Revised Draft
06-30-2006

Analysis of AM Peak Period Travel In Northern Virginia's I-66 Corridor

Summary

More than 6 out of 10 inbound AM peak period travelers in Northern Virginia's I-66 corridor are using transit or multiple occupant autos and vans for their travel to or through regional core area employment sites in Northern Virginia and the District of Columbia. This remarkable statistic is based on multi-day traffic and transit passenger counts conducted in mid-September, 2005 by staff from the Metropolitan Washington Council of Governments/National Capital Region Transportation Planning Board (COG/TPB), the Washington Metropolitan Area Transit Authority (WMATA), the Virginia Railway Express (VRE), the Arlington County Transit System (ART), the Fairfax Connector bus system, the Loudoun County Transit (LCT) commuter bus service and the Potomac and Rappahannock Transportation Commission (PRTC). This project was sponsored by the Virginia Department of Transportation (VDOT) in response to a request by the Northern Virginia Transportation Commission (NVTC) and was carried out as a VDOT Technical Assistance project in the TPB's Fiscal Year 2006 Unified Planning Work Program (UPWP).

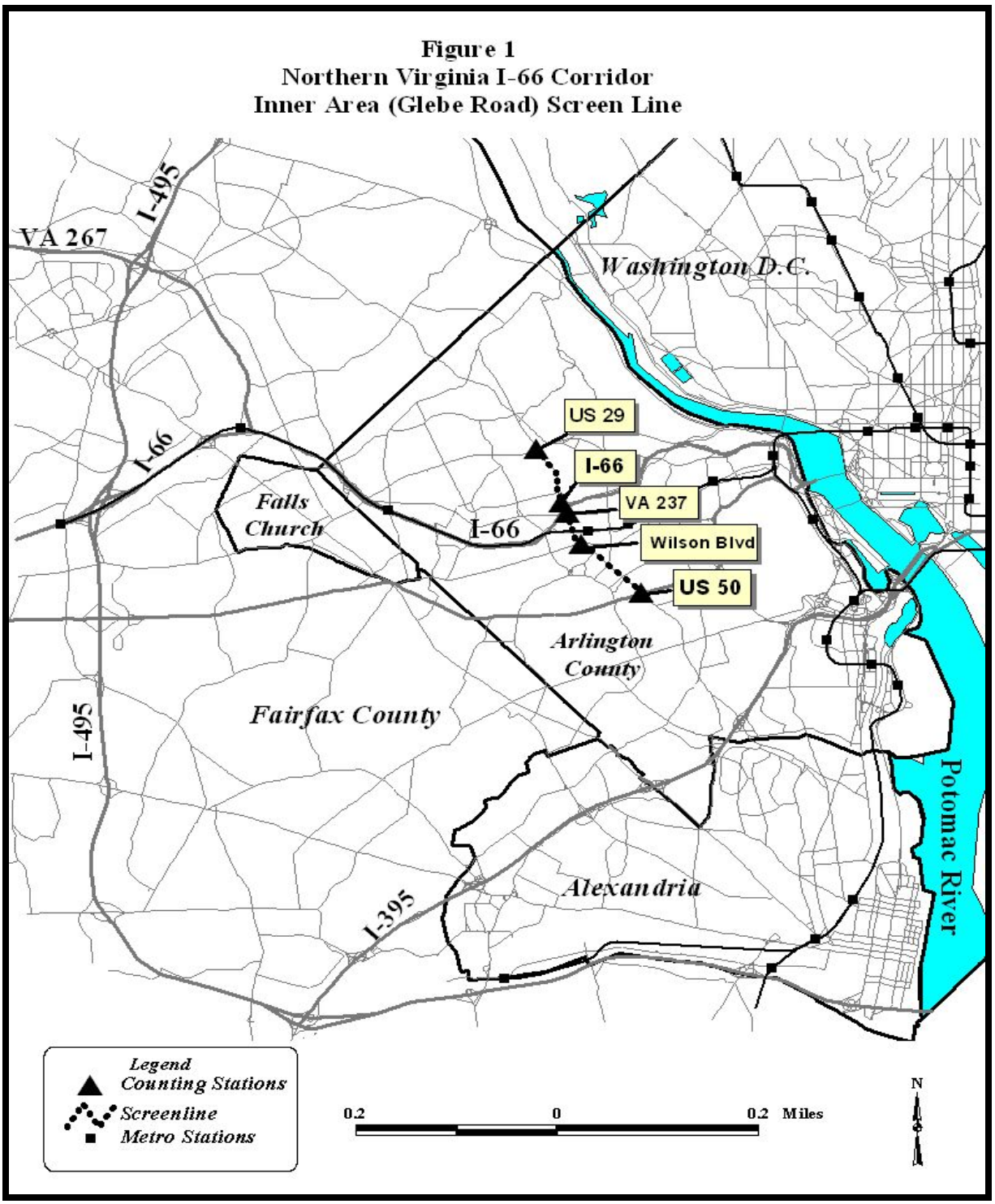
Study Background

One of NVTC's goals is to monitor and track changes in daily transit ridership relative to the growth in peak period auto travel in Northern Virginia's major commuting corridors. In pursuit of this goal, NVTC asked COG/TPB staff if corridor-specific estimates of AM peak period transit modal shares could be achieved through some modification or expansion of currently planned TPB travel monitoring activities. COG/TPB staff responded that statistically reliable travel modal share information could be obtained for the I-66 and I-95 travel corridors if some supplementary multi-day traffic and transit passenger counts were taken at a few selected locations and combined with traffic counts that COG/TPB already planned to make for VDOT as part of the Northern Virginia HOV Monitoring program in the fall of 2005.

An advisory working group composed of NVTC, VDOT, Virginia Department of Rail and Public Transportation (VDRPT), WMATA and local jurisdiction staff was established to review and refine the draft scope of work developed by COG/TPB in response to NVTC's request. The refined scope of work agreed to by the advisory committee recommended that two-day, mid-week counts of AM peak period inbound auto and transit person travel be taken on segments of Northern Virginia's major commuting routes along two screen lines: an outer area screen line just outside the Capital Beltway; and an inner area screen line just outside Glebe Road. It was also agreed, after much discussion about available resources for this project, that this project should be divided into multiple phases and conducted over several fiscal years as available funding permitted. VDOT agreed to help fund the first phase of this project and programmed some of its FY 2006 UPWP Technical Assistance funds for supplementary multi-

day traffic counts in the I-66 corridor at select locations along the inner area screen line just outside Glebe Road (Figure 1 and Appendix A). It was also agreed that NVTC would work with WMATA and local jurisdiction transit agencies in Northern Virginia to obtain multi-day transit ridership counts across this inner area I-66 corridor screen line in the same mid-September, 2005 time frame as the planned traffic counts.

Figure 1
Northern Virginia I-66 Corridor
Inner Area (Glebe Road) Screen Line



Total Person Travel

The traffic and transit passenger counts taken for this study on two "typical weekdays" were averaged together to compute a statistically dependable estimate of the 3-hour AM peak period for inbound person travel across the I-66 corridor inner area screen line. A "typical weekday for the purposes of this study was defined as a non-holiday Tuesday, Wednesday, or Thursday on which there were no special events or major traffic incidents that would affect typical travel patterns on these days.

Analysis of the average typical weekday count data collected in this study, presented in Table 1, show this 3-hour AM peak period for person travel to be from 6:15AM to 9:15AM when approximately 63,000 persons are traveling inbound on the major roads and transit routes serving Northern Virginia's I-66 corridor on their way to or through regional core area employment sites. Table 1 further reveals that the standard weekday variation for travel during this AM peak period is slightly more than 1,300 persons or approximately 2% of the total inbound AM peak period person travel across this screen line. This suggests that, for typical weekdays, there appears to be little day-to-day variation in total inbound AM peak period person travel across this screen line.

The data in Table 1 also show the morning peak 1-hour for inbound total person travel across the I-66 corridor inner area screen line at Glebe Road to be from 7:30AM to 8:30AM. The 26,000 peak hour travelers crossing this screen line represent approximately 41% of persons crossing this screen line the during 3-hour 6:15AM to 9:15AM morning peak period. On a typical weekday it is estimated that more than 6,000 inbound I-66 corridor travelers traverse this screen line in each 15-minute period during the AM peak hour. Day-to-day variation in typical weekday AM peak hour travel at 3% is slightly higher than for the entire 3-hour AM peak period.

Modal Shares

The data collected in this study indicate that on a typical weekday travel by transit accounts for the greatest share of inbound AM peak period person travel across the I-66 corridor inner area screen line at 37%. Persons traveling in 2+ person High Occupancy Vehicle (HOV 2+) carpools and vanpools account for another 26% of total AM peak period personal travel and persons traveling in Single Occupant Vehicles (SOV) account for 36%. Together, persons traveling by transit or HOV2+ vehicles account for about 64% of the total volume of AM peak period inbound travel across the I-66 corridor inner area screen line.

In the 7:30AM to 8:30AM peak hour, transit accounts for an even greater share of the inbound person travel across the I-66 corridor screen line at 39%. This higher transit modal share percentage comes at the expense of the SOV modal share which drops from 36% during the 3-hour AM peak period to 35% during the AM peak 1-hour. The HOV2+ modal share for the AM peak hour remains as it is for the AM peak period, 26%.

Day-to-day variation in typical weekday person travel in the 3-hour AM peak period and the 1-hour peak hour is approximately 4% to 5% for each individual travel mode. This percent

Table 1
AM Peak Period Travel in the I-66 Corridor
Total Inbound Person Trips at the Inner Area (Glebe Road) Screen Line

Time Period	Total Persons	Transit Persons	HOV2+ Persons	SOV Persons	Percent Transit	Percent HOV2+	Percent SOV
5:00 - 5:15 AM	811	224	65	523	28%	8%	64%
5:15 - 5:30 AM	1,244	132	153	960	11%	12%	77%
5:30 - 5:45 AM	2,310	615	267	1,428	27%	12%	62%
5:45 - 6:00 AM	2,698	763	363	1,572	28%	13%	58%
6:00 - 6:15 AM	2,687	571	504	1,612	21%	19%	60%
6:15 - 6:30 AM	3,845	1,504	697	1,645	39%	18%	43%
6:30 - 6:45 AM	4,238	1,511	1,393	1,334	36%	33%	31%
6:45 - 7:00 AM	4,338	1,737	1,296	1,305	40%	30%	30%
7:00 - 7:15 AM	4,827	1,759	1,399	1,669	36%	29%	35%
7:15 - 7:30 AM	5,734	2,082	1,746	1,907	36%	30%	33%
7:30 - 7:45 AM	6,536	2,587	1,876	2,074	40%	29%	32%
7:45 - 8:00 AM	6,513	2,400	1,788	2,326	37%	27%	36%
8:00 - 8:15 AM	6,586	2,657	1,749	2,181	40%	27%	33%
8:15 - 8:30 AM	6,088	2,400	1,383	2,305	39%	23%	38%
8:30 - 8:45 AM	5,823	2,275	1,364	2,184	39%	23%	38%
8:45 - 9:00 AM	4,479	1,424	1,135	1,920	32%	25%	43%
9:00 - 9:15 AM	4,278	1,357	871	2,051	32%	20%	48%
9:15 - 9:30 AM	3,459	706	801	1,953	20%	23%	56%
9:30 - 9:45 AM	3,456	889	715	1,853	26%	21%	54%
9:45 - 10:00 AM	2,862	303	688	1,872	11%	24%	65%
Total							
5:00-10:00 AM	82,809	27,892	20,248	34,670	34%	24%	42%
Standard Weekday Variation (STD)	919	1,381	527	64			
Percent Variation (CV)	1%	5%	3%	0%			
Peak Period							
6:15-9:15 AM	63,283	23,690	16,694	22,899	37%	26%	36%
Standard Weekday Variation (STD)	1,299	1,076	697	920			
Percent Variation (CV)	2%	5%	4%	4%			
Peak Hour							
7:30-8:30 AM	25,723	10,043	6,795	8,885	39%	26%	35%
Standard Weekday Variation (STD)	713	510	281	484			
Percent Variation (CV)	3%	5%	4%	5%			

Note: The person trip data presented in this table are the average of two "typical weekday" counts taken in mid-September, 2005. The standard weekday variation is the standard deviation (STD) of these two counts. The percent variation is the coefficient of variation (CV) expressed as the ratio of the count standard deviation to the count average times 100%.

variation is about twice the percent variation in total inbound AM peak period travel for all travel modes combined. This difference between the percent variation in overall person travel and the percent variation by travel mode suggests that, on a day-to-day basis, there appears to be some measurable switching between travel modes in the AM peak period and/or differences in the time of travel by mode between the 3-hour AM peak period and the shoulder periods before and after this peak period. For the entire 5-hour AM counting period SOV person travel shows the least variation, with almost no variation. Person travel by transit for this same 5-hour AM period shows the greatest variation at about 5%.

Travel by Transit

Approximately 19,000 persons in the I-66 corridor choose Metrorail for their AM peak period travel to and through regional core area employment centers. By far, Metrorail accounts for the greatest share of inbound AM peak period transit ridership in the I-66 corridor. This is not surprising given the fact that WMATA and local jurisdiction bus service feed many transit riders from local neighborhoods to the Metrorail system.

WMATA Metrobus, Fairfax Connector (FFX CONN), Loudoun County Transit (LCT) and PRTC OmniRide and Metro Direct bus routes provide feeder bus service to Orange Line Metrorail stations outside the I-66 inner area screen line. Many of the daily riders on these bus routes are also Metrorail riders who are included in the Metrorail passenger counts taken at the Glebe Road screen line. In addition to this Metrorail feeder bus service, these three transit providers also operate some direct bus service that crosses the I-66 inner area screen line on routes directly serving Rossyln or the Pentagon in Arlington, or the State Department across the Theodore Roosevelt Bridge in the District of Columbia.

The data presented in Table 2 show that on a typical weekday WMATA Metrobuses serve 720 inbound AM peak period weekday passengers for their travel across this I-66 inner area screen line, Fairfax Connector buses serve 233 passengers, Loudoun County Transit buses serve 889 passengers and PRTC OmniRide buses serve 204 riders. In addition to these three systems, the Arlington County Transit (ART) system supplements WMATA Metrobus service with some smaller, neighborhood-friendly vehicles that also cross the Glebe Road screen line. In this study, ART buses were found to carry 240 AM peak period transit riders across this I-66 corridor inner area screen line.

Virginia Railway Express' (VRE) Manassas line also provides service to AM peak period travelers who live in the broad I-66 transportation corridor. Because of the configuration of the railroad lines providing service from Northern Virginia's outer suburban jurisdictions to regional core area employment centers, VRE riders who board trains at VRE stations in the I-66 corridor technically cross the Glebe Road inner area screen line in the I-95 travel corridor. For the purposes of this study, AM peak period transit passengers boarding VRE Manassas line trains at the Broad Run, Manassas, and Manassas Park commuter rail station, plus one-half the AM peak VRE riders at the Burke Center station, minus the number of passengers alighting VRE trains before the Crystal City station were considered I-66 corridor inner area screen line travelers.

Table 2
AM Peak Period Travel in the I-66 Corridor
Total Inbound Transit Passengers at the Inner Area (Glebe Road) Screen Line

Time Period	Total Transit	ART BUS	FFX CONN BUS	LCT BUS	PRTC OMNI-RIDE	WMATA BUS	WMATA RAIL	VRE RAIL
5:00 - 5:15 AM	224	0	0	0	0	0	224	0
5:15 - 5:30 AM	132	0	0	0	0	0	132	0
5:30 - 5:45 AM	615	0	0	0	0	63	552	0
5:45 - 6:00 AM	763	0	0	0	45	12	383	324
6:00 - 6:15 AM	571	29	0	58	0	60	425	0
6:15 - 6:30 AM	1,504	5	38	63	42	64	1,292	0
6:30 - 6:45 AM	1,511	13	33	48	28	43	884	463
6:45 - 7:00 AM	1,737	19	33	103	38	57	1,490	0
7:00 - 7:15 AM	1,759	37	0	130	0	69	957	566
7:15 - 7:30 AM	2,082	30	46	152	38	48	1,770	0
7:30 - 7:45 AM	2,587	33	0	94	30	80	1,706	645
7:45 - 8:00 AM	2,400	27	43	100	0	79	2,152	0
8:00 - 8:15 AM	2,657	21	26	99	30	62	1,970	451
8:15 - 8:30 AM	2,400	23	0	87	0	84	2,207	0
8:30 - 8:45 AM	2,275	16	16	16	0	42	1,960	226
8:45 - 9:00 AM	1,424	8	0	0	0	40	1,377	0
9:00 - 9:15 AM	1,357	10	0	0	0	55	1,292	0
9:15 - 9:30 AM	706	16	0	0	0	46	645	0
9:30 - 9:45 AM	889	1	0	0	0	41	847	0
9:45 - 10:00 AM	303	16	0	0	0	23	265	0
Total								
5:00-10:00 AM	27,892	301	233	946	249	964	22,524	2,675
Standard Weekday Variation (STD)	1,381	6	34	22	16	131	1,260	12
Percent Variation (CV)	5%	2%	15%	2%	6%	14%	6%	0%
Peak Period								
6:15-9:15 AM	23,690	240	233	889	204	720	19,054	2,351
Standard Weekday Variation (STD)	1,076	5	34	19	14	150	932	12
Percent Variation (CV)	5%	2%	15%	2%	7%	21%	5%	1%
Peak Hour								
7:30-8:30 AM	10,043	103	69	379	59	304	8,034	1,096
Standard Weekday Variation (STD)	510	0	5	17	16	110	426	2
Percent Variation (CV)	5%	0%	7%	4%	27%	36%	5%	0%

Note: The transit ridership data presented in this table are the average of two "typical weekday" counts taken in mid-September, 2005. The standard weekday variation is the standard deviation (STD) of these two counts. The percent variation is the coefficient of variation (CV) expressed as the ratio of the count standard deviation to the count average times 100%.

The rationale for the decision to include some of the VRE Manassas line passenger boardings with the other I-66 corridor inner area transit and total person counts is that many of the AM peak period VRE riders boarding at these stations could use, if they so chose, other available options for AM peak period travel in the I-66 corridor that are counted at the inner area screen line. Morning peak VRE Manassas line passengers boarding trains at the Rolling Road and Backlick Road stations were not considered to be I-66 corridor travelers because these rail stations are more likely to serve Northern Virginia commuters and others traveling in the I-95 transportation corridor during the AM peak period. Because Burke Centre is located almost midway between the I-66 and I-95 travel corridors, it was decided for the purposes of this analysis to include half of the AM peak period transit passengers boarding VRE trains at the Burke Centre station in the calculation of I-66 inner area screen line total person and transit passenger totals.

The data in Table 2 show VRE trains are estimated to serve approximately 2,400 inbound I-66 corridor transit passengers traveling to regional core area employment centers in Arlington and DC. This represents approximately 10% of total AM peak period ridership at the I-66 corridor inner area screen line on most weekdays. Also, of all the various transit modes that were counted in this study, VRE ridership exhibited the least day-to-day variation, with an average percent difference of only about 1% for the 3-hour AM peak period.

Travel by High Occupancy Vehicles

This study also found almost 17,000 persons traveling in passenger vehicles with two or more occupants (HOV2+) for their typical weekday inbound AM peak period travel across the I-66 corridor inner area screen line. Not surprisingly, as seen in Table 3, the greatest amount of HOV2+ person travel was seen on I-66. Use of I-66's inbound lanes between 6:30AM and 9:00AM is restricted to HOV2+-person vehicles and single occupant vehicles that are traveling from Dulles Airport or have special "clean fuel" license tags or are law enforcement vehicles. The roadway facility with the second highest number of inbound AM peak period HOV2+ person trips in this study was US 50. Though significant, the amount of HOV2+ person travel on US 50 was only about one-fifth that on I-66. Inbound AM peak period HOV2+ person travel on US 29 (Lee Highway), VA 237 (Washington Boulevard) and Wilson Boulevard averaged about 600 persons on each of these three roadways.

The effectiveness of the I-66 HOV lanes in encouraging the use of car and vanpooling and their efficiency in moving large numbers of people per lane of roadway is clearly seen in the count data collected in this study. During the 2.5-hour time period the I-66 use restrictions are in effect, the two inbound I-66 HOV lanes carry an average of 2,800 persons per lane per hour compared to an average of just 1,200 persons per lane per hour on the seven inbound non-restricted general purpose lanes on the other roadway facilities crossing the Glebe Road screen line in this corridor.

Travel by Single Occupant Vehicles

The amount of inbound AM peak period single occupant vehicle (SOV) travel on each of the major Northern Virginia roadway facilities that cross the I-66 corridor inner area screen line

Table 3
AM Peak Period Travel in the I-66 Corridor
Inbound Persons in HOV2+ Vehicles at the Inner Area (Glebe Road) Screen Line

Time Period	Total HOV2+ Persons	HOV2+ Persons by I-66 Corridor Roadway Facility				
		US 29	I-66	VA 237	Wilson Blv	US 50
5:00 - 5:15 AM	65	0	64	0	1	0
5:15 - 5:30 AM	153	2	125	0	5	21
5:30 - 5:45 AM	267	2	226	0	9	31
5:45 - 6:00 AM	363	8	324	0	12	19
6:00 - 6:15 AM	504	14	437	1	21	32
6:15 - 6:30 AM	697	16	570	4	35	73
6:30 - 6:45 AM	1,393	28	1,160	26	38	142
6:45 - 7:00 AM	1,296	37	1,013	21	30	196
7:00 - 7:15 AM	1,399	44	1,034	35	42	245
7:15 - 7:30 AM	1,746	51	1,380	47	35	233
7:30 - 7:45 AM	1,876	57	1,305	71	51	393
7:45 - 8:00 AM	1,788	50	1,368	94	81	196
8:00 - 8:15 AM	1,749	57	1,256	92	95	250
8:15 - 8:30 AM	1,383	46	1,025	38	44	232
8:30 - 8:45 AM	1,364	57	976	55	64	212
8:45 - 9:00 AM	1,135	54	775	71	52	184
9:00 - 9:15 AM	871	72	517	53	39	192
9:15 - 9:30 AM	801	63	448	52	31	207
9:30 - 9:45 AM	715	63	360	42	35	215
9:45 - 10:00 AM	688	78	315	36	59	201
Total						
5:00-10:00 AM	20,248	794	14,675	736	774	3,269
Standard Weekday Variation (STD)	527	41	195	106	200	197
Percent Variation (CV)	3%	5%	1%	14%	26%	6%
Peak Period						
6:15-9:15 AM	16,694	566	12,376	605	603	2,545
Standard Weekday Variation (STD)	697	5	350	96	223	225
Percent Variation (CV)	4%	1%	3%	16%	37%	9%
Peak Hour						
7:30-8:30 AM	6,795	208	4,953	295	270	1,070
Standard Weekday Variation (STD)	281	24	94	65	77	339
Percent Variation (CV)	4%	12%	2%	22%	29%	32%

Note: The traffic count data presented in this table are the average of two "typical weekday" counts taken in mid-September, 2005. The standard weekday variation is the standard deviation (STD) of these two counts. The percent variation is the coefficient of variation (CV) expressed as the ratio of the count standard deviation to the count average times 100%

is also strongly influenced by restrictions on the use of the I-66 facility by SOVs during the morning peak period. Inbound travel on I-66 by SOVs from 6:30AM to 9:00AM is legally restricted to: (1) persons traveling from Dulles Airport; (2) persons in vehicles with "clean fuel" license plates; and (3) persons traveling in other vehicles exempt from the HOV requirement such as law enforcement vehicles. Significant fines and driver's license points are assessed to SOV travelers on I-66 caught violating these restricted use provisions.

The results of the two-day traffic counts conducted for this study presented in Table 4 show that on a typical weekday approximately 23,000 inbound AM peak period travelers cross the I-66 inner area screen line in single occupancy vehicles (SOVs).During the AM peak period, the US 50 roadway facility is seen to have the greatest amount of SOV travel. The data in Table 4 show approximately 11,000 AM peak period SOV users crossing the Glebe Road screen line on US 50. The relationship between the 6:30AM to 9:00AM use restrictions on I-66 and SOV travel on US 50 is also clearly seen in this table. In the time periods immediately before the I-66 use restrictions take effect there is more SOV travel on I-66 than on US 50. Likewise, in the time periods immediately after the I-66 use restrictions end, SOV travel on I-66 again exceeds that on US 50. Conversely, during the time periods when I-66 use restrictions are in effect, SOV travel on US 50 is two to four times the volume of SOV travel on I-66.

Typical weekday SOV travel on the I-66 facility itself totals about 4,500 persons for the 3-hour AM peak period (6:15AM to 9:15AM) persons. During the 2.5-hour restricted use period (6:30AM to 9:00AM) SOV travel on I-66 totals only 2,900 persons. This means that about 36% of the total AM peak period SOV travel on I-66 at the Glebe Road screen line occurs in the 15-minute periods just before and after the restricted use period. Also, for both the 15-minute time period after the start of use restrictions and the 15-minute time period before the end of the use restriction, the number of persons in SOVs on I-66 averaged 359. This average is measurably higher than the average for any 15-minute time period during the hours of restricted use.

Persons in SOVs traveling inbound across the Glebe Road screen line in the AM peak period totaled about 2,900 on US 29 (Lee Highway), about 2,300 on VA 237 (Washington Boulevard) and about 2,100 on Wilson Boulevard..

Vehicle Counts

Total typical weekday inbound AM peak period passenger vehicle flows across the I-66 inner area screen line on the major roadways analyzed in this study were found to be almost 30,500 vehicles, as seen in Table 5. The greatest number of these AM peak period vehicle movements were on US 50 with an inbound vehicle flow of approximately 12,200 vehicles, followed closely by I-66 with an inbound flow of about 10,100 vehicles. Inbound AM peak period passenger vehicle movements totaled approximately 3,200 on US 29 (Lee Highway) 2,600 on VA 237 (Washington Boulevard) and 2,400 on Wilson Boulevard.

Table 4
AM Peak Period Travel in the I-66 Corridor
Inbound Persons in SOV Vehicles at the Inner Area (Glebe Road) Screen Line

Time Period	Total SOV Persons	SOV Persons by I-66 Corridor Roadway Facility				
		US 29	I-66	VA 237	Wilson Blv	US 50
5:00 – 5:15 AM	523	8	350	7	14	145
5:15 – 5:30 AM	960	21	675	13	26	226
5:30 – 5:45 AM	1,428	37	994	26	24	348
5:45 – 6:00 AM	1,572	54	991	38	48	442
6:00 – 6:15 AM	1,612	66	929	35	52	531
6:15 – 6:30 AM	1,645	93	865	61	78	550
6:30 – 6:45 AM	1,334	144	359	74	124	634
6:45 – 7:00 AM	1,305	190	186	108	109	713
7:00 – 7:15 AM	1,669	259	237	152	143	878
7:15 – 7:30 AM	1,907	319	264	205	165	955
7:30 – 7:45 AM	2,074	346	315	257	208	949
7:45 – 8:00 AM	2,326	355	328	305	217	1,123
8:00 – 8:15 AM	2,181	290	286	271	232	1,103
8:15 – 8:30 AM	2,305	239	280	232	255	1,300
8:30 – 8:45 AM	2,184	251	293	218	232	1,192
8:45 – 9:00 AM	1,920	249	359	239	202	872
9:00 – 9:15 AM	2,051	216	749	179	163	744
9:15 – 9:30 AM	1,953	190	752	143	133	735
9:30 – 9:45 AM	1,853	187	805	137	152	574
9:45 - 10:00 AM	1,872	189	892	134	150	507
Total						
5:00-10:00 AM	34,670	3,697	10,904	2,830	2,723	14,518
Standard Weekday Variation (STD)	64	15	465	180	11	327
Percent Variation (CV)	0%	0%	4%	6%	0%	2%
Peak Period						
6:15-9:15 AM	22,899	2,949	4,517	2,298	2,125	11,011
Standard Weekday Variation (STD)	920	9	268	181	87	399
Percent Variation (CV)	4%	0%	6%	8%	4%	4%
Peak Hour						
7:30-8:30 AM	8,885	1,229	1,208	1,064	911	4,475
Standard Weekday Variation (STD)	484	32	158	113	41	203
Percent Variation (CV)	5%	3%	13%	11%	5%	5%

Note: The traffic count data presented in this table are the average of two "typical weekday" counts taken in mid-September, 2005. The standard weekday variation is the standard deviation (STD) of these two counts. The percent variation is the coefficient of variation (CV) expressed as the ratio of the count standard deviation to the count average times 100%.

Table 5
AM Peak Period Travel in the I-66 Corridor
Total Inbound Passenger Vehicles at the Inner Area (Glebe Road) Screen Line

Time Period	Total Passenger Vehicles	Passenger Vehicles by I-66 Corridor Roadway				
		US 29	I-66	VA 237	Wilson Blv	US 50
5:00 - 5:15 AM	556	8	382	7	15	145
5:15 - 5:30 AM	1,030	22	732	13	29	236
5:30 - 5:45 AM	1,539	38	1,085	26	28	363
5:45 - 6:00 AM	1,717	58	1,116	38	55	451
6:00 - 6:15 AM	1,817	70	1,109	36	60	543
6:15 - 6:30 AM	1,936	101	1,097	63	93	583
6:30 - 6:45 AM	1,963	155	881	84	142	702
6:45 - 7:00 AM	1,895	205	644	119	124	804
7:00 - 7:15 AM	2,318	280	722	169	162	985
7:15 - 7:30 AM	2,684	343	873	228	181	1,059
7:30 - 7:45 AM	2,942	373	911	291	232	1,136
7:45 - 8:00 AM	3,156	376	970	349	255	1,208
8:00 - 8:15 AM	2,986	314	867	315	277	1,214
8:15 - 8:30 AM	2,948	259	751	251	277	1,410
8:30 - 8:45 AM	2,813	277	750	240	263	1,283
8:45 - 9:00 AM	2,433	272	710	269	228	955
9:00 - 9:15 AM	2,427	249	968	201	183	827
9:15 - 9:30 AM	2,313	216	957	163	149	829
9:30 - 9:45 AM	2,158	217	955	155	170	662
9:45 - 10:00 AM	2,184	226	1,037	149	179	594
Total						
5:00-10:00 AM	43,808	4,054	17,511	3,161	3,098	15,986
Standard Weekday Variation (STD)	256	11	591	214	95	205
Percent Variation (CV)	1%	0%	3%	7%	3%	1%
Peak Period						
6:15-9:15 AM	30,497	3,202	10,140	2,576	2,415	12,164
Standard Weekday Variation (STD)	599	6	103	222	16	284
Percent Variation (CV)	2%	0%	1%	9%	1%	2%
Peak Hour						
7:30-8:30 AM	12,031	1,322	3,497	1,205	1,040	4,967
Standard Weekday Variation (STD)	359	43	224	142	6	30
Percent Variation (CV)	3%	3%	6%	12%	1%	1%

Note: The traffic count data presented in this table are the average of two "typical weekday" counts taken in mid-September, 2005. The standard weekday variation is the standard deviation (STD) of these two counts. The percent variation is the coefficient of variation (CV) expressed as the ratio of the count standard deviation to the count average times 100%.

Average Vehicle Occupancies

On a typical weekday a total of almost 40,000 persons in approximately 30,000 passenger vehicles were found in this study to be traveling inbound across the Glebe Road screen line during the 3-hour AM peak period. The persons in these passenger vehicles, which included autos, vans and motorcycles, accounted for about 63% of all inbound person travel across the I-66 corridor inner area screen line during this morning peak time period.

The data in Table 6 also show that the total number inbound AM peak period passenger vehicle flows on US 50 exceed the number on I-66 by 2,000 vehicles, but the number of persons in passenger vehicles on I-66 exceed those in passenger vehicles on US 50 by 3,000 persons. Thus, on a typical weekday, inbound AM peak period passenger vehicles on I-66 carry approximately 3,300 people in 2,000 fewer vehicles than on US 50.

The reason that the I-66 facility moves more persons in fewer vehicles than on US 50 is that average passenger vehicle occupancies for inbound AM peak period vehicles on I-66 are 50% higher than those for vehicles on US 50. Typical weekday AM peak period inbound passenger vehicle occupancies on I-66 averaged 1.67 persons per vehicle compared to only 1.11 persons per vehicle on US 50. Comparable passenger vehicle occupancies are 1.11 persons per vehicle for US 29 (Lee Highway), and 1.13 persons per vehicle on VA 237 (Washington Boulevard) and on Wilson Boulevard.

Table 6
AM Peak Period Travel in the I-66 Corridor
Average Inbound Passenger Vehicle Occupancies
at the Inner Area (Glebe Road) Screen Line

Roadway Facility	Number of Inbound Lanes	Passenger Vehicles		
		Person Count	Vehicle Count	Average Occupancy
US 29	2	3,514	3,202	1.10
I-66	2	16,893	10,140	1.67
VA 237	1	2,903	2,576	1.13
Wilson Blv	1	2,727	2,415	1.13
US 50	3	13,556	12,164	1.11
TOTAL	**9**	**39,593**	**30,497**	**1.30**

Note: The traffic count data presented in this table are the average of two "typical weekday" counts taken in mid-September, 2005

The data in tables 7 and 8 present the number and percentage distribution of vehicle occupancies classified by the number of persons in the vehicle for inbound AM peak period passenger vehicle flows across the I-66 corridor inner area screen line, respectively. These tables show that, for all major roads in the I-66 corridor, except for I-66 itself, about 90% of the inbound AM peak period passenger vehicles on these roadways are only carrying a single occupant. On the I-66 facility during this same time period about 56% of the passenger vehicles are carrying 2 or more occupants. In summary, inbound AM peak period passenger vehicles on I-66 at the Glebe Road screen line carry about 50% more people per vehicle than vehicles on any other major road at this screen line.

Table 7
AM Peak Period Travel in the I-66 Corridor
Inbound Passenger Vehicle Counts Classified by Number of Persons in Vehicle at the Inner Area (Glebe Road) Screen Line
3-Hour AM Peak Period - (6:15AM to 9:15AM)

Number of Persons in Vehicle	Corridor Total	I-66 Corridor Roadway Facility				
		US 29	I-66	VA 237	Wilson Blv	US 50
1-Person Autos	22,726	2,944	4,383	2,291	2,122	10,987
2-Person Autos	6,880	222	5,108	256	264	1,031
3+-Person Autos	648	30	463	20	23	113
Vanpools	71	3	53	3	4	10
Motorcycles	174	5	134	8	3	25
Total Passenger Vehicles	30,497	3,202	10,140	2,576	2,415	12,164

Table 8
AM Peak Period Travel in the I-66 Corridor
Distribution of Inbound Passenger Vehicle Counts by Number of Persons in Vehicle at the Inner Area (Glebe Road) Screen Line
3-Hour AM Peak Period - (6:15AM to 9:15AM)

Number of Persons in Vehicle	Corridor Total	I-66 Corridor Roadway Facility				
		US 29	I-66	VA 237	Wilson Blv	US 50
1-Person Autos	75%	92%	43%	89%	88%	90%
2-Person Autos	23%	7%	50%	10%	11%	8%
3+-Person Autos	2%	1%	5%	1%	1%	1%
Vanpools	0%	0%	1%	0%	0%	0%
Motorcycles	1%	0%	1%	0%	0%	0%
Total Passenger Vehicles	100%	100%	100%	100%	100%	100%

Statistical Confidence Levels for AM Peak Period Modal Share Estimates

One of the intended purposes of this study was to develop a statistically reliable estimate of the transit mode share of inbound AM peak period travel in Northern Virginia's I-66 corridor at the inner area Glebe Road screen line. Based on the statistical analysis of the two-day auto occupancy and transit passenger counts conducted, transit's share of inbound AM peak period travel on a typical weekday is estimated to be 37.4%plus or minus 0.8 percentage points at the 90% confidence level. This means that, statistically, one can be 90% confident that the actual share of AM peak period travel in the I-66 corridor by transit would be found in the range from 36.6% to 38.2%, if these counts had been taken on every typical weekday between Tuesday, September 13, 2005 and Thursday, September 22, 2005..

The HOV2+ person share of inbound AM peak period travel on a typical weekday at the inner area Glebe Road screen line is estimated to be 26.4% plus or minus 0.3 percentage points at the 90% confidence level. The share of SOV travel at this same screen line is estimated to be 36.2% plus or minus 0.2 percentage points at the 90% confidence level.

Major Findings and Conclusions[1]

Analysis of two-day auto occupancy and transit passenger counts conducted on typical weekdays in mid-September, 2005 show that more than 6 out of 10 inbound AM peak period travelers in Northern Virginia's I-66 corridor are using transit or HOV 2+ passenger vehicles for their travel to or through regional core area employment sites in Northern Virginia and the District of Columbia.

Travel by transit during the 3-hour AM peak period from 6:15AM to 9:15AM was found to account for the greatest share of inbound person travel across the I-66 corridor inner area screen line at Glebe Road. Based on statistical analysis of the two-day counts, transit's share of this AM peak travel is estimated at 37.4% and one can be 90% confident that transit's share is no less than 36.6% and could be at high as 38.2%.

Approximately, 19,000 persons in the I-66 corridor choose the Metrorail Orange Line for their AM peak period travel to and through regional core area employment centers in Northern Virginia and downtown Washington, DC. By far, Metrorail accounts for the greatest share of transit ridership in the I-66 corridor, but this is not surprising given that WMATA and local jurisdiction bus service feed many transit riders from local neighborhoods to several Metrorail Orange Line stations located along the I-66 corridor.

The WMATA Metrobus, Fairfax Connector (FFX CONN), Loudoun County Transit (LCT), PRTC OmniRide and Arlington County Transit (ART) systems, in addition to providing feeder bus service to Metrorail stations, also operate some bus service that directly crosses the I-66 corridor inner area screen line. On a typical weekday approximately 2,300 persons are riding buses operated by these transit providers as they cross the inner area screen line at Glebe Road.

[1] The major findings presented in this section of the report are for the 6:15PM to 9:15AM 3-hour AM peak period unless otherwise stated.

The Manassas line of the Virginia Railway Express (VRE) that serves AM peak period travelers living in the I-66 transportation corridor carries about 2,400 inbound riders across the inner area screen line to regional core area employment centers.[2] Typical weekday ridership on VRE showed the least day-to-day variation of any of the transit modes and was second only to Metrorail in the total number of I-66 corridor inbound riders carried during the AM peak period.

Almost 17,000 persons were found crossing the I-66 corridor inner area screen line in passenger vehicles with two or more occupants (HOV2+). The overwhelming majority of these HOV2+ persons (12,400) were on the I-66 facility itself. The corridor facility with the second highest number of HOV2+ persons (2,500) was US 50 (Arlington Boulevard). Though significant, the amount of HOV 2+ person travel on US 50 was only about one-fifth that on I-66.

The effectiveness of the I-66 HOV lanes in encouraging the use of car and vanpooling and their efficiency in moving large numbers of people per lane of roadway was clearly seen in the count data collected in study. During the time period the I-66 use restrictions are in effect, the two inbound I-66 HOV lanes carry an average of 2,800 persons per lane per hour compared to an average of just 1,200 persons per lane per hour on the seven inbound non-restricted general purpose lanes on the other roadway facilities crossing the Glebe Road screen line in this corridor.

The amount of inbound AM peak period single occupant vehicle (SOV) travel on each of the major Northern Virginia roadway facilities that cross the I-66 corridor inner area screen line is also strongly influenced by restrictions on the use of the I-66 facility by SOVs during the morning peak period. On a typical weekday approximately 23,000 AM peak period travelers cross the I-66 inner area screen line in single occupancy vehicles, with almost half of them on US Route 50 and less than 20% on them on I-66.[3]

Inbound AM peak period passenger vehicles on I-66 at the Glebe Road screen line were found to be carrying 50% more people per vehicle than on any other corridor roadway at this screen line. Vehicle occupancies for inbound vehicles on I-66 during the 6:15AM to 9:15AM peak period averaged 1.67 persons per vehicle. Average vehicle occupancies for inbound vehicles on other roadway facilities in the corridor ranged to 1.11 to 1.13 persons per vehicle.

The share of I-66 corridor inbound AM peak period person travel by persons traveling in HOV2+ vehicles at the Glebe Road screen line is estimated at 26.4% plus or minus 0.3 percentage points at the 90% confidence level.

The share of I-66 corridor inbound AM peak period person travel by persons traveling in SOV vehicles at the Glebe Road screen line is estimated at 36.2% plus or minus 0.2 percentage points at the 90% confidence level.

---

[2] Includes VRE riders boarding trains at the Broad Run, Manassas and Manassas Park stations, plus one-half the riders at the Burke Center station minus passengers alighting VRE trains before the Crystal City station.

3 Inbound travel on I-66 by SOVs from 6:30AM to 9:00AM is legally restricted to: (1) persons traveling from Dulles Airport; (2) persons in vehicles with "clean fuel" license plates; and (3) persons traveling in exempt vehicles such as law enforcement vehicles. Significant fines and driver's license points are assessed to SOV travelers on I-66 caught violating these restricted use provisions.

Appendix A
I-66 Corridor Inner Area Screen Line Counting Stations/Locations

I-66 Corridor Facility/Service	Counting Location	Count Dates			
Roadway					
Lee Highway (US 29)	@ E. of N George Mason Dr	Tues	9/20/2005	Wed	9/21/2005
I-66 Eastbound.	Between Sycamore St & Fairfax Dr	Wed	9/14/2005	Thur	9/15/2005
Washington Boulevard (Va.237)	@ N. Aberdeen Street	Tues	9/20/2005	Wed	9/21/2005
Wilson Boulevard.	@ N. Albemarle St	Wed	9/14/2005	Thur	9/15/2005
Arlington Boulevard (US 50).	Between George Mason Dr & Glebe	Tues	9/20/2005	Wed	9/21/2005
Metrorail					
Orange Line - Eastbound	East Falls Church Station	Tues	9/20/2005	Thur	9/22/2005
Fairfax Connector Routes					
989	Pentagon Station- arrive volume	Wed	9/14/2005	Thur	9/15/2005
Metrobus Routes					
1B, 1C, 1E, 1F, 1Z, 4A	Wilson Blvd @ George Mason Drive	Tues	9/20/2005	Thur	9/22/2005
4A, 4B, 4E, 4S	Clarendon Blvd @ Ode Street	Tues	9/20/2005	Thur	9/22/2005
Loudoun County Transit					
DC1, DC2E, DC4, DC5, D6, DC7E	Rosslyn - arrive volume	Wed	9/14/2005	Thur	9/15/2005
DC8E, DC11, DC12, DC13, DC14	Rosslyn - arrive volume	Wed	9/14/2005	Thur	9/15/2005
DC15, DC16, DC17E, DC19, DC20	Rosslyn - arrive volume	Wed	9/14/2005	Thur	9/15/2005
DC3W, DC9W, DC10, DC18W	State Department - arrive volume	Wed	9/14/2005	Thur	9/15/2005
PTRC OmniRide					
M1, M-2, M-2A,	Pentagon Station- arrive volume	Tues	9/13/2005	Thur	9/15/2005
M-3, M-4, M-5	Pentagon Station- arrive volume	Tues	9/13/2005	Thur	9/15/2005
M-3R	State Department	Tues	9/13/2005	Thur	9/15/2005
Arlington County Transit					
ART51, ART52A, ART52B	16th St @ Glebe Rd	Tues	9/20/2005	Wed	9/21/2005
ART53A, ART53B	Williamsburg & N. Glebe	Tues	9/20/2005	Wed	9/21/2005
ART75A, ART 75B	Ballston-MU Station	Tues	9/20/2005	Wed	9/21/2005
Virginia Railway Express					
Manassas Line	(Broad Run, Manassas, Manassas Park, Burke Center, Backlick Rd, Rolling Road, Alexandria Stations) - Boardings and Alightings	Wed	9/14/2005	Thur	9/15/2005