311	0.25990	0.24966	0.24095	0.24539	0.27207
38	0.26796	0.22777	0.26089	0.26071	0.24723	0.24132	0.24271	0.27272
39	0.26614	0.22829	0.25879	0.26148	0.24493	0.24167	0.24017	0.27334
40	0.26441	0.22879	0.25680	0.26222	0.24274	0.24200	0.23776	0.27392
41	0.26261	0.23000	0.25479	0.26408	0.24042	0.24304	0.23528	0.27564
42	0.26089	0.23114	0.25288	0.26586	0.23822	0.24403	0.23293	0.27728
43	0.25926	0.23224	0.25105	0.26755	0.23611	0.24497	0.23068	0.27884
44	0.25770	0.23328	0.24931	0.26917	0.23411	0.24587	0.22853	0.28033
45	0.25620	0.23428	0.24765	0.27072	0.23219	0.24673	0.22648	0.28176
46	0.25469	0.23587	0.24602	0.27345	0.23029	0.24818	0.22451	0.28435
47	0.25324	0.23740	0.24447	0.27606	0.22848	0.24956	0.22262	0.28684
48	0.25186	0.23886	0.24297	0.27857	0.22675	0.25088	0.22082	0.28922
49	0.25053	0.24027	0.24154	0.28097	0.22508	0.25215	0.21908	0.29151
50	0.24925	0.24162	0.24017	0.28328	0.22348	0.25337	0.21742	0.29370
51	0.24811	0.24372	0.23898	0.28712	0.22215	0.25533	0.21605	0.29741
52	0.24701	0.24574	0.23784	0.29081	0.22087	0.25721	0.21474	0.30098
53	0.24596	0.24768	0.23674	0.29436	0.21963	0.25903	0.21348	0.30441
54	0.24494	0.24955	0.23568	0.29778	0.21844	0.26077	0.21226	0.30771
55	0.24396	0.25136	0.23466	0.30107	0.21730	0.26245	0.21109	0.31090
56	0.24317	0.25411	0.23387	0.30638	0.21636	0.26507	0.21018	0.31609
57	0.24240	0.25677	0.23311	0.31151	0.21545	0.26760	0.20929	0.32110
58	0.24166	0.25934	0.23238	0.31646	0.21458	0.27004	0.20844	0.32594
59	0.24094	0.26183	0.23167	0.32124	0.21373	0.27240	0.20761	0.33061
60	0.24024	0.26422	0.23099	0.32586	0.21291	0.27468	0.20682	0.33513
61	0.23965	0.26790	0.23047	0.33326	0.21221	0.27823	0.20620	0.34241
62	0.23908	0.27146	0.22996	0.34042	0.21153	0.28167	0.20559	0.34946
63	0.23853	0.27491	0.22947	0.34736	0.21087	0.28499	0.20501	0.35629
64	0.23799	0.27825	0.22900	0.35408	0.21024	0.28822	0.20445	0.36290
65	0.23747	0.28149	0.22854	0.36059	0.20962	0.29134	0.20391	0.36931

Fleet Composite Emissions Factors for Dallas 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	6.03797	5.57745	6.14984	4.07161	8.54848	6.05556	8.72726	4.56080
3	4.89550	5.41603	4.98033	3.92634	6.78548	5.85833	6.92089	4.37886
4	3.46742	5.21427	3.51843	3.74475	4.58173	5.61179	4.66292	4.15143
5	2.61058	5.09321	2.64129	3.63579	3.25948	5.46386	3.30814	4.01498
6	2.24759	4.81542	2.29088	3.44156	2.75890	5.13744	2.81706	3.78296
7	1.98831	4.61700	2.04059	3.30283	2.40134	4.90428	2.46629	3.61723
8	1.79386	4.46819	1.85287	3.19878	2.13317	4.72941	2.20322	3.49293
9	1.64261	4.35245	1.70687	3.11785	1.92460	4.59340	1.99860	3.39626
10	1.52162	4.25985	1.59007	3.05311	1.75774	4.48459	1.83491	3.31892
11	1.43512	4.13339	1.50619	2.95182	1.65531	4.33997	1.73475	3.20077
12	1.36303	4.02801	1.43630	2.86742	1.56995	4.21945	1.65128	3.10232
13	1.30204	3.93884	1.37716	2.79600	1.49772	4.11748	1.58065	3.01901
14	1.24976	3.86241	1.32647	2.73478	1.43582	4.03007	1.52012	2.94760
15	1.20445	3.79617	1.28254	2.68172	1.38216	3.95432	1.46765	2.88571
16	1.16979	3.75866	1.23886	2.62756	1.34399	3.91379	1.42004	2.82302
17	1.13922	3.72557	1.20032	2.57977	1.31031	3.87803	1.37803	2.76771
18	1.11204	3.69615	1.16607	2.53729	1.28037	3.84625	1.34069	2.71854
19	1.08772	3.66983	1.13542	2.49928	1.25358	3.81781	1.30728	2.67455
20	1.06583	3.64614	1.10784	2.46508	1.22948	3.79221	1.27721	2.63495
21	1.04800	3.62327	1.08503	2.43331	1.20552	3.76682	1.24794	2.59786
22	1.03179	3.60247	1.06430	2.40443	1.18374	3.74373	1.22134	2.56414
23	1.01699	3.58348	1.04537	2.37806	1.16386	3.72265	1.19704	2.53335
24	1.00342	3.56608	1.02802	2.35389	1.14563	3.70333	1.17478	2.50512
25	0.99094	3.55006	1.01205	2.33166	1.12886	3.68555	1.15429	2.47916
26	0.97871	3.53835	0.99784	2.31365	1.11279	3.67171	1.13604	2.45741
27	0.96740	3.52751	0.98468	2.29697	1.09791	3.65889	1.11915	2.43727
28	0.95689	3.51744	0.97246	2.28149	1.08409	3.64699	1.10346	2.41857
29	0.94710	3.50807	0.96108	2.26707	1.07122	3.63591	1.08886	2.40115
30	0.93797	3.49932	0.95046	2.25361	1.05921	3.62557	1.07523	2.38490
31	0.92799	3.49606	0.93989	2.24747	1.04643	3.62032	1.06176	2.37619
32	0.91864	3.49300	0.92998	2.24170	1.03445	3.61541	1.04913	2.36803
33	0.90985	3.49013	0.92068	2.23629	1.02319	3.61079	1.03726	2.36035

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.90158	3.48743	0.91192	2.23119	1.01260	3.60644	1.02609	2.35313
35	0.89378	3.48489	0.90365	2.22639	1.00261	3.60234	1.01557	2.34633
36	0.88804	3.49410	0.89803	2.23411	0.99511	3.61032	1.00814	2.35279
37	0.88260	3.50282	0.89271	2.24142	0.98802	3.61788	1.00111	2.35890
38	0.87746	3.51107	0.88767	2.24834	0.98130	3.62503	0.99445	2.36469
39	0.87258	3.51891	0.88289	2.25491	0.97492	3.63182	0.98814	2.37019
40	0.86794	3.52635	0.87835	2.26114	0.96887	3.63827	0.98214	2.37541
41	0.86332	3.54592	0.87380	2.27697	0.96291	3.65686	0.97622	2.39024
42	0.85892	3.56455	0.86948	2.29205	0.95724	3.67456	0.97058	2.40436
43	0.85472	3.58232	0.86535	2.30643	0.95183	3.69144	0.96520	2.41782
44	0.85072	3.59928	0.86141	2.32015	0.94666	3.70756	0.96007	2.43068
45	0.84689	3.61549	0.85764	2.33326	0.94173	3.72295	0.95516	2.44296
46	0.84327	3.64615	0.85407	2.35753	0.93671	3.75272	0.95015	2.46631
47	0.83981	3.67550	0.85064	2.38077	0.93191	3.78123	0.94535	2.48867
48	0.83649	3.70364	0.84736	2.40304	0.92730	3.80854	0.94075	2.51010
49	0.83331	3.73062	0.84421	2.42439	0.92289	3.83474	0.93634	2.53066
50	0.83025	3.75652	0.84119	2.44490	0.91865	3.85989	0.93210	2.55039
51	0.82768	3.80146	0.83864	2.48007	0.91483	3.90401	0.92827	2.58472
52	0.82520	3.84467	0.83618	2.51388	0.91116	3.94644	0.92458	2.61772
53	0.82282	3.88625	0.83382	2.54642	0.90763	3.98726	0.92103	2.64949
54	0.82053	3.92629	0.83155	2.57775	0.90423	4.02657	0.91762	2.68007
55	0.81832	3.96487	0.82935	2.60794	0.90095	4.06445	0.91433	2.70955
56	0.81668	4.02903	0.82771	2.65774	0.89846	4.12785	0.91181	2.75856
57	0.81509	4.09093	0.82611	2.70579	0.89605	4.18903	0.90938	2.80586
58	0.81355	4.15071	0.82458	2.75218	0.89373	4.24809	0.90703	2.85153
59	0.81207	4.20845	0.82309	2.79699	0.89148	4.30516	0.90477	2.89564
60	0.81063	4.26427	0.82166	2.84032	0.88931	4.36032	0.90257	2.93829
61	0.80964	4.35564	0.82065	2.91078	0.88775	4.45096	0.90098	3.00801
62	0.80869	4.44405	0.81966	2.97897	0.88625	4.53868	0.89943	3.07549
63	0.80776	4.52966	0.81872	3.04499	0.88479	4.62362	0.89794	3.14082
64	0.80686	4.61260	0.81780	3.10895	0.88337	4.70590	0.89649	3.20411
65	0.80599	4.69298	0.81690	3.17094	0.88200	4.78565	0.89508	3.26545

Fleet Composite Emissions Factors for Dallas 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	1.35547	0.32184	1.36845	0.30409	1.46596	0.40788	1.48227	0.39254
3	1.08531	0.30698	1.09157	0.28971	1.16356	0.38637	1.17217	0.37133
4	0.74761	0.28840	0.74546	0.27173	0.78556	0.35948	0.78455	0.34481
5	0.54499	0.27725	0.53779	0.26095	0.55876	0.34334	0.55198	0.32889
6	0.46628	0.24955	0.46191	0.24220	0.47487	0.30581	0.47087	0.30277
7	0.41007	0.22977	0.40771	0.22881	0.41495	0.27901	0.41293	0.28410
8	0.36791	0.21493	0.36706	0.21877	0.37001	0.25891	0.36948	0.27010
9	0.33512	0.20339	0.33545	0.21096	0.33506	0.24327	0.33569	0.25922
10	0.30888	0.19415	0.31015	0.20471	0.30710	0.23076	0.30865	0.25051
11	0.29036	0.18284	0.29271	0.19530	0.28951	0.21595	0.29218	0.23783
12	0.27493	0.17341	0.27818	0.18746	0.27485	0.20361	0.27846	0.22727
13	0.26188	0.16543	0.26588	0.18082	0.26244	0.19317	0.26685	0.21833
14	0.25068	0.15860	0.25534	0.17513	0.25181	0.18422	0.25690	0.21066
15	0.24098	0.15267	0.24621	0.17020	0.24259	0.17647	0.24827	0.20402
16	0.23248	0.15118	0.23654	0.16551	0.23550	0.17460	0.24001	0.19775
17	0.22497	0.14987	0.22802	0.16138	0.22924	0.17295	0.23272	0.19221
18	0.21830	0.14871	0.22044	0.15770	0.22367	0.17149	0.22624	0.18729
19	0.21233	0.14766	0.21365	0.15441	0.21869	0.17018	0.22044	0.18288
20	0.20696	0.14672	0.20755	0.15145	0.21421	0.16900	0.21522	0.17892
21	0.20257	0.14572	0.20259	0.14871	0.20929	0.16764	0.20969	0.17522
22	0.19857	0.14480	0.19808	0.14622	0.20481	0.16640	0.20467	0.17185
23	0.19492	0.14397	0.19397	0.14394	0.20073	0.16527	0.20008	0.16878
24	0.19158	0.14321	0.19020	0.14186	0.19699	0.16424	0.19587	0.16596
25	0.18850	0.14250	0.18673	0.13994	0.19354	0.16328	0.19200	0.16337
26	0.18535	0.14193	0.18336	0.13826	0.18999	0.16239	0.18822	0.16103
27	0.18243	0.14140	0.18024	0.13671	0.18671	0.16157	0.18471	0.15886
28	0.17972	0.14090	0.17734	0.13526	0.18366	0.16080	0.18146	0.15685
29	0.17719	0.14044	0.17465	0.13392	0.18082	0.16009	0.17843	0.15498
30	0.17483	0.14002	0.17213	0.13266	0.17817	0.15942	0.17560	0.15323
31	0.17251	0.13967	0.16979	0.13183	0.17554	0.15876	0.17293	0.15193
32	0.17033	0.13935	0.16760	0.13105	0.17306	0.15814	0.17043	0.15070
33	0.16829	0.13905	0.16554	0.13031	0.17074	0.15755	0.16808	0.14956

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.16636	0.13876	0.16360	0.12962	0.16856	0.15700	0.16587	0.14848
35	0.16455	0.13849	0.16177	0.12897	0.16650	0.15648	0.16378	0.14746
36	0.16297	0.13912	0.16032	0.12954	0.16465	0.15697	0.16206	0.14789
37	0.16147	0.13972	0.15894	0.13008	0.16291	0.15743	0.16043	0.14829
38	0.16006	0.14029	0.15764	0.13059	0.16126	0.15787	0.15889	0.14867
39	0.15871	0.14083	0.15640	0.13108	0.15970	0.15829	0.15743	0.14903
40	0.15744	0.14134	0.15523	0.13154	0.15821	0.15868	0.15604	0.14937
41	0.15619	0.14249	0.15407	0.13254	0.15673	0.15972	0.15463	0.15025
42	0.15499	0.14358	0.15296	0.13349	0.15531	0.16071	0.15329	0.15109
43	0.15386	0.14463	0.15190	0.13439	0.15397	0.16165	0.15202	0.15189
44	0.15277	0.14563	0.15089	0.13525	0.15268	0.16255	0.15080	0.15265
45	0.15174	0.14658	0.14992	0.13607	0.15145	0.16341	0.14964	0.15338
46	0.15080	0.14822	0.14905	0.13744	0.15033	0.16495	0.14857	0.15464
47	0.14990	0.14980	0.14820	0.13875	0.14927	0.16642	0.14755	0.15584
48	0.14905	0.15130	0.14740	0.14001	0.14824	0.16783	0.14658	0.15699
49	0.14822	0.15275	0.14663	0.14121	0.14726	0.16918	0.14564	0.15810
50	0.14743	0.15414	0.14588	0.14237	0.14631	0.17047	0.14474	0.15916
51	0.14686	0.15641	0.14535	0.14421	0.14565	0.17264	0.14411	0.16090
52	0.14631	0.15859	0.14483	0.14599	0.14501	0.17473	0.14351	0.16257
53	0.14578	0.16070	0.14434	0.14770	0.14440	0.17673	0.14292	0.16418
54	0.14527	0.16272	0.14386	0.14934	0.14381	0.17866	0.14236	0.16573
55	0.14478	0.16467	0.14340	0.15093	0.14324	0.18052	0.14182	0.16723
56	0.14452	0.16778	0.14316	0.15341	0.14292	0.18353	0.14151	0.16960
57	0.14427	0.17077	0.14292	0.15580	0.14260	0.18643	0.14121	0.17189
58	0.14403	0.17367	0.14269	0.15810	0.14230	0.18923	0.14093	0.17410
59	0.14380	0.17646	0.14247	0.16033	0.14201	0.19193	0.14065	0.17623
60	0.14357	0.17917	0.14226	0.16249	0.14173	0.19454	0.14038	0.17830
61	0.14350	0.18346	0.14219	0.16586	0.14162	0.19873	0.14026	0.18157
62	0.14343	0.18761	0.14212	0.16912	0.14151	0.20279	0.14015	0.18473
63	0.14337	0.19163	0.14205	0.17228	0.14140	0.20671	0.14003	0.18779
64	0.14331	0.19552	0.14199	0.17534	0.14130	0.21052	0.13993	0.19076
65	0.14325	0.19930	0.14192	0.17830	0.14120	0.21420	0.13982	0.19363

Fleet Composite Emissions Factors for El Paso 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	9.51054	5.27037	9.76746	3.51117	12.05739	5.78570	12.41164	4.04658
3	7.69244	5.11342	7.88391	3.38460	9.65456	5.58914	9.92091	3.87885
4	5.41981	4.91723	5.52947	3.22638	6.65102	5.34345	6.80750	3.66918
5	4.05623	4.79952	4.11680	3.13145	4.84890	5.19603	4.93946	3.54339
6	3.47371	4.52016	3.54889	2.96409	4.12156	4.86699	4.22057	3.33529
7	3.05762	4.32061	3.14324	2.84455	3.60204	4.63196	3.70708	3.18665
8	2.74556	4.17095	2.83900	2.75489	3.21239	4.45568	3.32197	3.07517
9	2.50284	4.05455	2.60237	2.68516	2.90933	4.31858	3.02243	2.98846
10	2.30866	3.96143	2.41307	2.62937	2.66689	4.20890	2.78280	2.91910
11	2.17288	3.83558	2.28142	2.54264	2.50416	4.06451	2.62309	2.81452
12	2.05972	3.73071	2.17171	2.47036	2.36856	3.94419	2.48999	2.72737
13	1.96397	3.64197	2.07888	2.40920	2.25382	3.84238	2.37737	2.65363
14	1.88191	3.56591	1.99932	2.35677	2.15547	3.75511	2.28083	2.59042
15	1.81078	3.49999	1.93036	2.31134	2.07023	3.67947	2.19717	2.53564
16	1.75842	3.46760	1.86454	2.26714	2.00262	3.64301	2.11582	2.48223
17	1.71222	3.43901	1.80647	2.22814	1.94297	3.61083	2.04405	2.43510
18	1.67115	3.41360	1.75485	2.19348	1.88995	3.58223	1.98024	2.39321
19	1.63441	3.39086	1.70866	2.16246	1.84251	3.55664	1.92315	2.35573
20	1.60134	3.37040	1.66709	2.13454	1.79981	3.53361	1.87178	2.32200
21	1.57334	3.35094	1.63183	2.10899	1.76570	3.51088	1.83033	2.29059
22	1.54789	3.33325	1.59976	2.08576	1.73469	3.49022	1.79265	2.26205
23	1.52465	3.31710	1.57049	2.06455	1.70637	3.47136	1.75825	2.23598
24	1.50334	3.30229	1.54366	2.04511	1.68042	3.45407	1.72672	2.21209
25	1.48375	3.28867	1.51897	2.02722	1.65654	3.43816	1.69770	2.19011
26	1.46502	3.27914	1.49757	2.01241	1.63373	3.42592	1.67213	2.17113
27	1.44768	3.27032	1.47775	1.99869	1.61261	3.41458	1.64845	2.15355
28	1.43158	3.26213	1.45935	1.98595	1.59300	3.40406	1.62646	2.13723
29	1.41659	3.25450	1.44222	1.97409	1.57474	3.39426	1.60599	2.12203
30	1.40260	3.24738	1.42623	1.96302	1.55769	3.38511	1.58688	2.10785
31	1.38712	3.24531	1.41010	1.95802	1.53894	3.38062	1.56738	2.09993
32	1.37260	3.24338	1.39498	1.95334	1.52135	3.37641	1.54910	2.09250
33	1.35897	3.24156	1.38078	1.94893	1.50483	3.37245	1.53192	2.08552

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	1.34613	3.23985	1.36742	1.94479	1.48929	3.36873	1.51576	2.07896
35	1.33403	3.23823	1.35481	1.94089	1.47463	3.36522	1.50052	2.07276
36	1.32570	3.24768	1.34688	1.94747	1.46408	3.37292	1.49028	2.07754
37	1.31781	3.25662	1.33937	1.95371	1.45411	3.38021	1.48060	2.08206
38	1.31035	3.26509	1.33226	1.95961	1.44466	3.38712	1.47143	2.08633
39	1.30326	3.27313	1.32551	1.96521	1.43569	3.39367	1.46274	2.09039
40	1.29653	3.28076	1.31910	1.97054	1.42717	3.39989	1.45447	2.09425
41	1.28987	3.29979	1.31269	1.98251	1.41866	3.41746	1.44615	2.10471
42	1.28352	3.31792	1.30659	1.99392	1.41056	3.43419	1.43822	2.11467
43	1.27746	3.33520	1.30077	2.00480	1.40283	3.45015	1.43066	2.12417
44	1.27168	3.35170	1.29521	2.01518	1.39545	3.46538	1.42345	2.13323
45	1.26616	3.36746	1.28990	2.02511	1.38841	3.47993	1.41655	2.14190
46	1.26037	3.39656	1.28423	2.04220	1.38117	3.50769	1.40939	2.15760
47	1.25482	3.42443	1.27881	2.05858	1.37424	3.53428	1.40253	2.17264
48	1.24950	3.45114	1.27361	2.07426	1.36760	3.55975	1.39596	2.18705
49	1.24441	3.47675	1.26863	2.08931	1.36124	3.58419	1.38966	2.20087
50	1.23951	3.50134	1.26384	2.10376	1.35512	3.60764	1.38361	2.21414
51	1.23473	3.54359	1.25909	2.12770	1.34947	3.64865	1.37796	2.23679
52	1.23012	3.58421	1.25452	2.15071	1.34404	3.68808	1.37253	2.25856
53	1.22570	3.62330	1.25012	2.17286	1.33882	3.72602	1.36731	2.27952
54	1.22143	3.66094	1.24589	2.19419	1.33378	3.76255	1.36228	2.29970
55	1.21732	3.69721	1.24181	2.21474	1.32893	3.79776	1.35743	2.31914
56	1.21388	3.75703	1.23834	2.24769	1.32497	3.85642	1.35341	2.35089
57	1.21057	3.81476	1.23499	2.27949	1.32114	3.91303	1.34954	2.38152
58	1.20736	3.87050	1.23176	2.31019	1.31745	3.96768	1.34579	2.41109
59	1.20427	3.92434	1.22864	2.33985	1.31388	4.02048	1.34218	2.43967
60	1.20128	3.97640	1.22562	2.36852	1.31043	4.07152	1.33868	2.46729
61	1.19882	4.06098	1.22306	2.41403	1.30768	4.15500	1.33583	2.51165
62	1.19644	4.14283	1.22059	2.45807	1.30502	4.23578	1.33306	2.55458
63	1.19414	4.22209	1.21819	2.50072	1.30245	4.31401	1.33038	2.59614
64	1.19191	4.29887	1.21587	2.54203	1.29995	4.38978	1.32778	2.63641
65	1.18974	4.37329	1.21362	2.58207	1.29753	4.46323	1.32527	2.67544

Fleet Composite Emissions Factors for El Paso 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	2.05558	0.62766	2.09342	0.58881	2.43077	0.78045	2.48123	0.74691
3	1.64025	0.60142	1.66539	0.56362	1.92716	0.74261	1.96194	0.70972
4	1.12110	0.56863	1.13035	0.53214	1.29765	0.69531	1.31283	0.66322
5	0.80960	0.54896	0.80933	0.51325	0.91994	0.66693	0.92336	0.63533
6	0.69044	0.49942	0.69389	0.48107	0.77921	0.60200	0.78552	0.59089
7	0.60533	0.46404	0.61144	0.45808	0.67869	0.55562	0.68707	0.55915
8	0.54149	0.43751	0.54960	0.44084	0.60330	0.52083	0.61323	0.53534
9	0.49184	0.41687	0.50150	0.42743	0.54467	0.49378	0.55580	0.51682
10	0.45212	0.40036	0.46302	0.41670	0.49776	0.47213	0.50985	0.50201
11	0.42548	0.38000	0.43768	0.40033	0.46658	0.44612	0.47981	0.48026
12	0.40329	0.36303	0.41657	0.38669	0.44061	0.42444	0.45478	0.46213
13	0.38450	0.34867	0.39870	0.37515	0.41863	0.40609	0.43359	0.44679
14	0.36841	0.33636	0.38339	0.36525	0.39979	0.39037	0.41544	0.43365
15	0.35445	0.32569	0.37012	0.35668	0.38346	0.37674	0.39970	0.42225
16	0.34355	0.32385	0.35696	0.34872	0.36949	0.37388	0.38342	0.41157
17	0.33392	0.32223	0.34534	0.34169	0.35716	0.37136	0.36905	0.40215
18	0.32537	0.32079	0.33502	0.33545	0.34620	0.36911	0.35628	0.39378
19	0.31772	0.31950	0.32578	0.32986	0.33640	0.36711	0.34485	0.38628
20	0.31083	0.31834	0.31747	0.32483	0.32758	0.36530	0.33457	0.37954
21	0.30521	0.31714	0.31068	0.32021	0.32095	0.36326	0.32676	0.37323
22	0.30010	0.31605	0.30451	0.31601	0.31492	0.36141	0.31967	0.36749
23	0.29544	0.31505	0.29888	0.31218	0.30942	0.35971	0.31319	0.36225
24	0.29116	0.31414	0.29372	0.30867	0.30437	0.35816	0.30725	0.35745
25	0.28723	0.31330	0.28897	0.30544	0.29973	0.35673	0.30179	0.35303
26	0.28334	0.31268	0.28467	0.30257	0.29505	0.35541	0.29669	0.34898
27	0.27973	0.31211	0.28069	0.29991	0.29072	0.35418	0.29197	0.34522
28	0.27638	0.31159	0.27699	0.29745	0.28669	0.35304	0.28758	0.34173
29	0.27326	0.31109	0.27355	0.29515	0.28294	0.35199	0.28350	0.33849
30	0.27035	0.31064	0.27034	0.29301	0.27944	0.35100	0.27969	0.33546
31	0.26736	0.31030	0.26731	0.29194	0.27580	0.35001	0.27599	0.33356
32	0.26456	0.30998	0.26447	0.29093	0.27239	0.34909	0.27251	0.33177
33	0.26193	0.30969	0.26180	0.28999	0.26918	0.34822	0.26925	0.33010

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.25946	0.30941	0.25929	0.28910	0.26616	0.34741	0.26618	0.32853
35	0.25712	0.30915	0.25692	0.28826	0.26331	0.34664	0.26328	0.32704
36	0.25523	0.31024	0.25517	0.28922	0.26082	0.34730	0.26092	0.32756
37	0.25343	0.31127	0.25351	0.29012	0.25847	0.34794	0.25869	0.32804
38	0.25173	0.31225	0.25194	0.29097	0.25625	0.34854	0.25657	0.32851
39	0.25012	0.31317	0.25045	0.29178	0.25414	0.34910	0.25457	0.32895
40	0.24859	0.31406	0.24903	0.29255	0.25213	0.34964	0.25266	0.32936
41	0.24708	0.31605	0.24763	0.29419	0.25009	0.35129	0.25070	0.33064
42	0.24565	0.31794	0.24629	0.29575	0.24815	0.35285	0.24883	0.33186
43	0.24428	0.31975	0.24501	0.29724	0.24629	0.35435	0.24705	0.33302
44	0.24298	0.32148	0.24379	0.29866	0.24452	0.35577	0.24535	0.33413
45	0.24173	0.32313	0.24262	0.30002	0.24283	0.35713	0.24373	0.33519
46	0.24047	0.32584	0.24142	0.30212	0.24117	0.35952	0.24211	0.33696
47	0.23925	0.32844	0.24026	0.30413	0.23958	0.36181	0.24057	0.33864
48	0.23809	0.33093	0.23916	0.30605	0.23806	0.36401	0.23909	0.34026
49	0.23698	0.33331	0.23809	0.30790	0.23660	0.36611	0.23767	0.34182
50	0.23591	0.33560	0.23707	0.30967	0.23520	0.36813	0.23630	0.34331
51	0.23494	0.33925	0.23613	0.31237	0.23403	0.37148	0.23516	0.34570
52	0.23400	0.34276	0.23523	0.31496	0.23291	0.37470	0.23406	0.34800
53	0.23310	0.34614	0.23436	0.31746	0.23183	0.37780	0.23300	0.35021
54	0.23224	0.34939	0.23352	0.31986	0.23079	0.38079	0.23199	0.35234
55	0.23140	0.35252	0.23271	0.32218	0.22978	0.38367	0.23100	0.35439
56	0.23081	0.35740	0.23212	0.32566	0.22904	0.38827	0.23027	0.35758
57	0.23023	0.36212	0.23156	0.32902	0.22833	0.39271	0.22955	0.36066
58	0.22967	0.36667	0.23101	0.33226	0.22764	0.39700	0.22887	0.36364
59	0.22914	0.37106	0.23048	0.33539	0.22697	0.40115	0.22820	0.36651
60	0.22862	0.37531	0.22997	0.33842	0.22632	0.40516	0.22756	0.36928
61	0.22826	0.38193	0.22959	0.34299	0.22585	0.41151	0.22707	0.37358
62	0.22791	0.38834	0.22923	0.34741	0.22539	0.41766	0.22659	0.37774
63	0.22757	0.39455	0.22887	0.35169	0.22495	0.42362	0.22613	0.38176
64	0.22724	0.40056	0.22853	0.35584	0.22452	0.42939	0.22568	0.38566
65	0.22692	0.40638	0.22820	0.35986	0.22410	0.43498	0.22525	0.38944

Fleet Composite Emissions Factors for Houston 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	6.50657	4.08295	6.54229	3.38129	8.13773	4.50710	8.18777	3.80810
3	5.25055	3.94720	5.27672	3.25303	6.49674	4.34057	6.53397	3.64886
4	3.68052	3.77750	3.69476	3.09270	4.44552	4.13240	4.46671	3.44981
5	2.73851	3.67569	2.74559	2.99650	3.21478	4.00750	3.22636	3.33038
6	2.34498	3.43453	2.37001	2.82581	2.72768	3.72425	2.75674	3.12769
7	2.06389	3.26228	2.10175	2.70389	2.37976	3.52193	2.42129	2.98291
8	1.85307	3.13308	1.90055	2.61245	2.11881	3.37019	2.16971	2.87433
9	1.68910	3.03260	1.74406	2.54133	1.91586	3.25217	1.97403	2.78988
10	1.55792	2.95222	1.61887	2.48443	1.75349	3.15775	1.81749	2.72231
11	1.46730	2.84616	1.53162	2.39594	1.64651	3.03599	1.71378	2.61954
12	1.39179	2.75777	1.45892	2.32221	1.55735	2.93453	1.62735	2.53389
13	1.32789	2.68299	1.39740	2.25981	1.48191	2.84867	1.55423	2.46141
14	1.27313	2.61889	1.34467	2.20633	1.41725	2.77508	1.49154	2.39929
15	1.22566	2.56333	1.29897	2.15998	1.36121	2.71130	1.43722	2.34546
16	1.19045	2.53848	1.25433	2.11350	1.31781	2.68396	1.38415	2.29177
17	1.15939	2.51656	1.21495	2.07248	1.27951	2.65984	1.33732	2.24440
18	1.13178	2.49707	1.17994	2.03601	1.24547	2.63840	1.29570	2.20229
19	1.10707	2.47963	1.14862	2.00339	1.21502	2.61922	1.25845	2.16462
20	1.08484	2.46394	1.12042	1.97403	1.18761	2.60195	1.22494	2.13071
21	1.06684	2.44856	1.09711	1.94680	1.16578	2.58450	1.19767	2.09901
22	1.05047	2.43459	1.07592	1.92205	1.14595	2.56863	1.17289	2.07018
23	1.03553	2.42183	1.05657	1.89945	1.12783	2.55414	1.15026	2.04387
24	1.02183	2.41013	1.03884	1.87874	1.11123	2.54086	1.12952	2.01974
25	1.00923	2.39937	1.02252	1.85968	1.09595	2.52865	1.11043	1.99755
26	0.99704	2.39141	1.00819	1.84396	1.08124	2.51892	1.09352	1.97869
27	0.98575	2.38404	0.99493	1.82940	1.06762	2.50992	1.07787	1.96124
28	0.97526	2.37719	0.98261	1.81589	1.05497	2.50156	1.06333	1.94503
29	0.96550	2.37082	0.97114	1.80330	1.04319	2.49377	1.04979	1.92993
30	0.95639	2.36487	0.96043	1.79156	1.03220	2.48651	1.03716	1.91585
31	0.94632	2.36222	0.94973	1.78575	1.02015	2.48221	1.02445	1.90793
32	0.93688	2.35973	0.93970	1.78031	1.00885	2.47817	1.01253	1.90051
33	0.92801	2.35740	0.93028	1.77520	0.99824	2.47439	1.00134	1.89355

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.91966	2.35520	0.92141	1.77039	0.98825	2.47082	0.99080	1.88699
35	0.91179	2.35313	0.91305	1.76585	0.97883	2.46746	0.98087	1.88080
36	0.90618	2.36025	0.90751	1.77237	0.97192	2.47356	0.97401	1.88629
37	0.90087	2.36698	0.90227	1.77853	0.96539	2.47934	0.96753	1.89149
38	0.89585	2.37336	0.89730	1.78436	0.95919	2.48481	0.96138	1.89641
39	0.89108	2.37941	0.89259	1.78990	0.95332	2.49000	0.95556	1.90108
40	0.88655	2.38516	0.88811	1.79516	0.94774	2.49493	0.95002	1.90552
41	0.88201	2.39960	0.88362	1.80800	0.94213	2.50858	0.94445	1.91756
42	0.87768	2.41335	0.87933	1.82023	0.93680	2.52157	0.93914	1.92903
43	0.87355	2.42646	0.87525	1.83189	0.93171	2.53396	0.93409	1.93996
44	0.86962	2.43898	0.87135	1.84302	0.92685	2.54579	0.92926	1.95040
45	0.86585	2.45094	0.86762	1.85366	0.92221	2.55709	0.92464	1.96037
46	0.86207	2.47291	0.86387	1.87287	0.91756	2.57834	0.92001	1.97885
47	0.85845	2.49395	0.86028	1.89126	0.91311	2.59869	0.91558	1.99654
48	0.85498	2.51412	0.85683	1.90889	0.90884	2.61819	0.91133	2.01350
49	0.85166	2.53346	0.85353	1.92579	0.90475	2.63690	0.90726	2.02977
50	0.84846	2.55203	0.85036	1.94202	0.90082	2.65485	0.90335	2.04538
51	0.84565	2.58373	0.84756	1.96947	0.89742	2.68590	0.89996	2.07216
52	0.84294	2.61421	0.84487	1.99585	0.89415	2.71574	0.89670	2.09791
53	0.84034	2.64354	0.84227	2.02125	0.89101	2.74446	0.89356	2.12269
54	0.83783	2.67178	0.83978	2.04570	0.88798	2.77212	0.89054	2.14655
55	0.83541	2.69899	0.83737	2.06926	0.88507	2.79877	0.88763	2.16954
56	0.83352	2.74375	0.83549	2.10774	0.88282	2.84292	0.88538	2.20741
57	0.83170	2.78694	0.83367	2.14487	0.88064	2.88552	0.88321	2.24395
58	0.82994	2.82864	0.83191	2.18073	0.87855	2.92665	0.88111	2.27923
59	0.82823	2.86892	0.83021	2.21536	0.87652	2.96638	0.87909	2.31331
60	0.82659	2.90787	0.82857	2.24884	0.87456	3.00480	0.87713	2.34626
61	0.82534	2.97109	0.82732	2.30291	0.87311	3.06744	0.87567	2.39974
62	0.82414	3.03227	0.82611	2.35523	0.87171	3.12806	0.87425	2.45150
63	0.82297	3.09150	0.82493	2.40589	0.87035	3.18675	0.87289	2.50161
64	0.82184	3.14889	0.82380	2.45497	0.86903	3.24362	0.87156	2.55016
65	0.82075	3.20451	0.82269	2.50253	0.86776	3.29873	0.87027	2.59722

Fleet Composite Emissions Factors for Houston 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	1.39092	0.29109	1.39208	0.28491	1.51808	0.36424	1.52007	0.35827
3	1.10695	0.27731	1.10698	0.27133	1.20528	0.34493	1.20596	0.33914
4	0.75199	0.26008	0.75062	0.25435	0.81429	0.32078	0.81332	0.31522
5	0.53902	0.24974	0.53680	0.24417	0.57969	0.30629	0.57773	0.30087
6	0.45784	0.22356	0.45921	0.22640	0.49078	0.27184	0.49242	0.27708
7	0.39986	0.20486	0.40378	0.21371	0.42728	0.24723	0.43148	0.26009
8	0.35637	0.19083	0.36221	0.20420	0.37965	0.22877	0.38578	0.24735
9	0.32255	0.17992	0.32988	0.19680	0.34261	0.21442	0.35023	0.23743
10	0.29549	0.17119	0.30401	0.19087	0.31298	0.20293	0.32180	0.22950
11	0.27719	0.16069	0.28651	0.18195	0.29290	0.18948	0.30251	0.21791
12	0.26195	0.15193	0.27192	0.17452	0.27617	0.17827	0.28644	0.20825
13	0.24905	0.14452	0.25957	0.16823	0.26202	0.16879	0.27284	0.20007
14	0.23799	0.13817	0.24899	0.16284	0.24988	0.16066	0.26118	0.19307
15	0.22841	0.13266	0.23982	0.15817	0.23937	0.15361	0.25108	0.18699
16	0.22036	0.13163	0.23022	0.15374	0.23013	0.15228	0.24026	0.18127
17	0.21326	0.13073	0.22175	0.14984	0.22198	0.15111	0.23071	0.17623
18	0.20694	0.12992	0.21422	0.14637	0.21474	0.15007	0.22223	0.17174
19	0.20130	0.12920	0.20748	0.14327	0.20826	0.14914	0.21463	0.16773
20	0.19621	0.12855	0.20141	0.14047	0.20243	0.14830	0.20780	0.16411
21	0.19224	0.12782	0.19658	0.13789	0.19804	0.14728	0.20252	0.16074
22	0.18864	0.12715	0.19218	0.13554	0.19404	0.14636	0.19773	0.15768
23	0.18534	0.12655	0.18817	0.13339	0.19040	0.14552	0.19335	0.15488
24	0.18232	0.12599	0.18449	0.13143	0.18706	0.14475	0.18934	0.15232
25	0.17954	0.12548	0.18111	0.12962	0.18398	0.14403	0.18564	0.14996
26	0.17671	0.12504	0.17785	0.12802	0.18080	0.14335	0.18203	0.14783
27	0.17408	0.12464	0.17484	0.12655	0.17785	0.14271	0.17869	0.14586
28	0.17164	0.12426	0.17204	0.12518	0.17511	0.14211	0.17558	0.14403
29	0.16937	0.12392	0.16944	0.12391	0.17257	0.14156	0.17269	0.14233
30	0.16725	0.12359	0.16701	0.12272	0.17019	0.14105	0.16999	0.14073
31	0.16517	0.12327	0.16477	0.12191	0.16780	0.14047	0.16744	0.13955
32	0.16323	0.12298	0.16267	0.12115	0.16557	0.13993	0.16506	0.13844
33	0.16140	0.12270	0.16070	0.12045	0.16347	0.13942	0.16281	0.13740

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.15967	0.12243	0.15885	0.11978	0.16149	0.13894	0.16070	0.13642
35	0.15805	0.12218	0.15710	0.11915	0.15963	0.13849	0.15871	0.13550
36	0.15667	0.12275	0.15575	0.11969	0.15797	0.13894	0.15709	0.13593
37	0.15536	0.12328	0.15447	0.12021	0.15641	0.13937	0.15555	0.13635
38	0.15413	0.12378	0.15326	0.12070	0.15493	0.13977	0.15409	0.13674
39	0.15296	0.12426	0.15211	0.12116	0.15352	0.14016	0.15271	0.13711
40	0.15184	0.12471	0.15102	0.12160	0.15219	0.14052	0.15139	0.13746
41	0.15074	0.12568	0.14994	0.12253	0.15083	0.14141	0.15005	0.13831
42	0.14969	0.12661	0.14891	0.12342	0.14953	0.14226	0.14877	0.13911
43	0.14869	0.12749	0.14792	0.12426	0.14830	0.14306	0.14756	0.13988
44	0.14773	0.12833	0.14699	0.12506	0.14712	0.14383	0.14639	0.14061
45	0.14682	0.12913	0.14609	0.12583	0.14599	0.14457	0.14528	0.14131
46	0.14597	0.13047	0.14525	0.12709	0.14497	0.14583	0.14428	0.14249
47	0.14516	0.13175	0.14446	0.12830	0.14400	0.14703	0.14331	0.14362
48	0.14438	0.13297	0.14369	0.12945	0.14307	0.14818	0.14239	0.14471
49	0.14364	0.13415	0.14296	0.13056	0.14217	0.14929	0.14151	0.14574
50	0.14292	0.13528	0.14225	0.13162	0.14131	0.15035	0.14066	0.14674
51	0.14240	0.13708	0.14174	0.13331	0.14074	0.15208	0.14009	0.14835
52	0.14190	0.13881	0.14125	0.13492	0.14019	0.15374	0.13955	0.14989
53	0.14142	0.14048	0.14077	0.13648	0.13966	0.15534	0.13903	0.15138
54	0.14095	0.14208	0.14031	0.13798	0.13915	0.15687	0.13852	0.15281
55	0.14050	0.14363	0.13987	0.13942	0.13865	0.15835	0.13804	0.15419
56	0.14027	0.14605	0.13964	0.14166	0.13838	0.16070	0.13777	0.15635
57	0.14004	0.14838	0.13941	0.14382	0.13812	0.16296	0.13751	0.15844
58	0.13982	0.15063	0.13920	0.14591	0.13787	0.16514	0.13726	0.16046
59	0.13960	0.15281	0.13899	0.14792	0.13763	0.16725	0.13702	0.16241
60	0.13940	0.15491	0.13878	0.14987	0.13739	0.16929	0.13679	0.16429
61	0.13933	0.15820	0.13871	0.15290	0.13730	0.17251	0.13669	0.16725
62	0.13926	0.16138	0.13864	0.15583	0.13720	0.17562	0.13660	0.17011
63	0.13919	0.16446	0.13858	0.15867	0.13712	0.17863	0.13651	0.17288
64	0.13913	0.16745	0.13851	0.16142	0.13703	0.18155	0.13642	0.17557
65	0.13907	0.17034	0.13845	0.16409	0.13695	0.18438	0.13634	0.17817

Fleet Composite Emissions Factors for Lubbock 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	11.92473	9.02452	12.43220	6.05127	21.07732	9.43762	22.13703	6.49479
3	9.70809	8.77463	10.08688	5.84928	16.79650	9.15714	17.60280	6.26006
4	6.93729	8.46227	7.15522	5.59679	11.44548	8.80654	11.93500	5.96664
5	5.27480	8.27486	5.39623	5.44530	8.23487	8.59617	8.53433	5.79060
6	4.53038	7.86362	4.65060	5.17009	6.94755	8.14343	7.21365	5.48185
7	3.99866	7.56989	4.11800	4.97351	6.02804	7.82004	6.27031	5.26131
8	3.59986	7.34958	3.71855	4.82608	5.33841	7.57750	5.56281	5.09591
9	3.28969	7.17823	3.40787	4.71140	4.80203	7.38886	5.01253	4.96726
10	3.04155	7.04116	3.15933	4.61967	4.37292	7.23795	4.57230	4.86435
11	2.84979	6.84196	2.97004	4.47431	4.05385	7.02292	4.24804	4.70380
12	2.69000	6.67596	2.81230	4.35318	3.78795	6.84373	3.97782	4.57000
13	2.55479	6.53550	2.67882	4.25069	3.56296	6.69210	3.74917	4.45679
14	2.43889	6.41511	2.56442	4.16284	3.37012	6.56214	3.55319	4.35976
15	2.33845	6.31077	2.46527	4.08670	3.20298	6.44951	3.38334	4.27566
16	2.25083	6.23149	2.36438	4.00687	3.03261	6.36757	3.19417	4.18807
17	2.17351	6.16154	2.27537	3.93643	2.88229	6.29527	3.02726	4.11078
18	2.10479	6.09936	2.19625	3.87382	2.74867	6.23100	2.87889	4.04208
19	2.04330	6.04372	2.12545	3.81780	2.62911	6.17350	2.74614	3.98061
20	1.98796	5.99365	2.06174	3.76738	2.52151	6.12174	2.62667	3.92529
21	1.94402	5.94638	2.01138	3.72082	2.45567	6.07227	2.55293	3.87384
22	1.90408	5.90340	1.96559	3.67849	2.39581	6.02730	2.48589	3.82706
23	1.86761	5.86416	1.92379	3.63984	2.34116	5.98623	2.42469	3.78435
24	1.83417	5.82819	1.88547	3.60442	2.29106	5.94859	2.36858	3.74520
25	1.80341	5.79510	1.85022	3.57182	2.24497	5.91396	2.31696	3.70918
26	1.77394	5.77171	1.81890	3.54670	2.19979	5.88871	2.26892	3.68059
27	1.74666	5.75006	1.78989	3.52345	2.15794	5.86533	2.22444	3.65411
28	1.72132	5.72995	1.76296	3.50185	2.11909	5.84362	2.18314	3.62953
29	1.69773	5.71122	1.73789	3.48174	2.08292	5.82340	2.14468	3.60664
30	1.67571	5.69375	1.71449	3.46297	2.04916	5.80454	2.10879	3.58528
31	1.65154	5.68939	1.69014	3.45650	2.01214	5.79845	2.07080	3.57651
32	1.62888	5.68531	1.66732	3.45042	1.97744	5.79274	2.03519	3.56828
33	1.60760	5.68147	1.64588	3.44472	1.94484	5.78738	2.00174	3.56055

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	1.58757	5.67786	1.62570	3.43935	1.91416	5.78233	1.97025	3.55327
35	1.56868	5.67446	1.60667	3.43429	1.88523	5.77757	1.94056	3.54641
36	1.55460	5.69214	1.59329	3.44729	1.86115	5.79412	1.91658	3.55821
37	1.54128	5.70887	1.58063	3.45960	1.83837	5.80977	1.89389	3.56938
38	1.52866	5.72472	1.56863	3.47125	1.81679	5.82460	1.87240	3.57996
39	1.51668	5.73975	1.55725	3.48231	1.79632	5.83867	1.85200	3.59000
40	1.50531	5.75404	1.54644	3.49282	1.77687	5.85204	1.83263	3.59953
41	1.49417	5.79254	1.53571	3.51991	1.75697	5.88965	1.81261	3.62569
42	1.48356	5.82921	1.52550	3.54571	1.73802	5.92547	1.79354	3.65060
43	1.47344	5.86418	1.51575	3.57032	1.71996	5.95963	1.77536	3.67435
44	1.46378	5.89755	1.50645	3.59380	1.70271	5.99224	1.75800	3.69702
45	1.45456	5.92945	1.49757	3.61624	1.68623	6.02339	1.74142	3.71869
46	1.44534	5.99121	1.48853	3.65863	1.67013	6.08435	1.72508	3.76022
47	1.43652	6.05035	1.47987	3.69921	1.65472	6.14271	1.70943	3.79999
48	1.42807	6.10702	1.47158	3.73810	1.63995	6.19864	1.69444	3.83810
49	1.41996	6.16138	1.46362	3.77540	1.62578	6.25229	1.68006	3.87465
50	1.41217	6.21356	1.45599	3.81121	1.61218	6.30379	1.66625	3.90975
51	1.40495	6.30520	1.44877	3.87332	1.60070	6.39470	1.65453	3.97110
52	1.39801	6.39331	1.44184	3.93305	1.58965	6.48212	1.64326	4.03009
53	1.39132	6.47809	1.43516	3.99052	1.57903	6.56623	1.63241	4.08686
54	1.38489	6.55973	1.42874	4.04586	1.56880	6.64723	1.62197	4.14153
55	1.37869	6.63841	1.42254	4.09919	1.55894	6.72529	1.61190	4.19420
56	1.37355	6.77037	1.41728	4.18784	1.55062	6.85659	1.60327	4.28217
57	1.36859	6.89769	1.41220	4.27339	1.54259	6.98328	1.59494	4.36704
58	1.36380	7.02063	1.40729	4.35598	1.53483	7.10560	1.58690	4.44899
59	1.35917	7.13940	1.40256	4.43577	1.52734	7.22377	1.57913	4.52817
60	1.35469	7.25421	1.39797	4.51291	1.52010	7.33801	1.57162	4.60470
61	1.35118	7.44334	1.39420	4.63910	1.51418	7.52652	1.56528	4.73024
62	1.34778	7.62637	1.39055	4.76123	1.50844	7.70895	1.55915	4.85174
63	1.34449	7.80359	1.38701	4.87948	1.50289	7.88559	1.55322	4.96938
64	1.34130	7.97528	1.38359	4.99403	1.49751	8.05671	1.54747	5.08334
65	1.33821	8.14167	1.38027	5.10506	1.49229	8.22256	1.54190	5.19380

Fleet Composite Emissions Factors for Lubbock 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	2.51151	0.77665	2.59209	0.71195	4.11660	0.89405	4.27899	0.83582
3	2.02651	0.74440	2.08415	0.68131	3.28240	0.85347	3.40401	0.79639
4	1.42026	0.70409	1.44922	0.64302	2.23965	0.80275	2.31028	0.74711
5	1.05652	0.67990	1.06826	0.62004	1.61400	0.77232	1.65404	0.71754
6	0.90482	0.62337	0.91916	0.58076	1.36236	0.70397	1.40010	0.66903
7	0.79646	0.58300	0.81266	0.55270	1.18263	0.65515	1.21872	0.63437
8	0.71519	0.55271	0.73278	0.53166	1.04782	0.61853	1.08268	0.60838
9	0.65198	0.52916	0.67066	0.51529	0.94297	0.59005	0.97688	0.58816
10	0.60142	0.51032	0.62096	0.50220	0.85910	0.56727	0.89223	0.57199
11	0.56264	0.48596	0.58326	0.48217	0.79147	0.53850	0.82424	0.54779
12	0.53033	0.46566	0.55184	0.46548	0.73511	0.51453	0.76758	0.52762
13	0.50299	0.44849	0.52525	0.45135	0.68742	0.49424	0.71964	0.51056
14	0.47955	0.43377	0.50247	0.43924	0.64655	0.47685	0.67855	0.49593
15	0.45924	0.42101	0.48272	0.42875	0.61112	0.46178	0.64294	0.48325
16	0.44125	0.41599	0.46152	0.41850	0.57181	0.45616	0.59924	0.47092
17	0.42537	0.41155	0.44281	0.40945	0.53713	0.45120	0.56069	0.46003
18	0.41126	0.40762	0.42618	0.40140	0.50630	0.44679	0.52641	0.45036
19	0.39863	0.40409	0.41130	0.39421	0.47871	0.44285	0.49575	0.44170
20	0.38727	0.40092	0.39791	0.38773	0.45389	0.43930	0.46815	0.43391
21	0.37920	0.39779	0.38828	0.38173	0.44199	0.43566	0.45445	0.42663
22	0.37187	0.39494	0.37953	0.37628	0.43118	0.43235	0.44200	0.42001
23	0.36517	0.39234	0.37154	0.37130	0.42131	0.42933	0.43062	0.41397
24	0.35903	0.38996	0.36422	0.36674	0.41226	0.42656	0.42020	0.40843
25	0.35338	0.38777	0.35748	0.36254	0.40393	0.42401	0.41061	0.40334
26	0.34773	0.38613	0.35139	0.35898	0.39522	0.42194	0.40129	0.39888
27	0.34249	0.38461	0.34575	0.35568	0.38716	0.42002	0.39266	0.39475
28	0.33763	0.38320	0.34052	0.35261	0.37967	0.41824	0.38465	0.39092
29	0.33310	0.38188	0.33564	0.34976	0.37270	0.41658	0.37719	0.38735
30	0.32888	0.38066	0.33109	0.34709	0.36619	0.41503	0.37023	0.38402
31	0.32429	0.38006	0.32651	0.34581	0.35897	0.41401	0.36288	0.38215
32	0.31998	0.37949	0.32222	0.34460	0.35220	0.41306	0.35598	0.38039
33	0.31594	0.37896	0.31818	0.34346	0.34584	0.41217	0.34951	0.37874

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.31213	0.37847	0.31438	0.34239	0.33986	0.41133	0.34341	0.37718
35	0.30855	0.37800	0.31080	0.34138	0.33421	0.41053	0.33767	0.37571
36	0.30550	0.37944	0.30792	0.34259	0.32882	0.41175	0.33232	0.37668
37	0.30262	0.38080	0.30520	0.34374	0.32372	0.41289	0.32727	0.37760
38	0.29989	0.38209	0.30262	0.34482	0.31888	0.41398	0.32248	0.37847
39	0.29730	0.38331	0.30017	0.34585	0.31430	0.41500	0.31793	0.37929
40	0.29483	0.38447	0.29785	0.34683	0.30994	0.41598	0.31362	0.38007
41	0.29236	0.38748	0.29548	0.34926	0.30530	0.41882	0.30897	0.38233
42	0.29001	0.39034	0.29323	0.35158	0.30088	0.42152	0.30454	0.38448
43	0.28777	0.39306	0.29108	0.35380	0.29667	0.42409	0.30032	0.38653
44	0.28563	0.39567	0.28903	0.35591	0.29265	0.42655	0.29630	0.38849
45	0.28359	0.39816	0.28707	0.35793	0.28880	0.42890	0.29245	0.39036
46	0.28157	0.40269	0.28512	0.36148	0.28528	0.43329	0.28890	0.39376
47	0.27965	0.40704	0.28324	0.36489	0.28191	0.43749	0.28551	0.39701
48	0.27780	0.41120	0.28145	0.36816	0.27867	0.44151	0.28226	0.40013
49	0.27603	0.41520	0.27973	0.37129	0.27557	0.44537	0.27913	0.40312
50	0.27433	0.41903	0.27807	0.37429	0.27259	0.44908	0.27614	0.40599
51	0.27284	0.42554	0.27661	0.37930	0.27050	0.45545	0.27404	0.41086
52	0.27141	0.43180	0.27520	0.38411	0.26849	0.46158	0.27202	0.41553
53	0.27003	0.43782	0.27384	0.38874	0.26656	0.46748	0.27007	0.42003
54	0.26871	0.44362	0.27253	0.39320	0.26469	0.47317	0.26820	0.42437
55	0.26743	0.44921	0.27127	0.39749	0.26289	0.47864	0.26640	0.42854
56	0.26643	0.45836	0.27027	0.40442	0.26144	0.48767	0.26492	0.43534
57	0.26547	0.46718	0.26929	0.41111	0.26004	0.49638	0.26349	0.44191
58	0.26453	0.47571	0.26836	0.41756	0.25869	0.50479	0.26211	0.44824
59	0.26363	0.48394	0.26745	0.42379	0.25739	0.51291	0.26077	0.45436
60	0.26277	0.49190	0.26657	0.42982	0.25613	0.52077	0.25948	0.46028
61	0.26210	0.50478	0.26587	0.43946	0.25511	0.53353	0.25841	0.46980
62	0.26145	0.51724	0.26518	0.44879	0.25413	0.54589	0.25737	0.47902
63	0.26083	0.52931	0.26452	0.45782	0.25318	0.55785	0.25637	0.48794
64	0.26022	0.54100	0.26388	0.46658	0.25226	0.56944	0.25540	0.49659
65	0.25964	0.55233	0.26326	0.47506	0.25136	0.58067	0.25445	0.50497

Fleet Composite Emissions Factors for Pharr 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	13.32494	4.42463	13.20199	4.34884	17.81424	4.73554	17.64080	4.65760
3	10.69719	4.27286	10.60061	4.18853	14.11733	4.55731	13.98193	4.47103
4	7.41250	4.08316	7.34888	3.98815	9.49619	4.33451	9.40833	4.23782
5	5.44168	3.96934	5.39784	3.86792	6.72351	4.20084	6.66418	4.09789
6	4.62946	3.70387	4.62596	3.65703	5.64368	3.90012	5.62791	3.86008
7	4.04930	3.51426	4.07461	3.50640	4.87237	3.68532	4.88773	3.69022
8	3.61418	3.37204	3.66111	3.39343	4.29388	3.52422	4.33259	3.56283
9	3.27575	3.26143	3.33949	3.30556	3.84395	3.39892	3.90081	3.46374
10	3.00501	3.17295	3.08219	3.23527	3.48401	3.29869	3.55539	3.38447
11	2.81587	3.05839	2.90025	3.12596	3.23764	3.17095	3.31692	3.26320
12	2.65825	2.96293	2.74863	3.03487	3.03233	3.06450	3.11820	3.16215
13	2.52488	2.88216	2.62034	2.95780	2.85861	2.97443	2.95006	3.07664
14	2.41057	2.81293	2.51037	2.89174	2.70970	2.89722	2.80593	3.00334
15	2.31149	2.75292	2.41507	2.83448	2.58065	2.83031	2.68102	2.93982
16	2.23091	2.72926	2.31953	2.77644	2.46452	2.80418	2.55022	2.87567
17	2.15981	2.70839	2.23523	2.72523	2.36206	2.78111	2.43481	2.81906
18	2.09661	2.68983	2.16029	2.67971	2.27098	2.76062	2.33223	2.76875
19	2.04006	2.67323	2.09324	2.63898	2.18948	2.74227	2.24044	2.72373
20	1.98917	2.65828	2.03290	2.60232	2.11614	2.72577	2.15783	2.68321
21	1.95254	2.64364	1.98758	2.56826	2.06915	2.70907	2.10220	2.64529
22	1.91924	2.63032	1.94637	2.53730	2.02642	2.69390	2.05163	2.61083
23	1.88884	2.61816	1.90875	2.50903	1.98741	2.68004	2.00546	2.57936
24	1.86097	2.60702	1.87426	2.48311	1.95166	2.66734	1.96313	2.55051
25	1.83533	2.59676	1.84254	2.45927	1.91876	2.65565	1.92419	2.52397
26	1.81091	2.58918	1.81488	2.43975	1.88710	2.64635	1.88937	2.50173
27	1.78829	2.58217	1.78927	2.42169	1.85779	2.63774	1.85712	2.48113
28	1.76729	2.57565	1.76549	2.40491	1.83058	2.62974	1.82719	2.46201
29	1.74774	2.56959	1.74335	2.38929	1.80524	2.62229	1.79931	2.44420
30	1.72949	2.56392	1.72268	2.37471	1.78159	2.61534	1.77329	2.42758
31	1.70839	2.56131	1.70081	2.36799	1.75478	2.61114	1.74577	2.41894
32	1.68861	2.55887	1.68031	2.36170	1.72964	2.60719	1.71998	2.41084
33	1.67003	2.55657	1.66105	2.35579	1.70603	2.60349	1.69574	2.40323

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	1.65254	2.55440	1.64292	2.35022	1.68380	2.60000	1.67293	2.39607
35	1.63605	2.55236	1.62583	2.34498	1.66285	2.59672	1.65142	2.38931
36	1.62422	2.55937	1.61403	2.35268	1.64665	2.60271	1.63531	2.39600
37	1.61303	2.56600	1.60287	2.35996	1.63132	2.60837	1.62006	2.40233
38	1.60242	2.57228	1.59229	2.36686	1.61681	2.61374	1.60562	2.40833
39	1.59236	2.57824	1.58226	2.37341	1.60303	2.61883	1.59192	2.41402
40	1.58281	2.58390	1.57273	2.37963	1.58995	2.62367	1.57891	2.41943
41	1.57299	2.59811	1.56295	2.39569	1.57641	2.63705	1.56544	2.43466
42	1.56365	2.61165	1.55363	2.41098	1.56352	2.64979	1.55262	2.44916
43	1.55473	2.62455	1.54474	2.42556	1.55122	2.66194	1.54039	2.46299
44	1.54623	2.63687	1.53626	2.43947	1.53949	2.67353	1.52871	2.47619
45	1.53810	2.64864	1.52816	2.45277	1.52827	2.68461	1.51756	2.48881
46	1.52944	2.67002	1.51953	2.47735	1.51660	2.70523	1.50596	2.51264
47	1.52114	2.69050	1.51127	2.50089	1.50543	2.72498	1.49486	2.53545
48	1.51319	2.71011	1.50335	2.52344	1.49473	2.74390	1.48422	2.55732
49	1.50557	2.72893	1.49576	2.54508	1.48446	2.76204	1.47401	2.57829
50	1.49825	2.74700	1.48847	2.56584	1.47460	2.77947	1.46421	2.59842
51	1.49105	2.77768	1.48131	2.60146	1.46544	2.80945	1.45511	2.63334
52	1.48413	2.80719	1.47442	2.63571	1.45662	2.83828	1.44636	2.66692
53	1.47747	2.83559	1.46779	2.66866	1.44815	2.86602	1.43793	2.69923
54	1.47106	2.86293	1.46141	2.70040	1.43998	2.89273	1.42982	2.73034
55	1.46488	2.88928	1.45526	2.73098	1.43212	2.91847	1.42201	2.76032
56	1.45937	2.93240	1.44978	2.78138	1.42522	2.96093	1.41516	2.81006
57	1.45405	2.97401	1.44450	2.83001	1.41856	3.00190	1.40855	2.85806
58	1.44892	3.01419	1.43940	2.87696	1.41214	3.04146	1.40217	2.90440
59	1.44396	3.05300	1.43447	2.92233	1.40593	3.07968	1.39601	2.94918
60	1.43917	3.09052	1.42970	2.96618	1.39993	3.11662	1.39005	2.99246
61	1.43487	3.15115	1.42544	3.03742	1.39465	3.17661	1.38482	3.06308
62	1.43072	3.20982	1.42132	3.10637	1.38955	3.23467	1.37975	3.13142
63	1.42670	3.26663	1.41733	3.17313	1.38461	3.29089	1.37485	3.19760
64	1.42280	3.32167	1.41346	3.23780	1.37982	3.34535	1.37010	3.26170
65	1.41903	3.37501	1.40971	3.30048	1.37518	3.39814	1.36550	3.32384

Fleet Composite Emissions Factors for Pharr 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	2.75511	0.57193	2.74460	0.57717	3.46475	0.65775	3.44923	0.66278
3	2.20744	0.54511	2.20007	0.55012	2.75062	0.62383	2.73936	0.62865
4	1.52285	0.51159	1.51941	0.51630	1.85795	0.58144	1.85203	0.58598
5	1.11209	0.49148	1.11101	0.49602	1.32235	0.55600	1.31962	0.56038
6	0.94661	0.44304	0.95422	0.46232	1.11219	0.49790	1.11852	0.51935
7	0.82840	0.40845	0.84222	0.43826	0.96208	0.45641	0.97488	0.49005
8	0.73975	0.38250	0.75823	0.42021	0.84950	0.42528	0.86714	0.46807
9	0.67080	0.36232	0.69289	0.40617	0.76193	0.40108	0.78335	0.45098
10	0.61564	0.34618	0.64063	0.39494	0.69188	0.38171	0.71632	0.43730
11	0.57577	0.32685	0.60216	0.37811	0.64043	0.35886	0.66636	0.41724
12	0.54254	0.31075	0.57010	0.36409	0.59755	0.33982	0.62473	0.40053
13	0.51443	0.29712	0.54297	0.35222	0.56127	0.32370	0.58950	0.38638
14	0.49033	0.28544	0.51972	0.34205	0.53017	0.30989	0.55930	0.37426
15	0.46944	0.27532	0.49957	0.33324	0.50322	0.29792	0.53313	0.36375
16	0.45187	0.27379	0.47810	0.32491	0.47746	0.29581	0.50351	0.35381
17	0.43636	0.27244	0.45915	0.31756	0.45472	0.29395	0.47737	0.34503
18	0.42258	0.27125	0.44232	0.31103	0.43451	0.29230	0.45413	0.33723
19	0.41025	0.27018	0.42725	0.30519	0.41643	0.29082	0.43334	0.33025
20	0.39915	0.26921	0.41369	0.29993	0.40016	0.28949	0.41463	0.32397
21	0.39213	0.26810	0.40441	0.29504	0.39138	0.28788	0.40358	0.31808
22	0.38574	0.26709	0.39597	0.29059	0.38340	0.28643	0.39354	0.31272
23	0.37991	0.26616	0.38826	0.28653	0.37611	0.28509	0.38437	0.30783
24	0.37457	0.26531	0.38120	0.28281	0.36943	0.28387	0.37597	0.30334
25	0.36965	0.26453	0.37470	0.27938	0.36328	0.28275	0.36824	0.29922
26	0.36475	0.26383	0.36893	0.27632	0.35702	0.28164	0.36111	0.29545
27	0.36021	0.26318	0.36358	0.27348	0.35122	0.28060	0.35451	0.29197
28	0.35599	0.26258	0.35862	0.27085	0.34584	0.27964	0.34838	0.28873
29	0.35207	0.26202	0.35399	0.26840	0.34082	0.27875	0.34267	0.28572
30	0.34841	0.26149	0.34968	0.26611	0.33615	0.27791	0.33734	0.28290
31	0.34426	0.26092	0.34529	0.26480	0.33086	0.27695	0.33182	0.28112
32	0.34037	0.26039	0.34118	0.26358	0.32591	0.27605	0.32665	0.27944
33	0.33672	0.25988	0.33731	0.26242	0.32125	0.27521	0.32178	0.27786

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	0.33329	0.25941	0.33367	0.26134	0.31688	0.27441	0.31721	0.27638
35	0.33005	0.25896	0.33024	0.26032	0.31275	0.27366	0.31289	0.27498
36	0.32736	0.25965	0.32754	0.26102	0.30907	0.27411	0.30920	0.27545
37	0.32483	0.26030	0.32498	0.26168	0.30558	0.27454	0.30570	0.27588
38	0.32242	0.26092	0.32256	0.26231	0.30229	0.27494	0.30239	0.27630
39	0.32014	0.26150	0.32026	0.26290	0.29916	0.27532	0.29925	0.27669
40	0.31797	0.26206	0.31807	0.26347	0.29619	0.27569	0.29627	0.27706
41	0.31571	0.26344	0.31580	0.26489	0.29302	0.27688	0.29310	0.27830
42	0.31356	0.26475	0.31363	0.26625	0.29000	0.27801	0.29007	0.27947
43	0.31150	0.26601	0.31157	0.26755	0.28712	0.27909	0.28719	0.28060
44	0.30954	0.26720	0.30959	0.26878	0.28438	0.28012	0.28444	0.28167
45	0.30767	0.26835	0.30771	0.26996	0.28175	0.28110	0.28181	0.28269
46	0.30575	0.27022	0.30578	0.27192	0.27917	0.28280	0.27922	0.28447
47	0.30391	0.27201	0.30394	0.27380	0.27670	0.28442	0.27675	0.28618
48	0.30215	0.27372	0.30217	0.27559	0.27434	0.28597	0.27438	0.28781
49	0.30046	0.27537	0.30047	0.27731	0.27207	0.28746	0.27211	0.28938
50	0.29884	0.27695	0.29885	0.27897	0.26989	0.28889	0.26993	0.29088
51	0.29737	0.27944	0.29738	0.28161	0.26810	0.29122	0.26814	0.29336
52	0.29596	0.28185	0.29596	0.28414	0.26638	0.29347	0.26642	0.29573
53	0.29460	0.28416	0.29460	0.28658	0.26473	0.29562	0.26476	0.29802
54	0.29330	0.28638	0.29329	0.28893	0.26313	0.29770	0.26317	0.30022
55	0.29204	0.28853	0.29203	0.29119	0.26160	0.29970	0.26163	0.30234
56	0.29098	0.29185	0.29097	0.29472	0.26030	0.30287	0.26034	0.30572
57	0.28996	0.29505	0.28994	0.29813	0.25905	0.30592	0.25909	0.30897
58	0.28897	0.29814	0.28896	0.30142	0.25784	0.30886	0.25788	0.31212
59	0.28802	0.30113	0.28801	0.30460	0.25667	0.31171	0.25671	0.31515
60	0.28709	0.30401	0.28708	0.30767	0.25554	0.31446	0.25559	0.31809
61	0.28629	0.30849	0.28629	0.31245	0.25456	0.31878	0.25461	0.32272
62	0.28552	0.31282	0.28552	0.31709	0.25361	0.32297	0.25366	0.32721
63	0.28477	0.31701	0.28477	0.32157	0.25268	0.32702	0.25274	0.33156
64	0.28404	0.32107	0.28405	0.32592	0.25179	0.33095	0.25185	0.33577
65	0.28334	0.32501	0.28335	0.33013	0.25092	0.33475	0.25099	0.33985

Fleet Composite Emissions Factors for San Antonio 2000

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
2.5	9.16686	5.49727	9.50756	3.57886	14.57716	6.09881	15.18352	4.20814
3	7.46412	5.33099	7.72682	3.44465	11.64032	5.89031	12.10815	4.02974
4	5.33570	5.12315	5.50090	3.27689	7.96927	5.62969	8.26393	3.80674
5	4.05865	4.99844	4.16534	3.17624	5.76664	5.47332	5.95741	3.67293
6	3.47980	4.70986	3.59571	2.99891	4.87429	5.12743	5.05890	3.45038
7	3.06633	4.50374	3.18883	2.87225	4.23690	4.88036	4.41711	3.29141
8	2.75623	4.34915	2.88367	2.77725	3.75885	4.69506	3.93576	3.17218
9	2.51505	4.22891	2.64633	2.70336	3.38704	4.55093	3.56139	3.07945
10	2.32210	4.13271	2.45645	2.64425	3.08959	4.43564	3.26188	3.00526
11	2.18065	4.00124	2.31718	2.55258	2.88306	4.28257	3.05433	2.89326
12	2.06277	3.89168	2.20112	2.47618	2.71095	4.15502	2.88137	2.79992
13	1.96303	3.79898	2.10291	2.41154	2.56532	4.04709	2.73502	2.72095
14	1.87754	3.71951	2.01874	2.35613	2.44050	3.95458	2.60958	2.65325
15	1.80344	3.65065	1.94579	2.30811	2.33232	3.87440	2.50086	2.59459
16	1.74771	3.61226	1.87511	2.26051	2.23732	3.83259	2.38900	2.53672
17	1.69853	3.57840	1.81274	2.21850	2.15350	3.79571	2.29030	2.48566
18	1.65481	3.54829	1.75731	2.18117	2.07899	3.76292	2.20257	2.44027
19	1.61570	3.52136	1.70771	2.14776	2.01233	3.73358	2.12407	2.39966
20	1.58049	3.49711	1.66307	2.11770	1.95233	3.70717	2.05342	2.36311
21	1.55222	3.47386	1.62675	2.09000	1.91112	3.68109	2.00352	2.32901
22	1.52651	3.45271	1.59374	2.06483	1.87365	3.65738	1.95814	2.29802
23	1.50304	3.43341	1.56360	2.04184	1.83944	3.63573	1.91672	2.26972
24	1.48152	3.41571	1.53597	2.02077	1.80809	3.61589	1.87875	2.24377
25	1.46173	3.39943	1.51055	2.00139	1.77924	3.59763	1.84381	2.21990
26	1.44284	3.38772	1.48868	1.98545	1.75135	3.58354	1.81249	2.19947
27	1.42535	3.37687	1.46844	1.97069	1.72552	3.57048	1.78350	2.18055
28	1.40911	3.36679	1.44965	1.95698	1.70154	3.55836	1.75657	2.16298
29	1.39399	3.35741	1.43215	1.94422	1.67921	3.54708	1.73151	2.14662
30	1.37987	3.34866	1.41582	1.93231	1.65838	3.53655	1.70811	2.13135
31	1.36345	3.34569	1.39857	1.92676	1.63461	3.53138	1.68316	2.12284
32	1.34805	3.34292	1.38239	1.92156	1.61234	3.52653	1.65977	2.11487
33	1.33358	3.34031	1.36720	1.91667	1.59141	3.52198	1.63780	2.10737

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
34	1.31997	3.33785	1.35290	1.91207	1.57171	3.51769	1.61711	2.10032
35	1.30713	3.33553	1.33942	1.90773	1.55314	3.51365	1.59762	2.09367
36	1.29864	3.34540	1.33119	1.91459	1.53930	3.52211	1.58377	2.09905
37	1.29061	3.35473	1.32340	1.92107	1.52621	3.53012	1.57067	2.10415
38	1.28300	3.36357	1.31602	1.92721	1.51380	3.53770	1.55826	2.10897
39	1.27578	3.37195	1.30902	1.93303	1.50203	3.54490	1.54648	2.11355
40	1.26892	3.37992	1.30238	1.93857	1.49085	3.55173	1.53529	2.11789
41	1.26197	3.40054	1.29557	1.95171	1.47928	3.57128	1.52365	2.12990
42	1.25534	3.42019	1.28908	1.96423	1.46827	3.58989	1.51256	2.14133
43	1.24903	3.43892	1.28290	1.97616	1.45777	3.60764	1.50199	2.15223
44	1.24300	3.45680	1.27700	1.98755	1.44775	3.62458	1.49190	2.16264
45	1.23724	3.47388	1.27136	1.99844	1.43817	3.64076	1.48226	2.17258
46	1.23128	3.50601	1.26545	2.01779	1.42851	3.67191	1.47246	2.19090
47	1.22557	3.53678	1.25979	2.03632	1.41926	3.70174	1.46308	2.20844
48	1.22010	3.56626	1.25436	2.05408	1.41040	3.73032	1.45410	2.22525
49	1.21486	3.59454	1.24915	2.07111	1.40190	3.75774	1.44548	2.24138
50	1.20982	3.62168	1.24416	2.08746	1.39374	3.78406	1.43720	2.25686
51	1.20502	3.66865	1.23933	2.11491	1.38655	3.83016	1.42987	2.28341
52	1.20041	3.71382	1.23470	2.14131	1.37963	3.87450	1.42282	2.30893
53	1.19596	3.75728	1.23024	2.16671	1.37298	3.91716	1.41603	2.33349
54	1.19169	3.79913	1.22594	2.19118	1.36657	3.95824	1.40950	2.35715
55	1.18756	3.83946	1.22180	2.21475	1.36039	3.99783	1.40320	2.37994
56	1.18400	3.90639	1.21816	2.25301	1.35510	4.06398	1.39775	2.41738
57	1.18055	3.97098	1.21465	2.28993	1.35000	4.12782	1.39249	2.45351
58	1.17723	4.03334	1.21126	2.32558	1.34507	4.18945	1.38742	2.48840
59	1.17402	4.09358	1.20798	2.36001	1.34030	4.24899	1.38251	2.52210
60	1.17092	4.15181	1.20482	2.39331	1.33570	4.30655	1.37777	2.55467
61	1.16825	4.24698	1.20202	2.44676	1.33178	4.40098	1.37366	2.60736
62	1.16566	4.33907	1.19932	2.49849	1.32798	4.49237	1.36968	2.65834
63	1.16316	4.42825	1.19670	2.54858	1.32430	4.58086	1.36582	2.70771
64	1.16074	4.51463	1.19416	2.59710	1.32074	4.66658	1.36209	2.75554
65	1.15839	4.59836	1.19170	2.64413	1.31728	4.74966	1.35847	2.80189

Fleet Composite Emissions Factors for San Antonio 2025

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	Voc	NOx	VOC	NOx	VOC	NOx
2.5	2.03894	0.53755	2.07031	0.51289	2.95708	0.69274	3.01663	0.67219
3	1.64667	0.51334	1.66746	0.48940	2.35647	0.65769	2.39908	0.63757
4	1.15634	0.48309	1.16391	0.46004	1.60570	0.61388	1.62714	0.59430
5	0.86214	0.46493	0.86178	0.44242	1.15524	0.58759	1.16398	0.56833
6	0.73786	0.42076	0.74291	0.41283	0.97633	0.52792	0.98881	0.52699
7	0.64909	0.38921	0.65801	0.39169	0.84854	0.48530	0.86368	0.49745
8	0.58251	0.36554	0.59433	0.37584	0.75270	0.45333	0.76984	0.47530
9	0.53073	0.34714	0.54480	0.36350	0.67815	0.42847	0.69685	0.45808
10	0.48931	0.33241	0.50518	0.35364	0.61851	0.40858	0.63846	0.44429
11	0.45871	0.31436	0.47601	0.33876	0.57446	0.38478	0.59541	0.42413
12	0.43322	0.29931	0.45169	0.32636	0.53775	0.36494	0.55953	0.40732
13	0.41164	0.28658	0.43112	0.31587	0.50669	0.34816	0.52917	0.39310
14	0.39315	0.27567	0.41348	0.30688	0.48006	0.33378	0.50315	0.38091
15	0.37713	0.26621	0.39820	0.29909	0.45699	0.32131	0.48060	0.37034
16	0.36465	0.26423	0.38259	0.29176	0.43508	0.31858	0.45527	0.36039
17	0.35364	0.26249	0.36882	0.28529	0.41575	0.31618	0.43292	0.35160
18	0.34385	0.26094	0.35657	0.27954	0.39857	0.31404	0.41305	0.34379
19	0.33509	0.25955	0.34562	0.27439	0.38319	0.31213	0.39527	0.33680
20	0.32721	0.25830	0.33576	0.26976	0.36936	0.31041	0.37927	0.33051
21	0.32125	0.25697	0.32814	0.26547	0.36109	0.30843	0.36927	0.32461
22	0.31584	0.25575	0.32122	0.26158	0.35357	0.30663	0.36018	0.31924
23	0.31089	0.25465	0.31489	0.25802	0.34671	0.30499	0.35188	0.31434
24	0.30635	0.25363	0.30910	0.25476	0.34042	0.30349	0.34427	0.30985
25	0.30218	0.25270	0.30376	0.25175	0.33463	0.30210	0.33728	0.30572
26	0.29801	0.25193	0.29907	0.24908	0.32866	0.30079	0.33073	0.30193
27	0.29415	0.25123	0.29473	0.24661	0.32313	0.29957	0.32467	0.29842
28	0.29057	0.25057	0.29070	0.24431	0.31800	0.29844	0.31905	0.29516
29	0.28723	0.24996	0.28694	0.24217	0.31322	0.29738	0.31381	0.29213
30	0.28411	0.24939	0.28344	0.24018	0.30877	0.29640	0.30892	0.28929
31	0.28062	0.24891	0.27991	0.23907	0.30376	0.29539	0.30383	0.28745
32	0.27735	0.24846	0.27660	0.23803	0.29907	0.29445	0.29905	0.28571
33	0.27428	0.24804	0.27349	0.23705	0.29466	0.29356	0.29457	0.28409

Speed (mph)	AM				PM			
	Freeway		Arterial		Freeway		Arterial	
	VOC	NOx	Voc	NOx	VOC	NOx	VOC	NOx
34	0.27138	0.24765	0.27056	0.23613	0.29051	0.29273	0.29035	0.28255
35	0.26865	0.24728	0.26780	0.23527	0.28660	0.29194	0.28637	0.28111
36	0.26645	0.24809	0.26572	0.23599	0.28306	0.29247	0.28291	0.28154
37	0.26436	0.24886	0.26375	0.23668	0.27970	0.29296	0.27963	0.28195
38	0.26238	0.24958	0.26188	0.23733	0.27652	0.29344	0.27653	0.28234
39	0.26051	0.25027	0.26011	0.23795	0.27351	0.29389	0.27359	0.28271
40	0.25872	0.25093	0.25843	0.23853	0.27064	0.29431	0.27079	0.28306
41	0.25690	0.25253	0.25669	0.23990	0.26760	0.29571	0.26780	0.28422
42	0.25517	0.25406	0.25504	0.24121	0.26470	0.29704	0.26494	0.28532
43	0.25351	0.25552	0.25346	0.24245	0.26194	0.29831	0.26222	0.28637
44	0.25193	0.25691	0.25195	0.24364	0.25930	0.29952	0.25962	0.28737
45	0.25042	0.25824	0.25051	0.24477	0.25678	0.30067	0.25713	0.28833
46	0.24891	0.26049	0.24905	0.24661	0.25438	0.30274	0.25476	0.28998
47	0.24746	0.26265	0.24765	0.24837	0.25208	0.30472	0.25249	0.29156
48	0.24607	0.26472	0.24631	0.25006	0.24988	0.30662	0.25031	0.29307
49	0.24474	0.26670	0.24502	0.25168	0.24778	0.30844	0.24822	0.29452
50	0.24346	0.26861	0.24378	0.25324	0.24575	0.31019	0.24621	0.29591
51	0.24232	0.27170	0.24267	0.25568	0.24420	0.31312	0.24468	0.29819
52	0.24122	0.27468	0.24160	0.25804	0.24271	0.31593	0.24320	0.30039
53	0.24017	0.27754	0.24056	0.26031	0.24127	0.31864	0.24177	0.30249
54	0.23915	0.28030	0.23957	0.26249	0.23989	0.32125	0.24040	0.30453
55	0.23817	0.28295	0.23861	0.26459	0.23856	0.32376	0.23908	0.30648
56	0.23740	0.28715	0.23784	0.26783	0.23747	0.32782	0.23799	0.30957
57	0.23665	0.29121	0.23710	0.27096	0.23643	0.33173	0.23694	0.31256
58	0.23592	0.29512	0.23638	0.27399	0.23542	0.33550	0.23593	0.31544
59	0.23522	0.29890	0.23568	0.27691	0.23444	0.33915	0.23495	0.31822
60	0.23455	0.30256	0.23501	0.27973	0.23350	0.34268	0.23400	0.32091
61	0.23400	0.30832	0.23444	0.28409	0.23272	0.34830	0.23319	0.32512
62	0.23347	0.31390	0.23389	0.28831	0.23196	0.35374	0.23241	0.32921
63	0.23295	0.31930	0.23336	0.29240	0.23122	0.35901	0.23165	0.33316
64	0.23245	0.32454	0.23284	0.29635	0.23051	0.36412	0.23092	0.33699
65	0.23197	0.32961	0.23235	0.30019	0.22982	0.36907	0.23020	0.34070

APPENDIX B: MOBILE6 COMMANDS AND INPUT PARAMETERS DESCRIPTIONS

Tables [B-1](#) through [B-11](#) describe the MOBILE6 inputs TTI used to develop 2000, 2025 average on-road mobile source emissions factors. Emissions factors were developed at the TxDOT district level for eight urban mobility study areas. The methodology for developing emissions factors is based on the Transportation Modeling Program's current virtual link-based emissions inventory methodology. Header commands and descriptive output commands are excluded. Unless otherwise stated, input parameter values apply to all analysis years.

Table B-1. MOBILE6 Pollutants and Emissions Rates.

Command	Function/Description	Input Parameter Source/Value
POLLUTANTS	Defines the basic set of pollutants to report.	Hydrocarbon (HC), CO, NO _x .
PARTICULATES	Enables computation of particulate matter (PM) and related emissions factors.	NOT APPLIED.
PARTICULATE EF	Specifies location of files that contain the particulate emissions factors when PARTICULATES command is used.	NOT APPLIED.
PARTICLE SIZE	Allows user to specify the maximum particulate size cutoff used by MOBILE.	NOT APPLIED.
EXPRESS HC AS VOC	One of five possible commands that allow the user to specify the particular HC species (non-methane HC, non-methane organic gases, total HC, total organic gases, and VOC) to report in the exhaust emissions output.	APPLIED. Only the command is required.
NO REFUELING	Directs MOBILE6 not to calculate refueling emissions factors.	APPLIED. Only the command is required.
AIR TOXICS	Enables the computation of air toxic emissions factors (six explicit pollutants) and specifies which to calculate.	NOT APPLIED.
ADDITIONAL HAPS	Allows entry of emissions factors or air toxic ratios for calculation of additional user-defined air toxic pollutant emissions factors.	NOT APPLIED.
MPG ESTIMATES	Allows entry of alternate fuel economy data by vehicle class and model year.	NOT APPLIED. (MOBILE6 default values are assumed.)

Table B-2. MOBILE6 External Conditions.

Command	Function/Description	Input Parameter Source/Value
CALENDAR YEAR	Identifies calendar year for which emissions factors are to be calculated. (Required to run model).	2000, 2025.
EVALUATION MONTH	Provides option of calculating January 1 or July 1 emissions factors for calendar year of evaluation.	7 (for July).
MIN/MAX TEMPERATURE	Sets minimum and maximum daily temperatures. (Required to run model if the HOURLY TEMPERATURES command is not used.)	NOT APPLIED. (See HOURLY TEMPERATURES.)
HOURLY TEMPERATURES	Allows temperatures input for each hour of day (Required to run model if MIN/ MAX TEMPERATURE command is not used.)	As provided by TCEQ (December 2003). Developed by climate zone.
ALTITUDE	Specifies high- or low-altitude for modeling area.	NOT APPLIED. (EPA default, low altitude, is assumed).
ABSOLUTE HUMIDITY	Used to specify daily average humidity (directly affects NOx emissions). MOBILE6 also converts absolute humidity to heat index which affects HC and CO emissions for the portion of the fleet that MOBILE6 determines is using air conditioning.	NOT APPLIED. (See RELATIVE HUMIDITY.)
<u>Environmental Effects on Air Conditioning:</u>	Commands used by MOBILE6 to model the extent of vehicle air-conditioning usage.	
CLOUD COVER	Defines average percent cloud cover for given day.	NOT APPLIED. (MOBILE6 default assumed.)
PEAK SUN	Specifies midday hours with peak sun intensity.	NOT APPLIED. (MOBILE6 default assumed.)
SUNRISE/SUNSET	Allows user to specify time of sunrise and sunset.	Values are 7 a.m. and 8 p.m. for all climate zones, as provided by TCEQ.
RELATIVE HUMIDITY	Specifies use of 24 hourly relative humidity values entered by user. MOBILE6 will perform hour-specific calculations with hourly values rather than use single daily default absolute humidity value.	As provided by TCEQ (December 2003). Developed by climate zone.
BAROMETRIC PRES	Specifies use of user input daily average barometric pressure for use with hourly relative humidity to calculate hourly absolute humidity values.	As provided by TCEQ (December 2003). Developed by climate zone.

Table B-3. MOBILE6 Vehicle Fleet Characteristics.

Command	Function/Description	Input Parameter Source/Value
REG DIST	Allows the user to supply registration distributions by age for any of the 16 composite (combined gasoline and diesel) vehicle types.	Locality-Specific/EPA default. TTI developed the age distributions using the latest available TxDOT registration data aggregated at the TxDOT district level. These distributions were assumed for both analysis years. July 2003 TxDOT district-level registrations data were applied for LDV, LDT, MC, and HDV; the MOBILE6 default was used for buses.
DIESEL FRACTIONS	Permits user to supply locality-specific diesel fractions for 14 of the 16 composite vehicle categories by age.	Locality-Specific/EPA default. TTI developed the evaluation year-specific local diesel fractions with the latest available TxDOT registration data aggregated at the state level. July 2003 TxDOT state level gasoline/diesel registrations data were used for HDV; LDV, LDT, and Bus fractions are MOBILE6 defaults. The latest diesel fractions (2003 for Texas data and 1997 for MOBILE6 default data) were assumed as the values for each model year up to the future year of evaluation (2025). Earlier model year fractions not required to complete each data set were removed from the input data.
MILE ACCUM RATE	Allows the user to supply the annual mileage accumulation rates by vehicle type and age.	NOT APPLIED. (MOBILE6 defaults are assumed.)
NGV FRACTION	Lets user specify percent of natural gas vehicles (NGV) in the fleet by type and age certified to operate on either compressed or liquefied natural gas.	NOT APPLIED. (The MOBILE6 default percentage of NGV vehicles in the fleet, zero, is assumed.)
NGV EF	Permits the user to enter alternate NGV emissions factors for each of the 28 vehicle types, for running and start emissions.	NOT APPLIED. (The MOBILE6 default, none, is assumed.)

Table B-4. MOBILE6 Activity.

Command	Function/Description	Input Parameter Source/Value
VMT FRACTIONS	Used in MOBILE6 to weight the emissions of various vehicle types into average rates for groupings of vehicle classes.	NOT APPLIED. (MOBILE6 default assumed, used for aggregate results which do not apply to this analysis.)
VMT BY FACILITY	VMT fractions by MOBILE6 road type combine the four road type emissions factors into the “all road types” emissions factors.	NOT APPLIED. (MOBILE6 default assumed, used for aggregate results with no impact on this analysis.)
VMT BY HOUR	Allows VMT fractions allocation by hour-of-day; applied in conversion of grams per hour (g/hr) to g/mi, as well as in weighting of hourly g/mi rates to obtain daily emissions factors.	Locality-specific. TTI developed and applied hourly VMT fractions at the TxDOT District-level using recent multi-year TxDOT ATR data.
SPEED VMT	Allows user to allocate VMT by average speed (14 preselected: 2.5 and 5 through 65 at 5 mph increments) for arterials and freeways for each hour of the day.	Generic input for all counties. Inputs were set up to calculate emissions factors by 14 MOBILE6 speed bin speed scenarios for MOBILE6 freeway and arterial road types.
AVERAGE SPEED	Allows a single average speed for combined freeways and arterials for the entire day.	NOT APPLIED.
STARTS PER DAY	Lets user specify the average number of engine starts per vehicle per day by vehicle types for weekend days and weekdays.	NOT APPLIED. (MOBILE6 weekday defaults are assumed.)
START DIST	Allows user to allocate engine starts by hour of the day for weekend days and weekdays.	NOT APPLIED. (MOBILE6 weekday defaults are assumed.)
SOAK DISTRIBUTION	Allows use of alternate vehicle soak duration distributions for weekend days and weekdays.	NOT APPLIED. (MOBILE6 weekday defaults are assumed.)
HOT SOAK ACTIVITY	Allows users to specify a hot soak duration distribution for each of 14 daily time periods for weekend days and for weekdays.	NOT APPLIED. (MOBILE6 weekday defaults are assumed.)
DIURN SOAK ACTIVITY	Allows user set diurnal soak time distributions for each of 18 daily time periods.	NOT APPLIED. (The MOBILE6 defaults are assumed.)
WE DA TRI LEN DI	Specifies alternate fractions of VMT that occur during trips of various durations at each hour of the average weekday.	MOBILE6 defaults were assumed except that Houston and Dallas areas use the latest TDM-based weekday distributions developed by the Houston-Galveston Area Council (HGAC) and the North Central Texas Council of Governments (NCTCOG), respectively.
WE EN TRI LEN DI	Specifies hourly alternate fractions of VMT for trips of various lengths for weekend days.	NOT APPLIED.
WE VEH US	Directs MOBILE6 to use weekend activity data for calculating emissions factors.	NOT APPLIED.

Table B-5. MOBILE6 State Programs.

Command	Function/Description	Input Parameter Source/Value
STAGE II REFUELING	Allows modeling of at-the-pump refueling emissions.	NOT APPLIED. Accounted for as an area source category.
ANTI-TAMP PROG	Allows user to model impacts of an ATP.	Applied for all areas with counties that administer I/M programs. For this project: Harris, Dallas, El Paso. The same ATP descriptive input will be used for all counties. See Table B-8 .
<u>I/M Commands:</u> I/M PROGRAM I/M MODEL YEARS I/M VEHICLES I/M STRINGENCY I/M COMPLIANCE I/M WAIVER RATES I/M CUTPOINTS I/M EXEMPTION AGE I/M GRACE PERIOD NO I/M TTC CREDITS I/M EFFECTIVENESS I/M DESC FILE	Required for exhaust/evaporative I/M programs. Required for exhaust/evaporative I/M programs. Required for exhaust/evaporative I/M programs. Required for exhaust. Do not use for evaporative. Required for exhaust. Optional for evaporative. Required for exhaust. Optional for evaporative. Optional for exhaust (but required for IM240). Do not use with evaporative. Optional for both exhaust and evaporative. Optional for both exhaust and evaporative. Optional for exhaust. Do not use with evaporative. Optional for exhaust. Do not use with evaporative. Optional for both.	Applied for all areas with counties that administer I/M programs (for this project: Harris, Dallas, El Paso). The inputs are by area program designs as specified in I/M SIP. For this analysis, it is assumed that all I/M programs start on January 1 of the program start year. See Table B-9 and Table B-10 .

Table B-6. MOBILE6 Fuels.

Command	Function/Description	Input Parameter Source/Value
FUEL PROGRAM	Allows specification of one of four options: 1. Conventional Gasoline East Tier 2 sulfur phase-in schedule (includes Texas); 2. Reformulated Gasoline (RFG); 3. Conventional Gasoline West; or 4. Sulfur content for gasoline after 1999.	Option 1: Applied for all areas except for Houston and Dallas. Option 2: Applied for Houston and Dallas.
SULFUR CONTENT	(or GASOLINE SULFUR) Allows use of alternate sulfur content for conventional gasoline through calendar year 1999.	NOT APPLIED. (MOBILE6 default is assumed.)
DIESEL SULFUR	Allows use of ave. diesel fuel sulfur level. Required if PARTICULATES command is used. No affect on HC, CO, NOx or air toxics (except if calculated as ratio to PM).	NOT APPLIED.
OXYGENATED FUELS	Allows oxygenated gasoline exhaust effects modeling for gasoline-fueled vehicle types. Not for use with AIR TOXICS command.	NOT APPLIED.
FUEL RVP	Allows user to specify fuel RVP for area being modeled (required to run model).	<ul style="list-style-type: none"> • 6.8 psi: Houston and Dallas under federal RFG program, • 7.0 psi: El Paso, low RVP program limit, • 7.6 psi: Counties under Texas Regional Low RVP (7.8 psi limit) program. (Assumed refiner compliance safety margin of -0.2 psi is applied.) • 8.7 psi: Counties under federal summer limit of 9.0 psi. (Assumed refiner compliance safety margin of -0.3 psi is applied).
SEASON	Identifies effective season for RFG calculation regardless of month modeled.	NOT APPLIED.
GAS AROMATIC%	Only when AIR TOXICS command is used.	NOT APPLIED.
GAS OLEFIN%	Only when AIR TOXICS command is used.	NOT APPLIED.
GAS BENZENE%	Only when AIR TOXICS command is used.	NOT APPLIED.
E200	Only when AIR TOXICS command is used.	NOT APPLIED.
E300	Only when AIR TOXICS command is used.	NOT APPLIED.
OXYGENATE	Only when AIR TOXICS command is used.	NOT APPLIED.
RVP OXY WAIVER	Only when AIR TOXICS command is used.	NOT APPLIED.

Table B-7. MOBILE6 Alternative Emissions Regulations and Control Measures.

Command	Function/Description	Input Parameter Source/Value
NO CLEAN AIR ACT	Models vehicle emissions as if the Federal Clean Air Act Amendments of 1990 had not been implemented.	NOT APPLIED.
<u>HDDV NO_x Off-Cycle Emissions Effects:</u> NO DEFEAT DEVICE NO NOX PULL AHEAD NO REBUILD REBUILD EFFECTS	Turns off the effects of the HDD vehicle NO _x off-cycle emissions effects (defeat device emissions). Turns off HDD NO _x emissions reduction effects of Pull-Ahead program. Turns off HDD NO _x emissions reduction effects of Rebuild program. Allows user change Rebuild program effectiveness rate.	NOT APPLIED (MOBILE6 default, 0.90, is assumed for REBUILD EFFECTS).
<u>Tier 2 Emissions Standards and Fuel Requirements:</u> NO TIER2 T2 EXH PHASE-IN T2 EVAP PHASE-IN T2 CERT	Allow the overriding of the default Tier 2 emissions standards and fuel requirements settings. Disables Tier 2 requirements. Allows alternate Tier 2 exhaust standard phase-in schedules. Allows alternate Tier 2 evaporative standard phase-in schedules. Allows user to specify alternate Tier 2 50,000-mile certification standards.	NOT APPLIED.
94+ LDG IMPLEMENTATION	Allows use of alternate 1994 and later fleet penetration fractions for LDGVs under the Tier 1, NLEV (or California LEV 1), and Tier 2 emissions standard programs.	NOT APPLIED.
NO 2007 HDDV RULE	Disables 2007 HDV emissions standards.	NOT APPLIED.

Tables B-8, through B-11 provide the ATP and I/M program MOBILE6 descriptive inputs. Although the I/M programs vary by county within the Houston region and also within the Dallas region, for this analysis the Harris County I/M program was modeled for the Houston metropolitan area and the Dallas County program was modeled for the Dallas-Ft. Worth metropolitan area.

Table B-8. 2000 and 2025 MOBILE6 ATP Commands and Data Parameter Values.

<p>Geographic coverage: Harris, El Paso, Dallas (corresponds with I/M). ATP 2 modeled only (for 1984+ model years).</p> <p>ATP start year (YY): 84: Harris, 86: Dallas, El Paso.</p> <p>Evaluation Year: 2000</p> <p>ANTI-TAMP PROG YY 84 98 22222 22222222 2 11 096. 22112222</p> <p>Evaluation Year: 2025</p> <p>ANTI-TAMP PROG YY 01 23 22222 22222222 2 11 096. 22112222</p>
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***Data parameter value definitions for ATP:**

- The first number (YY) is the last two digits of the program start year, which differs based on county grouping.
- The second number is the last two digits of oldest model year covered by the program. The vehicles 25 years old and older are exempt from inspections. However, for 2000, only 1984 and newer model years ATP is modeled (ATP2). For 2025 ATP is same for full 24 year model coverage window.
- The third number is the newest model year covered by the program. Vehicles less than two years old are exempt.
- The next 14 values are on/off toggles to identify the vehicle types covered (1 = no, 2 = yes). The vehicles in input string order are: LDGV, LDGT1, LDGT2, LDGT3, LDGT4; and HDGV2B, HDGV3, HDGV4, HDGV5, HDGV6, HDGV7, HDGV8A, HDGV8B; and GAS BUS.
- The next entry must be “1” (EPA no longer supports additional credit for test only program). A “2” will cause ATP credit to be discontinued.
- The next data parameter is the program inspection frequency (1 = annual, 2 = biennial).
- The next number is the program compliance rate in percent.
- The last eight data parameters in the input string are on/off toggles (1 = no, 2 = yes) indicating which checks are performed, in the following order: 1) air pump disablement, 2) catalyst removal, 3) fuel inlet restrictor removal, 4) tailpipe lead deposit, 5) exhaust gas recirculation disablement, 6) evaporative system disablement, 7) positive crankcase ventilation system disablement, and 8) missing gas cap. Note that the MOBILE6 no longer applies tampering or tampering reduction effects for the diurnal and hot soak emissions control systems. Thus, the MOBILE6 ATP check numbers 6 and 8, evaporative system disablement and missing gas cap, have no effect on the resulting emissions factors.

Table B-9. Dallas, Harris County: 2000 MOBILE6 I/M Commands, Data Parameter Values.

<p>MOBILE6 inputs: The commands (in bold) with their corresponding data parameters values as defined by I/M program design, are described below. Except for the I/M EFFECTIVENESS command, the first data value following each command identifies the I/M program number (i.e., program numbers 1 and 2) to which the command and its associated parameters apply. I/M STRINGENCY applies only to the exhaust I/M program (program #1). I/M COMPLIANCE and I/M WAIVER RATES apply to all I/M programs (thus, “#” takes values 1 and 2).</p>		
<p>I/M GRACE PERIOD: # 2 (exempts vehicles less than 2 years old, i.e., cal. yr. minus 2)</p>		
<p>I/M EXEMPTION AGE: # 25 (exempts vehicles greater than or equal to 25 years old, i.e., calendar year minus 24)</p>		
<p>I/M STRINGENCY: 1 20 (percent stringency level for pre-1981 cars and light trucks)</p>		
<p>I/M COMPLIANCE: # 96 (percent compliance)</p>		
<p>I/M WAIVER RATES: # 3 3 (pre-1981 and post-1980 waiver rates in percent)</p>		
<p>I/M EFFECTIVENESS: 1 1 1 (fractional exhaust I/M effectiveness for HC, CO, and NOx)</p>		
I/M PROGRAM	I/M MODEL YEARS	I/M VEHICLES*
1 YYYY 2050 1 TRC 2500/IDLE	1 1950 2050	1 22222 22222222 2
2 YYYY 2050 1 TRC GC	2 1950 2050	2 22222 22222222 2
<p><i>Explanation of command data parameters:</i></p>		
<p><u>I/M PROGRAM command:</u> the parameters, in numerical order, are defined as: 1st is the I/M Program number; 2nd and 3rd are the program start (see “YYYY” explanation below) and end years, respectively; 4th is the program frequency (1 = annual, 2 = biennial); 5th is the program type (TRC = test and repair computerized); 6th is inspection type (2500/IDLE = test at idle, 2500 rpm; OBD I/M and EVAP OBD & GC are on-board diagnostic exhaust and evaporative I/M [with GC], respectively, and GC = gas cap pressure check).</p>		
<p>“YYYY”, or start year field, varies by county and by I/M program emissions type as follows:</p> <ul style="list-style-type: none"> 1: exhaust programs with county/start year: Dallas/1990, Harris/1997, 2: evap. program with county/start year: Dallas/1996, Harris/1997. 		
<p><u>I/M MODEL YEARS command:</u> The 1st and 2nd fields are the first and last model year covered, respectively. By program design, vehicles less than 2 years old and greater than or equal to 25 years old are exempt from testing.</p>		
<p><u>I/M VEHICLES command:</u> The 14 data parameters are on/off toggles (1 = no, 2 = yes) indicating which vehicle types are subject to inspection. The 14 corresponding vehicle types, in input order are: LDGV, LDGT1, LDGT2, LDGT3, LDGT4; and HDGV2B, HDGV3, HDGV4, HDGV5, HDGV6, HDGV7, HDGV8A, HDGV8B; and GAS BUS.</p>		

Table B-10. Dallas, Harris County: 2025 MOBILE6 I/M Commands, Data Parameter Values.

<p>MOBILE6 inputs: The commands (in bold) with their corresponding data parameters values as defined by program design, are described below. The first data value following each command (excluding I/M EFFECTIVENESS) identifies the program number (i.e., 1 through 4) to which the command and its associated parameters apply. STRINGENCY applies only to exhaust I/M programs, thus “\$” takes the values 1 and 2 (see I/M PROGRAM command descriptions 1 through 4, below). COMPLIANCE and WAIVER RATES applies to all I/M programs (thus “#” takes values 1 through 4).</p>		
<p>I/M STRINGENCY: # 20 (percent stringency level for pre-1981 cars and light trucks) I/M COMPLIANCE: # 96 (percent compliance) I/M WAIVER RATES: # 3 3 (pre-1981 and post-1980 waiver rates in percent) I/M EFFECTIVENESS: 1 1 1 (fractional exhaust I/M effectiveness for HC, CO, and NOx)</p>		
I/M PROGRAM	I/M MODEL YEARS	I/M VEHICLES
1 YYYY 2050 1 TRC 2500/IDLE	1 2001 2023	1 11111 22222222 2
2 YYYY 2050 1 TRC OBD I/M	2 2001 2023	2 22222 11111111 1
3 YYYY 2050 1 TRC GC	3 2001 2023	3 11111 22222222 2
4 YYYY 2050 1 TRC EVAP OBD & GC	4 2001 2023	4 22222 11111111 1
<p><i>Explanation of command data parameters:</i></p> <p>I/M PROGRAM command: the parameters, in numerical order, are defined as: 1st is I/M program number 2nd and 3rd are the program start year (see “YYYY” explanation below) and end year, respectively, 4th is the program frequency (1 = annual, 2 = biennial), 5th is the program type (TRC = test and repair computerized), 6th is inspection type (2500/IDLE = test at idle, 2500 rpm; OBD I/M and EVAP OBD and GC are on-board diagnostic exhaust and evaporative I/M [with GC], respectively, and GC = gas cap pressure check). “YYYY”, or start year field, varies by county and by I/M program emissions type as follows: 1, 2: exhaust programs with county/start year: Dallas/1990, Harris/1997, 3, 4: evap. programs with county/start year: Dallas/1996, Harris/1997.</p> <p>I/M MODEL YEARS command: The 1st field is I/M program number. The 2nd field is the first model year covered and the 3rd field is the last model year covered. By program design, vehicles less than 2 years old and greater than or equal to 25 years old are exempt from testing. This I/M model year coverage window is calculated by subtracting 2 and 24 from the calendar year of evaluation. The I/M MODEL YEARS values in parenthesis above are for the 2013 evaluation.</p> <p>I/M VEHICLES command: The 14 data parameters are on/off toggles (1 = no, 2 = yes) indicating which vehicle types are subject to inspection. The 14 corresponding vehicle types, in input order are: LDGV, LDGT1, LDGT2, LDGT3, LDGT4; and HDGV2B, HDGV3, HDGV4, HDGV5, HDGV6, HDGV7, HDGV8A, HDGV8B; and GAS BUS.</p>		

Table B-11. El Paso 2000, 2025 MOBILE6 I/M Commands and Data Parameter Values.

<p>MOBILE6 inputs: The commands (in bold) with their corresponding data parameters values as defined by program design, are described below. These commands are applied for all calendar years of evaluation. Except for the I/M EFFECTIVENESS command, the first data value following each command identifies the program (i.e., 1 or 2) to which the command and its associated parameters apply. Note that I/M STRINGENCY applies only to exhaust I/M programs (1). The commands below with “#” as the first parameter apply to both programs (here “#” takes values 1 and 2).</p> <p>I/M GRACE PERIOD: # 2 (exempts vehicles less than 2 years old, i.e., cal. yr. minus 2) I/M EXEMPTION AGE: # 25 (exempts vehicles greater than or equal to 25 years old, i.e., cal. yr. minus 24) I/M STRINGENCY: 1 20 (percent stringency level for pre-1981 cars and light trucks) I/M COMPLIANCE: # 96 (percent compliance) I/M WAIVER RATES: # 3 3 (pre-1981 and post-1980 waiver rates in percent) I/M EFFECTIVENESS: 1 1 1 (fractional exhaust I/M effectiveness for HC, CO, and NOx)</p>		
I/M PROGRAM	I/M MODEL YEARS	I/M VEHICLES
1 1987 2050 1 TRC 2500/IDLE	1 1950 2050	1 22222 22222222 2
2 1997 2050 1 TRC GC	2 1950 2050	2 22222 22222222 2
<p><i>Explanation of command data parameters:</i></p> <p>I/M PROGRAM command: The parameters, in numerical order, are defined as: 1st is the I/M Program number 2nd and 3rd are the program start and end years, respectively, 4th is the program frequency (1 = annual, 2 = biennial), 5th is the program type (TRC = test and repair computerized), 6th is inspection type (2500/IDLE = test at idle and at 2500 rpm, and GC = gas cap pressure check).</p> <p>I/M MODEL YEARS command: 1st is I/M program number, 2nd and 3rd are the first model year covered and last model year covered, respectively, By program design, vehicles less than 2 years old and greater than or equal to 25 years old are exempt from testing. MOBILE6 is set up to model this “2 through 24 year old coverage window” using the I/M GRACE PERIOD and I/M EXEMPTION AGE commands and parameters as described above.</p> <p>I/M VEHICLES command: 1st parameter is I/M program number. The next 14 data parameters are on/off toggles (1 = no, 2 = yes) indicating which vehicle types are subject to inspection. The 14 corresponding vehicle types, in input order are: LDGV, LDGT1, LDGT2, LDGT3, LDGT4; and HDGV2B, HDGV3, HDGV4, HDGV5, HDGV6, HDGV7, HDGV8A, HDGV8B; and GAS BUS.</p>		