

**ARTERIAL HIGHWAY SYSTEM PERFORMANCE
IN THE METROPOLITAN WASHINGTON REGION**

FY 2009 CONGESTION MONITORING AND ANALYSIS

Travel Forecasting Subcommittee Meeting

September 18, 2009

Arterial Highway Travel Time/Speed Monitoring Study

Purpose

- To identify the location, severity and extent of congestion on the major arterial highway routes in the region

Overview of the monitoring program

- Monitor 57 (9 new) major arterial highway routes totaling 429 miles
- Begun in 2000, routes monitored on a three year cycle (e.g., 2003 routes repeated in 2006, and 2009)
- Program enhanced in FY2009; Additional routes will cover 65 miles. FY2009 study included 26 miles for the additional routes.
- Four cars equipped with Global Positioning system (GPS) and Pocket PC were used to record travel time and speed data on each route between 1 PM to 8 PM on week days covering the PM peak period and off-peak period

Performance Analysis /Methodology

- Level of Service (LOS) for the routes is determined using speed data and the 2000 Highway Capacity Manual procedure
- LOS E & F is considered as congestion
- LOS was determined for entire route as well as the segments within during the PM peak hour, peak period and off-peak period
- Results compared with 2003 and 2006 surveys

Table 1

Monitored Routes (Three Year Cycle)

Schedule and Routes for Arterial Travel Time Data Collection

Jurisdiction	FY 2000 (PM) FY 2003 (PM) FY 2006 (PM) FY 2009 (PM)		FY 2001 (PM) FY 2004 (PM) FY 2007 (PM) FY 2010 (PM)		FY 2002 (PM) FY 2005 (PM) FY 2008 (PM) FY 2011 (PM)		Total
	Routes	Mileage	Routes	Mileage	Routes	Mileage	
Maryland	MD 355	6.6	MD 4	11.5	Georgia Ave.	9.5	
	MD 355	8.7	MD 586	5.4	MD 5	11.9	
	MD 117	6.0	MD 450	12.0	MD 20	9.0	
	MD 196	5.0	MD 144	4.1	MD 193 (University Blvd.)	4.2	
	MD 197	14.7	Colesville Rd / US29 *	7.3	Randolph Rd	9.1	
	US-1 (Baltimore Av.) Seg-1 *	5.2			Indian Head Highway *	11.0	
	US-1 (Baltimore Av.) Seg-2 *	8.2					
	MD 193 *	4.6					
	59.8		41.1		54.7	155.6	
Virginia	US 50	13.0	VA 234	22.4	FFX Co. Parkway	19.8	
	US 50	10.0	VA 28	17.1	US 1	18.8	
	US 15	12.5	VA 120	8.1	US 29	21.0	
	VA 123	5.9	VA 7	29.2	US 29 *	11.0	
	VA 123	7.6	VA 26 *	7.0			
	VA 123	14.2					
	Wilson Blvd *	4.9					
	68.1		83.8		70.6	222.5	
District of Columbia	Wisconsin Avenue	4.1	Canal Rd/M St.	3.7	Connecticut Ave.	4.0	
	Pennsylvania Avenue	1.1	7th St./Georgia Ave	3.4	K St./New York Ave.	4.2	
	17th Street	0.7	Georgia Ave.	3.3	Nebraska Ave./Military Rd	2.2	
	Independence Avenue	1.9	Constitution Ave/Louisiana Ave.1	2.4	Pennsylvania Avenue	0.8	
	I Street	0.8	Penn Ave./Branch Ave.	3.7	14th Street NW	1.0	
	I Street	0.6	South Dakota *	2.7	10th Street NW *2	6.1	
	15th Street	0.7			L Street NW *3	1.1	
	16th Street NW	6.1					
	L Street NW	1.2					
	Rhode Island Av. (US-1) *	3.3					
		20.6		19.2		19.4	69.1
TOTAL		148.4		144.1		144.7	429.9

Note:

1. Constitution Avenue/Louisiana Avenue was not studied in FY 2004 due to construction along the route but survey was performed in FY 2005
2. 10th St. NW was surveyed in FY 2002 & 2006 but not FY 2005 due to construction
3. L Street NW was surveyed in FY 2002 but not in FY 2005 due to construction

* New Routes constitute 65.2 miles

Table 2

Routes & Limits for FY 2009

Jurisdiction	Route	Route Limits		Distance
		From	To	(miles)
MD	MD 355 (Segment 1 & 2)	Western Ave.	MontgomeryVillage Ave.	15.3
	MD 117	Muddy Branch Rd	Clarksburg Rd	6.8
	MD 198	MD 650	Old Gunpowder Rd	5
	MD 197	MD 198	US 301	14.7
	US-1/ Baltimore Av. (Seg-1& 2) *	Eastern Av	MD 198	13.4
	MD 193 *	Collesville RD (US 29)	Adelphi RD	4.6
MD Total				59.8
VA	US 50 (Segment 1 & 2)	Henry Bacon Dr.	Centerview Drive	23
	US 15	VA 7	Lovettsville Road	12.5
	VA 123 (Segment 1, 2 & 3)	Kirby Road	Old Courthouse Road	27.7
	Wilson Blvd *	N. Lynn St.	Roosevelt Blvd	4.9
VA Total				68.1
DC	Wisconsin Avenue	M Street	Western Avenue	4.1
	Pennsylvania Avenue	M Street	17 th Street, N.W.	1.1
	17 th Street	Pennsylvania Ave.	Independence Avenue	0.7
	Independence Avenue	17 th Street, S.W.	2 nd Street, S.E.	1.9
	I Street	14 th Street, N.W.	Pennsylvania Avenue	0.8
	H Street	Pennsylvania Ave.	14 th Street, N.W.	0.6
	15 th Street	Independence Ave	E Street, N.W.	0.7
	Rhode Island Av. (US-1) *	Florida Av.	Eastern Av	3.3
	DC Total			
Regional Total				141.1

* FY 2009 New Routes: 26.2 miles

FY 2009 Summary of LOS by Time Period and Direction

Jurisdiction	Route	LOS (Peakhour)		LOS (Off Peak Period)		LOS (Peak Period)	
		North/ Eastbound	South/ Westbound	North/ Eastbound	South/ Westbound	North/ Eastbound	South/ Westbound
MD	MD 355 - Seg 2	E	E	D	D	E	E
	MD 355 - Seg 1	D	D	C	D	D	D
	MD 117	C	C	B	B	C	C
	MD 198	B	C	B	B	B	C
	MD 197	B	B	B	B	B	B
	US-1 (Baltimore Av.) Seg-1	D	D	C	C	C	C
	US-1 (Baltimore Av.) Seg-2	D	C	C	C	D	C
	MD 193	D	D	D	D	D	C
VA	US 50 - Seg 1	C	E	B	B	C	D
	US 50 - Seg 2	E	E	C	C	D	D
	US 15	C	A	A	A	B	A
	VA 123 - Seg 1	E	E	C	C	D	E
	VA 123 - Seg 2	D	E	D	D	D	E
	VA 123 - Seg 3	A	B	A	A	A	B
	Wilson Blvd.	C	D	C	D	C	C
DC	Wisconsin Avenue	D	D	E	D	D	E
	Pennsylvania Avenue	E	D	D	D	D	D
	17th Street	D	F	C	D	C	E
	Independence Avenue	D	D	D	C	D	D
	I Street	-	F	-	F	-	F
	H Street	E	-	E	-	F	-
	15th Street	C	E	C	C	C	D
	Rhode Island Av.	E	D	D	D	D	D

FY 2009 Summary of LOS by Time Period & Bi-Directional Distance Traveled

LOS	PM Peak Hour		PM Peak Period		PM Off-Peak Period	
	Mileage	Percentage (%)	Mileage	Percentage (%)	Mileage	Percentage (%)
Maryland						
A-D	101.5	84.9	108.3	90.6	114.8	96.0
E-F	18.1	15.1	11.3	9.4	4.8	4.0
Total	119.6	100.0	119.6	100.0	119.6	100.0
Virginia						
A-D	107.6	79.0	121.2	89.0	132.0	96.9
E-F	28.6	21.0	15.0	11.0	4.2	3.1
Total	136.2	100.0	136.2	100.0	136.2	100.0
District of Columbia						
A-D	16.3	65.2	20.1	80.4	22.1	88.4
E-F	8.7	34.8	4.9	19.6	2.9	11.6
Total	25.0	100.0	25.0	100.0	25.0	100.0

Region summary

LOS	PM Peak Hour		PM Peak Period		PM Off-Peak Period	
	Mileage	Percentage (%)	Mileage	Percentage (%)	Mileage	Percentage (%)
Region						
A-D	225.4	80.3	249.6	88.9	268.9	95.8
E-F	55.4	19.7	31.2	11.1	11.9	4.2
Total	280.8	100.0	280.8	100.0	280.8	100.0

PM Peak Hour (PM PKH): 5:00 PM-6:00 PM

PM Off-Peak Period (PM OPKP): 1:00 PM-4:00 PM, 7:00PM - 8:00PM

PM Peak Period (PM PKP): 4:00 PM-7:00 PM

Findings - FY 2009 Survey

System Level

- The District of Columbia has the highest percentage of LOS “E-F” (35%) during the peak hour (VA 21% & MD 15%)
- The District of Columbia has the highest percentages of LOS “E-F” during the peak period (20%) and off-peak period (12%)
- Increase in miles with LOS E-F during PM peak hour when compared to 2003 and 2006
- Of the routes studied in FY2009, MD-355 is the most congested route in MD, US-50 & VA-123 in VA, and H street, I street and 17th street in DC.

Segments with PM Peak Hour LOS “E” or “F” (FY2009 Survey)

Virginia Segments

	Routes	Segments	Direction	2006 Speed	2006 LOS	2009 Speed	2009 LOS	Change in speed	% Difference in speed
VA	US 50 Segment 2	Fairfax Co Pkwy to Fair Ridge Rd	EB	36.9	B	17.3	E	-19.6	-113%
VA	US 50 Segment 2	Plantation Pkwy to Chain Bridge Rd	WB	27.3	C	8.4	F	-18.9	-224%
VA	VA 123 - Segment 1	Old Dominion Dr to Lewisville Rd	WB	19.8	D	11.0	F	-8.8	-79%
VA	US 50 Segment 1	Manchester St to Patrick Henry Dr	WB	13.9	E	6.9	F	-7.0	-103%
VA	US 50 Segment 1	Graham Rd to Annandale Rd	EB	23.1	C	17.0	E	-6.1	-36%
VA	US 50 Segment 2	Fair Ridge Rd to Jermantown Rd	EB	26.8	D	20.8	E	-6.0	-29%
VA	VA 123 - Segment 1	International Dr to Old Courthouse Rd	WB	13.4	E	9.7	F	-3.7	-39%
VA	US 50 Segment 1	Annandale Rd to Graham Rd	WB	13.6	E	10.0	F	-3.6	-37%
VA	VA 123 - Segment 1	International Dr to Lewinsville Rd	EB	15.3	E	11.7	F	-3.6	-31%
VA	VA 123 - Segment 3	University Dr to Braddock Rd	SB	7.7	F	4.4	F	-3.3	-73%
VA	US 50 Segment 2	US 29 to Jermantown Rd	WB	10.9	F	8.3	F	-2.6	-32%
VA	VA 123 - Segment 2	Beulah Rd to Lawyers Rd	SB	8.1	F	6.1	F	-2.0	-33%
VA	US 50 Segment 1	VA 7 to Annandale Rd	WB	11.7	F	9.7	F	-2.0	-21%
VA	VA 123 - Segment 1	Lewisville Rd to International Dr	WB	18.6	D	16.9	E	-1.7	-10%
VA	US 50 Segment 2	Chain Bridge Rd to US 29	WB	12.6	F	10.9	F	-1.7	-15%
VA	US 50 Segment 1	Gallows Rd to Prosperity Rd	WB	7.8	F	7.4	F	-0.4	-5%
VA	VA 123 - Segment 2	University Dr to Main St	NB	17.0	E	16.9	E	-0.1	-1%

Segments with PM Peak Hour LOS “E” or “F” (FY 2009 Survey)

Maryland & DC Segments

Juris	Routes	Segments	Dir.	2006 Speed	2006 LOS	2009 Speed	2009 LOS	Change in speed	% Difference in speed
MD	MD 117	Muddy Branch to Quince Orchard	WB	19.6	C	13.2	E	-6.4	-48%
MD	MD 355 Segment 2	Jones Bridge Road to Cedar Lane	NB	14.7	E	8.6	F	-6.1	-72%
MD	MD 355 Segment 1	Washington to Viers Mill	SB	19.9	D	14.9	E	-5.0	-34%
MD	MD 355 Segment 1	Summit Ave to Montgomey	NB	16.1	E	15.4	E	-0.7	-4%
MD	MD 355 Segment 2	Old Georgetown Pkwy to Jones Bridge Road	NB	7.0	F	6.4	F	-0.6	-9%
MD	MD 355 Segment 2	Montrose Road to Nicholson	SB	15.4	E	15.2	E	-0.2	-1%
MD	MD 355 Segment 1	Wooton Pkwy to Edmonson	SB	8.4	F	8.2	F	-0.2	-2%

Juris	Routes	Segments	Direction	2006 Speed	2006 LOS	2009 Speed	2009 LOS	Change in speed	% Difference in speed
DC	Wisconsin Avenue	River Rd to Western Ave	NB	17.7	C	8.9	E	-8.8	-100%
DC	Wisconsin Avenue	M St NW to R St NW	NB	11.8	D	8.1	E	-3.7	-45%
DC	17th Street NW	Pennsylvania Ave to Independence Ave	SB	8.1	E	5.8	F	-2.3	-39%
DC	Wisconsin Avenue	R St NW to M St NW	SB	5.9	F	5.4	F	-0.5	-8%
DC	H Street NW	Pennsylvania Ave to 14th St	EB	7.9	E	7.7	E	-0.2	-2%

Routes & Segments with PM Peak Hour LOS Improvements (Virginia)

Juris	Routes	Segments	Dir.	2006 Speed	2006 LOS	2009 Speed	2009 LOS	Change in speed	% Difference in speed
VA	US 50 Segment 2	Centerview Dr to Lees Corner Rd	EB	8.8	F	18.1	E	9.3	51%
VA	VA 123 - Segment 2	Main St to US 50	NB	8.0	F	16.4	E	8.4	51%
VA	VA 123 - Segment 2	Old Courthouse Rd to Beulah Rd	SB	6.9	F	13.0	F	6.1	47%
VA	US 50 Segment 2	Lees Corner Rd to Stringfellow Rd	EB	11.0	F	19.6	E	8.6	44%
VA	VA 123 - Segment 2	US 50 to Main St	SB	14.1	E	18.9	D	4.8	26%
VA	US 50 Segment 1	VA 7 to Patrick Henry Dr	EB	13.6	E	17.1	D	3.5	21%

Routes & Segments with PM Peak Hour LOS Improvements (Maryland & DC)

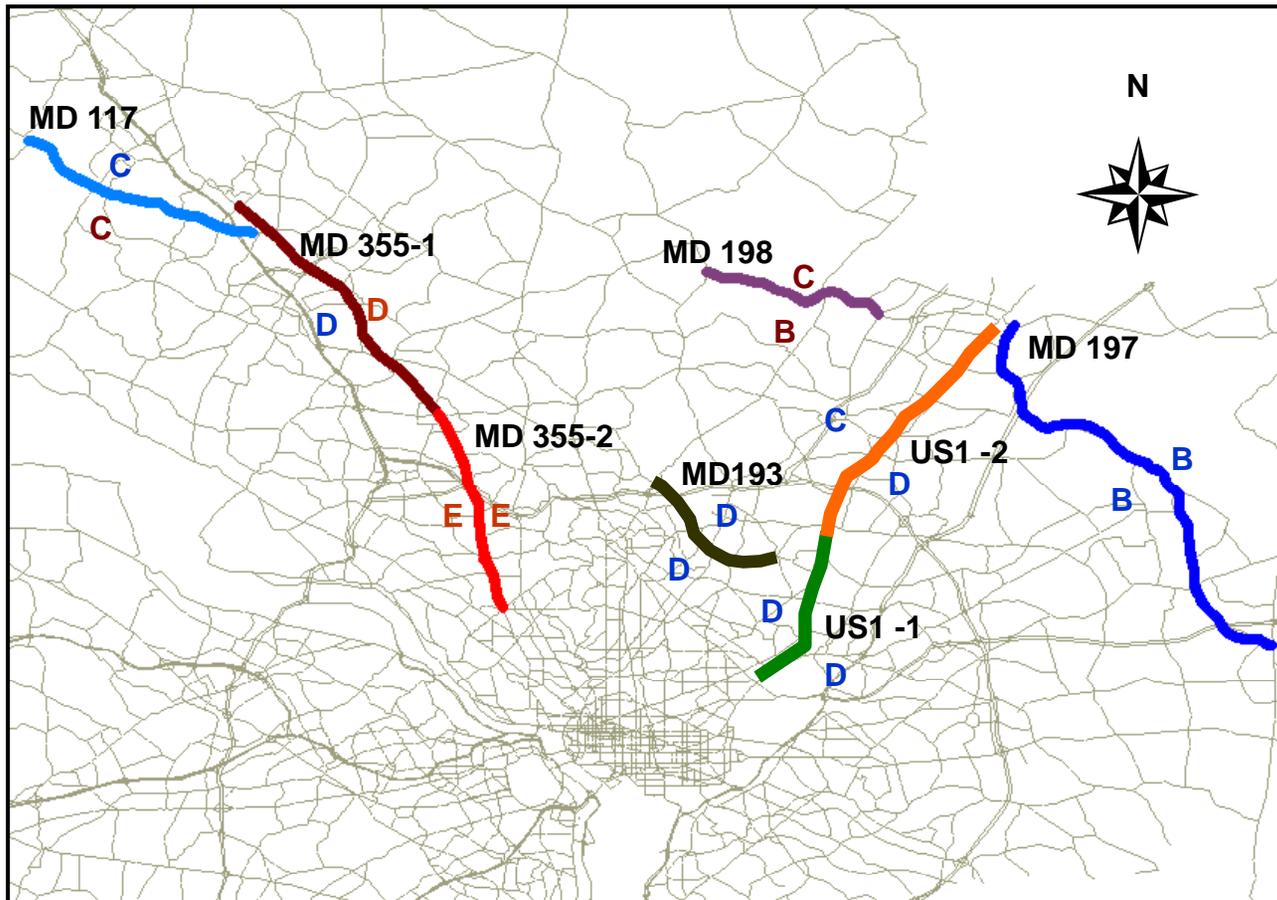
Juris	Routes	Segments	Dir.	2006 Speed	2006 LOS	2009 Speed	2009 LOS	Change in speed	% Difference in speed
MD	MD 355 Segment 2	Jones Bridge Road to Old Georgetown Pkwy	SB	11.8	F	15.8	E	4.0	26%
MD	MD 355 Segment 2	Montgomery Avenue to Bradley Lane	SB	6.2	F	10.2	F	4.0	39%
MD	MD 355 Segment 1	Edmonson to Wooton Pkwy	NB	16.6	E	20.7	D	4.1	20%
MD	MD 355 Segment 2	Montgomery Avenue to Old Georgetown Pkwy	NB	14.9	E	21.4	D	6.5	30%
MD	MD 355 Segment 2	Bradley Lane to Western Avenue	SB	16.5	E	17.6	D	1.1	6%
MD	MD 355 Segment 1	Twinbrook to Edmonson	NB	14.0	E	27.5	C	13.5	49%

Juris	Routes	Segments	Dir.	2006 Speed	2006 LOS	2009 Speed	2009 LOS	Change in speed	% Difference in speed
DC	Independence Avenue	14th Street NW to 17th Street NW	WB	3.5	F	7.6	E	4.1	54%
DC	15th Street NW	Independence Av to E St	NB	8.6	E	15.0	C	6.4	43%

Segments With PM Peak Hour LOS “E” or “F” (New Routes)

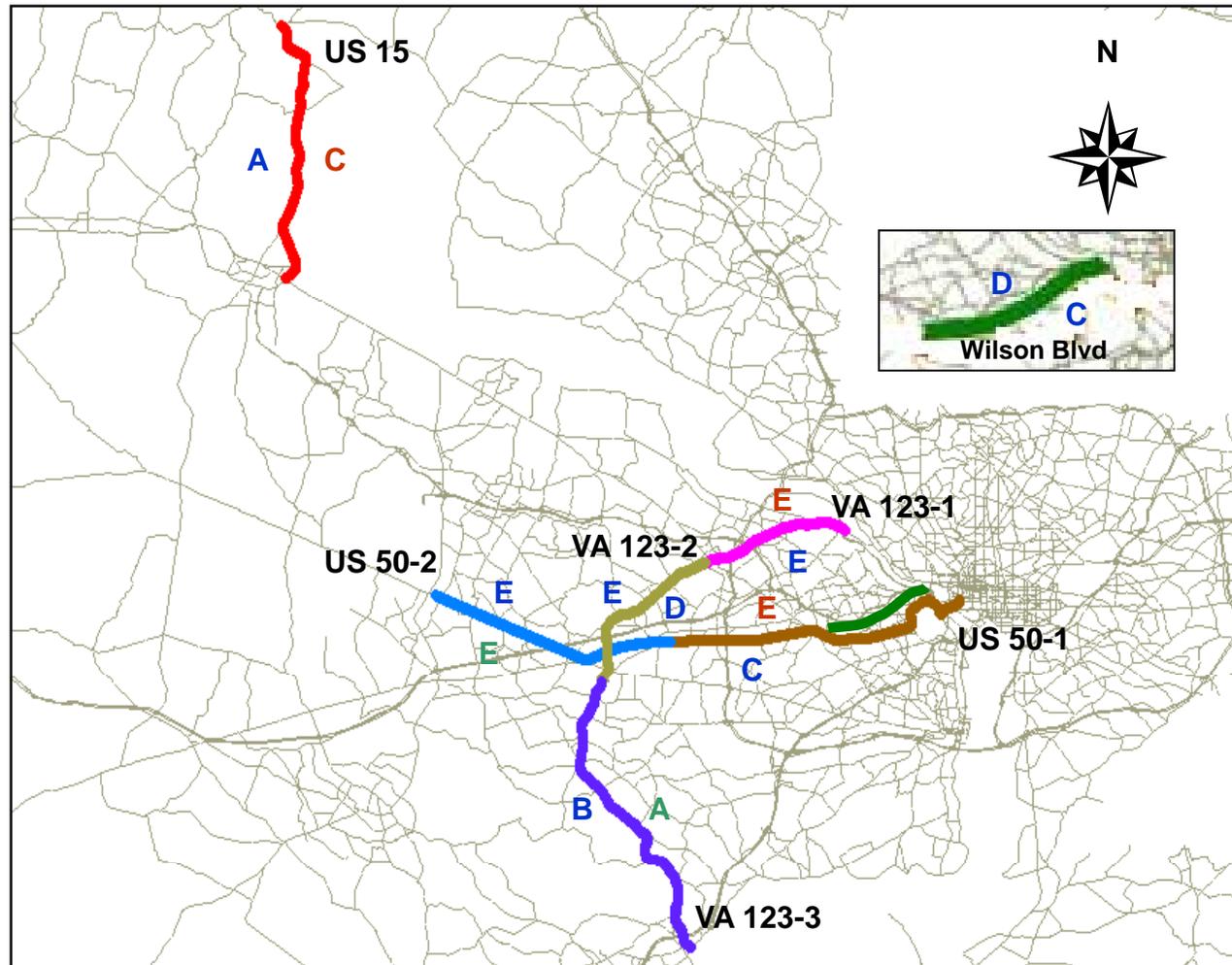
Juris	Routes	Segments	Direction	2006 LOS	2006 LOS
VA	Wilson/Clarendon Blvd	N. Glebe St. N. to Randolph St.	EB	-	E
VA	Wilson/Clarendon Blvd	N. Randolph St. to N. Monroe St.	EB	-	E
VA	Wilson/Clarendon Blvd	N. Monroe St. to Highland St.	EB	-	E
VA	Wilson/Clarendon Blvd	N. Randolph St. to N. Glebe St.	WB	-	F
MD	Baltimore Av. (US-1) Seg-1	Campus Dr./Paint Branch Pkw to Grenbelt Rd	NB	-	E
MD	Baltimore Av. (US-1) Seg-1	Queens Chapel Rd. to East-West Highway	SB	-	E
MD	Baltimore Av. (US-1) Seg-1	East-West Highway to US 1 bypass	SB	-	E
MD	Baltimore Av (US-1) Seg-2	University Blvd to Cherry Hill Rd.	NB	-	F
MD	Baltimore Av (US-1) Seg-2	Cherry Hill Rd. to Powder Mill Rd.	NB	-	E
MD	Baltimore Av (US-1) Seg-2	Muirkirk Meadows Rd to Contee Rd	NB	-	F
MD	Baltimore Av (US-1) Seg-2	Gorman Av. (MD198) to Cherry Ln.	SB	-	E
MD	University Blvd (MD 193)	New Hampshire Ave. to Riggs Rd.	EB	-	E
MD	University Blvd (MD 193)	Riggs Rd. to New Hampshire Ave.	WB	-	F
MD	University Blvd (MD 193)	New Hampshire Ave. to Piney Branch Rd	WB	-	E
DC	Rhode Island Av. (US-1)	4th St NE to 10th St NE	EB	-	F
DC	Rhode Island Av. (US-1)	10th St NE to Montana Av.	EB	-	E
DC	Rhode Island Av. (US-1)	Montana Av. To Eastern Av.	EB	-	E
DC	Rhode Island Av. (US-1)	10th St NE to 4th St NE	WB	-	E

Figure 1
Maryland Tours
LOS for PM Peak Hour (FY 2009)
5:00 PM - 6:00 PM



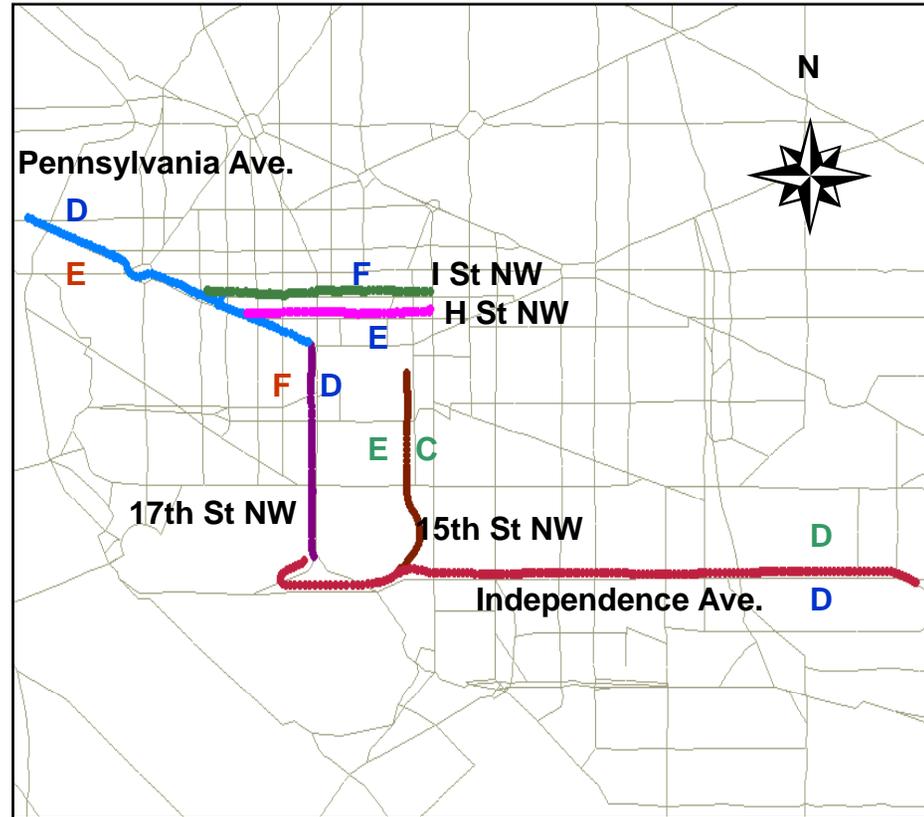
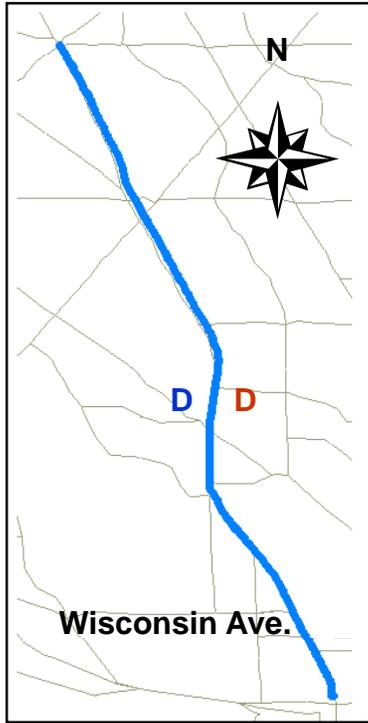
- 1) MD 117 - Muddy Branch Road to Clarksburg Road
- 2) MD 197 - US 301 to MD 198
- 3) MD 198 - New Hampshire Avenue to Old Gunpowder Road
- 4) MD 355 Segment 1 - Montrose Road to Montgomery Village Avenue
- 5) MD 355 Segment 2 - Western Avenue to Montrose Road
- 6) US-1 (Baltimore Av.) Seg 1 - Eastern Avenue & University Blvd (MD 193)
- 7) US-1 (Baltimore Av.) Seg 2 - University Blvd (MD 193) to MD198
- 8) University Blvd (MD193) - Collesville RD (US 29) and Adelphi Rd

Figure 2
Virginia Tours
LOS for PM Peak Hour (FY 2008)
5:00 PM - 6:00 PM



- 1) VA 123 Segment 1 - Old Courthouse Road and Kirby Road
- 2) VA 123 Segment 2 - University Drive to Old Courthouse Road
- 3) VA 123 Segment 3 - Horner Road to University Drive
- 4) US 15 - VA 7 to Lovettsville Road
- 5) US 50 Segment 1 - Nutley Street to Henry Bacon Drive
- 6) US 50 Segment 2 - Centerview Drive – Nutely Street
- 7) Wilson/Clarendon Blvd - Roosevelt Blvd & Lynn Rd

Figure 3
District of Columbia Tours
LOS for PM Peak Hour (FY 2008)
5:00 PM - 6:00 PM



- 1) Wisconsin Avenue NW - M Street NW to Western Avenue
- 2) Pennsylvania Avenue NW - 17th Street NW to M Street NW
- 3) Independence Avenue - 17th Street NW to 2nd Street SE
- 4) H Street NW - Pennsylvania Avenue to 14th Street NE
- 5) I Street NW - 14th Street to Pennsylvania Avenue NW
- 6) 15th Street NW - Independence Avenue to E Street NW
- 7) 17th Street NW - Independence Avenue to Pennsylvania Avenue
- 8) Rhode Island Av. (US-1) - Florida Avenue to eastern Avenue

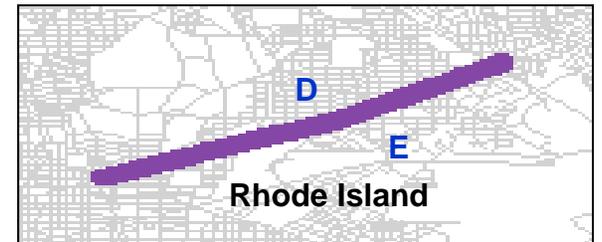




Figure 16
MD 355 Segment 2

Segment Length: 6.6 miles

Between Montrose Road and Western Avenue
LOS for PM Period in FY 2003 FY 2006 and FY 2009

			FY 09	FY 06	FY 03				FY 03	FY 06	FY 09			
Southbound	F	F	D	F	F	D	Montrose Rd.	C	B	D	C	B	D	
	B	C	B	B	C	B	Nicholson Rd.	E	D	D	D	F	D	
	C	D	D	D	D	D	Edson Ln.	B	C	B	C	B	B	
	C	C	B	C	C	B	Tuckerman La.	B	D	C	B	C	C	
	D	D	D	C	D	D	Pooks Hill Rd.	A	B	B	A	B	A	
	D	D	D	F	F	E	Cedar Ln.	C	E	F	C	E	F	
	E	F	D	E	F	C	Jones Bidge Rd.	E	F	F	D	E	F	
	E	D	C	E	E	C	Old Georgetown Pkwy	F	E	D	E	E	D	
	F	F	D	F	F	E	Montgomery Ave.	D	D	D	D	D	D	
	D	E	D	D	E	D	Bradley Ln.	C	D	D	C	C	D	
						Western Avenue								
	PM Peak Period		PM Peak Hour					PM Peak Hour				PM Peak Period		

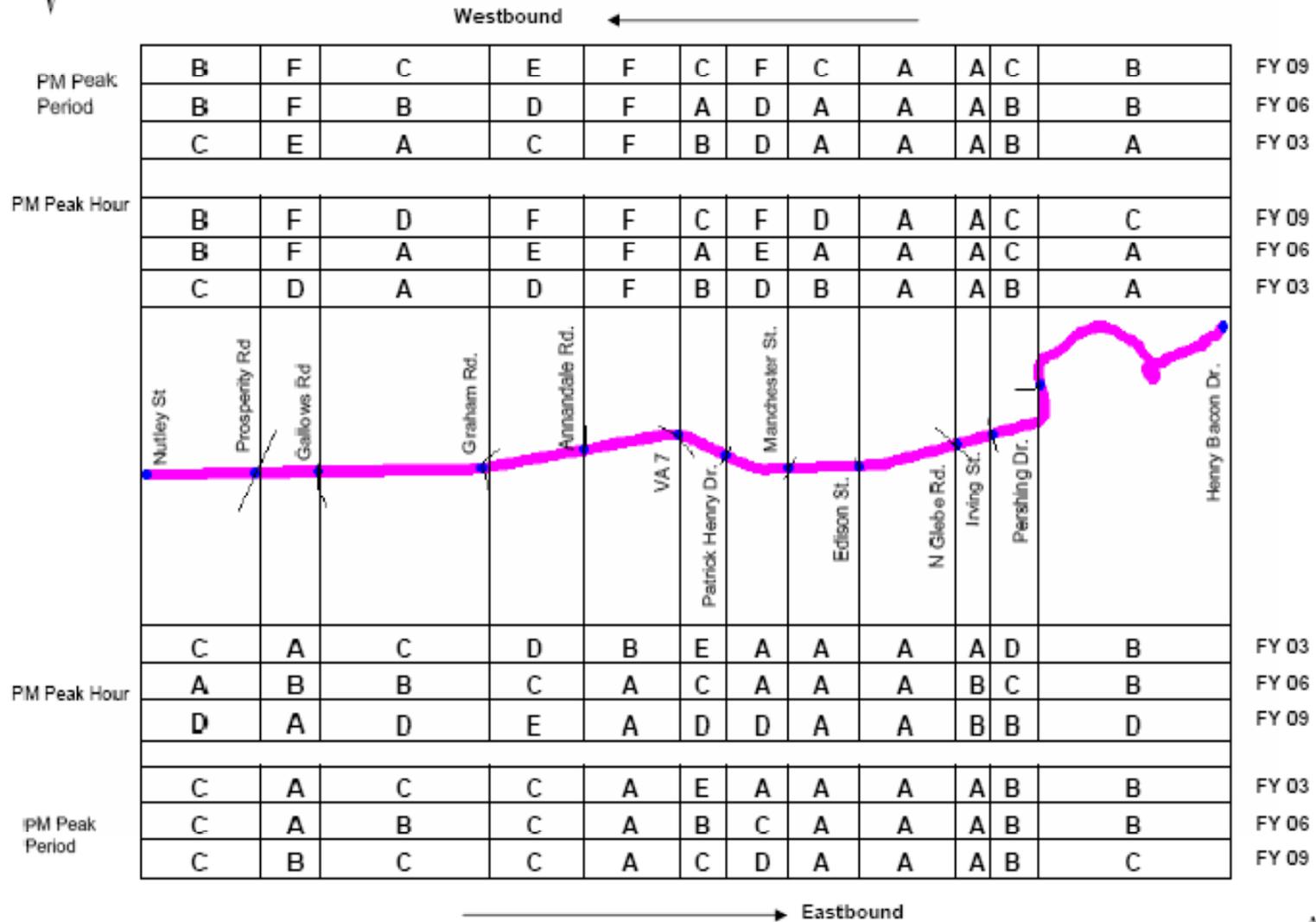
A-16



Figure 24
US 50 Segment 1

Between Nutley Street and Henry Bacon Drive
LOS for PM Period in FY 2003 FY 2006 and FY 2009

Segment Length: 13.0 miles



A-24



Figure 31
I Street NW

Segment Length: 0.6 miles

Between 14th Street NW to Pennsylvania Avenue NW
LOS for PM Period in FY 2003 FY 2006 and FY 2009

Westbound ←

PM Peak Period	E	FY 09
	F	FY 06
	F	FY 03
PM Peak Hour	E	FY 09
	F	FY 06
	F	FY 03

Vertical labels on the graph: Pennsylvania Ave. (left), 14th St NW (right)

Thank You