

# Richmond Area Transportation Trends

## Technical Report for the 2031 Long-Range Transportation Plan and Congestion Management System Update

Town of  
*Ashland*  
Counties of  
*Charles City*  
*Chesterfield*  
*Goochland*  
*Hanover*  
*Henrico*  
*New Kent*  
*Powhatan*  
City of  
*Richmond*



Richmond Regional Planning District Commission  
9211 Forest Hill Avenue, Suite 200  
Richmond, Virginia 23235  
Phone: (804) 323-2033  
Fax: (804) 323-2025  
[www.richmondregional.org](http://www.richmondregional.org)

**Analysis of Factors Related to the  
Performance of the Richmond Region  
Transportation Network  
TECHNICAL REPORT**

**Introduction**

A comprehensive assessment of factors related to transportation network performance is an essential component of a complete congestion management system (CMS). In combination with the other CMS components, it helps to provide decision makers with a better understanding of the many influences that affect the performance of the transportation network. Results can help to prioritize competing strategies to maintain an efficient and safe transportation system.

Accordingly, the 2008 update of the Richmond region CMS contains a thorough state-of-the-roadway network analysis for the region. This includes, for each transportation factor, an analysis over time for the measure and a comparison of Richmond data to both national trends and trends identified for similar regions throughout the U.S. The study results are summarized in the State-of-the-Transportation System report found in the Richmond Area 2031 Long-Range Transportation Plan (LRTP). The data analysis will be available for use by the CMS working committee to perform alternatives analyses for the congested corridors identified both in the 2031 LRTP and through the CMS working committee.

This report is organized into the following two sections:

- I. Factors related to the performance of the highway network
- II. Factors related to the performance of the transit network

The first section looks at the following three factors that relate to the performance of the highway network in the Richmond region:

- Population
- Vehicle Registrations
- Vehicle-Miles of Travel (VMT)

For each of these factors, change over time is analyzed and then compared with Virginia and national trends. Time periods and geographic extent used in the study were directly related to the availability of data.

For the purpose of the CMS study, Richmond region is defined as an area consisting of the nine localities found within the Richmond Regional Planning District Commission (includes the rural areas for Charles City, Goochland, New Kent and Powhatan counties, and the Tri-Cities Area MPO portion of Chesterfield county). The RRPDC localities are as follows:

Town of Ashland	Goochland County
Charles City County	Hanover County
Chesterfield County	

Henrico County  
New Kent County

Powhatan County  
City of Richmond

The historic trend analysis for both population and vehicle registrations covered the thirteen year period from 1992 to 2005. For vehicle-miles of travel, we looked at data for the Richmond urbanized area from 1994-2005.

The second section analyzes the following data related to the performance of the Richmond region transit system:

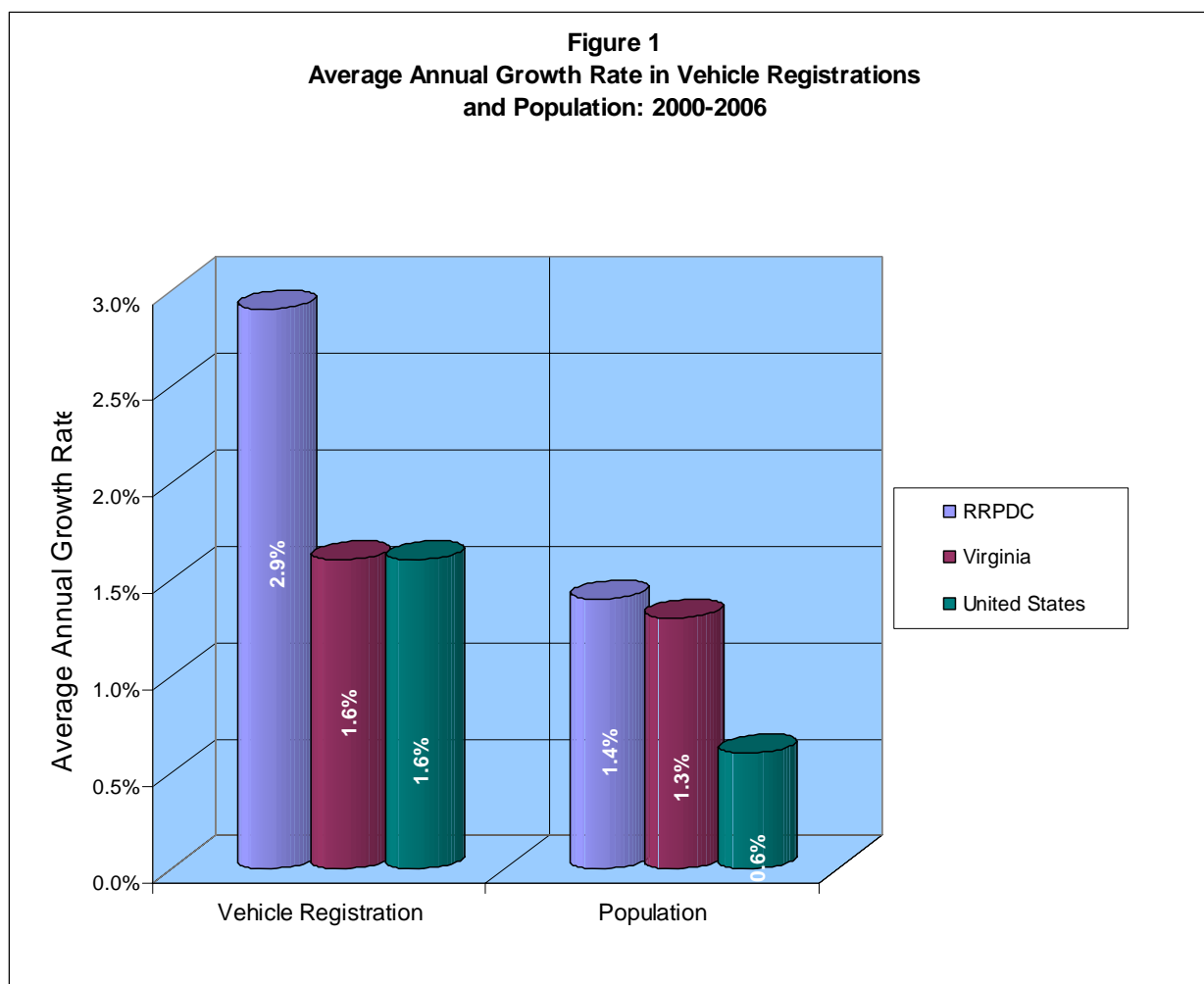
- GRTC Ridership from 2002 to 2007
- RideFinders vanpool and carpool participation from 2002 to 2007
- Annual transit passenger miles for the Richmond region, the nation, and southeastern urban areas from 2000 to 2005
- Transit passenger miles per capita in southeastern urban areas, 2005

## Factors Related to the Performance of the Highway Network

### Trends in Population and Vehicle Registrations

In the Richmond region, growth in vehicle registrations far outpaces the region's population growth. Figure 1 indicates that, from 2000 to 2006, the region's average annual growth rate for vehicle registrations (2.9%) is more than double that of the area's average annual growth in population (1.4%). Richmond area's vehicle registration is increasing at a faster rate than that of the state and nation.

In 2006, there were 925,988 registered vehicles in the Richmond region, or .98 vehicles for every area resident. By comparison, Virginia had .87 vehicles per person and nationally there were .82 vehicles per person.



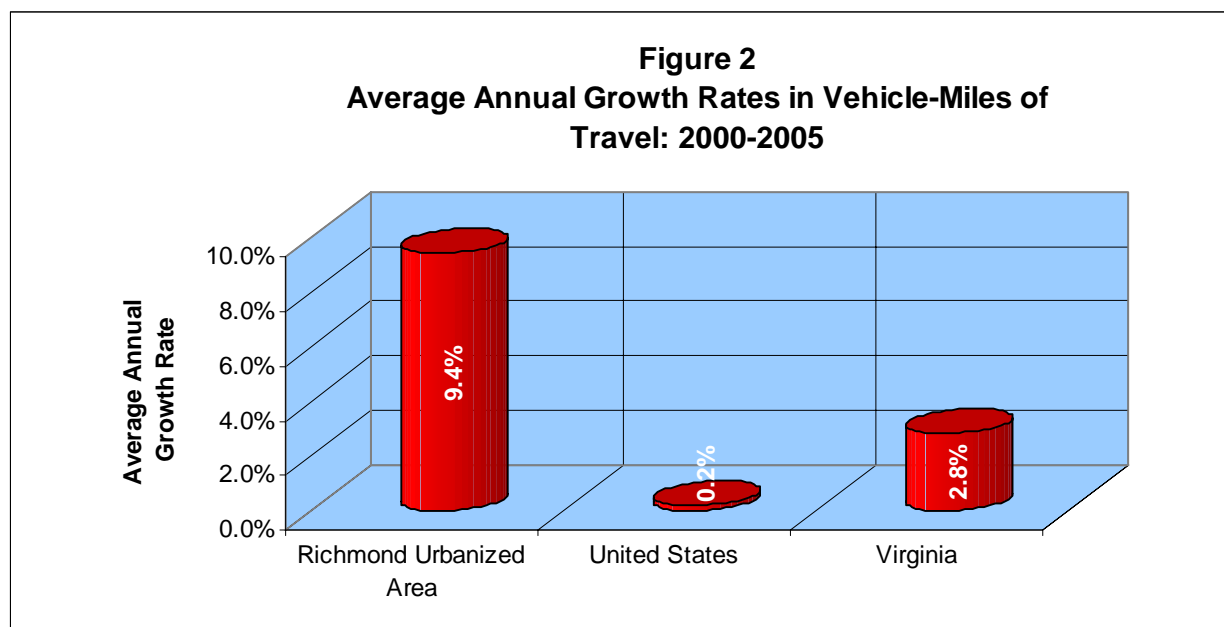
Sources: Virginia Dept. of Motor Vehicles, Weldon Cooper Center for Public Service, U.S. Bureau of the Census, FHWA Highway Statistics Reports (2000-2006)

## Trends in Vehicle-Miles of Travel

Referred to as VMT, vehicle-miles of travel is a measure commonly used to gauge the daily demand residents and visitors place on a region's transportation network. VMT is the sum of the number of miles every vehicle travels on an average weekday in the Richmond region. Average annual daily traffic counts (AADT) and centerline road length are used to calculate VMT.

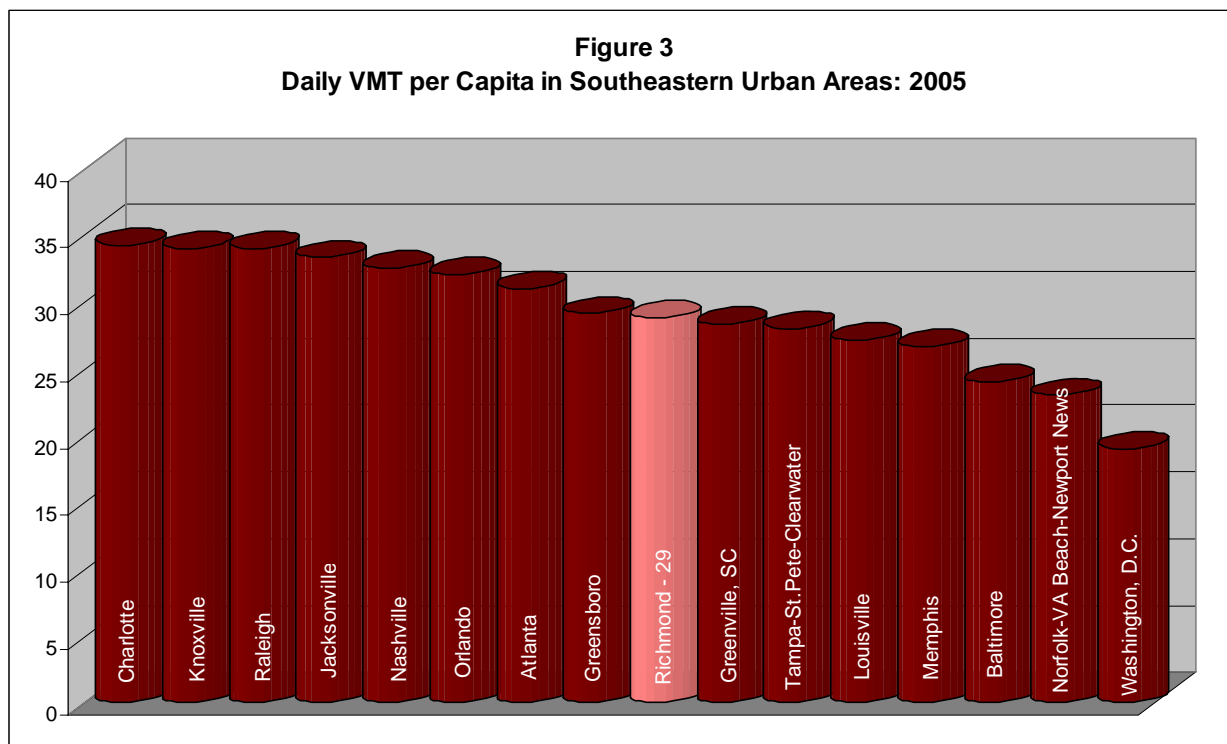
Figure 2 on page 4 shows that VMT in the Richmond region has grown by an average of 9.4% annually from 2000 to 2005 and this is outpacing state and national VMT growth trends for the same time period. For the Richmond urbanized area, there was approximately 26.2 million vehicle-miles of travel per day in 2005. To put that number into perspective, every day, the total vehicle-miles traveled in the Richmond area is equivalent to driving a vehicle completely across Virginia – from the eastern shore to Cumberland Gap – approximately 44,407 times.

These VMT figures coincide with the increases in population and vehicle registrations discussed earlier. Over time, more people continue to move to the Richmond region in addition to the rapid rise in people registering to use vehicles along the region's roadways – this all adds up to increased levels of vehicle-miles traveled.



Source: FHWA Highway Statistics Reports (2000-2005)

Using available data from *FHWA's 2005 Highway Statistics Report*, the Richmond urbanized area's daily VMT per capita in 2005 was compared to other urbanized areas in the south and southeast. Of the cities shown in Figure 3 on page 5, Charlotte came in with the highest amount at 34 vehicle-miles of travel per person and Washington, D.C. and Hampton Roads had the lowest figure of 23 VMT per person. Richmond's 29 vehicle-miles of travel per capita fits roughly in the middle of the field and this figure outpaces both Hampton Roads and Washington, D.C..



Source: 2005 FHWA Highway Statistics Report

## Summary

In summary, the Richmond region’s population is growing at a slower rate than Virginia’s as a whole, but somewhat higher than the nation’s. However, the number of people registering to use vehicles in this region is growing much faster than the growth in population. Due in part to these factors, the daily demand being placed on the transportation network – expressed in terms of vehicle-miles of travel – is increasing at a rate much higher than VMT growth at both state and national levels. The increasing growth trends in vehicle registrations and vehicle-miles of travel for the Richmond region area are mirrored at both state and national levels; however, the region is experiencing them more intensely.

## **Factors Related to the Performance of the Transit Network**

### **GRTC Ridership Trends**

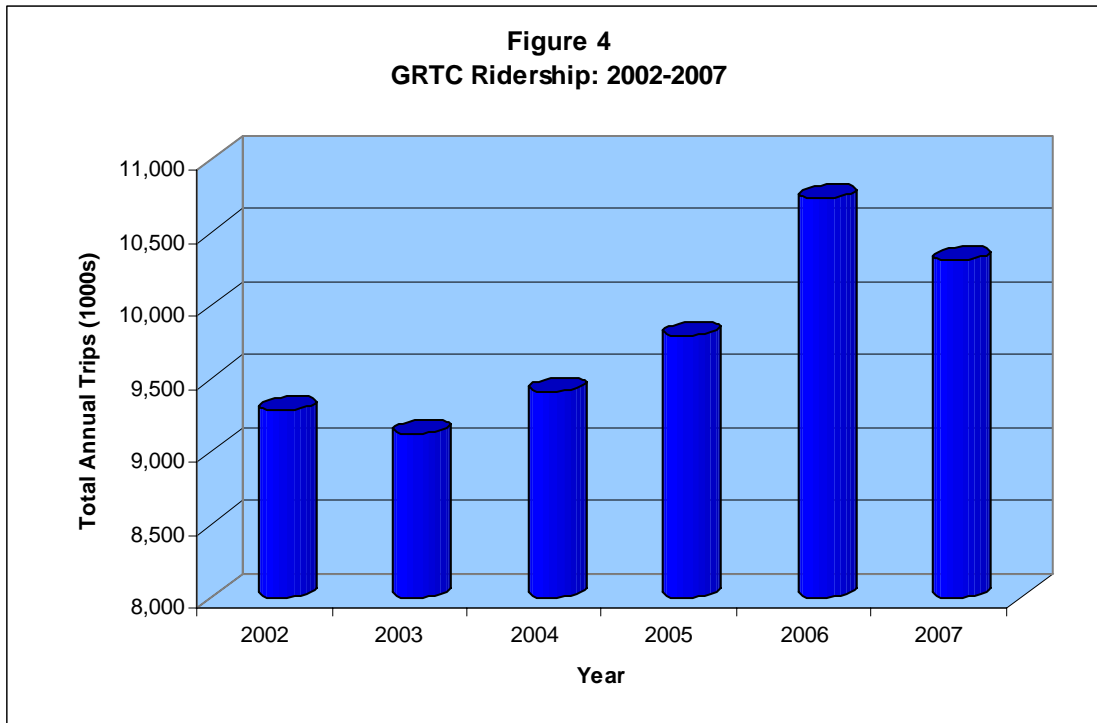
The GRTC Transit System (GRTC) is the principal public transportation provider for the Richmond region. Currently, GRTC operates fixed-route service within the City of Richmond, Henrico county and to a lesser extent, in portions of Chesterfield county. Weekday and weekend fixed-route and paratransit service is available within the City of Richmond, Henrico County and parts of Chesterfield County only. Welfare-to-work transportation is provided in the City of Richmond and the counties of Chesterfield, Hanover, Henrico, Goochland, and Powhatan. Shared ride commuter services and transit information has been provided by RideFinders since 1981. (Please refer to Chapter 9, Public Transportation System, for more detail information on Richmond region's transit system)

Currently, GRTC operates 34 bus routes with 169 fleet of vehicles directly operating during maximum service period. According to the 2006 National Transit Database, the GRTC service area covers 437 square miles and serves the Richmond urbanized area population of 818,836.

Concerning performance, GRTC's 2007 Comprehensive Operation Analysis indicates that, in general, GRTC performs better than the 11 peer transit systems used throughout the report for comparison purposes. In the cost effectiveness and revenue generation measures GRTC ranks near the top in most of the rankings such as farebox recovery, cost per passenger, subsidy per trip, revenue per revenue mile and so on. GRTC's Service Span measures show that it provides an average service span on weekdays and Saturdays and above average on Sundays. However, the general transportation efficiency which measures the average speed of buses ranks GRTC last among its peers. This shows that GRTC buses spend more time in areas of congestion and have more boardings and alightings per stop than those of the peer group. The slow operating speed could be the result of GRTC operating primarily during peak hours when the level of congestion is the highest during the day. Therefore, the good financial efficiency exhibited by GRTC comes at the expense of providing more service during off peak times and reducing headways during peak times.

The 2007 COA analysis also indicates excess bus capacity during AM and PM peak times. It identifies several underperforming routes and excess bus stops on major corridors. Some of the major recommendations of the COA are providing new bus services, better signage and schedules, transfer centers and bus rapid transit along Broad Street corridor.

The graph in Figure 4 looks at GRTC ridership trends for the 2002 to 2007 period. Although ridership data for a more expansive time period was available, this period was used to keep a level of consistency amongst the several different types of data used in the transit trends analysis. The graph indicates that growth for the 2002 to 2007 time period has fluctuated but shown a steady increase, settling on 10,306 total annual trips for 2007. According to the COA analysis, the average weekday ridership for GRTC is about 40,000.



Source: Annual Transit Development Programs, GRTC Transit System

### **RideFinders Vanpool and Carpool Participation Trends**

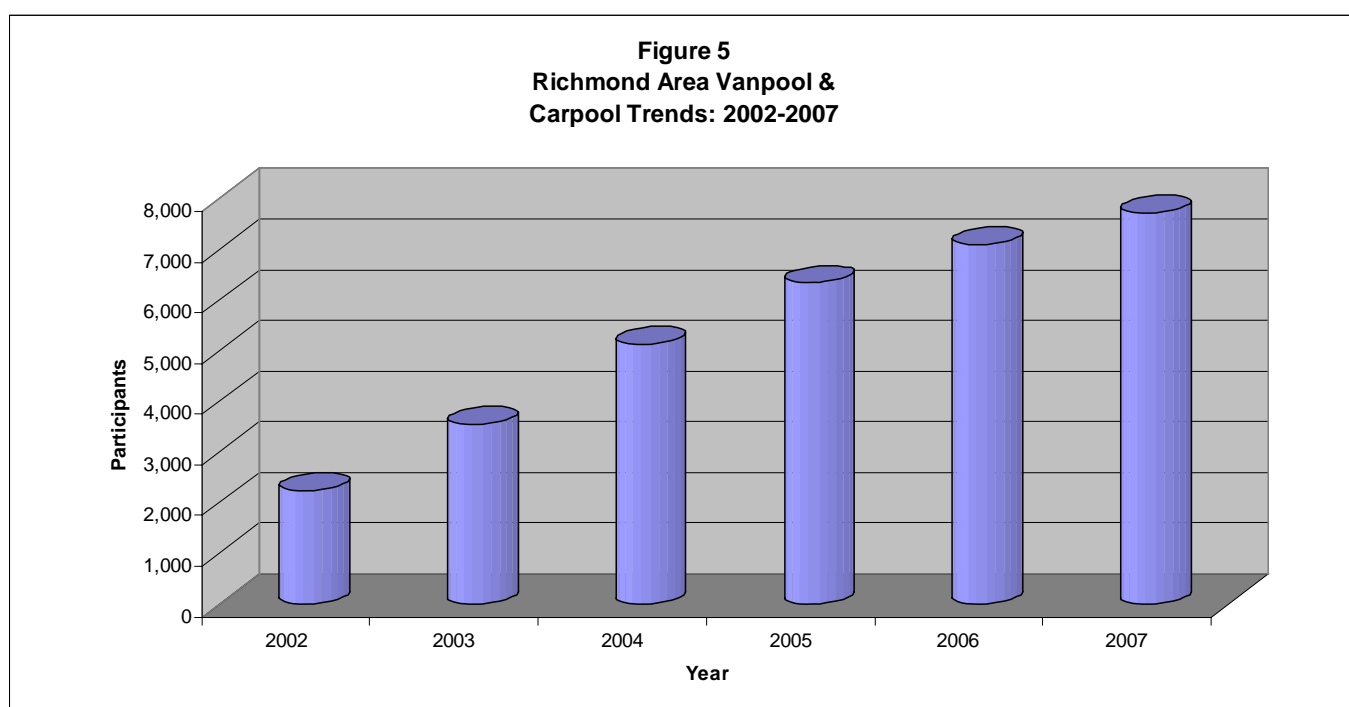
RideFinders, a division of the GRTC Transit System, is the regional non-profit rideshare agency that works to move more commuters in fewer vehicles around the Central Virginia region. RideFinders' efforts help increase the efficiency of the region's transportation infrastructure, protect the air quality, enhance the quality of life, and sustain a healthy economy.

The list below contains the programs and services RideFinders provides for commuters and employers throughout the Central Virginia region.

- Transit Information and transit media
- Vanpool Formation Services
- Carpool Matching
- Telework Consulting
- Clean Air Campaign
- Downtown Commuter Guide
- Emergency Ride Home Program
- Transportation Planning
- Employer-Based Marketing
- Employer Relocation and Site Analysis Services
- Commuter Choice Program Development
- Bike and Pedestrian Commuter Service
- Park and Ride Lot Information

RideFinders provides management for a fleet of approximately 60 vanpools serving Greater Richmond locations such as Brandermill, Stephens Church, Amelia, Chester, Chesterfield, Colonial Heights, Mechanicsville, Hopewell, Sandston, Bottoms Bridge, Ladysmith, and Midlothian. In addition, Ridefinders vanpools serve long-distance commuters to Washington D.C. and Blackstone, and from Hampton, Charlottesville, Williamsburg, Newport News, Gloucester, Fredericksburg, and Orange, Virginia.

For the RideFinders component of the analysis, carpool and vanpool participants were combined and growth trends were identified from 2002-2007. The graph below shows that, for the six year period, vanpool and carpool participation grew at an average annual rate of approximately 30%, from around 2,234 participants in 2002 to around 7,722 participants in 2007.



Source: RideFinders FY 02 - FY 07

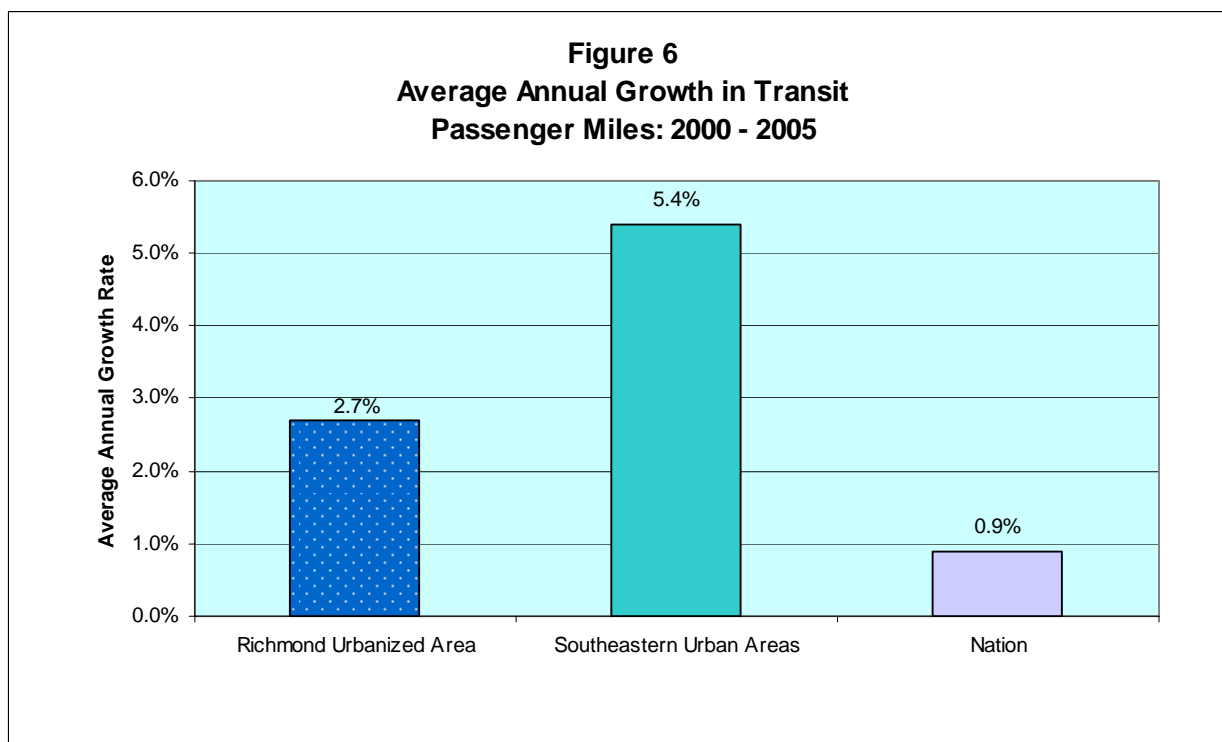
## **Transit Usage Trends**

This section of the transit analysis assesses usage trends by looking at:

- Total annual transit passenger miles for the Richmond area, the nation, and southeastern urban areas from 2000 to 2005
- Transit passenger miles per capita in southeastern urban areas, 2005

Total Annual Transit Passenger Miles, 2000-2005

Annual transit passenger miles represent, at the regional level, the total amount of passenger miles traveled using public transportation. The graph shows average annual growth rates in total passenger miles from 2000 to 2005. In 2005, approximately 45 million passenger miles were traveled on all modes of public transit in the Richmond region. For the 5 year period, Richmond’s average annual transit usage growth rate of 2.7% is higher than that of the nation (0.9%) but is only half as much as that of the southeastern urban areas(5.4%). For a detailed listing of the urban areas used in the analysis, see the table in Appendix C entitled: Southeastern Urban Areas Historical Transit Passenger Miles: 2000-2005.



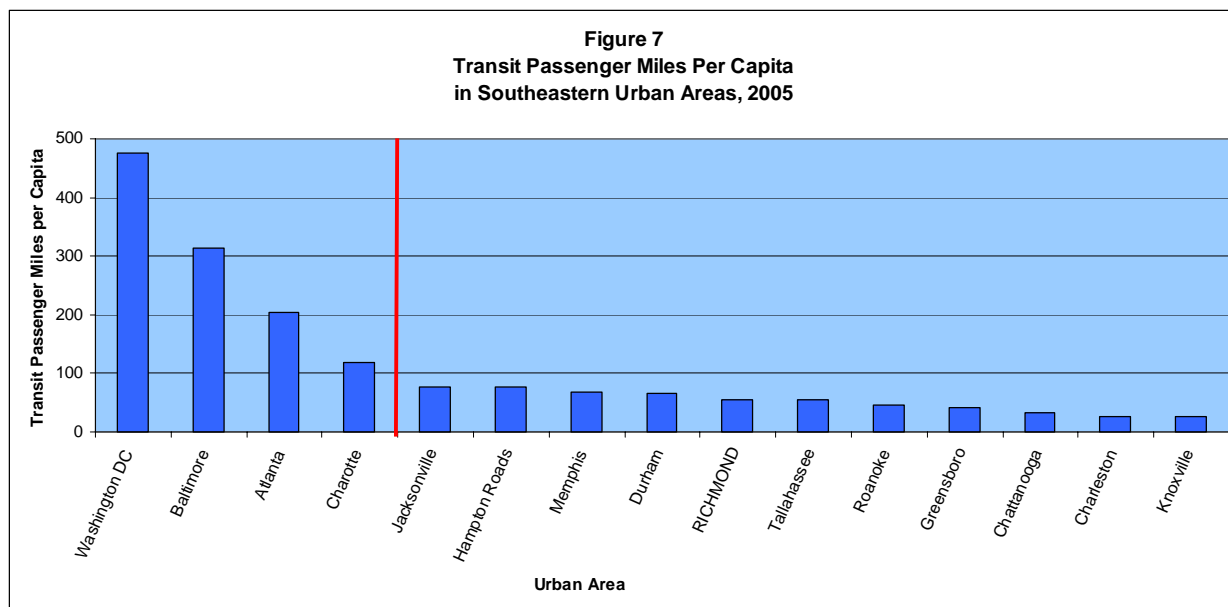
Source: National Transit Database

Transit Passenger Miles per Capita in Southeastern Urban Areas, 2005

Transit passenger miles per capita represent, on average, the number of miles each person travels using public transportation for a given year. The graph in Figure 7 depicts a comparison of 2005 transit passenger miles per capita for the Richmond urbanized area and a selected group of large southeastern urban areas. The comparison shows that Washington, D.C. came in with highest figure at 475 transit miles per person, and Knoxville, TN came in with lowest figure at 27 transit miles per person. The Richmond area’s 55 transit miles per person places the region in the lower half of the study group.

The three largest southeastern metropolitan areas in the analysis: Washington, D.C.; Baltimore, MD; and Atlanta, GA had from four to seven times as many passenger miles per person than the

Richmond area. Washington, D.C., Baltimore, Charlotte and Atlanta are the only four urban areas in the comparison group with light rail transit or a subway system in place. The light rail in Charlotte started in November 2007 and therefore, the 2005 transit passenger miles data is pre light rail era. All of the remaining urban areas found in the graph show slight differences in passenger miles per person for 2005.



Source: National Transit Database

## Summary

In summary, from the early to the mid 2000s, fixed route public transit usage in the Richmond area has been growing at a rate while carpooling and vanpooling are becoming increasingly popular throughout the region. During the same time period, overall transit usage in the Richmond area – expressed in terms of annual transit passenger miles – is growing at a much slower rate than other southeastern metropolitan areas.

## APPENDIX

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## **APPENDIX A: SOURCE INFORMATION**

### **Population:**

#### Virginia and U.S.

USDOT FHWA Highway Statistics Reports (2000-2006)

TABLE DL-1C: Ratio of Drivers to Population

Virginia 2006: U.S. Bureau of the Census and Weldon Cooper Center for Public Service

U.S. 2000: U.S. Census Bureau Annual Estimates of the Population for the United States (2000-2007)

#### RRPDC

*U.S. Bureau of the Census and Weldon Cooper Center for Public Service*

### **Vehicle Miles Traveled**

#### Virginia and U.S.

USDOT FHWA Highway Statistics Reports (2000-2005)

TABLE HM-81: Rural and Urban Miles, Lane Miles, and Daily Travel, Estimated

#### Richmond Urbanized Area

USDOT FHWA Highway Statistics Reports (2000-2005)

TABLE HM-72: Urbanized Areas - Selected Characteristics

### **2005 Vehicle Miles Traveled Per Capita**

USDOT FHWA Highway Statistics Report (2005)

TABLE HM-72: Urbanized Areas - 2005 Selected Characteristics

### **Vehicle Registrations**

#### Virginia and US

USDOT FHWA Highway Statistics Reports (2000-2006)

TABLE MV-1: State Motor Vehicle Registrations

#### RRPDC

Virginia Department of Motor Vehicles, City/County Vehicle Registration Counts; 2000 - 2006 reports from DMV;

1992 - 1997 Weldon Cooper Statistical Abstract

[http://www.ccps.virginia.edu/demographics/statistical\\_abstract/DOWNLOAD\\_files/Section21download/21\\_13B.xls](http://www.ccps.virginia.edu/demographics/statistical_abstract/DOWNLOAD_files/Section21download/21_13B.xls);

2002 fax from Weldon Cooper.

### **GRTC Transit System Ridership**

FY 2002-2007 Ridership from GRTC Transit System Annual Transit Development Programs

### **RideFinders Carpool and Vanpool Participants**

FY 2002-2007 Carpool and Vanpool Participants from RideFinders FY 2002-2007 Comparison Chart

### **Transit Miles per Capita**

2005 National Transit Data Base

<http://www.ntdprogram.gov/ntdprogram/data.htm>

### **Annual Transit Passenger Miles**

2000 -2005 National Transit Data Base

<http://www.ntdprogram.gov/ntdprogram/data.htm>

**APPENDIX B: Population, Vehicle Registration, and Vehicle-Miles of Travel Data**

**Historical Population and Vehicle Registration for  
RRPDC, Virginia, and U.S.: 2000 - 2006**

**RRPDC**

Year	Population	Growth Rate	Vehicle Registration	Growth Rate
2000	865,941		778,451	
2001	878,100	1.4%	800,903	2.9%
2002	889,600	1.3%	824,004	2.9%
2003	901,400	1.3%	847,580	2.9%
2004	917,400	1.8%	873,637	3.1%
2005	928,644	1.2%	901,358	3.2%
2006	941,242	1.4%	925,988	2.7%
TOTAL		8%		17.6%
Annual Average		1.4%		2.9%

Note: RRPDC includes Counties of Charles City, Chesterfield, Goochland, Hanover, Henrico, New Kent, and Powhatan, Town of Ashland, and City of Richmond

**Virginia**

Year	Population	Growth Rate	Vehicle Registration	Growth Rate
2000	7,078,515		6,046,127	
2001	7,196,800	1.7%	6,171,381	2.1%
2002	7,287,800	1.3%	6,272,836	1.6%
2003	7,364,600	1.1%	6,346,009	1.2%
2004	7,481,300	1.6%	6,497,426	2.4%
2005	7,567,500	1.2%	6,591,497	1.4%
2006	7,640,249	1.0%	6,635,497	0.7%
TOTAL		7.7%		9.4%
Annual Average		1.3%		1.6%

**United States**

Year	Population	Growth Rate	Vehicle Registration	Growth Rate
2000	287,421,906		221,475,173	
2001	285,112,030	-0.8%	230,428,326	4.0%
2002	287,888,021	1.0%	229,619,979	-0.4%
2003	290,447,644	0.9%	231,389,998	0.8%
2004	293,191,511	0.9%	237,242,616	2.5%
2005	295,895,897	0.9%	241,193,974	1.7%
2006	298,754,819	1.0%	244,165,686	1.2%
TOTAL		3.9%		9.9%
Annual Average		0.6%		1.6%

**APPENDIX B Continued**

**Historical Vehicle-Miles of Travel  
for Richmond, Virginia, and U.S.:  
2000-2005**

**Richmond Urbanized Area**

Year	VMT	Growth Rate
2000	16,879,000	
2001	18,555,000	9.9%
2002	24,648,000	32.8%
2003	25,522,000	3.5%
2004	25,816,000	1.2%
2005	26,187,000	1.4%
Total Growth		48.9%
Average Annual Growth		9.4%

**Virginia**

Year	VMT	Growth Rate
2000	180,521,000	0.7%
2001	158,816,000	-12.0%
2002	166,412,000	4.8%
2003	167,826,000	0.8%
2004	172,746,000	2.9%
2005	176,096,000	1.9%
Total Growth		0.82%
Average Annual Growth		0.2%

**United States**

Year	VMT	Growth Rate
2000	4,879,557,000	1.9%
2001	4,933,428,000	1.1%
2002	5,034,031,000	2.0%
2003	5,093,863,000	1.2%
2004	5,195,526,000	2.0%
2005	5,252,388,000	1.1%
Total Growth		9.3%
Average Annual Growth		2.8%

**APPENDIX B Continued**

**Southeastern Urbanized Areas Population, Centerline Miles,  
Daily VMT, and VMT per Capita: 2005**

City	Estimated Population (1,000)	Total Centerline Miles	Total Daily VMT (1,000)	Daily VMT per Person
Atlanta, GA	4,172	19,504	128,353	31
Knoxville, TN	483	2,965	16,430	34
Nashville, TN	984	4,650	31,955	32.5
Raleigh, NC	673	3,529	22,891	34
Greensboro, NC	312	1,688	9,064	29.1
Charlotte, NC	855	3,737	29,513	34.5
Orlando, FL	1,335	5,373	42,447	32
Jacksonville, FL	992	5,067	33,078	33.3
Louisville, KY	904	4,394	24,515	27.1
<b>RICHMOND, VA</b>	<b>910</b>	<b>4,682</b>	<b>26,187</b>	<b>28.8</b>
Memphis, TN	1,017	3,888	27,037	26.6
Tampa-St. Pete-Clearwater, FL	2,251	9,466	63,177	28
Norfolk-VA Beach- Newport News, VA	1,521	5,904	35,657	23
Greenville, SC	316	2,127	8,957	28.3
Washington, D.C.	4,251	11,543	97,009	23
Baltimore, MD	2,149	7,101	52,541	24
<b>TOTAL</b>	<b>23,125</b>		<b>648,811</b>	<b>469.2</b>

**APPENDIX C: Transit Data**

GRTC Transit System Ridership 2002 - 2007	
Fiscal Year	Total GRTC Ridership (Trips)
2002	9,286,789
2003	9,127,242
2004	9,412,804
2005	9,800,860
2006	10,738,378
2007	10,311,113

Ridefinders Vanpool and Carpool  
 Participants: 2002-2007

Fiscal Year	Total Participants	Annual Growth Rate
2002	2,234	
2003	3,550	58.91%
2004	5,129	44.48%
2005	6,347	23.75%
2006	7,100	11.86%
2007	7,722	8.76%

**APPENDIX C Continued**

**Transit Passenger Miles Per Capita in  
Southeastern Urban Areas: 2005**

Urban Area	Annual Transit Miles per Capita	Annual Passenger Miles (000)	Population (000)
Atlanta, GA	214	749,676	3,499
Washington D.C	203	2,014,974	9,933
Charlotte, NC	141	106,824	758
Jacksonville, FL	78	68,315	882
Hampton Roads, VA	75	104,658	1,394
Durham, NC	65	18,646	287
Memphis, TN	63	61,291	972
<b>RICHMOND, VA</b>	<b>60</b>	<b>49,268</b>	<b>818</b>
Roanoke, VA	49	9,698	197
Greensboro, NC	46	12,396	267
Chattanooga, TN	35	11,833	343
Charleston, SC	34	14,571	423
Knoxville, TN	30	12,689	419

**Southeastern Urban Areas Historical Transit Passenger Miles: 2000 – 2005**

	Total Passenger Miles (in 000's)						Growth Rate
	2000	2001	2002	2003	2004	2005	
Washington, DC	1,645,803	1,825,314	1,897,126	1,909,194	1,955,778	1,868,081	2.7%
Hampton Roads, VA	95,129	93,313	81,617	96,117	91,062	105,288	2.7%
Greensboro, NC	8,769	9,914	No Data	7,403	8,536	11,166	34.5%
Durham, NC	11,974	15,236	13,821	12,595	12,193	18,572	11.6%
Charlotte, NC	70,423	86,081	87,474	100,044	90,078	89,547	5.5%
Charleston, SC	17,344	17,085	15,342	14,175	11,577	11,543	-7.6%
Knoxville, TN	5,505	6,769	7,113	7,184	7,229	11,505	5.5%
Memphis, TN	64,069	97,909	67,779	65,946	72,489	65,028	3.8%
Chattanooga, TN	10,152	11,375	11,256	11,326	11,300	11,363	2.4%
<b>RICHMOND, VA</b>	<b>42,299</b>	<b>49,911</b>	<b>52,472</b>	<b>42,046</b>	<b>42,480</b>	<b>45,062</b>	<b>2.7%</b>
Roanoke, VA	7,425	7,828	7,618	9,061	8,997	9,200	4.6%
Atlanta, GA	778,426	849,507	816,748	724,584	736,269	716,492	-1.4%
Jacksonville, FL	48,471	59,872	59,103	68,247	65,765	66,968	7.2%
Tallahassee, FL	10,124	10,148	10,675	10,502	10,666	11,000	1.7%
Total	2,815,913	3,140,262	3,128,144	3,078,424	3,124,419	3,040,815	76.1%
<b>Southeast Urban Area Annual Growth Rate</b>							<b>5.4%</b>
National	45,100,242	46,507,500	45,944,200	45,676,800	46,545,800	47,121,000	0.9%