State Implementation Plan

PLAN TO IMPROVE AIR QUALITY IN THE WASHINGTON, DC-MD-VA REGION

February 19, 2004

State Implementation Plan
"Severe Area SIP"

APPENDICES
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METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

Appendices Volume I

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Membership Rosters for the Metropolitan Washington Air Quality Committee (MWAQC) and its Technical Advisory Committee and the Air Quality Public Advisory Committee

Metropolitan Washington Air Quality Committee

MEMBERSHIP LIST

Denotes Chair ★
Denotes Vice Chair ★★

Jurisdiction	Member	Telephone	Fax	Alternate	Telephone	Fax
District of Columbia						
Council	Phil Mendelson ★★	(202) 724-8064	(202) 724-8099	Adrian Fenty	(202) 724-8052	-
Executive	Ted Gordon	(202) 442-8989	(202) 442-4808	James Collier	(202) 535-1656	(202) 535-1362
	Elizabeth Berry	(202) 727-3512		Sharon Anderson	(202) 727- 6265	
Maryland						
Bowie	*VACANT*	-	-	-	-	-
Calvert County	Dave Brownlee	(301)535-1600x2338	-	Howard Chang	(301)870-2520	(301)274-1924
Charles County	Wayne Cooper	(301) 645-0552	(301) 645-0560	Victoria Greenfield	(301) 638-0801	(301) 645-0560
College Park	Eric C. Olson	(301) 864-3770	(301) 699-8029	Andrew Fellows	(301) 864-8666	(202) 895-0438
Frederick County	Jan Gardner	(301) 694-1092 (301) 694-1100 main	(301) 694-1849	Larry Bohn	(301) 631-3179	(301) 631-3180
Gaithersburg	John Schlichting	(202) 729-3835	(202) 929-1010	-	-	-
Greenbelt	Leta M. Mach	(301) 474-8000	(301) 441-8248	-	-	-
Montgomery County (Council)	Nancy Floreen ★★	(240) 777-7906	(240) 777-7989	Keith Levchenko	(240) 777-7944	(240) 777-7888
Montgomery County (Council)	Howard Denis	(240) 777-7964	(240) 777-7989			
Montgomery County (Executive)	Douglas Duncan	(240) 777-2500	(240) 777-7765	James Caldwell	(240) 777-7781	(240) 777-7765
Prince George's Co. (Council)	Thomas E. Dernoga ★	(301) 952-3887	(301) 952-4801	-	-	-
Prince George's Co. (Executive)	Donna M.P Wilson	(301) 883-5812	(301) 883-5444	Sherry Conway Appel	(301) 883-5835	(301) 883-5444
	Betty Hager Francis	(301) 883-5600	(301) 883-5709			
Rockville	*VACANT*	-	-	*VACANT*	-	-
Takoma Park	Joy Austin-Lane	(301) 891-1700	(301) 270-8794	-	-	-
Virginia						
Alexandria	Rodella S. "Del" Pepper	(703) 751-0770 (h) (703) 838-4500 (o)	(703) 519-3356	Andrew H. Macdonald	(703) 548-7572 (ho) (703) 838-4500 (o)	(703) 838-6433
Arlington County	Paul Ferguson	(703) 228-3130	(703) 228-7430	Barbara Favola	(703) 228-3130	(703) 228-7430
City of Fairfax	Patrice Winter	(703) 385-7800	(703) 385-7811	Robert F. Lederer	(703) 591-8217	(703) 385-7811
Fairfax County	Linda Smyth	(703) 560-6946	(703) 207-3541			
Fairfax County	T. Dana Kauffman★★	(703) 971-6262	(703) 971-3032	Gerald Hyland	(703) 780-7518	(703) 780-1491
Fairfax County	Sharon Bulova	(703) 425-9342	(703) 503-9583			
Falls Church	Lindy Hockenberry	(703) 241-0934	(703) 248-5146	David Sydner	(703) 241-0914	(703) 248-5146
Loudoun County	Mick Staton	(703) 777-0204	(703) 777-0421	-	-	-
Prince William County	Corey Stewart	(703) 792-4620	(703) 792-4610	Ricardo Canizales	(703) 792-5985	(703) 792-7159
Stafford County	Robert Gibbons	(540) 752-7276	(540) 752-1936	Jeffrey Harvey	(540) 658-8668	(540) 658-6824
Chairman, Air Quality Public Advisory Committee						
	Julie Crenshaw	(703) 549-2630 (H)				
State Air Management Directors						
District of Columbia	Don Wambsgans	(202) 535-2255	(202) 535-1371	Stan Tracey/Ram T.	(202) 535-2990	(202) 535-1371
Maryland	Tom Snyder	(410) 537-3290	(410) 537-3391	George (Tad) Aburn	(410) 537-3242	(410) 537-3202
Virginia	John M. Daniel	(804) 698-4311	(804) 698-4510	James Sydnor	(804) 698-4424	(804) 698-4510
Chairman, Transportation Planning Board						
	Christopher Zimmerman	(703) 358-3130	(703) 228-7430	-	-	-
State Transportation Directors						
District of Columbia	Michelle Pourciau	(202) 671-1356	(202) 671-0650	Maurice Keys	(202) 671-2730	(202) 671-0617
Maryland	Marsha Kaiser	(410) 865-1275	(410) 865-1339	Nat Bottingheimer	(410) 865-1285	(410) 850-9263
Virginia	Thomas Farley	(703) 383-2477	(703) 383-2382	Joanne Sorenson	(703) 383-2461	(703) 383-2470
Maryland General Assembly						
	Del. James Hubbard	(301) 858-3103	(301) 858-3850	Del Barbara Frush	(301) 858-3114	(301) 858-3850
	TBD		(301) 858-3850	Sen Roy Dyson	(410) 841-3673	(301) 858-3928
Virginia General Assembly						
	Sen. Mary Margaret Whipple	(703) 538-4097	(703) 538-2486	Sen Warren Barry	(703) 321-0900	-
				Del. Brian Moran	(703) 549-8253	(703) 739-6761

Metropolitan Washington Air Quality
Technical Advisory Committee
MEMBERSHIP LIST

Denotes Chair ⚜

Chairman, Hon.T. Dana Kauffman

Jurisdiction	Member	Telephone	Fax	Alternate	Telephone	Fax
Maryland						
Bowie	*VACANT*	-	-	-	-	-
Calvert County	Howard Chang	(301) 870-2520	(301) 274-1924	-	-	-
Charles County	Victoria Greenfield	(301) 683-0801	(301) 645-0560	-	-	-
College Park	Ron Monteith	(301) 864-3770	(301) 699-8029	M. Patrick Peck	(301) 864-8664	(301) 699-8029
Frederick City	*VACANT*	-	-	-	-	-
Frederick County	Larry Bohn	(301) 631-3179	(301) 631-3180	-	-	-
Gaithersburg	Paul Folkers	(301) 258-6310	(301) 948-6149	-	-	-
Greenbelt	Michael McLaughlin	(301) 474-8000	(301) 441-8248	Carl Hursch	(301) 474-8004	(301) 474-8149
Montgomery County	Mary Richmond	(240) 777-7758	(240) 777-7765	-	-	-
Prince George's Co.	Sherry Conway Appel	(301) 883-5835	(301) 883-9218	Marcelino Cole	(301) 883-7169	-
Rockville	Eugene H. Cranor	(301) 309-3220	(301) 762-7153	-	-	-
Takoma Park	Venita George	(301) 270-5900	(301) 270-8794	Daryl Braithwaite	(301) 585-8333 ext. 315	(301) 585-2405
Virginia						
Alexandria	William Skrabak	(703) 519-3400 ext. 163	(703) 519-5941	-	-	-
Arlington County	Jeffrey Harn	(703) 228-3612	(703) 228-7134	-	-	-
City of Fairfax	Adrian Schagrin	(703) 385-7810	(703) 591-5727	-	-	-
Fairfax County	Hon. T. Dana Kauffman*	(703) 971-6262	(703) 971-3032			
Fairfax County	Kambiz Agazi	(703) 324-1788	(703) 324-1847			
Falls Church	-	-	-	Wayne French	(703) 241-5080	(703) 248-5184
Loudoun County	Mark Moszak	703-771-5104	-	-	-	-
Prince William County	Ricardo Canizales	703-792-5985	703-792-7159	Mark Colwell	(703) 792-6984	(703) 792-7012
Stafford County	William C. Shelly	(540) 659-8668	(703) 777-0441	Russell Seymour	(540) 658-8668	(540) 658-6824
State Air Management						
District of Columbia	Don Wambsgans	(202) 535-2255	(202) 535-2881	Stan Tracey, Ram T.	(202) 565-2990	(202) 535-1371
Maryland	George (Tad) Aburn	(410) 631-3242	(410) 631-3202	Diane Franks	(410) 631-3250	(410) 631-3202
Virginia	James Sydnor	(804) 698-4424	(804) 698-4510	Terry Darton	(540) 899-4505	(703) 583-3841
	Jim Ponticello	(804) 698-4405	(804) 698-4510			
State Transportation Agencies						
District of Columbia DPW	Michelle Pourciau	(202) 671-0497	(202) 939-7185	Maurice Keys	(202) 671-0497b	(202)671-7185
Maryland DOT	Howard Simons	(410) 865-1296	(410) 850-9263	-	-	-
Virginia DOT	Samuel F. Curling Jr.	(804) 371-6768	(804) 786-7401	Kanti Srikanth	(703) 383-2228	(703) 383-2230
TPB Technical Committee						
	Alex Hekimian	(301) 495-4531	(301) 495-1302	James Maslanka	(703) 228-3694	(703) 228-3594

Air Quality Public Advisory Committee (AQPAC)

MEMBERSHIP LIST

Category	Organization	Contact Name
Business/Industry (5 members)		
	AAA Mid-Atlantic	Deborah DeYoung
	Greater Washington Board of Trade	Bob Grow Shimona Scott, Alternate
	Mirant Mid-Atlantic	Bill Butler
	Washington Area Auto Dealers	Tom Mann Gerard Murphy, Alternate
	Maryland Highway Contractors Association	Brian Holmes
Education/Scientific (3 members)		
	American Planning Association	Lee Schoenecker
	Northern Virginia Regional Representative	Larry Zaragoza
	Washington Academy of Science	Elise Ann Brown
Environmental/Health (5 members)		
	District Interracial Coalition for Environmental Equity (DICEE)	Lisa Mosczynski Rodney Livingston, Alternate
	Episcopal Stewardship of Creation	Julie Crenshaw
	Washington Regional Network	Jim Clarke
	Keystone Center	Jeremy Kranowitz
	VACANT	
Civic/Community (5 members)		
	VA/Urban	Ed Fendley, Arlington
	District of Columbia	Jill Engel-Cox
	VA/Rural	Kim Hosen, PW Co. Charlie Grymes, Alternate
	MD/Urban -- **VACANT**	
	MD/Rural -- **VACANT**	

Appendix B

MOBILE6 Inventories and Documentation

November 26, 2003

To: Beth Lowe

From: Mike Clifford MC

Subject: Final 2002 and 2005 ozone season mobile source emissions inventory results

This memo transmits the final set of regional (MSA) mobile source emissions inventory totals needed for the severe area SIP. These results are based upon the same technical methods and planning assumptions used in assessing air quality conformity of the 2003 CLRP / FY2004-09 TIP, i.e., using adopted round 6.3 cooperative forecasts, and latest plan and program project submissions.

The attached seven exhibits contain VOC and NOx network and off-network emissions totals for uncontrolled and controlled conditions for each year. Exhibit 1 is the only exhibit which incorporates TCMs. It reflects relevant TCM emissions reductions in order to provide net mobile source emissions totals for each analysis year / scenario. Exhibits 2 and 3 present results by transportation component; exhibits 4 -7 present emissions by state.

As we understand that no analysis of additional or incremental control strategies is required, this completes DTP's inventory development for the severe area ozone SIP.

Attached: Exhibits 1 - 7

Exhibit 1

Summary Table

2002 & 2005 Mobile Source Emissions inventory for Rate of Progress

	2002				2005			
	Uncontrolled		Controlled		Uncontrolled		Controlled	
	VOC	NOx	VOC	NOx	VOC	NOx	VOC	NOx
M.S. Inventory (t/day)	181.5	335.7	125.5	290.8	178.2	321.2	97.7	235.4
TCMs (t/day)			0.3	0.5			0.3	0.7
Net (t/day)	181.5	335.7	125.2	290.3	178.2	321.2	97.4	234.7

Exhibit 2

SEVERE AREA SIP
2002 Summary Table
Mobile Emissions Inventories
(Tons/Day)

	Uncontrolled		Controlled	
	VOC	NOx	VOC	NOx
I Network				
Start	36.7	24.8	25.5	14.1
Running	90.7	282.7	61.7	251.1
Soak	14.4	----------	11.2	----------
II Off-Network				
Diurnal	5.2	----------	3.1	----------
Resting Loads	15.4	----------	12.3	----------
Local Roads	16.0	13.2	9.6	11.3
School Buses	0.5	6.4	0.4	6.1
Transit Buses	0.6	6.5	0.4	6.6
Auto Access	2.0	2.1	1.3	1.7
Total	181.5	335.7	125.5	290.8

Control Strategy Reductions	56.0	44.9

Case 0 Uncontrolled
Case 5 Controlled

Exhibit 3

SEVERE AREA SIP
2005 Summary Table
Mobile Emissions Inventories
(Tons/Day)

	Uncontrolled		Controlled	
	VOC	NOx	VOC	NOx
I Network				
Start	33.6	25.2	17.3	10.9
Running	89.6	268.0	46.8	202.1
Soak	15.6	---------	11.2	---------
II Off-Network				
Diurnal	5.2	---------	2.8	---------
Resting Loads	15.6	---------	10.6	---------
Local Roads	15.8	13.4	7.3	9.9
School Buses	0.5	6.3	0.4	5.5
Transit Buses	0.5	6.0	0.3	5.6
Auto Access	1.9	2.2	1.0	1.5
Total	178.2	321.2	97.7	235.4

Control Strategy Reductions	80.5	85.8

Case 0 Uncontrolled
Case 6 Controlled

Exhibit 4
Summary Table
2002 VOC Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

Jurisdiction	2002	
	Uncontrolled	Controlled
District of Columbia	18.8	12.8
Maryland	84.7	58.9
Virginia	78.0	53.8
Total	181.5	125.5

Exhibit 5
Summary Table
2002 NOx Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

Jurisdiction	2002	
	Uncontrolled	Controlled
District of Columbia	28.8	24.9
Maryland	159.4	138.5
Virginia	147.5	127.4
Total	335.7	290.8

Exhibit 6
Summary Table
2005 VOC Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

Jurisdiction	2005	
	Uncontrolled	Controlled
District of Columbia	18.0	10.1
Maryland	82.0	45.2
Virginia	78.2	42.4
Total	178.2	97.7

Exhibit 7
Summary Table
2005 NOx Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

Jurisdiction	2005	
	Uncontrolled	Controlled
District of Columbia	27.2	20.2
Maryland	152.2	112.2
Virginia	141.8	103.0
Total	321.2	235.4

MEMORANDUM

June 2, 2003

To: Joan Rohlfs

From: Mike Clifford

Subject: Mobile source emissions inventories for severe ozone nonattainment area state implementation plan

Introduction

This memo transmits the final mobile source emissions inventories developed for the severe ozone nonattainment area state implementation plan (SIP) for the Washington region, and documents the technical methods applied in that process. Exhibits 1 and 2 contain the VOC and NO_x emissions estimates by travel component for the analysis years and conditions required for rate of progress and attainment planning; Exhibits 3 and 4 contain the aggregate emissions data summarized by state.

Primary components include network and off-network analyses. The fundamental emissions calculation in each category represents emissions as the product of a travel element and an emissions rate associated with that travel. For example, VMT (in miles per day) multiplied by a VOC or NOx emissions rate (in grams per mile) yields emissions (in grams, which is aggregated and converted to tons, per day). Each of the travel categories is described below. Most of the work to prepare these inventories was performed between October 2002 and March 2003; however, the inventories were recomputed in April to reflect technical corrections (I/M program and diesel sales fraction updates) advanced by the air management agencies.

Network Components

Travel Demand

The travel demand component for this work was based upon the execution of the COG/TPB's Version 2.1 travel forecasting process, see COG/TPB Travel Forecasting Model, Version 2.1/TP+, Release C, User's Guide (Report), December, 2002. This represents the first application of this new modeling process in regional long range planning activities. Inputs to the process include Round 6.2 Cooperative Forecast land activity assumptions and the current regional long range plan adopted by the TPB in July 2002.

Emissions Factors

The emissions factors for this work were developed by E. H. Pechan and Associates (Pechan), and COG/DEP staff using EPA's Mobile6 emissions factor model (User's Guide to Mobile6.0, EPA, January, 2002). Following the development of inputs to the model under the guidance of the joint TPB / MWAQC Mobile6 Task Force, and documentation of the inputs and methods by Pechan staff in two memos, appropriate emissions factors for all years were developed by Pechan and COG/DEP staff. (These two memos are contained in Attachment A: the first is entitled "1990 and 2005 MOBILE6 Input Documentation", January 27, 2003; the second is: "Adjusted Base Years MOBILE6 Input Documentation for 1996, 1999, 2002, and 2005", March 10, 2003.)

While all inputs to the Mobile6 emissions factor model were examined in detail and updated as appropriate to reflect new data or procedures, one aspect of the updated emissions factor development process deserves special mention - the development of the vehicle miles traveled (VMT) mix input, i.e., the amount of travel occurring in the Washington area by type of vehicle. This approach is notable in that it represents a significant improvement over past methods. The following explanation also responds to a request from EPA (Attachment B - March 4, 2003 EPA memo containing Region III comments on VMT Mix Methodology) regarding the reason for the change in methodology.

Past methods used at COG to estimate VMT mix have involved the use of state-wide databases of travel tabulated according to FHWA categories of vehicles (which differ from EPA's Mobile model categories of vehicles). These values were then applied in a static manner through time, i.e., a base year set of VMT mix percentages were developed and applied for all analysis years. With Mobile6 a more precise accounting of travel by vehicle type is now possible: (1) by cross-section, i.e., 28 types of vehicles and associated VMT mix percentages contained within the model, based upon local vehicle registration data as a starting point, and (2) through time, i.e., the percentage of each vehicle type changes through time in the model according to observed data trends, e.g., the well documented increases in SUV's and decreases in autos. Similarly, COG/TPB's current travel demand modeling process contains an explicit representation of truck travel, which is modeled as a function of land use characteristics, which also vary on a cross-sectional basis throughout the region and through time as land use changes.

The resulting VMT mix methodology, described in detail in the 1/27/3 Pechan memo, is a significant improvement over past methods in that it incorporates the best of both local and national data and trends, reflecting: (1) the use of local vehicle registration data to develop VMT characteristics for the full 28 vehicle types required by the Mobile6 model, and (2) the changes in VMT mix occurring through time and reflected within the Mobile6 model, and (3) adjustments to reflect the overall split between light duty and heavy duty vehicles specific to the Washington region. The new process is therefore a more accurate one in estimating VMT mix for both base year and forecast year conditions and should therefore lead to better estimates for the resulting emissions factors in each case as well.

Mobile Source Emissions

The calculation of mobile emissions occurs through application of the COG/TPB emissions post-processor (Attachment C - memo dated March 19, 2003, updated 5/14/03, entitled "Description of the Version 2.1/TP+/MOBILE6 Emissions Post–Processor"). This series of programs applies the travel and emissions factors to develop emissions for each of the start, running and soak portions of the trip cycle. This work was performed for each of the required analysis years; the results in Exhibits 1 - 4 reflect the final execution of the programs following technical corrections work activities.

Off-Network Components

These separate calculations of emissions represent additional mobile source emissions which are computed offline, via spreadsheet methods. Separate emissions estimates are prepared for the following categories: diurnal and resting losses, local roads, school and transit buses, and auto access. Attachments D - G are technical memos documenting these separate analyses.

Technical Corrections

Following review of initial emissions results, the air management agencies identified a number of technical corrections associated with the Mobile model input specifications for diesel sales fractions and vehicle inspection and maintenance programs. These updates, contained in Pechan's April 3, 2003 memo (Attachment H), were incorporated into the Mobile6 specifications for each analysis year and rerun by DEP / Pechan to develop updated emissions factors. These factors, in turn, were applied by COG/TPB staff in the recalculation of mobile emissions for all analysis cases and reflect the final numbers contained in Exhibits 1 - 4.

Round 6.3 Sensitivity Test

In Exhibits 1 and 2 there is a "Round 6.3 Adjustment" entry for year 2002 and 2005 summaries of controlled emissions. This adjustment reflects the impacts of forthcoming land activity estimates for the region. Since the new forecasts represent higher estimates of households, population and jobs, a sensitivity analysis was performed to estimate the additional emissions which might be expected. Methods and results are documented in the attached technical memorandum (Attachment I) from Mike Clifford to the TPB Technical Committee dated April 4, 2003. As with the above analysis, the Round 6.3 sensitivity tests were rerun using the technical corrections inputs; Exhibits 1 - 4 incorporate all updates and reflect the final mobile source inventory calculations.

Following:

Exhibits 1 - 4

Exhibit 1

Summary Table
VOC Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

			1990 Adjusted				Uncontrolled		Controlled		Controlled with 6.3 Adj.'s	
		1990 Base	1996	1999	2002	2005	2002	2005	2002	2005	2002	2005
Network	Start	59.61	36.41	31.33	27.51	24.38	36.11	33.09	25.09	17.00	25.60	17.41
	Running	162.00	91.36	78.58	71.26	66.74	90.16	88.86	61.36	46.52	61.95	47.22
	Soak	21.00	11.58	11.01	11.03	11.61	14.18	15.34	11.00	11.02	11.24	11.28
Off-Network	Diurnals	8.27	5.14	4.63	4.29	4.07	5.25	5.16	3.13	2.82	3.13	2.82
	Resting	17.31	13.71	12.95	12.46	12.13	15.25	15.57	12.31	10.55	12.31	10.55
	Local Roads	27.10	15.39	13.56	12.58	11.99	15.86	15.66	9.51	7.30	9.49	7.37
	School Bus	0.65	0.50	0.46	0.43	0.40	0.48	0.47	0.43	0.38	0.43	0.38
	Transit Bus	1.27	0.74	0.63	0.51	0.44	0.57	0.49	0.38	0.27	0.38	0.27
	Auto Access	1.94	1.16	1.01	0.91	0.84	1.97	1.92	1.33	1.02	1.34	1.05
TOTAL		299.15	176.00	154.16	140.98	132.59	179.82	176.56	124.53	96.88	125.87	98.34
							Round 6.3 Adjustment:		1.34	1.46		
									125.87	**98.34**		

NOTES:

1. **Primary travel demand estimates utilize Round 6.2 forecasts**
2. **Emission Factors reflect I/M and diesel sales fractions "technical corrections"**
3. **Start-up emissions reflect 4/30/03 program code updates**
4. **2002 and 2005 controlled network emissions reflect Round 6.3 forecasts.**

Exhibit 2

Summary Table
NOx Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

			1990 Adjusted				Uncontrolled		Controlled		Controlled with 6.3 adj.'s	
		1990 Base	1996	1999	2002	2005	2002	2005	2002	2005	2002	2005
Network	Start	23.10	19.93	18.89	18.63	17.87	24.38	24.83	13.85	10.70	14.13	10.95
	Running	324.37	256.63	247.14	226.41	207.06	281.10	268.06	249.71	203.20	251.58	204.25
	Soak	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----
Off-Network	Diurnals	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----
	Resting	-----	-----	-----	-----	----	-----	-----	-----	-----	-----	-----
	Local Roads	17.73	12.03	11.20	10.70	10.42	13.90	13.49	11.21	10.27	11.21	10.38
	School Bus	5.97	5.72	5.69	5.65	5.38	6.35	6.34	6.09	5.49	6.09	5.49
	Transit Bus	8.16	6.42	6.08	5.82	5.37	6.54	6.03	6.59	5.55	6.59	5.55
	Auto Access	1.47	1.06	0.99	0.96	0.94	2.13	2.21	1.67	1.45	1.67	1.50
TOTAL		380.80	301.79	289.98	268.18	247.04	334.40	320.96	289.12	236.67	291.28	238.12
							Round 6.3 Adjustment:		2.16	1.45		
									291.28	**238.12**		

NOTES:

1. **Primary travel demand estimates utilize Round 6.2 forecasts**
2. **Emission Factors reflect I/M and diesel sales fractions "technical corrections"**
3. **Start-up emissions reflect 4/30/03 program code updates**
4. **2002 and 2005 controlled network emissions reflect Round 6.3 forecasts.**

Exhibit 3

Summary Table
VOC Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

Jurisdiction		1990 Adjusted				Uncontrolled		Controlled		Cont. w/ 6.3 adj.'s	
	1990 Base	1996	1999	2002	2005	2002	2005	2002	2005	2002	2005
District of Columbia	42.00	24.12	20.63	18.68	17.57	18.09	17.51	12.39	9.84	12.80	10.22
Maryland	133.42	78.40	69.49	63.65	59.77	84.25	81.98	58.66	45.16	59.17	45.54
Virginia	123.73	73.48	64.03	58.65	55.25	77.49	77.07	53.48	41.88	53.89	42.58
Total	299.15	176.00	154.16	140.98	132.59	179.82	176.56	124.53	96.88	125.87	98.34
						Round 6.3 Adjustment:		1.34	1.46		
								125.87	**98.34**		

NOTES:

1. **Primary travel demand estimates utilize Round 6.2 forecasts**
2. **Emission Factors reflect I/M and diesel sales fractions "technical corrections"**
3. **Start-up emissions reflect 4/30/03 program code updates**
4. **2002 and 2005 Controlled includes Round 6.3 Adjustments.**

Exhibit 4

Summary Table
NOx Mobile Emissions Inventories
for "Severe Area" Rate of Progress and Attainment
(Tons / Day)

Jurisdiction		1990 Adjusted				Uncontrolled		Controlled		Cont. w/ 6.3 Adj.'s	
	1990 Base	1996	1999	2002	2005	2002	2005	2002	2005	2002	2005
District of Columbia	41.88	32.05	30.38	28.21	26.15	28.17	26.91	24.30	20.05	24.84	20.46
Maryland	181.66	145.02	140.06	129.70	119.41	160.14	153.23	138.50	114.19	139.43	114.45
Virginia	157.26	124.72	119.53	110.27	101.47	146.10	140.82	126.32	102.43	127.01	103.20
Total	380.80	301.79	289.98	268.18	247.04	334.40	320.96	289.12	236.67	291.28	238.12

Round 6.3 Adjustment: 2.16 1.45

291.28 **238.12**

NOTES:

1. Primary travel demand estimates utilize Round 6.2 forecasts
2. Emission Factors reflect I/M and diesel sales fractions "technical corrections"
3. Start-up emissions reflect 4/30/03 program code updates
4. 2002 and 2005 Controlled includes Round 6.3 Adjustments.

Attachments:

A. M. Mullen (Pechan) memos on Mobile6 Input Documentation, 1/27/3 and 3/10/3

B. M. Morris (EPA) memo on Region III Comments on VMT Mix, 3/4/3

C. R. Milone (COG/TPB) memo on Emissions Post-Processor, 5/14/3

D. E. Lucas (COG/TPB) memo on Diurnal and Resting Loss Emissions, 4/8/3

E. E. Lucas memo on Local Street Emissions, 4/8/3

F. J. Posey (COG/TPB) memo on Transit and School Bus Data, 9/30/2

G. E. Lucas memo on Auto Access, 5/19/3

H. M. Mullen memo on Technical Corrections, 4/3/3

I. R. Milone (COG/TPB) memo on Development of MOBILE6 Composite Emission Rates 12/12/2

J. D. Sivasailam (COG/TPB) memo on V/C Ratios and Speed Lookup Tables, 2/3/3

K. M. Freeman (COG/TPB) memo on Validation of Mobile Emissions Post-Processor, 2/21/3

L. M. Freeman (COG/TPB) memo on Devlopment and Recommendations of Hourly Distributions of Daily Traffic Volumes, 8/27/2

Electronic Submittals:

COG/TPB Travel Forecasting Model, Version 2.1/TP+, Release C, Calibration Report, 12/23/2

COG/TPB Travel Forecasting Model, Version 2.1/TP+, Release C, User's Guide, 12/23/2

COG/TPB Travel Forecasting Model, Version 2.1/TP+, Release C, User's Guide Appendix 12/23/2

Attachment A

Memorandum

Date: January 27, 2003

To: Michael Clifford, COG/TPB
Joan Rohlfs, COG/DEP

From: Maureen Mullen, E.H. Pechan & Associates, Inc.

Subject: 1990 and 2005 MOBILE6 Input Documentation

cc: MOBILE6 Task Force Members

The purpose of this memorandum is to document the MOBILE6 inputs, and the methodologies that were used for developing these inputs, that were developed for the Metropolitan Washington Council of Governments for the purposes of complying with conformity and SIP requirements. This memo includes documentation of the inputs that were prepared for calculating emissions in 2005 and 1990. Separate sets of input files were created to model emission factors corresponding to travel in the COG region 1) on network and local roadways, 2) during auto access to transit, and 3) by diesel transit and school buses. The data included in each of these inputs is discussed separately below.

A. MOBILE6 NETWORK AND LOCAL INPUT FILE SETUP

The MOBILE6 input files representing the network and local roadway conditions include formatting commands, one-time inputs, and scenario data. The one-time inputs include county-specific registration distributions by age, county-specific diesel sales fractions by model year, and inspection and maintenance (I/M) programs.

1. MOBILE6 Run Data

Separate MOBILE6 input files were created for each of the following jurisdictions within the COG region: Washington, DC; Calvert County, Charles County, Frederick County, Montgomery County, and Prince George's County, MD; and Alexandria, Arlington County, Fairfax County, Loudoun County, Prince William County, and Stafford County, VA. The MOBILE6 header and run information common to all of these areas is shown in Table 1. Differences between the 1990 and 2005 input files are indicated on this table.

- The trip length distribution data referenced in Table 1 is shown in Table 2. These data, developed by COG/TPB staff based on the MWCOG Version 2 model, were presented at the May 1, 2002 MOBILE6 Task Force meeting. This same trip length distribution was applied in both the 1990 and 2005 input files.
- The fuel program input, indicating the presence of a reformulated gasoline program, is included in the 2005 inputs, but not in the 1990 inputs, as this program began in 1995.
- The command to disable the CAA is used only in 1990.
- Because the MWCOG region is in the Northeast Ozone Transport Region, the region

follows a different implementation schedule for the National Low Emission Vehicle (NLEV) program than that included in the MOBILE6 default. Table 3 shows the LEV implementation schedule for the MWCOG region. This information is accessed through use of the 94+ LDG IMP command. This LEV information was applied only in 2005. It is not applicable in 1990.

Additional data included in the run portion of the MOBILE6 input file includes the registration distribution data, diesel sales fractions, inspection and maintenance (I/M) program inputs, and anti-tampering program (ATP) inputs. These inputs vary by county or State and are discussed in further detail below.

a. Registration Distributions

County-specific registration distributions were used in the MOBILE6 input files. These distributions show the fraction of registered vehicles from ages 1 through 25 for each of 16 MOBILE6 vehicle types. The registration distribution inputs were different for 1990 and 2005. The registration distribution inputs used for 1990 and 2005 are provided in Appendix 1. Below is a detailed explanation of how these distributions were derived for 2005 and 1990.

2005 Registration Distributions

For the 2005 emission factor modeling, DC, Virginia, and Maryland obtained the most recent registration data available. Registration distributions input to MOBILE6 are assumed to represent July 1 registration data. Both Maryland and Virginia were able to obtain registration data sets extracted on July 1, 2002. DC's registration data set was extracted on August 26, 2002. Thus, an adjustment was made to the first model year of all vehicle types in the DC registration data. The number of registered LDVs and LDTs in the first model year was multiplied by 9/11. This fraction represents 9 months from the beginning of the 2002 model year (assumed to be October 1, 2001) as of July 1, 2002, but 11 months of registered vehicles in the DC database for the 2002 model year. Similarly, the number of HDVs and MCs registered in DC in the 2002 model year were multiplied by 6/8. This represents six months from the beginning of the model year (starts Jan 1) to July 1, 2002, but 8 months of registered HDVs and MCs in the DC database for the 2002 model year. For Maryland, Virginia, and DC, any 2003 model year vehicles were included with the 2002 model year as the first model year in the registration data.

For each county in Virginia and Maryland, the 2002 registration data included counts of registered vehicles by the MOBILE5 vehicle categories. For use with MOBILE6, the LDGV and LDDV vehicle counts by model year were grouped together and the fraction by model year calculated. This was then used as the MOBILE6 LDV registration distribution. The LDGT1 and LDDT vehicle counts by model year were grouped together to create the MOBILE6 LDT1 and LDT2 registration distributions. The MOBILE5 LDGT2 vehicle counts were converted to fractions by model year and applied to the MOBILE6 LDT3 and LDT4 vehicle categories. The HDGV and HDDV vehicle counts by model year were grouped together to create the registration distribution for the MOBILE HDV categories, except the MOBILE6 HDBT (transit bus) category. The MOBILE6 HDBT registration distribution was calculated from the HDDV data only. DC did not have breakdowns of the vehicle registrations by gasoline and diesel. Thus, the MOBILE6 default diesel sales fractions by model year DC HDV data were applied to obtain the MOBILE6 HDBT registration distribution.

1990 Registration Distributions

The 1990 distributions represent the DC's Department of Motor Vehicle Administration's (DMV) registration data, Maryland's Motor Vehicle Administration's (MVA) registration data, and Virginia's DMV registration based on the 1990 MOBILE5 registration distribution values. Because MOBILE5 only included eight vehicle categories (i.e., LDGV, LDGT1, LDGT2, HDGV, LDDV, LDDT, HDDV, and MC), these distributions had to be allocated to the 16 MOBILE6 vehicle categories included in the MOBILE6 registration distributions. This allocation was performed following the procedures in the MOBILE6 User's Guide. The MOBILE5 LDGV and motorcycle registration distributions were used directly as the MOBILE6 LDV and motorcycle registration distributions. Similarly, the MOBILE5 LDGT1 registration distributions were used directly as the MOBILE6 LDT1 and LDT2 registration distributions and the MOBILE5 LDGT2 distributions were used as the MOBILE6 LDT3 and LDT4 registration distributions. For HDVs, the MOBILE5 HDGV and HDDV values were first weighted together to make a single HDV group by multiplying the MOBILE5 HDGV registration distribution fractions by a value of 0.6504 while the HDDV registration distribution fraction by a value of 0.3496 for all twenty-five vehicle ages. These values are the 1990 model year's vehicle adjustment/weighting factors presented in Appendix D (Columns O and P) of the MOBILE6 User's Guide. Then, the adjusted HDGV and HDDV values were added together for each vehicle age to obtain the resulting HDV MOBILE6 registration distribution. This HDV registration distribution was applied to all MOBILE6 heavy-duty vehicle categories except for the transit bus category. For the transit bus category, the MOBILE5 HDDV registration distributions were applied directly.

b. Diesel Sales Fractions

The diesel sales fractions input to MOBILE6 are specific to the calendar year being modeled. The MOBILE6 diesel sales fractions for 1990 and 2005 are shown in Appendix 2.

2005 Diesel Sales Fractions

For 2005, diesel sales fractions were developed for each of the Maryland and Virginia counties, based on a 2005 year of analysis. The LDV diesel sales fractions were calculated by model year by dividing the LDDV registrations by the total of the LDGV plus LDDV registrations for each model year. Similarly, the LDT diesel sales fraction was calculated by model year by dividing the LDDT registrations by the total of the MOBILE5 LDGT1 plus LDDT registrations for each model year. These diesel sales fractions were applied to the MOBILE6 LDT1 and LDT2 categories. Based on the guidance in the MOBILE6 user's guide, the diesel sales fractions for the most recent model year for which data were available (2002) were also applied to all newer years through 2005. The MOBILE6 defaults for a 2005 calendar year are used for the District as well as for all of the heavy duty categories for Maryland and Virginia, since these sales fractions vary significantly by the MOBILE6 weight classes and the registration data for these States is not broken down by weight class. Appendix 2 shows the resulting diesel sales fractions, with the defaults shown for the District, and only the locally-derived LDV and LDT1/2 data shown for Maryland and Virginia.

1990 Diesel Sales Fractions

The LDV and the LDT diesel sales fractions were derived from the 1990 MOBILE5 diesel sales fractions. The format of the 1990 MOBILE5 diesel sales fractions inputs were converted to the appropriate MOBILE6 input format, but the values were unchanged from MOBILE5. The MOBILE5 LDV diesel sales fractions were applied to the MOBILE6 LDV diesel sales fractions while the MOIBLE5 LDT values were applied to MOBILE6's LDT1 and LDT2 diesel sales fractions. The MOBILE6 default diesel sales fractions were used for all other vehicle categories. For DC, the MOBILE6 default diesel sales fractions were applied to all vehicle categories.

c. I/M Anti-Tampering Program Inputs

Each jurisdiction provided I/M program inputs and ATP inputs in MOBILE6 format for 2005. Table 4 shows the I/M program parameters for DC. As shown in this table, a separate cutpoint file is needed for the vehicles included in the IM240 test. For all vehicles and model years included in the IM240 test (LDGVs, LDGTs, and HDGVs), the HC cutpoint modeled in this file is 0.8 grams per mile (g/mi), the CO cutpoint modeled is 15.0 g/mi, and the NOx cutpoint modeled is 2.0 g/mi. The I/M program parameters for Maryland are shown in Table 5. As with DC, a cutpoint file is needed to model the IM240 test. This cutpoint file is shown in Table 6. Table 7 shows the I/M program parameters for Virginia. The ATP inputs for all three jurisdictions are shown in Table 8.

The I/M and ATP inputs for 1990 were developed by converting the 1990 MOBILE5-based I/M inputs to MOBILE6 format, with some review and corrections by the air agencies. Tables 9 and 10 show the 1990 I/M program and ATP inputs, respectively

2. MOBILE6 Scenario Data

The MOBILE6 network/local input files each contain 134 different scenarios. Table 11 summarizes the scenario commands and inputs. The calendar year, RVP, and VMT fractions differ for 1990 and 2005. All other scenario inputs are the same regionwide for both years. The minimum and maximum daily temperatures shown in Table 11 represent the average minimum and maximum daily temperatures recorded at National Airport and Dulles Airport during the top ten ozone exceedance days from 1998 through 2000. These same temperatures were used to model both 1990 and 2005. The RVP input changes from 8.2 psi in 1990 to 7.8 in 2005.

a. Scenario-Specific Inputs

As shown in Table 11, several of these inputs vary by scenario. Table 12 summarizes the data modeled for each of these inputs by scenario. In scenarios 1 through 65, the AVERAGE SPEED input is modeled in 1 mile per hour (mph) increments, from 1 mph through 65 mph. The roadway type is also specified with the AVERAGE SPEED command. In scenarios 1 through 65, a roadway type of "Arterial" is specified. In scenarios 66 through 130, a roadway type of "Non-Ramp" is specified, again with speeds varying from 1 mph through 65 mph in 1 mph speed increments. The "Non-Ramp" roadway type represents interstates excluding the ramp portion of the interstate VMT. In each of these first 130 scenarios, the file referenced in the SOAK DISTRIBUTION command represents the stabilized operating mode. This soak distribution is the first distribution shown in Table 13. Scenario 131 is used to represent ramp VMT. This scenario includes the VMT BY FACILITY command, with the referenced file including 100 percent of the VMT on ramps. This ramp VMT is modeled at the MOBILE6 default ramp speed of 34.6 miles per hour. Scenarios 132 and 133 are used to represent cold start and hot start conditions, respectively.

Table 13 shows the soak distributions used in each of these scenarios. The final scenario, 134, models conditions on local roads for the off-network analysis. In this scenario, a different VMT mix is applied, specific to the local roads.

b. VMT Mix Fractions

VMT mix fractions by vehicle type for each jurisdiction in 1990 and 2005 were based on an estimate of the overall non-bus HDV VMT fraction as output from COG's travel demand model combined with county-specific registration distributions and diesel sales fractions and MOBILE6 default data on the VMT mix by vehicle type within the heavy and light-duty vehicle categories. As determined by the COG's travel demand model, the 1990 HDVs (excluding buses) account for 7.36 percent of the network VMT and 1.60 percent of local road VMT . The LDV + MC group is determined to account for 92.64 percent of the total network VMT. The local LDV + MC group accounts for 98.40 percent of the local road total VMT. The 2005 HDVs (excluding buses) account for 8.05 percent of the network VMT and 1.76 percent of local road VMT. The LDV + MC group accounts for 91.95 percent of the total network VMT and 98.24 percent of the local road total VMT in 2005.

A set of MOBILE6 input files was first prepared using each county's registration distribution and the corresponding diesel sales fraction data for that county. These input files included no VMT mix information, and were run for a July evaluation month for a sample scenario. These MOBILE6 input files were run through MOBILE6 and the database outputs for these inputs were obtained. The MOBILE6 database output format gives VMT fractions for each of the 28 MOBILE6 vehicle types, based on the registration distribution and diesel sales fractions supplied in the input file, as well as the MOBILE6 default VMT mix by vehicle category for 2005. Next, following the guidance included in EPA's MOBILE6 technical guidance document (section 4.1.4), the total VMT fractions in the LDV+MC and the HDV groups in the MOBILE6 database output files were separately totaled. Following the MOBILE6 technical guidance, the LDV and MC VMT fractions were multiplied by the ratio of COG's estimated LDV + MC VMT fraction to the default MOBILE6 LDV + MC VMT fraction. The HDV VMT fractions, excluding the bus fractions (which were multiplied by 0), were multiplied the ratio of COG's estimated HDV VMT fraction to the default MOBILE6 default non-bus HDV VMT fraction. Finally, the new VMT mixes were allocated to the 16 vehicle types required when using VMT mix as an input to MOBILE6. These VMT mixes were then used in the MOBILE6 input files. This procedure was followed separately for network road and locals roads for 1990 and 2005 for each county. Tables 14 and 15 show the resulting VMT mix fractions for 1990 network and local roads, respectively. Tables 16 and 17 show the resulting VMT mix fractions for 2005 network and local roads, respectively. The network VMT mix fractions were included in Scenarios 1 through 133 of the MOBILE6 input files, while Scenario 134 used the local road VMT mix fractions.

B. MOBILE6 AUTO ACCESS TO TRANSIT INPUT FILE SETUP AND PROCESSING

A separate set of MOBILE6 input files was created for use in off-network calculations of emissions resulting from auto access to transit. These input files were identical to the corresponding MOBILE6 network/local input files, with the exception of the VMT mixes used.

The same procedure was used for developing the VMT mixes to represent auto access to transit. However, as this analysis pertains to vehicle accessing the transit system, the vehicle types generating the VMT are believed to be strictly commuting vehicles. Therefore, the HDV fraction was assumed to be 0 percent in both 1990 and 2005, with the LDV + MC accounting for 100 percent of the vehicles accessing the transit system. The resulting VMT mix fractions used for 1990 and 2005 are reported in Tables 18 and 19, respectively.

The resulting MOBILE6 output files representing auto access to transit were post-processed. Running VOC emission factors by speed were estimated by averaging the total exhaust plus running loss plus crankcase VOC emission factors expressed in grams per mile over the 12 jurisdictions. Similarly, average NOx exhaust emission factors were estimated at each speed over the 12 jurisdictions. The composite hot and cold start VOC and NOx emission rates were calculated based on the start-up portion of the emission factors from scenarios 132 and 133 (cold start and hot start, respectively) in grams per mile, combined with data from the MOBILE6 database output on the average daily miles driven by vehicle type, and the average trip starts made per day. Once these values were calculated for each county, an average hot start and cold start emission factor was estimated over the 12-county region.

Start-up Rate (gm/trip) =

(LDGV ef * LDGV_M / LDGV_S * LDGV_APCT) +
(LDGT12 ef * LDGT12_M / LDGT12_S * LDGT12_APCT) +
(LDGT34 ef * LDGT34_M / LDGT34_S * LDGT34_APCT) +
(LDDV ef * LDDV_M / LDDV_S * LDDV_APCT) +
(LDDT ef * LDDT_M / LDDT_S * LDDT_APCT) +
(MC ef * MC_M / MC_S * MC_APCT)

Where:

LDGV ef, …, MC ef = vehicle-specific start-up emission factor (gm/mi) taken from the MOBILE6 database output

LDGV_APCT,…, MC_APCT = vehicle-specific proportion of VMT of the total (gas & diesel) vehicle VMT

LDGV_M,…, MC_M = vehicle-specific average daily miles driven

LDGV_T,…, MC_S = vehicle-specific average trip starts made per day

C. MOBILE6 DIESEL SCHOOL BUS AND DIESEL TRANSIT BUS INPUT FILE SETUP

Separate MOBILE6 files were set up to model diesel school bus and diesel transit bus emission factors. These input files were set up on a regional rather than county basis, with one input file per year for diesel school buses and one input file per year for diesel transit buses. Based on the October 10, 2002 memo prepared by COG DTP staff, a 2005 MOBILE6 registration distribution was developed for the school bus analysis by using the first 16 years of the default MOBILE6 HDBS registration distribution and renormalizing these data over these 16 years (i.e., zeroing out years 17 through 25). The registration distribution used to model diesel transit buses was based on the regional total fleet distribution survey data provided by COG DTP staff. The

2005 school bus and transit bus RDTs are also provided in Appendix 1. These same registration distributions were also used in the 1990 bus analysis. For the 1990 and 2005 school bus MOBILE6 input files, the VMT mix in all scenarios was set to 1 for the HDBS category and 0 for all other categories. For the 1990 and 2005 transit bus MOBILE6 input files, the VMT mix in all scenarios was set to 1 for the HDBT category and 0 for all other categories. These VMT mix fractions are shown in Table 20. In the MOBILE6 school bus input file, the diesel sales fractions for all 25 years for the HDBS category were set to 1. The MOBILE6 default diesel sales fractions were used in the transit bus input file. These defaults are also 1 for the entire HDBT category.

Each of the MOBILE6 bus input files was modeled with 67 scenarios. The first sixty-five scenarios apply to 'Arterial' roadway type with an average speed of 1 through 65 mph. (The arterial and non-ramp emission factors under these conditions are identical at the same speed.) Scenario 66 models freeway ramps and scenario 67 represents local roads. All scenario use the stabilized operating mode inputs and the same ambient and fuel conditions as included in the network/local MOBILE6 input files. These scenarios are summarized in Table 21.

Once these MOBILE6 bus input files were run through MOBILE6, the school bus and transit bus emission factors were extracted from the corresponding output files. No other emission factors from these output files were used.

Table 1
MOBILE6 Run Information Common to All COG Counties

Command	Input	Comment
RUN DATA		Marks end of header section and beginning of Run section of input file
EXPRESS HC AS VOC		Directs MOBILE6 to report HC in terms of volatile organic compounds
EXPAND EVAPORATIVE		Display all evaporative emission types in descriptive output file
EXPAND EXHAUST		Display start, running, and total exhasut emission factors in descriptive output file
NO REFUELING		Exclude refueling emissions from all emission factors
NO CLEAN AIR ACT	(1990 only)	Eliminates effect of Clean Air Act controls (This command is not used in 2005.)
WE DA TRI LEN DI	WeekTLD2.WDT	Reads weekday trip length percentages from specified file (see Table 2)
FUEL PROGRAM	2 S (2005 only)	Specifies that a Southern RFG program is in place (This command is not included in 1990.)
94+ LDG IMP	NLEVNE.D (2005 only)	Specifies that LEV implementation schedule should be read from specified file (see Table 3) (This command is not used in 1990.)
REG DIST	Varies by county	Registration distribution data (see Appendix 1)
ANTI-TAMP PROG	Varies by jurisdiction	
I/M PROGRAM	Varies by jurisdiction	
DIESEL FRACTIONS	Varies by county	See Appendix 2

Table 2
Trip Length Distributions

Length of Trip	MWCOG Regional Percentage of VMT (%)	MOBILE6 Default Percentage of VMT (%)
< 10 Minutes	10.86	6.74
11 - 20 Minutes	24.98	18.51
21 - 30 Minutes	19.71	16.78
31 - 40 Minutes	13.44	13.11
41 - 50 Minutes	9.29	8.33
> 50 Minutes	21.72	36.53

Table 3
LEV Implementation Schedule for MWCOG Region

	Percentage of New Vehicle Sales			
Model Year	Tier 1	Transitional LEV	LEV	Tier 2
1999	30	40	30	0
2000	0	40	60	0
2001	0	0	100	0
2002	0	0	100	0
2003	0	0	100	0
2004+	0	0	0	100

Table 4
2005 I/M Program Parameters for DC

Test Type	IDLE	IM240	OBD I/M	FP & GC	EVAP OBD & GC	IM240	FP & GC
I/M Program Years	1983-2050	1999-2050	2002-2050	1999-2050	2002-2050	1999-2050	1999-2050
Test Frequency	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial
Program Type	T/O	T/O	T/O	T/O	T/O	T/O	T/O
Model Years	1968-1983	1984-1995	1996-2050	1972-1995	1996-2050	1996-2050	1996-2050
Stringency Rate (%)	20	20	20	N/A	20	20	N/A
Compliance Rate (%)	96	96	96	96	96	96	96
Waiver Rate (%)	3	3	3	N/A	3	3	N/A
Exemption Age	25	25	25	25	25	25	25
Cutpoint File	N/A	DC_cpnew	N/A	N/A	N/A	DC_cpnew	N/A
Vehicles Tested							
LDGV	Yes	Yes	Yes	Yes	Yes	No	No
LDGT1	Yes	Yes	Yes	Yes	Yes	No	No
LDGT2	Yes	Yes	Yes	Yes	Yes	No	No
LDGT3	Yes	Yes	Yes	Yes	Yes	No	No
LDGT4	Yes	Yes	Yes	Yes	Yes	No	No
HDGV2B	Yes	Yes	No	Yes	No	Yes	Yes
HDGV3	Yes	Yes	No	Yes	No	Yes	Yes
HDGV4	Yes	Yes	No	Yes	No	Yes	Yes
HDGV5	Yes	Yes	No	Yes	No	Yes	Yes
HDGV6	No	No	No	No	No	No	No
HDGV7	No	No	No	No	No	No	No
HDGV8A	No	No	No	No	No	No	No
HDGV8B	No	No	No	No	No	No	No
GAS BUS	No	No	No	No	No	No	No

Table 5
2005 I/M Program Parameters for Maryland

Test Type	IDLE	IM240	OBD I/M	GC	EVAP OBD & GC	IDLE	GC
I/M Program Years	1984-2050	1984-2050	1984-2050	2003-2050	2003-2050	1984-2050	2003-2050
Test Frequency	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial
Program Type	T/O	T/O	T/O	T/O	T/O	T/O	T/O
Model Years	1977-1983	1984-1995	1996-2050	1977-1995	1996-2050	1977-2050	1977-2050
Stringency Rate (%)	20	20	20	N/A	N/A	20	N/A
Compliance Rate (%)	96	96	96	96	96	96	96
Waiver Rate (%)	3	3	3	3	3	3	3
Grace Period (years)	2	2	2	2	2	2	2
Cutpoint File	N/A	MD_cp05f	N/A	N/A	N/A	N/A	N/A
Vehicle Types							
LDGV	Yes	Yes	Yes	Yes	Yes	No	No
LDGT1	Yes	Yes	Yes	Yes	Yes	No	No
LDGT2	Yes	Yes	Yes	Yes	Yes	No	No
LDGT3	Yes	Yes	Yes	Yes	Yes	No	No
LDGT4	Yes	Yes	Yes	Yes	Yes	No	No
HDGV2B	No	No	No	No	No	Yes	Yes
HDGV3	No	No	No	No	No	Yes	Yes
HDGV4	No	No	No	No	No	Yes	Yes
HDGV5	No	No	No	No	No	Yes	Yes
HDGV6	No	No	No	No	No	Yes	Yes
HDGV7	No	No	No	No	No	No	No
HDGV8A	No	No	No	No	No	No	No
HDGV8B	No	No	No	No	No	No	No
GAS BUS	No	No	No	No	No	No	No

Table 6
IM240 Cutpoint File (MD_cp05f) for Maryland

```
I/M CUTPOINTS      :
* Block 1 (LDGV, Light LDGT1(EPA LD1))
  0.600   0.600   0.600   0.600   0.600   0.600   0.600   0.600   0.600   0.600
  0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800
  0.800   0.800   0.800   0.800   0.800
 10.000  10.000  10.000  10.000  10.000  10.000  10.000  10.000  10.000  10.000
 15.000  15.000  15.000  15.000  15.000  15.000  15.000  15.000  15.000  15.000
 15.000  15.000  15.000  15.000  15.000
  1.500   1.500   1.500   1.500   1.500   1.500   1.500   1.500   1.500   1.500
  2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000
  2.000   2.000   2.000   2.000   2.000
* Block 2 (Heavy LDGT1, Light LDGT2 (EPA LD2&3))
  0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800
  1.600   1.600   1.600   1.600   1.600   1.600   1.600   1.600   1.600   1.600
  1.600   1.600   1.600   1.600   1.600
 13.000  13.000  13.000  13.000  13.000  13.000  13.000  13.000  13.000  13.000
 40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000
 40.000  40.000  40.000  40.000  40.000
  1.800   1.800   1.800   1.800   1.800   1.800   1.800   1.800   1.800   1.800
  2.500   2.500   2.500   2.500   2.500   2.500   2.500   2.500   2.500   2.500
  2.500   2.500   2.500   2.500   2.500
* Block 3 (Heavy LDGT2(EPA LD4))
  0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800   0.800
  1.600   1.600   1.600   1.600   1.600   1.600   1.600   1.600   1.600   1.600
  1.600   1.600   1.600   1.600   1.600
 15.000  15.000  15.000  15.000  15.000  15.000  15.000  15.000  15.000  15.000
 40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000
 40.000  40.000  40.000  40.000  40.000
  2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000
  3.500   3.500   3.500   3.500   3.500   3.500   3.500   3.500   4.500   4.500
  4.500   4.500   4.500   4.500   4.500
* Block 4 (HDGV)
  2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000
  2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   2.000   3.000
  3.000   5.000   5.000   5.000   5.000
 30.000  30.000  30.000  30.000  30.000  30.000  30.000  30.000  40.000  40.000
 40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000  40.000  50.000
 50.000  75.000  75.000  75.000  75.000
  4.000   4.000   4.000   4.000   4.000   4.000   4.000   4.000   5.000   5.000
  5.000   5.000   5.000   5.000   5.000   6.000   6.000   6.000   6.000   6.000
  6.000   6.000   6.000   6.000   6.000
```

Note: The 1996 and later cutpoints for LDGVs and LDGT1s are below the minimum allowable cutpoints in MOBILE6. Therefore, MOBILE6 overrides the 1996 and later cutpoints for LDGVs and LDGT1s with 0.80 grams/mile for HC, with 15.0 grams per mile for CO, and with 2.0 grams per mile for NOx.

Table 7
2005 I/M Program Parameters for Virginia

Test Type	2500/IDLE	ASM 2525/5015 FINAL	OBD I/M	EVAP OBD & GC	GC	2500/ILDE	GC
I/M Program Years	1983-2050	1998-2050	2002-2050	2002-2050	1998-2050	1983-2050	1998-2050
Test Frequency	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial
Program Type	TRC	TRC	TRC	TRC	TRC	TRC	TRC
Model Years	1968-1980	1981-1995	1996-2050	1996-2050	1973-1995	1981-2050	1973-2050
Stringency Rate (%)	35	35	35	N/A	N/A	35	N/A
Compliance Rate (%)	98	98	98	98	98	98	98
Waiver Rate (%)	3	3	3	3	3	3	3
Exemption Age	24	24	24	24	24	24	24
I/M Effectiveness (%)	94	94	94	N/A	N/A	94	N/A
Vehicle Types							
LDGV	Yes	Yes	Yes	Yes	Yes	No	No
LDGT1	Yes	Yes	Yes	Yes	Yes	No	No
LDGT2	Yes	Yes	Yes	Yes	Yes	No	No
LDGT3	Yes	Yes	Yes	Yes	Yes	No	No
LDGT4	Yes	Yes	Yes	Yes	Yes	No	No
HDGV2B	Yes	No	No	No	No	Yes	Yes
HDGV3	No	No	No	No	No	No	No
HDGV4	No	No	No	No	No	No	No
HDGV5	No	No	No	No	No	No	No
HDGV6	No	No	No	No	No	No	No
HDGV7	No	No	No	No	No	No	No
HDGV8A	No	No	No	No	No	No	No
HDGV8B	No	No	No	No	No	No	No
GAS BUS	No	No	No	No	No	No	No

Table 8
Anti-tampering Program Parameters for 2005

Program Element	DC	MD	VA
Program Start Year	1982	1989	1983
First Model Year	1984	1977	1973
Last Model Year	2050	2050	2050
Program Type	Test Only	Test Only	Test Only
Inspection Frequency	Biennial	Biennial	Biennial
Compliance Rate (%)	96	98	98
Vehicle Types			
LDGV	Yes	Yes	Yes
LDGT1	Yes	Yes	Yes
LDGT2	Yes	Yes	Yes
LDGT3	Yes	Yes	Yes
LDGT4	Yes	Yes	Yes
HDGV2B	Yes	Yes	Yes
HDGV3	Yes	Yes	No
HDGV4	Yes	Yes	No
HDGV5	Yes	Yes	No
HDGV6	Yes	Yes	No
HDGV7	Yes	Yes	No
HDGV8A	Yes	Yes	No
HDGV8B	Yes	Yes	No
GAS BUS	Yes	Yes	No
Inspections Performed			
Air pump system disablement	No	No	Yes
Catalyst removal	Yes	Yes	Yes
Fuel inlet restrictor disablement	Yes	Yes	No
Tailpipe lead deposit test	No	No	No
EGR disablement	No	No	Yes
Evaporative system disablement	No	No	Yes
PCV system disablement	No	No	Yes
Missing gas cap	Yes	Yes	Yes

Table 9
1990 I/M Program Parameters

Program Parameters	DC	MD	VA
Test Type	IDLE	IDLE	2500/IDLE
I/M Program Years	1983	1984	1983
Test Frequency	Biennial	Biennial	Biennial
Program Type	T/O	T/O	TRC
Model Years	1968 - 2050	1977 - 2050	1968 - 2050
Stringency Rate (%)	20	23	35
Compliance Rate (%)	96	98	98
Waiver Rate (%)	3	16 and 17	3
I/M Exemption Age			24
Vehicles Tested			
LDGV	Yes	Yes	Yes
LDGT1	Yes	Yes	Yes
LDGT2	Yes	Yes	Yes
LDGT3	Yes	Yes	Yes
LDGT4	Yes	Yes	Yes
HDGV2B	Yes	Yes	Yes
HDGV3	Yes	Yes	No
HDGV4	Yes	Yes	No
HDGV5	Yes	Yes	No
HDGV6	Yes	Yes	No
HDGV7	Yes	Yes	No
HDGV8A	Yes	Yes	No
HDGV8B	Yes	Yes	No
GAS BUS	Yes	Yes	No

Table 10
1990 Anti-tampering Program Parameters

Program Parameters	**DC**	**MD**	**VA**
Program Start Year	1982	1989	1989
First Model Year	1984	1977	1979
Last Model Year	2050	2050	2050
Program Type	Test Only	Test Only	Test Only
Inspection Frequency	Biennial	Biennial	Biennial
Compliance Rate (%)	96	98	98
Vehicle Types			
LDGV	Yes	Yes	Yes
LDGT1	Yes	Yes	Yes
LDGT2	Yes	Yes	Yes
LDGT3	Yes	Yes	Yes
LDGT4	Yes	Yes	Yes
HDGV2B	Yes	Yes	Yes
HDGV3	Yes	Yes	Yes
HDGV4	Yes	Yes	Yes
HDGV5	Yes	Yes	Yes
HDGV6	Yes	Yes	Yes
HDGV7	Yes	Yes	Yes
HDGV8A	Yes	Yes	Yes
HDGV8B	Yes	Yes	Yes
GAS BUS	Yes	Yes	Yes
Inspections Performed			
Air pump system disablement	No	No	Yes
Catalyst removal	Yes	Yes	Yes
Fuel inlet restrictor disablement	Yes	Yes	No
Tailpipe lead deposit test	No	No	No
EGR disablement	No	No	Yes
Evaporative system disablement	No	No	Yes
PCV system disablement	No	No	Yes
Missing gas cap	Yes	Yes	Yes

Table 11
MOBILE6 Scenario Data Inputs

Command	Input	Comment
CALENDAR YEAR	varies	1990 or 2005
EVALUATION MONTH	7	July registration distributions
MIN/MAX TEMPERATURE	68.5 95.0	Daily ozone season temperature range (^{o}F)
ALTITUDE	1	Low altitude area
FUEL RVP	varies	8.2 in 1990, 7.8 in 2005 but overwritten by default RFG parameters
AVERAGE SPEED	varies	See memo text; not used for scenarios 131-134
VMT BY FACILITY	varies	See memo text; not used for scenarios 1-130
SOAK DISTRIBUTION	varies	See memo text
VMT FRACTIONS	varies	See memo text

Table 12
Summary of Scenarios Modeled in Each MOBILE6 Input File
For Network or Auto Access to Transit Analysis

Scenario Number	Operating Mode	Facility Type	Speed
1-65	Stabilized	Arterial/Collectors	1-65 mph
66-130	Stabilized	Freeways excluding Ramps	1-65 mph
131	Stabilized	Freeway Ramps	34.6 mph
132	Cold Start	Local Roadways	12.9 mph
133	Hot Start	Local Roadways	12.9 mph
134	Stabilized	Local Roadways	12.9 mph

Table 13
Soak Distributions

Stabilized Operating Mode

```
SOAK DISTRIBUTION
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*1.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
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24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*1.00
```

Cold Start Operating Mode

```
SOAK DISTRIBUTION
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
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24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*1.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
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24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*1.00 24*0.00 24*0.00
```

Hot Start Operating Mode

```
SOAK DISTRIBUTION
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*1.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
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24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*1.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00 24*0.00
```

Table 14
1990 Summer VMT Mix Fractions
For Network Analysis

Vehicle Type	1990 Summer VMT Mix Fractions											
		Maryland Counties					Virginia Counties					
	DC	Calvert	Charles	Frederick	Montgomery	Prince George's	Alexandria	Arlington	Fairfax	Loudoun	Prince William	Stafford
LDV	0.6483	0.6223	0.6239	0.6260	0.6225	0.6242	0.6377	0.6477	0.6357	0.6399	0.6344	0.6432
LDT1	0.0425	0.0484	0.0478	0.0474	0.0480	0.0479	0.0453	0.0443	0.0457	0.0454	0.0466	0.0452
LDT2	0.1416	0.1612	0.1592	0.1579	0.1600	0.1594	0.1508	0.1477	0.1520	0.1510	0.1552	0.1505
LDT3	0.0593	0.0622	0.0619	0.0617	0.0622	0.0614	0.0598	0.0558	0.0601	0.0581	0.0582	0.0562
LDT4	0.0273	0.0286	0.0284	0.0284	0.0286	0.0282	0.0275	0.0257	0.0277	0.0267	0.0268	0.0258
HDV2B	0.0244	0.0243	0.0243	0.0243	0.0243	0.0243	0.0243	0.0243	0.0243	0.0243	0.0243	0.0243
HDV3	0.0024	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
HDV4	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
HDV5	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
HDV6	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050
HDV7	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
HDV8A	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071
HDV8B	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258	0.0258
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC	0.0074	0.0037	0.0052	0.0050	0.0051	0.0053	0.0053	0.0052	0.0052	0.0053	0.0052	0.0055

Table 15
1990 Summer VMT Mix Fractions
For Local Analysis

Vehicle Type	1990 Summer VMT Mix Fractions											
		Maryland Counties					Virginia Counties					
	DC	Calvert	Charles	Frederick	Montgomery	Prince George's	Alexandria	Arlington	Fairfax	Loudoun	Prince William	Stafford
LDV	0.6886	0.6609	0.6626	0.6650	0.6612	0.6630	0.6774	0.6879	0.6752	0.6797	0.6739	0.6832
LDT1	0.0452	0.0515	0.0508	0.0504	0.0510	0.0509	0.0481	0.0471	0.0485	0.0482	0.0495	0.0480
LDT2	0.1504	0.1713	0.1691	0.1677	0.1700	0.1693	0.1601	0.1568	0.1615	0.1604	0.1649	0.1598
LDT3	0.0630	0.0660	0.0657	0.0655	0.0660	0.0652	0.0635	0.0593	0.0639	0.0617	0.0618	0.0597
LDT4	0.0290	0.0304	0.0302	0.0301	0.0304	0.0300	0.0292	0.0273	0.0294	0.0284	0.0284	0.0275
HDV2B	0.0054	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053
HDV3	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
HDV4	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
HDV5	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
HDV6	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
HDV7	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
HDV8A	0.0015	0.0016	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
HDV8B	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056	0.0056
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC	0.0078	0.0039	0.0056	0.0053	0.0054	0.0056	0.0057	0.0056	0.0055	0.0056	0.0055	0.0058

Table 16
2005 Summer VMT Mix Fractions
For Network Analysis

Vehicle Type	2005 Summer VMT Mix Fractions											
		Maryland Counties					Virginia Counties					
	DC	Calvert	Charles	Frederick	Montgomery	Prince George's	Alexandria	Arlington	Fairfax	Loudoun	Prince William	Stafford
LDV	0.4210	0.4112	0.4134	0.4144	0.4100	0.4152	0.4095	0.4156	0.4123	0.4164	0.4187	0.4255
LDT1	0.0846	0.0868	0.0868	0.0868	0.0874	0.0869	0.0839	0.0832	0.0837	0.0833	0.0831	0.0824
LDT2	0.2815	0.2890	0.2889	0.2890	0.2907	0.2894	0.2793	0.2771	0.2785	0.2775	0.2767	0.2745
LDT3	0.0873	0.0875	0.0860	0.0855	0.0870	0.0843	0.0973	0.0953	0.0961	0.0942	0.0931	0.0905
LDT4	0.0401	0.0402	0.0395	0.0393	0.0400	0.0388	0.0447	0.0438	0.0442	0.0433	0.0428	0.0416
HDV2B	0.0245	0.0253	0.0253	0.0248	0.0245	0.0250	0.0241	0.0243	0.0243	0.0243	0.0243	0.0245
HDV3	0.0024	0.0024	0.0024	0.0025	0.0024	0.0024	0.0025	0.0025	0.0025	0.0025	0.0025	0.0024
HDV4	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022	0.0022
HDV5	0.0016	0.0017	0.0017	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
HDV6	0.0062	0.0061	0.0061	0.0061	0.0062	0.0061	0.0062	0.0062	0.0062	0.0062	0.0062	0.0062
HDV7	0.0073	0.0072	0.0072	0.0072	0.0073	0.0072	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073
HDV8A	0.0081	0.0078	0.0078	0.0080	0.0081	0.0080	0.0082	0.0081	0.0081	0.0081	0.0081	0.0081
HDV8B	0.0282	0.0278	0.0278	0.0281	0.0282	0.0280	0.0284	0.0283	0.0283	0.0283	0.0283	0.0282
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC	0.0050	0.0048	0.0049	0.0045	0.0044	0.0049	0.0048	0.0045	0.0047	0.0048	0.0051	0.0050

Table 17
2005 Summer VMT Mix Fractions
For Local Analysis

Vehicle Type	2005 Summer VMT Mix Fractions											
		Maryland Counties					Virginia Counties					
	DC	Calvert	Charles	Frederick	Montgomery	Prince George's	Alexandria	Arlington	Fairfax	Loudoun	Prince William	Stafford
LDV	0.4498	0.4394	0.4417	0.4428	0.4380	0.4436	0.4375	0.4441	0.4406	0.4448	0.4475	0.4546
LDT1	0.0903	0.0927	0.0927	0.0927	0.0933	0.0929	0.0896	0.0889	0.0894	0.0891	0.0888	0.0881
LDT2	0.3008	0.3087	0.3087	0.3088	0.3106	0.3092	0.2984	0.2960	0.2975	0.2965	0.2956	0.2932
LDT3	0.0932	0.0935	0.0919	0.0913	0.0930	0.0900	0.1040	0.1018	0.1027	0.1006	0.0994	0.0967
LDT4	0.0429	0.0430	0.0422	0.0420	0.0428	0.0414	0.0478	0.0468	0.0472	0.0463	0.0457	0.0444
HDV2B	0.0053	0.0055	0.0055	0.0055	0.0054	0.0055	0.0053	0.0053	0.0053	0.0053	0.0053	0.0053
HDV3	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
HDV4	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
HDV5	0.0004	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
HDV6	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013
HDV7	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
HDV8A	0.0018	0.0017	0.0017	0.0017	0.0018	0.0017	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
HDV8B	0.0062	0.0061	0.0061	0.0061	0.0062	0.0061	0.0062	0.0062	0.0062	0.0062	0.0062	0.0062
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC	0.0054	0.0051	0.0052	0.0048	0.0047	0.0053	0.0051	0.0048	0.0050	0.0051	0.0054	0.0054

Table 18
1990 Summer VMT Mix Fractions
For Auto Access to Transit Analysis

Vehicle Type	1990 Summer VMT Mix Fractions											
		Maryland Counties					Virginia Counties					
	DC	Calvert	Charles	Frederick	Montgomery	Prince George's	Alexandria	Arlington	Fairfax	Loudoun	Prince William	Stafford
LDV	0.6998	0.6717	0.6734	0.6757	0.6719	0.6737	0.6883	0.6991	0.6862	0.6907	0.6848	0.6943
LDT1	0.0459	0.0523	0.0516	0.0512	0.0519	0.0517	0.0489	0.0479	0.0493	0.0490	0.0503	0.0488
LDT2	0.1529	0.1741	0.1718	0.1704	0.1727	0.1721	0.1627	0.1594	0.1641	0.1630	0.1676	0.1624
LDT3	0.0640	0.0671	0.0668	0.0666	0.0671	0.0663	0.0646	0.0603	0.0649	0.0627	0.0628	0.0607
LDT4	0.0294	0.0308	0.0307	0.0306	0.0309	0.0305	0.0297	0.0277	0.0299	0.0288	0.0289	0.0279
HDV2B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV8A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV8B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC	0.0080	0.0040	0.0057	0.0055	0.0055	0.0057	0.0058	0.0056	0.0056	0.0058	0.0056	0.0059

Table 19
2005 Summer VMT Mix Fractions
For Auto Access to Transit Analysis

Vehicle Type	2005 Summer VMT Mix Fractions											
		Maryland Counties					Virginia Counties					
	DC	Calvert	Charles	Frederick	Montgomery	Prince George's	Alexandria	Arlington	Fairfax	Loudoun	Prince William	Stafford
LDV	0.4579	0.4472	0.4496	0.4507	0.4459	0.4515	0.4453	0.4520	0.4484	0.4528	0.4554	0.4627
LDT1	0.0920	0.0944	0.0944	0.0944	0.0950	0.0945	0.0912	0.0905	0.0910	0.0907	0.0904	0.0897
LDT2	0.3061	0.3142	0.3142	0.3143	0.3162	0.3147	0.3038	0.3013	0.3029	0.3018	0.3010	0.2985
LDT3	0.0949	0.0952	0.0935	0.0930	0.0946	0.0917	0.1058	0.1036	0.1045	0.1024	0.1012	0.0984
LDT4	0.0436	0.0438	0.0430	0.0427	0.0435	0.0422	0.0487	0.0477	0.0481	0.0471	0.0465	0.0452
HDV2B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV8A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDV8B	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC	0.0055	0.0052	0.0053	0.0049	0.0048	0.0054	0.0052	0.0049	0.0051	0.0052	0.0055	0.0055

Table 20
2005 VMT Mix Fractions
For School Bus and Transit Bus Analysis

Vehicle Type	VMT Mix Fractions	
	School Bus	Transit Bus
LDV	0.0000	0.0000
LDT1	0.0000	0.0000
LDT2	0.0000	0.0000
LDT3	0.0000	0.0000
LDT4	0.0000	0.0000
HDV2B	0.0000	0.0000
HDV3	0.0000	0.0000
HDV4	0.0000	0.0000
HDV5	0.0000	0.0000
HDV6	0.0000	0.0000
HDV7	0.0000	0.0000
HDV8A	0.0000	0.0000
HDV8B	0.0000	0.0000
HDBS	1.0000	0.0000
HDBT	0.0000	1.0000
MC	0.0000	0.0000

Table 21
Summary of Scenarios Modeled in Each MOBILE6 Input File For School Bus or Transit Bus Analysis

Scenario Number	Operating Mode	Facility Type	Speed
1-65	Stabilized	Arterial/Collectors	1-65 mph
66	Stabilized	Freeway Ramps	34.6 mph
67	Stabilized	Local Road	12.9 mph

Appendix 1
Vehicle Registration Distributions

Registration distributions (RDT) specify the fraction of vehicles by age in the fleet. The distribution for each vehicle category is presented (in fraction) for the newest model year (2002 for model year 2005) and progressing back for 25 model years. This information is given for each of the 16 required vehicle classes used in MOBILE6, for each jurisdiction. For school and transit buses, the RDT reported were based on 2005 metropolitan Washington's regional distribution.

District of Columbia—1990 Registration Data

```
* LDV           M5 LDGV
  0.0250  0.0669  0.0649  0.0699  0.0759  0.0849  0.0899  0.0819  0.0759  0.0729
  0.0509  0.0400  0.0350  0.0310  0.0330  0.0270  0.0210  0.0140  0.0090  0.0080
  0.0070  0.0060  0.0040  0.0030  0.0030
* LDT1          M5 LDGT1
  0.0221  0.0873  0.0873  0.0873  0.0873  0.0722  0.0612  0.0461  0.0371  0.0321
  0.0311  0.0552  0.0491  0.0481  0.0371  0.0291  0.0181  0.0231  0.0181  0.0150
  0.0090  0.0080  0.0080  0.0050  0.0261
* LDT2          M5 LDGT1
  0.0221  0.0873  0.0873  0.0873  0.0873  0.0722  0.0612  0.0461  0.0371  0.0321
  0.0311  0.0552  0.0491  0.0481  0.0371  0.0291  0.0181  0.0231  0.0181  0.0150
  0.0090  0.0080  0.0080  0.0050  0.0261
* LDT3          M5 LDGT2
  0.0190  0.0739  0.0739  0.0739  0.0739  0.0539  0.0519  0.0350  0.0559  0.0320
  0.0290  0.0829  0.0869  0.0509  0.0400  0.0310  0.0190  0.0240  0.0190  0.0150
  0.0090  0.0080  0.0090  0.0060  0.0270
* LDT4          M5 LDGT2
  0.0190  0.0739  0.0739  0.0739  0.0739  0.0539  0.0519  0.0350  0.0559  0.0320
  0.0290  0.0829  0.0869  0.0509  0.0400  0.0310  0.0190  0.0240  0.0190  0.0150
  0.0090  0.0080  0.0090  0.0060  0.0270
* HDV2B         M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV3          M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV4          M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV5          M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV6          M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV7          M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV8a         M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDV8b         M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDBS          M5 HDVs (Combined HDGV and HDDV)
  0.0094  0.0550  0.0550  0.0550  0.0550  0.0516  0.0432  0.0280  0.0316  0.0371
  0.0410  0.0657  0.0554  0.0587  0.0499  0.0320  0.0367  0.0375  0.0322  0.0245
  0.0175  0.0175  0.0168  0.0109  0.0830
* HDBT          M5 HDDVs
  0.0120  0.0682  0.0682  0.0682  0.0682  0.0752  0.0622  0.0411  0.0421  0.0522
  0.0542  0.0672  0.0562  0.0582  0.0461  0.0191  0.0231  0.0291  0.0251  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles   M5 MC
  0.0531  0.1862  0.1491  0.1211  0.0971  0.0771  0.0621  0.0501  0.0400  0.0320
  0.0250  0.1071  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
```

0.0000 0.0000 0.0000 0.0000 0.0000

Calvert County, MD—1990 Registration Data

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* LDV           M5 LDGV
  0.0404  0.0852  0.1002  0.0975  0.1030  0.0993  0.0822  0.0726  0.0486  0.0373
  0.0365  0.0293  0.0323  0.0269  0.0216  0.0146  0.0083  0.0061  0.0080  0.0069
  0.0054  0.0043  0.0042  0.0036  0.0257
* LDT1          M5 LDGT1
  0.0661  0.1347  0.1553  0.1423  0.1312  0.0930  0.0730  0.0577  0.0302  0.0145
  0.0103  0.0099  0.0216  0.0174  0.0124  0.0084  0.0055  0.0029  0.0031  0.0044
  0.0027  0.0008  0.0008  0.0006  0.0010
* LDT2          M5 LDGT1
  0.0661  0.1347  0.1553  0.1423  0.1312  0.0930  0.0730  0.0577  0.0302  0.0145
  0.0103  0.0099  0.0216  0.0174  0.0124  0.0084  0.0055  0.0029  0.0031  0.0044
  0.0027  0.0008  0.0008  0.0006  0.0010
* LDT3          M5 LDGT2
  0.0392  0.0840  0.1040  0.1071  0.0981  0.1108  0.0729  0.0634  0.0428  0.0310
  0.0277  0.0248  0.0377  0.0352  0.0257  0.0174  0.0100  0.0140  0.0082  0.0111
  0.0055  0.0083  0.0066  0.0042  0.0106
* LDT4          M5 LDGT2
  0.0392  0.0840  0.1040  0.1071  0.0981  0.1108  0.0729  0.0634  0.0428  0.0310
  0.0277  0.0248  0.0377  0.0352  0.0257  0.0174  0.0100  0.0140  0.0082  0.0111
  0.0055  0.0083  0.0066  0.0042  0.0106
* HDV2B         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT          M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles   M5 MC
  0.0109  0.0193  0.0153  0.0139  0.0203  0.0371  0.0297  0.0223  0.0272  0.0361
  0.0336  0.7343  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
```

0.0000 0.0000 0.0000 0.0000 0.0000

Charles County, MD—1990 Registration Data

* LDV M5 LDGV
0.0432 0.0850 0.0998 0.0994 0.1006 0.0973 0.0852 0.0752 0.0502 0.0366
0.0347 0.0298 0.0334 0.0270 0.0224 0.0140 0.0073 0.0069 0.0077 0.0069
0.0051 0.0042 0.0047 0.0033 0.0200
* LDT1 M5 LDGT1
0.0673 0.1276 0.1531 0.1487 0.1205 0.0904 0.0707 0.0567 0.0297 0.0169
0.0119 0.0103 0.0237 0.0220 0.0157 0.0094 0.0058 0.0052 0.0045 0.0024
0.0028 0.0016 0.0008 0.0009 0.0014
* LDT2 M5 LDGT1
0.0673 0.1276 0.1531 0.1487 0.1205 0.0904 0.0707 0.0567 0.0297 0.0169
0.0119 0.0103 0.0237 0.0220 0.0157 0.0094 0.0058 0.0052 0.0045 0.0024
0.0028 0.0016 0.0008 0.0009 0.0014
* LDT3 M5 LDGT2
0.0429 0.0813 0.0974 0.1061 0.1009 0.1075 0.0753 0.0631 0.0436 0.0323
0.0267 0.0253 0.0399 0.0325 0.0250 0.0166 0.0119 0.0140 0.0098 0.0103
0.0076 0.0066 0.0059 0.0051 0.0123
* LDT4 M5 LDGT2
0.0429 0.0813 0.0974 0.1061 0.1009 0.1075 0.0753 0.0631 0.0436 0.0323
0.0267 0.0253 0.0399 0.0325 0.0250 0.0166 0.0119 0.0140 0.0098 0.0103
0.0076 0.0066 0.0059 0.0051 0.0123
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0268 0.0539 0.0539 0.0539 0.0539 0.0502 0.0427 0.0276 0.0312 0.0366
0.0406 0.0646 0.0543 0.0576 0.0488 0.0313 0.036 0.0364 0.0311 0.0244
0.0175 0.0174 0.0167 0.0108 0.0816
* HDBT M5 HDDVs
0.0339 0.0669 0.0669 0.0669 0.0669 0.0729 0.0609 0.0399 0.0409 0.0509
0.0529 0.0659 0.0549 0.0569 0.0449 0.0190 0.0230 0.0279 0.0240 0.0160
0.0110 0.0090 0.0070 0.0050 0.0160
* Motorcycles M5 MC
0.0286 0.0800 0.0529 0.0521 0.0580 0.1006 0.0705 0.0617 0.0705 0.0808

0.0698 0.2746 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Frederick County, MD—1990 Registration Data

```
* LDV          M5 LDGV
  0.0390  0.0904  0.1052  0.0988  0.0980  0.0953  0.0795  0.0734  0.0487  0.0386
  0.0345  0.0318  0.0313  0.0274  0.0196  0.0126  0.0073  0.0073  0.0081  0.0067
  0.0049  0.0051  0.0045  0.0040  0.0279
* LDT1         M5 LDGT1
  0.0694  0.1255  0.1402  0.1311  0.1162  0.0994  0.0770  0.0617  0.0273  0.0163
  0.0105  0.0117  0.0325  0.0241  0.0159  0.0105  0.0063  0.0052  0.0043  0.0046
  0.0032  0.0020  0.0013  0.0008  0.0029
* LDT2         M5 LDGT1
  0.0694  0.1255  0.1402  0.1311  0.1162  0.0994  0.0770  0.0617  0.0273  0.0163
  0.0105  0.0117  0.0325  0.0241  0.0159  0.0105  0.0063  0.0052  0.0043  0.0046
  0.0032  0.0020  0.0013  0.0008  0.0029
* LDT3         M5 LDGT2
  0.0391  0.0787  0.0971  0.1037  0.0966  0.1101  0.0722  0.0638  0.0450  0.0305
  0.0273  0.0277  0.0438  0.0369  0.0262  0.0189  0.0104  0.0122  0.0104  0.0110
  0.0071  0.0062  0.0059  0.0049  0.0141
* LDT4         M5 LDGT2
  0.0391  0.0787  0.0971  0.1037  0.0966  0.1101  0.0722  0.0638  0.0450  0.0305
  0.0273  0.0277  0.0438  0.0369  0.0262  0.0189  0.0104  0.0122  0.0104  0.0110
  0.0071  0.0062  0.0059  0.0049  0.0141
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT         M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles  M5 MC
  0.0308  0.0386  0.0506  0.0506  0.0620  0.0854  0.0691  0.0617  0.0652  0.0880
  0.0828  0.3152  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
```

0.0000 0.0000 0.0000 0.0000 0.0000

Montgomery County, MD—1990 Registration Data

```
* LDV           M5 LDGV
  0.0462  0.0981  0.0983  0.1057  0.1104  0.1061  0.0877  0.0783  0.0525  0.0399
  0.0339  0.0279  0.0253  0.0201  0.0149  0.0093  0.0054  0.0051  0.0052  0.0049
  0.0036  0.0031  0.0030  0.0024  0.0128
* LDT1          M5 LDGT1
  0.0899  0.1530  0.1555  0.1451  0.1222  0.0926  0.0705  0.0513  0.0239  0.0132
  0.0102  0.0080  0.0171  0.0137  0.0096  0.0068  0.0037  0.0030  0.0034  0.0022
  0.0017  0.0008  0.0008  0.0005  0.0014
* LDT2          M5 LDGT1
  0.0899  0.1530  0.1555  0.1451  0.1222  0.0926  0.0705  0.0513  0.0239  0.0132
  0.0102  0.0080  0.0171  0.0137  0.0096  0.0068  0.0037  0.0030  0.0034  0.0022
  0.0017  0.0008  0.0008  0.0005  0.0014
* LDT3          M5 LDGT2
  0.0358  0.0868  0.1129  0.1152  0.1057  0.1219  0.0802  0.0696  0.0439  0.0299
  0.0236  0.0225  0.0337  0.0267  0.0206  0.0143  0.0084  0.0090  0.0079  0.0081
  0.0048  0.0045  0.0039  0.0025  0.0076
* LDT4          M5 LDGT2
  0.0358  0.0868  0.1129  0.1152  0.1057  0.1219  0.0802  0.0696  0.0439  0.0299
  0.0236  0.0225  0.0337  0.0267  0.0206  0.0143  0.0084  0.0090  0.0079  0.0081
  0.0048  0.0045  0.0039  0.0025  0.0076
* HDV2B         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT          M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles   M5 MC
  0.0307  0.0526  0.0627  0.0633  0.0679  0.0990  0.0700  0.0537  0.0679  0.0888
  0.0626  0.2809  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
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0.0000 0.0000 0.0000 0.0000 0.0000

Prince George's County, MD—1990 Registration Data

```
* LDV          M5 LDGV
  0.0416  0.0857  0.0946  0.1040  0.1052  0.0946  0.0842  0.0775  0.0514  0.0399
  0.0371  0.0310  0.0329  0.0271  0.0209  0.0143  0.0083  0.0075  0.0076  0.0061
  0.0047  0.0038  0.0034  0.0029  0.0140
* LDT1         M5 LDGT1
  0.0721  0.1415  0.1501  0.1429  0.1220  0.0819  0.0703  0.0543  0.0297  0.0173
  0.0123  0.0109  0.0259  0.0183  0.0146  0.0106  0.0058  0.0052  0.0045  0.0037
  0.0022  0.0009  0.0010  0.0004  0.0016
* LDT2         M5 LDGT1
  0.0721  0.1415  0.1501  0.1429  0.1220  0.0819  0.0703  0.0543  0.0297  0.0173
  0.0123  0.0109  0.0259  0.0183  0.0146  0.0106  0.0058  0.0052  0.0045  0.0037
  0.0022  0.0009  0.0010  0.0004  0.0016
* LDT3         M5 LDGT2
  0.0358  0.0855  0.1004  0.1095  0.0933  0.1062  0.0772  0.0641  0.0426  0.0295
  0.0271  0.0240  0.0379  0.0328  0.0273  0.0209  0.0126  0.0146  0.0111  0.0111
  0.0086  0.0067  0.0063  0.0045  0.0105
* LDT4         M5 LDGT2
  0.0358  0.0855  0.1004  0.1095  0.0933  0.1062  0.0772  0.0641  0.0426  0.0295
  0.0271  0.0240  0.0379  0.0328  0.0273  0.0209  0.0126  0.0146  0.0111  0.0111
  0.0086  0.0067  0.0063  0.0045  0.0105
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT         M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles  M5 MC
  0.0323  0.0533  0.0617  0.0501  0.0668  0.1186  0.0816  0.0633  0.0663  0.0848
  0.0552  0.2661  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
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0.0000 0.0000 0.0000 0.0000 0.0000

Alexandria, VA—1990 Registration Data

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* LDV          M5 LDGV
  0.0676  0.0820  0.0955  0.0937  0.0893  0.0777  0.0732  0.0539  0.0485  0.0478
  0.0448  0.0433  0.0403  0.0325  0.0255  0.0146  0.0143  0.0131  0.0100  0.0073
  0.0054  0.0043  0.0034  0.0027  0.0092
* LDT1         M5 LDGT1
  0.0704  0.1140  0.1112  0.1118  0.1282  0.0734  0.0621  0.0421  0.0366  0.0305
  0.0200  0.0228  0.0251  0.0216  0.0166  0.0117  0.0176  0.0148  0.0148  0.0109
  0.0083  0.0073  0.0065  0.0057  0.0162
* LDT2         M5 LDGT1
  0.0704  0.1140  0.1112  0.1118  0.1282  0.0734  0.0621  0.0421  0.0366  0.0305
  0.0200  0.0228  0.0251  0.0216  0.0166  0.0117  0.0176  0.0148  0.0148  0.0109
  0.0083  0.0073  0.0065  0.0057  0.0162
* LDT3         M5 LDGT2
  0.0558  0.0735  0.0945  0.0765  0.0812  0.0653  0.0546  0.0399  0.0395  0.0382
  0.0322  0.0679  0.0601  0.0528  0.0417  0.0215  0.0279  0.0133  0.0129  0.0095
  0.0099  0.0095  0.0090  0.0086  0.0043
* LDT4         M5 LDGT2
  0.0558  0.0735  0.0945  0.0765  0.0812  0.0653  0.0546  0.0399  0.0395  0.0382
  0.0322  0.0679  0.0601  0.0528  0.0417  0.0215  0.0279  0.0133  0.0129  0.0095
  0.0099  0.0095  0.0090  0.0086  0.0043
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT         M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles  M5 MC
  0.0306  0.0395  0.0447  0.0582  0.0910  0.0828  0.0589  0.0679  0.1380  0.1007
  0.0500  0.2379  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
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0.0000 0.0000 0.0000 0.0000 0.0000

Arlington County, VA—1990 Registration Data

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* LDV          M5 LDGV
  0.1121  0.0925  0.0835  0.0841  0.0823  0.0735  0.0719  0.0539  0.0486  0.0475
  0.0449  0.0400  0.0365  0.0275  0.0212  0.0119  0.0118  0.0114  0.0097  0.0074
  0.0054  0.0047  0.0041  0.0036  0.0096
* LDT1         M5 LDGT1
  0.0561  0.0921  0.1103  0.1085  0.1183  0.0763  0.0740  0.0547  0.0472  0.0413
  0.0257  0.0260  0.0221  0.0220  0.0202  0.0119  0.0174  0.0114  0.0124  0.0076
  0.0070  0.0085  0.0070  0.0059  0.0161
* LDT2         M5 LDGT1
  0.0561  0.0921  0.1103  0.1085  0.1183  0.0763  0.0740  0.0547  0.0472  0.0413
  0.0257  0.0260  0.0221  0.0220  0.0202  0.0119  0.0174  0.0114  0.0124  0.0076
  0.0070  0.0085  0.0070  0.0059  0.0161
* LDT3         M5 LDGT2
  0.0371  0.0535  0.0742  0.0668  0.0699  0.0707  0.0535  0.0437  0.0348  0.0426
  0.0359  0.0781  0.0773  0.0605  0.0554  0.0246  0.0230  0.0195  0.0152  0.0121
  0.0117  0.0086  0.0062  0.0047  0.0203
* LDT4         M5 LDGT2
  0.0371  0.0535  0.0742  0.0668  0.0699  0.0707  0.0535  0.0437  0.0348  0.0426
  0.0359  0.0781  0.0773  0.0605  0.0554  0.0246  0.0230  0.0195  0.0152  0.0121
  0.0117  0.0086  0.0062  0.0047  0.0203
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT         M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles  M5 MC
  0.0254  0.0412  0.0379  0.0494  0.0872  0.0920  0.0580  0.0810  0.1328  0.0796
  0.0628  0.2526  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
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0.0000 0.0000 0.0000 0.0000 0.0000

Fairfax County, VA—1990 Registration Data

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* LDV          M5 LDGV
  0.0722  0.0922  0.1008  0.1053  0.1019  0.0899  0.0806  0.0553  0.0448  0.0420
  0.0369  0.0355  0.0309  0.0241  0.0171  0.0100  0.0099  0.0098  0.0082  0.0064
  0.0050  0.0045  0.0041  0.0038  0.0088
* LDT1         M5 LDGT1
  0.0687  0.1076  0.1223  0.1291  0.1346  0.0849  0.0778  0.0541  0.0362  0.0282
  0.0195  0.0200  0.0148  0.0143  0.0109  0.0069  0.0112  0.0105  0.0098  0.0060
  0.0059  0.0054  0.0049  0.0045  0.0119
* LDT2         M5 LDGT1
  0.0687  0.1076  0.1223  0.1291  0.1346  0.0849  0.0778  0.0541  0.0362  0.0282
  0.0195  0.0200  0.0148  0.0143  0.0109  0.0069  0.0112  0.0105  0.0098  0.0060
  0.0059  0.0054  0.0049  0.0045  0.0119
* LDT3         M5 LDGT2
  0.0546  0.0795  0.0944  0.0900  0.0921  0.0824  0.0630  0.0461  0.0312  0.0332
  0.0310  0.0618  0.0653  0.0487  0.0340  0.0176  0.0162  0.0129  0.0102  0.0066
  0.0057  0.0052  0.0048  0.0044  0.0091
* LDT4         M5 LDGT2
  0.0546  0.0795  0.0944  0.0900  0.0921  0.0824  0.0630  0.0461  0.0312  0.0332
  0.0310  0.0618  0.0653  0.0487  0.0340  0.0176  0.0162  0.0129  0.0102  0.0066
  0.0057  0.0052  0.0048  0.0044  0.0091
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT         M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles  M5 MC
  0.0373  0.0442  0.0424  0.0575  0.0952  0.0824  0.0577  0.0783  0.1192  0.0815
  0.0609  0.2434  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
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0.0000 0.0000 0.0000 0.0000 0.0000

Loudoun County, VA—1990 Registration Data

```
* LDV           M5 LDGV
  0.0660  0.0910  0.1001  0.1009  0.0959  0.0830  0.0775  0.0503  0.0416  0.0400
  0.0363  0.0394  0.0361  0.0291  0.0220  0.0128  0.0131  0.0126  0.0115  0.0084
  0.0065  0.0059  0.0053  0.0048  0.0100
* LDT1          M5 LDGT1
  0.0642  0.0917  0.1103  0.1138  0.1260  0.0914  0.0869  0.0555  0.0377  0.0315
  0.0228  0.0236  0.0229  0.0175  0.0154  0.0093  0.0103  0.0126  0.0103  0.0080
  0.0066  0.0066  0.0066  0.0066  0.0119
* LDT2          M5 LDGT1
  0.0642  0.0917  0.1103  0.1138  0.1260  0.0914  0.0869  0.0555  0.0377  0.0315
  0.0228  0.0236  0.0229  0.0175  0.0154  0.0093  0.0103  0.0126  0.0103  0.0080
  0.0066  0.0066  0.0066  0.0066  0.0119
* LDT3          M5 LDGT2
  0.0521  0.0805  0.0913  0.0687  0.0699  0.0629  0.0557  0.0392  0.0245  0.0307
  0.0343  0.0696  0.0694  0.0624  0.0367  0.0236  0.0261  0.0186  0.0172  0.0133
  0.0105  0.0112  0.0105  0.0097  0.0117
* LDT4          M5 LDGT2
  0.0521  0.0805  0.0913  0.0687  0.0699  0.0629  0.0557  0.0392  0.0245  0.0307
  0.0343  0.0696  0.0694  0.0624  0.0367  0.0236  0.0261  0.0186  0.0172  0.0133
  0.0105  0.0112  0.0105  0.0097  0.0117
* HDV2B         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT          M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles   M5 MC
  0.0356  0.0484  0.0497  0.0650  0.0938  0.0681  0.0399  0.0748  0.1214  0.0723
  0.0638  0.2673  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
```

0.0000 0.0000 0.0000 0.0000 0.0000

Prince William, VA—1990 Registration Data

```
* LDV          M5 LDGV
  0.0669  0.0919  0.0985  0.0997  0.0937  0.0801  0.0738  0.0502  0.0417  0.0420
  0.0382  0.0403  0.0373  0.0310  0.0224  0.0133  0.0134  0.0133  0.0111  0.0082
  0.0069  0.0060  0.0052  0.0046  0.0104
* LDT1         M5 LDGT1
  0.0835  0.1090  0.1214  0.1287  0.1303  0.0829  0.0750  0.0476  0.0361  0.0254
  0.0172  0.0188  0.0159  0.0129  0.0097  0.0062  0.0105  0.0106  0.0119  0.0064
  0.0069  0.0070  0.0069  0.0068  0.0124
* LDT2         M5 LDGT1
  0.0835  0.1090  0.1214  0.1287  0.1303  0.0829  0.0750  0.0476  0.0361  0.0254
  0.0172  0.0188  0.0159  0.0129  0.0097  0.0062  0.0105  0.0106  0.0119  0.0064
  0.0069  0.0070  0.0069  0.0068  0.0124
* LDT3         M5 LDGT2
  0.0425  0.0731  0.0846  0.0763  0.0819  0.0742  0.0641  0.0478  0.0293  0.0336
  0.0313  0.0679  0.0649  0.0542  0.0358  0.0217  0.0213  0.0183  0.0137  0.0108
  0.0106  0.0112  0.0106  0.0101  0.0101
* LDT4         M5 LDGT2
  0.0425  0.0731  0.0846  0.0763  0.0819  0.0742  0.0641  0.0478  0.0293  0.0336
  0.0313  0.0679  0.0649  0.0542  0.0358  0.0217  0.0213  0.0183  0.0137  0.0108
  0.0106  0.0112  0.0106  0.0101  0.0101
* HDV2B        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b        M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT         M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles  M5 MC
  0.0290  0.0326  0.0411  0.0549  0.0870  0.0891  0.0611  0.0741  0.1300  0.0867
  0.0632  0.2512  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
```

0.0000 0.0000 0.0000 0.0000 0.0000

Stafford County, VA—1990 Registration Data

```
* LDV           M5 LDGV
  0.0551  0.0830  0.0891  0.0866  0.0846  0.0724  0.0717  0.0501  0.0442  0.0456
  0.0420  0.0487  0.0436  0.0364  0.0299  0.0178  0.0176  0.0166  0.0151  0.0094
  0.0081  0.0069  0.0060  0.0051  0.0143
* LDT1          M5 LDGT1
  0.0589  0.0905  0.1077  0.1152  0.1149  0.0643  0.0715  0.0555  0.0391  0.0300
  0.0253  0.0253  0.0264  0.0213  0.0165  0.0117  0.0167  0.0169  0.0183  0.0103
  0.0121  0.0110  0.0099  0.0090  0.0220
* LDT2          M5 LDGT1
  0.0589  0.0905  0.1077  0.1152  0.1149  0.0643  0.0715  0.0555  0.0391  0.0300
  0.0253  0.0253  0.0264  0.0213  0.0165  0.0117  0.0167  0.0169  0.0183  0.0103
  0.0121  0.0110  0.0099  0.0090  0.0220
* LDT3          M5 LDGT2
  0.0416  0.0701  0.0701  0.0510  0.0568  0.0568  0.0464  0.0324  0.0276  0.0340
  0.0317  0.0784  0.0837  0.0733  0.0480  0.0297  0.0372  0.0301  0.0209  0.0140
  0.0159  0.0131  0.0108  0.0090  0.0172
* LDT4          M5 LDGT2
  0.0416  0.0701  0.0701  0.0510  0.0568  0.0568  0.0464  0.0324  0.0276  0.0340
  0.0317  0.0784  0.0837  0.0733  0.0480  0.0297  0.0372  0.0301  0.0209  0.0140
  0.0159  0.0131  0.0108  0.0090  0.0172
* HDV2B         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV3          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV4          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV5          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV6          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV7          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8a         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDV8b         M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBS          M5 HDVs (Combined HDGV and HDDV)
  0.0268  0.0539  0.0539  0.0539  0.0539  0.0502  0.0427  0.0276  0.0312  0.0366
  0.0406  0.0646  0.0543  0.0576  0.0488  0.0313   0.036  0.0364  0.0311  0.0244
  0.0175  0.0174  0.0167  0.0108  0.0816
* HDBT          M5 HDDVs
  0.0339  0.0669  0.0669  0.0669  0.0669  0.0729  0.0609  0.0399  0.0409  0.0509
  0.0529  0.0659  0.0549  0.0569  0.0449  0.0190  0.0230  0.0279  0.0240  0.0160
  0.0110  0.0090  0.0070  0.0050  0.0160
* Motorcycles   M5 MC
  0.0341  0.0321  0.0472  0.0402  0.0934  0.0904  0.0612  0.0793  0.1285  0.0753
  0.0582  0.2600  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
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0.0000 0.0000 0.0000 0.0000 0.0000

District of Columbia—2002 Registration Data

* LDV M5 LDGV
0.0443 0.0624 0.0785 0.0637 0.0650 0.0677 0.0640 0.0740 0.0652 0.0565
0.0529 0.0487 0.0487 0.0436 0.0380 0.0320 0.0251 0.0177 0.0127 0.0071
0.0041 0.0034 0.0026 0.0041 0.0177
* LDT1 M5 LDGT1
0.0674 0.0949 0.0853 0.0831 0.0864 0.0766 0.0674 0.0648 0.0563 0.0495
0.0367 0.0348 0.0339 0.0327 0.0294 0.0252 0.0199 0.0128 0.0113 0.0063
0.0035 0.0027 0.0021 0.0032 0.0139
* LDT2 M5 LDGT1
0.0674 0.0949 0.0853 0.0831 0.0864 0.0766 0.0674 0.0648 0.0563 0.0495
0.0367 0.0348 0.0339 0.0327 0.0294 0.0252 0.0199 0.0128 0.0113 0.0063
0.0035 0.0027 0.0021 0.0032 0.0139
* LDT3 M5 LDGT2
0.0674 0.0949 0.0853 0.0831 0.0864 0.0766 0.0674 0.0648 0.0563 0.0495
0.0367 0.0348 0.0339 0.0327 0.0294 0.0252 0.0199 0.0128 0.0113 0.0063
0.0035 0.0027 0.0021 0.0032 0.0139
* LDT4 M5 LDGT2
0.0674 0.0949 0.0853 0.0831 0.0864 0.0766 0.0674 0.0648 0.0563 0.0495
0.0367 0.0348 0.0339 0.0327 0.0294 0.0252 0.0199 0.0128 0.0113 0.0063
0.0035 0.0027 0.0021 0.0032 0.0139
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0668 0.1240 0.0720 0.0916 0.0601 0.0514 0.0406 0.0611 0.0745 0.0597
0.0318 0.0353 0.0505 0.0335 0.0376 0.0289 0.0243 0.0144 0.0059 0.0045
0.0041 0.0035 0.0041 0.0038 0.0160
* HDBT M5 HDDVs
0.0816 0.1720 0.1134 0.0740 0.0533 0.0602 0.0366 0.0569 0.0687 0.0407
0.0289 0.0325 0.0533 0.0305 0.0207 0.0195 0.0187 0.0118 0.0057 0.0041
0.0028 0.0020 0.0041 0.0016 0.0065
* Motorcycles M5 MC
0.1138 0.1400 0.0856 0.0891 0.0410 0.0474 0.0545 0.0460 0.0255 0.0290
0.0219 0.3063 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000

0.0000 0.0000 0.0000 0.0000 0.0000

Calvert County, MD—2002 Registration Data

* LDV M5 LDGV
0.0452 0.0709 0.0786 0.0710 0.0696 0.0719 0.0602 0.0707 0.0588 0.0537
0.0463 0.0441 0.0405 0.0366 0.0337 0.0272 0.0220 0.0151 0.0103 0.0064
0.0034 0.0029 0.0027 0.0030 0.0551
* LDT1 M5 LDGT1
0.0719 0.0899 0.1074 0.1046 0.0951 0.0779 0.0735 0.0708 0.0554 0.0466
0.0370 0.0316 0.0273 0.0266 0.0238 0.0187 0.0130 0.0071 0.0068 0.0035
0.0019 0.0015 0.0005 0.0021 0.0054
* LDT2 M5 LDGT1
0.0719 0.0899 0.1074 0.1046 0.0951 0.0779 0.0735 0.0708 0.0554 0.0466
0.0370 0.0316 0.0273 0.0266 0.0238 0.0187 0.0130 0.0071 0.0068 0.0035
0.0019 0.0015 0.0005 0.0021 0.0054
* LDT3 M5 LDGT2
0.0580 0.0816 0.0813 0.0717 0.0615 0.0643 0.0563 0.0583 0.0638 0.0469
0.0354 0.0313 0.0379 0.0418 0.0438 0.0356 0.0388 0.0221 0.0152 0.0099
0.0073 0.0050 0.0042 0.0061 0.0219
* LDT4 M5 LDGT2
0.0580 0.0816 0.0813 0.0717 0.0615 0.0643 0.0563 0.0583 0.0638 0.0469
0.0354 0.0313 0.0379 0.0418 0.0438 0.0356 0.0388 0.0221 0.0152 0.0099
0.0073 0.0050 0.0042 0.0061 0.0219
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0367 0.0683 0.0720 0.0582 0.0413 0.0555 0.0445 0.0683 0.0491 0.0298
0.0339 0.0215 0.0486 0.0459 0.0601 0.0399 0.0348 0.0344 0.0211 0.0133
0.0092 0.0087 0.0124 0.0151 0.0775
* HDBT M5 HDDVs
0.0053 0.0339 0.0446 0.0446 0.0499 0.0838 0.0749 0.0927 0.0553 0.0410
0.0517 0.0250 0.0517 0.0410 0.0677 0.0695 0.0392 0.0321 0.0250 0.0125
0.0071 0.0107 0.0196 0.0053 0.0160
* Motorcycles M5 MC
0.1049 0.1128 0.0976 0.0740 0.0567 0.0467 0.0477 0.0331 0.0231 0.0294

0.0215 0.3526 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Charles County, MD—2002 Registration Data

* LDV M5 LDGV
0.0495 0.0696 0.0802 0.0724 0.0728 0.0715 0.0623 0.0730 0.0631 0.0559
0.0457 0.0435 0.0390 0.0356 0.0315 0.0271 0.0192 0.0160 0.0107 0.0063
0.0030 0.0023 0.0025 0.0030 0.0444
* LDT1 M5 LDGT1
0.0731 0.1015 0.1050 0.0993 0.0944 0.0849 0.0739 0.0688 0.0549 0.0467
0.0327 0.0282 0.0240 0.0274 0.0223 0.0179 0.0121 0.0097 0.0071 0.0039
0.0019 0.0013 0.0006 0.0021 0.0063
* LDT2 M5 LDGT1
0.0731 0.1015 0.1050 0.0993 0.0944 0.0849 0.0739 0.0688 0.0549 0.0467
0.0327 0.0282 0.0240 0.0274 0.0223 0.0179 0.0121 0.0097 0.0071 0.0039
0.0019 0.0013 0.0006 0.0021 0.0063
* LDT3 M5 LDGT2
0.0579 0.0821 0.0750 0.0673 0.0620 0.0651 0.0509 0.0575 0.0661 0.0452
0.0357 0.0355 0.0380 0.0400 0.0429 0.0380 0.0347 0.0247 0.0182 0.0116
0.0080 0.0053 0.0043 0.0081 0.0258
* LDT4 M5 LDGT2
0.0579 0.0821 0.0750 0.0673 0.0620 0.0651 0.0509 0.0575 0.0661 0.0452
0.0357 0.0355 0.0380 0.0400 0.0429 0.0380 0.0347 0.0247 0.0182 0.0116
0.0080 0.0053 0.0043 0.0081 0.0258
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0359 0.0721 0.0678 0.0611 0.0497 0.0546 0.0441 0.0613 0.0399 0.0449
0.0302 0.0325 0.0413 0.0492 0.0500 0.0447 0.0404 0.0294 0.0206 0.0122
0.0071 0.0096 0.0119 0.0158 0.0738
* HDBT M5 HDDVs
0.0149 0.0298 0.0437 0.0785 0.0656 0.0716 0.0636 0.0825 0.0557 0.0447
0.0318 0.0308 0.0467 0.0656 0.0686 0.0547 0.0427 0.0318 0.0159 0.0089
0.0060 0.0139 0.0060 0.0119 0.0139
* Motorcycles M5 MC

0.0944 0.1365 0.0971 0.0800 0.0576 0.0432 0.0512 0.0372 0.0375 0.0296
0.0273 0.3083 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Frederick County, MD—2002 Registration Data

* LDV M5 LDGV
0.0528 0.0761 0.0821 0.0730 0.0712 0.0732 0.0661 0.0745 0.0607 0.0541
0.0449 0.0414 0.0388 0.0338 0.0276 0.0233 0.0178 0.0122 0.0089 0.0045
0.0030 0.0021 0.0022 0.0031 0.0528
* LDT1 M5 LDGT1
0.0738 0.0984 0.1056 0.0973 0.0992 0.0825 0.0744 0.0767 0.0622 0.0455
0.0334 0.0281 0.0251 0.0239 0.0198 0.0158 0.0100 0.0083 0.0057 0.0029
0.0019 0.0009 0.0010 0.0024 0.0053
* LDT2 M5 LDGT1
0.0738 0.0984 0.1056 0.0973 0.0992 0.0825 0.0744 0.0767 0.0622 0.0455
0.0334 0.0281 0.0251 0.0239 0.0198 0.0158 0.0100 0.0083 0.0057 0.0029
0.0019 0.0009 0.0010 0.0024 0.0053
* LDT3 M5 LDGT2
0.0465 0.0741 0.0762 0.0733 0.0678 0.0677 0.0547 0.0645 0.0677 0.0434
0.0373 0.0377 0.0376 0.0430 0.0424 0.0353 0.0345 0.0210 0.0161 0.0105
0.0060 0.0060 0.0043 0.0081 0.0242
* LDT4 M5 LDGT2
0.0465 0.0741 0.0762 0.0733 0.0678 0.0677 0.0547 0.0645 0.0677 0.0434
0.0373 0.0377 0.0376 0.0430 0.0424 0.0353 0.0345 0.0210 0.0161 0.0105
0.0060 0.0060 0.0043 0.0081 0.0242
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0606 0.0805 0.0921 0.0899 0.0416 0.0700 0.0501 0.0531 0.0363 0.0314
0.0236 0.0237 0.0405 0.0412 0.0436 0.0311 0.0344 0.0268 0.0176 0.0108
0.0085 0.0085 0.0093 0.0146 0.0603
* HDBT M5 HDDVs
0.0353 0.0544 0.0616 0.1062 0.0387 0.1045 0.0624 0.0684 0.0506 0.0429
0.0255 0.0212 0.0344 0.0374 0.0527 0.0463 0.0391 0.0302 0.0221 0.0110
0.0068 0.0093 0.0072 0.0119 0.0200

* Motorcycles M5 MC
0.0841 0.1112 0.0905 0.0655 0.0528 0.0409 0.0389 0.0350 0.0285 0.0276
0.0223 0.4029 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Montgomery County, MD—2002 Registration Data

* LDV M5 LDGV
0.0635 0.0864 0.0846 0.0754 0.0730 0.0724 0.0652 0.0748 0.0626 0.0551
0.0480 0.0434 0.0422 0.0335 0.0273 0.0231 0.0164 0.0114 0.0075 0.0045
0.0027 0.0019 0.0016 0.0019 0.0216
* LDT1 M5 LDGT1
0.0951 0.1220 0.1208 0.1064 0.0931 0.0848 0.0725 0.0695 0.0543 0.0418
0.0289 0.0250 0.0201 0.0171 0.0141 0.0108 0.0071 0.0047 0.0037 0.0019
0.0011 0.0006 0.0005 0.0011 0.0027
* LDT2 M5 LDGT1
0.0951 0.1220 0.1208 0.1064 0.0931 0.0848 0.0725 0.0695 0.0543 0.0418
0.0289 0.0250 0.0201 0.0171 0.0141 0.0108 0.0071 0.0047 0.0037 0.0019
0.0011 0.0006 0.0005 0.0011 0.0027
* LDT3 M5 LDGT2
0.0726 0.0976 0.0894 0.0733 0.0622 0.0672 0.0562 0.0661 0.0638 0.0413
0.0335 0.0303 0.0354 0.0395 0.0370 0.0308 0.0296 0.0177 0.0143 0.0075
0.0058 0.0041 0.0031 0.0053 0.0164
* LDT4 M5 LDGT2
0.0726 0.0976 0.0894 0.0733 0.0622 0.0672 0.0562 0.0661 0.0638 0.0413
0.0335 0.0303 0.0354 0.0395 0.0370 0.0308 0.0296 0.0177 0.0143 0.0075
0.0058 0.0041 0.0031 0.0053 0.0164
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0589 0.0987 0.1176 0.0854 0.0497 0.0671 0.0405 0.0623 0.0356 0.0308
0.0199 0.0303 0.0407 0.0389 0.0366 0.0414 0.0277 0.0203 0.0138 0.0083
0.0067 0.0056 0.0111 0.0101 0.0419
* HDBT M5 HDDVs
0.0105 0.0309 0.0454 0.0725 0.0491 0.0949 0.0493 0.1019 0.0414 0.0456
0.0256 0.0533 0.0723 0.0594 0.0449 0.0850 0.0410 0.0230 0.0156 0.0072

0.0057 0.0048 0.0070 0.0037 0.0099
* Motorcycles M5 MC
0.0853 0.1188 0.0877 0.0634 0.0555 0.0416 0.0442 0.0413 0.0362 0.0325
0.0263 0.3673 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Prince George's County, MD—2002 Registration Data

* LDV M5 LDGV
0.0418 0.0637 0.0732 0.0668 0.0691 0.0741 0.0664 0.0757 0.0664 0.0589
0.0523 0.0468 0.0466 0.0409 0.0352 0.0296 0.0222 0.0159 0.0106 0.0060
0.0034 0.0027 0.0022 0.0030 0.0263
* LDT1 M5 LDGT1
0.0669 0.0933 0.0973 0.0990 0.0984 0.0881 0.0732 0.0727 0.0588 0.0487
0.0349 0.0308 0.0293 0.0270 0.0235 0.0176 0.0114 0.0089 0.0063 0.0033
0.0019 0.0011 0.0009 0.0021 0.0045
* LDT2 M5 LDGT1
0.0669 0.0933 0.0973 0.0990 0.0984 0.0881 0.0732 0.0727 0.0588 0.0487
0.0349 0.0308 0.0293 0.0270 0.0235 0.0176 0.0114 0.0089 0.0063 0.0033
0.0019 0.0011 0.0009 0.0021 0.0045
* LDT3 M5 LDGT2
0.0472 0.0723 0.0759 0.0616 0.0580 0.0638 0.0536 0.0578 0.0648 0.0436
0.0361 0.0342 0.0425 0.0464 0.0445 0.0369 0.0397 0.0258 0.0204 0.0132
0.0084 0.0076 0.0049 0.0096 0.0312
* LDT4 M5 LDGT2
0.0472 0.0723 0.0759 0.0616 0.0580 0.0638 0.0536 0.0578 0.0648 0.0436
0.0361 0.0342 0.0425 0.0464 0.0445 0.0369 0.0397 0.0258 0.0204 0.0132
0.0084 0.0076 0.0049 0.0096 0.0312
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0431 0.0847 0.0871 0.0830 0.0509 0.0674 0.0405 0.0714 0.0485 0.0300
0.0215 0.0294 0.0650 0.0501 0.0531 0.0331 0.0271 0.0249 0.0200 0.0070
0.0057 0.0058 0.0050 0.0084 0.0374
* HDBT M5 HDDVs
0.0215 0.0421 0.0395 0.0724 0.0477 0.0828 0.0613 0.1030 0.0452 0.0363

0.0285 0.0478 0.1143 0.0746 0.0483 0.0414 0.0277 0.0206 0.0139 0.0053
0.0041 0.0038 0.0034 0.0041 0.0104
* Motorcycles M5 MC
0.0856 0.1345 0.1067 0.0854 0.0557 0.0470 0.0492 0.0407 0.0331 0.0341
0.0290 0.2989 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Alexandria, VA—2002 Registration Data

* LDV M5 LDGV
0.1006 0.0993 0.0778 0.0690 0.0673 0.0655 0.0588 0.0668 0.0571 0.0521
0.0458 0.0448 0.0417 0.0350 0.0298 0.0255 0.0178 0.0118 0.0071 0.0044
0.0024 0.0017 0.0014 0.0014 0.0149
* LDT1 M5 LDGT1
0.1357 0.1517 0.0854 0.0674 0.0720 0.0683 0.0590 0.0595 0.0540 0.0434
0.0342 0.0318 0.0266 0.0246 0.0208 0.0185 0.0146 0.0096 0.0064 0.0035
0.0029 0.0020 0.0012 0.0012 0.0056
* LDT2 M5 LDGT1
0.1357 0.1517 0.0854 0.0674 0.0720 0.0683 0.0590 0.0595 0.0540 0.0434
0.0342 0.0318 0.0266 0.0246 0.0208 0.0185 0.0146 0.0096 0.0064 0.0035
0.0029 0.0020 0.0012 0.0012 0.0056
* LDT3 M5 LDGT2
0.1475 0.2009 0.0913 0.0922 0.0647 0.0559 0.0407 0.0450 0.0379 0.0240
0.0209 0.0140 0.0205 0.0229 0.0195 0.0162 0.0125 0.0105 0.0074 0.0048
0.0027 0.0020 0.0017 0.0062 0.0380
* LDT4 M5 LDGT2
0.1475 0.2009 0.0913 0.0922 0.0647 0.0559 0.0407 0.0450 0.0379 0.0240
0.0209 0.0140 0.0205 0.0229 0.0195 0.0162 0.0125 0.0105 0.0074 0.0048
0.0027 0.0020 0.0017 0.0062 0.0380
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0721 0.1407 0.1120 0.1002 0.0465 0.0796 0.0519 0.0668 0.0441 0.0296
0.0211 0.0210 0.0301 0.0357 0.0454 0.0221 0.0238 0.0166 0.0107 0.0055
0.0033 0.0047 0.0030 0.0040 0.0097
* HDBT M5 HDDVs

0.0632 0.0977 0.1025 0.1188 0.0402 0.0872 0.0546 0.0728 0.0460 0.0326
0.0182 0.0249 0.0326 0.0364 0.0680 0.0239 0.0278 0.0172 0.0105 0.0048
0.0019 0.0048 0.0029 0.0048 0.0057
* Motorcycles M5 MC
0.1312 0.1213 0.1082 0.0829 0.0668 0.0407 0.0468 0.0453 0.0353 0.0253
0.0215 0.2748 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Arlington County, VA—2002 Registration Data

* LDV M5 LDGV
0.0714 0.0840 0.0803 0.0715 0.0677 0.0687 0.0624 0.0687 0.0595 0.0556
0.0481 0.0483 0.0439 0.0387 0.0314 0.0258 0.0193 0.0126 0.0088 0.0046
0.0032 0.0021 0.0019 0.0019 0.0196
* LDT1 M5 LDGT1
0.0900 0.1039 0.0949 0.0764 0.0794 0.0739 0.0670 0.0678 0.0619 0.0492
0.0374 0.0365 0.0282 0.0294 0.0258 0.0219 0.0189 0.0110 0.0074 0.0041
0.0031 0.0020 0.0012 0.0015 0.0071
* LDT2 M5 LDGT1
0.0900 0.1039 0.0949 0.0764 0.0794 0.0739 0.0670 0.0678 0.0619 0.0492
0.0374 0.0365 0.0282 0.0294 0.0258 0.0219 0.0189 0.0110 0.0074 0.0041
0.0031 0.0020 0.0012 0.0015 0.0071
* LDT3 M5 LDGT2
0.1000 0.1391 0.1040 0.1075 0.0731 0.0622 0.0472 0.0533 0.0445 0.0282
0.0230 0.0168 0.0221 0.0278 0.0247 0.0200 0.0163 0.0121 0.0089 0.0058
0.0029 0.0017 0.0018 0.0075 0.0494
* LDT4 M5 LDGT2
0.1000 0.1391 0.1040 0.1075 0.0731 0.0622 0.0472 0.0533 0.0445 0.0282
0.0230 0.0168 0.0221 0.0278 0.0247 0.0200 0.0163 0.0121 0.0089 0.0058
0.0029 0.0017 0.0018 0.0075 0.0494
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0461 0.1056 0.1376 0.0946 0.0598 0.0710 0.0545 0.0705 0.0464 0.0373
0.0248 0.0245 0.0290 0.0404 0.0354 0.0282 0.0244 0.0195 0.0135 0.0055
0.0052 0.0029 0.0046 0.0035 0.0152

* HDBT M5 HDDVs
0.0352 0.0803 0.1465 0.0972 0.0648 0.0592 0.0535 0.0718 0.0437 0.0493
0.0239 0.0324 0.0296 0.0394 0.0451 0.0352 0.0225 0.0225 0.0155 0.0028
0.0056 0.0014 0.0070 0.0028 0.0127
* Motorcycles M5 MC
0.0793 0.1187 0.1024 0.0619 0.0529 0.0394 0.0523 0.0400 0.0394 0.0298
0.0231 0.3607 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Fairfax County, VA—2002 Registration Data

* LDV M5 LDGV
0.0583 0.0848 0.0923 0.0803 0.0763 0.0738 0.0648 0.0709 0.0608 0.0552
0.0470 0.0429 0.0412 0.0340 0.0276 0.0230 0.0167 0.0113 0.0074 0.0042
0.0025 0.0018 0.0015 0.0017 0.0197
* LDT1 M5 LDGT1
0.0846 0.1045 0.1091 0.0880 0.0879 0.0802 0.0702 0.0679 0.0609 0.0457
0.0331 0.0309 0.0254 0.0255 0.0218 0.0186 0.0150 0.0093 0.0065 0.0035
0.0022 0.0017 0.0011 0.0013 0.0053
* LDT2 M5 LDGT1
0.0846 0.1045 0.1091 0.0880 0.0879 0.0802 0.0702 0.0679 0.0609 0.0457
0.0331 0.0309 0.0254 0.0255 0.0218 0.0186 0.0150 0.0093 0.0065 0.0035
0.0022 0.0017 0.0011 0.0013 0.0053
* LDT3 M5 LDGT2
0.0935 0.1402 0.1191 0.1243 0.0805 0.0673 0.0501 0.0535 0.0437 0.0263
0.0207 0.0143 0.0200 0.0235 0.0210 0.0165 0.0130 0.0103 0.0077 0.0052
0.0021 0.0017 0.0017 0.0069 0.0369
* LDT4 M5 LDGT2
0.0935 0.1402 0.1191 0.1243 0.0805 0.0673 0.0501 0.0535 0.0437 0.0263
0.0207 0.0143 0.0200 0.0235 0.0210 0.0165 0.0130 0.0103 0.0077 0.0052
0.0021 0.0017 0.0017 0.0069 0.0369
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059
0.0039 0.0033 0.0027 0.0031 0.0097
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0504 0.1074 0.1335 0.1051 0.0607 0.0810 0.0573 0.0753 0.0505 0.0322
0.0237 0.0227 0.0309 0.0360 0.0290 0.0254 0.0218 0.0171 0.0112 0.0059

0.0039 0.0033 0.0027 0.0031 0.0097
* HDBT M5 HDDVs
0.0523 0.0934 0.1151 0.1029 0.0590 0.0782 0.0563 0.0813 0.0542 0.0365
0.0250 0.0288 0.0362 0.0376 0.0329 0.0314 0.0236 0.0193 0.0117 0.0053
0.0044 0.0028 0.0024 0.0027 0.0069
* Motorcycles M5 MC
0.0881 0.1186 0.1092 0.0888 0.0641 0.0478 0.0475 0.0426 0.0335 0.0285
0.0268 0.3045 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Loudoun County, VA—2002 Registration Data

* LDV M5 LDGV
0.0747 0.0934 0.0972 0.0835 0.0811 0.0750 0.0671 0.0704 0.0581 0.0522
0.0414 0.0386 0.0347 0.0284 0.0236 0.0186 0.0143 0.0096 0.0066 0.0036
0.0020 0.0015 0.0012 0.0016 0.0216
* LDT1 M5 LDGT1
0.0849 0.1114 0.1148 0.0915 0.0884 0.0833 0.0697 0.0628 0.0570 0.0421
0.0298 0.0274 0.0221 0.0242 0.0211 0.0170 0.0153 0.0103 0.0069 0.0041
0.0025 0.0023 0.0015 0.0017 0.0081
* LDT2 M5 LDGT1
0.0849 0.1114 0.1148 0.0915 0.0884 0.0833 0.0697 0.0628 0.0570 0.0421
0.0298 0.0274 0.0221 0.0242 0.0211 0.0170 0.0153 0.0103 0.0069 0.0041
0.0025 0.0023 0.0015 0.0017 0.0081
* LDT3 M5 LDGT2
0.0918 0.1434 0.1212 0.1250 0.0789 0.0671 0.0480 0.0477 0.0398 0.0233
0.0182 0.0122 0.0169 0.0222 0.0198 0.0152 0.0130 0.0111 0.0079 0.0059
0.0024 0.0021 0.0025 0.0086 0.0557
* LDT4 M5 LDGT2
0.0918 0.1434 0.1212 0.1250 0.0789 0.0671 0.0480 0.0477 0.0398 0.0233
0.0182 0.0122 0.0169 0.0222 0.0198 0.0152 0.0130 0.0111 0.0079 0.0059
0.0024 0.0021 0.0025 0.0086 0.0557
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329
0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDBS M5 HDVs (Combined HDGV and HDDV)
0.0546 0.1133 0.1217 0.1070 0.0560 0.0823 0.0550 0.0697 0.0489 0.0329

0.0218 0.0168 0.0278 0.0346 0.0356 0.0260 0.0255 0.0179 0.0131 0.0072
0.0045 0.0052 0.0033 0.0049 0.0144
* HDBT M5 HDDVs
0.0580 0.1063 0.1018 0.1056 0.0526 0.0808 0.0540 0.0734 0.0521 0.0372
0.0227 0.0180 0.0310 0.0355 0.0422 0.0303 0.0284 0.0187 0.0142 0.0071
0.0047 0.0054 0.0026 0.0052 0.0118
* Motorcycles M5 MC
0.1024 0.1392 0.1204 0.0871 0.0608 0.0500 0.0527 0.0368 0.0355 0.0239
0.0242 0.2669 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Prince William, VA—2002 Registration Data

* LDV M5 LDGV
0.0519 0.0765 0.0874 0.0754 0.0765 0.0769 0.0670 0.0733 0.0630 0.0562
0.0456 0.0431 0.0387 0.0355 0.0305 0.0244 0.0183 0.0123 0.0088 0.0047
0.0026 0.0019 0.0016 0.0020 0.0259
* LDT1 M5 LDGT1
0.0720 0.0897 0.0967 0.0810 0.0844 0.0802 0.0692 0.0676 0.0640 0.0492
0.0360 0.0328 0.0300 0.0306 0.0290 0.0231 0.0201 0.0119 0.0088 0.0047
0.0036 0.0025 0.0016 0.0018 0.0095
* LDT2 M5 LDGT1
0.0720 0.0897 0.0967 0.0810 0.0844 0.0802 0.0692 0.0676 0.0640 0.0492
0.0360 0.0328 0.0300 0.0306 0.0290 0.0231 0.0201 0.0119 0.0088 0.0047
0.0036 0.0025 0.0016 0.0018 0.0095
* LDT3 M5 LDGT2
0.0768 0.1187 0.1039 0.1136 0.0771 0.0670 0.0488 0.0528 0.0460 0.0281
0.0223 0.0149 0.0223 0.0283 0.0270 0.0209 0.0174 0.0133 0.0106 0.0071
0.0035 0.0025 0.0024 0.0094 0.0653
* LDT4 M5 LDGT2
0.0768 0.1187 0.1039 0.1136 0.0771 0.0670 0.0488 0.0528 0.0460 0.0281
0.0223 0.0149 0.0223 0.0283 0.0270 0.0209 0.0174 0.0133 0.0106 0.0071
0.0035 0.0025 0.0024 0.0094 0.0653
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDBS M5 HDVs (Combined HDGV and HDDV)

0.0532 0.0985 0.1249 0.1119 0.0544 0.0761 0.0548 0.0682 0.0511 0.0359
0.0220 0.0178 0.0280 0.0385 0.0346 0.0290 0.0251 0.0215 0.0130 0.0073
0.0053 0.0045 0.0041 0.0042 0.0160
* HDBT M5 HDDVs
0.0625 0.0961 0.1203 0.1218 0.0508 0.0711 0.0535 0.0680 0.0523 0.0400
0.0204 0.0179 0.0274 0.0365 0.0361 0.0317 0.0239 0.0230 0.0118 0.0065
0.0049 0.0037 0.0039 0.0037 0.0119
* Motorcycles M5 MC
0.1235 0.1399 0.1087 0.0864 0.0563 0.0494 0.0532 0.0419 0.0313 0.0235
0.0199 0.2661 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Stafford County, VA—2002 Registration Data

* LDV M5 LDGV
0.0493 0.0783 0.0861 0.0775 0.0751 0.0731 0.0651 0.0730 0.0611 0.0569
0.0457 0.0411 0.0373 0.0371 0.0311 0.0244 0.0193 0.0125 0.0092 0.0045
0.0032 0.0017 0.0020 0.0022 0.0332
* LDT1 M5 LDGT1
0.0640 0.0857 0.0926 0.0780 0.0802 0.0746 0.0662 0.0648 0.0660 0.0493
0.0381 0.0331 0.0312 0.0337 0.0318 0.0255 0.0247 0.0145 0.0106 0.0070
0.0045 0.0038 0.0026 0.0033 0.0141
* LDT2 M5 LDGT1
0.0640 0.0857 0.0926 0.0780 0.0802 0.0746 0.0662 0.0648 0.0660 0.0493
0.0381 0.0331 0.0312 0.0337 0.0318 0.0255 0.0247 0.0145 0.0106 0.0070
0.0045 0.0038 0.0026 0.0033 0.0141
* LDT3 M5 LDGT2
0.0677 0.1103 0.0964 0.1048 0.0712 0.0598 0.0447 0.0486 0.0458 0.0272
0.0228 0.0149 0.0237 0.0307 0.0296 0.0224 0.0207 0.0157 0.0121 0.0099
0.0039 0.0035 0.0036 0.0156 0.0943
* LDT4 M5 LDGT2
0.0677 0.1103 0.0964 0.1048 0.0712 0.0598 0.0447 0.0486 0.0458 0.0272
0.0228 0.0149 0.0237 0.0307 0.0296 0.0224 0.0207 0.0157 0.0121 0.0099
0.0039 0.0035 0.0036 0.0156 0.0943
* HDV2B M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV3 M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV4 M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV5 M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV6 M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV7 M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV8a M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202
* HDV8b M5 HDVs (Combined HDGV and HDDV)
0.0530 0.0945 0.1181 0.0910 0.0501 0.0738 0.0537 0.0695 0.0538 0.0319
0.0235 0.0201 0.0296 0.0458 0.0397 0.0332 0.0302 0.0235 0.0140 0.0101
0.0050 0.0043 0.0057 0.0057 0.0202

```
* HDBS          M5 HDVs (Combined HDGV and HDDV)
0.0530  0.0945  0.1181  0.0910  0.0501  0.0738  0.0537  0.0695  0.0538  0.0319
0.0235  0.0201  0.0296  0.0458  0.0397  0.0332  0.0302  0.0235  0.0140  0.0101
0.0050  0.0043  0.0057  0.0057  0.0202
* HDBT          M5 HDDVs
0.0681  0.0933  0.1135  0.0908  0.0454  0.0725  0.0549  0.0744  0.0574  0.0340
0.0221  0.0221  0.0284  0.0460  0.0429  0.0385  0.0284  0.0240  0.0113  0.0082
0.0038  0.0013  0.0050  0.0038  0.0101
* Motorcycles   M5 MC
0.1106  0.1186  0.1030  0.0874  0.0646  0.0531  0.0499  0.0392  0.0357  0.0281
0.0227  0.2871  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000
0.0000  0.0000  0.0000  0.0000  0.0000
```

2005 Regional School Bus Registration Data

* HDBS M5 HDVs (Combined HDGV and HDDV)

0.0522	0.0975	0.0911	0.0851	0.0795	0.0742	0.0693	0.0648	0.0606	0.0566
0.0528	0.0494	0.0461	0.0430	0.0402	0.0376	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000					

2005 Regional Transit Bus Registration Data

* HDBT M5 HDDVs

0.0324	0.0660	0.1071	0.0602	0.0478	0.1120	0.0333	0.0756	0.0336	0.0318
0.0457	0.0136	0.0867	0.0475	0.0592	0.0691	0.0654	0.0068	0.0000	0.0062
0.0000	0.0000	0.0000	0.0000	0.0000					

Appendix 2
Diesel Sales Fractions

The diesel sales fractions are presented by vehicle, year-specific model year, and going back 25 model years. Maryland and Virginia use the defaults present for the District for all categories other than LDVs and LDT12 for network and off-network analyses. The diesel sales fractions for the school bus analysis is also provided in this section.

District of Columbia—MOBILE6 1990 Default Diesel Sales Fractions

* LDV
0.0004 0.0004 0.0001 0.0027 0.0032 0.0097 0.0162 0.0241 0.0510 0.0706
0.0390 0.0269 0.0114 0.0093 0.0137 0.0155 0.0067 0.0067 0.0067 0.0067
0.0067 0.0067 0.0067 0.0067 0.0067
* LDT12
0.0000 0.0000 0.0000 0.0007 0.0033 0.0048 0.0120 0.0223 0.0656 0.0616
0.0439 0.0316 0.0259 0.0000 0.0187 0.1038 0.1170 0.1170 0.1170 0.1170
0.1170 0.1170 0.1170 0.1170 0.1170
* LDT34
0.0096 0.0083 0.0072 0.0082 0.0124 0.0135 0.0169 0.0209 0.0256 0.0013
0.0006 0.0011 0.0001 0.0000 0.0000 0.0000 0.0001 0.0001 0.0001 0.0001
0.0001 0.0001 0.0001 0.0001 0.0001
* HDV2B
0.2384 0.2058 0.1756 0.1958 0.2726 0.2743 0.3004 0.2918 0.2859 0.0138
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
* HDV3
0.8477 0.7940 0.7488 0.7789 0.7842 0.6145 0.5139 0.5032 0.4277 0.0079
0.0000 0.0000 0.0001 0.0003 0.0010 0.0028 0.0248 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000
* HDV4
0.7275 0.7158 0.5647 0.3178 0.2207 0.1968 0.1570 0.0738 0.0341 0.0414
0.0003 0.0000 0.0000 0.0000 0.0259 0.0078 0.0004 0.0090 0.0112 0.0112
0.0112 0.0112 0.0112 0.0112 0.0112
* HDV5
0.2730 0.2616 0.1543 0.0615 0.0383 0.0333 0.0255 0.0111 0.0049 0.0060
0.0000 0.0000 0.0000 0.0000 0.0037 0.0011 0.0001 0.0013 0.0016 0.0016
0.0016 0.0016 0.0016 0.0016 0.0016
* HDV6
0.5617 0.4537 0.4216 0.4734 0.4705 0.4525 0.4310 0.3569 0.3690 0.4413
0.3094 0.1679 0.1390 0.0808 0.0476 0.0365 0.0288 0.0274 0.0297 0.0297
0.0297 0.0297 0.0297 0.0297 0.0297
* HDV7
0.8177 0.7440 0.7184 0.7588 0.7567 0.7431 0.7261 0.6602 0.6717 0.7344
0.6107 0.4140 0.3610 0.2353 0.1489 0.1170 0.0940 0.0897 0.0966 0.0966
0.0966 0.0966 0.0966 0.0966 0.0966
* HDV8A
0.9982 0.9979 0.9969 0.9978 0.9980 0.9979 0.9976 0.9969 0.9978 0.9982
0.9974 0.9965 0.9964 0.9949 0.9920 0.9936 0.9819 0.9812 0.9720 0.9720
0.9720 0.9720 0.9720 0.9720 0.9720
* HDV8B
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000
* HDBS
0.8760 0.7710 0.7502 0.7345 0.6733 0.5155 0.3845 0.3238 0.3260 0.2639
0.0594 0.0460 0.0291 0.0240 0.0086 0.0087 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

Calvert County, MD—1990 Diesel Sales Fractions

* LDV

0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0010
0.0000 0.0000 0.0020 0.0030 0.0190 0.0200 0.0270 0.0250 0.0410 0.0310
0.0150 0.0090 0.0040 0.0050 0.0050

* LDT1, LDT2

0.0100 0.0100 0.0100 0.0100 0.0100 0.0100 0.0100 0.0100 0.0100 0.0020
0.0050 0.0040 0.0030 0.0160 0.0320 0.0510 0.0420 0.1450 0.1220 0.1060
0.0190 0.0000 0.0000 0.0000 0.0380

Charles County, MD—1990 Diesel Sales Fractions

* LDV

0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0030 0.0020 0.0070 0.0080 0.0060 0.0170 0.0200 0.0130
0.0060 0.0040 0.0000 0.0000 0.0060

* LDT1, LDT2

0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0030
0.0030 0.0050 0.0100 0.0090 0.0070 0.0300 0.0310 0.0850 0.0550 0.0510
0.0110 0.0000 0.0000 0.0000 0.0000

Frederick County, MD—1990 Diesel Sales Fractions

* LDV

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0000
0.0010 0.0000 0.0010 0.0040 0.0080 0.0090 0.0050 0.0140 0.0220 0.0210
0.0070 0.0050 0.0030 0.0050 0.0030

* LDT1, LDT2

0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0050
0.0030 0.0020 0.0060 0.0110 0.0200 0.0320 0.0460 0.0820 0.1420 0.0570
0.0160 0.0090 0.0000 0.0000 0.0000

Montgomery County, MD—1990 Diesel Sales Fractions

* LDV

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010
0.0010 0.0000 0.0060 0.0060 0.0190 0.0260 0.0330 0.0520 0.0650 0.0560
0.0440 0.0210 0.0180 0.0230 0.0220

* LDT1, LDT2

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0040
0.0090 0.0080 0.0090 0.0260 0.0270 0.0530 0.0590 0.2070 0.1740 0.1300
0.0220 0.0190 0.0060 0.0060 0.0060

Prince Georges County, MD—1990 Diesel Sales Fractions

* LDV

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010
0.0010 0.0000 0.0050 0.0050 0.0130 0.0180 0.0220 0.0380 0.0500 0.0390
0.0190 0.0120 0.0060 0.0050 0.0100

* LDT1, LDT2

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0100
0.0190 0.0130 0.0190 0.0330 0.0440 0.0640 0.0760 0.1950 0.1460 0.1080

0.0250 0.0210 0.0050 0.0180 0.0080

Alexandria, VA—1990 Diesel Sales Fractions

* LDV
0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010
0.0010 0.0000 0.0030 0.0050 0.0140 0.0190 0.0220 0.0410 0.0460 0.0380
0.0190 0.0110 0.0070 0.0090 0.0090
* LDT1, LDT2
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0020 0.0050 0.0170 0.0290 0.0670 0.1930 0.1720 0.0100
0.0090 0.0000 0.0000 0.0240 0.0170

Arlington County, VA—1990 Diesel Sales Fractions

* LDV
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0010 0.0000 0.0020 0.0040 0.0130 0.0210 0.0200 0.0380 0.0490 0.0320
0.0230 0.0150 0.0090 0.0100 0.0100
* LDT1, LDT2
0.0060 0.0060 0.0060 0.0060 0.0060 0.0060 0.0060 0.0060 0.0060 0.0060
0.0020 0.0010 0.0070 0.0140 0.0170 0.0570 0.0680 0.2210 0.2480 0.0700
0.0130 0.0070 0.0000 0.0000 0.0000

Fairfax County, VA—1990 Diesel Sales Fractions

* LDV
0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010
0.0010 0.0000 0.0030 0.0050 0.0150 0.0220 0.0280 0.0480 0.0620 0.0540
0.0300 0.0150 0.0090 0.0130 0.0170
* LDT1, LDT2
0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020
0.0050 0.0020 0.0060 0.0130 0.0140 0.0320 0.0410 0.1240 0.1540 0.0350
0.0110 0.0050 0.0020 0.0060 0.0000

Loudoun County, VA—1990 Diesel Sales Fractions

* LDV
0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020
0.0020 0.0010 0.0040 0.0070 0.0130 0.0230 0.0290 0.0490 0.0660 0.0430
0.0270 0.0120 0.0060 0.0080 0.0100
* LDT1, LDT2
0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030
0.0010 0.0010 0.0060 0.0100 0.0240 0.0290 0.0330 0.1010 0.1340 0.0330
0.0090 0.0090 0.0060 0.0070 0.0700

Prince William County, VA—1990 Diesel Sales Fractions

* LDV
0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010
0.0010 0.0000 0.0010 0.0050 0.0110 0.0190 0.0220 0.0460 0.0620 0.0430
0.0200 0.0100 0.0040 0.0040 0.0100
* LDT1, LDT2
0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030
0.0030 0.0030 0.0050 0.0110 0.0140 0.0290 0.0480 0.1140 0.1540 0.0210

0.0200 0.0030 0.0040 0.0000 0.0000

Stafford County, VA—1990 Diesel Sales Fractions

* LDV

0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030 0.0030

0.0020 0.0000 0.0020 0.0070 0.0160 0.0220 0.0300 0.0600 0.0630 0.0450

0.0170 0.0050 0.0050 0.0040 0.0050

* LDT1, LDT2

0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020 0.0020

0.0030 0.0000 0.0030 0.0080 0.0070 0.0320 0.0450 0.1550 0.0800 0.0180

0.0050 0.0040 0.0050 0.0000 0.0000

District of Columbia—MOBILE6 2005 Default Diesel Sales Fractions

* LDV
0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009 0.0009
0.0006 0.0001 0.0003 0.0006 0.0013 0.0004 0.0004 0.0001 0.0027 0.0032
0.0097 0.0162 0.0241 0.0510 0.0706
* LDT12
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0007 0.0033
0.0048 0.0120 0.0223 0.0656 0.0616
* LDT34
0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126 0.0126
0.0115 0.0111 0.0145 0.0115 0.0129 0.0096 0.0083 0.0072 0.0082 0.0124
0.0135 0.0169 0.0209 0.0256 0.0013
* HDV2B
0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998 0.1998
0.2578 0.2515 0.3263 0.2784 0.2963 0.2384 0.2058 0.1756 0.1958 0.2726
0.2743 0.3004 0.2918 0.2859 0.0138
* HDV3
0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774 0.6774
0.7715 0.7910 0.8105 0.8068 0.8280 0.8477 0.7940 0.7488 0.7789 0.7842
0.6145 0.5139 0.5032 0.4277 0.0079
* HDV4
0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606 0.8606
0.8473 0.8048 0.8331 0.7901 0.7316 0.7275 0.7158 0.5647 0.3178 0.2207
0.1968 0.1570 0.0738 0.0341 0.0414
* HDV5
0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647 0.4647
0.4384 0.3670 0.4125 0.3462 0.2771 0.2730 0.2616 0.1543 0.0615 0.0383
0.0333 0.0255 0.0111 0.0049 0.0060
* HDV6
0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300 0.6300
0.6078 0.5246 0.5767 0.5289 0.5788 0.5617 0.4537 0.4216 0.4734 0.4705
0.4525 0.4310 0.3569 0.3690 0.4413
* HDV7
0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563 0.8563
0.8443 0.7943 0.8266 0.7972 0.8279 0.8177 0.7440 0.7184 0.7588 0.7567
0.7431 0.7261 0.6602 0.6717 0.7344
* HDV8A
0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992 0.9992
0.9989 0.9987 0.9989 0.9977 0.9984 0.9982 0.9979 0.9969 0.9978 0.9980
0.9979 0.9976 0.9969 0.9978 0.9982
* HDV8B
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000
* HDBS
0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585 0.9585
0.8857 0.8525 0.8795 0.9900 0.9105 0.8760 0.7710 0.7502 0.7345 0.6733
0.5155 0.3845 0.3238 0.3260 0.2639

Calvert County, MD—2005 Diesel Sales Fractions

* LDV

0.0006 0.0006 0.0006 0.0006 0.0000 0.0004 0.0017 0.0029 0.0020 0.0015
0.0025 0.0010 0.0016 0.0013 0.0033 0.0022 0.0008 0.0000 0.0086 0.0027
0.0389 0.0284 0.1091 0.0855 0.1200

* LDT1, LDT2

0.0009 0.0009 0.0009 0.0009 0.0014 0.0048 0.0185 0.0068 0.0265 0.0185
0.0246 0.0082 0.0097 0.0070 0.0061 0.0095 0.0146 0.0407 0.0104 0.0249
0.0818 0.0660 0.0926 0.2000 0.1304

Charles County, MD—2005 Diesel Sales Fractions

* LDV

0.0000 0.0000 0.0000 0.0000 0.0000 0.0004 0.0029 0.0007 0.0010 0.0003
0.0002 0.0006 0.0000 0.0008 0.0020 0.0005 0.0005 0.0000 0.0046 0.0073
0.0165 0.0181 0.0279 0.0698 0.0451

* LDT1, LDT2

0.0025 0.0025 0.0025 0.0025 0.0018 0.0038 0.0212 0.0057 0.0259 0.0176
0.0215 0.0082 0.0106 0.0055 0.0159 0.0112 0.0147 0.0161 0.0376 0.0669
0.0369 0.0633 0.0682 0.1628 0.0357

Frederick County, MD—2005 Diesel Sales Fractions

* LDV

0.0002 0.0002 0.0002 0.0002 0.0003 0.0009 0.0033 0.0026 0.0007 0.0019
0.0010 0.0002 0.0002 0.0007 0.0013 0.0013 0.0012 0.0000 0.0049 0.0093
0.0367 0.0292 0.0389 0.0596 0.1330

* LDT1, LDT2

0.0013 0.0013 0.0013 0.0013 0.0019 0.0036 0.0203 0.0060 0.0272 0.0227
0.0317 0.0157 0.0115 0.0107 0.0127 0.0181 0.0229 0.0193 0.0363 0.0619
0.0802 0.0630 0.0976 0.1282 0.1892

Montgomery County, MD—2005 Diesel Sales Fractions

* LDV

0.0001 0.0001 0.0001 0.0001 0.0001 0.0004 0.0021 0.0015 0.0015 0.0012
0.0012 0.0008 0.0011 0.0014 0.0040 0.0006 0.0005 0.0008 0.0154 0.0102
0.0617 0.0864 0.1308 0.1700 0.1661

* LDT1, LDT2

0.0005 0.0005 0.0005 0.0005 0.0007 0.0017 0.0058 0.0033 0.0082 0.0083
0.0089 0.0068 0.0071 0.0093 0.0086 0.0110 0.0169 0.0158 0.0150 0.0501
0.0384 0.0862 0.0909 0.2108 0.1458

Prince Georges County, MD—1990 Diesel Sales Fractions

* LDV

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010
0.0010 0.0000 0.0050 0.0050 0.0130 0.0180 0.0220 0.0380 0.0500 0.0390
0.0190 0.0120 0.0060 0.0050 0.0100

* LDT1, LDT2

0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0010 0.0100
0.0190 0.0130 0.0190 0.0330 0.0440 0.0640 0.0760 0.1950 0.1460 0.1080
0.0250 0.0210 0.0050 0.0180 0.0080

Alexandria, VA—2005 Diesel Sales Fractions

* LDV

0.0014 0.0014 0.0014 0.0014 0.0016 0.0020 0.0027 0.0023 0.0008 0.0009

0.0011 0.0002 0.0010 0.0011 0.0023 0.0000 0.0006 0.0000 0.0127 0.0058

0.0353 0.0626 0.1318 0.1164 0.1553

* LDT1, LDT2

0.0036 0.0036 0.0036 0.0036 0.0077 0.0168 0.0273 0.0119 0.0164 0.0167

0.0264 0.0141 0.0248 0.0079 0.0353 0.0101 0.0073 0.0194 0.0291 0.0185

0.0327 0.0629 0.1037 0.1222 0.0883

Arlington County, VA—2005 Diesel Sales Fractions

* LDV

0.0012 0.0012 0.0012 0.0012 0.0023 0.0026 0.0027 0.0029 0.0015 0.0008

0.0011 0.0001 0.0006 0.0013 0.0015 0.0006 0.0014 0.0006 0.0099 0.0087

0.0446 0.0685 0.0857 0.1922 0.1481

* LDT1, LDT2

0.0056 0.0056 0.0056 0.0056 0.0221 0.0167 0.0235 0.0126 0.0119 0.0206

0.0136 0.0155 0.0127 0.0246 0.0206 0.0222 0.0184 0.0227 0.0115 0.0310

0.0568 0.0508 0.1211 0.1077 0.2126

Fairfax County, VA—2005 Diesel Sales Fractions

* LDV

0.0018 0.0018 0.0018 0.0018 0.0018 0.0022 0.0028 0.0022 0.0013 0.0016

0.0015 0.0005 0.0012 0.0013 0.0029 0.0015 0.0011 0.0007 0.0114 0.0089

0.0573 0.0842 0.1384 0.1989 0.1766

* LDT1, LDT2

0.0128 0.0128 0.0128 0.0128 0.0206 0.0218 0.0213 0.0197 0.0172 0.0099

0.0126 0.0184 0.0093 0.0110 0.0112 0.0165 0.0424 0.0141 0.0460 0.0312

0.0441 0.0609 0.0619 0.1032 0.0866

Loudoun County, VA—2005 Diesel Sales Fractions

* LDV

0.0024 0.0024 0.0024 0.0024 0.0033 0.0027 0.0047 0.0036 0.0016 0.0016

0.0020 0.0008 0.0013 0.0018 0.0027 0.0030 0.0010 0.0008 0.0117 0.0126

0.0720 0.0560 0.1283 0.2330 0.2138

* LDT1, LDT2

0.0162 0.0162 0.0162 0.0162 0.0430 0.0358 0.0352 0.0264 0.0395 0.0255

0.0297 0.0279 0.0287 0.0157 0.0318 0.0249 0.0289 0.0231 0.0162 0.0318

0.0515 0.0742 0.0830 0.0777 0.1313

Prince William County, VA—2005 Diesel Sales Fractions

* LDV

0.0026 0.0026 0.0026 0.0026 0.0041 0.0040 0.0025 0.0019 0.0013 0.0011

0.0009 0.0007 0.0010 0.0009 0.0026 0.0005 0.0008 0.0006 0.0075 0.0100

0.0263 0.0525 0.1135 0.1290 0.1344

* LDT1, LDT2

0.0431 0.0431 0.0431 0.0431 0.0305 0.0334 0.0250 0.0189 0.0182 0.0171

0.0189 0.0131 0.0163 0.0164 0.0268 0.0679 0.0394 0.0460 0.0174 0.0318

0.0349 0.0458 0.0589 0.0796 0.0988

Memorandum

Date: March 10, 2003

To: Michael Clifford, COG/TPB
Joan Rohlfs, COG/DEP

From: Maureen Mullen, Angelica Codd, E.H. Pechan & Associates, Inc.

Subject: Adjusted Base Years MOBILE6 Input Documentation for 1996, 1999, 2002, and 2005

cc: MOBILE6 Task Force Members

The purpose of this memorandum is to document the MOBILE6 inputs for the Metropolitan Washington Council of Governments for calculating the onroad adjusted base year emission inventories relative to calendar years 1996, 1999, 2002, and 2005. Separate sets of input files were created to model emission factors corresponding to travel in the COG region for each of these calendar years 1) on network and local roadways, 2) during auto access to transit, and 3) by diesel transit and school buses. These MOBILE6 input files are similar to the 1990 MOBILE6 input files documented in the following two memos: "1990 and 2005 MOBILE6 Input Documenation" dated January 27, 2003 and "Technical Corrections to the 1990 and 2005 MOBILE6 Input Parameters" dated March 5, 2003.

Differences between the MOBILE6 inputs documented in these memos are discussed below, along with documentation of the source of individual MOBILE6 input parameters.

- MOBILE6 Run Commands—The following run commands are used in all of the adjusted base year MOBILE6 input files: "NO CLEAN AIR ACT", "NO TIER2", and "NO 2007 HDDV RULE". The MOBILE6 run commands "FUEL PROGRAM" and "94+ LDG IMP" are NOT used in any of the adjusted base year MOBILE 6 input files. These latter two commands model reformulated gasoline and the LEV program, neither of which are included in the adjusted base year modeling. All other MOBILE6 run commands shown in Table 1 of the January 27 memo are included in the adjusted base year runs.
- Registration Distributions—The registration distributions are the same as those documented for 1990 in the January 27 memo for network/local/auto access to transit and for diesel transit and school buses.
- Diesel Sales Fractions— Maryland and Virginia diesel sales fractions are the same as documented for 1990 in January 27 memo, with the technical corrections for DC as documented in the March 5 memo.
- Inspection and Maintenance (I/M) and Anti-Tampering Program (ATP) Inputs—The 1990 I/M and ATP programs as documented in March 5 memo, labeled as "Technical Correction Update" are used in all of the adjusted base case MOBILE6 input files.
- VMT Mix Fractions—The Maryland and Virginia VMT mix fractions are the same as documented for 1990 in the January 27 memo for network, local roads, auto access to transit, and diesel buses with the DC VMT mix fractions updated per the March 5 memo to account for technical corrections.
- Trip Length Distribution, Speeds, VMT by Facility, and Soak Distributions—All of these parameters are the same as those documented for 1990 in January 27 memo.
- Temperatures and Evaluation Month—These are the same as documented in January 27

memo (minimum temperature is 68.5^{o}F, maximum temperature is 95.0^{o}F, evaluation month of 7 for ozone season).

- RVP—The RVP modeled for all of the adjusted base year runs is 7.8 psi. This differs from the 1990 RVP of 8.2 psi to account for Phase II of the Federal RVP program which started in 1992. The RVP control program was enacted prior to the 1990 Clean Air Act Amendments, and therefore, needs to be accounted for in the adjusted base year MOBILE6 runs.
- Calendar Year—The calendar year is set to 1996, 1999, 2002, or 2005, depending on the year to be run.

Stafford County, VA—2005 Diesel Sales Fractions

* LDV

0.0107 0.0107 0.0107 0.0107 0.0065 0.0074 0.0068 0.0053 0.0021 0.0030
0.0018 0.0004 0.0000 0.0024 0.0043 0.0012 0.0030 0.0014 0.0109 0.0114
0.0440 0.0627 0.0488 0.1189 0.1772

* LDT1, LDT2

0.0223 0.0223 0.0223 0.0223 0.0288 0.0362 0.0375 0.0178 0.0289 0.0314
0.0291 0.0192 0.0187 0.0202 0.0116 0.0173 0.0240 0.0182 0.0196 0.0312
0.0424 0.0689 0.0878 0.1625 0.1320

School Bus—2005 Regional Diesel Sales Fractions

* All Other Vehicle Categories

0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000

* HDBS

1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000
1.0000 1.0000 1.0000 1.0000 1.0000

Attachment B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

DATE: March 04, 2003

SUBJECT: EPA Region III comments on MWCOG's MOBILE6 VMT Mix Methodology

FROM: Makeba A. Morris, Acting Branch Chief,
Air Quality Planning and Information Services Branch

TO: Joan Rohlfs, COG/DEP

The purpose of this memorandum is in response to the Metropolitan Washington Council of Governments (MWCOG) request for written comments from the Environmental Protection Agency (EPA) Region III office on the methodology used to obtain Vehicle Miles Traveled (VMT) inputs for MOBILE6 (M6) modeling used in preparing the highway vehicle emissions inventories for the Metropolitan Washington, D.C. ozone non-attainment area (Washington area). Staff from EPA Region III's Air Quality Planning and Information Services Branch have been working with the MOBILE6 Task Force Members of the MWCOG on the MOBILE6 inputs being used.

During a M6 Task Force meeting, EPA received a copy of a memo dated January 27, 2003 from Maureen Mullen of E.H. Pechan & Associates, Inc. to Michael Clifford, COG/TPB and Joan Rohlfs, COG/DEP entitled 1990 and 2005 MOBILE6 Input Documentation. The January 27, 2003 memo describes a methodology being used to develop new VMT mix fractions by vehicle type for each jurisdiction in 1990 and 2005. After review of this documentation, it is the EPA's opinion that the methodology described is an acceptable methodology in determining VMT mix fractions for MOBILE6.

The Metropolitan Washington area will soon be categorized as a Severe Area for Ozone Non-Attainment effective March 25, 2003, and will be required to develop and submit Rate of Progress Plans (ROP) through 2005. For this reason, the 1990 base year emission inventory for the Washington area will need to be amended to include On-road mobile source inventories using M6. It appears that this new methodology is not the same methodology that was used to determine the VMT mix fractions for the 1990 base year in earlier State Implementation Plan (SIP) submittals. This is a significant technical change and for this reason, EPA is requesting that an explanation of the reason for the change in methodology be submitted with the final SIP submittal.

Attachment C

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS
777 North Capitol Street, N.E.
Suite 300
Washington, D.C. 20002-4239

MEMORANDUM

TO: Files

FROM: Ronald Milone

DATE: March 19, 2003 (Updated 5/14/03)

SUBJECT: Description of the Version 2.1/TP+/MOBILE6 Emissions Post–Processor

1.0 Introduction

This memorandum describes the operation of COG/TPB's post-processor for estimating network-related mobile emissions in the Washington, D.C. Region. The post-processor calculates emissions by combining information from the regional travel demand model and from the EPA mandated MOBILE emission rate model. New and enhanced versions of both models have prompted COG to reexamine the post-processor in recent months. COG's latest travel model release, the Version 2.1/TP+ model[1], includes a number of improvements including greater sensitivity to travel by time of day. Furthermore, EPA has recently released the MOBILE6[2] model which contains many enhancements including the ability to produce emission rates by different facility types and by an increased number of vehicle classifications.

The rationale behind the use of a post-processor is addressed in federal guidance:

> Since emissions are extremely sensitive to vehicle speed, EPA and DOT recommend that speeds be estimated in a separate step after traffic assignment (also known as "post-processing"), using refined speed-volume relationships and final assigned traffic volumes. Post-processed speeds estimated in the validation year should be compared with speeds empirically observed during peak- and off-peak periods…. Based on these comparisons, speed-volume relationships used for speed post-processing should be adjusted to obtain reasonable agreement with observed speeds. *Regardless of the specific analytical technique, every effort must be made to ensure that speed estimates are credible and based on a reproducible and logical analytical procedure*.[3]

Although restrained highway speeds are by-products of the traffic assignment step, the overriding objective is to produce accurate vehicle routing and link volumes. *Link-level* speed results produced from traffic assignments are generally considered to be unsuitable for direct use in computing emissions, and so a refinement is required. The post-processor serves to improve

[1] MWCOG, December 23, 2002, COG/TPB Travel Forecasting Model Version 2.1/TP+, Release C, Calibration Report. (See accompanying compact disc.)
[2] EPA, January 2002, User's Guide to MOBILE6.
[3] Transportation Conformity Reference Guide, FHWA, Revised 7/31/2001. Page D-6-9.

the representation of speeds throughout the day to facilitate the emissions calculation. Highway speeds are refined by developing hourly volume and capacity estimates and by using revised speed-flow curves. The post-processor ideally represents an attempt to improve the representation of delay caused by queuing and to address behavioral shifts made in response to future congestion (e.g., peak-spreading).

This memorandum does not address the validation of the post-processor. However, other COG/DTP memoranda addressing the development of speed flow curves and the performance of the post-processor results are available as companion documents.[4]

It is important to point out that the post-processor is used to develop estimates of mobile emissions attributable to *modeled* trips and VMT (i.e., as part of the 4-step process), which do not account for the entire universe of mobile source emissions. Off-network components include vehicle-related (diurnal and resting loss) emissions as well as emissions relating to local road, bus, and park-and-ride travel. The off-network emission components are developed using an assortment of off-line procedures which are not addressed in this memorandum.

2.0 Post-Processor Overview

The mobile emission post-processor is used to arrive at an estimate of daily air pollution generated by motor vehicles operating on the regional highway network. The emission calculation is based on vehicle-specific rates furnished by the MOBILE6 model. MOBILE6 calculates emission rates using a host of inputs relating to environmental factors, fleet characteristics, travel characteristics of the region, and inspection policy. The MOBILE6 Task Force, a joint group of members from the TPB Technical Committee and the Metropolitan Washington Air Quality Committee (MWAQC), spent approximately one year formulating inputs to the MOBILE6 model. The pollutants accounted for in MOBILE6 are volatile organic compounds (VOC/HC), carbon monoxide (CO), and oxides of nitrogen (NOx). Mobile emissions are computed essentially by multiplying a unit of travel by an associated emission rate. Mobile emissions are commonly computed using a single *per VMT* rate which reflects all facets of the vehicle trip cycle (i.e., the starting, hot-stabilized, soaking, and evaporative stages). COG/TPB, however, does not assume the 'single rate' approach. Instead, emissions are computed separately for each stage of the trip cycle. More specifically, *per trip* rates are developed to compute starting and soaking emissions, while *per VMT* rates are developed to compute hot-stabilized (or running) emissions. Evaporative (or diurnal) rates are also computed on a *per vehicle* basis. This detailed computation approach is sometimes referred to as the 'hybrid' emission estimation method.

Emission rates used in COG/TPB's post processor are formulated on a county-by-county basis as several inputs to the MOBILE6 model vary by jurisdiction. These include the vehicle registration distributions, diesel sales fraction distributions, vehicle 'mix' distributions, and parameters relating to the jurisdiction's participation in state and federal air quality programs

[4] See February 3, 2003 Memorandum to the file from Daivamani Sivasailam, Subject: V/C Ratios and Speed Look Up Tables and February 21, 2003 Memorandum to the file from Michael Freeman, Subject: Validation of Mobile Emissions Post-Processor per the MOBILE6/Version 2.1/TP+ Model (Attachments K and L).

(e.g., I/M procedures and the use of reformulated gasoline). Table 1 indicates the 27 counties (and external station groups) for which mobile emission rates are prepared. The table indicates that specific emission rates are explicitly developed for 16 of the 27 jurisdictions. 'Nearest-neighbor' emission rates are used for the remaining 11 areas. A map of the emission areas is shown as Exhibit 1. The exhibit also indicates the extent of the modeled study area, which, for the most part, extends beyond the Washington Metropolitan Statistical Area (MSA). The non-attainment area is defined as the Washington MSA.

An overview of the mobile emissions post-processor is shown as Exhibit 2. The exhibit graphically shows how the post-processor relates to the MOBILE6 model and the travel demand model. The MOBILE6 model is executed 16 times as described above. Each MOBILE6 run consists of 134 separate 'scenarios' representing the following conditions:

MOBILE6 'Scenarios'	Operating Mode	Facility Type	Speed Specifications
1-65	Stabilized	Arterial	1 to 65 mph in 1 mph increments
66-130	Stabilized	Freeway, Non-Ramp	1 to 65 mph in 1 mph increments
131	Stabilized	Freeway Ramp	-
132	Cold	Local	-
133	Hot	Local	-
134	Stabilized	Local	-

Running emission rates and soak rates are developed from the results of scenarios 1-131. As shown, the running rates are developed on a speed and facility type basis. Scenarios 132 and 133 are used to develop the starting emission rates. Starting rates are developed specifically for cold and hot starting conditions. The local rates developed in scenario 134 are used to support off-network emission calculations.

Exhibit 2 also indicates that a processing step named *M6RATES* follows immediately after MOBILE6 processing. The step is necessary for three reasons. First, the M6RATES program is used to convert vehicle-specific rates into composite rates. Composite emission rates are computed by weighting the vehicle-specific rates by the associated VMT proportions used in the MOBILE6 program. Secondly, the M6RATES program specially computes emission rates suitable for trip-end and vehicle-related emission calculations. Because the MOBILE6 model produces all rates on a *per mile* basis, transformations are necessary to produce *per trip* rates to compute start and soak emissions and *per vehicle* rates to compute diurnal emissions. The transformations are made using regional estimates of trip starts and miles driven by specific vehicle classifications. The estimates are extracted from the database output of the MOBILE6 model and are entered into the M6RATES program as user-defined parameters.[5] Finally, the M6RATES program produces the composite rates in a fixed file format which facilitates subsequent computer processing. The program is executed in a 'batch' fashion for each jurisdiction. It ultimately produces 64 ASCII files, four rate types (freeway rates, arterial rates, ramp rates, and start-up) for each of the 16 jurisdictions. These ASCII files are accessed directly by the post-processor.

[5] A detailed description of the transformations is given in a December 12, 2002 Memorandum from Ronald Milone to the files, Subject: Development of Composite Emission Rates from MOBILE6 Listings. See Attachment J.

Table 1
Jurisdictional Emission Areas
(Locations for which emission rates are calculated)

Emission Area System Number	Jurisdiction / External Station Group	TAZ Range	'Nearest Neighbor' Emission Rates Used? (Y/N)	'Nearest Neighbor' Jurisdiction
1	Washington, DC	1 - 319	N	*N/A*
2	Montgomery	320 - 627	N	*N/A*
3	Prince George's	640 – 1020	N	*N/A*
4	Howard	1080 – 1099	Y	Prince George's
5	Anne Arundel	1110 – 1142	Y	Prince George's
6	Carroll	1060 – 1073	Y	Prince George's
7	Baltimore Externals	2172 – 2191	Y	Prince George's
8	Calvert	1150 – 1163	N	*N/A*
9	Charles	1200 – 1223	N	*N/A*
10	Frederick	1030 – 1053	N	*N/A*
11	Frederick Externals	2169 – 2171	Y	Frederick
12	Arlington	1230 – 1311	N	*N/A*
13	Fairfax	1400 – 1755	N	*N/A*
14	Loudoun	1780 – 1905	N	*N/A*
15	Prince William	1920 - 2061	N	*N/A*
16	Stafford	2080 – 2093	N	*N/A*
17	Alexandria	1330 – 1389	N	*N/A*
18	St. Mary's	1170 – 1190	N	*N/A*
19	Washington Co. Externals	2164 – 2168	N	*N/A*
20	Clarke	2130 – 2132	N	*N/A*
21	Fauquier	2115 – 2125	Y	Clarke
22	Jefferson W. Virginia	2135 – 2141	Y	Clarke
23	Western Externals	2154 – 2163	Y	Clarke
24	Spotsylvania	2105 – 2110	N	*N/A*
25	King George	2070 – 2074	Y	Spotsylvania
26	City of Fredericksburg	2100 - 2101	Y	Spotsylvania
27	Southern Externals	2145 – 2153	Y	Spotsylvania

N/A – Not applicable

- MSA Indicator

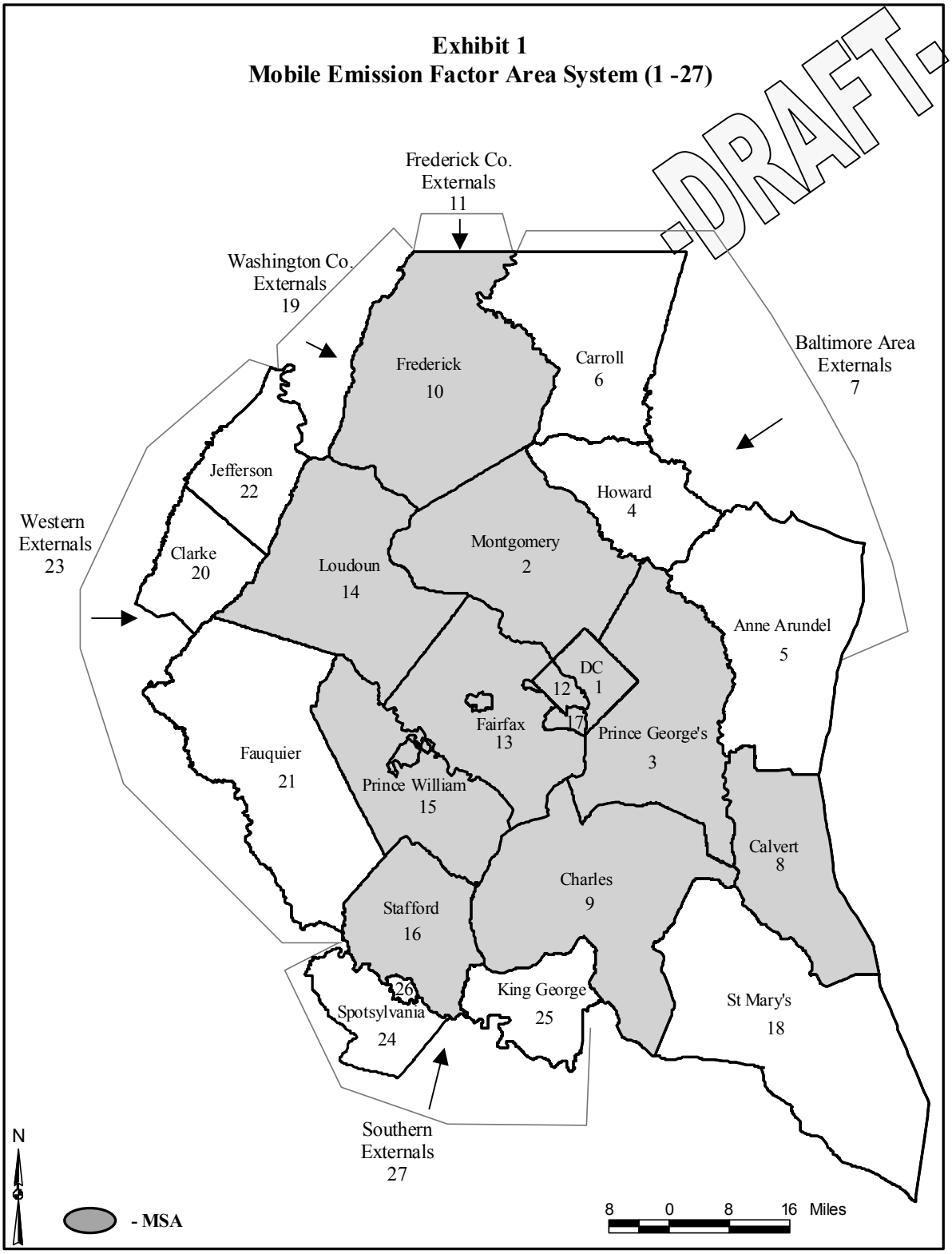


Exhibit 1
Mobile Emission Factor Area System (1 -27)
-DRAFT-
Frederick Co.
Externals
11
Washington Co.
Externals
19
Baltimore Area
Externals
7
Western
Externals
23
Southern
Externals
27
Frederick
10
Carroll
6
Howard
4
Jefferson
22
Clarke
20
Loudoun
14
Montgomery
2
Anne Arundel
5
DC
1
12
17
Fairfax
13
Prince George's
3
Fauquier
21
Prince William
15
Calvert
8
Charles
9
Stafford
16
26
Spotsylvania
24
King George
25
St Mary's
18
N
- MSA
8 0 8 16 Miles

Exhibit 2
Mobile Emissions Development Process

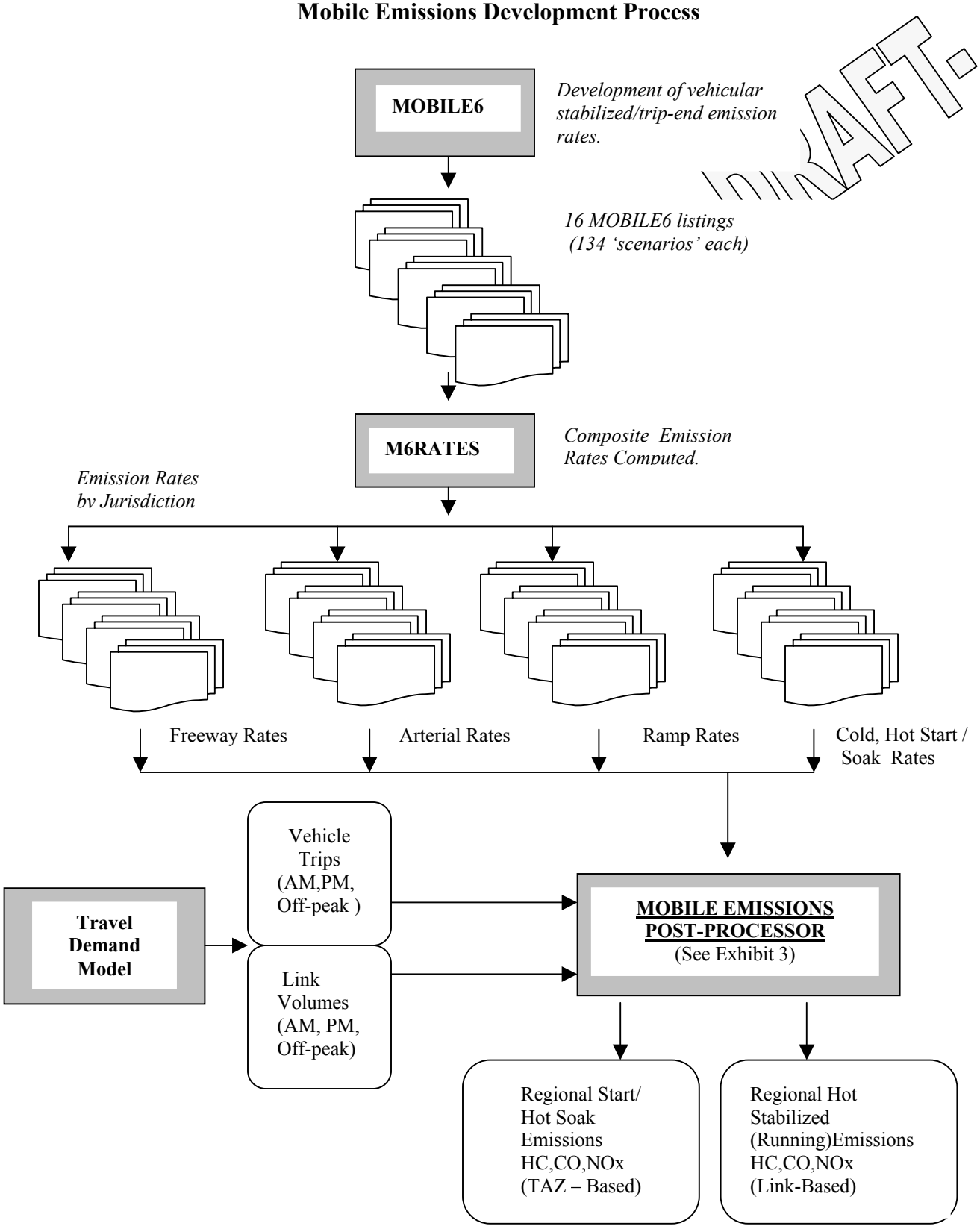


Exhibit 2 also indicates that the travel demand model elements entered into the post-processor are trip tables and loaded links volumes. The Version 2.1/TP+ model produces trip tables and loaded link traffic volumes on the basis of three discrete time periods: the AM peak period (6:00AM-9:00AM), the PM peak period (4:00PM-7:00PM) and the off-peak period hours (i.e., the remaining 18 hours of the day).

3.0 Post-Processor Program Steps

The post-processor consists of a series of five program steps graphically shown as Exhibit 3. The steps are executed with TP+ programs. The five steps are summarized below. (Associated TP+ program names are in parenthesis):

1) Trip Table Formatting (AQTRIPS.S): AM, PM, and off-peak trip tables produced by the travel demand model are read. The program produces zonal trip-ends for each of the three time periods. It also produces a file containing the proportion of daily vehicle trips from/to each of the 27 emission areas. Since the trip proportions are developed with daily trips, the proportion in the *i/j* direction is generally the same as that in the *j/i* direction.

2) Time-of-Day Trip-Ends Program (ZONESPRD.S): The program reads the zonal origins and destinations, described above, and apportions them among discrete hourly periods.

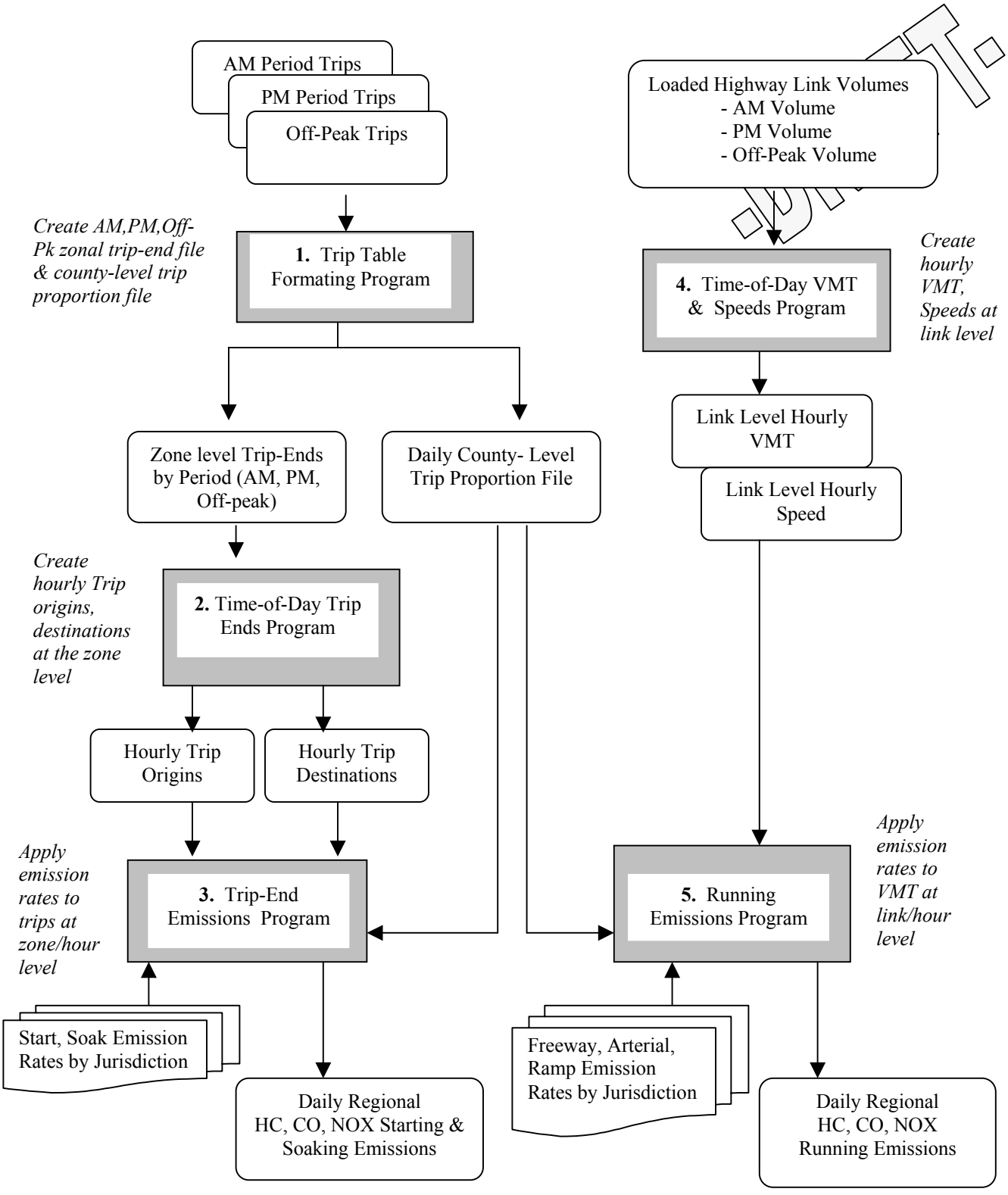
3) Start/Soak Emissions Program (STRT_SK.S): The program applies emission rates to the trip-ends to compute start-up and soaking emissions on a zone-by-zone and hour-by hour basis. The program reads 1) hourly trip-ends, 2) the MOBILE6-generated cold/hot starting rates and soak rates, and 3) the county level trip proportions file. HC, CO, and NOx starting emissions and HC soak emissions result from the program.

4) Time-of-Day VMT and Speeds Program (PEAKSPRD.S): The program reads the AM, PM, and off-peak network link volumes produced by the travel demand model. It produces hourly volumes, VMT, and restrained speed for each highway link.

5) Running Emissions Program (RUNNING.S): The program computes hot stabilized emissions on a link-by-link and hour-by-hour basis. It reads 1) the hourly link VMT and highway speed files developed above, 2) MOBILE6-based running emission rates which are provided on the basis of speed, and 3) the county level trip proportions file. HC, CO, and NOx running emissions result from the program

Details concerning the above steps are presented below.

Exhibit 3
COG/DTP Mobile Emissions Post-Processor Steps



4.0 Post –Processor Computations

Start-up and soaking emissions are computed by applying per-trip emission rates to trips at the zone level, on an hour-by-hour basis. Starting pollutant rates consist of both *cold* and *hot transient* types and are associated with HC, CO, and NOx emissions. Soaking emission are developed with a single HC rate. An hourly allocation of trip origins (or trip starts) is necessary for the starting emission calculation since the proportion of cold and hot starts vary by the time of day. The assumed hourly distribution of AM, PM, and Off-peak vehicle trips is shown on Table 2. The hourly distribution was derived from the 1994 Household Travel Survey (HTS). The assumed hourly distribution for cold and hot transient starts is shown on Table 3. This table was also derived from the 1994 HTS. The table logically indicates that the share of hot vehicle starts is low in the early morning hours and higher, to varying degrees, in later hours.

It was stated earlier that emission rates are developed on a county-by-county basis. An averaged emission rate is used in the post processor, as opposed to a single county-specific rate, because the vehicle starts in any given jurisdiction are realistically made by residents of that jurisdiction as well as by residents of many other jurisdictions. For example, the emission rate used within the District of Columbia is the average of all emission rates weighted by the proportion of daily vehicle trips from each jurisdiction to the District. The general equation for computing starting emissions for a specific TAZ and hour of the day is as follows:

$$StartEm_{ih} = Starts_h * \sum_{j=1}^{27} ((CSR_j * CPCT_h + HSR_j * HPCT_h) * Tprop_{ij})$$

Where:

$StartEm_{ih}$ = Zonal starting-up emissions (in grams) at hour h in jurisdiction i
$Starts_h$ = Zonal vehicle starts at hour h
CSR_j = Cold Start rate (gm/trip) for jurisdiction j
$CPCT_h$ = Cold start proportion at hour h
HSR_j = Hot Start rate (gm/trip) for jurisdiction j
$HPCT_h$ = Hot start proportion at hour h
$Tprop_{ij}$ = Proportion of daily trips between jurisdiction i/j

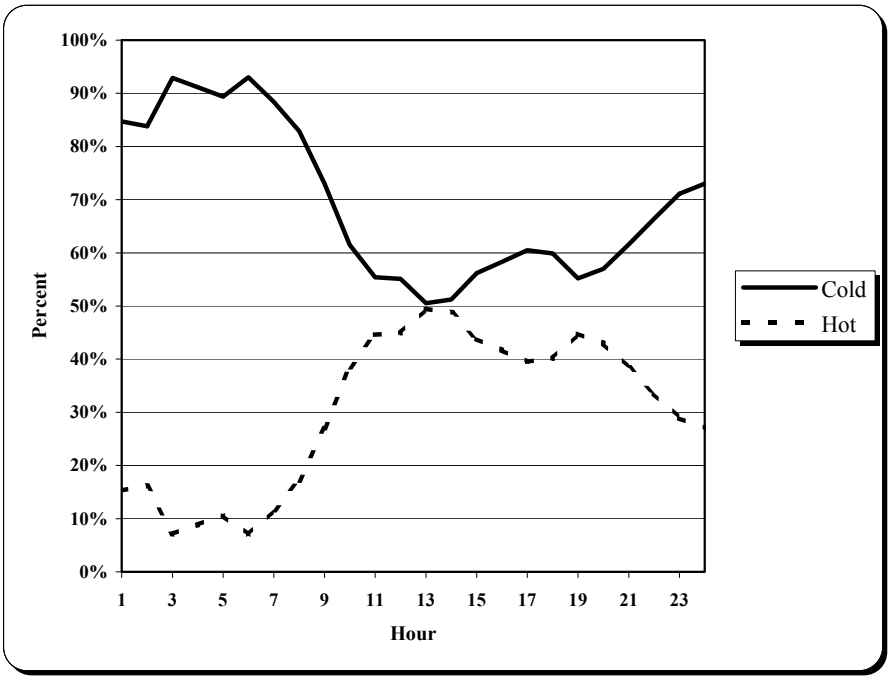
Table 2

Distribution of AM, PM, and Off-Peak Period Auto Driver Trips
Among
Hourly Periods

Hour No.		% AM	% PM	Off-Peak
1	12mid - 12:59AM			0.30%
2	1:00AM - 1:59AM			0.40%
3	2:00AM - 2:59AM			0.30%
4	3:00AM - 3:59AM			0.30%
5	4:00AM - 4:59AM			0.50%
6	5:00AM - 5:59AM			2.20%
7	6:00AM - 6:59AM	20.10%		
8	7:00AM - 7:59AM	39.80%		
9	8:00AM - 8:59AM	40.10%		
10	9:00AM - 9:59AM			9.70%
11	10:00AM - 10:59AM			8.20%
12	11:00AM - 11:59AM			9.20%
13	12noon - 12:59PM			10.10%
14	1:00PM - 1:59PM			8.90%
15	2:00PM - 2:59PM			9.00%
16	3:00PM - 3:59PM			11.60%
17	4:00PM - 4:59PM		31.40%	
18	5:00PM - 5:59PM		37.30%	
19	6:00PM - 6:59PM		31.30%	
20	7:00PM - 7:59PM			10.80%
21	8:00PM - 8:59PM			7.70%
22	9:00PM - 9:59PM			5.80%
23	10:00PM - 10:59PM			3.40%
24	11:00PM - 11:59PM			1.60%
Total		100.00%	100.00%	100.00%

Table 3
Distribution of Cold / Hot Transient Vehicle Starts by Hour

Hour No.		% Cold	% Hot	Total
1	12mid - 12:59AM	84.70%	15.30%	100.00%
2	1:00AM - 1:59AM	83.80%	16.20%	100.00%
3	2:00AM - 2:59AM	92.90%	7.10%	100.00%
4	3:00AM - 3:59AM	91.20%	8.80%	100.00%
5	4:00AM - 4:59AM	89.40%	10.60%	100.00%
6	5:00AM - 5:59AM	93.00%	7.00%	100.00%
7	6:00AM - 6:59AM	88.40%	11.60%	100.00%
8	7:00AM - 7:59AM	82.90%	17.10%	100.00%
9	8:00AM - 8:59AM	73.00%	27.00%	100.00%
10	9:00AM - 9:59AM	61.50%	38.50%	100.00%
11	10:00AM - 10:59AM	55.40%	44.60%	100.00%
12	11:00AM - 11:59AM	55.10%	44.90%	100.00%
13	12noon - 12:59PM	50.50%	49.50%	100.00%
14	1:00PM - 1:59PM	51.20%	48.80%	100.00%
15	2:00PM - 2:59PM	56.20%	43.80%	100.00%
16	3:00PM - 3:59PM	58.30%	41.70%	100.00%
17	4:00PM - 4:59PM	60.50%	39.50%	100.00%
18	5:00PM - 5:59PM	59.90%	40.10%	100.00%
19	6:00PM - 6:59PM	55.20%	44.80%	100.00%
20	7:00PM - 7:59PM	57.00%	43.00%	100.00%
21	8:00PM - 8:59PM	61.60%	38.40%	100.00%
22	9:00PM - 9:59PM	66.40%	33.60%	100.00%
23	10:00PM - 10:59PM	71.10%	28.90%	100.00%
24	11:00PM - 11:59PM	73.00%	27.00%	100.00%



Similarly, the equation for computing hot soak emissions is as follows:

$$SoakEm_{ih} = Stops_h * \sum_{j=1}^{27} (HSR_j * Tprop_{ij})$$

Where:

$SoakEm_{ih}$ = Zonal hot soak emissions (in grams) at hour h in jurisdiction i
$Stops_h$ = Vehicle stops at hour h
HSR_j = Hot Soak rate (gm/trip) for jurisdiction j
$Tprop_{ij}$ = Proportion of daily trips between jurisdiction i and jurisdiction j

The regional total of starting/soaking emissions is, therefore, based on the result of the above equations accumulated over all TAZ's, over all hours of the day. Regional emissions in grams are converted to tons using a conversion factor of 907,184.74 gm/ton.

5.0 Running (Hot Stabilized) Emissions

Running emissions relate to HC, CO, and NOx pollutants. They are computed by applying per mile emission rates to VMT at the network link level, on an hour-by-hour basis. The calculation is applied on an hourly basis because the running emission rates are provided as a function of highway speed, which varies with congestion throughout the day. As with the trip-end emission calculation, the running emission rate for a given link is a weighted average of all jurisdictional rates based on the proportion of daily vehicle trips from each county to the specific county associated with the link.

The allocation of link volumes among hourly periods is done in a two-step manner. First, a default hourly distribution is applied to the daily link volume, based on the facility class and *peaking* classification of the link. Facility classifications are defined as freeway, arterial, or local. COG has established three peaking types, AM-oriented, PM-oriented, and Even, based on the following *peaking percentage*[6]:

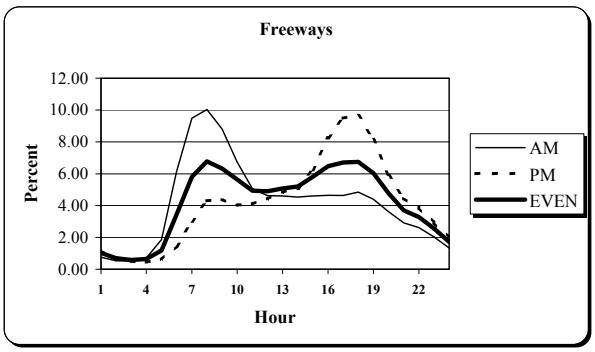
Peaking Percentage = ((AM Volume* PM scale factor) – PM Volume) / Daily Link Volume

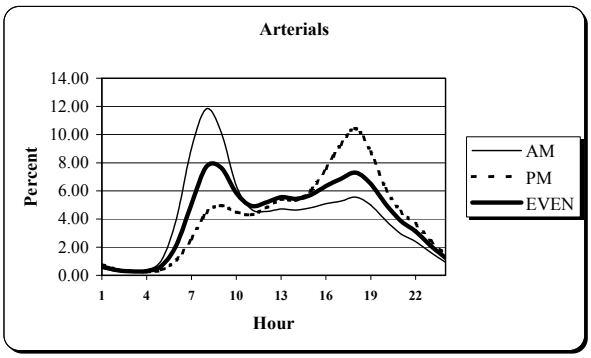
An AM classification is assumed for peaking percentages greater than 7.5%. A PM classification is assumed for peaking percentages less than –7.5%. Otherwise, the link is considered to be of the even peaking group. The PM scale factor shown is applied to all AM period volumes so that the sum of regional AM link volumes will equal the sum of regional PM volumes. The scaled volume is used *only* for the purpose of computing the peaking index. Default hourly distributions associated with specific facility and peaking classifications are shown on Table 4. The distribution selected for a given link is applied to the *daily* link volume to arrive at initial hourly volume estimates.

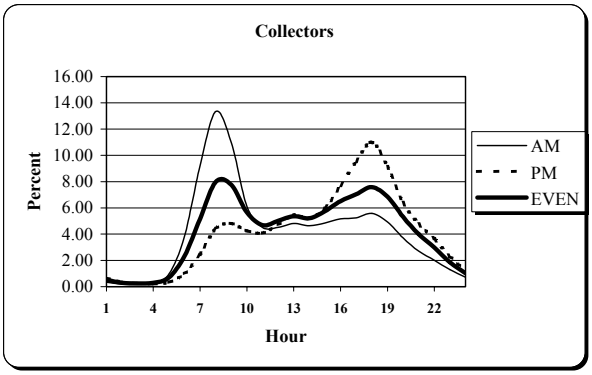
[6] See August 27, 2002 Memorandum from Michael Freeman to File, Subject: Development and Recommendations of Hourly Distributions of Daily Traffic Volumes (Attachment M).

Table 4
Hourly Distribution of Daily Traffic by Orientation and Facility Type

Hour No.		AM			PM			EVEN		
		Freeway	Arterial	Collector	Freeway	Arterial	Collector	Freeway	Arterial	Collector
1	12mid - 12:59AM	0.76	0.49	0.34	1.17	0.78	0.65	1.02	0.64	0.51
2	1:00AM - 1:59AM	0.54	0.30	0.20	0.68	0.42	0.34	0.69	0.38	0.30
3	2:00AM - 2:59AM	0.51	0.25	0.18	0.50	0.29	0.25	0.58	0.29	0.23
4	3:00AM - 3:59AM	0.71	0.37	0.29	0.44	0.24	0.21	0.65	0.32	0.29
5	4:00AM - 4:59AM	1.86	1.09	0.96	0.61	0.39	0.33	1.18	0.69	0.69
6	5:00AM - 5:59AM	6.12	4.05	3.80	1.45	1.10	1.00	3.43	2.18	2.31
7	6:00AM - 6:59AM	9.49	9.02	9.21	3.01	2.60	2.45	5.81	5.07	5.15
8	7:00AM - 7:59AM	10.02	11.83	13.33	4.31	4.45	4.43	6.77	7.72	7.99
9	8:00AM - 8:59AM	8.80	10.13	10.94	4.38	4.97	4.81	6.33	7.64	7.75
10	9:00AM - 9:59AM	6.74	6.37	6.11	4.03	4.49	4.26	5.65	5.85	5.66
11	10:00AM - 10:59AM	5.08	4.70	4.50	4.10	4.30	4.09	4.93	4.93	4.68
12	11:00AM - 11:59AM	4.62	4.53	4.51	4.42	4.79	4.72	4.90	5.17	5.01
13	12noon - 12:59PM	4.60	4.71	4.81	4.84	5.39	5.45	5.09	5.56	5.36
14	1:00PM - 1:59PM	4.53	4.64	4.64	5.08	5.34	5.20	5.19	5.44	5.20
15	2:00PM - 2:59PM	4.61	4.80	4.85	6.25	6.03	5.99	5.81	5.72	5.74
16	3:00PM - 3:59PM	4.65	5.09	5.17	8.27	7.59	7.70	6.48	6.34	6.51
17	4:00PM - 4:59PM	4.64	5.27	5.23	9.49	9.30	9.54	6.70	6.86	7.03
18	5:00PM - 5:59PM	4.85	5.55	5.58	9.66	10.42	11.00	6.75	7.30	7.57
19	6:00PM - 6:59PM	4.40	4.99	4.92	8.16	8.77	9.15	6.03	6.49	6.85
20	7:00PM - 7:59PM	3.61	3.90	3.72	5.90	6.17	6.41	4.76	5.07	5.32
21	8:00PM - 8:59PM	2.91	2.96	2.70	4.46	4.55	4.78	3.70	3.88	3.99
22	9:00PM - 9:59PM	2.61	2.40	2.01	3.87	3.67	3.66	3.28	3.13	2.99
23	10:00PM - 10:59PM	2.03	1.64	1.30	2.94	2.47	2.29	2.57	2.12	1.85
24	11:00PM - 11:59PM	1.33	0.93	0.72	1.99	1.48	1.29	1.72	1.23	1.03
Total		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00







In the second step, the initial hourly volume is compared to the hourly link capacity (Level-of-Service 'E') and adjusted if necessary. The adjustment procedure (outlined on Table 5) begins with the comparison of AM peak hour traffic and PM peak hour traffic with the available capacity. If the initial peak hour volume exceeds capacity, then the peak hour volume is adjusted to equal the capacity and the portion of volume exceeding capacity is then apportioned in equal parts to the hour before and the hour after the peak hour. Because this adjustment could potentially cause the 'shoulder' hour volumes to exceed capacity, added steps are undertaken to compare the resulting volumes in each successive shoulder hour with the capacity. If a given shoulder hour volume exceeds capacity, then the volume is similarly adjusted to equal capacity and the 'overflow' volume is added to the volume of the adjacent hourly period. Traffic assignments on rare occasions produce severely overloaded link volumes to the point where a given link volume could exceed the capacity over *all* hours of the day. Because of this possibility, volume adjustments are *not* made for the first, noon, and last hours (hours 1, 13, and 24), even if a given link volume is determined to exceed capacity in those particular hours. A recent analysis of 2005 hourly volumes developed using the above procedure indicated that regional overflow VMT in hours 1, 13, and 24 amounted to 0.40% of the total VMT simulated (660,197 out of 166,348,942).

It is important to add that the volume spreading procedure affects the final hourly link *volume* but only conditionally affects the hourly *speed*. The final hourly speed is computed using speed delay functions and the *maximum* of the adjusted/unadjusted hourly volumes. In other words the congested speed is based on the highest possible V/C ratio determined at any point in the volume spreading process. The speed delay functions used in the post-processor are detailed on Table 6. The functions are based on Highway Capacity Manual relationships and observed speed and density data collected in the Washington region. The table indicates that freeways and expressways degrade at speeds beyond a V/C of 1.0, reflecting unstable flow conditions, while arterial and local speeds do not degrade beyond capacity. This is because congested arterial speeds are ultimately subject to constraints imposed by the signal system, rather than by extreme traffic densities.

Subsequent to the development of restrained speeds, the general equation for computing running emissions is:

$$RunningEm_{ih} = VMT_h * \sum_{j=1}^{27} (RRate_j * Tprop_{ij})$$

Where:

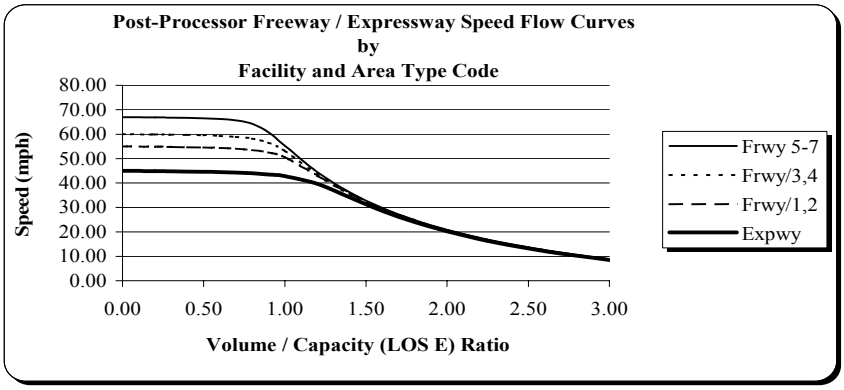
$RunningEm_{ih}$	=	Running link emissions at hour h in jurisdiction i
VMT_h	=	Vehicle Miles Travel (after peak-spreading) at hour h
$RRate_j$	=	Running rate (gm/mi) as a function of highway speed for jurisdiction j
$Tprop_{ij}$	=	Proportion of daily trips between jurisdiction i/j

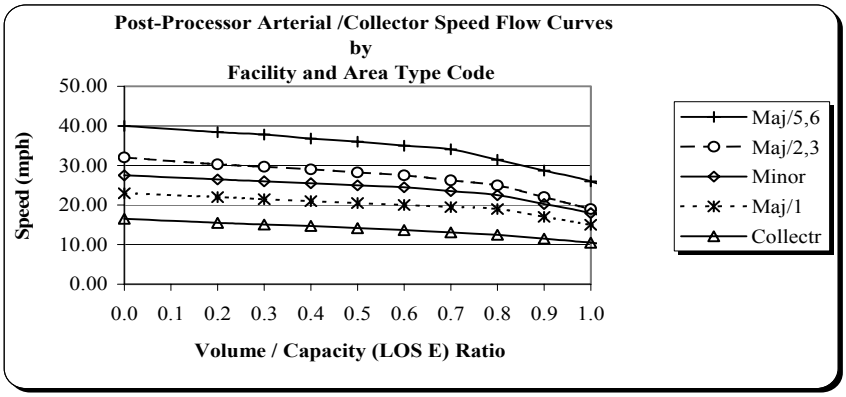
The regional running emissions are the accumulation of calculated hourly emissions over all network links in the study area. Emissions in grams are converted to tons using a conversion factor of 907,184.74 gm/ton.

Table 5	
Peak Spreading Procedure ***Adjustment Process for Spreading Hourly Volumes When Initial Volumes Exceed Capacity***	
Step 1:	The AM peak hour (hour 8) initial volume is compared to the link capacity. If the initial hour 8 volume exceeds capacity, then the hour 8 volume is set to capacity and the excess volume portion is added to the volume in periods occurring before *and* after the AM peak hour (hours 7 and 9) on a 50/50 basis.
Step 2:	The PM peak hour (hour 18) initial volume is compared to the link capacity. If the initial volume exceeds capacity, then the hour 18 volume is set to capacity and the excess volume portion is added to the volume in periods occurring before *and* after the PM peak hour (hours 17 and 19) on a 50/50 basis.
Step 3:	The volume occurring during pre-AM peak hours (hours 1 to 7) are sequentially checked against the link capacity and adjusted (if necessary) in a backward-moving fashion. If the volume occurring in hour 7 exceeds capacity then the hour 7 volume is set to capacity and the excess volume portion is added to the volume of hour 6 volume, and so on. There is no volume spreading at hour 1, even for rare cases where the resulting hour 1 volume exceeds capacity.
Step 4:	The volume occurring during post-AM peak hours (hours 9 to 13) are sequentially checked against the link capacity and adjusted (if necessary) in a forward-moving fashion. If the volume occurring in hour 9 exceeds capacity then the hour 9 volume is set to capacity and the excess volume portion is added to the volume of hour 10 volume, and so on. There is no volume spreading at hour 13 (the midday hour), even for rare cases where the resulting hour 13 volume exceeds capacity.
Step 5:	The volume occurring during pre-PM peak hours (hours 13 to 17) are sequentially checked against the link capacity and adjusted (if necessary) in a backward-moving fashion. If the volume occurring in hour 17 exceeds capacity then the hour 17 volume is set to capacity and the excess volume portion is added to the volume of hour 16 volume, and so on. There is no volume spreading at hour 13 (the midday hour), even for rare cases where the resulting hour 13 volume exceeds capacity.
Step 6:	The volume occurring during post-PM peak hours (hours 19 to 24) are sequentially checked against the link capacity and adjusted (if necessary) in a forward-moving fashion. If the volume occurring in hour 19 exceeds capacity then the hour 19 volume is set to capacity and the excess volume portion is added to the volume of hour 20 volume, and so on. There is no volume spreading at hour 24, even for rare cases where the resulting hour 24 volume exceeds capacity.

Table 6
Speed Delay Functions Used in the MWCOG Mobile Emissions Post Processor
By
Facility Type and Area Type (1-7)

	Freeway			Expwy	Major Arterial			Minor	Collect.
V/C	1,2	3,4	5-7	1-7	1	2-4	5-7	1-7	1-7
0.00	55.00	60.00	67.00	45.00	23.00	32.00	40.00	27.50	16.50
0.20	54.89	59.89	66.88	44.89	22.00	30.30	38.40	26.50	15.50
0.30	54.81	59.80	66.79	44.82	21.50	29.65	37.80	26.00	15.10
0.40	54.71	59.69	66.67	44.73	21.00	29.00	36.80	25.50	14.70
0.50	54.57	59.54	66.49	44.62	20.50	28.25	36.00	25.00	14.20
0.60	54.37	59.30	66.18	44.47	20.00	27.50	35.00	24.50	13.70
0.70	54.06	58.91	65.60	44.26	19.50	26.25	34.10	23.50	13.10
0.80	53.54	58.17	64.26	43.97	19.00	25.00	31.40	22.50	12.50
0.90	52.56	56.56	60.84	43.53	17.00	22.00	28.70	20.25	11.50
1.00	50.58	53.22	55.28	42.82	15.00	19.00	26.00	18.00	10.50
1.20	43.14	43.88	44.47	39.68	15.00	19.00	26.00	18.00	10.50
1.40	35.53	35.86	36.16	34.17	15.00	19.00	26.00	18.00	10.50
1.60	29.41	29.62	29.82	28.67	15.00	19.00	26.00	18.00	10.50
1.80	24.55	24.70	24.85	24.05	15.00	19.00	26.00	18.00	10.50
2.00	20.61	20.73	20.86	20.23	15.00	19.00	26.00	18.00	10.50
2.25	16.65	16.75	16.85	16.35	15.00	19.00	26.00	18.00	10.50
2.50	13.47	13.55	13.64	13.22	15.00	19.00	26.00	18.00	10.50
2.75	10.86	10.93	11.02	10.64	15.00	19.00	26.00	18.00	10.50
3.00	8.68	8.75	8.82	8.48	15.00	19.00	26.00	18.00	10.50
3.25	6.83	6.89	6.97	6.65	15.00	19.00	26.00	18.00	10.50
3.50	5.24	5.31	5.37	5.08	15.00	19.00	26.00	18.00	10.50





6.0 Conclusion

This memorandum has outlined the method by which mobile emissions are calculated in the Washington, D.C. Region. The methodology uses outputs of COG's Version 2.1/TP+ travel model and the EPA mandated MOBILE6 model. The method also includes a rigorous development of highway volume and speeds by hour of the day. It will continue to be reviewed and updated periodically as newly collected data and improved methods become available.

Attachment D

Memo

To: Air Quality Files

From: Eulalie G. Lucas

Date: 5/28/2003

Re: Severe Area SIP- Vehicle Related Emissions: Diurnal and Resting Loss

This memo illustrates the calculation of Diurnal and Resting Loss emissions and also documents recent updates to the travel portion of the analysis. A detailed description of work regarding emissions factor updates using Mobile6 is contained in a report by Maureen Mullen of E.H. Pechan & Associates, dated January 27, 2003.

There were two updates to the vehicle forecast component of the Mobile source emissions inventory. (1). Base year 1999 was changed to 2002 in Maryland and Virginia with those data becoming available in the summer of 2002; the District of Columbia's 1990 vehicle registration data was replaced with year 2002 data. (2) Staff prepared updated vehicle forecasts based upon the 2002 control totals, and growth factors previously developed by DTP staff and documented in the July 2002 Air Quality Conformity report.

Vehicle ownership forecasts reflect trends through time for each jurisdiction; given the 2002 data, the slope of the forecast trend line in each jurisdiction was maintained but revised to 'intercept' 2002 conditions. This approach is illustrated on the attached graph for Prince George's County; also attached is a summary of vehicle registration forecasts. As a part of this update, trend lines were also extended out to year 2030 to be consistent with the new horizon year associated with forthcoming Round 6.3 Cooperative Forecasts. Also included is a copy of a spreadsheet displaying the calculation of diurnals and resting loss emissions, for year 2005.

The calculation of these emissions is an off-line process utilizing a spreadsheet format with a very basic calculation:

Number of vehicles by jurisdiction X jurisdiction emissions factor = Emissions

Attachments (3)

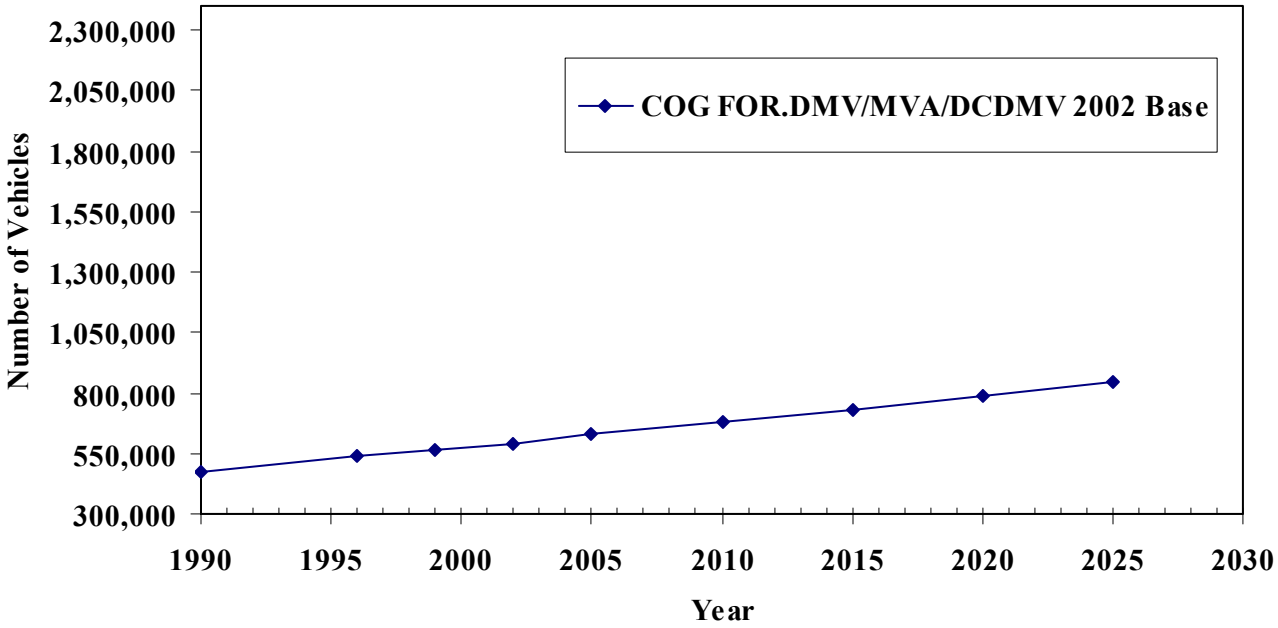
Attachment 1

VEHICLE REGISTRATION FORECASTS BY JURISDICTION
REGISTRATION ADJUSTED TO BASE YEAR 2002

Jurisdiction	1990	1996	1999	2002	2005	2010	2015	2020	2025	2030
District of Columbia	236396	238954	244429	247230	250529	256028	261526	267025	272524	278022
Calvert	46460	49490	61156	68364	76422	89851	103281	116710	130140	143569
Charles	79335	83628	97210	105103	113637	127861	142085	156309	170533	184757
Frederick	139276	146689	169853	183264	197734	221851	245967	270084	294201	318318
Montgomery	535649	560301	630943	670718	713000	783470	853940	924410	994880	1065350
Prince George's	473278	491058	537853	563481	590330	635078	679825	724573	769321	814069
Alexandria	121137	122647	125913	127590	129289	132121	134953	137785	140617	143449
Arlington	140154	141896	145665	147599	149559	152826	156093	159360	162626	165893
Fairfax	671677	698891	772561	813278	856141	927580	999019	1070458	1141896	1213335
Loudoun	128800	136160	160485	174821	190437	216464	242491	268517	294544	320571
Prince William	221384	232621	266649	286152	307081	341964	376846	411728	446610	481492
Stafford	59333	62943	75635	83261	91656	105647	119638	133629	147620	161611
TOTAL	**2852879**	**2965277**	**3288353**	**3470861**	**3665816**	**3990740**	**4315664**	**4640588**	**4965512**	**5290436**

The above forecasts are based on 2002 vehicle registration data from the Virginia DMV, Maryland MVA and the District of Columbia DMV. Growth factors using data from Hari Gouru's 1998 forecasts were used to develop data for out years.

Vehicle Registration for Prince George's County by Year



Attachment 3

DIURNAL AND RESTING LOSS EMISSIONS
VOC

Jurisdiction	TOTAL VEHICLES	FACTORS DIURNAL (gm/day/veh)	FACTORS RESTGL (gm/hr/veh)	EMISSIONS DIURNAL (Tons/day)	EMISSIONS RESTGL (Tons/day)
District of Columbia	250,529	0.804	3.231	0.22	0.87
Montgomery	713,000	0.643	2.347	0.50	1.81
Prince Georges	590,330	0.768	2.97	0.49	1.89
Frederick	197,734	0.777	2.895	0.17	0.62
Charles	113,637	0.81	3.057	0.10	0.38
Calvert	76,422	0.823	3.118	0.07	0.26
Arlington	129,289	0.714	2.684	0.10	0.37
Alexandria	149,559	0.648	2.392	0.10	0.39
Fairfax	856,141	0.665	2.407	0.62	2.23
Loudoun	190,437	0.664	2.37	0.14	0.49
Prince William	307,081	0.743	2.815	0.25	0.93
Stafford	91,656	0.834	3.169	0.08	0.31
MSA - SUBTOTAL MODELED AREA	3,665,815			2.82	10.55
TOTAL	3665815.312			2.82106196	10.54985321

Note: 98% of vehicles, which are gas operated, are used to compute Diurnal and Resting Loss emission
Based on 2002 vehicle registration

Attachment E

Memo

To: Air Quality Files

From: Eulalie G. Lucas

CC: Mike Clifford

Date: 5/28/2003

Re: Severe Area SIP- Preparation of Local Street Emissions

This memo documents preparation of the local street component of the mobile emissions inventory, including development of local VMT mix percentages as well as the introduction of new base year data. While there was extensive work associated with the procedures used in the development of local street VMT mix, this memo will only highlight this effort. A technical report dated January 27,2003 from Maureen Mullen, E.H. Pechan & Associates includes full details on this input as well as other inputs and methodologies used in the preparation of Mobile6 emissions rates to meet SIP requirements.

Background

The approach used in the calculation of emissions associated with travel on local streets involves the use of state traffic count summary reports, as developed for the Highway Performance Monitoring System (HPMS), in conjunction with emissions factors, by county. The calculation involved, simply, the product of VMT and VOC and NO_x emissions factors, by county.

UPDATES

There were two major updates related to Local street emissions estimates. (1) Mobile6 calculates an emissions rate specific to local street VMT; VMT mix procedures specific to local street and utilizing outputs through time from COG/TPB's truck model have also been developed (reference M. Mullen's January 27, 2003 memo and the attached truck model adjustment percentages, seen in Table 1. (2) The 1990 HPMS based year data were updated to 2000 conditions, Table 2.

Results

Tables 3 and 4 show local street emissions estimates for year 2005 for VOC and NO_x. These estimates are based upon use of all the revised inputs i.e. Mobile6 emissions rates as well as revised travel demand assumptions. Results for other analysis years are available and are contained in the Mobile6 local street emissions files.

Attachments (4)

TABLE 1

Mobile 6 Inputs

	Truck VMT %	Local Road HD VMT %
1990	7.36	1.60
1994	7.56	1.65
1996	7.66	1.67
1999	7.76	1.69
2000	7.86	1.71
2002	7.94	1.73
2005	8.05	1.75
2015	8.63	1.88
2025	9.21	2.01
2030	9.50	2.07

NOTE: This summary table includes years relevant to conformity, as well as those needed for SIP and ROP work.

Table 2

Local Street VMT

Summary of Year 2000 Highway Performance Monotoring System(HPMS) Data from Maryland, Virginia and the District of Columbia

Jurisdiction	2000 Average Weekday Travel VMT (Local Roadways 000's)
District of Columbia	1,510
Montgomery	1,404
Prince George's	1,299
Frederick	609
Charles	259
Calvert	208
Arlington	243
City of Alexandria	453
Fairfax	2,127
Loudoun	674
Prince William	877
Stafford	256
TOTAL	9,919

Table 3
LOCAL EMISSIONS CALCULATION WORKSHEET
VOC
2005 case 7

JUR	2000 TOTAL VMT(000S)	2005 Forecast VMT (000S)	Growth Rate	2000 HPMS LOCAL VMT	2005 Forecast Loc. VMT	2005 c7 RUNNING EMISS RATE	RUNNING EMISS. (GMs)	RUNNING EMISS. (TONS)
DC	9392	10027	1.07	1510000	1612184	0.7	1128529	1.24
MTG	21666	23201	1.07	1404000	1503477	0.564	847961	0.93
PG	22799	24070	1.06	1299000	1371418	0.678	929821	1.02
FRED	7962	8773	1.10	609000	671075	0.64	429488	0.47
CHS	2467	2684	1.09	259000	281707	0.659	185645	0.20
CALVRT	1395	1522	1.09	208000	226904	0.671	152252	0.17
	65681	70278		5289000	5666764		3673696	4.05

JUR	2000 TOTAL VMT(000S)		Growth Rate	(A) PRORATED VA LOCL VMT		(B) 2005 c7 RUN. EMISS RATE	(A)*(B) VOC EMISS. VA LOCL GMs	VOC EMISS. VA LOCAL TONS
ARL	4591	4991	1.09	243000	264162	0.609	160875	0.18
ALX	2308	2345	1.02	453000	460260	0.54	248540	0.27
FFX	28260	30091	1.06	2127000	2264805	0.566	1281879	1.41
LDN	5171	6525	1.26	674000	850475	0.539	458406	0.51
PW	7442	8319	1.12	877000	980263	0.625	612664	0.68
STAFF	3647	3948	1.08	256000	277125	0.666	184565	0.20
	51419	56218		4630000	5097089		2946930	
TOTAL	117100	126496		9919000	10764		6620626	7.30
						Total MSA	6620626	7.30

Table 4

LOCAL EMISSIONS CALCULATION WORKSHEET
N O x
2005 Case 7 CONFORMITY ANALYSIS

JUR	2000 TOTAL VMT(000S)	2005 Forecast VMT (000S)	Growth Rate	HPMS LOCAL VMT	Forecast Loc. VMT	2005 C 7 RUNNING EMISS RATE	RUNNING EMISS. (GMs)	RUNNING EMISS. (TONS)
DC	9392	10027	1.07	1510000	1612184	0.872	1405825	1.550
MTG	21666	23201	1.07	1404000	1503477	0.805	1210299	1.334
PG	22799	24070	1.06	1299000	1371418	0.876	1201362	1.324
FRED	7962	8773	1.10	609000	671075	1.414	948900	1.046
CHS	2467	2684	1.09	259000	281707	0.868	244522	0.270
CALVRT	1395	1522	1.09	208000	226904	0.879	199448	0.220
	65681	70278		5289000	5666764			5.743
						(BELOW)		

JUR	TOTAL VMT(000S)			(A) PRORATED VA LOCL VMT		(B) 2005 c7 RUNNNING EMISS RATE	(A)*(B) NOx EMISS. VA LOCL GMs	^ NOx EMISS. VA LOCL TONS
ARL	4591	4991	1.09	243000	264162	0.816	215556	0.238
ALX	2308	2345	1.02	453000	460260	0.744	342433	0.377
FFX	28260	30091	1.06	2127000	2264805	0.806	1825433	2.012
LDN	5171	6525	1.26	674000	850475	0.786	668473	0.737
PW	7442	8319	1.12	877000	980263	0.838	821460	0.906
STAFF.	3647	3948	1.08	256000	277125	0.854	236664	0.261
VA	51419	56218		4630000	5097089			4.531
				9919000	10764			
Total	117100	126496						10.274

Attachment F

MEMORANDUM

March 2, 2003

To: Files

From: Jane Posey, MWCOG/DTP

Subject: Transit and School Bus Emissions

Background

For the development of the HDV percentage in the VMT mix for Mobile6, staff divided the vehicle class into trucks and buses, with the further breakdown of buses into transit bus and school bus categories. This memo discusses the collection of information from regional transit providers and the development of VOC and NOx emissions estimates for transit and school buses for various analysis years.

Approach

Data Collection

In order to obtain current regional transit data, staff developed a questionnaire for transit providers and school bus operators in the region. The technique of emailing and then conducting follow-up phone calls produced a high response rate. Staff used response data to complete tables showing total fleet distribution by age (Attachment 1a), and daily VMT with average operating speed, by provider (Attachment 1b).

Fleet Age Distribution

Staff compared the regional transit bus and school bus fleet distribution survey data to the Mobile6 default data. The resulting graphs are shown in Attachment 2a and 2b. The transit bus distribution shows a fairly regular three to four year cycle of bus purchases in the region. The school bus survey data shows variability over time, with a large purchase in several jurisdictions between 1998 and 2000. Because of the variability in the school bus data, with no clear purchasing cycle as is seen in the transit data, staff used the default data curve for school buses, with one exception. That is, staff adjusted the end of the default school bus distribution curve to reflect that no school buses in the region are older than 16 years. The resulting updated default curve is shown as "revised school bus percentage" on Attachment 2b. For simplification purposes, because the number of buses other than diesel is statistically insignificant, the fleet will be input to the Mobile model as 100 percent diesel. Emissions for buses that are not diesel (e.g. CNG buses) are accounted for using TERM analysis.

VMT Estimates

The annual VMT from the survey was divided by the number of service days for each provider to calculate a daily VMT. To account for bus VMT for providers in the region for which no survey data was received, staff estimated VMT by using data from providers with similar service type. In many cases, where VMT data was not provided, total number of buses was provided, making the estimate process more accurate. In Attachment 1b, estimated VMT values are shown in italics. Daily school bus VMT represents a school day in May.

The resulting daily 2001 VMT from the survey, including estimation values from providers for which no data was received, is 277,000 for transit buses (compared to 180,000 in the FY03-08 TIP), and 489,900 for school buses.

For estimating bus VMT for the future, staff used the HDBS (school bus) and HDBT (transit bus) values in the "National Average Vehicle Miles Traveled Fractions by Vehicle Class" table from EPA's *Technical Guidance on the use of Mobile 6 for Emission Inventory Preparation* to modify current data. This table is shown as Attachment 3. For example, HDBS fractions increase from 0.0019 to 0.0020, or by 5.26%, between 2002 and 2005. Applications of this increase to base year school bus VMT yields an estimate of 515,684 VMT in 2005.

Emission Estimates

Using the survey data, staff created transit bus and school bus emission tables. In the tables, the daily VMT was adjusted from the base (survey) year (2001) using the method described above (see table C). A consultant (EH Pechan) used the fleet age distributions as an input to the Mobile6 model to produce emission factors for VOC and NOx, by speed. Using the appropriate emission factor, as provided by EH Pechan, based on the average operating speed for each provider, staff calculated the VOC and NOx emissions for transit buses and school buses for each analysis year. The emission factor tables for each analysis year are included as Attachment 4. The transit bus and school bus emission tables for each analysis year are included as Attachment 5.

ATTACHMENT 1

Attachment 1a

Total Fleet Distribution by Age

Transit and Other Bus

Age	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Transit and Other Bus Percentage	2.98	6.07	9.84	5.53	4.40	10.30	3.06	6.95	3.09	2.92	4.20	1.25	7.97	4.37	5.45	6.35	6.01	0.62	0.00	0.57	0.00	0.00	0.00	0.00	0.00
Mobile 6 Default	3.07	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.14	6.13	6.11	6.07	5.95	5.68	5.11	4.06	2.54	1.21	0.99	0.81	0.66	0.54	0.44	0.37	1.14

School Bus

Age	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
School Bus Percentage	6.62	10.98	11.00	12.74	13.68	8.22	3.01	4.63	3.12	0.65	1.51	6.48	5.99	3.32	4.28	3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile 6 Default Percentage	3.93	7.34	6.86	6.41	5.99	5.59	5.22	4.88	4.56	4.26	3.98	3.72	3.47	3.24	3.03	2.83	2.64	2.47	2.31	2.16	2.01	1.88	1.76	1.65	7.81
Revised Default Percentage	5.22	9.75	9.11	8.51	7.95	7.42	6.93	6.48	6.05	5.66	5.28	4.94	4.61	4.30	4.02	3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Attachment 1b

2001 Bus
Operating Statistics

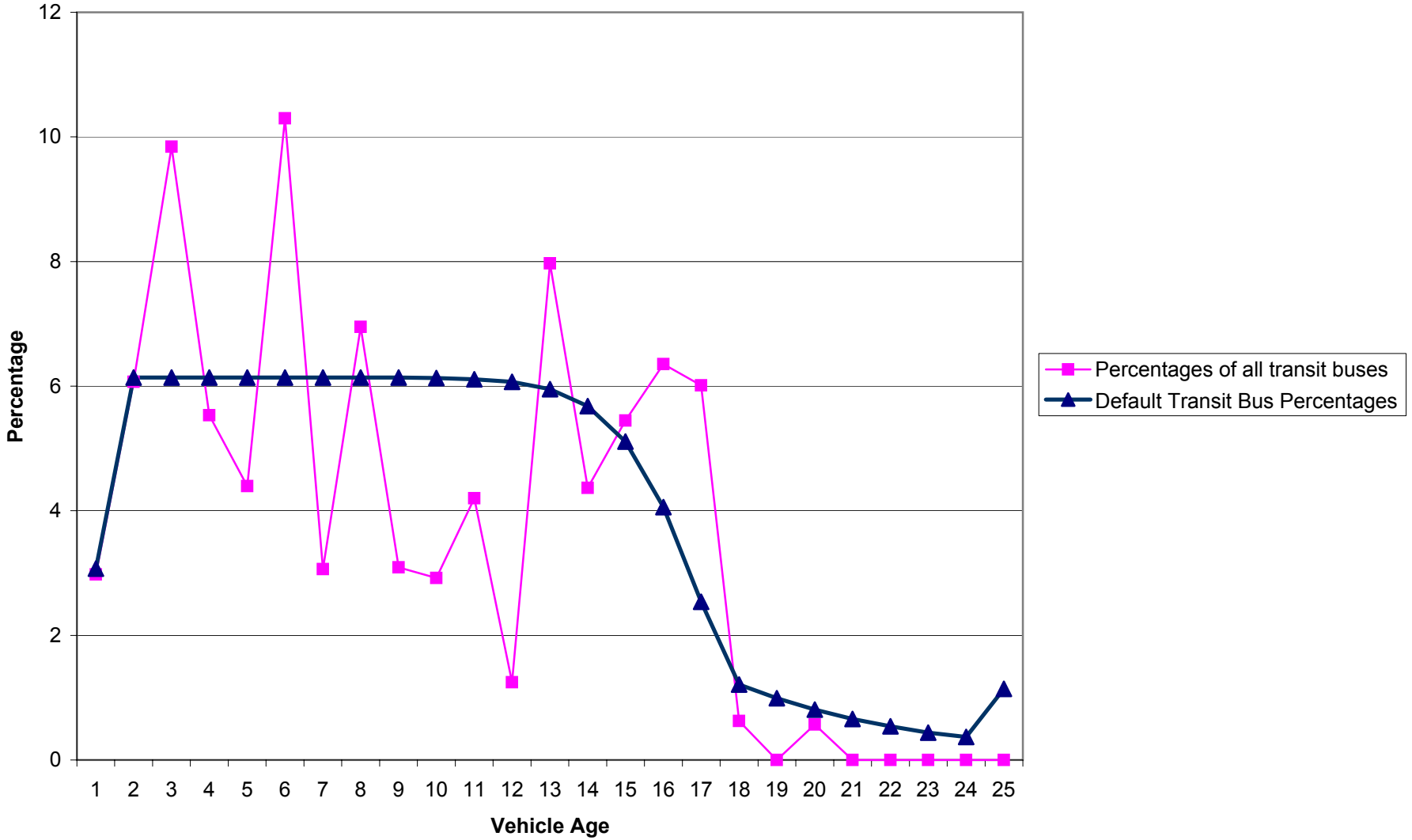
Service	Contact Name	Average Speed	Daily VMT
Metrobus	Lora Byala	*10*	123,299
Fairfax Connector	Andy Szakos	*15*	18,036
PRTC Omnilink	Tim Roseboom	*15*	4038
Alexandria DASH	Cindy Modell	13	3,454
City of Fairfax CUE	Alex Verzosa	15	1,483
Arlington Co. ART	Jim Maslanka	16	794
Loudoun Transportation Assc.	Mark McGregor	15	4,532
Mont. Co. Ride-On	Phil McLaughlin	14.5	35,616
PG Co. The Bus	Frank Bell	15-20	9,723
Fredrick Co. TransiT	Sherry Burford	11.78	3,082
Corridor Transit (CTC)	Joe Gann	17.8	1,265
Crystal City Express		*15*	96
Skyline Crystal Express		*15*	144
PRTC OmniRide	Tim Roseboom	26.62	*5,700*
Loudoun Commuter Service	Sharon Affinito	*25*	1,866
MTA Commuter buses	Larry Dougherty	*45*	10,453
Lee Coaches	Joe Ann Foweler	*45*	70
Brooks Transit		*45*	750
Quicks Commuter Service	Robbie Quick	*45*	1,320
Eyre buses (under MTA)	Teri Lee Cosker	*45*	(under MTA)
Dillon buses (under MTA)	Ron Dillon Sr.	*45*	(under MTA)
Keller buses (under MTA)	Charles D. Keller	*45*	(under MTA)
National Coach Works	Jeff Bodnar	*45*	1,650
Greyhound / Trailways (VA)	David Cohen	*55*	*5000*
Peter Pan / Trailways	Christ Crean	*55*	*2000*
Carolina Trailways		*55*	*500*
Capitol Trailways	Ms.Gale Ellsworth	*55*	*500*
Martz / Grey Line sightseeing	Robert Lynch	55-68	*5000*
New World	Arnold Brown	*20*	299
Washington Flyer Coach Service	Nicholas Marshall	65	1,370
ShuttleUM (U. of MD)	Cynthia Trombly	11.1	1,864

2001 Bus
Operating Statistics

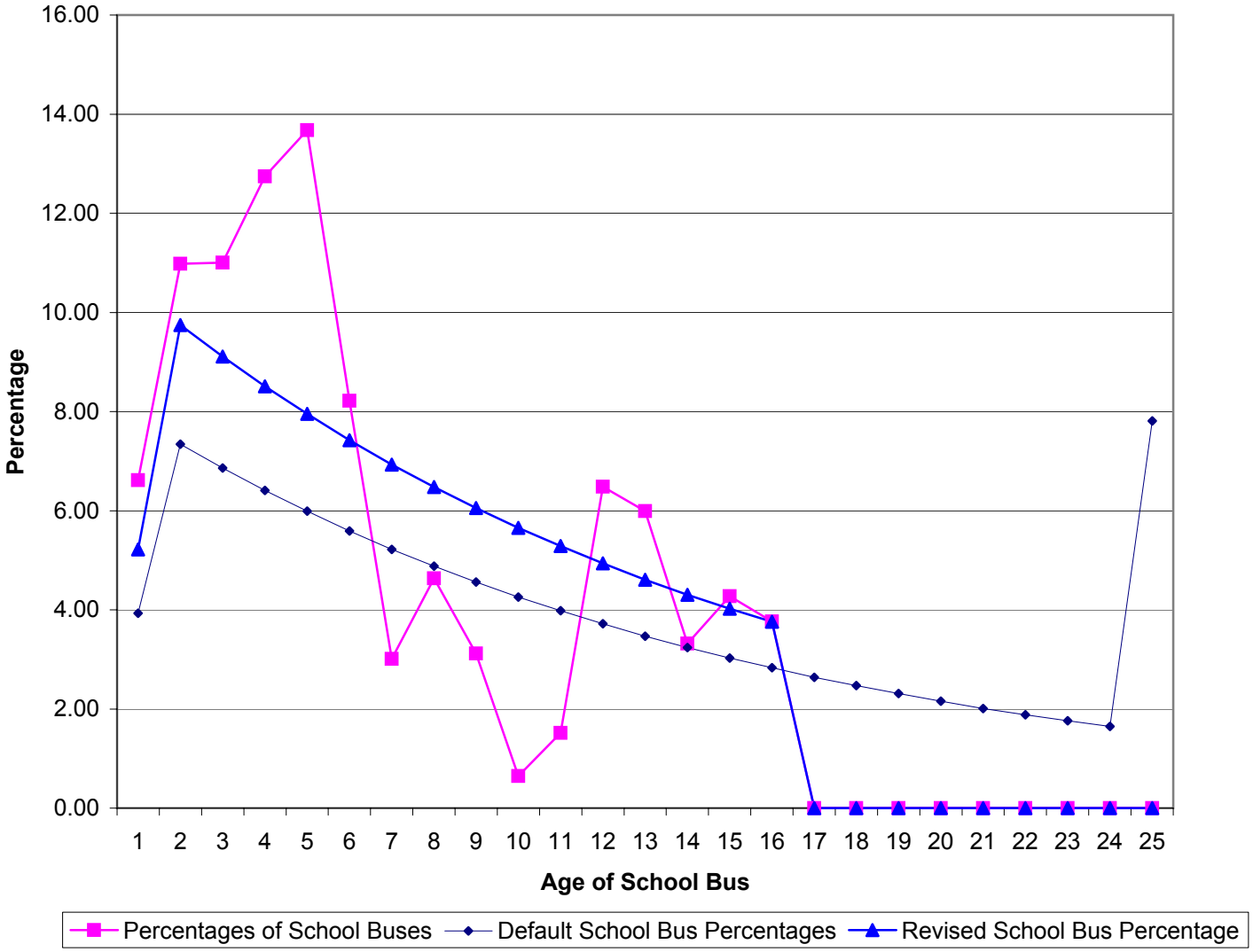
Service	Contact Name	Average Speed	Daily VMT
Georgetown U. shuttle	Diann Nock Smith	15	*100*
American U. shuttle	Thomas Leathers	20-25	83
George Washington U shuttle	John Kane	*15*	*100*
CIA Shuttle		*15*	*200*
EPA Shuttle		*15*	*200*
USDOT Shuttle	Franklin Weaver	*15*	*200*
Gallaudet Shuttle	Darnese Nicholson	*15*	100
Tourmobile	Richard Lewis	*15*	(Gas powered)
Old Town "trolley" buses		*20*	*300*
Metro Access - paratransit	Avon Mackel	15	*5000*
Fairfax Co. Fastran- paratransit	Steve Yaffe	14.53	11,427
Alexandria DOT-paratransit	Lakeshia Lewis	*15*	924
Arlington STAR-paratransit	Eric Smith	*15*	3,245
City of Ffx, City Wheels-paratransit.	Alex Verzosa	*15*	*100*
City of Falls Ch. Fare Wheels-paratransit	Letha Flippin	*15*	*100*
Loudoun Transit (LCTA)-paratransit	Mark McGregor	*15*	*100*
P.G. Co. paratransit	Frank Bell	*15*	*3000*
All buses excluding school			**277,361**
School buses - DC	Alfred Winder	14	*12696*
School buses- Mont. Co.	Qiyu C. Wu	*30*	100,000
School buses- P.G. Co.	Mark Dreszer	*30*	129,967
School buses- Fred. Co.	Richard Wandres	*30*	25,589
School buses- Alexandria	Velma Tsongos	*25*	2,028
School buses- Arl. Co.	Daniel Roseboro	*25*	2,600
School buses- Ffx. Co.	Tim Parker	30-35	96,524
School buses- Loud. Co.	J Michael Lunsfurg	*30*	28,347
School buses- P.W. Co.	Eward Bishop	*30*	36,114
School buses-Charles Co		*30*	20,801
School buses-Calvert Co	Brian Stevens	*30*	25,653
School buses-Stafford Co		*30*	9,609
Total for School Buses			**480,319**

ATTACHMENT 2

Attachment 2a **Transit Fleet Vehicle Age Distribution**



Attachment 2b **School Bus Age Distribution**



ATTACHMENT 3

Table 4.1.2
National Average Vehicle Miles Traveled Fractions By Vehicle Class
Using MOBILE6

Calenda r Year	LDV 1	LDT1 2	LDT2 3	LDT3 4	LDT4 5	HDV2B 6	HDV3 7	HDV4 8	HDV5 9	HDV6 10	HDV7 11	HDV8A 12	HDV8B 13	HDBS 14	HDBT 15	MC 16
1990	0.6284	0.0420	0.1397	0.0566	0.0260	0.0332	0.0034	0.0020	0.0016	0.0064	0.0079	0.0094	0.0337	0.0017	0.0008	0.0073
1991	0.6212	0.0435	0.1448	0.0560	0.0257	0.0336	0.0035	0.0021	0.0017	0.0066	0.0081	0.0095	0.0341	0.0017	0.0008	0.0072
1992	0.6109	0.0456	0.1518	0.0555	0.0255	0.0342	0.0036	0.0022	0.0017	0.0068	0.0083	0.0097	0.0346	0.0017	0.0008	0.0071
1993	0.6009	0.0477	0.1587	0.0551	0.0253	0.0348	0.0036	0.0023	0.0018	0.0070	0.0085	0.0098	0.0350	0.0017	0.0008	0.0070
1994	0.5910	0.0497	0.1655	0.0546	0.0251	0.0354	0.0037	0.0024	0.0018	0.0072	0.0087	0.0100	0.0355	0.0018	0.0008	0.0070
1995	0.5815	0.0517	0.1721	0.0542	0.0249	0.0358	0.0037	0.0025	0.0019	0.0073	0.0089	0.0101	0.0360	0.0018	0.0009	0.0069
1996	0.5721	0.0534	0.1776	0.0547	0.0252	0.0362	0.0037	0.0025	0.0019	0.0075	0.0090	0.0102	0.0364	0.0018	0.0009	0.0068
1997	0.5569	0.0557	0.1853	0.0571	0.0263	0.0367	0.0037	0.0026	0.0020	0.0077	0.0092	0.0104	0.0370	0.0018	0.0009	0.0067
1998	0.5360	0.0590	0.1963	0.0605	0.0278	0.0372	0.0038	0.0027	0.0021	0.0079	0.0095	0.0106	0.0376	0.0019	0.0009	0.0065
1999	0.5153	0.0622	0.2071	0.0638	0.0294	0.0377	0.0038	0.0028	0.0021	0.0081	0.0097	0.0107	0.0382	0.0019	0.0009	0.0064
2000	0.4953	0.0655	0.2179	0.0672	0.0309	0.0380	0.0038	0.0029	0.0022	0.0082	0.0098	0.0108	0.0386	0.0019	0.0009	0.0062
2001	0.4785	0.0683	0.2273	0.0700	0.0322	0.0381	0.0038	0.0029	0.0022	0.0083	0.0099	0.0109	0.0388	0.0019	0.0009	0.0061
2002	0.4646	0.0706	0.2349	0.0724	0.0333	0.0382	0.0038	0.0030	0.0022	0.0084	0.0100	0.0109	0.0390	0.0019	0.0009	0.0060
2003	0.4507	0.0729	0.2425	0.0748	0.0344	0.0384	0.0038	0.0030	0.0023	0.0085	0.0100	0.0110	0.0392	0.0019	0.0009	0.0059
2004	0.4365	0.0752	0.2503	0.0771	0.0355	0.0386	0.0038	0.0030	0.0023	0.0085	0.0101	0.0111	0.0394	0.0019	0.0009	0.0058
2005	0.4231	0.0774	0.2577	0.0794	0.0365	0.0387	0.0038	0.0031	0.0023	0.0086	0.0102	0.0111	0.0395	0.0020	0.0009	0.0057
2006	0.4096	0.0797	0.2654	0.0818	0.0376	0.0387	0.0038	0.0031	0.0023	0.0086	0.0102	0.0111	0.0396	0.0020	0.0009	0.0056
2007	0.3952	0.0822	0.2735	0.0843	0.0388	0.0387	0.0038	0.0031	0.0023	0.0086	0.0102	0.0111	0.0396	0.0020	0.0009	0.0056
2008	0.3807	0.0846	0.2817	0.0868	0.0399	0.0388	0.0038	0.0031	0.0024	0.0087	0.0102	0.0111	0.0397	0.0020	0.0009	0.0055
2009	0.3669	0.0869	0.2894	0.0892	0.0410	0.0389	0.0038	0.0032	0.0024	0.0087	0.0103	0.0112	0.0398	0.0020	0.0010	0.0054
2010	0.3544	0.0891	0.2965	0.0914	0.0420	0.0390	0.0038	0.0032	0.0024	0.0087	0.0103	0.0112	0.0399	0.0020	0.0010	0.0054
2011	0.3428	0.0911	0.3031	0.0934	0.0430	0.0390	0.0038	0.0032	0.0024	0.0087	0.0103	0.0112	0.0398	0.0020	0.0010	0.0053
2012	0.3325	0.0928	0.3090	0.0952	0.0438	0.0390	0.0038	0.0032	0.0024	0.0087	0.0103	0.0112	0.0399	0.0020	0.0010	0.0053
2013	0.3231	0.0944	0.3143	0.0969	0.0445	0.0390	0.0038	0.0032	0.0024	0.0087	0.0103	0.0112	0.0399	0.0020	0.0010	0.0053
2014	0.3145	0.0959	0.3191	0.0983	0.0452	0.0391	0.0038	0.0032	0.0024	0.0088	0.0103	0.0112	0.0400	0.0020	0.0010	0.0052
2015	0.3071	0.0971	0.3233	0.0996	0.0458	0.0391	0.0039	0.0032	0.0024	0.0088	0.0104	0.0112	0.0400	0.0020	0.0010	0.0052
2016	0.3004	0.0982	0.3270	0.1008	0.0463	0.0392	0.0039	0.0033	0.0024	0.0088	0.0104	0.0112	0.0400	0.0020	0.0010	0.0052
2017	0.2944	0.0992	0.3304	0.1018	0.0468	0.0392	0.0039	0.0033	0.0024	0.0088	0.0104	0.0113	0.0401	0.0020	0.0010	0.0051
2018	0.2892	0.1001	0.3332	0.1027	0.0472	0.0393	0.0039	0.0033	0.0024	0.0088	0.0104	0.0113	0.0402	0.0020	0.0010	0.0051
2019	0.2846	0.1008	0.3357	0.1035	0.0476	0.0394	0.0039	0.0033	0.0025	0.0088	0.0104	0.0113	0.0403	0.0020	0.0010	0.0051
2020 - 2050	0.2793	0.1017	0.3384	0.1043	0.0480	0.0396	0.0039	0.0033	0.0025	0.0089	0.0105	0.0114	0.0405	0.0020	0.0010	0.0051

Source: Technical Guidance on the use of Mobile 6 for Emission Inventory Preparation, U.S. EPA. January, 2002.

ATTACHMENT 4

MWCOG Regional Diesel Bus Emission Factors in 1990

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	4.075	24.445	8.813	46.360
Arterial/Freeway	2	4.075	24.445	8.813	46.360
Arterial/Freeway	3	3.911	23.620	8.457	44.796
Arterial/Freeway	4	3.705	22.589	8.012	42.841
Arterial/Freeway	5	3.581	21.971	7.745	41.668
Arterial/Freeway	6	3.325	20.723	7.190	39.302
Arterial/Freeway	7	3.141	19.832	6.793	37.612
Arterial/Freeway	8	3.004	19.164	6.496	36.345
Arterial/Freeway	9	2.897	18.644	6.265	35.359
Arterial/Freeway	10	2.812	18.228	6.080	34.570
Arterial/Freeway	11	2.660	17.531	5.753	33.247
Arterial/Freeway	12	2.534	16.949	5.480	32.144
Arterial/Freeway	13	2.427	16.457	5.249	31.211
Arterial/Freeway	14	2.336	16.035	5.051	30.411
Arterial/Freeway	15	2.256	15.670	4.879	29.718
Arterial/Freeway	16	2.155	15.241	4.660	28.906
Arterial/Freeway	17	2.066	14.864	4.467	28.189
Arterial/Freeway	18	1.986	14.528	4.295	27.552
Arterial/Freeway	19	1.915	14.227	4.141	26.982
Arterial/Freeway	20	1.851	13.957	4.003	26.469
Arterial/Freeway	21	1.780	13.701	3.849	25.983
Arterial/Freeway	22	1.715	13.468	3.709	25.542
Arterial/Freeway	23	1.656	13.255	3.582	25.138
Arterial/Freeway	24	1.602	13.060	3.465	24.768
Arterial/Freeway	25	1.552	12.881	3.357	24.428
Arterial/Freeway	26	1.501	12.751	3.246	24.182
Arterial/Freeway	27	1.454	12.630	3.144	23.953
Arterial/Freeway	28	1.410	12.518	3.049	23.741
Arterial/Freeway	29	1.369	12.414	2.960	23.543
Arterial/Freeway	30	1.331	12.317	2.878	23.359
Arterial/Freeway	31	1.294	12.291	2.797	23.311
Arterial/Freeway	32	1.259	12.267	2.722	23.265
Arterial/Freeway	33	1.226	12.245	2.651	23.222
Arterial/Freeway	34	1.195	12.224	2.585	23.182
Arterial/Freeway	35	1.166	12.204	2.522	23.144
Arterial/Freeway	36	1.139	12.276	2.464	23.281
Arterial/Freeway	37	1.114	12.344	2.408	23.410
Arterial/Freeway	38	1.089	12.409	2.356	23.533
Arterial/Freeway	39	1.067	12.470	2.306	23.649
Arterial/Freeway	40	1.045	12.528	2.259	23.760
Arterial/Freeway	41	1.025	12.703	2.217	24.092
Arterial/Freeway	42	1.007	12.870	2.178	24.408
Arterial/Freeway	43	0.989	13.029	2.140	24.710

MWCOG Regional Diesel Bus Emission Factors in 1990

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	44	0.973	13.181	2.104	24.998
Arterial/Freeway	45	0.957	13.326	2.069	25.273
Arterial/Freeway	46	0.943	13.622	2.040	25.834
Arterial/Freeway	47	0.931	13.905	2.013	26.372
Arterial/Freeway	48	0.919	14.177	1.986	26.886
Arterial/Freeway	49	0.907	14.437	1.961	27.380
Arterial/Freeway	50	0.896	14.687	1.937	27.854
Arterial/Freeway	51	0.887	15.137	1.919	28.707
Arterial/Freeway	52	0.879	15.569	1.902	29.527
Arterial/Freeway	53	0.872	15.985	1.885	30.316
Arterial/Freeway	54	0.864	16.386	1.869	31.076
Arterial/Freeway	55	0.857	16.772	1.853	31.809
Arterial/Freeway	56	0.853	17.431	1.845	33.058
Arterial/Freeway	57	0.849	18.066	1.836	34.263
Arterial/Freeway	58	0.845	18.680	1.828	35.426
Arterial/Freeway	59	0.842	19.272	1.821	36.550
Arterial/Freeway	60	0.838	19.845	1.813	37.637
Arterial/Freeway	61	0.838	20.801	1.813	39.450
Arterial/Freeway	62	0.838	21.726	1.813	41.204
Arterial/Freeway	63	0.838	22.622	1.813	42.902
Arterial/Freeway	64	0.838	23.489	1.813	44.548
Arterial/Freeway	65	0.838	24.330	1.813	46.143
Ramp	34.6	1.178	12.197	2.547	23.131
Local	12.9	2.468	16.625	5.337	31.530

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY1996

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	3.131	23.410	5.168	36.483
Arterial/Freeway	2	3.131	23.410	5.168	36.483
Arterial/Freeway	3	3.004	22.620	4.959	35.252
Arterial/Freeway	4	2.846	21.633	4.698	33.714
Arterial/Freeway	5	2.751	21.041	4.541	32.791
Arterial/Freeway	6	2.554	19.846	4.216	30.929
Arterial/Freeway	7	2.413	18.993	3.984	29.599
Arterial/Freeway	8	2.308	18.353	3.809	28.601
Arterial/Freeway	9	2.226	17.855	3.674	27.826
Arterial/Freeway	10	2.160	17.456	3.565	27.205
Arterial/Freeway	11	2.044	16.788	3.373	26.163
Arterial/Freeway	12	1.947	16.231	3.213	25.296
Arterial/Freeway	13	1.865	15.760	3.078	24.561
Arterial/Freeway	14	1.794	15.356	2.962	23.932
Arterial/Freeway	15	1.733	15.006	2.861	23.386
Arterial/Freeway	16	1.656	14.596	2.733	22.747
Arterial/Freeway	17	1.587	14.234	2.619	22.183
Arterial/Freeway	18	1.526	13.913	2.519	21.682
Arterial/Freeway	19	1.471	13.625	2.428	21.234
Arterial/Freeway	20	1.422	13.366	2.347	20.830
Arterial/Freeway	21	1.367	13.121	2.257	20.448
Arterial/Freeway	22	1.318	12.897	2.175	20.100
Arterial/Freeway	23	1.272	12.694	2.100	19.783
Arterial/Freeway	24	1.231	12.507	2.032	19.492
Arterial/Freeway	25	1.193	12.335	1.968	19.224
Arterial/Freeway	26	1.153	12.211	1.904	19.030
Arterial/Freeway	27	1.117	12.095	1.844	18.850
Arterial/Freeway	28	1.083	11.988	1.788	18.683
Arterial/Freeway	29	1.052	11.888	1.736	18.528
Arterial/Freeway	30	1.022	11.795	1.688	18.383
Arterial/Freeway	31	0.994	11.771	1.640	18.344
Arterial/Freeway	32	0.967	11.748	1.596	18.308
Arterial/Freeway	33	0.942	11.726	1.555	18.275
Arterial/Freeway	34	0.918	11.706	1.516	18.243
Arterial/Freeway	35	0.896	11.687	1.479	18.213
Arterial/Freeway	36	0.875	11.756	1.445	18.321
Arterial/Freeway	37	0.856	11.821	1.412	18.423
Arterial/Freeway	38	0.837	11.883	1.382	18.519
Arterial/Freeway	39	0.819	11.942	1.352	18.611
Arterial/Freeway	40	0.803	11.998	1.325	18.698
Arterial/Freeway	41	0.788	12.165	1.300	18.959
Arterial/Freeway	42	0.774	12.325	1.277	19.208
Arterial/Freeway	43	0.760	12.477	1.255	19.446
Arterial/Freeway	44	0.747	12.623	1.234	19.672
Arterial/Freeway	45	0.735	12.762	1.213	19.889
Arterial/Freeway	46	0.725	13.045	1.196	20.330

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY1996

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	47	0.715	13.317	1.180	20.753
Arterial/Freeway	48	0.706	13.576	1.165	21.158
Arterial/Freeway	49	0.697	13.826	1.150	21.547
Arterial/Freeway	50	0.688	14.065	1.136	21.920
Arterial/Freeway	51	0.682	14.496	1.125	22.591
Arterial/Freeway	52	0.676	14.910	1.115	23.237
Arterial/Freeway	53	0.670	15.309	1.105	23.858
Arterial/Freeway	54	0.664	15.692	1.096	24.456
Arterial/Freeway	55	0.658	16.062	1.087	25.032
Arterial/Freeway	56	0.655	16.693	1.082	26.015
Arterial/Freeway	57	0.652	17.301	1.077	26.963
Arterial/Freeway	58	0.650	17.889	1.072	27.879
Arterial/Freeway	59	0.647	18.456	1.068	28.763
Arterial/Freeway	60	0.644	19.005	1.063	29.618
Arterial/Freeway	61	0.644	19.920	1.063	31.045
Arterial/Freeway	62	0.644	20.806	1.063	32.425
Arterial/Freeway	63	0.644	21.664	1.063	33.762
Arterial/Freeway	64	0.644	22.495	1.063	35.057
Arterial/Freeway	65	0.644	23.300	1.063	36.312
Ramp	34.6	0.905	11.680	1.493	18.203
Local	12.9	1.896	15.921	3.130	24.813

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY1999

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	2.866	23.294	4.404	34.571
Arterial/Freeway	2	2.866	23.294	4.404	34.571
Arterial/Freeway	3	2.750	22.508	4.226	33.405
Arterial/Freeway	4	2.606	21.526	4.003	31.948
Arterial/Freeway	5	2.519	20.937	3.870	31.073
Arterial/Freeway	6	2.338	19.748	3.592	29.309
Arterial/Freeway	7	2.209	18.899	3.394	28.048
Arterial/Freeway	8	2.113	18.262	3.246	27.103
Arterial/Freeway	9	2.038	17.766	3.130	26.368
Arterial/Freeway	10	1.977	17.370	3.038	25.780
Arterial/Freeway	11	1.871	16.705	2.874	24.793
Arterial/Freeway	12	1.782	16.151	2.738	23.970
Arterial/Freeway	13	1.707	15.682	2.623	23.275
Arterial/Freeway	14	1.643	15.280	2.524	22.678
Arterial/Freeway	15	1.587	14.932	2.438	22.161
Arterial/Freeway	16	1.516	14.524	2.328	21.556
Arterial/Freeway	17	1.453	14.164	2.232	21.021
Arterial/Freeway	18	1.397	13.844	2.146	20.546
Arterial/Freeway	19	1.347	13.558	2.069	20.121
Arterial/Freeway	20	1.302	13.300	2.000	19.739
Arterial/Freeway	21	1.252	13.056	1.923	19.377
Arterial/Freeway	22	1.206	12.834	1.853	19.047
Arterial/Freeway	23	1.165	12.631	1.790	18.746
Arterial/Freeway	24	1.127	12.445	1.731	18.470
Arterial/Freeway	25	1.092	12.274	1.677	18.217
Arterial/Freeway	26	1.056	12.150	1.622	18.033
Arterial/Freeway	27	1.022	12.036	1.571	17.862
Arterial/Freeway	28	0.992	11.929	1.523	17.704
Arterial/Freeway	29	0.963	11.830	1.479	17.557
Arterial/Freeway	30	0.936	11.737	1.438	17.420
Arterial/Freeway	31	0.910	11.713	1.398	17.383
Arterial/Freeway	32	0.885	11.690	1.360	17.349
Arterial/Freeway	33	0.862	11.668	1.325	17.317
Arterial/Freeway	34	0.841	11.648	1.291	17.287
Arterial/Freeway	35	0.820	11.629	1.260	17.259
Arterial/Freeway	36	0.801	11.698	1.231	17.361
Arterial/Freeway	37	0.783	11.763	1.203	17.458
Arterial/Freeway	38	0.766	11.824	1.177	17.549
Arterial/Freeway	39	0.750	11.883	1.152	17.636
Arterial/Freeway	40	0.735	11.938	1.129	17.718
Arterial/Freeway	41	0.721	12.105	1.108	17.966
Arterial/Freeway	42	0.708	12.264	1.088	18.202
Arterial/Freeway	43	0.696	12.416	1.069	18.427
Arterial/Freeway	44	0.684	12.561	1.051	18.642
Arterial/Freeway	45	0.673	12.699	1.034	18.847
Arterial/Freeway	46	0.664	12.981	1.019	19.265

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY1999

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	47	0.655	13.251	1.006	19.666
Arterial/Freeway	48	0.646	13.509	0.992	20.050
Arterial/Freeway	49	0.638	13.758	0.980	20.418
Arterial/Freeway	50	0.630	13.996	0.968	20.772
Arterial/Freeway	51	0.624	14.424	0.959	21.408
Arterial/Freeway	52	0.618	14.836	0.950	22.019
Arterial/Freeway	53	0.613	15.233	0.942	22.608
Arterial/Freeway	54	0.608	15.615	0.934	23.174
Arterial/Freeway	55	0.603	15.983	0.926	23.721
Arterial/Freeway	56	0.600	16.610	0.922	24.652
Arterial/Freeway	57	0.597	17.216	0.918	25.551
Arterial/Freeway	58	0.595	17.800	0.914	26.418
Arterial/Freeway	59	0.592	18.365	0.910	27.257
Arterial/Freeway	60	0.590	18.911	0.906	28.067
Arterial/Freeway	61	0.590	19.822	0.906	29.419
Arterial/Freeway	62	0.590	20.703	0.906	30.727
Arterial/Freeway	63	0.590	21.557	0.906	31.993
Arterial/Freeway	64	0.590	22.384	0.906	33.221
Arterial/Freeway	65	0.590	23.185	0.906	34.410
Ramp	34.6	0.828	11.622	1.272	17.249
Local	12.9	1.736	15.843	2.667	23.513

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY2002

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	2.669	23.177	3.554	33.102
Arterial/Freeway	2	2.669	23.177	3.554	33.102
Arterial/Freeway	3	2.561	22.394	3.411	31.984
Arterial/Freeway	4	2.426	21.415	3.231	30.587
Arterial/Freeway	5	2.345	20.828	3.123	29.749
Arterial/Freeway	6	2.177	19.644	2.900	28.058
Arterial/Freeway	7	2.057	18.797	2.740	26.850
Arterial/Freeway	8	1.967	18.163	2.620	25.944
Arterial/Freeway	9	1.897	17.669	2.527	25.239
Arterial/Freeway	10	1.841	17.274	2.452	24.675
Arterial/Freeway	11	1.742	16.612	2.320	23.729
Arterial/Freeway	12	1.659	16.060	2.210	22.941
Arterial/Freeway	13	1.589	15.592	2.117	22.274
Arterial/Freeway	14	1.529	15.192	2.037	21.702
Arterial/Freeway	15	1.477	14.845	1.968	21.207
Arterial/Freeway	16	1.411	14.438	1.879	20.626
Arterial/Freeway	17	1.353	14.080	1.801	20.114
Arterial/Freeway	18	1.301	13.761	1.732	19.659
Arterial/Freeway	19	1.254	13.476	1.670	19.251
Arterial/Freeway	20	1.212	13.219	1.614	18.885
Arterial/Freeway	21	1.165	12.975	1.552	18.538
Arterial/Freeway	22	1.123	12.754	1.496	18.222
Arterial/Freeway	23	1.084	12.552	1.444	17.933
Arterial/Freeway	24	1.049	12.367	1.397	17.669
Arterial/Freeway	25	1.016	12.197	1.354	17.426
Arterial/Freeway	26	0.983	12.073	1.309	17.250
Arterial/Freeway	27	0.952	11.959	1.268	17.086
Arterial/Freeway	28	0.923	11.853	1.230	16.935
Arterial/Freeway	29	0.896	11.754	1.194	16.794
Arterial/Freeway	30	0.871	11.662	1.161	16.662
Arterial/Freeway	31	0.847	11.637	1.128	16.627
Arterial/Freeway	32	0.824	11.614	1.098	16.595
Arterial/Freeway	33	0.803	11.593	1.069	16.564
Arterial/Freeway	34	0.783	11.573	1.042	16.535
Arterial/Freeway	35	0.764	11.554	1.017	16.508
Arterial/Freeway	36	0.746	11.622	0.994	16.606
Arterial/Freeway	37	0.729	11.687	0.971	16.698
Arterial/Freeway	38	0.713	11.749	0.950	16.786
Arterial/Freeway	39	0.698	11.807	0.930	16.869
Arterial/Freeway	40	0.684	11.862	0.911	16.948
Arterial/Freeway	41	0.671	12.028	0.894	17.185
Arterial/Freeway	42	0.659	12.187	0.878	17.412
Arterial/Freeway	43	0.648	12.338	0.863	17.627
Arterial/Freeway	44	0.637	12.482	0.848	17.833
Arterial/Freeway	45	0.626	12.620	0.834	18.030
Arterial/Freeway	46	0.618	12.901	0.823	18.431

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY2002

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	47	0.609	13.170	0.812	18.815
Arterial/Freeway	48	0.601	13.428	0.801	19.183
Arterial/Freeway	49	0.594	13.675	0.791	19.536
Arterial/Freeway	50	0.586	13.912	0.781	19.875
Arterial/Freeway	51	0.581	14.339	0.774	20.484
Arterial/Freeway	52	0.576	14.750	0.767	21.071
Arterial/Freeway	53	0.571	15.145	0.760	21.635
Arterial/Freeway	54	0.566	15.525	0.754	22.178
Arterial/Freeway	55	0.561	15.892	0.747	22.701
Arterial/Freeway	56	0.559	16.517	0.744	23.594
Arterial/Freeway	57	0.556	17.121	0.741	24.455
Arterial/Freeway	58	0.554	17.703	0.737	25.287
Arterial/Freeway	59	0.551	18.266	0.734	26.091
Arterial/Freeway	60	0.549	18.810	0.731	26.867
Arterial/Freeway	61	0.549	19.717	0.731	28.163
Arterial/Freeway	62	0.549	20.596	0.731	29.417
Arterial/Freeway	63	0.549	21.446	0.731	30.631
Arterial/Freeway	64	0.549	22.270	0.731	31.807
Arterial/Freeway	65	0.549	23.068	0.731	32.947
Ramp	34.6	0.771	11.581	1.027	16.534
Local	12.9	1.616	15.752	2.153	22.502

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY2005

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	2.508	22.295	3.063	30.764
Arterial/Freeway	2	2.508	22.295	3.063	30.764
Arterial/Freeway	3	2.407	21.533	2.939	29.710
Arterial/Freeway	4	2.280	20.581	2.784	28.391
Arterial/Freeway	5	2.204	20.010	2.691	27.600
Arterial/Freeway	6	2.046	18.857	2.499	26.005
Arterial/Freeway	7	1.933	18.034	2.361	24.865
Arterial/Freeway	8	1.849	17.416	2.258	24.010
Arterial/Freeway	9	1.783	16.936	2.177	23.345
Arterial/Freeway	10	1.730	16.552	2.113	22.813
Arterial/Freeway	11	1.637	15.907	1.999	21.921
Arterial/Freeway	12	1.560	15.370	1.904	21.177
Arterial/Freeway	13	1.494	14.916	1.824	20.548
Arterial/Freeway	14	1.437	14.526	1.755	20.008
Arterial/Freeway	15	1.389	14.188	1.696	19.541
Arterial/Freeway	16	1.326	13.793	1.620	18.993
Arterial/Freeway	17	1.271	13.444	1.552	18.510
Arterial/Freeway	18	1.222	13.134	1.493	18.081
Arterial/Freeway	19	1.179	12.856	1.439	17.696
Arterial/Freeway	20	1.139	12.606	1.391	17.350
Arterial/Freeway	21	1.095	12.369	1.338	17.023
Arterial/Freeway	22	1.056	12.154	1.289	16.725
Arterial/Freeway	23	1.019	11.958	1.245	16.453
Arterial/Freeway	24	0.986	11.778	1.204	16.203
Arterial/Freeway	25	0.955	11.612	1.167	15.974
Arterial/Freeway	26	0.924	11.492	1.128	15.807
Arterial/Freeway	27	0.895	11.380	1.093	15.653
Arterial/Freeway	28	0.868	11.277	1.060	15.510
Arterial/Freeway	29	0.843	11.181	1.029	15.377
Arterial/Freeway	30	0.819	11.091	1.000	15.253
Arterial/Freeway	31	0.796	11.067	0.972	15.220
Arterial/Freeway	32	0.775	11.045	0.946	15.189
Arterial/Freeway	33	0.755	11.024	0.921	15.161
Arterial/Freeway	34	0.736	11.005	0.898	15.133
Arterial/Freeway	35	0.718	10.986	0.876	15.108
Arterial/Freeway	36	0.701	11.053	0.856	15.200
Arterial/Freeway	37	0.685	11.116	0.837	15.287
Arterial/Freeway	38	0.671	11.176	0.819	15.370
Arterial/Freeway	39	0.656	11.232	0.802	15.448
Arterial/Freeway	40	0.643	11.286	0.785	15.523
Arterial/Freeway	41	0.631	11.448	0.771	15.747
Arterial/Freeway	42	0.620	11.602	0.757	15.960
Arterial/Freeway	43	0.609	11.749	0.744	16.164
Arterial/Freeway	44	0.599	11.889	0.731	16.358
Arterial/Freeway	45	0.589	12.023	0.719	16.544
Arterial/Freeway	46	0.581	12.297	0.709	16.922

MWCOG Regional Diesel Bus Emission Factors in Adjusted BY2005

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	47	0.573	12.558	0.699	17.284
Arterial/Freeway	48	0.565	12.809	0.690	17.632
Arterial/Freeway	49	0.558	13.050	0.682	17.965
Arterial/Freeway	50	0.551	13.281	0.673	18.284
Arterial/Freeway	51	0.546	13.696	0.667	18.860
Arterial/Freeway	52	0.541	14.096	0.661	19.413
Arterial/Freeway	53	0.536	14.480	0.655	19.945
Arterial/Freeway	54	0.532	14.850	0.649	20.457
Arterial/Freeway	55	0.528	15.207	0.644	20.951
Arterial/Freeway	56	0.525	15.815	0.641	21.793
Arterial/Freeway	57	0.523	16.402	0.638	22.606
Arterial/Freeway	58	0.520	16.969	0.635	23.391
Arterial/Freeway	59	0.518	17.517	0.633	24.149
Arterial/Freeway	60	0.516	18.046	0.630	24.882
Arterial/Freeway	61	0.516	18.929	0.630	26.104
Arterial/Freeway	62	0.516	19.783	0.630	27.287
Arterial/Freeway	63	0.516	20.611	0.630	28.433
Arterial/Freeway	64	0.516	21.412	0.630	29.542
Arterial/Freeway	65	0.516	22.189	0.630	30.618
Ramp	34.6	0.725	11.267	0.885	15.599
Local	12.9	1.519	15.071	1.855	20.763

MWCOG Regional Diesel Bus Emission Factors in 2005

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	2.005	19.347	1.680	28.336
Arterial/Freeway	2	2.005	19.347	1.680	28.336
Arterial/Freeway	3	1.924	18.685	1.613	27.363
Arterial/Freeway	4	1.822	17.857	1.528	26.147
Arterial/Freeway	5	1.762	17.360	1.477	25.418
Arterial/Freeway	6	1.635	16.358	1.371	23.946
Arterial/Freeway	7	1.545	15.643	1.295	22.895
Arterial/Freeway	8	1.478	15.106	1.239	22.107
Arterial/Freeway	9	1.425	14.688	1.195	21.493
Arterial/Freeway	10	1.383	14.354	1.159	21.003
Arterial/Freeway	11	1.308	13.794	1.097	20.180
Arterial/Freeway	12	1.246	13.327	1.045	19.494
Arterial/Freeway	13	1.194	12.931	1.001	18.913
Arterial/Freeway	14	1.149	12.593	0.963	18.416
Arterial/Freeway	15	1.110	12.299	0.930	17.984
Arterial/Freeway	16	1.060	11.955	0.889	17.479
Arterial/Freeway	17	1.016	11.652	0.852	17.034
Arterial/Freeway	18	0.977	11.382	0.819	16.637
Arterial/Freeway	19	0.942	11.141	0.790	16.283
Arterial/Freeway	20	0.910	10.923	0.763	15.964
Arterial/Freeway	21	0.876	10.717	0.734	15.662
Arterial/Freeway	22	0.844	10.530	0.707	15.387
Arterial/Freeway	23	0.815	10.360	0.683	15.136
Arterial/Freeway	24	0.788	10.203	0.661	14.906
Arterial/Freeway	25	0.764	10.059	0.640	14.694
Arterial/Freeway	26	0.738	9.954	0.619	14.541
Arterial/Freeway	27	0.715	9.858	0.599	14.399
Arterial/Freeway	28	0.694	9.768	0.581	14.267
Arterial/Freeway	29	0.673	9.684	0.564	14.144
Arterial/Freeway	30	0.655	9.606	0.549	14.029
Arterial/Freeway	31	0.636	9.585	0.533	13.999
Arterial/Freeway	32	0.619	9.566	0.519	13.971
Arterial/Freeway	33	0.603	9.548	0.506	13.944
Arterial/Freeway	34	0.588	9.531	0.493	13.919
Arterial/Freeway	35	0.574	9.515	0.481	13.896
Arterial/Freeway	36	0.560	9.573	0.470	13.981
Arterial/Freeway	37	0.548	9.628	0.459	14.061
Arterial/Freeway	38	0.536	9.680	0.449	14.137
Arterial/Freeway	39	0.525	9.729	0.440	14.210
Arterial/Freeway	40	0.514	9.776	0.431	14.279
Arterial/Freeway	41	0.504	9.916	0.423	14.485
Arterial/Freeway	42	0.495	10.050	0.415	14.682
Arterial/Freeway	43	0.487	10.178	0.408	14.870
Arterial/Freeway	44	0.478	10.300	0.401	15.049
Arterial/Freeway	45	0.471	10.417	0.395	15.220
Arterial/Freeway	46	0.464	10.654	0.389	15.569

Arterial/Freeway	47	0.458	10.882	0.384	15.903
Arterial/Freeway	48	0.452	11.100	0.379	16.223
Arterial/Freeway	49	0.446	11.309	0.374	16.531
Arterial/Freeway	50	0.441	11.510	0.369	16.825
Arterial/Freeway	51	0.436	11.871	0.366	17.356
Arterial/Freeway	52	0.433	12.218	0.363	17.866
Arterial/Freeway	53	0.429	12.553	0.359	18.357
Arterial/Freeway	54	0.425	12.874	0.356	18.830
Arterial/Freeway	55	0.422	13.185	0.353	19.285
Arterial/Freeway	56	0.420	13.714	0.352	20.062
Arterial/Freeway	57	0.418	14.224	0.350	20.812
Arterial/Freeway	58	0.416	14.717	0.349	21.535
Arterial/Freeway	59	0.414	15.193	0.347	22.235
Arterial/Freeway	60	0.412	15.653	0.346	22.910
Arterial/Freeway	61	0.412	16.421	0.346	24.038
Arterial/Freeway	62	0.412	17.164	0.346	25.129
Arterial/Freeway	63	0.412	17.883	0.346	26.186
Arterial/Freeway	64	0.412	18.580	0.346	27.209
Arterial/Freeway	65	0.412	19.255	0.346	28.201
Ramp	34.6	0.579	9.797	0.486	14.388
Local	12.9	1.214	13.067	1.018	19.112

MWCOG Regional Diesel Bus Emission Factors in 2030

		Diesel Bus Emission Factors (grams/mile)			
	Speed	School Bus		Transit Bus	
Road Type	(mph)	VOC	NOx	VOC	NOx
Arterial/Freeway	1	0.8782	0.9424	0.7326	1.2699
Arterial/Freeway	2	0.8782	0.9424	0.7326	1.2699
Arterial/Freeway	3	0.8427	0.9106	0.7030	1.2271
Arterial/Freeway	4	0.7983	0.8708	0.6660	1.1735
Arterial/Freeway	5	0.7717	0.8470	0.6438	1.1414
Arterial/Freeway	6	0.7164	0.7989	0.5976	1.0766
Arterial/Freeway	7	0.6769	0.7646	0.5647	1.0303
Arterial/Freeway	8	0.6473	0.7388	0.5400	0.9956
Arterial/Freeway	9	0.6243	0.7188	0.5208	0.9686
Arterial/Freeway	10	0.6058	0.7027	0.5054	0.9470
Arterial/Freeway	11	0.5732	0.6758	0.4782	0.9107
Arterial/Freeway	12	0.5460	0.6534	0.4555	0.8805
Arterial/Freeway	13	0.5230	0.6344	0.4363	0.8549
Arterial/Freeway	14	0.5033	0.6182	0.4198	0.8330
Arterial/Freeway	15	0.4862	0.6041	0.4056	0.8140
Arterial/Freeway	16	0.4644	0.5876	0.3874	0.7918
Arterial/Freeway	17	0.4451	0.5730	0.3713	0.7722
Arterial/Freeway	18	0.4280	0.5601	0.3570	0.7547
Arterial/Freeway	19	0.4126	0.5485	0.3442	0.7391
Arterial/Freeway	20	0.3989	0.5381	0.3327	0.7251
Arterial/Freeway	21	0.3835	0.5282	0.3199	0.7118
Arterial/Freeway	22	0.3696	0.5192	0.3083	0.6997
Arterial/Freeway	23	0.3569	0.5110	0.2977	0.6886
Arterial/Freeway	24	0.3452	0.5035	0.2880	0.6785
Arterial/Freeway	25	0.3345	0.4966	0.2790	0.6692
Arterial/Freeway	26	0.3235	0.4915	0.2698	0.6624
Arterial/Freeway	27	0.3133	0.4869	0.2613	0.6561
Arterial/Freeway	28	0.3038	0.4826	0.2534	0.6503
Arterial/Freeway	29	0.2950	0.4786	0.2461	0.6449
Arterial/Freeway	30	0.2867	0.4748	0.2392	0.6399
Arterial/Freeway	31	0.2787	0.4738	0.2325	0.6385
Arterial/Freeway	32	0.2712	0.4729	0.2263	0.6373
Arterial/Freeway	33	0.2642	0.4720	0.2204	0.6361
Arterial/Freeway	34	0.2575	0.4712	0.2148	0.6350
Arterial/Freeway	35	0.2513	0.4705	0.2096	0.6340
Arterial/Freeway	36	0.2455	0.4732	0.2048	0.6377
Arterial/Freeway	37	0.2400	0.4759	0.2002	0.6413
Arterial/Freeway	38	0.2348	0.4784	0.1958	0.6446
Arterial/Freeway	39	0.2298	0.4807	0.1917	0.6478
Arterial/Freeway	40	0.2251	0.4830	0.1878	0.6508
Arterial/Freeway	41	0.2209	0.4897	0.1843	0.6599
Arterial/Freeway	42	0.2170	0.4962	0.1810	0.6686
Arterial/Freeway	43	0.2132	0.5023	0.1779	0.6769
Arterial/Freeway	44	0.2096	0.5081	0.1748	0.6848
Arterial/Freeway	45	0.2061	0.5137	0.1720	0.6923
Arterial/Freeway	46	0.2033	0.5251	0.1696	0.7077

Arterial/Freeway	47	0.2005	0.5361	0.1673	0.7224
Arterial/Freeway	48	0.1979	0.5465	0.1651	0.7365
Arterial/Freeway	49	0.1954	0.5566	0.1630	0.7500
Arterial/Freeway	50	0.1930	0.5662	0.1610	0.7630
Arterial/Freeway	51	0.1912	0.5835	0.1595	0.7864
Arterial/Freeway	52	0.1895	0.6002	0.1581	0.8088
Arterial/Freeway	53	0.1878	0.6163	0.1567	0.8305
Arterial/Freeway	54	0.1862	0.6317	0.1553	0.8513
Arterial/Freeway	55	0.1847	0.6466	0.1541	0.8713
Arterial/Freeway	56	0.1838	0.6720	0.1533	0.9055
Arterial/Freeway	57	0.1830	0.6965	0.1526	0.9386
Arterial/Freeway	58	0.1822	0.7201	0.1520	0.9704
Arterial/Freeway	59	0.1814	0.7430	0.1513	1.0012
Arterial/Freeway	60	0.1807	0.7651	0.1507	1.0310
Arterial/Freeway	61	0.1807	0.8019	0.1507	1.0806
Arterial/Freeway	62	0.1807	0.8376	0.1507	1.1287
Arterial/Freeway	63	0.1807	0.8721	0.1507	1.1752
Arterial/Freeway	64	0.1807	0.9055	0.1507	1.2203
Arterial/Freeway	65	0.1807	0.9380	0.1507	1.2640
Ramp	34.6	0.2537	0.4702	0.2117	0.6336
Local	12.9	0.5318	0.6409	0.4436	0.8637

ATTACHMENT 5

1990 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	44,991	*10*	6.080	273546.9824	0.3015	34.570	1555348.5496	1.7145
District of Columbia	MTA Commuter buses	2,234	*45*	2.069	4621.9391	0.0051	25.273	56457.3547	0.0622
District of Columbia	Peter Pan / Trailways	178	*55*	1.853	329.8340	0.0004	31.809	5662.0020	0.0062
District of Columbia	Carolina Trailways	18	*55*	1.853	32.9834	0.0000	31.809	566.2002	0.0006
District of Columbia	Capitol Trailways	89	*55*	1.853	164.9170	0.0002	31.809	2831.0010	0.0031
District of Columbia	Martz / Grey Line sightseeing	445	55	1.853	824.5850	0.0009	31.809	14155.0050	0.0156
District of Columbia	New World Tours	89	*20*	4.003	356.2670	0.0004	26.469	2355.7410	0.0026
District of Columbia	Georgetown U. shuttle	89	15	4.879	434.2310	0.0005	29.718	2644.9020	0.0029
District of Columbia	American U. shuttle	74	20	4.003	295.7016	0.0003	26.469	1955.2650	0.0022
District of Columbia	George Washington U shuttle	89	*15*	4.879	434.2310	0.0005	29.718	2644.9020	0.0029
District of Columbia	EPA Shuttle	178	*15*	4.879	868.4620	0.0010	29.718	5289.8040	0.0058
District of Columbia	USDOT Shuttle	178	*15*	4.879	868.4620	0.0010	29.718	5289.8040	0.0058
District of Columbia	Gallaudet Shuttle	89	*15*	4.879	434.2310	0.0005	29.718	2644.9020	0.0029
District of Columbia	Metro Access - paratransit	4,450	15	4.879	21711.5500	0.0239	29.718	132245.1000	0.1458
Maryland	Corridor Transit (CTC)	1,126	18	4.295	4835.5258	0.0053	27.552	31019.4192	0.0342
Maryland	Peter Pan / Trailways	1,602	*55*	1.853	2968.5060	0.0033	31.809	50958.0180	0.0562
Maryland	Carolina Trailways	200	*55*	1.853	371.0633	0.0004	31.809	6369.7523	0.0070
Maryland	Capitol Trailways	356	*55*	1.853	659.6680	0.0007	31.809	11324.0040	0.0125
Maryland	Martz / Grey Line sightseeing	2,003	55	1.853	3710.6325	0.0041	31.809	63697.5225	0.0702
Maryland	New World Tours	89	*20*	4.003	356.2670	0.0004	26.469	2355.7410	0.0026
Montgomery	Metrobus	15,363	*15*	4.879	74956.9552	0.0826	29.718	456562.9832	0.5033
Montgomery	MTA Commuter buses	1,940	*45*	2.069	4014.2738	0.0044	25.273	49034.6746	0.0541
Montgomery	Mont. Co. Ride-On	31,698	15	4.879	154655.7130	0.1705	29.718	942008.2963	1.0384

1990 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	Metrobus	21,947	*15*	4.879	107081.3646	0.1180	29.718	652232.8332	0.7190
Prince George's	MTA Commuter buses	6,088	*45*	2.069	12595.2444	0.0139	25.273	153851.9148	0.1696
Prince George's	PG Co. The Bus	8,653	15	4.879	42220.2801	0.0465	29.718	257163.8215	0.2835
Prince George's	ShuttleUM (U. of MD)	1,659	11	5.753	9543.9969	0.0105	33.247	55155.4431	0.0608
Prince George's	P.G. Co. paratransit	2,670	*15*	4.879	13026.9300	0.0144	29.718	79347.0600	0.0875
Frederick	MTA Commuter buses	329	*45*	2.069	681.3217	0.0008	25.273	8322.3989	0.0092
Frederick	Fredrick Co. TransiT	2,743	12	5.480	15031.5304	0.0166	32.144	88170.3491	0.0972
Charles	MTA Commuter buses	2,038	*45*	2.069	4216.8289	0.0046	25.273	51508.9013	0.0568
Calvert	MTA Commuter buses	961	*45*	2.069	1988.7228	0.0022	25.273	24292.4076	0.0268
Virginia	Metrobus	27,434	*15*	4.879	133851.7058	0.1475	29.718	815291.0415	0.8987
Virginia	Lee Coaches	62	*45*	2.069	128.8987	0.0001	25.273	1574.5079	0.0017
Virginia	Brooks Transit	668	*45*	2.069	1381.0575	0.0015	25.273	16869.7275	0.0186
Virginia	Quicks Commuter Service	1,175	*45*	2.069	2430.6612	0.0027	25.273	29690.7204	0.0327
Virginia	National Coach Works	1,469	*45*	2.069	3038.3265	0.0033	25.273	37113.4005	0.0409
Virginia	Greyhound / Trailways (VA)	4,450	*55*	1.853	8245.8500	0.0091	31.809	141550.0500	0.1560
Virginia	Carolina Trailways	200	*55*	1.853	371.0633	0.0004	31.809	6369.7523	0.0070
Virginia	Martz / Grey Line sightseeing	2,003	55	1.853	3710.6325	0.0041	31.809	63697.5225	0.0702
Virginia	New World Tours	89	*20*	4.003	356.2670	0.0004	26.469	2355.7410	0.0026
Alexandria	Alexandria DASH	3,074	13	5.249	16135.7409	0.0178	31.211	95944.4867	0.1058
Alexandria	Old Town "trolley" buses	267	*20*	4.003	1068.8010	0.0012	26.469	7067.2230	0.0078
Alexandria	Alexandria DOT-paratransit	822	*15*	4.879	4012.2944	0.0044	29.718	24438.8945	0.0269
Arlington	Arlington Co. ART	707	16	4.660	3293.0356	0.0036	28.906	20426.7140	0.0225
Arlington	Crystal City Express	85	*15*	4.879	416.8618	0.0005	29.718	2539.1059	0.0028
Arlington	Skyline Crystal Express	128	*15*	4.879	625.2926	0.0007	29.718	3808.6589	0.0042

1990 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Arlington	Arlington STAR-paratransit	2,888	*15*	4.879	14090.7960	0.0155	29.718	85827.0699	0.0946
Fairfax	Fairfax Connector	16,052	*15*	4.879	78317.9032	0.0863	29.718	477034.5247	0.5258
Fairfax	Washington Flyer Coach Service	1,219	65	1.813	2210.5909	0.0024	46.143	56262.1599	0.0620
Fairfax	Fairfax Co. Fastran- paratransit	10,170	15	4.879	49619.5764	0.0547	29.718	302232.9515	0.3332
Fairfax	City of Fairfax CUE	1,320	15	4.879	6439.6457	0.0071	29.718	39223.8967	0.0432
Fairfax	City of Ffx, City Wheels-paratransit.	89	*15*	4.879	434.2310	0.0005	29.718	2644.9020	0.0029
Fairfax	City of Falls Ch. Fare Wheels-paratransit	89	*15*	4.879	434.2310	0.0005	29.718	2644.9020	0.0029
Prince William	PRTC Omnilink	3,594	*15*	4.879	17534.2478	0.0193	29.718	106801.1428	0.1177
Prince William	PRTC OmniRide	5,073	27	3.144	15949.5120	0.0176	23.953	121513.5690	0.1339
Loudoun	Loudoun Transportation Assc.	4,033	15	4.879	19679.3489	0.0217	29.718	119866.9586	0.1321
Loudoun	Loudoun Commuter Service	1,661	*25*	3.357	5575.1042	0.0061	24.428	40568.5567	0.0447
Loudoun	Loudoun Transit (LCTA)-paratransit	89	*15*	4.879	434.2310	0.0005	29.718	2644.9020	0.0029
TOTAL		243,567			1147625.1076	1.2650		7399469.1554	8.1565

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

1990 SCHOOL BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	11,299	14	2.336	26395.4918	0.0291	16.035	181186.5204	0.1997
Montgomery	89,000	30	1.331	118459.0000	0.1306	12.317	1096213.0000	1.2084
Prince George's	115,671	30	1.331	153957.6085	0.1697	12.317	1424715.1497	1.5705
Frederick	22,774	30	1.331	30312.4735	0.0334	12.317	280509.9446	0.3092
Charles	18,513	30	1.331	24640.6566	0.0272	12.317	228023.2661	0.2514
Calvert	22,831	30	1.331	30388.2873	0.0335	12.317	281211.5209	0.3100
Alexandria	1,805	25	1.552	2801.2358	0.0031	12.881	23249.1745	0.0256
Arlington	2,314	25	1.552	3591.3280	0.0040	12.881	29806.6340	0.0329
Fairfax	85,906	30	1.331	114341.3652	0.1260	12.317	1058108.6361	1.1664
Prince William	32,141	30	1.331	42780.2833	0.0472	12.317	395886.3628	0.4364
Loudoun	25,229	30	1.331	33579.5727	0.0370	12.317	310743.4991	0.3425
Stafford	8,553	30	1.331	11383.9099	0.0125	12.317	105346.0693	0.1161
TOTAL	436,037			592631.2126	0.6533		5414999.7776	5.9690

1996 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	44,991	*10*	3.565	160393.9132	0.1768	27.205	1223987.7724	1.3492
District of Columbia	MTA Commuter buses	2,234	*45*	1.213	2709.7207	0.0030	19.889	44430.0371	0.0490
District of Columbia	Peter Pan / Trailways	178	*55*	1.087	193.4860	0.0002	25.032	4455.6960	0.0049
District of Columbia	Carolina Trailways	18	*55*	1.087	19.3486	0.0000	25.032	445.5696	0.0005
District of Columbia	Capitol Trailways	89	*55*	1.087	96.7430	0.0001	25.032	2227.8480	0.0025
District of Columbia	Martz / Grey Line sightseeing	445	55	1.087	483.7150	0.0005	25.032	11139.2400	0.0123
District of Columbia	New World Tours	89	*20*	2.347	208.8830	0.0002	20.830	1853.8700	0.0020
District of Columbia	Georgetown U. shuttle	89	15	2.861	254.6290	0.0003	23.386	2081.3540	0.0023
District of Columbia	American U. shuttle	74	20	2.347	173.3729	0.0002	20.830	1538.7121	0.0017
District of Columbia	George Washington U shuttle	89	*15*	2.861	254.6290	0.0003	23.386	2081.3540	0.0023
District of Columbia	EPA Shuttle	178	*15*	2.861	509.2580	0.0006	23.386	4162.7080	0.0046
District of Columbia	USDOT Shuttle	178	*15*	2.861	509.2580	0.0006	23.386	4162.7080	0.0046
District of Columbia	Gallaudet Shuttle	89	*15*	2.861	254.6290	0.0003	23.386	2081.3540	0.0023
District of Columbia	Metro Access - paratransit	4,450	15	2.861	12731.4500	0.0140	23.386	104067.7000	0.1147
Maryland	Corridor Transit (CTC)	1,126	18	2.519	2836.0162	0.0031	21.682	24410.6797	0.0269
Maryland	Peter Pan / Trailways	1,602	*55*	1.087	1741.3740	0.0019	25.032	40101.2640	0.0442
Maryland	Carolina Trailways	200	*55*	1.087	217.6718	0.0002	25.032	5012.6580	0.0055
Maryland	Capitol Trailways	356	*55*	1.087	386.9720	0.0004	25.032	8911.3920	0.0098
Maryland	Martz / Grey Line sightseeing	2,003	55	1.087	2176.7175	0.0024	25.032	50126.5800	0.0553
Maryland	New World Tours	89	*20*	2.347	208.8830	0.0002	20.830	1853.8700	0.0020
Montgomery	Metrobus	15,363	*15*	2.861	43954.0580	0.0485	23.386	359283.3275	0.3960
Montgomery	MTA Commuter buses	1,940	*45*	1.213	2353.4626	0.0026	19.889	38588.6378	0.0425
Montgomery	Mont. Co. Ride-On	31,698	15	2.861	90688.6646	0.1000	23.386	741295.0406	0.8171
Prince George's	Metrobus	21,947	*15*	2.861	62791.5114	0.0692	23.386	513261.8964	0.5658

1996 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	MTA Commuter buses	6,088	*45*	1.213	7384.2588	0.0081	19.889	121076.2764	0.1335
Prince George's	PG Co. The Bus	8,653	15	2.861	24757.5777	0.0273	23.386	202370.0494	0.2231
Prince George's	ShuttleUM (U. of MD)	1,659	11	3.373	5595.6721	0.0062	26.163	43403.3705	0.0478
Prince George's	P.G. Co. paratransit	2,670	*15*	2.861	7638.8700	0.0084	23.386	62440.6200	0.0688
Frederick	MTA Commuter buses	329	*45*	1.213	399.4409	0.0004	19.889	6549.4477	0.0072
Frederick	Fredrick Co. TransiT	2,743	12	3.213	8813.1947	0.0097	25.296	69386.4221	0.0765
Charles	MTA Commuter buses	2,038	*45*	1.213	2472.2153	0.0027	19.889	40535.7709	0.0447
Calvert	MTA Commuter buses	961	*45*	1.213	1165.9356	0.0013	19.889	19117.3068	0.0211
Virginia	Metrobus	27,434	*15*	2.861	78489.3893	0.0865	23.386	641577.3705	0.7072
Virginia	Lee Coaches	62	*45*	1.213	75.5699	0.0001	19.889	1239.0847	0.0014
Virginia	Brooks Transit	668	*45*	1.213	809.6775	0.0009	19.889	13275.9075	0.0146
Virginia	Quicks Commuter Service	1,175	*45*	1.213	1425.0324	0.0016	19.889	23365.5972	0.0258
Virginia	National Coach Works	1,469	*45*	1.213	1781.2905	0.0020	19.889	29206.9965	0.0322
Virginia	Greyhound / Trailways (VA)	4,450	*55*	1.087	4837.1500	0.0053	25.032	111392.4000	0.1228
Virginia	Carolina Trailways	200	*55*	1.087	217.6718	0.0002	25.032	5012.6580	0.0055
Virginia	Martz / Grey Line sightseeing	2,003	55	1.087	2176.7175	0.0024	25.032	50126.5800	0.0553
Virginia	New World Tours	89	*20*	2.347	208.8830	0.0002	20.830	1853.8700	0.0020
Alexandria	Alexandria DASH	3,074	13	3.078	9461.9567	0.0104	24.561	75501.9877	0.0832
Alexandria	Old Town "trolley" buses	267	*20*	2.347	626.6490	0.0007	20.830	5561.6100	0.0061
Alexandria	Alexandria DOT-paratransit	822	*15*	2.861	2352.7720	0.0026	23.386	19231.7110	0.0212
Arlington	Arlington Co. ART	707	16	2.733	1931.3018	0.0021	22.747	16074.3950	0.0177
Arlington	Crystal City Express	85	*15*	2.861	244.4438	0.0003	23.386	1998.0998	0.0022
Arlington	Skyline Crystal Express	128	*15*	2.861	366.6658	0.0004	23.386	2997.1498	0.0033
Arlington	Arlington STAR-paratransit	2,888	*15*	2.861	8262.7111	0.0091	23.386	67539.9373	0.0745

1996 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Fairfax	Fairfax Connector	16,052	*15*	2.861	45924.8864	0.0506	23.386	375393.0074	0.4138
Fairfax	Washington Flyer Coach Service	1,219	65	1.063	1296.1159	0.0014	36.312	44275.2216	0.0488
Fairfax	Fairfax Co. Fastran- paratransit	10,170	15	2.861	29096.4558	0.0321	23.386	237836.3216	0.2622
Fairfax	City of Fairfax CUE	1,320	15	2.861	3776.1481	0.0042	23.386	30866.4798	0.0340
Fairfax	City of Ffx, City Wheels-paratransit.	89	*15*	2.861	254.6290	0.0003	23.386	2081.3540	0.0023
Fairfax	City of Falls Ch. Fare Wheels-paratransit	89	*15*	2.861	254.6290	0.0003	23.386	2081.3540	0.0023
Prince William	PRTC Omnilink	3,594	*15*	2.861	10281.9190	0.0113	23.386	84045.0745	0.0926
Prince William	PRTC OmniRide	5,073	27	1.844	9354.6120	0.0103	18.850	95626.0500	0.1054
Loudoun	Loudoun Transportation Assc.	4,033	15	2.861	11539.7863	0.0127	23.386	94326.9633	0.1040
Loudoun	Loudoun Commuter Service	1,661	*25*	1.968	3268.3363	0.0036	19.224	31926.0658	0.0352
Loudoun	Loudoun Transit (LCTA)-paratransit	89	*15*	2.861	254.6290	0.0003	23.386	2081.3540	0.0023
TOTAL		243,567			672945.5602	0.7418		5822935.1339	6.4187

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

1996 SCHOOL BUS CHARACTERISTICS / EMISSIONS (1990 Adjusted)

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	11,299	14	1.794	20271.1954	0.0223	15.356	173514.2006	0.1913
Montgomery	89,000	30	1.022	90958.0000	0.1003	11.795	1049755.0000	1.1572
Prince George's	115,671	30	1.022	118215.3839	0.1303	11.795	1364335.0809	1.5039
Frederick	22,774	30	1.022	23275.2426	0.0257	11.795	268621.8070	0.2961
Charles	18,513	30	1.022	18920.1736	0.0209	11.795	218359.5376	0.2407
Calvert	22,831	30	1.022	23333.4557	0.0257	11.795	269293.6502	0.2968
Alexandria	1,805	25	1.193	2153.2696	0.0024	12.335	22263.6882	0.0245
Arlington	2,314	25	1.193	2760.6020	0.0030	12.335	28543.1900	0.0315
Fairfax	85,906	30	1.022	87796.2999	0.0968	11.795	1013265.5162	1.1169
Prince William	32,141	30	1.022	32848.5721	0.0362	11.795	379108.5207	0.4179
Loudoun	25,229	30	1.022	25783.8643	0.0284	11.795	297574.0499	0.3280
Stafford	8,553	30	1.022	8741.0638	0.0096	11.795	100881.4555	0.1112
TOTAL	436,037			455057.1228	0.5016		5185515.6966	5.7161

1999 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	44,991	*10*	3.038	136683.5086	0.1507	25.780	1159875.1984	1.2785
District of Columbia	MTA Commuter buses	2,234	*45*	1.034	2309.8526	0.0025	18.847	42102.3133	0.0464
District of Columbia	Peter Pan / Trailways	178	*55*	0.926	164.8280	0.0002	23.721	4222.3380	0.0047
District of Columbia	Carolina Trailways	18	*55*	0.926	16.4828	0.0000	23.721	422.2338	0.0005
District of Columbia	Capitol Trailways	89	*55*	0.926	82.4140	0.0001	23.721	2111.1690	0.0023
District of Columbia	Martz / Grey Line sightseeing	445	55	0.926	412.0700	0.0005	23.721	10555.8450	0.0116
District of Columbia	New World Tours	89	*20*	2.000	178.0000	0.0002	19.739	1756.7710	0.0019
District of Columbia	Georgetown U. shuttle	89	15	2.438	216.9820	0.0002	22.161	1972.3290	0.0022
District of Columbia	American U. shuttle	74	20	2.000	147.7400	0.0002	19.739	1458.1199	0.0016
District of Columbia	George Washington U shuttle	89	*15*	2.438	216.9820	0.0002	22.161	1972.3290	0.0022
District of Columbia	EPA Shuttle	178	*15*	2.438	433.9640	0.0005	22.161	3944.6580	0.0043
District of Columbia	USDOT Shuttle	178	*15*	2.438	433.9640	0.0005	22.161	3944.6580	0.0043
District of Columbia	Gallaudet Shuttle	89	*15*	2.438	216.9820	0.0002	22.161	1972.3290	0.0022
District of Columbia	Metro Access - paratransit	4,450	15	2.438	10849.1000	0.0120	22.161	98616.4500	0.1087
Maryland	Corridor Transit (CTC)	1,126	18	2.146	2416.0741	0.0027	20.546	23131.7141	0.0255
Maryland	Peter Pan / Trailways	1,602	*55*	0.926	1483.4520	0.0016	23.721	38001.0420	0.0419
Maryland	Carolina Trailways	200	*55*	0.926	185.4315	0.0002	23.721	4750.1303	0.0052
Maryland	Capitol Trailways	356	*55*	0.926	329.6560	0.0004	23.721	8444.6760	0.0093
Maryland	Martz / Grey Line sightseeing	2,003	55	0.926	1854.3150	0.0020	23.721	47501.3025	0.0524
Maryland	New World Tours	89	*20*	2.000	178.0000	0.0002	19.739	1756.7710	0.0019
Montgomery	Metrobus	15,363	*15*	2.438	37455.4328	0.0413	22.161	340463.4320	0.3753
Montgomery	MTA Commuter buses	1,940	*45*	1.034	2006.1668	0.0022	18.847	36566.9494	0.0403
Montgomery	Mont. Co. Ride-On	31,698	15	2.438	77280.3091	0.0852	22.161	702464.6966	0.7743
Prince George's	Metrobus	21,947	*15*	2.438	53507.7612	0.0590	22.161	486376.3314	0.5361

1999 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	MTA Commuter buses	6,088	*45*	1.034	6294.5784	0.0069	18.847	114732.9972	0.1265
Prince George's	PG Co. The Bus	8,653	15	2.438	21097.1599	0.0233	22.161	191769.5487	0.2114
Prince George's	ShuttleUM (U. of MD)	1,659	11	2.874	4767.8510	0.0053	24.793	41130.5953	0.0453
Prince George's	P.G. Co. paratransit	2,670	*15*	2.438	6509.4600	0.0072	22.161	59169.8700	0.0652
Frederick	MTA Commuter buses	329	*45*	1.034	340.4962	0.0004	18.847	6206.3171	0.0068
Frederick	Fredrick Co. TransiT	2,743	12	2.738	7510.2792	0.0083	23.970	65749.2306	0.0725
Charles	MTA Commuter buses	2,038	*45*	1.034	2107.3954	0.0023	18.847	38412.0707	0.0423
Calvert	MTA Commuter buses	961	*45*	1.034	993.8808	0.0011	18.847	18115.7364	0.0200
Virginia	Metrobus	27,434	*15*	2.438	66884.7015	0.0737	22.161	607970.4143	0.6702
Virginia	Lee Coaches	62	*45*	1.034	64.4182	0.0001	18.847	1174.1681	0.0013
Virginia	Brooks Transit	668	*45*	1.034	690.1950	0.0008	18.847	12580.3725	0.0139
Virginia	Quicks Commuter Service	1,175	*45*	1.034	1214.7432	0.0013	18.847	22141.4556	0.0244
Virginia	National Coach Works	1,469	*45*	1.034	1518.4290	0.0017	18.847	27676.8195	0.0305
Virginia	Greyhound / Trailways (VA)	4,450	*55*	0.926	4120.7000	0.0045	23.721	105558.4500	0.1164
Virginia	Carolina Trailways	200	*55*	0.926	185.4315	0.0002	23.721	4750.1303	0.0052
Virginia	Martz / Grey Line sightseeing	2,003	55	0.926	1854.3150	0.0020	23.721	47501.3025	0.0524
Virginia	New World Tours	89	*20*	2.000	178.0000	0.0002	19.739	1756.7710	0.0019
Alexandria	Alexandria DASH	3,074	13	2.623	8063.2594	0.0089	23.275	71548.7465	0.0789
Alexandria	Old Town "trolley" buses	267	*20*	2.000	534.0000	0.0006	19.739	5270.3130	0.0058
Alexandria	Alexandria DOT-paratransit	822	*15*	2.438	2004.9137	0.0022	22.161	18224.3200	0.0201
Arlington	Arlington Co. ART	707	16	2.328	1645.1045	0.0018	21.556	15232.7630	0.0168
Arlington	Crystal City Express	85	*15*	2.438	208.3027	0.0002	22.161	1893.4358	0.0021
Arlington	Skyline Crystal Express	128	*15*	2.438	312.4541	0.0003	22.161	2840.1538	0.0031
Arlington	Arlington STAR-paratransit	2,888	*15*	2.438	7041.0659	0.0078	22.161	64002.0761	0.0706

1999 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Fairfax	Fairfax Connector	16,052	*15*	2.438	39134.8735	0.0431	22.161	355729.2584	0.3921
Fairfax	Washington Flyer Coach Service	1,219	65	0.906	1104.6858	0.0012	34.410	41956.1130	0.0462
Fairfax	Fairfax Co. Fastran- paratransit	10,170	15	2.438	24794.5331	0.0273	22.161	225378.0348	0.2484
Fairfax	City of Fairfax CUE	1,320	15	2.438	3217.8431	0.0035	22.161	29249.6391	0.0322
Fairfax	City of Ffx, City Wheels- paratransit.	89	*15*	2.438	216.9820	0.0002	22.161	1972.3290	0.0022
Fairfax	City of Falls Ch. Fare Wheels- paratransit	89	*15*	2.438	216.9820	0.0002	22.161	1972.3290	0.0022
Prince William	PRTC Omnilink	3,594	*15*	2.438	8761.7332	0.0097	22.161	79642.6450	0.0878
Prince William	PRTC OmniRide	5,073	27	1.571	7969.6830	0.0088	17.862	90613.9260	0.0999
Loudoun	Loudoun Transportation Assc.	4,033	15	2.438	9833.6242	0.0108	22.161	89385.9503	0.0985
Loudoun	Loudoun Commuter Service	1,661	*25*	1.677	2785.0610	0.0031	18.217	30253.7006	0.0333
Loudoun	Loudoun Transit (LCTA)- paratransit	89	*15*	2.438	216.9820	0.0002	22.161	1972.3290	0.0022
TOTAL		243,567			573453.5861	0.6321		5517918.0986	6.0825

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

1999 SCHOOL BUS CHARACTERISTICS / EMISSIONS (1990 Adjusted)

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	11,299	14	1.643	18564.9799	0.0205	15.280	172655.4432	0.1903
Montgomery	89,000	30	0.936	83304.0000	0.0918	11.737	1044593.0000	1.1515
Prince George's	115,671	30	0.936	108267.7097	0.1193	11.737	1357626.1843	1.4965
Frederick	22,774	30	0.936	21316.6606	0.0235	11.737	267300.9028	0.2946
Charles	18,513	30	0.936	17328.0650	0.0191	11.737	217285.7899	0.2395
Calvert	22,831	30	0.936	21369.9751	0.0236	11.737	267969.4423	0.2954
Alexandria	1,805	25	1.092	1970.9726	0.0022	12.274	22153.5881	0.0244
Arlington	2,314	25	1.092	2526.8880	0.0028	12.274	28402.0360	0.0313
Fairfax	85,906	30	0.936	80408.3530	0.0886	11.737	1008282.9473	1.1114
Prince William	32,141	30	0.936	30084.4066	0.0332	11.737	377244.3160	0.4158
Loudoun	25,229	30	0.936	23614.1849	0.0260	11.737	296110.7777	0.3264
Stafford	8,553	30	0.936	8005.5144	0.0088	11.737	100385.3873	0.1107
TOTAL	436,037			416761.7098	0.4594		5160009.8149	5.6879

2002 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	44,991	*10*	2.452	110318.6186	0.1216	24.675	1110159.8340	1.2237
District of Columbia	MTA Commuter buses	2,234	*45*	0.834	1863.0726	0.0021	18.030	40277.2170	0.0444
District of Columbia	Peter Pan / Trailways	178	*55*	0.747	132.9660	0.0001	22.701	4040.7780	0.0045
District of Columbia	Carolina Trailways	18	*55*	0.747	13.2966	0.0000	22.701	404.0778	0.0004
District of Columbia	Capitol Trailways	89	*55*	0.747	66.4830	0.0001	22.701	2020.3890	0.0022
District of Columbia	Martz / Grey Line sightseeing	445	55	0.747	332.4150	0.0004	22.701	10101.9450	0.0111
District of Columbia	New World Tours	89	*20*	1.614	143.6460	0.0002	18.885	1680.7650	0.0019
District of Columbia	Georgetown U. shuttle	89	15	1.968	175.1520	0.0002	21.207	1887.4230	0.0021
District of Columbia	American U. shuttle	74	20	1.614	119.2262	0.0001	18.885	1395.0350	0.0015
District of Columbia	George Washington U shuttle	89	*15*	1.968	175.1520	0.0002	21.207	1887.4230	0.0021
District of Columbia	EPA Shuttle	178	*15*	1.968	350.3040	0.0004	21.207	3774.8460	0.0042
District of Columbia	USDOT Shuttle	178	*15*	1.968	350.3040	0.0004	21.207	3774.8460	0.0042
District of Columbia	Gallaudet Shuttle	89	*15*	1.968	175.1520	0.0002	21.207	1887.4230	0.0021
District of Columbia	Metro Access - paratransit	4,450	15	1.968	8757.6000	0.0097	21.207	94371.1500	0.1040
Maryland	Corridor Transit (CTC)	1,126	18	1.732	1949.9722	0.0021	19.659	22133.0852	0.0244
Maryland	Peter Pan / Trailways	1,602	*55*	0.747	1196.6940	0.0013	22.701	36367.0020	0.0401
Maryland	Carolina Trailways	200	*55*	0.747	149.5868	0.0002	22.701	4545.8753	0.0050
Maryland	Capitol Trailways	356	*55*	0.747	265.9320	0.0003	22.701	8081.5560	0.0089
Maryland	Martz / Grey Line sightseeing	2,003	55	0.747	1495.8675	0.0016	22.701	45458.7525	0.0501
Maryland	New World Tours	89	*20*	1.614	143.6460	0.0002	18.885	1680.7650	0.0019
Montgomery	Metrobus	15,363	*15*	1.968	30234.7382	0.0333	21.207	325806.9583	0.3591
Montgomery	MTA Commuter buses	1,940	*45*	0.834	1618.1268	0.0018	18.030	34981.8060	0.0386
Montgomery	Mont. Co. Ride-On	31,698	15	1.968	62382.1363	0.0688	21.207	672224.5757	0.7410
Prince George's	Metrobus	21,947	*15*	1.968	43192.4832	0.0476	21.207	465438.5118	0.5131

2002 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	MTA Commuter buses	6,088	*45*	0.834	5077.0584	0.0056	18.030	109759.4280	0.1210
Prince George's	PG Co. The Bus	8,653	15	1.968	17030.0290	0.0188	21.207	183514.1383	0.2023
Prince George's	ShuttleUM (U. of MD)	1,659	11	2.320	3848.7872	0.0042	23.729	39365.4618	0.0434
Prince George's	P.G. Co. paratransit	2,670	*15*	1.968	5254.5600	0.0058	21.207	56622.6900	0.0624
Frederick	MTA Commuter buses	329	*45*	0.834	274.6362	0.0003	18.030	5937.2790	0.0065
Frederick	Fredrick Co. TransiT	2,743	12	2.210	6061.9858	0.0067	22.941	62926.7042	0.0694
Charles	MTA Commuter buses	2,038	*45*	0.834	1699.7754	0.0019	18.030	36746.9430	0.0405
Calvert	MTA Commuter buses	961	*45*	0.834	801.6408	0.0009	18.030	17330.4360	0.0191
Virginia	Metrobus	27,434	*15*	1.968	53990.6040	0.0595	21.207	581798.1398	0.6413
Virginia	Lee Coaches	62	*45*	0.834	51.9582	0.0001	18.030	1123.2690	0.0012
Virginia	Brooks Transit	668	*45*	0.834	556.6950	0.0006	18.030	12035.0250	0.0133
Virginia	Quicks Commuter Service	1,175	*45*	0.834	979.7832	0.0011	18.030	21181.6440	0.0233
Virginia	National Coach Works	1,469	*45*	0.834	1224.7290	0.0014	18.030	26477.0550	0.0292
Virginia	Greyhound / Trailways (VA)	4,450	*55*	0.747	3324.1500	0.0037	22.701	101019.4500	0.1114
Virginia	Carolina Trailways	200	*55*	0.747	149.5868	0.0002	22.701	4545.8753	0.0050
Virginia	Martz / Grey Line sightseeing	2,003	55	0.747	1495.8675	0.0016	22.701	45458.7525	0.0501
Virginia	New World Tours	89	*20*	1.614	143.6460	0.0002	18.885	1680.7650	0.0019
Alexandria	Alexandria DASH	3,074	13	2.117	6507.7850	0.0072	22.274	68471.6124	0.0755
Alexandria	Old Town "trolley" buses	267	*20*	1.614	430.9380	0.0005	18.885	5042.2950	0.0056
Alexandria	Alexandria DOT-paratransit	822	*15*	1.968	1618.4045	0.0018	21.207	17439.7885	0.0192
Arlington	Arlington Co. ART	707	16	1.879	1327.8141	0.0015	20.626	14575.5692	0.0161
Arlington	Crystal City Express	85	*15*	1.968	168.1459	0.0002	21.207	1811.9261	0.0020
Arlington	Skyline Crystal Express	128	*15*	1.968	252.2189	0.0003	21.207	2717.8891	0.0030
Arlington	Arlington STAR-paratransit	2,888	*15*	1.968	5683.6824	0.0063	21.207	61246.8764	0.0675

2002 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Fairfax	Fairfax Connector	16,052	*15*	1.968	31590.4147	0.0348	21.207	340415.6123	0.3752
Fairfax	Washington Flyer Coach Service	1,219	65	0.731	891.3083	0.0010	32.947	40172.2771	0.0443
Fairfax	Fairfax Co. Fastran- paratransit	10,170	15	1.968	20014.6190	0.0221	21.207	215675.8262	0.2377
Fairfax	City of Fairfax CUE	1,320	15	1.968	2597.5042	0.0029	21.207	27990.4831	0.0309
Fairfax	City of Ffx, City Wheels- paratransit.	89	*15*	1.968	175.1520	0.0002	21.207	1887.4230	0.0021
Fairfax	City of Falls Ch. Fare Wheels- paratransit	89	*15*	1.968	175.1520	0.0002	21.207	1887.4230	0.0021
Prince William	PRTC Omnilink	3,594	*15*	1.968	7072.6378	0.0078	21.207	76214.1407	0.0840
Prince William	PRTC OmniRide	5,073	27	1.268	6432.5640	0.0071	17.086	86677.2780	0.0955
Loudoun	Loudoun Transportation Assc.	4,033	15	1.968	7937.8886	0.0088	21.207	85538.0104	0.0943
Loudoun	Loudoun Commuter Service	1,661	*25*	1.354	2248.6420	0.0025	17.426	28940.0552	0.0319
Loudoun	Loudoun Transit (LCTA)- paratransit	89	*15*	1.968	175.1520	0.0002	21.207	1887.4230	0.0021
TOTAL		243,567			462868.0868	0.5102		5280497.0039	5.8207

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

2002 SCHOOL BUS CHARACTERISTICS / EMISSIONS (1990 Adjusted)

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	11,299	14	1.529	17276.8438	0.0190	15.192	171661.0925	0.1892
Montgomery	89,000	30	0.871	77519.0000	0.0855	11.662	1037918.0000	1.1441
Prince George's	115,671	30	0.871	100749.1187	0.1111	11.662	1348950.8871	1.4870
Frederick	22,774	30	0.871	19836.3369	0.0219	11.662	265592.8370	0.2928
Charles	18,513	30	0.871	16124.7272	0.0178	11.662	215897.3232	0.2380
Calvert	22,831	30	0.871	19885.9491	0.0219	11.662	266257.1045	0.2935
Alexandria	1,805	25	1.016	1833.7987	0.0020	12.197	22014.6092	0.0243
Arlington	2,314	25	1.016	2351.0240	0.0026	12.197	28223.8580	0.0311
Fairfax	85,906	30	0.871	74824.4396	0.0825	11.662	1001839.9703	1.1043
Prince William	32,141	30	0.871	27995.2117	0.0309	11.662	374833.7065	0.4132
Loudoun	25,229	30	0.871	21974.3109	0.0242	11.662	294218.6155	0.3243
Stafford	8,553	30	0.871	7449.5759	0.0082	11.662	99743.9198	0.1099
TOTAL	436,037			387820.3364	0.4275		5127151.9236	5.6517

2005 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	44,991	*10*	2.113	95066.5746	0.1048	22.813	1026386.0706	1.1314
District of Columbia	MTA Commuter buses	2,234	*45*	0.719	1606.1741	0.0018	16.544	36957.6416	0.0407
District of Columbia	Peter Pan / Trailways	178	*55*	0.644	114.6320	0.0001	20.951	3729.2780	0.0041
District of Columbia	Carolina Trailways	18	*55*	0.644	11.4632	0.0000	20.951	372.9278	0.0004
District of Columbia	Capitol Trailways	89	*55*	0.644	57.3160	0.0001	20.951	1864.6390	0.0021
District of Columbia	Martz / Grey Line sightseeing	445	55	0.644	286.5800	0.0003	20.951	9323.1950	0.0103
District of Columbia	New World Tours	89	*20*	1.391	123.7990	0.0001	17.350	1544.1500	0.0017
District of Columbia	Georgetown U. shuttle	89	15	1.696	150.9440	0.0002	19.541	1739.1490	0.0019
District of Columbia	American U. shuttle	74	20	1.391	102.7532	0.0001	17.350	1281.6445	0.0014
District of Columbia	George Washington U shuttle	89	*15*	1.696	150.9440	0.0002	19.541	1739.1490	0.0019
District of Columbia	EPA Shuttle	178	*15*	1.696	301.8880	0.0003	19.541	3478.2980	0.0038
District of Columbia	USDOT Shuttle	178	*15*	1.696	301.8880	0.0003	19.541	3478.2980	0.0038
District of Columbia	Gallaudet Shuttle	89	*15*	1.696	150.9440	0.0002	19.541	1739.1490	0.0019
District of Columbia	Metro Access - paratransit	4,450	15	1.696	7547.2000	0.0083	19.541	86957.4500	0.0959
Maryland	Corridor Transit (CTC)	1,126	18	1.493	1680.8941	0.0019	18.081	20356.4939	0.0224
Maryland	Peter Pan / Trailways	1,602	*55*	0.644	1031.6880	0.0011	20.951	33563.5020	0.0370
Maryland	Carolina Trailways	200	*55*	0.644	128.9610	0.0001	20.951	4195.4378	0.0046
Maryland	Capitol Trailways	356	*55*	0.644	229.2640	0.0003	20.951	7458.5560	0.0082
Maryland	Martz / Grey Line sightseeing	2,003	55	0.644	1289.6100	0.0014	20.951	41954.3775	0.0462
Maryland	New World Tours	89	*20*	1.391	123.7990	0.0001	17.350	1544.1500	0.0017
Montgomery	Metrobus	15,363	*15*	1.696	26055.9533	0.0287	19.541	300211.9004	0.3309
Montgomery	MTA Commuter buses	1,940	*45*	0.719	1395.0038	0.0015	16.544	32098.6688	0.0354
Montgomery	Mont. Co. Ride-On	31,698	15	1.696	53760.2150	0.0593	19.541	619415.3078	0.6828
Prince George's	Metrobus	21,947	*15*	1.696	37222.7904	0.0410	19.541	428874.1434	0.4728

2005 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	MTA Commuter buses	6,088	*45*	0.719	4376.9844	0.0048	16.544	100713.2544	0.1110
Prince George's	PG Co. The Bus	8,653	15	1.696	14676.2851	0.0162	19.541	169097.4573	0.1864
Prince George's	ShuttleUM (U. of MD)	1,659	11	1.999	3316.2610	0.0037	21.921	36366.0622	0.0401
Prince George's	P.G. Co. paratransit	2,670	*15*	1.696	4528.3200	0.0050	19.541	52174.4700	0.0575
Frederick	MTA Commuter buses	329	*45*	0.719	236.7667	0.0003	16.544	5447.9392	0.0060
Frederick	Fredrick Co. TransiT	2,743	12	1.904	5222.6339	0.0058	21.177	58088.0875	0.0640
Charles	MTA Commuter buses	2,038	*45*	0.719	1465.3939	0.0016	16.544	33718.3264	0.0372
Calvert	MTA Commuter buses	961	*45*	0.719	691.1028	0.0008	16.544	15902.0928	0.0175
Virginia	Metrobus	27,434	*15*	1.696	46528.4880	0.0513	19.541	536092.6793	0.5909
Virginia	Lee Coaches	62	*45*	0.719	44.7937	0.0000	16.544	1030.6912	0.0011
Virginia	Brooks Transit	668	*45*	0.719	479.9325	0.0005	16.544	11043.1200	0.0122
Virginia	Quicks Commuter Service	1,175	*45*	0.719	844.6812	0.0009	16.544	19435.8912	0.0214
Virginia	National Coach Works	1,469	*45*	0.719	1055.8515	0.0012	16.544	24294.8640	0.0268
Virginia	Greyhound / Trailways (VA)	4,450	*55*	0.644	2865.8000	0.0032	20.951	93231.9500	0.1028
Virginia	Carolina Trailways	200	*55*	0.644	128.9610	0.0001	20.951	4195.4378	0.0046
Virginia	Martz / Grey Line sightseeing	2,003	55	0.644	1289.6100	0.0014	20.951	41954.3775	0.0462
Virginia	New World Tours	89	*20*	1.391	123.7990	0.0001	17.350	1544.1500	0.0017
Alexandria	Alexandria DASH	3,074	13	1.824	5607.0854	0.0062	20.548	63165.7849	0.0696
Alexandria	Old Town "trolley" buses	267	*20*	1.391	371.3970	0.0004	17.350	4632.4500	0.0051
Alexandria	Alexandria DOT-paratransit	822	*15*	1.696	1394.7226	0.0015	19.541	16069.7368	0.0177
Arlington	Arlington Co. ART	707	16	1.620	1144.7892	0.0013	18.993	13421.5934	0.0148
Arlington	Crystal City Express	85	*15*	1.696	144.9062	0.0002	19.541	1669.5830	0.0018
Arlington	Skyline Crystal Express	128	*15*	1.696	217.3594	0.0002	19.541	2504.3746	0.0028
Arlington	Arlington STAR-paratransit	2,888	*15*	1.696	4898.1328	0.0054	19.541	56435.3851	0.0622

2005 TRANSIT BUS CHARACTERISTICS / EMISSIONS
(1990 Adjusted)

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Fairfax	Fairfax Connector	16,052	*15*	1.696	27224.2598	0.0300	19.541	313672.9136	0.3458
Fairfax	Washington Flyer Coach Service	1,219	65	0.630	768.1590	0.0008	30.618	37332.5274	0.0412
Fairfax	Fairfax Co. Fastran- paratransit	10,170	15	1.696	17248.3709	0.0190	19.541	198732.5562	0.2191
Fairfax	City of Fairfax CUE	1,320	15	1.696	2238.4995	0.0025	19.541	25791.5797	0.0284
Fairfax	City of Ffx, City Wheels- paratransit.	89	*15*	1.696	150.9440	0.0002	19.541	1739.1490	0.0019
Fairfax	City of Falls Ch. Fare Wheels- paratransit	89	*15*	1.696	150.9440	0.0002	19.541	1739.1490	0.0019
Prince William	PRTC Omnilink	3,594	*15*	1.696	6095.1187	0.0067	19.541	70226.8366	0.0774
Prince William	PRTC OmniRide	5,073	27	1.093	5544.7890	0.0061	15.653	79407.6690	0.0875
Loudoun	Loudoun Transportation Assc.	4,033	15	1.696	6840.7821	0.0075	19.541	78818.2327	0.0869
Loudoun	Loudoun Commuter Service	1,661	*25*	1.167	1938.0836	0.0021	15.974	26528.6608	0.0292
Loudoun	Loudoun Transit (LCTA)- paratransit	89	*15*	1.696	150.9440	0.0002	19.541	1739.1490	0.0019
TOTAL		243,567			398896.2307	0.4397		4868221.7583	5.3663

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

2005 SCHOOL BUS CHARACTERISTICS / EMISSIONS (1990 Adjusted)

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	11,299	14	1.437	16237.2953	0.0179	14.526	164135.6654	0.1809
Montgomery	89,000	30	0.819	72891.0000	0.0803	11.091	987099.0000	1.0881
Prince George's	115,671	30	0.819	94734.2460	0.1044	11.091	1282902.9573	1.4142
Frederick	22,774	30	0.819	18652.0780	0.0206	11.091	252588.7631	0.2784
Charles	18,513	30	0.819	15162.0569	0.0167	11.091	205326.4630	0.2263
Calvert	22,831	30	0.819	18698.7282	0.0206	11.091	253220.5065	0.2791
Alexandria	1,805	25	0.955	1723.6986	0.0019	11.612	20958.7310	0.0231
Arlington	2,314	25	0.955	2209.8700	0.0024	11.612	26870.1680	0.0296
Fairfax	85,906	30	0.819	70357.3088	0.0776	11.091	952787.4388	1.0503
Prince William	32,141	30	0.819	26323.8557	0.0290	11.091	356480.9329	0.3930
Loudoun	25,229	30	0.819	20662.4118	0.0228	11.091	279812.9535	0.3084
Stafford	8,553	30	0.819	7004.8251	0.0077	11.091	94860.2139	0.1046
TOTAL	436,037			364657.3744	0.4020		4877043.7934	5.3760

2005 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	50,552	*10*	1.1593	58604.9336	0.0646	21.0028	1061733.5456	1.1704
District of Columbia	MTA Commuter buses	2,510	*45*	0.3945	990.1950	0.0011	15.2198	38201.6980	0.0421
District of Columbia	Peter Pan / Trailways	200	*55*	0.3534	70.6800	0.0001	19.2851	3857.0200	0.0043
District of Columbia	Carolina Trailways	20	*55*	0.3534	7.0680	0.0000	19.2851	385.7020	0.0004
District of Columbia	Capitol Trailways	100	*55*	0.3534	35.3400	0.0000	19.2851	1928.5100	0.0021
District of Columbia	Martz / Grey Line sightseeing	500	55	0.3534	176.7000	0.0002	19.2851	9642.5500	0.0106
District of Columbia	New World Tours	100	*20*	0.7632	76.3200	0.0001	15.9640	1596.4000	0.0018
District of Columbia	Georgetown U. shuttle	100	15	0.9303	93.0300	0.0001	17.9844	1798.4400	0.0020
District of Columbia	American U. shuttle	83	20	0.7632	63.3456	0.0001	15.9640	1325.0120	0.0015
District of Columbia	George Washington U shuttle	100	*15*	0.9303	93.0300	0.0001	17.9844	1798.4400	0.0020
District of Columbia	EPA Shuttle	200	*15*	0.9303	186.0600	0.0002	17.9844	3596.8800	0.0040
District of Columbia	USDOT Shuttle	200	*15*	0.9303	186.0600	0.0002	17.9844	3596.8800	0.0040
District of Columbia	Gallaudet Shuttle	100	*15*	0.9303	93.0300	0.0001	17.9844	1798.4400	0.0020
District of Columbia	Metro Access - paratransit	5,000	15	0.9303	4651.5000	0.0051	17.9844	89922.0000	0.0991
Maryland	Corridor Transit (CTC)	1,265	18	0.8189	1035.9085	0.0011	16.6374	21046.3110	0.0232
Maryland	Peter Pan / Trailways	1,800	*55*	0.3534	636.1200	0.0007	19.2851	34713.1800	0.0383
Maryland	Carolina Trailways	225	*55*	0.3534	79.5150	0.0001	19.2851	4339.1475	0.0048
Maryland	Capitol Trailways	400	*55*	0.3534	141.3600	0.0002	19.2851	7714.0400	0.0085
Maryland	Martz / Grey Line sightseeing	2,250	55	0.3534	795.1500	0.0009	19.2851	43391.4750	0.0478
Maryland	New World Tours	100	*20*	0.7632	76.3200	0.0001	15.9640	1596.4000	0.0018
Montgomery	Metrobus	17,262	*15*	0.9303	16058.8386	0.0177	17.9844	310446.7128	0.3422
Montgomery	MTA Commuter buses	2,180	*45*	0.3945	860.0100	0.0009	15.2198	33179.1640	0.0366
Montgomery	Mont. Co. Ride-On	35,616	15	0.9303	33133.5648	0.0365	17.9844	640532.3904	0.7061

2005 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	Metrobus	24,660	*15*	0.9303	22941.1980	0.0253	17.9844	443495.3040	0.4889
Prince George's	MTA Commuter buses	6,840	*45*	0.3945	2698.3800	0.0030	15.2198	104103.4320	0.1148
Prince George's	PG Co. The Bus	9,723	15	0.9303	9045.3069	0.0100	17.9844	174862.3212	0.1928
Prince George's	ShuttleUM (U. of MD)	1,864	11	1.0968	2044.4352	0.0023	20.1796	37614.7744	0.0415
Prince George's	P.G. Co. paratransit	3,000	*15*	0.9303	2790.9000	0.0031	17.9844	53953.2000	0.0595
Frederick	MTA Commuter buses	370	*45*	0.3945	145.9650	0.0002	15.2198	5631.3260	0.0062
Frederick	Fredrick Co. TransiT	3,082	12	1.0448	3220.0736	0.0035	19.4936	60079.2752	0.0662
Charles	MTA Commuter buses	2,290	*45*	0.3945	903.4050	0.0010	15.2198	34853.3420	0.0384
Calvert	MTA Commuter buses	1,080	*45*	0.3945	426.0600	0.0005	15.2198	16437.3840	0.0181
Virginia	Metrobus	30,825	*15*	0.9303	28676.4975	0.0316	17.9844	554369.1300	0.6111
Virginia	Lee Coaches	70	*45*	0.3945	27.6150	0.0000	15.2198	1065.3860	0.0012
Virginia	Brooks Transit	750	*45*	0.3945	295.8750	0.0003	15.2198	11414.8500	0.0126
Virginia	Quicks Commuter Service	1,320	*45*	0.3945	520.7400	0.0006	15.2198	20090.1360	0.0221
Virginia	National Coach Works	1,650	*45*	0.3945	650.9250	0.0007	15.2198	25112.6700	0.0277
Virginia	Greyhound / Trailways (VA)	5,000	*55*	0.3534	1767.0000	0.0019	19.2851	96425.5000	0.1063
Virginia	Carolina Trailways	225	*55*	0.3534	79.5150	0.0001	19.2851	4339.1475	0.0048
Virginia	Martz / Grey Line sightseeing	2,250	55	0.3534	795.1500	0.0009	19.2851	43391.4750	0.0478
Virginia	New World Tours	100	*20*	0.7632	76.3200	0.0001	15.9640	1596.4000	0.0018
Alexandria	Alexandria DASH	3,454	13	1.0008	3456.7632	0.0038	18.9131	65325.8474	0.0720
Alexandria	Old Town "trolley" buses	300	*20*	0.7632	228.9600	0.0003	15.9640	4789.2000	0.0053
Alexandria	Alexandria DOT-paratransit	924	*15*	0.9303	859.5972	0.0009	17.9844	16617.5856	0.0183
Arlington	Arlington Co. ART	794	16	0.8885	705.4690	0.0008	17.4793	13878.5642	0.0153
Arlington	Crystal City Express	96	*15*	0.9303	89.3088	0.0001	17.9844	1726.5024	0.0019
Arlington	Skyline Crystal Express	144	*15*	0.9303	133.9632	0.0001	17.9844	2589.7536	0.0029

2005 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	Daily VMT	Average Speed	VOC			NOx		
				factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Arlington	Arlington STAR-paratransit	3,245	*15*	0.9303	3018.8235	0.0033	17.9844	58359.3780	0.0643
Fairfax	Fairfax Connector	18,036	*15*	0.9303	16778.8908	0.0185	17.9844	324366.6384	0.3576
Fairfax	Washington Flyer Coach Service	1,370	65	0.3457	473.6090	0.0005	28.2011	38635.5070	0.0426
Fairfax	Fairfax Co. Fastran- paratransit	11,427	15	0.9303	10630.5381	0.0117	17.9844	205507.7388	0.2265
Fairfax	City of Fairfax CUE	1,483	15	0.9303	1379.6349	0.0015	17.9844	26670.8652	0.0294
Fairfax	City of Ffx, City Wheels-paratransit.	100	*15*	0.9303	93.0300	0.0001	17.9844	1798.4400	0.0020
Fairfax	City of Falls Ch. Fare Wheels-paratransit	100	*15*	0.9303	93.0300	0.0001	17.9844	1798.4400	0.0020
Prince William	PRTC Omnilink	4,038	*15*	0.9303	3756.5514	0.0041	17.9844	72621.0072	0.0801
Prince William	PRTC OmniRide	5,700	27	0.5994	3416.5800	0.0038	14.3988	82073.1600	0.0905
Loudoun	Loudoun Transportation Assc.	4,532	15	0.9303	4216.1196	0.0046	17.9844	81505.3008	0.0898
Loudoun	Loudoun Commuter Service	1,866	*25*	0.6400	1194.2400	0.0013	14.6943	27419.5638	0.0302
Loudoun	Loudoun Transit (LCTA)-paratransit	100	*15*	0.9303	93.0300	0.0001	17.9844	1798.4400	0.0020
TOTAL		273,671			245867.5790	0.2710		5034457.3240	5.5495

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

2005 SCHOOL BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	13,331	14	1.1488	15314.4230	0.0169	12.5925	167868.0990	0.1850
Montgomery	105,000	30	0.6545	68722.5000	0.0758	9.6060	1008630.0000	1.1118
Prince George's	136,465	30	0.6545	89316.5716	0.0985	9.6060	1310886.1521	1.4450
Frederick	26,868	30	0.6545	17585.4005	0.0194	9.6060	258098.3307	0.2845
Charles	21,841	30	0.6545	14294.9672	0.0158	9.6060	209805.1263	0.2313
Calvert	26,936	30	0.6545	17629.3829	0.0194	9.6060	258743.8539	0.2852
Alexandria	2,129	25	0.7635	1625.7969	0.0018	10.0588	21419.2087	0.0236
Arlington	2,730	25	0.7635	2084.3550	0.0023	10.0588	27460.5240	0.0303
Fairfax	101,350	30	0.6545	66333.7059	0.0731	9.6060	973570.0212	1.0732
Prince William	37,920	30	0.6545	24818.4437	0.0274	9.6060	364256.6382	0.4015
Loudoun	29,764	30	0.6545	19480.7671	0.0215	9.6060	285916.3461	0.3152
Stafford	10,091	30	0.6545	6604.2323	0.0073	9.6060	96929.3430	0.1068
TOTAL	514,425			343810.5461	0.3790		4983583.6432	5.4935

2030 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	2001 Daily VMT	Daily VMT	Average Speed	VOC			NOx		
					factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	Metrobus	50,552	56,113	*10*	0.5054	25548.9808	0.0282	0.9470	47872.7440	0.0528
District of Columbia	MTA Commuter buses	2,510	2,786	*45*	0.1720	431.7200	0.0005	0.6923	1737.6730	0.0019
District of Columbia	Peter Pan / Trailways	200	222	*55*	0.1541	30.8200	0.0000	0.8713	174.2600	0.0002
District of Columbia	Carolina Trailways	20	22	*55*	0.1541	3.0820	0.0000	0.8713	17.4260	0.0000
District of Columbia	Capitol Trailways	100	111	*55*	0.1541	15.4100	0.0000	0.8713	87.1300	0.0001
District of Columbia	Martz / Grey Line sightseeing	500	555	55	0.1541	77.0500	0.0001	0.8713	435.6500	0.0005
District of Columbia	New World Tours	100	111	*20*	0.3327	33.2700	0.0000	0.7251	72.5100	0.0001
District of Columbia	Georgetown U. shuttle	100	111	15	0.4056	40.5600	0.0000	0.8140	81.4000	0.0001
District of Columbia	American U. shuttle	83	92	20	0.3327	27.6141	0.0000	0.7251	60.1833	0.0001
District of Columbia	George Washington U shuttle	100	111	*15*	0.4056	40.5600	0.0000	0.8140	81.4000	0.0001
District of Columbia	EPA Shuttle	200	222	*15*	0.4056	81.1200	0.0001	0.8140	162.8000	0.0002
District of Columbia	USDOT Shuttle	200	222	*15*	0.4056	81.1200	0.0001	0.8140	162.8000	0.0002
District of Columbia	Gallaudet Shuttle	100	111	*15*	0.4056	40.5600	0.0000	0.8140	81.4000	0.0001
District of Columbia	Metro Access - paratransit	5,000	5,550	15	0.4056	2028.0000	0.0022	0.8140	4070.0000	0.0045
Maryland	Corridor Transit (CTC)	1,265	1,404	18	0.3570	451.6050	0.0005	0.7547	954.6955	0.0011
Maryland	Peter Pan / Trailways	1,800	1,998	*55*	0.1541	277.3800	0.0003	0.8713	1568.3400	0.0017
Maryland	Carolina Trailways	225	250	*55*	0.1541	34.6725	0.0000	0.8713	196.0425	0.0002
Maryland	Capitol Trailways	400	444	*55*	0.1541	61.6400	0.0001	0.8713	348.5200	0.0004
Maryland	Martz / Grey Line sightseeing	2,250	2,498	55	0.1541	346.7250	0.0004	0.8713	1960.4250	0.0022
Maryland	New World Tours	100	111	*20*	0.3327	33.2700	0.0000	0.7251	72.5100	0.0001
Montgomery	Metrobus	17,262	19,161	*15*	0.4056	7001.4672	0.0077	0.8140	14051.2680	0.0155
Montgomery	MTA Commuter buses	2,180	2,420	*45*	0.1720	374.9600	0.0004	0.6923	1509.2140	0.0017
Montgomery	Mont. Co. Ride-On	35,616	39,534	15	0.4056	14445.8496	0.0159	0.8140	28991.4240	0.0320

2030 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	2001 Daily VMT	Daily VMT	Average Speed	VOC			NOx		
					factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Prince George's	Metrobus	24,660	27,373	*15*	0.4056	10002.0960	0.0110	0.8140	20073.2400	0.0221
Prince George's	MTA Commuter buses	6,840	7,592	*45*	0.1720	1176.4800	0.0013	0.6923	4735.3320	0.0052
Prince George's	PG Co. The Bus	9,723	10,793	15	0.4056	3943.6488	0.0043	0.8140	7914.5220	0.0087
Prince George's	ShuttleUM (U. of MD)	1,864	2,069	11	0.4782	891.3648	0.0010	0.9107	1697.5448	0.0019
Prince George's	P.G. Co. paratransit	3,000	3,330	*15*	0.4056	1216.8000	0.0013	0.8140	2442.0000	0.0027
Frederick	MTA Commuter buses	370	411	*45*	0.1720	63.6400	0.0001	0.6923	256.1510	0.0003
Frederick	Fredrick Co. TransiT	3,082	3,421	12	0.4555	1403.8510	0.0015	0.8805	2713.7010	0.0030
Charles	MTA Commuter buses	2,290	2,542	*45*	0.1720	393.8800	0.0004	0.6923	1585.3670	0.0017
Calvert	MTA Commuter buses	1,080	1,199	*45*	0.1720	185.7600	0.0002	0.6923	747.6840	0.0008
Virginia	Metrobus	30,825	34,216	*15*	0.4056	12502.6200	0.0138	0.8140	25091.5500	0.0277
Virginia	Lee Coaches	70	78	*45*	0.1720	12.0400	0.0000	0.6923	48.4610	0.0001
Virginia	Brooks Transit	750	833	*45*	0.1720	129.0000	0.0001	0.6923	519.2250	0.0006
Virginia	Quicks Commuter Service	1,320	1,465	*45*	0.1720	227.0400	0.0003	0.6923	913.8360	0.0010
Virginia	National Coach Works	1,650	1,832	*45*	0.1720	283.8000	0.0003	0.6923	1142.2950	0.0013
Virginia	Greyhound / Trailways (VA)	5,000	5,550	*55*	0.1541	770.5000	0.0008	0.8713	4356.5000	0.0048
Virginia	Carolina Trailways	225	250	*55*	0.1541	34.6725	0.0000	0.8713	196.0425	0.0002
Virginia	Martz / Grey Line sightseeing	2,250	2,498	55	0.1541	346.7250	0.0004	0.8713	1960.4250	0.0022
Virginia	New World Tours	100	111	*20*	0.3327	33.2700	0.0000	0.7251	72.5100	0.0001
Alexandria	Alexandria DASH	3,454	3,834	13	0.4363	1506.9802	0.0017	0.8549	2952.8246	0.0033
Alexandria	Old Town "trolley" buses	300	333	*20*	0.3327	99.8100	0.0001	0.7251	217.5300	0.0002
Alexandria	Alexandria DOT-paratransit	924	1,026	*15*	0.4056	374.7744	0.0004	0.8140	752.1360	0.0008
Arlington	Arlington Co. ART	794	881	16	0.3874	307.5956	0.0003	0.7918	628.6892	0.0007
Arlington	Crystal City Express	96	107	*15*	0.4056	38.9376	0.0000	0.8140	78.1440	0.0001
Arlington	Skyline Crystal Express	144	160	*15*	0.4056	58.4064	0.0001	0.8140	117.2160	0.0001

2030 TRANSIT BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Operator	2001 Daily VMT	Daily VMT	Average Speed	VOC			NOx		
					factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
Arlington	Arlington STAR-paratransit	3,245	3,602	*15*	0.4056	1316.1720	0.0015	0.8140	2641.4300	0.0029
Fairfax	Fairfax Connector	18,036	20,020	*15*	0.4056	7315.4016	0.0081	0.8140	14681.3040	0.0162
Fairfax	Washington Flyer Coach Service	1,370	1,521	65	0.1507	206.4590	0.0002	1.2640	1731.6800	0.0019
Fairfax	Fairfax Co. Fastran- paratransit	11,427	12,684	15	0.4056	4634.7912	0.0051	0.8140	9301.5780	0.0103
Fairfax	City of Fairfax CUE	1,483	1,646	15	0.4056	601.5048	0.0007	0.8140	1207.1620	0.0013
Fairfax	City of Ffx, City Wheels-paratransit.	100	111	*15*	0.4056	40.5600	0.0000	0.8140	81.4000	0.0001
Fairfax	City of Falls Ch. Fare Wheels-paratransit	100	111	*15*	0.4056	40.5600	0.0000	0.8140	81.4000	0.0001
Prince William	PRTC Omnilink	4,038	4,482	*15*	0.4056	1637.8128	0.0018	0.8140	3286.9320	0.0036
Prince William	PRTC OmniRide	5,700	6,327	27	0.2613	1489.4100	0.0016	0.6561	3739.7700	0.0041
Loudoun	Loudoun Transportation Assc.	4,532	5,031	15	0.4056	1838.1792	0.0020	0.8140	3689.0480	0.0041
Loudoun	Loudoun Commuter Service	1,866	2,071	*25*	0.2790	520.6140	0.0006	0.6692	1248.7272	0.0014
Loudoun	Loudoun Transit (LCTA)-paratransit	100	111	*15*	0.4056	40.5600	0.0000	0.8140	81.4000	0.0001
TOTAL		273,671	303,775			107193.1531	0.1182		227734.5726	0.2510

Notes:

1) Used WMATA percent VMT by jurisdiction from FY03-08 AQC, Appendix I (page I-3)
2) Assumed average freeway speed of 55 mph where higher than 55 speed limit is available, and 45 mph where speed limit is 55

2030 SCHOOL BUS CHARACTERISTICS / EMISSIONS

Jurisdiction	Daily VMT	Average Speed	VOC			NOx		
			factors (g/mile)	emissions (grams)	emissions (tons)	factors (g/mile)	emissions (grams)	emissions (tons)
District of Columbia	13,331	14	0.5033	6709.3916	0.0074	0.6182	8241.1006	0.0091
Montgomery	105,000	30	0.2867	30103.5000	0.0332	0.4748	49854.0000	0.0550
Prince George's	136,465	30	0.2867	39124.6158	0.0431	0.4748	64793.7482	0.0714
Frederick	26,868	30	0.2867	7703.1846	0.0085	0.4748	12757.1401	0.0141
Charles	21,841	30	0.2867	6261.8290	0.0069	0.4748	10370.1305	0.0114
Calvert	26,936	30	0.2867	7722.4509	0.0085	0.4748	12789.0466	0.0141
Alexandria	2,129	25	0.3345	712.2843	0.0008	0.4966	1057.4600	0.0012
Arlington	2,730	25	0.3345	913.1850	0.0010	0.4966	1355.7180	0.0015
Fairfax	101,350	30	0.2867	29057.1023	0.0320	0.4748	48121.0750	0.0530
Prince William	37,920	30	0.2867	10871.5780	0.0120	0.4748	18004.2736	0.0198
Loudoun	29,764	30	0.2867	8533.4391	0.0094	0.4748	14132.1134	0.0156
Stafford	10,091	30	0.2867	2892.9464	0.0032	0.4748	4790.9694	0.0053
TOTAL	514,425		3.7526	150605.5071	0.1660	5.8846	246266.7753	0.2715

Attachment G

Memorandum

To: Air Quality Files

From: Eulalie G. Lucas
Transportation Engineer

Date: 5/28/2003

Re: Off- Network Emissions Calculations: Auto Access to transit.

Introduction:

This memo documents updates to the development of a component of the 'off-network' emissions analysis: Auto access to transit. This component along with bus, local street, diurnal and resting loss emissions are considered 'off-network' because inputs to these calculations are not generated by COG's/TPB travel demand model. As part of the updates for the Severe SIP (State Implementation Plan) submittal all components of the Mobile source inventories were revised.

One of the updates included heavy-duty truck percents; VMT Mix percent associated with auto access to transit did not include light duty trucks (LDGT2). This weight category includes Ford Navigators, which are used by some commuters to transit and park and ride lots and therefore was included in the current VMT Mix percents. In addition, VMT was allocated by facility type to insure consistency with Mobile6 requirements.

Auto Access to transit emissions:

The procedure used in the calculation of emissions associated with auto access to transit is an off-line process like local street emissions calculations. The approach is very simple; it involves the application of an emissions rate to the various components of travel, i.e. start up, running and hot soak. For trips originating outside the MSA, only those miles within the MSA are used in the calculation.

Separate emissions rates are applied by components of a trip cycle i.e. a start up rate for trip origins, a running rate for the running component and hot soak rate for trip destinations. These three rates represent an average of the twelve composite rates for jurisdictions in the non-attainment area and for seven MOBILE6 vehicle types, HDD fractions were zeroed out of the VMT Mix. This adjustment was made based on the assumption that heavy duty vehicles such as tractor trailers are typically not used by commuters for trips to and from transit locations or to park and ride lots, however as mentioned in the above paragraph Light Duty Trucks are included in the VMT Mix percents.

Results for 2005 are shown in Exhibits 1 and 2.

2005 CASE 7 VOC AIR QUALITY EMISSIONS INVENTORY
AUTO ACCESS TO TRANSIT
ACTION SCENARIO

LOCATION	2002 OUTSIDE MSA (%)	2002 INSIDE MSA	2002 OUTSIDE MSA	2002 Total	2005 INSIDE Growth Rate	2005 OUTSIDE Growth Rate	AVERAGE TRIP LENGTH	2005 VMT	ARTERIAL %	FREEWAY %	ARTERIAL VMT	FREEWAY VMT	EMISSIONS: COLD START Rate (gm/mile)	RUNNING Arterial Rate (gm/mile)	RUNNING Freeway Rate (gm/mile)	RUNNING Total Running	HOT SOAK Rate (gm/mile)	TOTAL (tons/day)
					1.101244178	1.101244178							1.6358	0.2901	0.2566		0.7096	
COMMUTER RAIL LOTS																		
BRUNSWICK 25%	25	305	102	**407**	336	112	7.5	3,362	57	43	1,916	1,445	0.0014	0.0012	0.0008	0.0020	0.0006	0.0041
PT OF ROCKS 25%	25	204	68	**272**	225	75	7.5	2,247	57	43	1,281	966	0.0009	0.0008	0.0005	0.0014	0.0004	0.0027
DICKERSON	0	15	0	**15**	17	0	7.5	124	57	43	71	53	0.0001	0.0000	0.0000	0.0001	0.0000	0.0002
BARNESVILLE	0	46	0	**46**	51	0	7.5	380	57	43	217	163	0.0002	0.0001	0.0001	0.0002	0.0001	0.0005
GERMANTOWN	0	386	0	**386**	425	0	7.5	3,188	57	43	1,817	1,371	0.0015	0.0012	0.0008	0.0019	0.0007	0.0041
MET GROVE	0	352	0	**352**	388	0	7.5	2,907	57	43	1,657	1,250	0.0014	0.0011	0.0007	0.0018	0.0006	0.0038
WAS GROVE	0	15	0	**15**	17	0	7.5	124	57	43	71	53	0.0001	0.0000	0.0000	0.0001	0.0000	0.0002
GARRETT PARK	0	22	0	**22**	24	0	7.5	182	57	43	104	78	0.0001	0.0001	0.0000	0.0001	0.0000	0.0002
BOWIE 50%	50	188	188	**375**	206	206	7.5	3,097	57	43	1,765	1,332	0.0011	0.0011	0.0008	0.0019	0.0005	0.0035
SEABROOK 15%	15	224	40	**264**	247	44	7.5	2,180	57	43	1,243	938	0.0010	0.0008	0.0005	0.0013	0.0004	0.0027
KENSINGTON	0	45	0	**45**	50	0	7.5	372	57	43	212	160	0.0002	0.0001	0.0001	0.0002	0.0001	0.0005
LAUREL 30%	30	209	90	**299**	230	99	7.5	2,470	57	43	1,408	1,062	0.0010	0.0009	0.0006	0.0015	0.0004	0.0029
GAITHESBURG	0	280	0	**280**	308	0	7.5	2,313	57	43	1,318	994	0.0011	0.0008	0.0006	0.0014	0.0005	0.0030
BERWYN HEIGHTS	0	30	0	**30**	33	0	4.5	149	57	43	85	64	0.0001	0.0001	0.0000	0.0001	0.0001	0.0003
RIVERDALE	0	65	0	**65**	72	0	4.5	322	57	43	184	139	0.0003	0.0001	0.0001	0.0002	0.0001	0.0006
								0										
METRO RAIL LOTS								0										
								0										
ADDISON ROAD 40%	40	791	527	**1318**	871	581	7.5	10,886	57	43	6,205	4,681	0.0042	0.0040	0.0026	0.0066	0.0018	0.0126
ARCHIVES	0	12	0	12	13	0	4.5	59	57	43	34	26	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
ARLING	0	10	0	10	11	0	4.5	50	57	43	28	21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
BALLSTON	0	1175	0	1175	1294	0	4.5	5,823	57	43	3,319	2,504	0.0047	0.0021	0.0014	0.0035	0.0020	0.0102
BENN.RD	0	520	0	520	573	0	4.5	2,577	57	43	1,469	1,108	0.0021	0.0009	0.0006	0.0016	0.0009	0.0045
BETH	0	395	0	395	435	0	4.5	1,957	57	43	1,116	842	0.0016	0.0007	0.0005	0.0012	0.0007	0.0034
BRADD RD	0	10	0	**10**	11	0	4.5	50	57	43	28	21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001
BROOKLAND	0	27	0	**27**	30	0	4.5	134	57	43	76	58	0.0001	0.0000	0.0000	0.0001	0.0000	0.0002
CHEVERLY	0	557	0	**557**	613	0	4.5	2,760	57	43	1,573	1,187	0.0022	0.0010	0.0007	0.0017	0.0010	0.0048
CLARENDON	0	554	0	554	610	0	4.5	2,745	57	43	1,565	1,181	0.0022	0.0010	0.0007	0.0017	0.0010	0.0048
CLEVELAND PK	0	366	0	366	403	0	4.5	1,814	57	43	1,034	780	0.0015	0.0007	0.0004	0.0011	0.0006	0.0032
COURT HOUSE	0	256	0	256	282	0	4.5	1,269	57	43	723	546	0.0010	0.0005	0.0003	0.0008	0.0004	0.0022
CRYSTAL CITY	0	347	0	347	382	0	4.5	1,720	57	43	980	739	0.0014	0.0006	0.0004	0.0010	0.0006	0.0030
DEANWOOD	0	194	0	**194**	214	0	4.5	961	57	43	548	413	0.0008	0.0004	0.0002	0.0006	0.0003	0.0017
DUN LORING 10%	10	1220	136	**1355**	1343	149	4.5	6,715	57	43	3,827	2,887	0.0051	0.0024	0.0016	0.0041	0.0022	0.0114
DUPONT CIRCLE	0	165	0	165	182	0	4.5	818	57	43	466	352	0.0007	0.0003	0.0002	0.0005	0.0003	0.0014
EASTERN MKT	0	178	0	178	196	0	4.5	882	57	43	503	379	0.0007	0.0003	0.0002	0.0005	0.0003	0.0015
EAST FALLS CH	0	442	0	**442**	487	0	4.5	2,190	57	43	1,249	942	0.0018	0.0008	0.0005	0.0013	0.0008	0.0038
EIS	0	352	0	352	388	0	4.5	1,744	57	43	994	750	0.0014	0.0006	0.0004	0.0011	0.0006	0.0031
FARRAGUT NORTH	0	102	0	102	112	0	4.5	505	57	43	288	217	0.0004	0.0002	0.0001	0.0003	0.0002	0.0009
FARRAGUT WEST	0	221	0	221	243	0	4.5	1,095	57	43	624	471	0.0009	0.0004	0.0003	0.0007	0.0004	0.0019
FEDERAL CENTER	0	75	0	75	83	0	4.5	372	57	43	212	160	0.0003	0.0001	0.0001	0.0002	0.0001	0.0007
FEDERAL TRI	0	54	0	54	59	0	4.5	268	57	43	153	115	0.0002	0.0001	0.0001	0.0002	0.0001	0.0005
FOGGY	0	102	0	102	112	0	4.5	505	57	43	288	217	0.0004	0.0002	0.0001	0.0003	0.0002	0.0009
FORT TROTTEN	0	445	0	**445**	490	0	4.5	2,205	57	43	1,257	948	0.0018	0.0008	0.0005	0.0013	0.0008	0.0039
FRH.HEIGHTS	0	679	0	679	748	0	4.5	3,365	57	43	1,918	1,447	0.0027	0.0012	0.0008	0.0020	0.0012	0.0059
GALLERY PLACE	0	124	0	124	137	0	4.5	614	57	43	350	264	0.0005	0.0002	0.0001	0.0004	0.0002	0.0011
GROSVENOR	0	716	0	**716**	788	0	4.5	3,548	57	43	2,022	1,526	0.0028	0.0013	0.0009	0.0022	0.0012	0.0062
HUNT NORTH 40%	40	1873	1249	**3122**	2063	1375	7.5	25,786	57	43	14,698	11,088	0.0099	0.0094	0.0063	0.0157	0.0043	0.0299
JUD SQUARE	0	110	0	110	121	0	4.5	545	57	43	311	234	0.0004	0.0002	0.0001	0.0003	0.0002	0.0010
KING ST	0	30	0	**30**	33	0	4.5	149	57	43	85	64	0.0001	0.0001	0.0000	0.0001	0.0001	0.0003
								0										
								0										
LANDOVER 25%	25	1410	470	**1880**	1553	518	7.5	15,528	57	43	8,851	6,677	0.0065	0.0057	0.0038	0.0094	0.0028	0.0188
L'ENFANT PLAZA	0	296	0	296	326	0	4.5	1,467	57	43	836	631	0.0012	0.0005	0.0004	0.0009	0.0005	0.0026
MCPHERSON SQ	0	52	0	52	57	0	4.5	258	57	43	147	111	0.0002	0.0001	0.0001	0.0002	0.0001	0.0005
MEDICAL CENTER	0	14	0	**14**	15	0	4.5	69	57	43	40	30	0.0001	0.0000	0.0000	0.0000	0.0000	0.0001
METRO CENTER	0	177	0	177	195	0	4.5	877	57	43	500	377	0.0007	0.0003	0.0002	0.0005	0.0003	0.0015
MINNES	0	353	0	**353**	389	0	4.5	1,749	57	43	997	752	0.0014	0.0006	0.0004	0.0011	0.0006	0.0031
NAT AIR	0	87	0	87	96	0	4.5	431	57	43	246	185	0.0003	0.0002	0.0001	0.0003	0.0001	0.0008
NEW CARROL 50%	50	1049	1049	**2097**	1155	1155	7.5	17,320	57	43	9,872	7,448	0.0062	0.0063	0.0042	0.0105	0.0027	0.0195
PRNTAGON	0	561	0	561	618	0	4.5	2,780	57	43	1,585	1,195	0.0022	0.0010	0.0007	0.0017	0.0010	0.0049
PENTAGON CITY	0	381	0	381	420	0	4.5	1,888	57	43	1,076	812	0.0015	0.0007	0.0005	0.0011	0.0007	0.0033
POTOMAC AVE	0	533	0	533	587	0	4.5	2,641	57	43	1,506	1,136	0.0021	0.0010	0.0006	0.0016	0.0009	0.0046
ROCKVILLE	0	667	0	**667**	735	0	4.5	3,305	57	43	1,884	1,421	0.0026	0.0012	0.0008	0.0020	0.0011	0.0058
ROSSLYN	0	356	0	356	392	0	4.5	1,764	57	43	1,006	759	0.0014	0.0006	0.0004	0.0011	0.0006	0.0031
SHADY GROVE 10%	10	3903	434	**4337**	4298	478	7.5	35,821	57	43	20,418	15,403	0.0164	0.0131	0.0087	0.0218	0.0071	0.0452
SILVER SPRING	0	44	0	**44**	48	0	4.5	218	57	43	124	94	0.0002	0.0001	0.0001	0.0001	0.0001	0.0004
SMITH MALL	0	120	0	120	132	0	4.5	595	57	43	339	256	0.0005	0.0002	0.0001	0.0004	0.0002	0.0010
STADIUM ARM	0	976	0	976	1075	0	4.5	4,837	57	43	2,757	2,080	0.0039	0.0018	0.0012	0.0029	0.0017	0.0085
TAKOMA PK	0	146	0	**146**	161	0	4.5	724	57	43	412	311	0.0006	0.0003	0.0002	0.0004	0.0003	0.0013
TENLEYTON	0	17	0	**17**	19	0	4.5	84	57	43	48	36	0.0001	0.0000	0.0000	0.0001	0.0000	0.0001
TWINBROOK	0	1136	0	**1136**	1251	0	4.5	5,630	57	43	3,209	2,421	0.0045	0.0021	0.0014	0.0034	0.0020	0.0099
UNION STAT	0	378	0	378	416	0	4.5	1,873	57	43	1,068	805	0.0015	0.0007	0.0005	0.0011	0.0007	0.0033
VAN NESS	0	343	0	343	378	0	4.5	1,700	57	43	969	731	0.0014	0.0006	0.0004	0.0010	0.0006	0.0030
VIENNA 25%	25	2798	933	**3731**	3082	1027	7.5	30,816	57	43	17,565	13,251	0.0130	0.0112	0.0075	0.0187	0.0056	0.0373
VA SQUARE	0	642	0	642	707	0	4.5	3,181	57	43	1,813	1,368	0.0025	0.0012	0.0008	0.0019	0.0011	0.0056
WEST FALLS CHURCH	0	2183	0	**2183**	2404	0	4.5	10,818	57	43	6,166	4,652	0.0087	0.0039	0.0026	0.0066	0.0038	0.0190
WHITE FLINT	0	1633	0	1633	1798	0	4.5	8,092	57	43	4,613	3,480	0.0065	0.0030	0.0020	0.0049	0.0028	0.0142
WOODLEY	0	68	0	68	75	0	4.5	337	57	43	192	145	0.0003	0.0001	0.0001	0.0002	0.0001	0.0006
RHODE ISLAND 30%	30	266	114	**380**	293	126	7.5	3,139	57	43	1,789	1,350	0.0013	0.0011	0.0008	0.0019	0.0006	0.0037
								0										
BUS & CAR POOL LOTS								0										
								0										
CARTER BARRON	0	798	0	798	879	0	4.5	3,955	57	43	2,254	1,700	0.0032	0.0014	0.0010	0.0024	0.0014	0.0069
PG PLAZA	0	47	0	**47**	52	0	4.5	233	57	43	133	100	0.0002	0.0001	0.0001	0.0001	0.0001	0.0004
PENN MAR SHOPP.	0	100	0	**100**	110	0	4.5	496	57	43	282	213	0.0004	0.0002	0.0001	0.0003	0.0002	0.0009
CAP PLAZA	0	100	0	**100**	110	0	4.5	496	57	43	282	213	0.0004	0.0002	0.0001	0.0003	0.0002	0.0009
EASTOVER	0	100	0	**100**	110	0	4.5	496	57	43	282	213	0.0004	0.0002	0.0001	0.0003	0.0002	0.0009
FOUR MILE RUN	0	28	0	**28**	31	0	4.5	139	57	43	79	60	0.0001	0.0001	0.0000	0.0001	0.0000	0.0002
SPRINGFIELD MALL	0	580	0	**580**	639	0	4.5	2,874	57	43	1,638	1,236	0.0023	0.0010	0.0007	0.0017	0.0010	0.0050
SPRINGFIELD METH CH	0	48	0	**48**	53	0	4.5	238	57	43	136	102	0.0002	0.0001	0.0001	0.0001	0.0001	0.0004
FRED ARMORY	0	33	0	**33**	36	0	7.5	273	57	43	155	117	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
MYERSVILLE	0	65	0	**65**	72	0	7.5	537	57	43	306	231	0.0003	0.0002	0.0001	0.0003	0.0001	0.0007
ROSEMONT	0	45	0	**45**	50	0	7.5	372	57	43	212	160	0.0002	0.0001	0.0001	0.0002	0.0001	0.0005
URBANA	0	193	0	**193**	213	0	7.5	1,594	57	43	909	685	0.0008	0.0006	0.0004	0.0010	0.0003	0.0021
JEFFERSON	0	40	0	**40**	44	0	7.5	330	57	43	188	142	0.0002	0.0001	0.0001	0.0002	0.0001	0.0004
NORBECK RD	0	248	0	**248**	273	0	7.5	2,048	57	43	1,168	881	0.0010	0.0007	0.0005	0.0012	0.0004	0.0027
MONTROSE RD	0	650	0	**650**	716	0	7.5	5,369	57	43	3,060	2,308	0.0026	0.0020	0.0013	0.0033	0.0011	0.0070
BRIGG CHENNY 50%	50	215	215	**430**	237	237	7.5	3,552	57	43	2,024	1,527	0.0013	0.0013	0.0009	0.0022	0.0006	0.0040
COMUS ROAD	0	30	0	**30**	33	0	7.5	248	57	43	141	107	0.0001	0.0001	0.0001	0.0002	0.0001	0.0003
LAKEFOREST MALL	0	300	0	**300**	330	0	7.5	2,478	57	43	1,412	1,065	0.0012	0.0009	0.0006	0.0015	0.0005	0.0032
BURTONSVILLE	0	500	0	**500**	551	0	7.5	4,130	57	43	2,354	1,776	0.0020	0.0015	0.0010	0.0025	0.0009	0.0054
FORGY MEM.	0	200	0	**200**	220	0	7.5	1,652	57	43	942	710	0.0008	0.0006	0.0004	0.0010	0.0003	0.0021
TECH ROAD	0	155	0	**155**	171	0	7.5	1,280	57	43	730	550	0.0006	0.0005	0.0003	0.0008	0.0003	0.0017
BELTWAY	0	265	0	**265**	292	0	7.5	2,189	57	43	1,248	941	0.0011	0.0008	0.0005	0.0013	0.0005	0.0028
LAUREL VAN DUSEN	0	62	0	**62**	68	0	7.5	512	57	43	292	220	0.0002	0.0002	0.0001	0.0003	0.0001	0.0007
ACCOKEEK	0	450	0	**450**	496	0	7.5	3,717	57	43	2,119	1,598	0.0018	0.0014	0.0009	0.0023	0.0008	0.0048
ABC DRIVE IN	0	100	0	**100**	110	0	7.5	826	57	43	471	355	0.0004	0.0003	0.0002	0.0005	0.0002	0.0011
BOWIE 20%	20	526	131	**657**	579	145	7.5	5,426	57	43	3,093	2,333	0.0023	0.0020	0.0013	0.0033	0.0010	0.0067
CLINTON 50%	50	212	212	**424**	233	233	7.5	3,502	57	43	1,996	1,506	0.0013	0.0013	0.0009	0.0021	0.0005	0.0039
OXON HILL 20%	20	519	130	**649**	572	143	7.5	5,360	57	43	3,055	2,305	0.0023	0.0020	0.0013	0.0033	0.0010	0.0066
EQUESTRIAN CENTER 50%	50	150	150	**300**	165	165	7.5	2,478	57	43	1,412	1,065	0.0009	0.0009	0.0006	0.0015	0.0004	0.0028
BOWIE MARKET PLACE	0	50	0	**50**	55	0	7.5	413	57	43	235	178	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
FT.WASHINGTON	0	412	0	**412**	454	0	7.5	3,403	57	43	1,940	1,463	0.0016	0.0012	0.0008	0.0021	0.0007	0.0044
MONTPELIER REC PARK	0	70	0	**70**	77	0	7.5	578	57	43	330	249	0.0003	0.0002	0.0001	0.0004	0.0001	0.0007
RESTON	0	1547	0	**1547**	1704	0	7.5	12,777	57	43	7,283	5,494	0.0061	0.0047	0.0031	0.0078	0.0027	0.0166
GREENBRIAR	0	55	0	**55**	61	0	7.5	454	57	43	259	195	0.0002	0.0002	0.0001	0.0003	0.0001	0.0006
FAIR OAKS	0	150	0	**150**	165	0	7.5	1,239	57	43	706	533	0.0006	0.0005	0.0003	0.0008	0.0003	0.0016
ROLLING VALLEY	0	628	0	**628**	692	0	7.5	5,187	57	43	2,957	2,230	0.0025	0.0019	0.0013	0.0032	0.0011	0.0067
SPRINGFIELD PLAZA	0	230	0	**230**	253	0	7.5	1,900	57	43	1,083	817	0.0009	0.0007	0.0005	0.0012	0.0004	0.0025
FAIRLANES BOWL	0	35	0	**35**	39	0	7.5	289	57	43	165	124	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
NOTTOWAY PARK	0	14	0	**14**	15	0	7.5	116	57	43	66	50	0.0001	0.0000	0.0000	0.0000	0.0001	0.0001
HORNER RD	0	2397	0	**2397**	2640	0	7.5	19,798	57	43	11,285	8,513	0.0095	0.0072	0.0048	0.0120	0.0041	0.0257
LAKE RIDGE	0	555	0	**555**	611	0	7.5	4,584	57	43	2,613	1,971	0.0022	0.0017	0.0011	0.0028	0.0010	0.0059
MINNIEVILLE RD 40%	40	336	224	560	370	247	7.5	4,625	57	43	2,636	1,989	0.0018	0.0017	0.0011	0.0028	0.0008	0.0054
GORDON BLVD	0	156	0	156	172	0	7.5	1,288	57	43	734	554	0.0006	0.0005	0.0003	0.0008	0.0003	0.0017
HILLENDALE	0	248	0	**248**	273	0	7.5	2,048	57	43	1,168	881	0.0010	0.0007	0.0005	0.0012	0.0004	0.0027
POTOMAC MILLS	0	946	0	**946**	1042	0	7.5	7,813	57	43	4,454	3,360	0.0038	0.0028	0.0019	0.0047	0.0016	0.0101
								0										

		2002			2005	2005	AVERAGE	2005	EMISSIONS								
									ARTERIAL	FREEWAY	ARTERIAL	FREEWAY	COLD START	RUNNING		HOT SOAK	TOTAL
List of new lots to be added in Conformity Document list								0									
								0									
PARK-AND-RIDE LOTS - MARYLAND								0									
CALVERT COUNTY								0									
Dunkirk	25	32	11	42	35	12	7.5	347	57	43	198	149	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
Huntingtown	25	26	9	35	29	10	7.5	289	57	43	165	124	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
Lord Calvert Bowling Alley	25	83	28	110	91	30	7.5	909	57	43	518	391	0.0004	0.0003	0.0002	0.0006	0.0002	0.0011
Lusby	25	23	8	30	25	8	7.5	248	57	43	141	107	0.0001	0.0001	0.0001	0.0002	0.0000	0.0003
North Beach VFD	25	53	18	70	58	19	7.5	578	57	43	330	249	0.0002	0.0002	0.0001	0.0004	0.0001	0.0007
Prince Frederick	25	53	18	70	58	19	7.5	578	57	43	330	249	0.0002	0.0002	0.0001	0.0004	0.0001	0.0007
St. Leonard	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
Sunderland	25	80	27	106	88	29	7.5	875	57	43	499	376	0.0004	0.0003	0.0002	0.0005	0.0002	0.0011
PARK-AND-RIDE LOTS - MARYLAND								0									
CHARLES COUNTY								0									
301 Park & Ride	25	287	96	383	316	105	7.5	3,163	57	43	1,803	1,360	0.0013	0.0012	0.0008	0.0019	0.0006	0.0038
Charles County Government Bl	25	26	9	35	29	10	7.5	289	57	43	165	124	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
Food Lion Shopping Center	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
La Plata Armory	25	15	5	20	17	6	7.5	165	57	43	94	71	0.0001	0.0001	0.0000	0.0001	0.0000	0.0002
Laurel Springs Regional Park	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
Life Wesleyan Church	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
Mattawoman-Beantown Rd	25	435	145	580	479	160	7.5	4,790	57	43	2,731	2,060	0.0020	0.0017	0.0012	0.0029	0.0009	0.0058
Smallwood Village	25	75	25	100	83	28	7.5	826	57	43	471	355	0.0003	0.0003	0.0002	0.0005	0.0002	0.0010
St. Charles Towne	25	263	88	350	289	96	7.5	2,891	57	43	1,648	1,243	0.0012	0.0011	0.0007	0.0018	0.0005	0.0035
PARK-AND-RIDE LOTS	25	0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FREDERICK COUNTY	25	0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Frederick (north)	25	123	41	164	135	45	7.5	1,355	57	43	772	582	0.0006	0.0005	0.0003	0.0008	0.0002	0.0016
Frederick (south)	25	173	58	230	190	63	7.5	1,900	57	43	1,083	817	0.0008	0.0007	0.0005	0.0012	0.0003	0.0023
Monacacy Marcst	25	600	200	800	661	220	7.5	6,607	57	43	3,766	2,841	0.0028	0.0024	0.0016	0.0040	0.0012	0.0080
PARK-AND-RIDE LOTS - MARYLAND								0									
MONTGOMERY COUNTY								0									
Colesville	0	190	0	190	209	0	7.5	1,569	57	43	894	675	0.0008	0.0006	0.0004	0.0010	0.0003	0.0020
Damascus	50	0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gaithersburg	50	259	259	517	285	285	7.5	4,270	57	43	2,434	1,836	0.0015	0.0016	0.0010	0.0026	0.0007	0.0048
Gaithersburg	50	175	175	350	193	193	7.5	2,891	57	43	1,648	1,243	0.0010	0.0011	0.0007	0.0018	0.0005	0.0033
Germantown Town	50	0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Greencastle	50	75	75	150	83	83	7.5	1,239	57	43	706	533	0.0004	0.0005	0.0003	0.0008	0.0002	0.0014
Milestone Shopping	50	88	88	175	96	96	7.5	1,445	57	43	824	622	0.0005	0.0005	0.0004	0.0009	0.0002	0.0016
PARK-AND-RIDE LOTS - MAYLAND								0									
PRINCE GEORGE'S COUNTY								0									
Hampton Mall	0	100	0	100	110	0	4.5	496	57	43	282	213	0.0004	0.0002	0.0001	0.0003	0.0002	0.0009
Laurel (south)	25	513	171	684	565	188	7.5	5,649	57	43	3,220	2,429	0.0024	0.0021	0.0014	0.0034	0.0010	0.0068
PARK-AND-RIDE LOTS - VIRGINI	0	0			0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ARLINGTON COUNTY	0	0			0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ballston Public Parking Garage	25	375	125	500	413	138	7.5	4,130	57	43	2,354	1,776	0.0017	0.0015	0.0010	0.0025	0.0008	0.0050
Washington-Lee	50	178	178	356	196	196	7.5	2,940	57	43	1,676	1,264	0.0011	0.0011	0.0007	0.0018	0.0005	0.0033
PARK-AND-RIDE LOTS - VIRGINIA								0									
FAIRFAX COUNTY								0									
American Legion	50	50	50	100	55	55	7.5	826	57	43	471	355	0.0003	0.0003	0.0002	0.0005	0.0001	0.0009
Canterbury Woods Pk	50	17	17	34	19	19	7.5	281	57	43	160	121	0.0001	0.0001	0.0001	0.0002	0.0000	0.0003
Centreville	50	185	185	370	204	204	7.5	3,056	57	43	1,742	1,314	0.0011	0.0011	0.0007	0.0019	0.0005	0.0034
Centreville United Methodist Ch	50	74	74	147	81	81	7.5	1,214	57	43	692	522	0.0004	0.0004	0.0003	0.0007	0.0002	0.0014
Fairfax County Government Cer	50	85	85	170	94	94	7.5	1,404	57	43	800	604	0.0005	0.0005	0.0003	0.0009	0.0002	0.0016
Greenbriar Park	50	28	28	55	30	30	7.5	454	57	43	259	195	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
Herndon-Monroe	50	873	873	1,745	961	961	7.5	14,413	57	43	8,215	6,197	0.0052	0.0053	0.0035	0.0088	0.0023	0.0162
Michael's	50	100	100	200	110	110	7.5	1,652	57	43	942	710	0.0006	0.0006	0.0004	0.0010	0.0003	0.0019
Parkwood Baptist	50	9	9	18	10	10	7.5	149	57	43	85	64	0.0001	0.0001	0.0000	0.0001	0.0000	0.0002
South Run District Pk	50	170	170	340	187	187	7.5	2,808	57	43	1,601	1,208	0.0010	0.0010	0.0007	0.0017	0.0004	0.0032
St Paul Chung Catholic Church	50	50	50	100	55	55	7.5	826	57	43	471	355	0.0003	0.0003	0.0002	0.0005	0.0001	0.0009
Stringfellow Rd	50	181	181	361	199	199	7.5	2,982	57	43	1,700	1,282	0.0011	0.0011	0.0007	0.0018	0.0005	0.0034
Sully Station	50	70	70	140	77	77	7.5	1,156	57	43	659	497	0.0004	0.0004	0.0003	0.0007	0.0002	0.0013
Sydenstricker Rd	50	84	84	167	92	92	7.5	1,379	57	43	786	593	0.0005	0.0005	0.0003	0.0008	0.0002	0.0016
Wakefield Chapel Pk	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0002	0.0001	0.0003	0.0001	0.0005
PARK-AND-RIDE LOTS - VIRGINIA								0									
LOUDOUN COUNTY								0									
Ashburn Farm	50	10	10	20	11	11	7.5	165	57	43	94	71	0.0001	0.0001	0.0000	0.0001	0.0000	0.0002
Ashburn Village	50	20	20	40	22	22	7.5	330	57	43	188	142	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
Cascades	50	28	28	55	30	30	7.5	454	57	43	259	195	0.0002	0.0002	0.0001	0.0003	0.0001	0.0005
Dulles North Transit	50	375	375	750	413	413	7.5	6,194	57	43	3,531	2,664	0.0022	0.0023	0.0015	0.0038	0.0010	0.0070
Hamilton	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0002	0.0001	0.0003	0.0001	0.0005
Innovation Avenue	50	38	38	75	41	41	7.5	619	57	43	353	266	0.0002	0.0002	0.0002	0.0004	0.0001	0.0007
Leesburg	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0002	0.0001	0.0003	0.0001	0.0005
Leesburg Kohls	50	600	600	1200	661	661	7.5	9,911	57	43	5,649	4,262	0.0036	0.0036	0.0024	0.0060	0.0016	0.0111
Purcellville	50	18	18	35	19	19	7.5	289	57	43	165	124	0.0001	0.0001	0.0001	0.0002	0.0000	0.0003
Sterling Park SC	50	23	23	45	25	25	7.5	372	57	43	212	160	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
Sterling Shaw Rd	50	24	24	48	26	26	7.5	396	57	43	226	170	0.0001	0.0001	0.0001	0.0002	0.0001	0.0004
PARK-AND-RIDE LOTS - VIRGINIA								0									
PRINCE WILLIAM COUNTY								0									
Brittany	50	48	48	95	52	52	7.5	785	57	43	447	337	0.0003	0.0003	0.0002	0.0005	0.0001	0.0009
Dale City	50	294	294	587	323	323	7.5	4,848	57	43	2,763	2,085	0.0017	0.0018	0.0012	0.0029	0.0008	0.0055
Harbor Drive	50	100	100	200	110	110	7.5	1,652	57	43	942	710	0.0006	0.0006	0.0004	0.0010	0.0003	0.0019
Lindendale	50	108	108	216	119	119	7.5	1,784	57	43	1,017	767	0.0006	0.0007	0.0004	0.0011	0.0003	0.0020
Montclair	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0002	0.0001	0.0003	0.0001	0.0005
PRTC Transit Center	50	93	93	185	102	102	7.5	1,528	57	43	871	657	0.0006	0.0006	0.0004	0.0009	0.0002	0.0017
Tackett's Mill	50	85	85	169	93	93	7.5	1,396	57	43	796	600	0.0005	0.0005	0.0003	0.0008	0.0002	0.0016
Triangle	50	15	15	29	16	16	7.5	240	57	43	137	103	0.0001	0.0001	0.0001	0.0001	0.0000	0.0003
I-95 / Rt 123	50	282	282	563	310	310	7.5	4,650	57	43	2,651	2,000	0.0017	0.0017	0.0011	0.0028	0.0007	0.0052
US 1 / VA 234	50	137	137	274	151	151	7.5	2,263	57	43	1,290	973	0.0008	0.0008	0.0006	0.0014	0.0004	0.0025
STAFFORD COUNTY								0									
Route 610	50	406	406	811	447	447	7.5	6,698	57	43	3,818	2,880	0.0024	0.0024	0.0016	0.0041	0.0010	0.0075
Route 610 (2)	50	375	375	750	413	413	7.5	6,194	57	43	3,531	2,664	0.0022	0.0023	0.0015	0.0038	0.0010	0.0070
Route 630	50	270	270	539	297	297	7.5	4,452	57	43	2,538	1,914	0.0016	0.0016	0.0011	0.0027	0.0007	0.0050
Route 17	50	518	518	1035	570	570	7.5	8,548	57	43	4,873	3,676	0.0031	0.0031	0.0021	0.0052	0.0013	0.0096
Linden	50	65	65	130	72	72	7.5	1,074	57	43	612	462	0.0004	0.0004	0.0003	0.0007	0.0002	0.0012
MARC TRAIN COMMUTER LOTS								0									
College Park	25	431	144	574	474	158	7.5	4,741	57	43	2,702	2,039	0.0020	0.0017	0.0012	0.0029	0.0009	0.0057
Frederick	0	0	0	0	0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Greenbelt	60	1346	2018	3364	1482	2223	7.5	27,784	57	43	15,837	11,947	0.0094	0.0101	0.0068	0.0169	0.0041	0.0303
Harpers Ferry		98	0	98	108	0	7.5	809	57	43	461	348	0.0004	0.0003	0.0002	0.0005	0.0002	0.0010
Muirkirk	60	260	390	650	286	429	7.5	5,369	57	43	3,060	2,308	0.0018	0.0020	0.0013	0.0033	0.0008	0.0059
Seabrook	0	264	0	264	291	0	4.5	1,308	57	43	746	563	0.0010	0.0005	0.0003	0.0008	0.0005	0.0023
Silver Spring	0	0	0	0	0	0	4.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Union Station	0	781	0	781	860	0	7.5	6,451	57	43	3,677	2,774	0.0031	0.0024	0.0016	0.0039	0.0013	0.0084
VIRGINIA RAILWAY EXPRESS COMMUTER LOTS								0									
Backlick Road	50	110	110	220	121	121	7.5	1,817	57	43	1,036	781	0.0007	0.0007	0.0004	0.0011	0.0003	0.0020
Broad Run	50	198	198	396	218	218	7.5	3,271	57	43	1,864	1,406	0.0012	0.0012	0.0008	0.0020	0.0005	0.0037
Brooke	50	150	150	300	165	165	7.5	2,478	57	43	1,412	1,065	0.0009	0.0009	0.0006	0.0015	0.0004	0.0028
Burke Center	50	275	275	550	303	303	7.5	4,543	57	43	2,589	1,953	0.0016	0.0017	0.0011	0.0028	0.0007	0.0051
Franconia/Springfield (operated	50	1900	1900	3800	2092	2092	7.5	31,385	57	43	17,890	13,496	0.0113	0.0114	0.0076	0.0191	0.0049	0.0353
Leeland Road	50	326	326	652	359	359	7.5	5,385	57	43	3,069	2,316	0.0019	0.0020	0.0013	0.0033	0.0008	0.0061
Lorton	50	100	100	200	110	110	7.5	1,652	57	43	942	710	0.0006	0.0006	0.0004	0.0010	0.0003	0.0019
Manassas	50	187	187	374	206	206	7.5	3,089	57	43	1,761	1,328	0.0011	0.0011	0.0008	0.0019	0.0005	0.0035
Manassas Park	50	150	150	300	165	165	7.5	2,478	57	43	1,412	1,065	0.0009	0.0009	0.0006	0.0015	0.0004	0.0028
Quantico	50	109	109	217	119	119	7.5	1,792	57	43	1,022	771	0.0006	0.0007	0.0004	0.0011	0.0003	0.0020
Rippon	50	150	150	300	165	165	7.5	2,478	57	43	1,412	1,065	0.0009	0.0009	0.0006	0.0015	0.0004	0.0028
Rolling Road	50	185	185	370	204	204	7.5	3,056	57	43	1,742	1,314	0.0011	0.0011	0.0007	0.0019	0.0005	0.0034
Woodbridge	50	294	294	588	324	324	7.5	4,856	57	43	2,768	2,088	0.0018	0.0018	0.0012	0.0030	0.0008	0.0055
METRORAIL PARKING LOTS								0									
Anacostia	25	861	287	1148	948	316	7.5	9,482	57	43	5,405	4,077	0.0040	0.0035	0.0023	0.0058	0.0017	0.0115
Branch Avenue	50	1611	1611	3222	1774	1774	7.5	26,612	57	43	15,169	11,443	0.0096	0.0097	0.0065	0.0162	0.0042	0.0299
Capitol Heights	50	194	194	387	213	213	7.5	3,196	57	43	1,822	1,374	0.0012	0.0012	0.0008	0.0019	0.0005	0.0036
College Park	25	465	155	620	512	171	7.5	5,121	57	43	2,919	2,202	0.0022	0.0019	0.0012	0.0031	0.0009	0.0062
Congress Heights	0	66	0	66	73	0	4.5	327	57	43	186	141	0.0003	0.0001	0.0001	0.0002	0.0001	0.0006
Deanwood	0	194	0	194	214	0	7.5	1,602	57	43	913	689	0.0008	0.0006	0.0004	0.0010	0.0003	0.0021
East Falls Church	50	221	221	442	243	243	7.5	3,651	57	43	2,081	1,570	0.0013	0.0013	0.0009	0.0022	0.0006	0.0041
Forest Glen	50	329	329	658	362	362	7.5	5,435	57	43	3,098	2,337	0.0020	0.0020	0.0013	0.0033	0.0009	0.0061
Franconia - Springfield	50	1987	1987	3973	2188	2188	4.5	19,689	57	43	11,222	8,466	0.0118	0.0072	0.0048	0.0120	0.0051	0.0289
Glenmont	50	925	925	1850	1019	1019	4.5	9,168	57	43	5,226	3,942	0.0055	0.0033	0.0022	0.0056	0.0024	0.0135
Greenbelt	50	1783	1783	3565	1963	1963	7.5	29,445	57	43	16,783	12,661	0.0106	0.0107	0.0072	0.0179	0.0046	0.0331
Naylor Road	50	216	216	431	237	237	7.5	3,560	57	43	2,029	1,531	0.0013	0.0013	0.0009	0.0022	0.0006	0.0040
Prince George's Plaza	25	927	309	1236	1021	340	7.5	10,209	57	43	5,819	4,390	0.0043	0.0037	0.0025	0.0062	0.0019	0.0124
Southern Avenue	50	1090	1090	2180	1200	1200	4.5	10,803	57	43	6,158	4,645	0.0065	0.0039	0.0026	0.0066	0.0028	0.0159
Suitland	50	1033	1033	2065	1137	1137	4.5	10,233	57	43	5,833	4,400	0.0062	0.0037	0.0025	0.0062	0.0027	0.0150
Van Dorn Street	50	204	204	407	224	224	4.5	2,017	57	43	1,150	867	0.0012	0.0007	0.0005	0.0012	0.0005	0.0030
West Hyattsville	25	453	151	604	499	166	7.5	4,989	57	43	2,844	2,145	0.0021	0.0018	0.0012	0.0030	0.0009	0.0060
Wheaton	25	759	253	1012	836	279	7.5	8,358	57	43	4,764	3,594	0.0035	0.0030	0.0020	0.0051	0.0015	0.0101
		80737	31790	112,527	88911	35008		818,600					0.3838	0.2984	0.1991	0.4975	0.1665	1.0478

Bold figures: New numbers taken from P & R directory
Figures in bracket: Carry forward figures from conformity doc.

Park lot Growth Rate	
transit trips 2005	1009538
transit trips 2000	863783
Annual growth rate	0.033748059
Growth factor (2002-2005)	1.101244178

NOVEMBER, 2002

2005 CASE 7 NOx AIR QUALITY EMISSIONS INVENTORY

AUTO ACCESS TO TRANSIT

ACTION SCENARIO

	LOCATION	2002 OUTSIDE MSA (%)	2002 INSIDE MSA	2002 OUTSIDE MSA	2002 Total	2005 INSIDE Growth Rate	2005 OUTSIDE Growth Rate	AVERAGE TRIP LENGTH	VMT	ARTERIAL %	FREEWAY %	ARTERIAL VMT	FREEWAY VMT	EMISSIONS: COLD START Rate (gm/mile)	EMISSIONS: RUNNING Arterial Rate (gm/mile)	EMISSIONS: RUNNING Freeway Rate (gm/mile)	EMISSIONS: RUNNING Total Running Emission (tones/day)	EMISSIONS: TOTAL (tons/day)
						1.101244178	1.101244178							0.9905	0.6881	0.7161		
	COMMUTER RAIL LOTS																	
1	BRUNSWICK 25%	25	305	102	**407**	336	112	7.5	3,362	57	43	1,916	1,445	0.0009	0.0029	0.0023	0.0052	0.0060
2	PT OF ROCKS 25%	25	204	68	**272**	225	75	7.5	2,247	57	43	1,281	966	0.0006	0.0019	0.0015	0.0035	0.0040
3	DICKERSON	0	15	0	**15**	17	0	7.5	124	57	43	71	53	0.0000	0.0001	0.0001	0.0002	0.0002
4	BARNESVILLE	0	46	0	**46**	51	0	7.5	380	57	43	217	163	0.0001	0.0003	0.0003	0.0006	0.0007
5	GERMANTOWN	0	386	0	**386**	425	0	7.5	3,188	57	43	1,817	1,371	0.0009	0.0028	0.0022	0.0049	0.0058
6	MET GROVE	0	352	0	**352**	388	0	7.5	2,907	57	43	1,657	1,250	0.0008	0.0025	0.0020	0.0045	0.0053
7	WAS GROVE	0	15	0	**15**	17	0	7.5	124	57	43	71	53	0.0000	0.0001	0.0001	0.0002	0.0002
8	GARRETT PARK	0	22	0	**22**	24	0	7.5	182	57	43	104	78	0.0001	0.0002	0.0001	0.0003	0.0003
9	BOWIE 50%	50	188	188	**375**	206	206	7.5	3,097	57	43	1,765	1,332	0.0007	0.0027	0.0021	0.0048	0.0055
10	SEABROOK 15%	15	224	40	**264**	247	44	7.5	2,180	57	43	1,243	938	0.0006	0.0019	0.0015	0.0034	0.0040
11	KENSINGTON	0	45	0	**45**	50	0	7.5	372	57	43	212	160	0.0001	0.0003	0.0003	0.0006	0.0007
12	LAUREL 30%	30	209	90	**299**	230	99	7.5	2,470	57	43	1,408	1,062	0.0006	0.0021	0.0017	0.0038	0.0044
13	GAITHESBURG	0	280	0	**280**	308	0	7.5	2,313	57	43	1,318	994	0.0007	0.0020	0.0016	0.0036	0.0042
14	BERWYN HEIGHTS	0	30	0	**30**	33	0	4.5	149	57	43	85	64	0.0001	0.0001	0.0001	0.0002	0.0003
15	RIVERDALE	0	65	0	**65**	72	0	4.5	322	57	43	184	139	0.0002	0.0003	0.0002	0.0005	0.0007
16									0									
17	METRO RAIL LOTS								0									
18									0									
19	ADDISON ROAD 40%	40	791	527	**1318**	871	581	7.5	10,886	57	43	6,205	4,681	0.0025	0.0094	0.0074	0.0168	0.0193
20	ARCHIVES	0	12	0	12	13	0	4.5	59	57	43	34	26	0.0000	0.0001	0.0000	0.0001	0.0001
21	ARLING	0	10	0	10	11	0	4.5	50	57	43	28	21	0.0000	0.0000	0.0000	0.0001	0.0001
22	BALLSTON	0	1175	0	1175	1294	0	4.5	5,823	57	43	3,319	2,504	0.0028	0.0050	0.0040	0.0090	0.0118
23	BENN.RD	0	520	0	520	573	0	4.5	2,577	57	43	1,469	1,108	0.0013	0.0022	0.0017	0.0040	0.0052
24	BETH	0	395	0	395	435	0	4.5	1,957	57	43	1,116	842	0.0009	0.0017	0.0013	0.0030	0.0040
25	BRADD RD	0	10	0	**10**	11	0	4.5	50	57	43	28	21	0.0000	0.0000	0.0000	0.0001	0.0001
26	BROOKLAND	0	27	0	**27**	30	0	4.5	134	57	43	76	58	0.0001	0.0001	0.0001	0.0002	0.0003
27	CHEVERLY	0	557	0	**557**	613	0	4.5	2,760	57	43	1,573	1,187	0.0013	0.0024	0.0019	0.0043	0.0056
28	CLARENDON	0	554	0	554	610	0	4.5	2,745	57	43	1,565	1,181	0.0013	0.0024	0.0019	0.0042	0.0056
29	CLEVELAND PK	0	366	0	366	403	0	4.5	1,814	57	43	1,034	780	0.0009	0.0016	0.0012	0.0028	0.0037
30	COURT HOUSE	0	256	0	256	282	0	4.5	1,269	57	43	723	546	0.0006	0.0011	0.0009	0.0020	0.0026
31	CRYSTAL CITY	0	347	0	347	382	0	4.5	1,720	57	43	980	739	0.0008	0.0015	0.0012	0.0027	0.0035
32	DEANWOOD	0	194	0	**194**	214	0	4.5	961	57	43	548	413	0.0005	0.0008	0.0007	0.0015	0.0020
33	DUN LORING 10%	10	1220	136	**1355**	1343	149	4.5	6,715	57	43	3,827	2,887	0.0031	0.0058	0.0046	0.0104	0.0135
34	DUPONT CIRCLE	0	165	0	165	182	0	4.5	818	57	43	466	352	0.0004	0.0007	0.0006	0.0013	0.0017
35	EASTERN MKT	0	178	0	178	196	0	4.5	882	57	43	503	379	0.0004	0.0008	0.0006	0.0014	0.0018
36	EAST FALLS CH	0	442	0	**442**	487	0	4.5	2,190	57	43	1,249	942	0.0011	0.0019	0.0015	0.0034	0.0044
37	EIS	0	352	0	352	388	0	4.5	1,744	57	43	994	750	0.0008	0.0015	0.0012	0.0027	0.0035
38	FARRAGUT NORTH	0	102	0	102	112	0	4.5	505	57	43	288	217	0.0002	0.0004	0.0003	0.0008	0.0010
39	FARRAGUT WEST	0	221	0	221	243	0	4.5	1,095	57	43	624	471	0.0005	0.0009	0.0007	0.0017	0.0022
40	FEDERAL CENTER	0	75	0	75	83	0	4.5	372	57	43	212	160	0.0002	0.0003	0.0003	0.0006	0.0008
41	FEDERAL TRI	0	54	0	54	59	0	4.5	268	57	43	153	115	0.0001	0.0002	0.0002	0.0004	0.0005
42	FOGGY	0	102	0	102	112	0	4.5	505	57	43	288	217	0.0002	0.0004	0.0003	0.0008	0.0010
43	FORT TROTTEN	0	445	0	**445**	490	0	4.5	2,205	57	43	1,257	948	0.0011	0.0019	0.0015	0.0034	0.0045
44	FRH.HEIGHTS	0	679	0	679	748	0	4.5	3,365	57	43	1,918	1,447	0.0016	0.0029	0.0023	0.0052	0.0068
45	GALLERY PLACE	0	124	0	124	137	0	4.5	614	57	43	350	264	0.0003	0.0005	0.0004	0.0009	0.0012
46	GROSVENOR	0	716	0	**716**	788	0	4.5	3,548	57	43	2,022	1,526	0.0017	0.0031	0.0024	0.0055	0.0072
47	HUNT NORTH 40%	40	1873	1249	**3122**	2063	1375	7.5	25,786	57	43	14,698	11,088	0.0060	0.0223	0.0175	0.0398	0.0458
48	JUD SQUARE	0	110	0	110	121	0	4.5	545	57	43	311	234	0.0003	0.0005	0.0004	0.0008	0.0011
49	KING ST	0	30	0	**30**	33	0	4.5	149	57	43	85	64	0.0001	0.0001	0.0001	0.0002	0.0003
50									0									
51									0									
52	LANDOVER 25%	25	1410	470	**1880**	1553	518	7.5	15,528	57	43	8,851	6,677	0.0040	0.0134	0.0105	0.0240	0.0279
53	L'ENFANT PLAZA	0	296	0	296	326	0	4.5	1,467	57	43	836	631	0.0007	0.0013	0.0010	0.0023	0.0030
54	MCPHERSON SQ	0	52	0	52	57	0	4.5	258	57	43	147	111	0.0001	0.0002	0.0002	0.0004	0.0005
55	MEDICAL CENTER	0	14	0	**14**	15	0	4.5	69	57	43	40	30	0.0000	0.0001	0.0000	0.0001	0.0001
56	METRO CENTER	0	177	0	177	195	0	4.5	877	57	43	500	377	0.0004	0.0008	0.0006	0.0014	0.0018
57	MINNES	0	353	0	**353**	389	0	4.5	1,749	57	43	997	752	0.0008	0.0015	0.0012	0.0027	0.0035
58	NAT AIR	0	87	0	87	96	0	4.5	431	57	43	246	185	0.0002	0.0004	0.0003	0.0007	0.0009
59	NEW CARROL 50%	50	1049	1049	**2097**	1155	1155	7.5	17,320	57	43	9,872	7,448	0.0038	0.0150	0.0118	0.0267	0.0305
60	PRNTAGON	0	561	0	561	618	0	4.5	2,780	57	43	1,585	1,195	0.0013	0.0024	0.0019	0.0043	0.0056
61	PENTAGON CITY	0	381	0	381	420	0	4.5	1,888	57	43	1,076	812	0.0009	0.0016	0.0013	0.0029	0.0038
62	POTOMAC AVE	0	533	0	533	587	0	4.5	2,641	57	43	1,506	1,136	0.0013	0.0023	0.0018	0.0041	0.0054
64	ROCKVILLE	0	667	0	**667**	735	0	4.5	3,305	57	43	1,884	1,421	0.0016	0.0029	0.0022	0.0051	0.0067
65	ROSSLYN	0	356	0	356	392	0	4.5	1,764	57	43	1,006	759	0.0009	0.0015	0.0012	0.0027	0.0036
66	SHADY GROVE 10%	10	3903	434	**4337**	4298	478	7.5	35,821	57	43	20,418	15,403	0.0099	0.0310	0.0243	0.0553	0.0652
67	SILVER SPRING	0	44	0	**44**	48	0	4.5	218	57	43	124	94	0.0001	0.0002	0.0001	0.0003	0.0004
68	SMITH MALL	0	120	0	120	132	0	4.5	595	57	43	339	256	0.0003	0.0005	0.0004	0.0009	0.0012
69	STADIUM ARM	0	976	0	976	1075	0	4.5	4,837	57	43	2,757	2,080	0.0023	0.0042	0.0033	0.0075	0.0098
70	TAKOMA PK	0	146	0	**146**	161	0	4.5	724	57	43	412	311	0.0004	0.0006	0.0005	0.0011	0.0015
71	TENLEYTON	0	17	0	**17**	19	0	4.5	84	57	43	48	36	0.0000	0.0001	0.0001	0.0001	0.0002
72	TWINBROOK	0	1136	0	**1136**	1251	0	4.5	5,630	57	43	3,209	2,421	0.0027	0.0049	0.0038	0.0087	0.0114
73	UNION STAT	0	378	0	378	416	0	4.5	1,873	57	43	1,068	805	0.0009	0.0016	0.0013	0.0029	0.0038
74	VAN NESS	0	343	0	343	378	0	4.5	1,700	57	43	969	731	0.0008	0.0015	0.0012	0.0026	0.0034
75	VIENNA 25%	25	2798	933	**3731**	3082	1027	7.5	30,816	57	43	17,565	13,251	0.0079	0.0266	0.0209	0.0476	0.0554
76	VA SQUARE	0	642	0	642	707	0	4.5	3,181	57	43	1,813	1,368	0.0015	0.0028	0.0022	0.0049	0.0065
77	WEST FALLS CHURCH	0	2183	0	**2183**	2404	0	4.5	10,818	57	43	6,166	4,652	0.0052	0.0094	0.0073	0.0167	0.0219
78	WHITE FLINT	0	1633	0	1633	1798	0	4.5	8,092	57	43	4,613	3,480	0.0039	0.0070	0.0055	0.0125	0.0164
79	WOODLEY	0	68	0	68	75	0	4.5	337	57	43	192	145	0.0002	0.0003	0.0002	0.0005	0.0007
80	RHODE ISLAND 30%	30	266	114	**380**	293	126	7.5	3,139	57	43	1,789	1,350	0.0008	0.0027	0.0021	0.0048	0.0056
81									0									
82	BUS & CAR POOL LOTS								0									
83									0									
84	CARTER BARRON	0	798	0	798	879	0	4.5	3,955	57	43	2,254	1,700	0.0019	0.0034	0.0027	0.0061	0.0080
87	PG PLAZA	0	47	0	47	52	0	4.5	233	57	43	133	100	0.0001	0.0002	0.0002	0.0004	0.0005
88	PENN MAR SHOPP.	0	100	0	**100**	110	0	4.5	496	57	43	282	213	0.0002	0.0004	0.0003	0.0008	0.0010
89	CAP PLAZA	0	100	0	**100**	110	0	4.5	496	57	43	282	213	0.0002	0.0004	0.0003	0.0008	0.0010
90	EASTOVER	0	100	0	**100**	110	0	4.5	496	57	43	282	213	0.0002	0.0004	0.0003	0.0008	0.0010
91	FOUR MILE RUN	0	28	0	**28**	31	0	4.5	139	57	43	79	60	0.0001	0.0001	0.0001	0.0002	0.0003
92	SPRINGFIELD MALL	0	580	0	**580**	639	0	4.5	2,874	57	43	1,638	1,236	0.0014	0.0025	0.0020	0.0044	0.0058
93	SPRINGFIELD METH CH	0	48	0	**48**	53	0	4.5	238	57	43	136	102	0.0001	0.0002	0.0002	0.0004	0.0005
94	FRED ARMORY	0	33	0	**33**	36	0	7.5	273	57	43	155	117	0.0001	0.0002	0.0002	0.0004	0.0005
95	MYERSVILLE	0	65	0	**65**	72	0	7.5	537	57	43	306	231	0.0002	0.0005	0.0004	0.0008	0.0010
96	ROSEMONT	0	45	0	**45**	50	0	7.5	372	57	43	212	160	0.0001	0.0003	0.0003	0.0006	0.0007
97	URBANA	0	193	0	**193**	213	0	7.5	1,594	57	43	909	685	0.0005	0.0014	0.0011	0.0025	0.0029
98	JEFFERSON	0	40	0	**40**	44	0	7.5	330	57	43	188	142	0.0001	0.0003	0.0002	0.0005	0.0006
99	NORBECK RD	0	248	0	**248**	273	0	7.5	2,048	57	43	1,168	881	0.0006	0.0018	0.0014	0.0032	0.0038
100	MONTROSE RD	0	650	0	**650**	716	0	7.5	5,369	57	43	3,060	2,308	0.0016	0.0046	0.0036	0.0083	0.0098
102	BRIGG CHENNY 50%	50	215	215	**430**	237	237	7.5	3,552	57	43	2,024	1,527	0.0008	0.0031	0.0024	0.0055	0.0063
104	COMUS ROAD	0	30	0	**30**	33	0	7.5	248	57	43	141	107	0.0001	0.0002	0.0002	0.0004	0.0005
105	LAKEFOREST MALL	0	300	0	**300**	330	0	7.5	2,478	57	43	1,412	1,065	0.0007	0.0021	0.0017	0.0038	0.0045
106	BURTONSVILLE	0	500	0	**500**	551	0	7.5	4,130	57	43	2,354	1,776	0.0012	0.0036	0.0028	0.0064	0.0076
107	FORCEY MEM.	0	200	0	**200**	220	0	7.5	1,652	57	43	942	710	0.0005	0.0014	0.0011	0.0025	0.0030
108	TECH ROAD	0	155	0	**155**	171	0	7.5	1,280	57	43	730	550	0.0004	0.0011	0.0009	0.0020	0.0023
110	BELTWAY	0	265	0	**265**	292	0	7.5	2,189	57	43	1,248	941	0.0006	0.0019	0.0015	0.0034	0.0040
112	LAUREL VAN DUSEN	0	62	0	**62**	68	0	7.5	512	57	43	292	220	0.0001	0.0004	0.0003	0.0008	0.0009
113	ACCOKEEK	0	450	0	**450**	496	0	7.5	3,717	57	43	2,119	1,598	0.0011	0.0032	0.0025	0.0057	0.0068
114	ABC DRIVE IN	0	100	0	**100**	110	0	7.5	826	57	43	471	355	0.0002	0.0007	0.0006	0.0013	0.0015
115	BOWIE 20%	20	526	131	**657**	579	145	7.5	5,426	57	43	3,093	2,333	0.0014	0.0047	0.0037	0.0084	0.0098
116	CLINTON 50%	50	212	212	**424**	233	233	7.5	3,502	57	43	1,996	1,506	0.0008	0.0030	0.0024	0.0054	0.0062
117	OXON HILL 20%	20	519	130	**649**	572	143	7.5	5,360	57	43	3,055	2,305	0.0014	0.0046	0.0036	0.0083	0.0097
118	EQUESTRIAN CENTER 50%	50	150	150	**300**	165	165	7.5	2,478	57	43	1,412	1,065	0.0005	0.0021	0.0017	0.0038	0.0044
119	BOWIE MARKET PLACE	0	50	0	**50**	55	0	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0008
120	FT.WASHINGTON	0	412	0	**412**	454	0	7.5	3,403	57	43	1,940	1,463	0.0010	0.0029	0.0023	0.0053	0.0062
121	MONTPELIER REC PARK	0	70	0	**70**	77	0	7.5	578	57	43	330	249	0.0002	0.0005	0.0004	0.0009	0.0011
123	RESTON	0	1547	0	**1547**	1704	0	7.5	12,777	57	43	7,283	5,494	0.0037	0.0110	0.0087	0.0197	0.0234
124	GREENBRIAR	0	55	0	**55**	61	0	7.5	454	57	43	259	195	0.0001	0.0004	0.0003	0.0007	0.0008
125	FAIR OAKS	0	150	0	**150**	165	0	7.5	1,239	57	43	706	533	0.0004	0.0011	0.0008	0.0019	0.0023

		2002			2005	2005	AVERAGE		ARTERIAL	FREEWAY	ARTERIAL	FREEWAY	EMISSIONS				
													POLLUTANT	RUNNING			TOTAL
126	ROLLING VALLEY	0	628	0	**628**	692	0	7.5	5,187	57	43	2,957	2,230	0.0015	0.0045	0.0035	0.0080	0.0095
130	SPRINGFIELD PLAZA	0	230	0	**230**	253	0	7.5	1,900	57	43	1,083	817	0.0006	0.0016	0.0013	0.0029	0.0035
134	FAIRLANES BOWL	0	35	0	**35**	39	0	7.5	289	57	43	165	124	0.0001	0.0002	0.0002	0.0004	0.0005
135	NOTTOWAY PARK	0	14	0	**14**	15	0	7.5	116	57	43	66	50	0.0000	0.0001	0.0001	0.0002	0.0002
137	HORNER RD	0	2397	0	**2397**	2640	0	7.5	19,798	57	43	11,285	8,513	0.0058	0.0171	0.0134	0.0306	0.0363
138	LAKE RIDGE	0	555	0	**555**	611	0	7.5	4,584	57	43	2,613	1,971	0.0013	0.0040	0.0031	0.0071	0.0084
139	MINNIEVILLE RD 40%	40	336	224	560	370	247	7.5	4,625	57	43	2,636	1,989	0.0011	0.0040	0.0031	0.0071	0.0082
140	GORDON BLVD	0	156	0	156	172	0	7.5	1,288	57	43	734	554	0.0004	0.0011	0.0009	0.0020	0.0024
142	HILLENDALE	0	248	0	**248**	273	0	7.5	2,048	57	43	1,168	881	0.0006	0.0018	0.0014	0.0032	0.0038
143	POTOMAC MILLS	0	946	0	**946**	1042	0	7.5	7,813	57	43	4,454	3,360	0.0023	0.0068	0.0053	0.0121	0.0143
									0									
	List of new lots to be added in Conformity Document list								0									
									0									
	PARK-AND-RIDE LOTS - MARYLAND								0									
	CALVERT COUNTY								0									
	Dunkirk	25	32	11	42	35	12	7.5	347	57	43	198	149	0.0001	0.0003	0.0002	0.0005	0.0006
	Huntingtown	25	26	9	35	29	10	7.5	289	57	43	165	124	0.0001	0.0002	0.0002	0.0004	0.0005
	Lord Calvert Bowling Alley	25	83	28	110	91	30	7.5	909	57	43	518	391	0.0002	0.0008	0.0006	0.0014	0.0016
	Lusby	25	23	8	30	25	8	7.5	248	57	43	141	107	0.0001	0.0002	0.0002	0.0004	0.0004
	North Beach VFD	25	53	18	70	58	19	7.5	578	57	43	330	249	0.0001	0.0005	0.0004	0.0009	0.0010
	Prince Frederick	25	53	18	70	58	19	7.5	578	57	43	330	249	0.0001	0.0005	0.0004	0.0009	0.0010
	St. Leonard	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	Sunderland	25	80	27	106	88	29	7.5	875	57	43	499	376	0.0002	0.0008	0.0006	0.0014	0.0016
	PARK-AND-RIDE LOTS - MARYLAND								0									
	CHARLES COUNTY								0									
	301 Park & Ride	25	287	96	383	316	105	7.5	3,163	57	43	1,803	1,360	0.0008	0.0027	0.0021	0.0049	0.0057
	Charles County Government Bld	25	26	9	35	29	10	7.5	289	57	43	165	124	0.0001	0.0002	0.0002	0.0004	0.0005
	Food Lion Shopping Center	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	La Plata Armory	25	15	5	20	17	6	7.5	165	57	43	94	71	0.0000	0.0001	0.0001	0.0003	0.0003
	Laurel Springs Regional Park	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	Life Wesleyan Church	25	38	13	50	41	14	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	Mattawoman-Beantown Rd	25	435	145	580	479	160	7.5	4,790	57	43	2,731	2,060	0.0012	0.0041	0.0033	0.0074	0.0086
	Smallwood Village	25	75	25	100	83	28	7.5	826	57	43	471	355	0.0002	0.0007	0.0006	0.0013	0.0015
	St. Charles Towne	25	263	88	350	289	96	7.5	2,891	57	43	1,648	1,243	0.0007	0.0025	0.0020	0.0045	0.0052
	PARK-AND-RIDE LOTS - MARYLAND								0									
	FREDERICK COUNTY								0									
	Frederick (north)	25	123	41	164	135	45	7.5	1,355	57	43	772	582	0.0003	0.0012	0.0009	0.0021	0.0024
	Frederick (south)	25	173	58	230	190	63	7.5	1,900	57	43	1,083	817	0.0005	0.0016	0.0013	0.0029	0.0034
	Monacacy Marcet	25	600	200	800	661	220	7.5	6,607	57	43	3,766	2,841	0.0017	0.0057	0.0045	0.0102	0.0119
	PARK-AND-RIDE LOTS - MARYLAND								0									
	MONTGOMERY COUNTY								0									
	Colesville	0	190	0	190	209	0	7.5	1,569	57	43	894	675	0.0005	0.0014	0.0011	0.0024	0.0029
	Damascus	50	0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
	Gaithersburg	50	259	259	517	285	285	7.5	4,270	57	43	2,434	1,836	0.0009	0.0037	0.0029	0.0066	0.0075
	Gaithersburg	50	175	175	350	193	193	7.5	2,891	57	43	1,648	1,243	0.0006	0.0025	0.0020	0.0045	0.0051
	Germantown Town	50	0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
	Greencastle	50	75	75	150	83	83	7.5	1,239	57	43	706	533	0.0003	0.0011	0.0008	0.0019	0.0022
	Milestone Shopping	50	88	88	175	96	96	7.5	1,445	57	43	824	622	0.0003	0.0012	0.0010	0.0022	0.0025
	PARK-AND-RIDE LOTS - MAYLAND								0									
	PRINCE GEORGE'S COUNTY								0									
	Hampton Mall	0	100	0	100	110	0	4.5	496	57	43	282	213	0.0002	0.0004	0.0003	0.0008	0.0010
	Laurel (south)	25	513	171	684	565	188	7.5	5,649	57	43	3,220	2,429	0.0014	0.0049	0.0038	0.0087	0.0102
	PARK-AND-RIDE LOTS - VIRGINIA								0									
	ARLINGTON COUNTY								0									
	Ballston Public Parking Garage	25	375	125	500	413	138	7.5	4,130	57	43	2,354	1,776	0.0011	0.0036	0.0028	0.0064	0.0074
	Washington-Lee	50	178	178	356	196	196	7.5	2,940	57	43	1,676	1,264	0.0006	0.0025	0.0020	0.0045	0.0052
	PARK-AND-RIDE LOTS - VIRGINIA								0									
	FAIRFAX COUNTY								0									
	American Legion	50	50	50	100	55	55	7.5	826	57	43	471	355	0.0002	0.0007	0.0006	0.0013	0.0015
	Canterbury Woods Pk	50	17	17	34	19	19	7.5	281	57	43	160	121	0.0001	0.0002	0.0002	0.0004	0.0005
	Centreville	50	185	185	370	204	204	7.5	3,056	57	43	1,742	1,314	0.0007	0.0026	0.0021	0.0047	0.0054
	Centreville United Methodist Chu	50	74	74	147	81	81	7.5	1,214	57	43	692	522	0.0003	0.0010	0.0008	0.0019	0.0021
	Fairfax County Government Cent	50	85	85	170	94	94	7.5	1,404	57	43	800	604	0.0003	0.0012	0.0010	0.0022	0.0025
	Greenbriar Park	50	28	28	55	30	30	7.5	454	57	43	259	195	0.0001	0.0004	0.0003	0.0007	0.0008
	Herndon-Monroe	50	873	873	1,745	961	961	7.5	14,413	57	43	8,215	6,197	0.0031	0.0125	0.0098	0.0222	0.0254
	Michael's	50	100	100	200	110	110	7.5	1,652	57	43	942	710	0.0004	0.0014	0.0011	0.0025	0.0029
	Parkwood Baptist	50	9	9	18	10	10	7.5	149	57	43	85	64	0.0000	0.0001	0.0001	0.0002	0.0003
	South Run District Pk	50	170	170	340	187	187	7.5	2,808	57	43	1,601	1,208	0.0006	0.0024	0.0019	0.0043	0.0049
	St Paul Chung Catholic Church	50	50	50	100	55	55	7.5	826	57	43	471	355	0.0002	0.0007	0.0006	0.0013	0.0015
	Stringfellow Rd	50	181	181	361	199	199	7.5	2,982	57	43	1,700	1,282	0.0007	0.0026	0.0020	0.0046	0.0053
	Sully Station	50	70	70	140	77	77	7.5	1,156	57	43	659	497	0.0003	0.0010	0.0008	0.0018	0.0020
	Sydenstricker Rd	50	84	84	167	92	92	7.5	1,379	57	43	786	593	0.0003	0.0012	0.0009	0.0021	0.0024
	Wakefield Chapel Pk	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	PARK-AND-RIDE LOTS - VIRGINIA								0									
	LOUDOUN COUNTY								0									
	Ashburn Farm	50	10	10	20	11	11	7.5	165	57	43	94	71	0.0000	0.0001	0.0001	0.0003	0.0003
	Ashburn Village	50	20	20	40	22	22	7.5	330	57	43	188	142	0.0001	0.0003	0.0002	0.0005	0.0006
	Cascades	50	28	28	55	30	30	7.5	454	57	43	259	195	0.0001	0.0004	0.0003	0.0007	0.0008
	Dulles North Transit	50	375	375	750	413	413	7.5	6,194	57	43	3,531	2,664	0.0014	0.0054	0.0042	0.0096	0.0109
	Hamilton	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	Innovation Avenue	50	38	38	75	41	41	7.5	619	57	43	353	266	0.0001	0.0005	0.0004	0.0010	0.0011
	Leesburg	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	Leesburg Kohls	50	600	600	1200	661	661	7.5	9,911	57	43	5,649	4,262	0.0022	0.0088	0.0067	0.0153	0.0175
	Purcellville	50	18	18	35	19	19	7.5	289	57	43	165	124	0.0001	0.0002	0.0002	0.0004	0.0005
	Sterling Park SC	50	23	23	45	25	25	7.5	372	57	43	212	160	0.0001	0.0003	0.0003	0.0006	0.0007
	Sterling Shaw Rd	50	24	24	48	26	26	7.5	396	57	43	226	170	0.0001	0.0003	0.0003	0.0006	0.0007
	PARK-AND-RIDE LOTS - VIRGINIA								0									
	PRINCE WILLIAM COUNTY								0									
	Brittany	50	48	48	95	52	52	7.5	785	57	43	447	337	0.0002	0.0007	0.0005	0.0012	0.0014
	Dale City	50	294	294	587	323	323	7.5	4,848	57	43	2,763	2,085	0.0011	0.0042	0.0033	0.0075	0.0085
	Harbor Drive	50	100	100	200	110	110	7.5	1,652	57	43	942	710	0.0004	0.0014	0.0011	0.0025	0.0029
	Lindendale	50	108	108	216	119	119	7.5	1,784	57	43	1,017	767	0.0004	0.0015	0.0012	0.0028	0.0031
	Montclair	50	25	25	50	28	28	7.5	413	57	43	235	178	0.0001	0.0004	0.0003	0.0006	0.0007
	PRTC Transit Center	50	93	93	185	102	102	7.5	1,528	57	43	871	657	0.0003	0.0013	0.0010	0.0024	0.0027
	Tackett's Mill	50	85	85	169	93	93	7.5	1,396	57	43	796	600	0.0003	0.0012	0.0009	0.0022	0.0025
	Triangle	50	15	15	29	16	16	7.5	240	57	43	137	103	0.0001	0.0002	0.0002	0.0004	0.0004
	I-95 / Rt 123	50	282	282	563	310	310	7.5	4,650	57	43	2,651	2,000	0.0010	0.0040	0.0032	0.0072	0.0082
	US 1 / VA 234	50	137	137	274	151	151	7.5	2,263	57	43	1,290	973	0.0005	0.0020	0.0015	0.0035	0.0040
	STAFFORD COUNTY								0									
	Route 610	50	406	406	811	447	447	7.5	6,698	57	43	3,818	2,880	0.0015	0.0058	0.0045	0.0103	0.0118
	Route 610 (2)	50	375	375	750	413	413	7.5	6,194	57	43	3,531	2,664	0.0014	0.0054	0.0042	0.0096	0.0109
	Route 630	50	270	270	539	297	297	7.5	4,452	57	43	2,538	1,914	0.0010	0.0038	0.0030	0.0069	0.0078
	Route 17	50	518	518	1035	570	570	7.5	8,548	57	43	4,873	3,676	0.0019	0.0074	0.0058	0.0132	0.0151
	Linden	50	65	65	130	72	72	7.5	1,074	57	43	612	462	0.0002	0.0009	0.0007	0.0017	0.0019
	MARC TRAIN COMMUTER LOTS								0									
	College Park	25	431	144	574	474	158	7.5	4,741	57	43	2,702	2,039	0.0012	0.0041	0.0032	0.0073	0.0085
	Frederick	0	0	0	0	0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
	Greenbelt	60	1346	2018	3364	1482	2223	7.5	27,784	57	43	15,837	11,947	0.0057	0.0240	0.0189	0.0429	0.0485
	Harpers Ferry		98	0	98	108	0	7.5	809	57	43	461	348	0.0002	0.0007	0.0005	0.0012	0.0015
	Muirkirk	60	260	390	650	286	429	7.5	5,369	57	43	3,060	2,308	0.0011	0.0046	0.0036	0.0083	0.0094
	Seabrook	0	264	0	264	291	0	4.5	1,308	57	43	746	563	0.0006	0.0011	0.0009	0.0020	0.0027
	Silver Spring	0	0	0	0	0	0	4.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
	Union Station	0	781	0	781	860	0	7.5	6,451	57	43	3,677	2,774	0.0019	0.0056	0.0044	0.0100	0.0118
	VIRGINIA RAILWAY EXPRESS COMMUTER LOTS								0									
	Backlick Road	50	110	110	220	121	121	7.5	1,817	57	43	1,036	781	0.0004	0.0016	0.0012	0.0028	0.0032
	Broad Run	50	198	198	396	218	218	7.5	3,271	57	43	1,864	1,406	0.0007	0.0028	0.0022	0.0050	0.0058
	Brooke	50	150	150	300	165	165	7.5	2,478	57	43	1,412	1,065	0.0005	0.0021	0.0017	0.0038	0.0044
	Burke Center	50	275	275	550	303	303	7.5	4,543	57	43	2,589	1,953	0.0010	0.0039	0.0031	0.0070	0.0080
	Franconia/Springfield (operated b	50	1900	1900	3800	2092	2092	7.5	31,385	57	43	17,890	13,496	0.0069	0.0271	0.0213	0.0484	0.0553
	Leeland Road	50	326	326	652	359	359	7.5	5,385	57	43	3,069	2,316	0.0012	0.0047	0.0037	0.0083	0.0095
	Lorton	50	100	100	200	110	110	7.5	1,652	57	43	942	710	0.0004	0.0014	0.0011	0.0025	0.0029
	Manassas	50	187	187	374	206	206	7.5	3,089	57	43	1,761	1,328	0.0007	0.0027	0.0021	0.0048	0.0054
	Manassas Park	50	150	150	300	165	165	7.5	2,478	57	43	1,412	1,065	0.0005	0.0021	0.0017	0.0038	0.0044
	Quantico	50	109	109	217	119	119	7.5	1,792	57	43	1,022	771	0.0004	0.0015	0.0012	0.0028	0.0032
	Rippon	50	150	150	300	165	165	7.5	2,478	57	43	1,412	1,065	0.0005	0.0021	0.0017	0.0038	0.0044
	Rolling Road	50	185	185	370	204	204	7.5	3,056	57	43	1,742	1,314	0.0007	0.0026	0.0021	0.0047	0.0054
	Woodbridge	50	294	294	588	324	324	7.5	4,856	57	43	2,768	2,088	0.0011	0.0042	0.0033	0.0075	0.0086
	METRORAIL PARKING LOTS		0	0		0	0	7.5	0	57	43	0	0	0.0000	0.0000	0.0000	0.0000	0.0000
	Anacostia	25	861	287	1148	948	316	7.5	9,482	57	43	5,405	4,077	0.0024	0.0082	0.0064	0.0146	0.0171
	Branch Avenue	50	1611	1611	3222	1774	1774	7.5	26,612	57	43	15,169	11,443	0.0058	0.0230	0.0181	0.0411	0.0469
	Capitol Heights	50	194	194	387	213	213	7.5	3,196	57	43	1,822	1,374	0.0007	0.0028	0.0022	0.0049	0.0056
	College Park	25	465	155	620	512	171	7.5	5,121	57	43	2,919	2,202	0.0013	0.0044	0.0035	0.0079	0.0092
	Congress Heights	0	66	0	66	73	0	4.5	327	57	43	186	141	0.0002	0.0003	0.0002	0.0005	0.0007
	Deanwood	0	194	0	194	214	0	7.5	1,602	57	43	913	689	0.0005	0.0014	0.0011	0.0025	0.0029
	East Falls Church	50	221	221	442	243	243	7.5	3,651	57	43	2,081	1,570	0.0008	0.0032	0.0025	0.0056	0.0064
	Forest Glen	50	329	329	658	362	362	7.5	5,435	57	43	3,098	2,337	0.0012	0.0047	0.0037	0.0084	0.0096
	Franconia - Springfield	50	1987	1987	3973	2188	2188	4.5	19,689	57	43	11,222	8,466	0.0072	0.0170	0.0134	0.0304	0.0376
	Glenmont	50	925	925	1850	1019	1019	4.5	9,168	57	43	5,226	3,942	0.0033	0.0079	0.0062	0.0142	0.0175
	Greenbelt	50	1783	1783	3565	1963	1963	7.5	29,445	57	43	16,783	12,661	0.0064	0.0255	0.0200	0.0454	0.0519
	Naylor Road	50	216	216	431	237	237	7.5	3,560	57	43	2,029	1,531	0.0008	0.0031	0.0024	0.0055	0.0063
	Prince George's Plaza	25	927	309	1236	1021	340	7.5	10,209	57	43	5,819	4,390	0.0026	0.0088	0.0069	0.0158	0.0184
	Southern Avenue	50	1090	1090	2180	1200	1200	4.5	10,803	57	43	6,158	4,645	0.0039	0.0093	0.0073	0.0167	0.0206
	Suitland	50	1033	1033	2065	1137	1137	4.5	10,233	57	43	5,833	4,400	0.0037	0.0088	0.0069	0.0158	0.0195
	Van Dorn Street	50	204	204	407	224	224	4.5	2,017	57	43	1,150	867	0.0007	0.0017	0.0014	0.0031	0.0038
	West Hyattsville	25	453	151	604	499	166	7.5	4,989	57	43	2,844	2,145	0.0013	0.0043	0.0034	0.0077	0.0090
	Wheaton	25	759	253	1012	836	279	7.5	8,358	57	43	4,764	3,594	0.0021	0.0072	0.0057	0.0129	0.0150
					112,527				818,600					0.2324	0.7078	0.5557	1.2635	1.4959

Bold figures: New numbers taken from P & R directory
Figures in bracket: Carry forward figures from conformity doc.

Park lot Growth Rate	
transit trips 2005	1009538
transit trips 2000	863783
Annual growth rate	0.033748059
Growth factor (2002-2005)	1.101244178

Attachment H

Memorandum

Date: April 3, 2003

To: Michael Clifford, COG/TP
Joan Rohlfs, COG/DEP

From: Maureen Mullen, Angelica Codd, E.H. Pechan & Associates, Inc.

Subject: Technical Corrections to the 1990 and 2005 MOBILE6 Input Parameters (revised)

cc: MOBILE6 Task Force Members

The purpose of this memorandum is to document technical corrections that have been made to the MOBILE6 inputs used in preparing the highway vehicle emission inventories for the Metropolitan Washington Council of Governments (MWCOG) region for calendar years 1990 and 2005. These corrected inputs are compared in this memo to those previously used in the MWCOG highway vehicle emissions modeling and documented in a memorandum entitled "1990 and 2005 MOBILE6 Input Documentation" dated January 27, 2003. These technical corrections have been provided by DC, Maryland, and Virginia air agency representatives after review of the January documentation. This memo is divided into two sections. The first section discusses the technical corrections to the 1990 input parameters. These corrections apply to 1990 diesel sales fractions, vehicle miles traveled (VMT) mix fractions, I/M, and ATP input parameters. The second section summarizes the technical corrections to the 2005 I/M and ATP input parameters.

A. 1990 MOBILE6 Input Updates

1. Diesel Sales Fractions

Previously, the LDV and the LDT diesel fractions for the District of Columbia were the MOBILE6 default diesel sales fractions for 1990. In this update, the diesel sales fractions for these vehicle categories were derived from the 1990 MOBILE5 default diesel sales fractions. MOBILE5 LDV diesel sales fractions were applied to the MOBILE6's LDV diesel sales fractions while the MOBILE5 LDT values were applied to the MOBILE6's LDT1 and LDT2 diesel sales fractions. As with the original emissions modeling, the MOBILE6 default diesel sales fractions were used for all other vehicle categories. Appendix 1 shows the 1990 MOBILE5 default LDV and LDT values and the MOBILE6 default diesel sales fractions for LDVs and LDT1/2s. There are no changes in the diesel sales fractions values for all other jurisdictions.

2. Inspection and Maintenance (I/M) and Anti-Tampering Program (ATP) Parameters

The 1990 I/M and ATP input parameters apply to the following jurisdictions: DC; Montgomery County and Prince George's County, MD; and Alexandria, Arlington County, Fairfax County, and Prince William County, VA. Table 1 presents the I/M program parameters for the District of Columbia. The I/M program parameters for Maryland are shown in Table 2. Table 3 reports the I/M program parameters for Virginia. Tables 1, 2, and 3 provide a

comparison of the I/M program parameters used in the original emission factor modeling versus the most recent corrections provided by each State agency.

Tables 4, 5, and 6 compare the original 1990 ATP parameters versus the corrected ATP data for the District of Columbia, Maryland, and Virginia, respectively.

Each table consisted of three columns. The first column lists the program parameters. The second column reports the data reported in the original emissions modeling. Lastly, the column called 'Technical Correction Update' shows the most corrections provided by each State agency. The I/M and ATP input parameters that had been changed are highlighted in the last column of each table.

3. VMT Mix Fractions

The VMT mix fractions for DC were re-calculated due to the diesel sales fractions updates. As before, the VMT mix fractions by vehicle type for DC were based on the over-all non-bus HDV VMT fractions as output for, COG's travel demand model combined with county-specific registration distributions and diesel sales fractions and MOBILE6 default data on the VMT mix by vehicle type within the heavy and light-duty vehicle categories. For a detailed explanation of the VMT mix fractions methodology, refer to the Memo dated January 27, 2003. There is no difference in the methodology used in re-calculating the DC's VMT mix fractions. The difference is due to the diesel sales fractions applied to each analysis. The original 1990 VMT mix fractions were calculated based on the MOBILE6 default diesel sales fractions for all vehicle categories. Currently, the VMT mix fractions are calculated based on a combined MOBILE5 and MOBILE6 default diesel sales fractions. MOBILE5's default LDV diesel sales fractions were applied to the MOBILE6's LDV diesel sales fractions while the MOBILE5's default LDT values were applied to the MOBILE6's LDT1 and LDT2 diesel sales fractions. The MOBILE6 default diesel sales fractions were used for all other vehicle categories. Table 7 presents the VMT mix fractions for the District of Columbia based on the two different diesel sales fractions applied.

B. 2005 MOBILE6 Input Updates

1. Inspection and Maintenance (I/M) and Anti-Tampering Program (ATP) Parameters

Each jurisdiction provided I/M program inputs and ATP inputs in MOBILE6 format for 2005. These inputs apply in all counties modeled by COG, except for St. Mary's County, MD and Clark County and Spotsylvania County, VA which do take participate in the I/M programs.

Tables 8, 9, and 10 provide the updated 2005 I/M input parameters for the District of Columbia, Maryland, and Virginia, respectively. All the changes in the input parameters are highlighted in yellow.

Below is a brief summary of the changes for each of the program parameters:

a. District of Columbia

1. Program #1 – IDLE Test
   - Added testing of the HDGV6 vehicle category.

2. Programs #2 and #6 – IM240
    - Changed I/M Program Start Year from 1999 to 1983.
    - Added testing of the HDGV6 vehicle category.

3. Program #3 - OBD I/M
    - Changed I/M Program Start Year from 2002 to 1983.

4. Programs #4 and #7 – FP and GC
    - Added testing of the HDGV6 vehicle category.

5. Program #5 – EVAP OBD & GC
    - Changed I/M Program Start Year from 2002 to 1999.

b. Maryland—No changes.

c. Virginia

1. Programs #1 through #7
    - Changed Exemption Age from 24.0 to N/A.

2. Program #2 – ASM 2525/5015 FINAL
    - Changed I/M Program Start Year from 1998 to 1983.

3. Program #3 – OBD I/M
    - Changed I/M Program Start Year from 2002 to 1983.

4. Program #4 – EVAP OBD & GC
    - Changed I/M Program Start Year from 2002 to 1998.

5. Programs #1, #2, #3, #6, and #7
    - Changed I/M Program Start Year to 1998 for Loudoun and Stafford Counties.

Tables 11, 12, and 13 provide a comparison of the original 2005 ATP input parameters versus the most recent available data submitted by each State agency. Table 11 presents the ATP parameters for DC. Maryland's ATP input parameters are shown in Table 12. Virginia's ATP input parameters are provided in Table 13. In both Maryland and DC, the HDGV7, HDGV8A, HDGV8b, and GAS BUS vehicle categories were removed from the ATP testing. In DC, corrections were made to the program start year (from 1982 to 1983) and to the first model year (from 1984 to 1968). In Maryland, the compliance rate was changed from 98 percent to 96 percent. In Virginia, the program start year was changed from 1983 to 1989 and the first model year was changed from 1973 to 1968.

Table 1
1990 I/M Program Parameters for DC

Program Parameters	Original I/M Data Reported	Technical Correction Update
Test Type	IDLE	IDLE
I/M Program Start Year	1983	1983
Test Frequency	Biennial	Biennial
Program Type	T/O	T/O
Model Years	1968- 2050	1968-2050
Stringency Rate (%)	20	20
Compliance Rate (%)	96	96
Waiver Rate (%)	3	3
Exemption Age		25
Vehicles Tested		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	Yes
HDGV4	Yes	Yes
HDGV5	Yes	Yes
HDGV6	Yes	Yes
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No

Table 2
1990 I/M Program Parameters for Maryland*

Program Parameters	Original I/M Data Reported	Technical Correction Update
Test Type	IDLE	IDLE
I/M Program Start Year	1984	1984
Test Frequency	Biennial	Biennial
Program Type	T/O	T/O
Model Years	1977-2050	1977-2050
Stringency Rate (%)	23	23
Compliance Rate (%)	98	96
Waiver Rate (%)	16 and 17	21 and 23
Grace Period (years	N/A	1
Vehicle Tested		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	Yes
HDGV4	Yes	Yes
HDGV5	Yes	Yes
HDGV6	Yes	Yes
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No

*** Maryland's 1990 I/M program applies to Montgomery and Prince George's Counties only.**

Table 3
1990 I/M Program Parameters for Virginia*

Program Parameters	Original I/M Data Reported	Technical Correction Update
Test Type	2500/IDLE	IDLE
I/M Program Start Year	1983	1983
Test Frequency	Biennial	Biennial
Program Type	TRC	TRC
Model Years	1968-2050	1968-2050
Stringency Rate (%)	35	35
Compliance Rate (%)	98	98
Waiver Rate (%)	3	3
Exemption Age	24	N/A
Vehicle Tested		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	No
HDGV3	No	No
HDGV4	No	No
HDGV5	No	No
HDGV6	No	No
HDGV7	No	No
HDGV8A	No	No
HDGV8B	No	No
GAS BUS	No	No

*** Virginia's 1990 I/M program applies to Alexandria, Arlington County, Fairfax County, and Prince William County. From 1983-1988, these counties had an annual, idle, manual test and repair inspection. In 1989, the region switched to a biennial, 2500/idle, computerized test and repair inspection and also started an ATP. The above inputs represent the most reasonable way to model the actual VA I/M program within MOBILE6.**

Table 4
1990 Anti-tampering Program Parameters for DC

Program Parameters	Original ATP Data Reported	Technical Correction Update
Program Start Year	1982	1983
First Model Year	1984	1968
Last Model Year	2050	2050
Program Type	Test Only	Test Only
Inspection Frequency	Biennial	Biennial
Compliance Rate (%)	96	96
Vehicle Types		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	Yes
HDGV4	Yes	Yes
HDGV5	Yes	Yes
HDGV6	Yes	Yes
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No
Inspections Performed		
Air pump system disablement	No	No
Catalyst removal	Yes	Yes
Fuel inlet restrictor disablement	Yes	Yes
Tailpipe lead deposit test	No	No
EGR disablement	No	No
Evaporative system disablement	No	No
PCV system disablement	No	No
Missing gas cap	Yes	Yes

Table 5
1990 Anti-tampering Program Parameters for Maryland*

Program Parameters	Original ATP Data Reported	Technical Correction Update
Program Start Year	1989	1989
First Model Year	1977	1977
Last Model Year	2050	2050
Program Type	Test Only	Test Only
Inspection Frequency	Biennial	Biennial
Compliance Rate (%)	98	96
Vehicle Types		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	Yes
HDGV4	Yes	Yes
HDGV5	Yes	Yes
HDGV6	Yes	Yes
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No
Inspections Performed		
Air pump system disablement	No	No
Catalyst removal	Yes	Yes
Fuel inlet restrictor disablement	Yes	Yes
Tailpipe lead deposit test	No	No
EGR disablement	No	No
Evaporative system disablement	No	No
PCV system disablement	No	No
Missing gas cap	Yes	No

*** Maryland's ATP applies to Montgomery and Prince George's Counties only.**

Table 6
1990 Anti-tampering Program Parameters for Virginia*

Program Parameters	Original ATP Data Reported	Technical Correction Update
Program Start Year	1989	1989
First Model Year	1979	1968
Last Model Year	2050	2050
Program Type	Test Only	Test and Repair Computerized+
Inspection Frequency	Biennial	Biennial
Compliance Rate (%)	98	98
Vehicle Types		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	No
HDGV4	Yes	No
HDGV5	Yes	No
HDGV6	Yes	No
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No
Inspections Performed		
Air pump system disablement	Yes	Yes
Catalyst removal	Yes	Yes
Fuel inlet restrictor disablement	No	Yes
Tailpipe lead deposit test	No	No
EGR disablement	Yes	Yes
Evaporative system disablement	Yes	Yes
PCV system disablement	Yes	Yes
Missing gas cap	Yes	Yes

*** Virginia's ATP applies to Alexandria, Arlington County, Fairfax County, and Prince William County only. There was no ATP for Clark, Loudoun, Spotsylvania, and Stafford counties in 1990.**

+ Modeled as Test Only (T/O). Per Mobile6 User's Guide (Section 2.8.9.3), EPA no longer support test and repair benefit discount.

Table 7
1990 Summer VMT Mix Fractions for DC

Vehicle Types	Network Analysis		Local Analysis		Auto Access to Transit Analysis	
	Original Data Reported*	Recent Update**	Original Data Reported*	Recent Update**	Original Data Reported*	Recent Update**
LDV	0.6483	0.6481	0.6886	0.6884	0.6998	0.6996
LDT1	0.0425	0.0426	0.0452	0.0452	0.0459	0.0460
LDT2	0.1416	0.1418	0.1504	0.1506	0.1529	0.1531
LDT3	0.0593	0.0593	0.0630	0.0630	0.0640	0.0640
LDT4	0.0273	0.0272	0.0290	0.0291	0.0294	0.0293
HDV2B	0.0244	0.0244	0.0054	0.0053	0.0000	0.0000
HDV3	0.0024	0.0024	0.0005	0.0005	0.0000	0.0000
HDV4	0.0016	0.0016	0.0003	0.0003	0.0000	0.0000
HDV5	0.0013	0.0013	0.0003	0.0003	0.0000	0.0000
HDV6	0.0050	0.0050	0.0011	0.0011	0.0000	0.0000
HDV7	0.0060	0.0060	0.0013	0.0013	0.0000	0.0000
HDV8A	0.0071	0.0071	0.0015	0.0015	0.0000	0.0000
HDV8B	0.0258	0.0258	0.0056	0.0056	0.0000	0.0000
HDBS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
HDBT***	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MC***	0.0074	0.0074	0.0078	0.0078	0.0080	0.0080

*** Based on 1990 registration distribution and MOBILE6 default diesel sales fractions.**

**** Based on 1990 registration distribution and combined MOBILE5 and MOBILE6 default diesel sales fractions. MOBILE5 default diesel sales fractions were applied to LDV, LDT1, and LDT2 vehicle categories. MOBILE6 default diesel sales fractions were applied to the remainder of the vehicle categories except HDBT and MC.**

***** The HDBT and MC vehicle types do not require diesel sales fractions. HDBT is assumed to be a 100.0% diesel-fueled while MC is assumed to be 100.0% gasoline-fueled vehicle categories.**

Table 8
2005 I/M Program Parameters for DC

Program Parameters	Program Number						
	1	2	3	4	5	6	7
Test Type	IDLE	IM240	OBD I/M	FP & GC	EVAP OBD & GC	IM240	FP & GC
I/M Program Start Year	1983	1983*	1983**	1999	1999**	1983*	1999
Test Frequency	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial
Program Type	T/O	T/O	T/O	T/O	T/O	T/O	T/O
Model Years	1968-1983	1984-1995	1996-2050	1972-1995	1996-2050	1996-2050	1996-2050
Stringency Rate (%)	20	20	20	N/A	20	20	N/A
Compliance Rate (%)	96	96	96	96	96	96	96
Waiver Rate (%)	3	3	3	N/A	3	3	N/A
Exemption Age	25	25	25	25	25	25	25
Cutpoint File	N/A	DC_cpnew	N/A	N/A	N/A	DC_cpnew	N/A
Vehicles Tested							
LDGV	Yes	Yes	Yes	Yes	Yes	No	No
LDGT1	Yes	Yes	Yes	Yes	Yes	No	No
LDGT2	Yes	Yes	Yes	Yes	Yes	No	No
LDGT3	Yes	Yes	Yes	Yes	Yes	No	No
LDGT4	Yes	Yes	Yes	Yes	Yes	No	No
HDGV2B	Yes	Yes	No	Yes	No	Yes	Yes
HDGV3	Yes	Yes	No	Yes	No	Yes	Yes
HDGV4	Yes	Yes	No	Yes	No	Yes	Yes
HDGV5	Yes	Yes	No	Yes	No	Yes	Yes
HDGV6	Yes	Yes	No	Yes	No	Yes	Yes
HDGV7	No	No	No	No	No	No	No
HDGV8A	No	No	No	No	No	No	No
HDGV8B	No	No	No	No	No	No	No
GAS BUS	No	No	No	No	No	No	No

*** The actual start date of the IM240 program in DC was 1999. The start dates shown above are needed to obtain the appropriate I/M credit in MOBILE6.**

**** The actual start date of OBD testing in DC was 2003. The start dates shown above are needed to obtain the appropriate I/M credit in MOBILE6.**

Table 9
2005 I/M Program Parameters for Maryland*

Program Parameters	Program Number						
	1	2	3	4	5	6	7
Test Type	IDLE	IM240	OBD I/M	GC	EVAP OBD & GC	IDLE	GC
I/M Program Start Year	1984**	1984**	1984**	2003	2003	1984**	2003
Test Frequency	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial
Program Type	T/O	T/O	T/O	T/O	T/O	T/O	T/O
Model Years	1977-1983	1984-1995	1996-2050	1977-1995	1996-2050	1977-2050	1977-2050
Stringency Rate (%)	20	20	20	N/A	N/A	20	N/A
Compliance Rate (%)	96	96	96	96	96	96	96
Waiver Rate (%)	3	3	3	3	3	3	3
Grace Period (years)	2	2	2	2	2	2	2
Cutpoint File	N/A	Final.C05	N/A	N/A	N/A	N/A	N/A
Vehicle Tested							
LDGV	Yes	Yes	Yes	Yes	Yes	No	No
LDGT1	Yes	Yes	Yes	Yes	Yes	No	No
LDGT2	Yes	Yes	Yes	Yes	Yes	No	No
LDGT3	Yes	Yes	Yes	Yes	Yes	No	No
LDGT4	Yes	Yes	Yes	Yes	Yes	No	No
HDGV2B	No	No	No	No	No	Yes	Yes
HDGV3	No	No	No	No	No	Yes	Yes
HDGV4	No	No	No	No	No	Yes	Yes
HDGV5	No	No	No	No	No	Yes	Yes
HDGV6	No	No	No	No	No	Yes	Yes
HDGV7	No	No	No	No	No	No	No
HDGV8A	No	No	No	No	No	No	No
HDGV8B	No	No	No	No	No	No	No
GAS BUS	No	No	No	No	No	No	No

*** I/M programs apply to all counties except St. Mary's County.**

**** The exhaust I/M program start date is 1995 for Calvert, Charles, Frederick, and Washington Counties.**

Table 10
2005 I/M Program Parameters for Virginia*

Program Parameters	Program Number						
	1	2	3	4	5	6	7
Test Type	2500/IDLE	ASM 2525/5015 FINAL	OBD I/M**	EVAP OBD & GC**	GC	2500/IDLE	GC
I/M Program Start Year	1983***	1983***	1983***	1998	1998	1983***	1998
Test Frequency	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial
Program Type	TRC	TRC	TRC	TRC	TRC	TRC	TRC
Model Years	1968-1980	1981-1995	1996-2050	1996-2050	1973-1995	1981-2050	1973-2050
Stringency Rate (%)	35	35	35	N/A	N/A	35	N/A
Compliance Rate (%)	98	98	98	98	98	98	98
Waiver Rate (%)	3	3	3	3	3	3	3
Exemption Age	N/A	N/A	N/A	N/A	N/A	N/A	N/A
I/M Effectiveness (%)	94%	94%	94%	N/A	N/A	94%	N/A
Vehicle Tested							
LDGV	Yes	Yes	Yes	Yes	Yes	No	No
LDGT1	Yes	Yes	Yes	Yes	Yes	No	No
LDGT2	Yes	Yes	Yes	Yes	Yes	No	No
LDGT3	Yes	Yes	Yes	Yes	Yes	No	No
LDGT4	Yes	Yes	Yes	Yes	Yes	No	No
HDGV2B	Yes	No	No	No	No	Yes	Yes
HDGV3	No	No	No	No	No	No	No
HDGV4	No	No	No	No	No	No	No
HDGV5	No	No	No	No	No	No	No
HDGV6	No	No	No	No	No	No	No
HDGV7	No	No	No	No	No	No	No
HDGV8A	No	No	No	No	No	No	No
HDGV8B	No	No	No	No	No	No	No
GAS BUS	No	No	No	No	No	No	No

* **All counties require I/M programs except for Clark and Spotsylvania Counties.**

** **The actual start date of the exhaust and evaporative OBD program is 2002. The dates above are used to obtain the appropriate credits in MOBILE6.**

*** **The exhaust I/M program start year is 1998 for Loudoun and Stafford Counties. The actual start date of the ASM program in the other counties was 1998. The date above ise used to obtain the appropriate credits in MOBILE6.**

Table 11
2005 Anti-tampering Program Parameters for DC*

Program Parameters	Original ATP Data Reported	Recent Update
Program Start Year	1982	1983
First Model Year	1984	1968
Last Model Year	2050	2050
Program Type	Test Only	Test Only
Inspection Frequency	Biennial	Biennial
Compliance Rate (%)	96	96
Vehicle Types		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	Yes
HDGV4	Yes	Yes
HDGV5	Yes	Yes
HDGV6	Yes	Yes
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No
Inspections Performed		
Air pump system disablement	No	No
Catalyst removal	Yes	Yes
Fuel inlet restrictor disablement	Yes	Yes
Tailpipe lead deposit test	No	No
EGR disablement	No	No
Evaporative system disablement	No	No
PCV system disablement	No	No
Missing gas cap	Yes	Yes

* **DC's ATP parameters are based on 1990 ATP data.**

Table 12
2005 Anti-tampering Program Parameters for Maryland*

Program Parameters	Original ATP Data Reported	Recent Update**
Program Start Year	1989	1989
First Model Year	1977	1977
Last Model Year	2050	2050
Program Type	Test Only	Test Only
Inspection Frequency	Biennial	Biennial
Compliance Rate (%)	98	96
Vehicle Types		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	Yes	Yes
HDGV4	Yes	Yes
HDGV5	Yes	Yes
HDGV6	Yes	Yes
HDGV7	Yes	No
HDGV8A	Yes	No
HDGV8B	Yes	No
GAS BUS	Yes	No
Inspections Performed		
Air pump system disablement	No	No
Catalyst removal	Yes	Yes
Fuel inlet restrictor disablement	Yes	Yes
Tailpipe lead deposit test	No	No
EGR disablement	No	No
Evaporative system disablement	No	No
PCV system disablement	No	No
Missing gas cap	Yes	Yes

*** Maryland's ATP applies to all counties except St. Mary's County.**

**** Based on 1996 ATP parameters.**

Table 13
2005 Anti-tampering Program Parameters for Virginia*

Program Parameters	Original ATP Data Reported	Recent Update
Program Start Year	1983	1989**
First Model Year	1973	1968
Last Model Year	2050	2050
Program Type	Test Only	Test and Repair Computerized***
Inspection Frequency	Biennial	Biennial
Compliance Rate (%)	98	98
Vehicle Types		
LDGV	Yes	Yes
LDGT1	Yes	Yes
LDGT2	Yes	Yes
LDGT3	Yes	Yes
LDGT4	Yes	Yes
HDGV2B	Yes	Yes
HDGV3	No	No
HDGV4	No	No
HDGV5	No	No
HDGV6	No	No
HDGV7	No	No
HDGV8A	No	No
HDGV8B	No	No
GAS BUS	No	No
Inspections Performed		
Air pump system disablement	Yes	Yes
Catalyst removal	Yes	Yes
Fuel inlet restrictor disablement	No	No
Tailpipe lead deposit test	No	No
EGR disablement	Yes	Yes
Evaporative system disablement	Yes	Yes
PCV system disablement	Yes	Yes
Missing gas cap	Yes	Yes

*** Virginia's ATP applies to all jurisdictions except Clark and Spotsylvania counties.**

**** ATP start year is 1998 for Loudoun and Stafford Counties.**

***** Modeled as Test Only (T/O). Per Mobile6 User's Guide (Section 2.8.9.3), EPA no longer support test and repair benefit discount.**

Appendix 1
Diesel Sales Fractions

The diesel sales fractions are presented by vehicle, year-specific model year, and going back 25 model years. The MOBILE5 default diesel sales fractions are based on 1990 national data and the MOBILE6 default diesel sales fractions are based on 1996 national data.

District of Columbia – 1990 MOBILE5 Default Diesel Sales Fractions

* LDV

0.0000	0.0000	0.0000	0.0030	0.0030	0.0090	0.0170	0.0210	0.0470	0.0590
0.0440	0.0210	0.0090	0.0050	0.0030	0.0020	0.0030	0.0020	0.0020	0.0010
0.0000	0.0000	0.0000	0.0000	0.0000					

* LDT1, LDT2

0.0020	0.0020	0.0020	0.0030	0.0070	0.0110	0.0230	0.0470	0.0930	0.0560
0.0350	0.0180	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000	0.0000	0.0000	0.0000	0.0000					

District of Columbia – 1990 MOBILE6 Default Diesel Sales Fractions

* LDV

0.0004	0.0004	0.0001	0.0027	0.0032	0.0097	0.0162	0.0241	0.0510	0.0706
0.0390	0.0269	0.0114	0.0093	0.0137	0.0155	0.0067	0.0067	0.0067	0.0067
0.0067	0.0067	0.0067	0.0067	0.0067					

* LDT1, LDT2

0.0000	0.0000	0.0000	0.0007	0.0033	0.0048	0.0120	0.0223	0.0656	0.0616
0.0439	0.0316	0.0259	0.0000	0.0187	0.1038	0.1170	0.1170	0.1170	0.1170
0.1170	0.1170	0.1170	0.1170	0.1170					

Attachment I

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS
777 North Capitol Street, N.E.
Suite 300
Washington, D.C. 20002-4201

MEMORANDUM

TO: Files

FROM: Ronald Milone

DATE: Oct. 23, 2002/ Updated December 12, 2002

SUBJECT: Development of Composite Mobile Emission Rates from MOBILE6 Listings

This memorandum describes specifications of a newly developed computer program (M6RATES.EXE) that generates composite mobile emission rates using a specially formatted MOBILE6 listing. The composite rates will be subsequently used to generate COG's mobile emission forecasts. Details on the requirements and operation of the M6RATES program are provided below.

Background:

COG's previous MOBILE5B-based mobile emission estimation procedures involved separate computations of running (stabilized), trip-end, and vehicle-related components. The procedure required that composite emission rates be developed from the MOBILE5B model on a per-mile, per-trip, and per-vehicle basis. COG has historically developed composite rates which were applied to total VMT or total trip-ends. The rates were developed on a jurisdictional basis since there are varying I/M policies between states and counties within the study area. To facilitate emission work, a SAS program was utilized to compute emission rates directly from MOBILE5B listings. The program extracted rate and VMT information for the various operating modes (i.e., stabilized, cold start, hot transient start modes) in order to compute composite rates. Composite running rates were developed for HC, CO, and NOx in grams/mile, by speed (5 to 65mph, by 5 mph increments). Because the cold/hot start-up rates produced by MOBILE5B include the stabilized emissions component, the development of 'final' start-up emission rates were computed by subtracting out running rates (at an assumed speed of 25 mph) from the start-up rates. The start-up HC, CO, and NOx rates generated from MOBILE5B were provided on a per-mile basis. COG has historically assumed that the per-mile rate could be converted to a per-trip rate assuming a uniform 'warming' distance of 3.59 miles per trip (the approximate distance traveled at a speed of 25 mph for 505 seconds). MOBILE5B provided vehicle-based emission rates (hot soaks, weighted diurnal, and resting loss) as per–vehicle rates.

MOBILE6 model computes running HC, CO, and NOx emission rates (per-mile) on a facility-specific basis, i.e., for arterials, freeway non-ramps, and freeway ramps. Arterial and freeway non-ramp emission rates are computed by speed while freeway ramp rates are computed for single assumed speed of 34.6 mph. COG has decided that freeway and arterial emissions will

now be developed for speeds ranging from 1 to 65 mph, at 1mph increments. Like MOBILE5B, the MOBILE6 model generates cold and hot cold/hot starting emissions rates as per-mile rates. However, the MOBILE6 start-up rates do not require the subtraction of stabilized rate components, as in MOBILE5B.

The M6RATES program generates composite HC, CO, and NOx running rates from MOBILE6 listings in the same general manner as the previous SAS program. However it has been modified to address the differences between the MOBILE5B and MOBILE6 models. M6RATES generates three sets of running emission rates corresponding to the three facility types. In addition, local running rates are also computed. The M6RATES program applies the traditionally assumed 3.59 miles to the per-mile rate to arrive at a final per-trip rate. As in MOBILE5B, the start-up rates are produced for both cold and hot starting conditions. Finally, the vehicle-related (hot soak, weighted diurnal, and resting loss) rates produced by MOBILE6 are provided as per-mile rates instead of per-vehicle rates. The M6RATES program transforms the per-mile rates to per-vehicle rates based on guidance from E.H. Pechan & Associates. The transformation is detailed below.

The M6RATES program produces the following 5 composite emission rate groups:

1) Stabilized arterial HC, CO, and NOx rates (gm/mi) by speed (1 to 65, by 1 mph);

2) Stabilized freeway non-ramp HC, CO, and NOx rates (gm/mi) by speed (1 to 65, by 1 mph);

3) Stabilized freeway ramp HC, CO, and NOx rates (gm/mi) corresponding to an average speed of 34.6 mph. The vehicle-related rates are produced with the ramp emissions. These include hot soak (gm/veh), diurnal (gm/veh), and resting loss (gm/veh/hour) components;

4) Stabilized local HC, CO, and NOx rates (gm/mi) and vehicle-related rates (gm/veh).

5) 'Cold' and 'Hot' start-up HC, CO, and NOx rates (gm/trip).

Program Operation:

The M6RATES program operation requires two user-prepared files: 1) a MOBILE6 generated listing file and 2) a control file. The MOBILE6 listing must be prepared in a standardized format. The listing must be in the MOBILE5B format and it must consist of a series of 134 model runs (or 'scenarios') in the sequence shown below:

```
Scenario    1: Op. Mode-Stabilized / Facility-Arterial / Speed  1.0 mph
…
Scenario   65: Op. Mode-Stabilized / Facility-Arterial / Speed 65.0 mph

Scenario   66: Op. Mode-Stabilized / Facility-Freeway Non-Ramp / Speed  1.0 mph
…
Scenario  130: Op. Mode-Stabilized / Facility-Freeway Non-Ramp / Speed 65.0 mph

Scenario  131: Op. Mode-Stabilized / Facility-Freeway Ramp
Scenario  132: Op. Mode-Cold  / Facility-Local
Scenario  133: Op. Mode-Hot   / Facility-Local
Scenario  134: Op. Mode-Stabilized / Facility-Local
```

Scenarios 1 through 65 support the development of stabilized running rates for arterials, by speed increment (1 to 65 by 1). Scenarios 66 through 130 support the development of stabilized running rates for non-ramp freeways. Scenarios 131, 132, 133, and 134 are used to compute freeway ramp stabilized, 'cold' start, 'hot' start emissions, and local stabilized rates, respectively. The M6RATES program reads the listing file and extracts out the necessary information to compute and/or format the final composite rates. The program extracts the scenario number (1-134) immediately after the character string ***SCENARIO:*** is detected in columns 66-74. The program also extracts the speed value for a given scenario immediately after the character string ***Speed:*** is detected in columns 34-39. The program also assumes that the emission rate tables of each scenario are of the same format.

The control file is a small ASCII file that lists filenames of input and outputs to the program as well as necessary program parameters. The parameters refer to the average number of vehicle trip-ends per day, by vehicle type, the average miles traveled per day, by vehicle type, and the average trip–starts per day, by vehicle type. The parameters are used to develop composite rates in desired units. The control file also allows a limited amount of descriptive character strings to appear in the listing file. The strings might specify, for example, the jurisdiction, 'case', or year associated with a specific run. An example of a control file listing is shown at the end of the memorandum.

The program line execution command form is as follows:

C:\> M6RATES <*Control Filename*>

The program creates 6 files:

1) A Program Report – The report indicates the run time and date, the input and output files. It also contains summaries of the all of the computed composite emission rates. It also indicates descriptive information the user may have provided.

2) Arterial Stabilized Emissions File - A 65-line ASCII file containing four data fields: speed, HC, CO, and NOx rates (all gm/mi).

3) Freeway Non-Ramp Stabilized Emissions File - A 65-line ASCII file containing four data fields: speed, HC, CO, and NOx rates (all gm/mi).

4) Freeway Ramp Stabilized / Vehicle Emissions File - An ASCII file containing a single line with six data fields: HC, CO, and NOx rates (gm/mi), Hot Soak(gm/trip-end), Wt Diurnal(gm/veh/day), Resting Loss(gm/veh/day).

5) Local Stabilized Emissions File - An ASCII file containing a single line with three data fields: HC, CO, and NOx rates (all gm/mi)

6) Starting Emissions File - An ASCII file containing a single line with six data fields: Cold HC, Cold CO, Cold NOx, Hot HC, Hot CO, and Hot NOx rates (all gm/trip-start)

Computations:

Composite arterial and freeway non-ramp stabilized rates are computed by speed range, as follows:

```
HC Rate (gm/mi) = VOC Total Exhaust Rate + Composite Crankcase Loss + Composite Running Loss

CO Rate (gm/mi) = CO Total Exhaust Rate

NOx Rate(gm/mi) = NOx Total Exhaust Rate

Composite Crankcase Loss Rate (gm/mi)=
LDGV rate*LDGVPCT + LGT12 rate*LGT12PCT + LGT34 rate*LGT34PCT + HDGV rate*HDGVPCT + MC rate*MCPCT

Composite Running Loss Rate (gm/mi) =
LDGV rate*LDGVPCT+ LGT12 rate*LGT12PCT + LGT34 rate*LGT34PCT + HDGV rate*HDGVPCT+ HDGV rate*MCPCT

Where:

 Total Exhaust Rates  = Total average rate (gm/mi) taken directly from the MOBILE6 listing

 LDGV rate, …,MC rate  = vehicle specific rates (gm/mi) taken directly from the MOBILE6 listing

 LDGVPCT,…,MCPCT      = proportion of VMT of the total (gas vehicular VMT from the MOBILE6
listing
```

Local stabilized rates are computed as above, except that HC, CO, and NOx rates are developed similarly, but as a single set of rates (i.e., not by speed range).

Vehicle-related emissions rates are computed as follows. :

```
Hot Soak Rate(gm/veh) =
        (LDGV rate     * LDGV_M     / LDGV_T    * LDGVPCT)   +
        (LDGT12 rate   * LDGT12_M   / LDGT12_T  * LDGT12PCT) +
        (LDGT34 rate   * LDGT34_M   / LDGT34_T  * LDGT34PCT) +
        (HDGV rate     * HDGV_M     / HDGV_T    * HDGVPCT)   +
        (MC rate       * MC_M       / MC_T      * MCPCT)


Diurnal Loss Rate (gm/veh/day) =
        (LDGV rate   * LDGV_M   * LDGVPCT)   +
        (LDGT12 rate * LDGT12_M * LDGT12PCT) +
        (LDGT34 rate * LDGT34_M * LDGT34PCT) +
        (HDGV rate   * HDGV_M   * HDGVPCT)   +
        (MC rate     * MC_M     * MCPCT)


Resting Loss Rate (gm/veh/day) =
        (LDGV rate   * LDGV_M   / LDGVPCT)   +
        (LDGT12 rate * LDGT12_M / LDGT12PCT) +
        (LDGT34 rate * LDGT34_M / LDGT34PCT) +
        (HDGV rate   * HDGV_M   / HDGVPCT)   +
        (MC rate     * MC_M     / MCPCT)
Where:
 LDGV rate, …,MC rate  = vehicle specific rates (gm/mi) taken directly from the Mobile listing
 LDGVPCT,…,MCPCT      =  The vehicle-specific proportion of VMT out of the total (gas/diesel)
vehicle VMT
 LDGV_M,…,MC_M        = The vehicle-specific average daily miles driven
```

```
 LDGV_T,…,MC_T        = The vehicle-specific average trips made per day
```

The composite cold / hot start-up rates for HC, CO, and NOx are computed as follows:

```
Start-up Rate (gm/trip) =
       (LDGV rate     * LDGV_M     / LDGV_S   * LDGV_PCT)   +
       (LDGT12 rate   * LDGT12_M   / LDGT12_S * LDGT12_PCT) +
       (LDGT34 rate   * LDGT34_M   / LDGT34_S * LDGT34_PCT) +
       (LDDV rate     * LDDV_M     / LDDV_S   * LDDV_PCT)   +
       (LDDT rate     * LDDT_M     / LDDT_S   * LDDT_PCT)   +
       (MC rate       * MC_M       / MC_S     * MC_PCT)

Where:
 LDGV rate, …,MC rate = vehicle specific start-up rates (gm/mi) taken directly from the Mobile
listing
 LDGV_PCT,…,MC_PCT     = The vehicle-specific proportion of VMT of the total(gas&diesel) vehicle
VMT
 LDGV_M,…,MC_M        = The vehicle-specific average daily miles driven
 LDGV_S,…,MC_S        = The vehicle-specific average trip starts made per day
```

Start-up emission rates calculated in this manner should be multiplied the total number of trips (light + heavy duty trips, gas and diesel).

Example Control File

```
M0551510.Ctl
  Control File for M6RATES Program
  The INPUT file is:
  unit  9:  Mobile 6 listing - in Mobile 5b format

  The 5 OUTPUT files are:
  unit 07:  listing   - (the program listing file)
  unit 15:  artrun   - Arterial     running emission rates by speed
  unit 16:  fwyrun   - Freeway      running emission rates by speed
  unit 17:  start    - Startup (Cold/Hot)   emission rates
  unit 18:  local    - Local        running emission rates
  unit 19:  ramp     - Freeway-Ramp running emission rates
  Params specify the Avg Trip-Ends (*_T), Miles (*_M), and Starts (*_S)
   by Vehicle Type

&descr
   utitle    = 'Mobile6 August 2002 No Tier 2 and Defeat Device'
   uyear     = '2005     '
   ujur      = 'City of Alexandria'
   /
&files
   listing   = 'test.rpt    '
   mob6_fil  = 'm0524031.txt'
   artrun    = 'test.r_a    '
   fwyrun    = 'test.r_f    '
   start     = 'test.stt    '
   local     = 'test.lcl    '
   ramp      = 'test.rmp    '
   /
&params

   hdgv_t    =   4.9123
   lddt_t    =   8.0600
   lddv_t    =   7.2800
   ldgt12_t  =   5.7548
   ldgt34_t  =   5.7548
   ldgv_t    =   5.3799
   mc_t      =   0.9639

   hdgv_m    =  38.8890
   lddt_m    =   8.0600
   lddv_m    =   7.2800
   ldgt12_m  =  39.9833
   ldgt34_m  =  43.3860
   ldgv_m    =  30.7361
   mc_m      =   7.7962

   hdgv_s    =   6.8800
   lddt_s    =   8.0600
   lddv_s    =   7.2800
   ldgt12_s  =   8.0600
   ldgt34_s  =   8.0600
   ldgv_s    =   7.2800
   mc_s      =   1.3500
   /
```

Example Program Listing

```
 Description: Mobile6 August 2002 No Tier 2 and Defeat Device
 Year:        2005  Jurisdiction: City of Alexandria
--------------------------------------------------------------------------------


  User Specified Filenames:

     Report listing:                     test.rpt
 (I) Mobile6 Raw Listing File:           m0524031.txt
 (O) Arterial Running Emission Rates:    test.r_a
 (O) Freeway  Running Emission Rates:    test.r_f
 (O) Start-up Emission Rates:            test.stt
 (O) Local    Running Emission Rates:    test.lcl
 (O) Fwy Ramp Running Emission Rates:    test.rmp


User Specified Daily Ends,VMT,Starts by Veh.Type:

Avg Trip-Ends/day by Vehicle Type
     hdgv     lddt     lddv   ldgt12   ldgt34     ldgv       mc
   4.9123   8.0600   7.2800   5.7548   5.7548   5.3799    .9639

Avg VMT/day       by Vehicle Type
     hdgv     lddt     lddv   ldgt12   ldgt34     ldgv       mc
  38.8890   8.0600   7.2800  39.9833  43.3860  30.7361   7.7962

Avg Starts/day    by Vehicle Type
     hdgv     lddt     lddv   ldgt12   ldgt34     ldgv       mc
   6.8800   8.0600   7.2800   8.0600   8.0600   7.2800   1.3500
```

Description: Mobile6 August 2002 No Tier 2 and Defeat Device
Year: 2005 Jurisdiction: City of Alexandria

M6 Composite ARTERIAL Stabilized Emission Rates:

Spd mph	HC gm/mi	CO gm/mi	NX gm/mi
1.	4.501	24.200	2.504
2.	4.505	24.200	2.504
3.	3.529	20.741	2.399
4.	2.308	16.417	2.267
5.	1.575	13.822	2.187
6.	1.305	12.159	2.046
7.	1.112	10.971	1.945
8.	.968	10.080	1.869
9.	.855	9.387	1.810
10.	.764	8.832	1.763
11.	.705	8.423	1.690
12.	.654	8.081	1.629
13.	.612	7.792	1.577
14.	.576	7.545	1.533
15.	.544	7.330	1.494
16.	.514	7.133	1.457
17.	.486	6.960	1.423
18.	.463	6.805	1.394
19.	.441	6.667	1.367
20.	.421	6.543	1.343
21.	.405	6.462	1.321
22.	.391	6.388	1.301
23.	.378	6.320	1.283
24.	.365	6.258	1.266
25.	.354	6.201	1.251
26.	.344	6.184	1.238
27.	.334	6.169	1.226
28.	.326	6.154	1.215
29.	.319	6.141	1.205
30.	.312	6.128	1.196
31.	.304	6.167	1.191
32.	.297	6.203	1.187
33.	.291	6.237	1.183
34.	.285	6.268	1.179
35.	.280	6.299	1.175
36.	.275	6.415	1.181
37.	.271	6.525	1.187
38.	.267	6.629	1.192
39.	.265	6.728	1.197
40.	.261	6.821	1.202
41.	.257	6.940	1.212
42.	.254	7.053	1.223
43.	.252	7.161	1.232
44.	.248	7.263	1.241
45.	.246	7.362	1.250
46.	.242	7.483	1.266
47.	.240	7.599	1.280
48.	.237	7.710	1.294
49.	.235	7.816	1.308
50.	.233	7.918	1.321
51.	.231	8.042	1.342
52.	.228	8.161	1.363
53.	.226	8.276	1.382
54.	.223	8.386	1.401
55.	.222	8.492	1.420

56.	.221	8.626	1.449
57.	.219	8.755	1.477
58.	.219	8.880	1.504
59.	.217	9.001	1.531
60.	.216	9.118	1.556
61.	.215	9.256	1.597
62.	.215	9.391	1.636
63.	.214	9.521	1.674
64.	.213	9.647	1.711
65.	.213	9.769	1.746

M6 Composite FREEWAY Stabilized Emission Rates:

Spd mph	HC gm/mi	CO gm/mi	NX gm/mi
1.	4.505	24.200	2.584
2.	4.505	24.200	2.584
3.	3.529	20.741	2.478
4.	2.308	16.417	2.346
5.	1.575	13.822	2.267
6.	1.292	11.972	2.070
7.	1.089	10.650	1.929
8.	.938	9.659	1.824
9.	.819	8.888	1.742
10.	.724	8.271	1.676
11.	.662	7.839	1.592
12.	.609	7.479	1.522
13.	.566	7.174	1.463
14.	.528	6.913	1.412
15.	.495	6.687	1.368
16.	.471	6.595	1.355
17.	.449	6.515	1.343
18.	.431	6.443	1.332
19.	.413	6.379	1.323
20.	.398	6.321	1.314
21.	.385	6.287	1.306
22.	.374	6.256	1.298
23.	.365	6.228	1.291
24.	.354	6.202	1.285
25.	.346	6.178	1.279
26.	.337	6.165	1.275
27.	.329	6.154	1.271
28.	.322	6.143	1.268
29.	.316	6.133	1.265
30.	.310	6.124	1.261
31.	.302	6.163	1.260
32.	.296	6.200	1.259
33.	.291	6.235	1.257
34.	.285	6.268	1.256
35.	.280	6.299	1.255
36.	.275	6.415	1.261
37.	.271	6.525	1.266
38.	.267	6.629	1.272
39.	.265	6.728	1.277
40.	.261	6.821	1.281
41.	.257	6.940	1.292
42.	.254	7.053	1.302
43.	.252	7.161	1.312
44.	.248	7.263	1.321
45.	.246	7.362	1.330
46.	.242	7.483	1.345
47.	.240	7.599	1.360
48.	.237	7.710	1.374
49.	.235	7.816	1.388
50.	.233	7.918	1.400
51.	.231	8.042	1.422
52.	.228	8.161	1.442

54.	.223	8.386	1.481
55.	.222	8.492	1.499
53.	.226	8.276	1.462
56.	.221	8.626	1.528
57.	.219	8.755	1.557
58.	.219	8.880	1.584
59.	.217	9.001	1.610
60.	.216	9.118	1.636
61.	.215	9.256	1.676
62.	.215	9.391	1.715
63.	.214	9.521	1.753
64.	.213	9.647	1.790
65.	.213	9.769	1.826

M6 -Composite Ramp Stabilized and Vehicle Emission Rates:

	HC	CO	NX	HotSk	Diurnl	RestingLoss
	gm/mi	gm/mi	gm/mi	gm/v/trp	gm/v/day	gm/veh/day
35.	.367	11.377	1.318	.609	.666	2.435

M6- Composite LOCAL Stabilized Emission Rates:

HC	CO	NX
gm/mi	gm/mi	gm/mi
.597	5.014	.893

M6 Composite - Hot & Cold Startup Emission Rates:

HotHC	HotCO	HotNx	ColdHC	ColdCO	ColdNx
gm/trip	gm/trip	gm/trip	gm/trip	gm/trip	gm/trip
.231	3.227	.188	1.397	27.910	.883

Attachment J

February 3, 2003

To: File

From: Daivamani Sivasailam

Subject: V/C Ratios and Speed Look Up Tables

Background

The post-processor that has been developed in conjunction with the Version 2.1 travel demand model forecasts hourly link volumes and hourly link speeds that are used with MOBILE6 emissions factor to estimate mobile source emissions. This memorandum describes the development of the speed look up tables that are used by the post-processor to estimate link speeds from link V/C ratios. For freeways and expressways a speed-flow-density model developed by Michel Van Aerde (1) was used to develop V/C ratio-speed relationship. Similarly, for arterial highways and collector roads the 2000 Highway Capacity Manual (HCM) (2) was used.

Speed estimation

The first steps in estimating speeds involve estimating hourly volumes, then the V/C ratios for each of the 24 hours in the day for all of the links in the network. Once this is done the appropriate speed look-up table (based on the facility type and area type) is used to estimate the link speed for each hour.

The Van Aerde model used to develop the V/C ratio-speed relationship is as follows:

$$D = 1/(C_1 + C_2 \{S_f - S\} + C_3 S)$$

where D= density
C_1, C_2, and C_3 are coefficients
S_f = free flow speed
S = Speed

MWCOG collected density and corresponding ~~density~~ speed information under various density conditions and calibrated the above model to develop values for C_1, C_2, and C_3 coefficients. The speed and density data points used to calibrate the Van Aerde model and the corresponding curve are shown in Exhibits 1 and 2.

1) Speed look-up table for freeways and expressways

The Version 2.1C travel demand model (3) consists of seven area types. However, for our purpose the seven area types were condensed to 3 area types for simplicity. Area types 1 and 2 were condensed to "urban area type". Similarly area types 3 and 4 were condensed to "suburban area type" and area types 5, 6 and 7 were condensed to "rural area type." The next step was to assign appropriate free flow speeds for the freeways in the three condensed area types in the Van Aerde model. For urban freeways a free flow speed of 55 mph, for suburban freeways a free flow speed of 62 mph (4), and for the rural freeways where the posted speed limit is 65 mph a free flow speed of 67 mph was used. The selection of the free-flow speeds was guided by permanent count station data obtained from Maryland State Highway Administration as part of the post processor development process(4). For expressways a free flow speed of 45 mph was used. Exhibit 3 shows the speed look-up table for freeways and expressways created using the free- flow speeds specified above. Exhibit 4 shows the v/c ratios versus speed curves for freeways and expressways.

2) Speed look-up table for arterial highways and collector roads

For arterial highways and collector roads the v/c ratios versus speed curves shown in the 2000 Highway Capacity Manual were used. The seven area types for major arterial highways were condensed to urban (area type 1), suburban (area type 2, 3 and 4) and rural (area type 5, 6 and 7); for minor arterial highways and collectors all area types were condensed into one. A speed look-up table was developed for major arterial, minor arterial and collector roads and is shown as Exhibit 5. Exhibit 6 shows the v/c ratios versus speed curves for major arterial, minor arterial and collector roads.

References

) A single regime speed-flow-density relationship for freeways and arterials, Michel Van Aerde, Transportation Research Board, 74th Annual Meeting, January 1995, Washington, D.C.

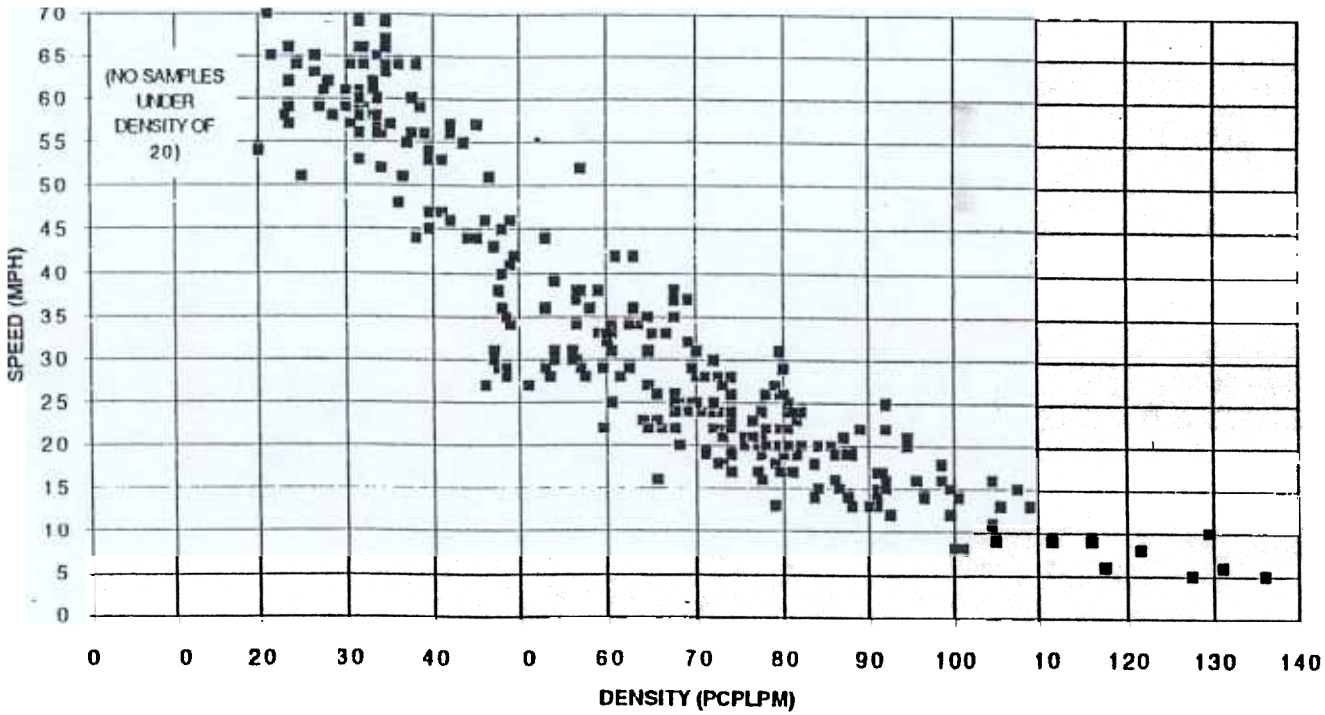
2) Highway Capacity Manual 2000, Transportation Research Board, National Research Council, Washington, D.C. 2000.

3) Version 2.1/TP+ Travel Model User's Guide, October 2002, Metropolitan Washington Council of Governments.

4) Memorandum "To: file", Michael Freeman, October 22, 2002, Metropolitan Washington Council of Governments, Washington, D.C.

Exhibits (1-6)

Exhibit I: **ALL SKYCOMP DATA SAMPLES**



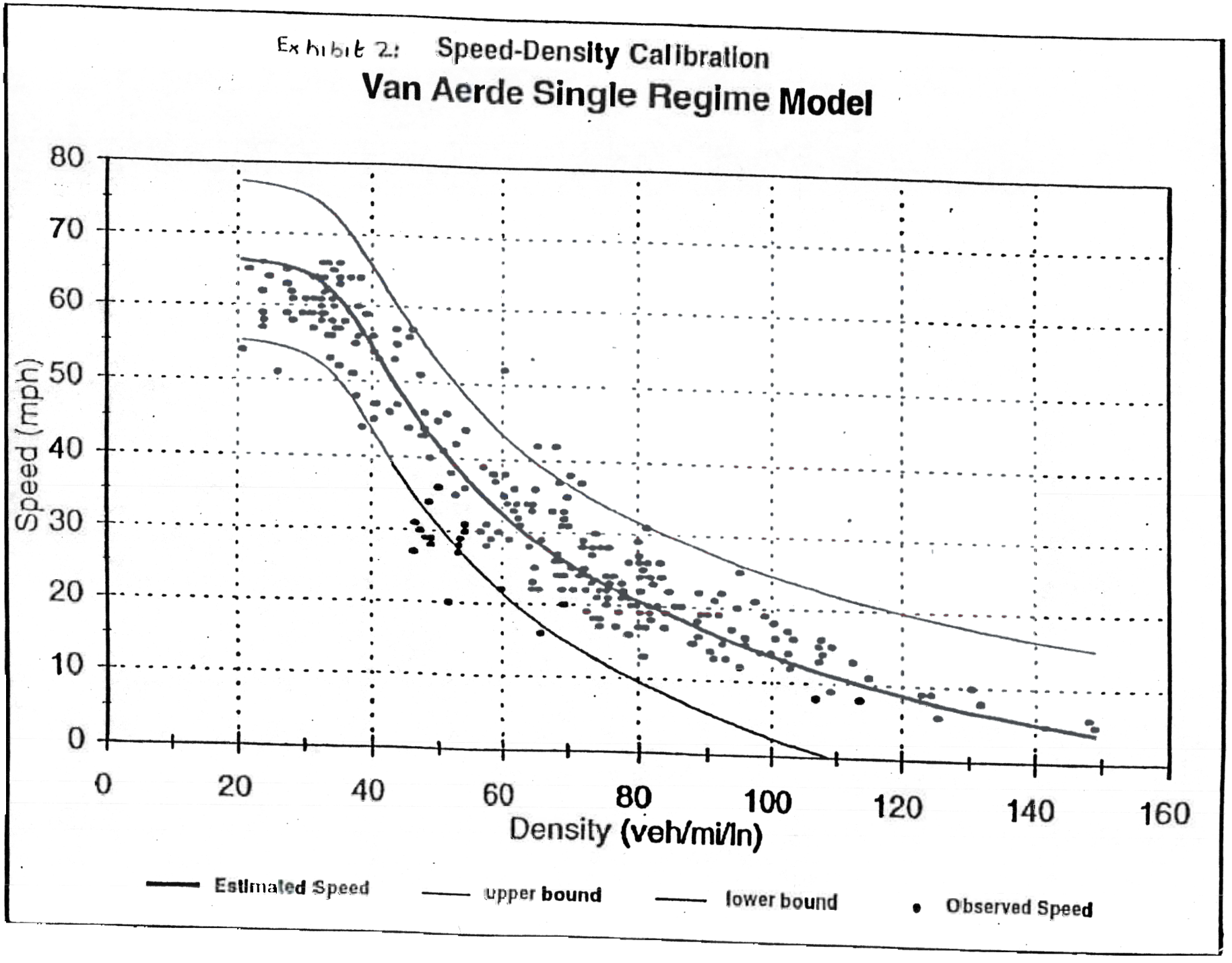


Exhibit 2: Speed-Density Calibration
Van Aerde Single Regime Model
Speed (mph)
0
10
20
30
40
50
60
70
80
0
20
40
60
80
100
120
140
160
Density (veh/mi/ln)
Estimated Speed
upper bound
lower bound
Observed Speed

Exhibit 3: Freeway Expressway Speed Look-up table

V/C Ratio	SPEED (MPH)			
	Urban Fwy.	Suburban Fwy.	Rural Fwy.	Expressway
0.00	55.00	60.00	67.00	45.00
0.20	54.89	59.89	66.88	44.89
0.30	54.81	59.80	66.79	44.82
0.40	54.71	59.69	66.67	44.73
0.50	54.57	59.54	66.49	44.62
0.60	54.37	59.30	66.18	44.47
0.70	54.06	58.91	65.60	44.26
0.80	53.54	58.17	64.26	43.97
0.90	52.56	56.56	60.84	43.53
1.00	50.58	53.22	55.28	42.82
1.20	43.14	43.88	44.47	39.68
1.40	35.53	35.86	36.16	34.17
1.60	29.41	29.62	29.82	28.67
1.80	24.55	24.70	24.85	24.05
2.00	20.61	20.73	20.86	20.23
2.25	16.65	16.75	16.85	16.35
2.50	13.47	13.55	13.64	13.22
2.75	10.86	10.93	11.02	10.64
3.00	8.68	8.75	8.82	8.48
3.25	6.83	6.89	6.97	6.65
3.50	5.24	5.31	5.37	5.08

Exhibit 4: V/C Ratio versus Freeway/Expressway Speeds

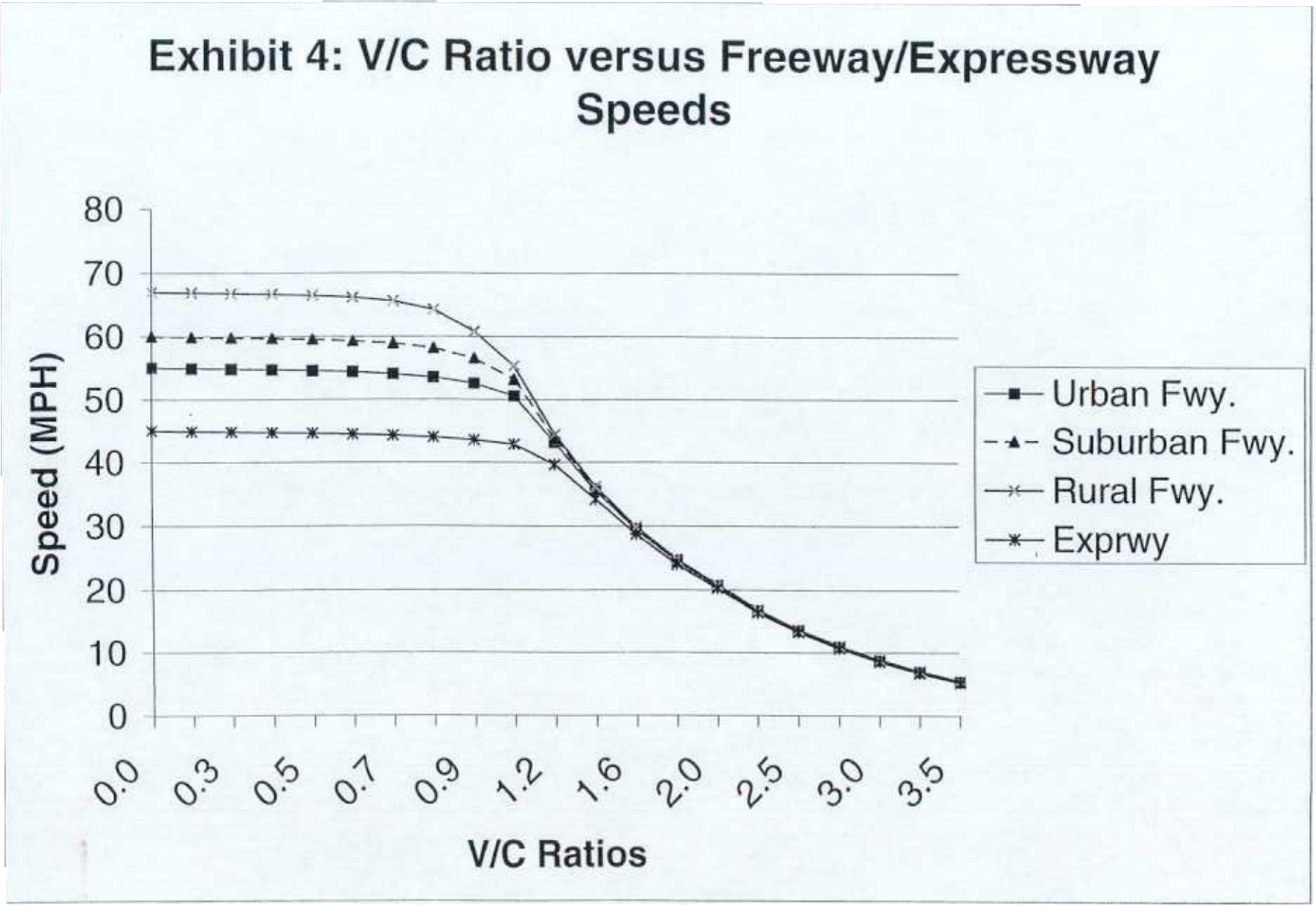
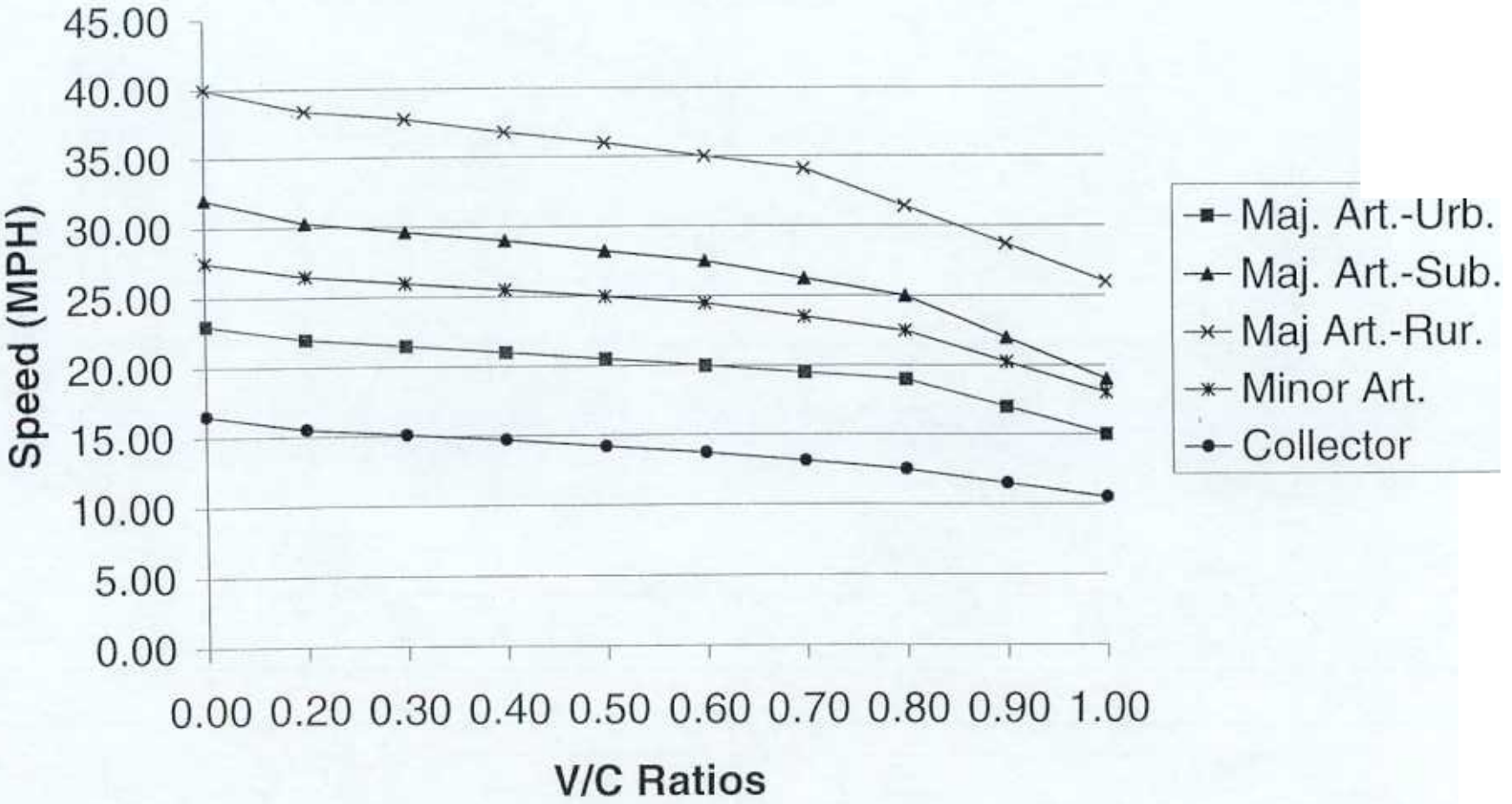


Exhibit 5: Arterial and Collector Speed Look-up Table

V/C Ratio	SPEED (MPH)				
	Maj. Art.-Urb.	Maj. Art.-Sub.	Maj Art.-Rur.	Minor Art.	Collector
0.00	23.00	32.00	40.00	27.50	16.50
0.20	22.00	30.30	38.40	26.50	15.50
0.30	21.50	29.65	37.80	26.00	15.10
0.40	21.00	29.00	36.80	25.50	14.70
0.50	20.50	28.25	36.00	25.00	14.20
0.60	20.00	27.50	35.00	24.50	13.70
0.70	19.50	26.25	34.10	23.50	13.10
0.80	19.00	25.00	31.40	22.50	12.50
0.90	17.00	22.00	28.70	20.25	11.50
1.00	15.00	19.00	26.00	18.00	10.50

Exhibit 6: V/C Ratios versus Arterial/Collector Speeds



Attachment K

MEMORANDUM

Date: February 21, 2003

To: File

CC: Mike Clifford, Jim Hogan, Ron Kirby, Ron Milone, Daivamani Sivasailam

From: Michael Freeman
Transportation Engineer

Subject: Validation of Mobile Emissions Post-Processor per the MOBILE6 / Version 2.1 / TP+ Model

Introduction

The purpose of this memorandum is to document the analyses and results related to the Version 2.1 TP+ Model based Post-Processor and available observed data. The analyses consisted of the following three comparisons:

1. Distribution of daily vehicular volumes on highway network links by hour.
2. Hourly operating speeds for freeway and expressway facilities.
3. Hourly operating speeds on arterial classified roadways.

Daily Volume Distribution by Hour

Observed Data

During the preliminary development of the post-processor, a regional database of hourly traffic volumes, collected during the years 2000 to 2002, was compiled from data provided by Maryland State Highway Administration (MSHA) and Virginia Department of Transportation (VDOT) [(1)]. An average distribution was developed for each aggregated functional class and peaking class. These distributions are depicted in EXHIBIT 1.

Estimated Values

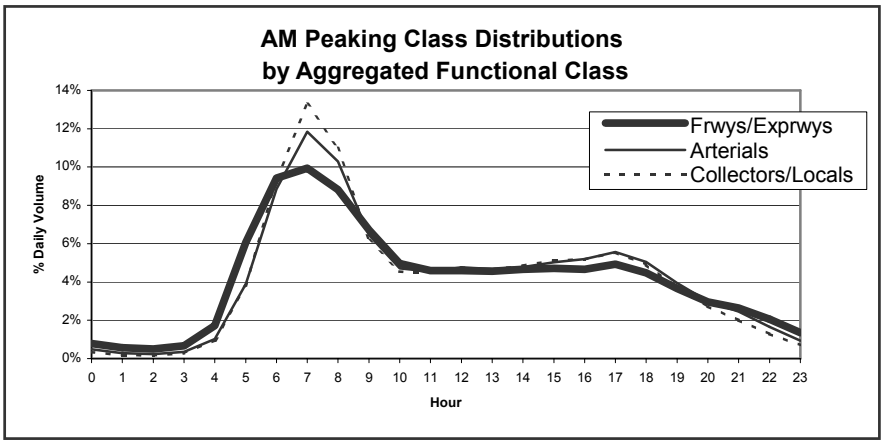
The post-processor incorporates the hourly volume distributions depicted in EXHIBIT 1, assigning one to each of the loaded highway network's links. The distribution applied to the link is selected based upon on the link's aggregated functional class assignment and its peaking class assignment [(2)].

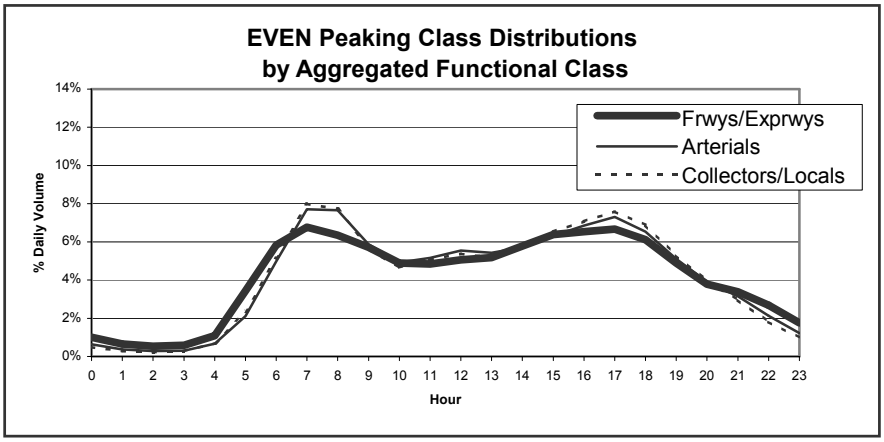
Comparison of Observed and Estimated

The frequency distribution of network links by class is compared with observed data in EXHIBIT 2.

EXHIBIT 1

Hourly Distribution of Daily Volume
by Peaking Class and Aggregated Functional Class





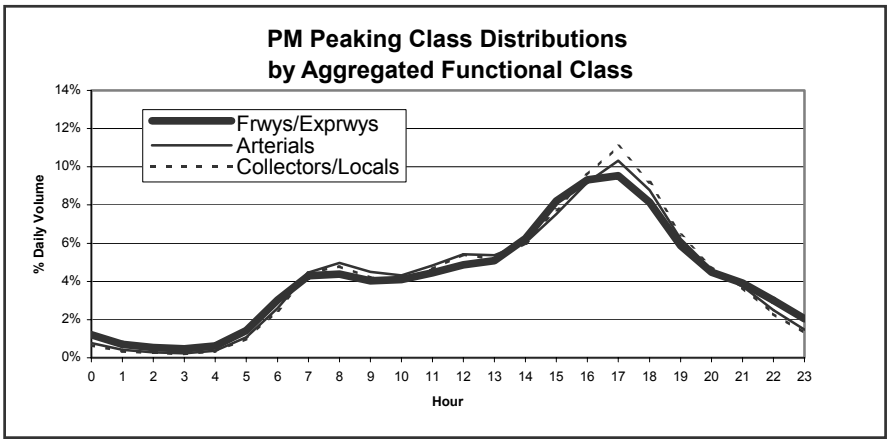


EXHIBIT 2
Frequency Distribution of Estimated and Observed Hourly Volume Distribution Classes

Peaking Class	Aggregated Functional Class	2005 Estimated		2000-2002 Observed		2005 Estimated		2000-2002 Observed	
		N	%	N	%	N	%	N	%
AM	Freeways / Expwys	1046	**6**	86	**3**	5145	**28**	606	**18**
	Arterials	2977	**16**	284	**9**				
	Collectors / Locals	1122	**6**	236	**7**				
Even	Freeways / Expwys	1581	**9**	208	**6**	6395	**35**	1271	**38**
	Arterials	3837	**21**	622	**19**				
	Collectors / Locals	977	**5**	441	**13**				
PM	Freeways / Expwys	780	**4**	124	**4**	6648	**37**	1446	**44**
	Arterials	3827	**21**	704	**21**				
	Collectors / Locals	2041	**11**	618	**19**				
TOTAL		18,188	**100**	3323	**100**	18,188	**100**	3323	**100**

Hourly Speeds for Freeways and Expressways

Observed Values: 2002 Skycomp Survey

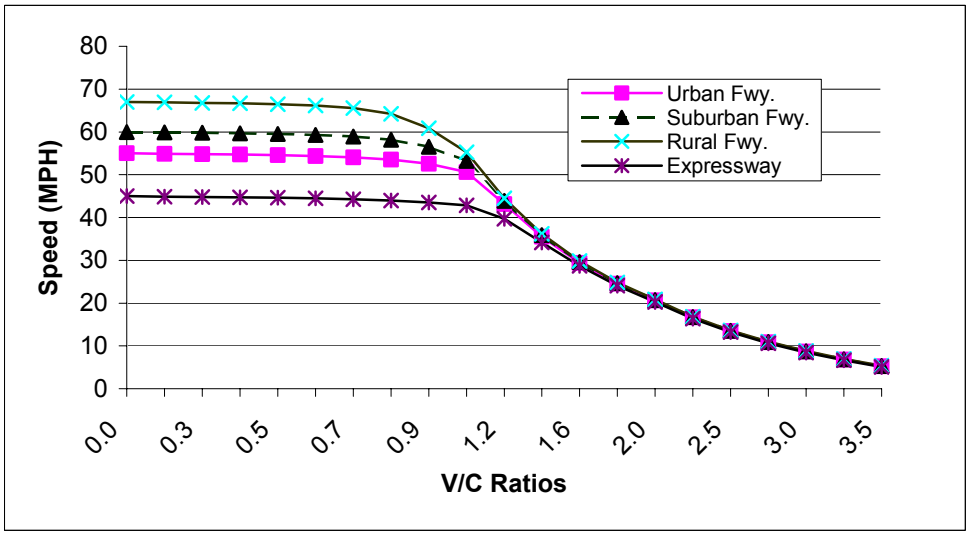
An annual survey of peak period freeway operating characteristics entitled "Traffic Quality on the Metropolitan Washington Area Freeway System" has been conducted by MWCOG since 1993 [(3)]. Although the 2002 edition of this survey was not yet published during the preparation of this memo, the data collected by Skycomp, Inc. for the survey were available and used for this analysis.

The survey consisted of taking aerial photographs during peak travel periods of all freeway facilities in the MWCOG jurisdictional area including all Interstate highways, VA 267 (Dulles Toll Road), Baltimore/Washington Parkway and US 50 in Maryland. Using the aerial photographs, roadway densities were calculated for roadway segments. The segments used in this study were generally beginning and ending at grade-separated intersections that could possibly contain more than one network link. An equivalency file was created to identify which network links were associated with each segment. Next, the equivalency file was applied to assign a vehicle density value to each network link in the study corridors. Then speed was calculated based upon the Van Aerde model as described in the "Traffic Quality" report 1993 [(3)].

2005 Estimated Values

The Version 2.1 Post-Processor calculates operating speeds based upon facility type and volume to capacity ratio. EXHIBIT 3 provides the curves used by the Post-Processor to calculate estimated speeds [(4)]. Links that had observed speeds available were extracted for comparison.

EXHIBIT 3
Version 2.1 Post-Processor
Speed Curves for Freeway/Expressways



Comparison of Observed and Estimated

The ratio of estimated to observed operating speeds was calculated for use as a tool for validation. A value of 1 indicates an identical match. A value greater than 1 indicates overestimation and a value less than 1 indicates underestimation. The statistics for observed speeds, estimated speeds, and the estimated/observed ratio are provided in EXHIBIT 4 below. Estimated mean hourly operating speeds ranged from 53 mph to 57 mph and observed mean hourly speeds ranged from 55 mph to 59 mph. The estimated mean to observed mean ratios ranged from 0.95 to 1.10.

EXHIBIT 4
Statistic Summary of Forecasted & Observed
Operating Speeds on Freeways and Expressways

Groupings	Time Interval	Number of Links with Observations	2005 Estimated		2002 Observed		Estimated / Observed Ratio	
			Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
By Hour	6 AM to 7 AM	192	53	12	58	9	0.95	0.34
	7 AM to 8 AM	191	53	11	55	13	1.03	0.43
	8 AM to 9 AM	247	54	11	56	12	1.03	0.42
	4 PM to 5 PM	159	56	8	56	11	1.05	0.38
	5 PM to 6 PM	159	56	7	55	12	1.10	0.50
	6 PM to 7 PM	194	57	7	59	7	0.98	0.22
By Time Period	AM Peak (6 AM to 9 AM)	630	53	11	56	11	1.00	0.40
	PM Peak (4PM to 7 PM)	512	56	8	57	10	1.04	0.38
Aggregate	6 AM to 9 AM, 4PM to 7 PM	1142	55	10	57	11	1.02	0.39

Hourly Speeds for Arterials

Observed Values: 1999 and 2000 Arterial Travel Time Surveys

MWCOG's 1999 and 2000 Arterial Travel Time Surveys were used for comparison with post-processor outputs [5,6]. The travel times along several arterial corridors were recorded during peak travel periods for these studies. The route milage and elapsed times were used to compute observed travel speeds.

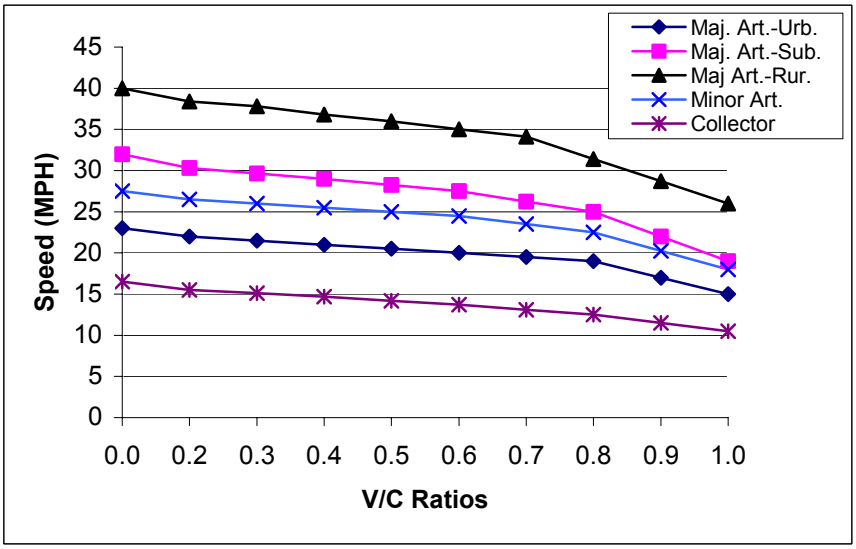
The following arterial corridors were observed in the travel time surveys and used for comparison with the Post-Processor's results.

STATE	CORRIDOR	FROM	TO
DC	Wisconsin Avenue	Western Avenue	M Street
	Pennsylvania Avenue	M Street	17th Street NW
	17th Street	Pennsylvania Avenue	Independence Avenue
	Independence Avenue	17th Street SW	2nd Street SE
	I Street / H Street	14th Street NW	Pennsylvania Avenue
	15th Street	Independence Avenue	E Street NW
MD	MD 355	Western Avenue	Montgomery Village Avenue
	MD 198	MD 650	Old Gunpowder Road
	MD 117	Muddy Branch Road	Clarksburg Road
	MD 197	MD 198	US 301
VA	US 50	Henry Bacon Drive	Centerview Drive
	VA 123	Kirby Road	Horner Road
	US 15	VA 7	Lovettsville Road

2005 Estimated Values

As with freeway facilities, the Post-Processor calculates operating speeds on arterial links by using a relationship related to V/C ratios [4]. The curves used for estimating speeds on arterial facilities are provided in EXHIBIT 5.

EXHIBIT 5
Version 2.1 Post-Processor
Speed Curves for Arterial Facilities



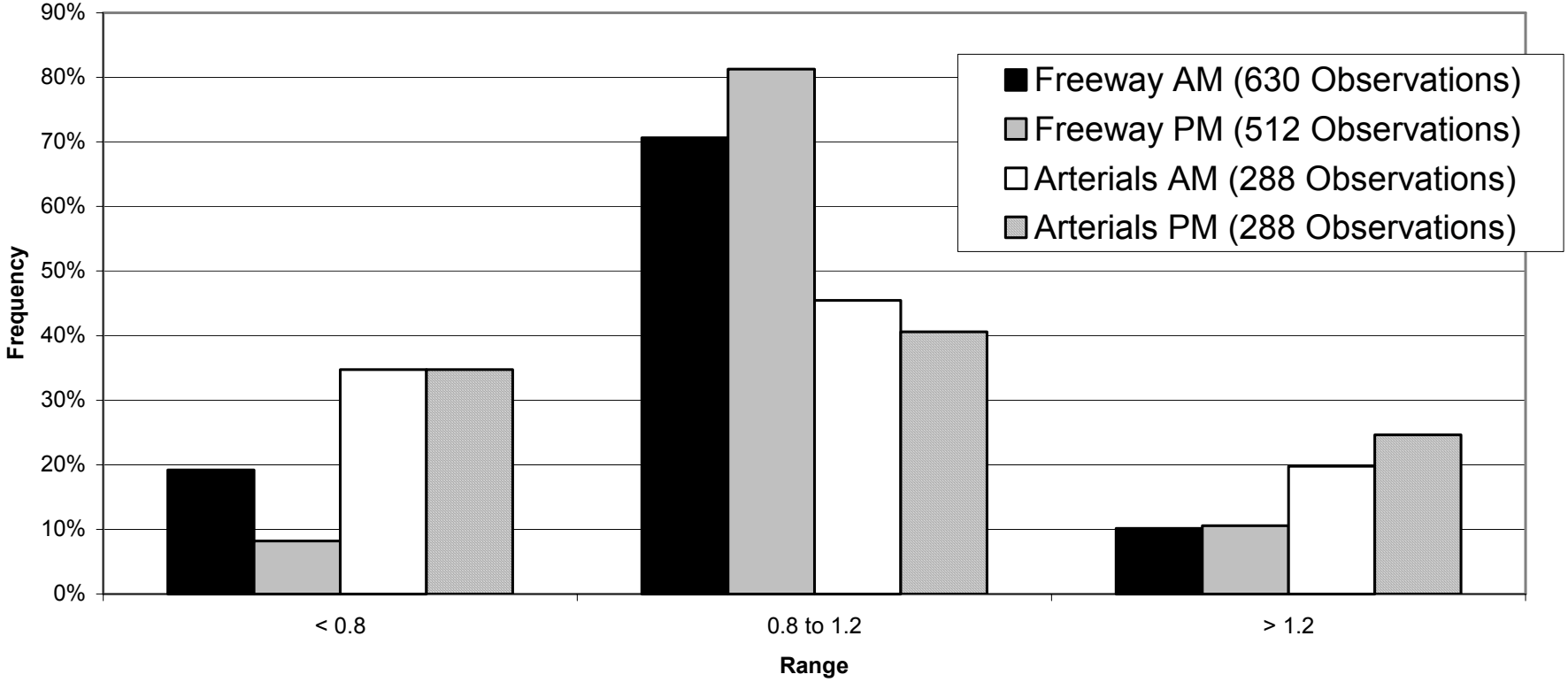
Comparison of Observed and Estimated

The statistic summary for estimated and observed arterial speeds is provided in EXHIBIT 6. For the AM Peak Period, mean operating speeds were calculated as 26 mph from the estimated data and 29 mph from the observed data. The mean estimated to observed ratio was calculated as 0.99 with a 0.40 standard deviation. For the PM Peak Period, mean operating speeds were calculated as 27 mph from the estimated data and 30 mph from the observed data. The mean estimated to observed ratio was calculated as 1.06 with a standard deviation of 0.65. EXHIBIT 7 is provided to graphically summarize the estimated / observed speed ratios by facility type and peak time period.

EXHIBIT 6
Statistic Summary of Estimated & Observed
Operating Speeds on Arterial Roadways

Groupings	Time Interval	Number of Observations	2005 Estimated		1999-2000 Observed		Estimated / Observed Ratio	
			Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
By Time Period	1999 AM Peak (7AM to 9AM)	288	26	6	29	9	0.99	0.40
	2000 PM Peak (4PM to 7PM)	288	27	6	30	11	1.06	0.65
Aggregate	1999 AM and 2000 PM Peak Periods	576	27	6	30	10	1.03	0.54

EXHIBIT 7
Distribution of Estimated/Observed Ratios



Conclusions

- *Hourly Volume Distribution*: The peaking class categories of "Even" and "PM" have similar characteristics for observed and estimated values. The "AM" peaking class has an acceptable difference of 10% between estimated and observed values.
- *Freeway / Expressway Hourly Operating Speeds*: The mean estimated / observed ratios by hour ranged from 0.95 to 1.10 with an aggregate value of 1.02. These values are within acceptable tolerances.
- *Arterial Hourly Operating Speeds*: The AM peak period mean estimated to observed ratio was calculated as 0.99. The PM peak period mean estimated to observed ratio was calculated as 1.06. These values are within acceptable tolerances.

References:

1) "*Development and Recommendations of Hourly Distributions of Daily Traffic Volumes*", MWCOG Memo by Michael Freeman, 8/27/02.
2) New Post-Processor Documentation, Ron Milone, Feb 03
3) *"Traffic Quality on the Metro Washington Freeway System, DRAFT Report",* prepared by Skycomp, Inc. for MWCOG, Spring 2002.
4) *"V/C Ratios and Speed Look-Up Tables",* MWCOG Memo by Daivamani Sivasailam, 2/3/03.
5) *"Arterial Highway System Performance in the Metropolitan Washington Region, FY 1999 Congestion Monitoring and Analysis Results"*, by MWCOG staff, June 1999.
6) "*Arterial Highway System Performance in the Metropolitan Washington Region, FY 2000 Congestion Monitoring and Analysis Results*", by MWCOG staff, June 2000.

Attachment L

Memorandum

Date: August 27, 2002

To: File

CC: Ron Kirby, Mike Clifford, Jim Hogan, Ron Milone, Mark Moran, Hamid Humeida, Daivamani Sivasailam, Bob Griffiths

From: Michael Freeman CMF
Transportation Engineer

Subject: Development and Recommendations of Hourly Distributions of Daily Traffic Volume

Introduction

Purpose

The purpose of this study is to develop recommendations for hourly volume distributions that can be applied to every link of the Version 2 network. These distributions are necessary to develop hourly volumes to be input into the MOBILE 6 model for the next air quality conformity analysis.

Methodology

The following steps were implemented to develop the hourly distributions:

- Data organization
    - Identify data observations: Each unique occurrence of location, date, and direction with 24 continuous hours of volume data was identified as an observation. Observations were identified independently for MD and VA data sets.

777 North Capitol Street, N.E. Suite 300 Washington, D.C. 20002-4239
Telephone (202) 962-3200 Fax (202) 962-3201 TDD (202) 962-3213 Internet http://www.mwcog.org

- Classify each observation: Two classification variables were created with three possible values each. Therefore, each observation could be assigned one of nine possible classification combinations.

- Statistical Analysis
  - Calculate the distribution of daily volume by hour for each data set.
  - Calculate means and 90% confidence intervals: For each of the nine class combinations, the mean with confidence intervals was calculated for each hour.
  - Compare statistics of MD and VA datasets and consider combining into one regional dataset.

Available Data

Although data from the District of Columbia was not available before the completion of this study, MWCOG was able to obtain HPMS hourly traffic volume data from MDSHA and VDOT. Each dataset identified every count station's location, direction, date, roadway functional classification, and hourly traffic volumes. DC is expected to release hourly traffic volume data later this year. When we receive the data, we can include them in a new regional analysis.

Data Organization

The volume data was classified in a manner that can be implemented with the Version 2 network. A cursory analysis indicated that possible correlations could exist between the distributions by functional classification and distributions by relationships between volumes for AM Peak, PM Peak, and Daily volumes that are forecasted in the Version 2 travel demand model. Two categorical classes were created to provide more realistic distributions based upon link characteristics. These categorical classes are Collapsed Functional Class and Peaking Class.

Collapsed Functional Class

Figure 1 identifies the relationship between the three Collapsed Functional Classes, HPMS data provided by the state agencies, and MWCOG's Version 2 travel demand model.

FIGURE 1: FUNCTIONAL CLASSES

HPMS Functional Class	Collapsed Functional Class	Version 2 Network Functional Class
Rural Interstate	Freeways/Expressways	Freeways
Urban Interstate		Expressways
Urban Freeways and Expressways		
Rural Other Principal Arterial	Arterials	Major Arterials
Rural Minor Arterial		
Urban Principal Arterial		Minor Arterials
Urban Minor Arterial		
Rural Major Collector	Collectors/Locals	Collectors
Rural Minor Collector		
Rural Local		
Urban Collector		
Urban Local		

Peaking Class

In the current post processor, each network link is assigned an orientation attribute of inbound, outbound, or circumferential. Generally, the distributions assigned to the inbound links have pronounced peaks in the morning. Conversely, the outbound links' highest volumes occur in the evening. The circumferential links have two peaks of approximately the same magnitude occurring in the AM and PM peak hours. The links are assigned the orientation attribute based solely on geographic orientation.

In an effort to account for different peaking characteristics for links near activity centers in the outer suburbs, ***a Peaking Class was defined to replace the orientation class used in the version 1 post processor.*** The peaking class is determined from the following attributes that are forecasted for each link of the Version 2 model:

V_{AM} = the sum of observed volumes of the three hours beginning at 6 AM, 7AM, and 8AM.

- V_{PM} = the sum of observed volumes of the three hours beginning at 4PM, 5PM, and 6PM.
- V_{TOTAL} = The total 24 hour volume forecasted for the link.

Each peaking Class is defined below in Figure 2.

FIGURE 2: PEAKING CLASS DEFINITIONS

Peaking Class	Condition
AM	$7.5\% < \frac{V_{AM} - V_{PM}}{V_{TOTAL}}$
EVEN	$-7.5\% \leq \frac{V_{AM} - V_{PM}}{V_{TOTAL}} \leq 7.5\%$
PM	$\frac{V_{AM} - V_{PM}}{V_{TOTAL}} < -7.5\%$

DATA CLASSIFCATION SUMMARY

The three Peaking Classes and three Collapsed Functional Classes result in nine class combinations. The number of unique location/date/direction distribution occurrences included in the analysis are summarized in Figure 3 below:

FIGURE 3: FREQUENCY OF OBSERVED DISTRIBUTIONS

			Peaking Class							
			AM		EVEN		PM		TOTAL	
Collapsed Functional Class	Freeways & Expressways	MD	174	*2.2%*	414	*5.3%*	245	*3.1%*	833	*10.6%*
		VA	37	*0.5%*	180	*2.3%*	57	*0.7%*	274	*3.5%*
		Region	**211**	***2.7%***	**594**	***7.5%***	**302**	***3.8%***	**1107**	***14.0%***
	Arterials	MD	511	*6.5%*	998	*12.7%*	1149	*14.6%*	2658	*33.7%*
		VA	230	*2.9%*	453	*5.7%*	569	*7.2%*	1252	*15.9%*
		Region	**741**	***9.4%***	**1451**	***18.4%***	**1718**	***21.8%***	**3910**	***49.6%***
	Collectors & Locals	MD	248	*3.1%*	380	*4.8%*	631	*8.0%*	1259	*16.0%*
		VA	290	*3.7%*	545	*6.9%*	771	*9.8%*	1606	*20.4%*
		Region	**538**	***6.8%***	**925**	***11.7%***	**1402**	***17.8%***	**2865**	***36.3%***
	TOTAL	MD	933	*11.8%*	1792	*22.7%*	2025	*25.7%*	4750	*60.3%*
		VA	557	*7.1%*	1178	*14.9%*	1397	*17.7%*	3132	*39.7%*
		Region	**1490**	***18.9%***	**2970**	***37.7%***	**3422**	***43.4%***	**7882**	***100.0%***

As shown in the above table, 4750 observations were included in the MD dataset and 3132 observations were included in the VA dataset. ***Combined, these result in a total of 7882 observations for the region.*** Each state's dataset contained at least 37 observations for each of the nine class combinations, resulting in acceptable sample sizes for analysis.

STATISTICAL ANALYSIS

Confidence Intervals

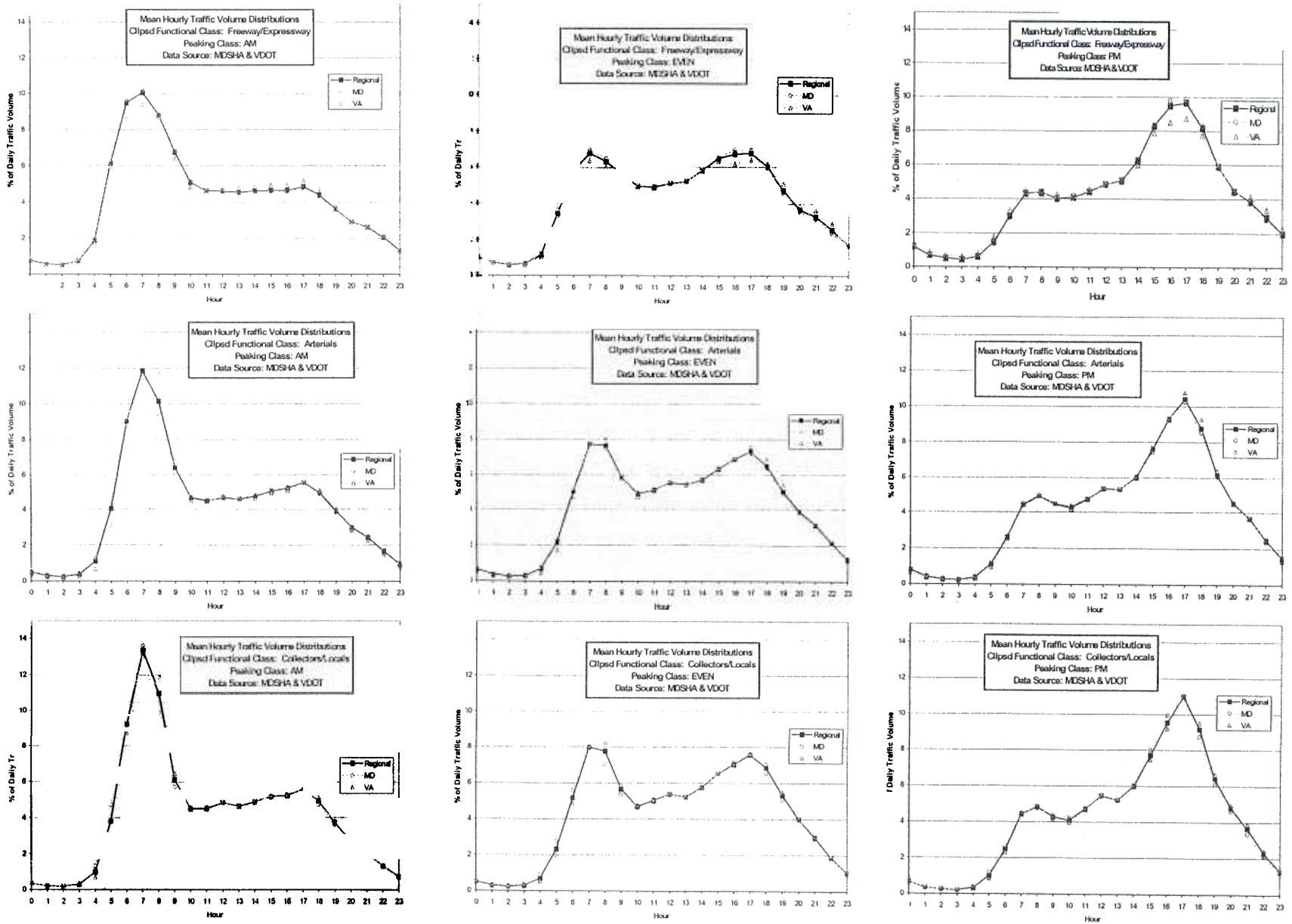
For each dataset (MD, VA, and Regional), the mean (% of daily total) of each hour for each class combination was calculated, along with the 90% confidence interval. The highest confidence interval range of 1.3% occurred with the VDOT dataset, Freeway/Expressway collapsed functional class, and AM peaking class. We are considering this an acceptable level of statistical error for the purposes of calculating hourly volumes within the Version 2 post processor. The means and confidence intervals are provided in graphical form in the appendix.

Regional Distributions

Figure 4 includes graphs of hourly volume distributions for each of the nine class combinations. Each hourly mean is plotted for Virginia, Maryland, and the Regional total datasets. ***There is very little difference between the datasets for most hours of the day.*** Maximum differences of approximately two percent occur between Virginia and Maryland during some of the peak hours. After observing these low differences among the results for each state, ***we decided to combine all of the data into a regional dataset to be applied over the entire network.*** These regional distributions are provided in tabular form in Figure 5.

FIGURE 4:

MEAN HOURLY VOLUME DISTRIBUTIONS BY STATE AND REGION



NOTE: A FULL PAGE VERSION OF EACH OF THE NINE GRAPHS IS PROVIDED IN THE APPENDIX

FIGURE 5:
RECOMMENDED DISTRIBUTION OF DAILY VOLUME BY HOUR

	COLLAPSED FUNCTIONAL CLASS								
	FREEWAYS/EXPESSWAYS			ARTERIALS			COLLECTORS/LOCALS		
	PEAKING CLASS			PEAKING CLASS			PEAKING CLASS		
HOUR	AM	EVEN	PM	AM	EVEN	PM	AM	EVEN	PM
0	0.758	1.022	1.169	0.490	0.642	0.780	0.337	0.507	0.645
1	0.541	0.693	0.677	0.301	0.379	0.419	0.195	0.297	0.336
2	0.511	0.577	0.502	0.250	0.288	0.288	0.176	0.232	0.251
3	0.708	0.648	0.441	0.374	0.316	0.244	0.285	0.294	0.207
4	1.856	1.176	0.610	1.091	0.688	0.387	0.959	0.686	0.334
5	6.123	3.431	1.449	4.048	2.175	1.103	3.804	2.310	1.000
6	9.488	5.805	3.011	9.020	5.069	2.603	9.206	5.153	2.452
7	10.022	6.769	4.305	11.834	7.724	4.454	13.334	7.985	4.430
8	8.804	6.330	4.381	10.128	7.639	4.965	10.938	7.748	4.811
9	6.735	5.645	4.030	6.373	5.852	4.489	6.106	5.656	4.257
10	5.075	4.930	4.095	4.703	4.933	4.300	4.499	4.683	4.093
11	4.622	4.903	4.421	4.527	5.174	4.794	4.513	5.013	4.721
12	4.596	5.086	4.844	4.713	5.556	5.387	4.813	5.359	5.453
13	4.528	5.191	5.076	4.635	5.436	5.344	4.639	5.203	5.204
14	4.605	5.812	6.251	4.798	5.717	6.025	4.849	5.743	5.989
15	4.645	6.477	8.268	5.087	6.337	7.593	5.171	6.513	7.701
16	4.637	6.702	9.493	5.265	6.859	9.303	5.233	7.033	9.537
17	4.845	6.753	9.659	5.551	7.301	10.417	5.579	7.571	11.003
18	4.399	6.029	8.159	4.988	6.490	8.768	4.915	6.847	9.153
19	3.610	4.756	5.897	3.899	5.068	6.167	3.719	5.316	6.409
20	2.914	3.700	4.461	2.962	3.875	4.550	2.700	3.986	4.778
21	2.612	3.277	3.868	2.401	3.130	3.671	2.012	2.985	3.656
22	2.033	2.568	2.939	1.637	2.118	2.471	1.298	1.854	2.290
23	1.333	1.717	1.996	0.926	1.232	1.476	0.717	1.025	1.289
SUM	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

ADDITIONAL ISSUES / FOLLOW-UP WORK TASKS

The following issues related to the application of hourly traffic distributions will be addressed in the future.

Develop hourly distributions while keeping the Version 2 peak period volume distributions intact: The distributions of this analysis are stratifications of daily volume. However, the Version 2 model will forecast volumes for three time periods: (6AM-9AM), (4PM-7PM), and (all remaining hours). As forecasted volumes from the Version 2 model become available, the distributions of these three time periods should be compared with the data that were used in the preparation of this analysis. If appropriate, the available observed data could be used to stratify the volumes from the three time periods into hourly volume, instead of stratifying daily volume directly into hourly volume.

Combining arterials, collectors and locals functional classes into one collapsed functional class: For this analysis, arterials were grouped into a collapsed functional class and collectors and locals were grouped into a second collapsed functional class. However, the resulting distributions for these two collapsed functional classes were very similar. By combining these classes, the distribution calculations could be simplified by reducing the number of link classes from nine to six.

Local Functional Classification Distributions. Collector and local functional classifications were grouped into one collapsed functional class for the analyses documented in this memo. However, it may be more appropriate to develop separate distributions for use in the Version 2 post processor. Currently, the highway network of MWCOG's travel demand model does not include roadways with local functional classifications. The local vehicle miles of travel (VMT) is forecasted by performing "off-line" calculations using output from the travel demand model. Since collector and local VMT are forecasted with different methods in the post processor, separate distributions should probably be used.

MOBILE6 Input and Output Files

MOBILE6 input and output files will be submitted electronically. A CD-ROM containing complete copies of these files will be provided upon request.

March 2004

Appendix C

Round 6.3 Cooperative Forecast Projections
Area and Nonroad Inventories and Projections