Statewide Public Transportation and Transportation Demand Management Plan

Commonwealth of Virginia

DRPT

Virginia Department of Rail and Public Transportation

November 2013

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From the Director

Regardless of where you live and work in Virginia, the Virginia Department of Rail and Public Transportation (DRPT) is working with federal, state, regional, local and private sector partners to bring you better transportation choices. There are 54 public transit systems and 55 human service operators in Virginia that range in size from two-bus programs in small towns to larger regional systems like Metrorail in Northern Virginia. Some systems are fee-based, while others provide free access for the elderly and disabled. By advising, supporting, and funding public transportation programs statewide, DRPT helps provide safe, reliable transportation options for everyone. In addition, DRPT currently partners with 16 commuter service programs operating in the Commonwealth to provide information, business incentives, and ridematching services at no charge.

DRPT is pleased to provide this 2013 Statewide Public Transportation and Transportation Demand Management (TDM) Plan. The plan details the status of transit and TDM in the Commonwealth, describes the challenges and opportunities we expect to face by the year 2040, identifies gaps in transit and TDM services across the state, and recommends optimum service and funding levels for transit and TDM.

As examples of the strength of our partnerships, one major rapid transit project has recently been completed with glowing reviews and another is underway. The Tide light rail system in Norfolk is now providing access to major areas such as Norfolk State University, Tidewater Community College (Norfolk Campus), Harbor Park, City Hall, MacArthur Center, and the Sentara Norfolk General Hospital. And, in Northern Virginia, the Dulles Corridor Metrorail Project is currently underway. When completed, the Dulles project will connect the National Capital Region to Virginia's largest employment center (Tysons Corner), Virginia's second largest employment concentration (Reston-Herndon) and one of the world's busiest airports (Dulles International Airport). Virginia's investment in these major projects is providing tremendous economic, environmental, energy and quality of life benefits and is helping to meet the goal of building a truly multimodal transportation system.

Other recent successes that support improved public transportation include DRPT's collaboration with the Virginia Department of Transportation (VDOT) to turn Northern Virginia's interstate highways into truly multimodal corridors providing enhanced transit services supported by TDM. Virginia is one of the leading states in advancing technology through investments in safety and security to make real time transit information available through text message, internet, and mobile phone applications. Virginia's is a national leader in TDM with programs across the Commonwealth in all major population and employment centers as well as many small urban and rural areas.

While these and many other initiatives are helping to improve transit and TDM, demand continues to outpace local, state, and federal resources. Metrorail and commuter rail and bus systems are quickly reaching their limits on capacity. Smaller cities and rural areas face mounting demand

for new and increased services as they feel the impact of population growth and demographic and economic shifts throughout the state.

To address the increasing demand with constrained finances, DRPT has developed a strategy that emphasizes further optimizing existing assets and focusing on new and expanded services that will provide the highest return on investment. To accomplish this, the 2013 plan concentrates on three themes:

- **Maintain our public transportation investment in a "State of Good Repair" to improve efficiency and reliability.** Addressing a backlog of deferred maintenance and regularly servicing and replacing vehicles, facilities and other infrastructure will improve service performance and reliability, critical factors to attracting and retaining ridership, and will allow our systems to operate more efficiently.
- **Expand transit and TDM capacity statewide to meet the needs of a growing economy and population.** No matter how well maintained the current system is, it will not be able to absorb projected demand from the Commonwealth's increasing population and changing demographics. With population expected to grow by 37 percent between 2010 and 2040, just maintaining transit's current market share of trips will require more capacity.
- **Invest in major rapid transit capital projects to assist in managing congestion.** In urban areas, where significant population growth is projected over the 28 year plan period, encouraging more people to use transit through investment in rapid transit solutions such as Bus Rapid Transit (BRT), streetcars, light rail, commuter rail and Metrorail will be critical because highway expansion alone simply cannot meet the mobility needs.

Optimizing assets and deploying them where they will provide the greatest benefit is the best way to leverage the Commonwealth's investments and support future growth and economic prosperity. This plan provides the blueprint for advancing public transportation and TDM in Virginia. Working with our public and private partners, DRPT will continue to provide choices that will support Virginians now and for the foreseeable future.

Thelma Drake
Director
Virginia Department of Rail and Public Transportation

Executive Summary

The Virginia Department of Rail and Pubic Transportation (DRPT) is the lead state agency for rail, public transportation and transportation demand management (TDM) in Virginia. Working with federal, state, regional, local and private partners across the Commonwealth, DRPT delivers reliable, cost-effective and efficient public transportation services to citizens and visitors. DRPT administers and manages state and federal grant programs, provides technical assistance, and supports 54 public transit systems, 55 human service operators and 16 regional TDM programs throughout the Commonwealth. Average monthly transit ridership in Virginia is more than 16.6 million, made up of 52 percent rail transit, 47 percent bus transit, and less than one percent human services transportation.

Existing public transportation systems in Virginia (**Figure ES-1**) range from small two-bus systems in rural areas to large regional systems in urban areas. Some systems are heavily used by commuters while others provide vital access to medical care and services for elderly and disabled residents. Virginia's continued investment in public transportation and TDM programs has the potential to provide significant economic, environmental, and quality of life benefits to residents of the Commonwealth. However, increased demand for public transportation services due to population growth and demographic and economic shifts combined with limited funding has led DRPT to develop a strategy to optimize existing services and provide new and expanded services that will maximize the return on investment.

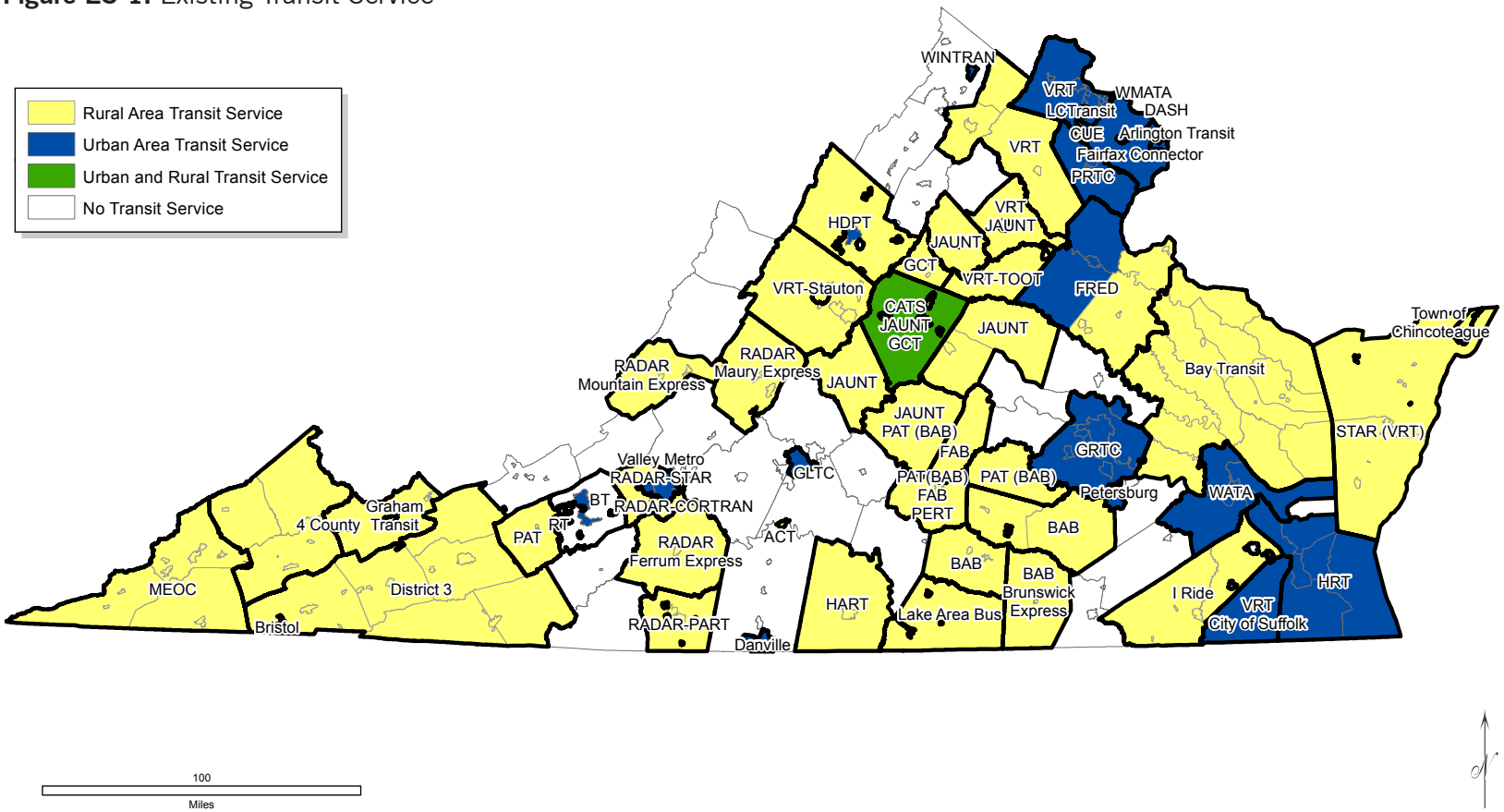
Average monthly transit ridership in Virginia increased by over 500,000 trips between 2011 and 2012.

ES.1 Population and Demographic Trends

Between 2010 and 2040, Virginia's population will increase by nearly 3 million residents to nearly 11 million, a 37 percent increase. **Figure ES-2** shows the population gain in this time period for each of the 21 Planning District Commissions. The Commonwealth's expected population growth rate far exceeds that of the U.S. as a whole (25 percent) during the same time period. In many of the state's urban areas, where seven out of 10 Virginians currently reside, growth is projected to be significantly higher. Job growth will track closely with population, with 85% of Virginia's job growth expected to occur in the four most urban PDCs (Northern Virginia, Richmond, Hampton Roads, and George Washington – Fredericksburg). This significant population and employment growth will likely bring with it ever-greater traffic congestion. Faced with limited highway funding and lack of space for more roadways, Virginia has a great opportunity to manage congestion and enhance mobility by continuing to invest in public transportation and TDM services.

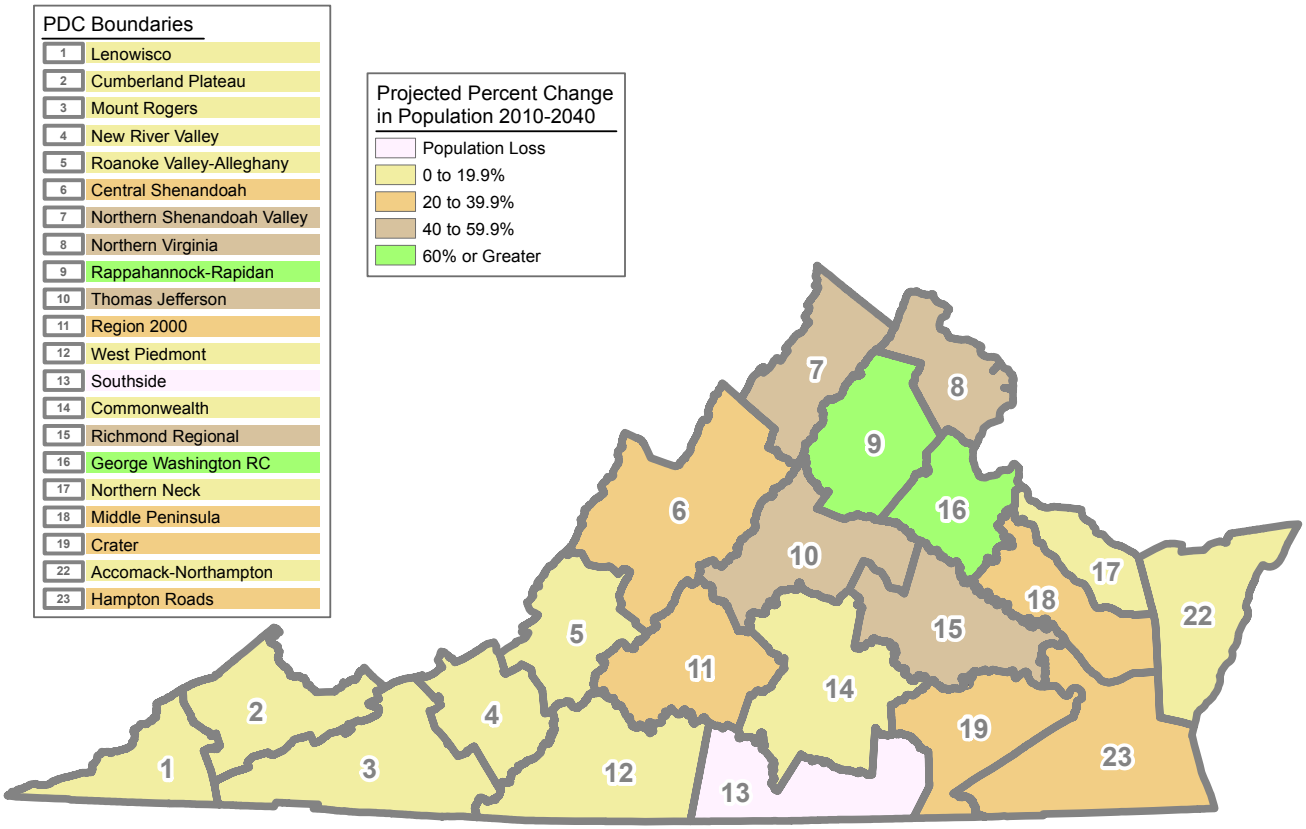
In addition, like the rest of the United States, the population in Virginia is aging. The proportion of persons age 65 and over will increase from about 12 percent in 2010 to 18 percent by 2040. Increases in the senior population and/or non-driver population will lead to increased demand for demand response and fixed route services. A third population trend in Virginia is the emergence of Generation Y (those born between the late 1970s and 1990s) as the fastest growing segment of the workforce. Overall, Generation Y has shown that it prefers pedestrian-friendly urban communities and is more committed to using public transportation.

Figure ES-1. Existing Transit Service



Index of Transit Agency Abbreviations					
ACT	Altavista Community Transit	GRTC	Greater Richmond Transit	PERT	Prince Edward Rural Transit
BAB	Blackstone Area Bus	HART	Halifax Area Rural Transit	PRTC	Potomac and Rappahannock Transportation Commission
BT	Blacksburg Transit	HDPT	Harrisonburg Department of Public Transportation	RADAR	Roanoke Area Dial a Ride
CATS	Charlottesville Area Transit System	HRT	Hampton Roads Transit	RT	Radford Transit
CUE	City-University Energysaver (Fairfax)	JAUNT	Jefferson Area United Transportation	STAR	Specialized Transit - Arranged Rides
DASH	Driving Alexandrians Safely Home	LC Transit	Loudoun County Transit	VRT	Virginia Regional Transit
FAB	Farmville Area Bus	MEOC	Mountain Empire Older Citizens	WATA	Williamsburg Area Transit Authority
FRED	Fredericksburg Area Transit	PART	Piedmont Area Regional Transit	WinTran	Winchester Transit
GCT	Greene County Transit	PAT	Pulaski Area Transit	WMATA	Washington Metropolitan Area Transit Authority
GLTC	Greater Lynchburg Transit	PAT (BAB)	Piedmont Area Transit		

Figure ES-2. Projected Population Change 2010-2040, by PDC



ES.2 Investment Strategies for Meeting Future Needs

To ensure that transit operators can meet existing and future demand for quality public transportation and mobility options, DRPT is focusing on maintaining the Commonwealth's current transit assets, maintaining acceptable levels of service, and looking toward the future to keep up with population growth and economic conditions. Needs for transit system improvements and continued funding can be broadly encompassed in terms of maintaining transit assets in a State of Good Repair, expanding existing transit and TDM capacity, and supporting implementation of major transit capital investments. These investment strategies are summarized as follows:

- **Bring Public Transportation Assets into a State of Good Repair –** Virginia currently has a $190 million backlog of deferred maintenance and replacement of vehicles that are reaching the end of their useful lives. If this backlog is not addressed, it can seriously impact the effectiveness and efficiency of service delivery. Clearing the backlog of deferred maintenance on facilities and infrastructure, and replacing aging vehicles, are key components of achieving a State of Good Repair.
- **Meet Future Travel Demand through Expanded Transit Capacity –** In order to keep up with existing and anticipated future transit demand and to extend to areas currently without service, investments must be made in existing transit systems. These investments will be tailored to particular regions of the state based on their underlying population and demographic trends.
- **Address Significant Growth with Rapid Transit Capital Projects –** Especially in high and very high growth jurisdictions, the anticipated growth in population and jobs will result in increased demand on transportation systems, both road and transit. Highway expansion alone cannot meet the significant growth in travel within the Commonwealth. Developing new services and systems that encourage more people to use transit, such as streetcars, light rail, bus rapid transit, suburban express bus routes to major employment

centers, and rural demand-response services in communities with no public transit options is crucial. These types of investments will increase mobility options and mobility in congested urban areas, provide mobility to people who cannot drive, provide transportation choices and encourage economic development and employment.

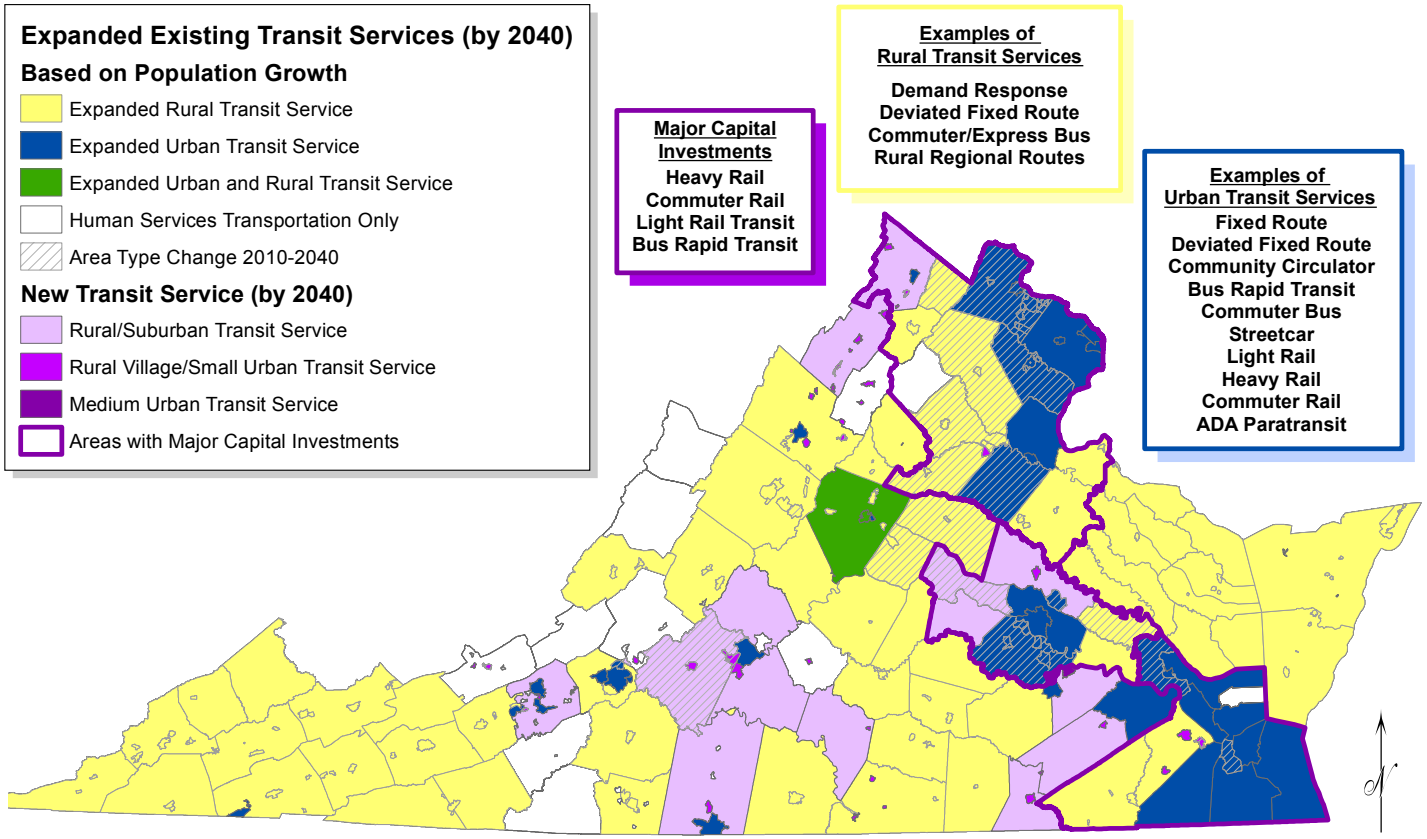
- **Reduce Auto Reliance and Increase Transit System Efficiency and Effectiveness through Expanded TDM Efforts** – TDM is an increasingly important support element of the transportation system in Virginia and throughout the United States. It focuses on the provision of commuter services, strategies and policies aimed at reducing the need to drive alone. The successful implementation of TDM strategies results in a more efficient use of road space by fewer vehicles, a reduction in rush hour traffic by shifting some trips to off-peak hours, and the elimination of some trips altogether with telework.

ES.3 Transit and TDM Service Gaps

To identify transit service gaps that if closed would benefit the Commonwealth, DRPT examined standards for various types of transit services and sought to match those standards to Virginia's varying demographic and development conditions. As shown in **Figure ES-3,** significant gaps exist across the Commonwealth between transit standards and the services that are now being offered. Experience both here and across the nation has shown that investment in transit to close these gaps will pay dividends in terms of expanded economic opportunity, reduced congestion, and environmental stewardship.

With regard to TDM services, gaps were identified for each TDM agency based on a comparison of TDM strategies currently provided by the agencies to recommended strategies. Reflecting funding shortfalls, gaps are present for TDM agencies across the state. In addition, six

Figure ES-3. Long Term Transit Enhancement Needs



Commonwealth PDCs currently have no TDM programs, although experience shows that even non-urban or small-town areas benefit from TDM programs.

ES.4 Recommended Transit/TDM Improvement Program

Based on the planning context developed through review of population and demographic trends, and the assessment of benefits likely to accrue from various levels of investment in transit and TDM services evaluated in this study, this plan makes the following recommendations for transit and TDM program improvements:

- *Service Recommendation #1:* Commit to an ongoing investment to address the existing SGR backlog and then continue maintaining transit assets in a SGR.
- *Service Recommendation #2:* Expand statewide transit capacity to meet the needs of a growing economy and population – expand services and enhance mode share.
- *Service Recommendation #3:* Add new human services transportation in jurisdictions that currently provide no service and in those that do not provide sufficient service.
- *Service Recommendation #4:* Expand TDM and other programs that improve overall transportation system efficiency.
- *Service Recommendation #5:* Study, plan, and construct major rapid transit capital projects.

These recommended transit and TDM program enhancements would provide long-term benefits to communities and travellers throughout the Commonwealth by maintaining equipment in a State of Good Repair, expanding transit and TDM services to achieve desirable performance standards, and supporting major transit capital projects designed to reduce congestion and support regional development visions. However, this recommended program would exceed financial resources that would be available under existing transit funding measures. Therefore, the following funding recommendations were developed to support and complement the service recommendations, addressing both capital and operating costs:

- *Funding Recommendation #1:* Based on performance, provide state formula operating funding of a minimum of 20 percent of reported expenses in order to provide minimum adequate operating and maintenance funding.
- *Funding Recommendation #2:* Establish a transit enhancement fund to encourage expansion of transit service when agencies are meeting or exceeding performance measures.
- *Funding Recommendation #3:* Recommend a State of Good Repair program in partnership with local transit grantees using a funding strategy consistent with existing federal, state and local shares (dependent on capital expenditure).
- *Funding Recommendation #4:* Establish a capital fund for major transit capital projects based on tiered approach developed by the Transit Service Delivery Advisory Committee (TSDAC).

A thoughtful strategy that emphasizes maximizing system performance while judiciously expanding service will serve the Commonwealth well. Addressing the identified needs with adequate funding will ensure that Virginians have a public transportation system that effectively contributes to economic vitality and quality of life.

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Table of Contents

1. Introduction and Purpose

In many areas of Virginia, public transportation services are an essential part of the transportation infrastructure. Transit increases access and mobility for residents of the Commonwealth by enabling more efficient use of the transportation network, thus saving time, conserving energy and providing economic benefits to the customers and communities served. For many Virginia residents, public transportation is the primary means of transportation and is a vital public service.

1.1. Virginia Department of Rail and Public Transportation

The Virginia Department of Rail and Public Transportation (DRPT) is the lead state agency for rail, public transportation and transportation demand management (TDM) in Virginia. DRPT helps keep Virginia moving forward by working with federal, state, regional, local and private partners across the Commonwealth to deliver reliable, cost-effective and efficient public transportation services to citizens and visitors. In addition, DRPT administers and manages state and federal grant programs, provides technical assistance, and supports 54 public transit systems, 55 human service operators and 16 TDM programs throughout the state. DRPT helps provide transportation choices including: rail transit, fixed route bus service, demand response bus service, ferry service, coordinated human service transportation and TDM (programs, projects, or policies that reduce or redistribute travel demand).

DRPT works closely with transit operators across the Commonwealth to prepare Transit Development Plans (TDPs). TDPs help transit operators improve their efficiency and effectiveness by identifying needs and the resources required to modify and enhance services provided to the general public, and also help operators effectively execute planning, funding, and implementation of public transit services. These plans feed directly into the transit funds programming process.

DRPT interacts with many of the 95 counties and 39 cities in Virginia and all of the 15 Metropolitan Planning Organizations (MPO) and 21 Planning District Commissions (PDC). DRPT also encourages the use of tools and techniques for improving the public's mobility, such as land use policies and planning and the use of Intelligent Transportation Systems (ITS). The Commonwealth has made great strides in incorporating forward-thinking planning and improvements to support the creation of a comprehensive, multimodal transportation network. To ensure that limited resources are applied most cost-effectively, DRPT continuously identifies and updates public transportation needs across the state through its planning and programming efforts. DRPT also works with the Secretary of Transportation and Virginia's modal agencies to update the statewide needs and priorities every five years through the development of a statewide transportation plan, known as VTrans. The VTrans 2035 update was completed in April 2013, with the final draft adopted by the Commonwealth Transportation Board (CTB) in February 2013.

1.2. Overview of the 2012 Statewide Transit and TDM Plan

The 2012 Statewide Transit and TDM Plan provides:

- High-level information on existing public transportation conditions in Virginia today.

- Guidelines for future transit and TDM levels of service, which allow clearer definition of transit and TDM needs and associated long-term public investment.
- A blueprint for addressing the needs for the future, with a focus on supporting the Commonwealth's key investment priorities and a changing population dynamic.
- Recommendations to Virginia's Surface Transportation Plan (VSTP), which addresses the Commonwealth's transportation goals and new challenges and opportunities facing highways, rail and public transportation.
- Guidance on fiscal requirements and strategies to maximize Virginia's investment in public transportation.

This plan was developed in coordination with transit and TDM operators and other Commonwealth transportation agencies. Information was also received from major public transportation stakeholders including MPOs, PDCs, and other organizations.

VTrans2035 is Virginia's overarching policy document that guides multimodal transportation investments in Virginia.

Virginia Surface Transportation Plan 2035 provides long-term multimodal transportation suggestions for the Commonwealth, based on the goals identified in VTrans2035. The plan includes recommended improvements to transit, rail, freight, highway, and ITS systems, and is used to determine highway projects for the Commonwealth Transportation Board's Six-Year Improvement Program.

What is public transportation?

Public transportation provides citizens with travel choices. In Virginia, public transportation includes:

» **Fixed route bus, rail transit, and ferry services** are the typical public bus and train services that comprise most transit systems throughout the Commonwealth and the nation. Fixed route services follow a published route and schedule. Only local/regional bus, rail (including VRE commuter rail) and ferry services are addressed in this document. The Statewide Rail Plan addresses intercity passenger rail services (e.g., Amtrak).

» **Demand Response Bus Service** is a type of service provided after the transit operator receives requests for service to and from a specific location directly from individual passengers or their agents. Service is during fixed hours and within a restricted zone, but does not operate on a fixed-route or a published schedule. In Virginia, transit operators may restrict eligibility to disabled passengers under guidelines per the Americans with Disabilities Act (ADA), in which case the service is considered "ADA complementary paratransit". If no fixed-route service exists, transit operators may leave service open to the general public (often referred to as "Dial-a-Ride" service). Some demand response services operate as "deviated fixed routes" whereby an operator runs fixed-route service but has the flexibility to go off route for a limited distance to pick-up and drop-off passengers.

» **Human Services Transportation** is provided by transit operators based on agreements with human services agencies, or after receipt of requests made by these agencies on behalf of individuals with disabilities, older adults and individuals with low incomes. Often, transit operators and human service providers plan service to meet the medical and work related needs of the latter's clients.

» **Transportation Demand Management (TDM)** is the use of programs and services to make the entire transportation system (roads, HOV/HOT lanes, buses, trains, automobiles, etc.) more efficient. It is through the application of TDM programs, projects, and policies that travel demand is reduced or redistributed through the change of one's mode of travel, time of travel or travel route, or through the elimination of the trip altogether. Examples of TDM programs and services are; carpool and vanpool formation, telework, commuter trip planning, and promotion of transit and other higher occupancy travel modes.

The development of the 2012 Statewide Transit and TDM Plan has been guided by the Commonwealth's transportation goals, as stated in the VTrans2035 Update, and DRPT's goals, as stated in the agency's 2010-2012 Strategic Plan:

Commonwealth Transportation Goals

- To provide a safe and secure transportation system
- To preserve and maintain the condition of the existing transportation system
- To facilitate the easy movement of people and goods, improve interconnectivity of regions, and provide access to different modes of transportation
- To protect the environment and improve the quality of life for Virginians
- To provide a transportation system that supports economic prosperity
- To promote livable communities and reduce transportation costs by facilitating the coordination of transportation and land use
- To achieve excellence in the execution of programs and delivery of service

DRPT Strategic Plan Goals

In support of the Commonwealth transportation goals, DRPT has identified the following strategic goals as the core of its operations:

- Assist in managing the growth in congestion on Virginia's highways
- Improve access for the general public and business to transportation choices (public transportation, carpools, vanpools, human service transportation, passenger rail, freight rail, and telecommuting)
- Provide access and improvements to Virginia's railways to encourage economic development and reduce traffic on Virginia's highways
- Seek the highest possible return on investment to maximize limited funding
- Increase communication to the general public, businesses and community decision-makers on transportation choices and telecommuting
- Implement best practice management tools and techniques to improve customer service and accountability

1.3. Benefits of Public Transportation Investment

Public transportation provides both direct and indirect benefits throughout the Commonwealth. While it is easy to see how users benefit from public transportation, primarily through improved mobility and economic opportunity, investment in public transportation provides a number of benefits for everyone that tie directly to the Commonwealth's goals for economic opportunity, sustainability, and safety:

Economic Development

- *Transit investment stimulates economic activity* – every dollar invested in public transportation generates approximately $4 in economic returns.[1]
- *Transit spending creates jobs* – direct spending on construction and operations of public transportation systems provides jobs and indirect consumer spending in the localities where those jobs are produced.[2]

[1] Weisbrod, Glen and Arlee Reno. *Economic Impacts of Public Transportation Investment,* prepared for the American Public Transportation Association. October 2009.
[2] Economic Development Research Group. *Job Impacts of Spending on Public Transportation: An Update,* prepared for the American Public Transportation Association. April 2009.

- *Businesses in congested regions can better attract skilled workers if quality public transportation is available* – businesses in congested areas such as Northern Virginia pay a premium, either in lost opportunities to attract skilled workers or in higher wages that they must pay to attract those workers. Managing traffic congestion by offering alternative transportation options attracts skilled workers and facilitates recruitment and retention by businesses.[3]
- *Workers have increased access to potential employers* – The ability of workers who depend on public transportation to retain their jobs or find new jobs depends on their access to employment centers. Job access is an important role of public transportation that is especially needed in areas with unemployment, transit-dependent populations and jobs and housing in dispersed locations outside of a central business district. Transit programs that target workers without access to transportation provide significant economic benefits for employers and workers.[4]
- *Savings at the regional level due to commuters making the switch to public transportation can be measured in reduced transportation expenses that can be shifted to boost consumer spending and saved time that can be applied to more productive uses of time that in turn lead to more business activity* – Money saved on gasoline and hours saved while not driving can be spent in other ways that benefit local economies, either through improved productivity or greater spending in local businesses.[5]

Energy

- *Due to the combined reduction in private passenger vehicle miles, reduced automobile congestion, and reduced travel distances due to the proximity created by public transportation, over 4 billion gallons of gasoline are saved and 37 million metric tons of carbon dioxide emissions are avoided.*[6]
- *According to the US Environmental Protection Agency's Greenhouse Gas Calculator, it would require 7.2 million acres of new pine or fir forests per year to match the annual carbon dioxide reductions provided by public transportation.*[7]
- *Without transit, drivers would have used 303 million more gallons of gasoline because of added roadway congestion during 2010. Drivers would have been stuck in an additional 796 million hours if there were no transit. Overall, the costs of congestion to drivers would have been an additional $16.8 billion if there had been no transit service.*[8]

Environment

- Public transportation is one of the easiest ways to reduce carbon dioxide emissions on a large-scale basis, which lessens the nation's impact on the environment due to its transportation needs. Traveling on public transportation reduces the nation's annual level of carbon dioxide emission by 37 million metric tons. Offsetting a

[3] Weisbrod, Glen and Arlee Reno. *Economic Impacts of Public Transportation Investment,* prepared for the American Public Transportation Association. October 2009.
[4] Thakuriah (Vonu), Piyushimita; P. S. Sriraj; Siim Soot; and Joseph Persky; University of Illinois at Chicago. *Economic Benefits of Employment Transportation Services,* report to Federal Transit Administration and Community Transportation Association of America. June 2008.
[5] Weisbrod, Glen and Arlee Reno. *Economic Impacts of Public Transportation Investment,* prepared for the American Public Transportation Association. October 2009.
[6] American Public Transportation Association. *2012 Public Transportation Fact Book,* Energy and Environment, September 2012.
[7] Ibid.
[8] Ibid.

similar amount of emissions would require the populations of New York City, Washington, D.C., Atlanta, Denver, and Los Angeles to simultaneously stop using electricity.[9]

- *Each individual's choice to use public transportation can make a significant difference to air quality.* The switch to transit is estimated to reduce each person's daily carbon emission by 20 pounds or more than 4,800 pounds in a year.[10]
- A single commuter switching his or her commute to public transportation can reduce a household's carbon emissions by 10 percent and up to 30 percent if he or she eliminates a second car. When compared to other household actions that limit CO2, taking public transportation can be 10 times more efficient in reducing emissions of this harmful greenhouse gas.[11]

Safety and Security

- *Federal Transit Administration data show that transit is among the safest ways to travel.* From 2003 to 2008 transit bus travel resulted in 0.05 deaths per 100 million passenger miles compared to 1.42 deaths for motor vehicles.
- *Transit systems play a role in local and regional emergency response efforts,* as evidenced by transit's key role in safe evacuation of thousands of citizens from center cities during 9/11 and other national disasters and weather emergencies.

[9] American Public Transportation Association. "Public Transportation Saves Energy and Helps Our Environment."
[10] Ibid.
[11] Ibid.

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2. Overview of Virginia's Public Transportation Systems and Programs

2.1. Current Public Transportation Systems

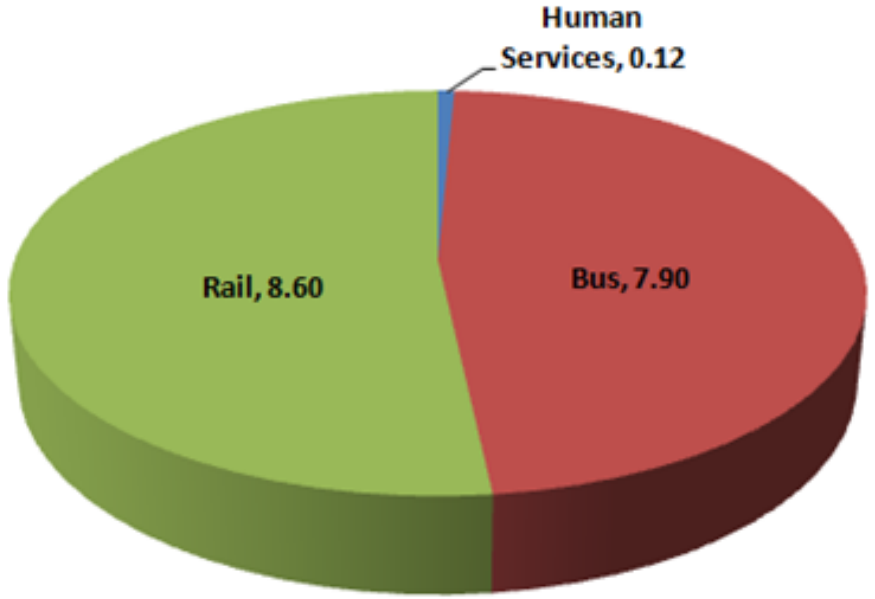
Throughout the Commonwealth, public transportation is the choice for approximately 200 million trips per year. Public transportation systems throughout the state serve Virginians of all ages, races, and income levels. Fifty-four public transit operators and 55 human service operators transport Virginians every day in something other than their own cars. Carpools, vanpools and teleworking all provide important choices for Virginians, managed by 16 TDM programs in urban and small urban areas.

Average monthly transit ridership in Virginia is more than 16.6 million, made up of 52 percent rail transit, 47 percent bus transit, and less than one percent human services transportation (**Figure 2-1**). Average monthly ridership increased by over 500,000 between 2011 and 2012.

Public transportation provides a vital link to important destinations, such as major employers, shopping, institutions of higher education and medical facilities. It supports Virginia's transportation network by supporting other transportation modes in many ways:

- Helping to manage congestion on roadways.
- Feeding passengers to and from inter-city bus and rail service.
- Providing convenient service to many airports.

Figure 2-1. Monthly Transit Ridership (2012, millions)



Virginians have reason to be proud of their public transportation systems. Operators of public transportation serve much of the Commonwealth, making a difference in the quality of life Virginians enjoy today. Virginia transit operators continue to be recognized for their efforts. In 2009, the American Public Transportation Association (APTA) honored Washington Metro's General Manager was named APTA's 2009 Outstanding Public Transportation Manager and in 2012, WMATA was honored with APTA's Innovation Award for their creative approach to paratransit eligibility and travel training. In 2011 and 2012, Potomac and Rappahannock Transportation Commission (OmniRide) received three separate AdWheel Awards from APTA for effective marketing programs. Blacksburg Transit also won two separate AdWheel Awards from APTA in 2012 for an effective marketing campaign and best illustrated vehicle.

2.1.1. Bus Transit

Virginia's bus systems and services have developed and grown along with the state's population, averaging nearly 8 million trips per month to jobs, schools, shopping and many other activities essential for economic prosperity. Bus systems are not just limited to large urban areas such as Northern Virginia, Richmond and Hampton Roads. Areas such as Charlottesville, Lynchburg, Danville, Harrisonburg and many rural counties offer fixed route, demand response and human services transportation. **Figure 2-2** lists bus transit operators in Virginia operating in each Planning District Commission (PDC).

Bus transportation in Virginia makes use of many strategies that have improved how bus services meet customer demand. In Northern Virginia, local bus service circulates in communities and feeds into Metrorail and

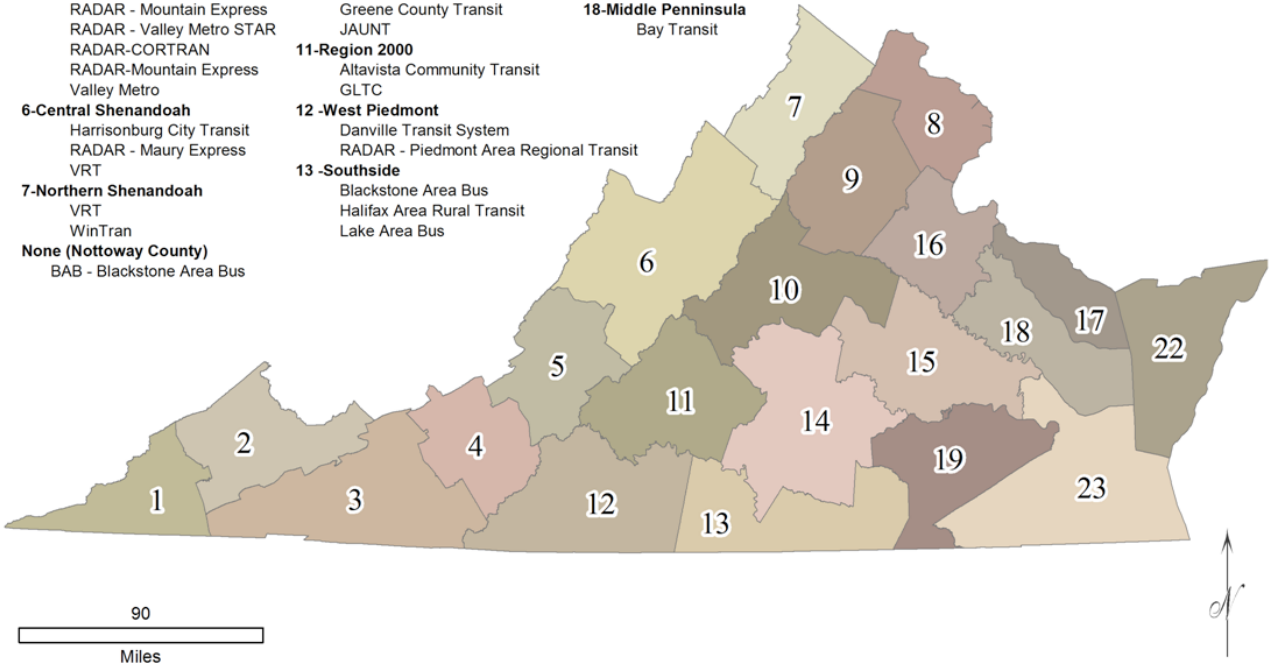
Figure 2-2. Transit Service Providers by Planning District Commission

1 - Lenowisco
MEOC
2 - Cumberland Plateau
Four County Transit
Graham Transit
MEOC
3 - Mount Rogers
Bristol Transit
District Three Public Transit
4 -New River Valley
Blacksburg Transit
Pulaski Area Transit
Radford Transit
5 -Roanoke Valley-Alleghany
RADAR - Mountain Express
RADAR - Valley Metro STAR
RADAR-CORTRAN
RADAR-Mountain Express
Valley Metro
6-Central Shenandoah
Harrisonburg City Transit
RADAR - Maury Express
VRT
7-Northern Shenandoah
VRT
WinTran
None (Nottoway County)
BAB - Blackstone Area Bus

8 -Northern Virginia
ART
CUE
DASH, DOT, King Street Trolley
Fairfax Connector
Loudoun County Transit
PRTC
VRT
WMATA
9-Pappahannock-Rapidan
JAUNT
VRT
10 -Thomas Jefferson
Charlottesville Area Transit
Greene County Transit
JAUNT
11-Region 2000
Altavista Community Transit
GLTC
12 -West Piedmont
Danville Transit System
RADAR - Piedmont Area Regional Transit
13 -Southside
Blackstone Area Bus
Halifax Area Rural Transit
Lake Area Bus

14- Commonwealth Regional Council
BAB - Blackstone Area Bus
Farmville Area Bus
JAUNT
PERT
Piedmont Area Transit (BAB)
VRT
15 - Richmond Regional
Bay Transit
GRTC
16-George Washington Regional
FRED
17-Northern Neck
Bay Transit
18-Middle Penninsula
Bay Transit

19 -Crater
BAB -Blackstone Area Bus
Bay Transit
GRTC
Petersburg Area Transit
22-Accomack-North Hampton
Pony Express (Town of Chincoteague)
Star Transit (VRT)
23-Hampton Roads
Bay Transit
HRT
I-RIDE
VRT
WATA



VRE stations, while express bus, commuter bus and limited stop services provide viable commuting choices. Other urban areas provide a mix of local and express bus service. These services play a key role in spurring economic development by providing mobility options, reducing reliance on automobiles, improving quality of life and helping to make communities more attractive to businesses and residents.

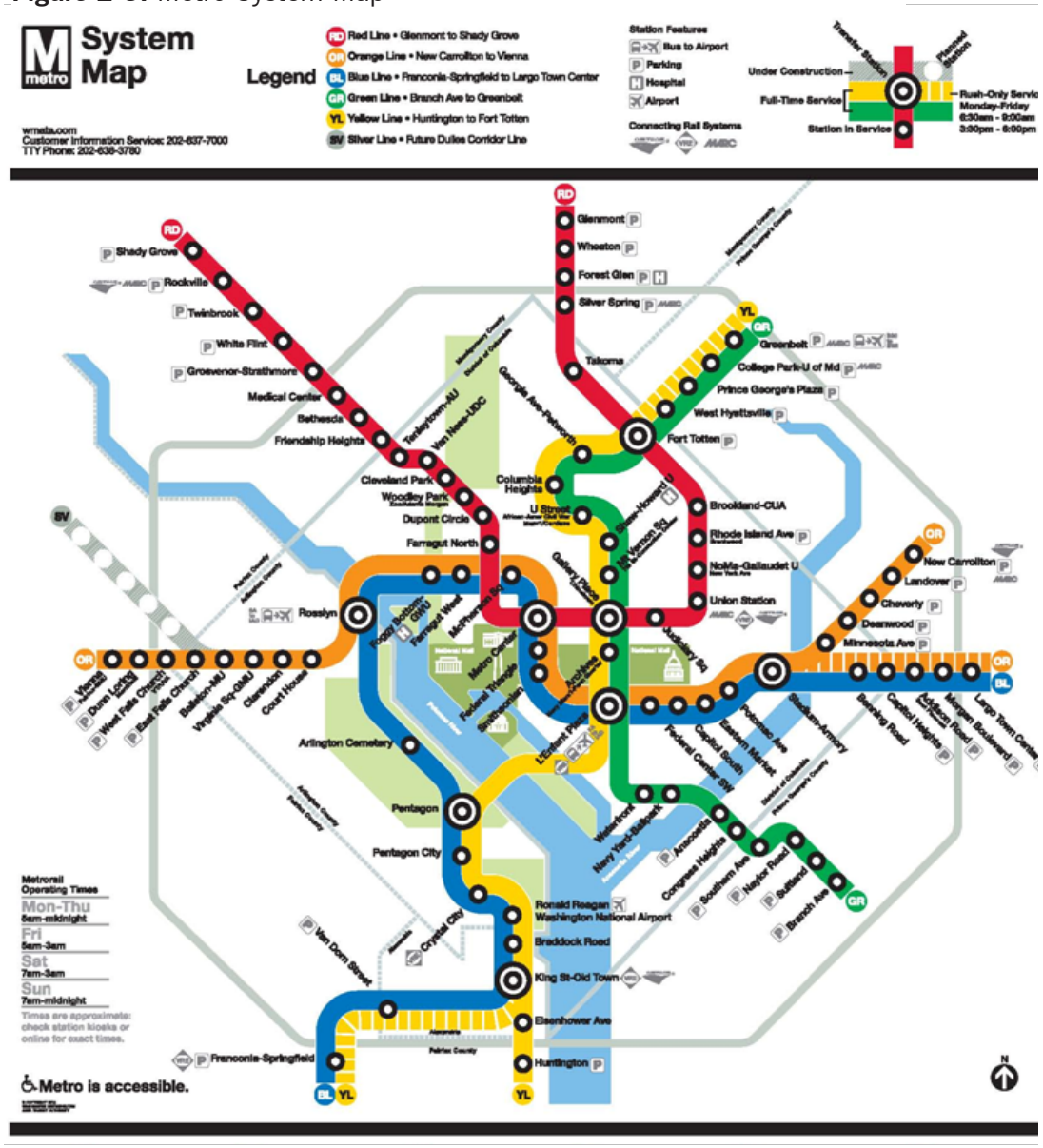
In less populated areas, demand response and human services transportation often provide the only transportation services for those who do not own, or choose not to own, their own automobile. By providing services that can be tailored to their needs, these bus services help smaller communities remain attractive places to live. While these services also support regional economic development, they are more importantly key economic lifelines for individuals in areas where public transportation provides the vital – and sometimes only – connection to health care and employment destinations.

If everyone in Northern Virginia who normally rides Metrorail had to drive a car to work instead, **the resulting traffic jam would stretch from Washington, DC to North Carolina.**

2.1.2. Rail Transit

Rail transit services are a major component of Virginia's transportation system. New light rail service, The Tide, has recently been inaugurated in Norfolk. In Northern Virginia, Metrorail service presently serves an average of 8.2 million trips per month and provides essential service to major destinations such as the Pentagon, Reagan National Airport and the Ballston to Rosslyn corridor in Arlington, as well as linking Virginia with the District of Columbia and Maryland.

Figure 2-3. Metro System Map



As shown on **Figure 2-3,** three of Metrorail's five lines serve Virginia with 20 stations in Arlington and Fairfax Counties, the Cities of Alexandria and Falls Church and the Town of Vienna. Eight stations in Virginia are among the top 25 highest ridership stations in the Metrorail system. The Dulles Corridor Metrorail Project (Silver Line) is a 23-mile extension of the existing Metrorail system that will add 11 new stations to serve Tysons Corner, the Reston/Herndon area, and Dulles Airport. Phase I is under construction from East Falls Church to Reston and is scheduled to be completed in 2013.

Virginia Railway Express (VRE), which in FY 2012 provided an average of 397,000 commuter rail trips monthly to Washington, DC from the Northern Virginia suburbs, began service in 1992. VRE forecasts that its ridership could grow by 63 to 85 percent by 2025, from 18,000 daily trips in 2012.[12] As shown on **Figure 2-4,** VRE serves 18 stations in two rail corridors parallel to I-95 and I-66, which are shared with both freight and intercity passenger service. Addressing capacity constraints, as well as the need to invest in improved station facilities, additional parking, and additional equipment and yard facilities, are essential if VRE service is to grow in the future to meet the anticipated demand.

High-profile rail transit projects are underway or were recently completed to address congestion in Virginia's two most populated areas:

- In Northern Virginia, the Metropolitan Washington Airports Authority (MWAA), in cooperation with DRPT, Washington Metropolitan Area Transit Authority (WMATA), Fairfax County and Loudoun County, is constructing a 23.1-mile extension of Metrorail (a 22 percent increase in track miles for the entire 106.3-mile Metrorail system) in the rapidly growing Dulles Corridor in Fairfax and Loudoun counties (**Figure 2-5**). The Dulles Corridor is home to several of the Washington, DC metropolitan region's most dynamic and rapidly growing activity centers, including Tysons Corner, Dulles International Airport, Reston, Herndon and eastern Loudoun County. The project will provide high-quality, high-capacity transit service in this burgeoning corridor. The Dulles Metrorail Extension will result in travel time savings, expand the reach of the existing regional Metrorail system, offer an alternative to automobile travel and support future development along the corridor. This is the largest transportation infrastructure project in the United States.

Figure 2-4. VRE System Map

[12] VRE Performance Measures, December 2012. http://www.vre.org/about/company/performance-measures.pdf

- The Tide, Virginia's first light rail system, opened for service in Norfolk in August 2011. It extends 7.4 miles from the Eastern Virginia Medical Center through downtown Norfolk along the I-264 corridor to Newtown Road within the City of Norfolk (**Figure 2-6**). Hampton Roads Transit (HRT) operates the service that includes eleven stations providing access to dining, shopping, and entertainment. Four park and ride lots provide access to the system in major areas such as Norfolk State University, Harbor Park, City Hall, MacArthur Center, Tidewater Community College (Norfolk Campus) and the Sentara Norfolk General Hospital. The system is projected to carry approximately 6,000-12,000 people per day by 2030 according to HRT, and is already exceeding current ridership projections. Initial projections for first-year ridership were around 2,900 daily rides, but in 2012 the service averaged about 4,900 daily rides. Future extension of this corridor to Virginia Beach is currently being studied by HRT. The selection of a Locally Preferred Alternative is expected in late 2014.

Figure 2-5. Dulles Corridor Metrorail Project

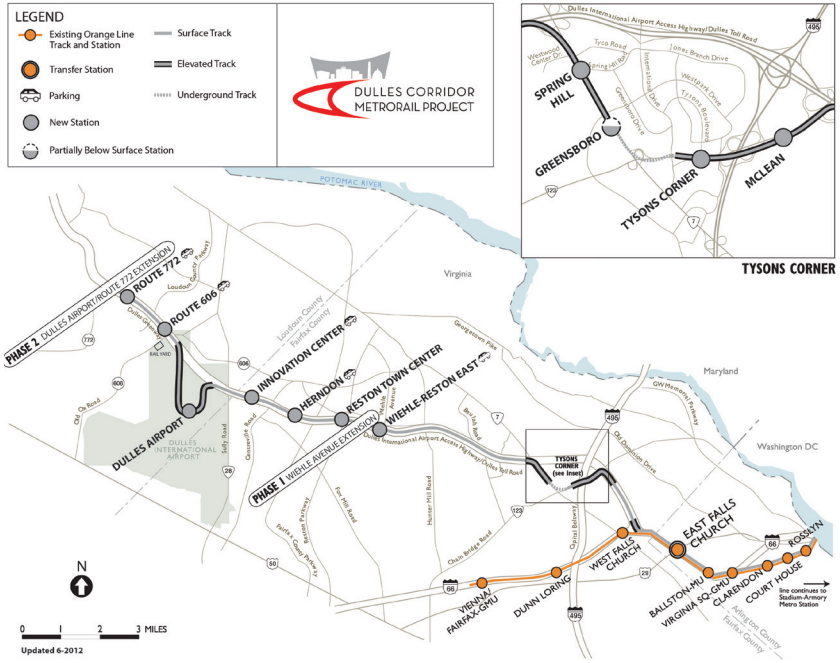
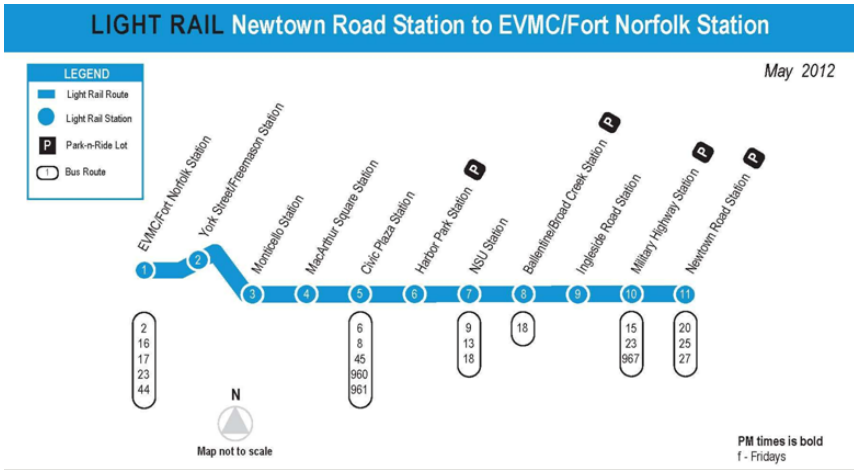


Figure 2-6. Tide Service Map



2.2. Transportation Demand Management Programs

Transportation Demand Management (TDM) programs date back to World War II when gasoline rationing spawned carpooling as a way to save fuel. After the war, programs encouraging carpooling went away until the oil and energy crisis of the 1970's. It was during the 1970's that ridesharing programs, as they were called, began to emerge in Northern Virginia. Through the 1980's and 1990's the number and magnitude of ridesharing programs grew in order to manage increasing traffic congestion and address air quality issues. In the late 1990's rideshare programs began to provide more than just carpool and vanpool matching for commuting to work. Today, these TDM programs play a key role in generating transit ridership and provide a variety of services to all types of travellers and employers.

By definition, TDM is the use of programs and services to make the entire transportation system (roads, HOV/HOT lanes, buses, trains, automobiles, etc.) more efficient. Greater efficiency of our transportation system is achieved by providing travellers with effective choices to improve travel reliability. It is through the application of TDM programs, projects, and policies that travel demand is reduced or

redistributed through the change of one's mode of travel, time of travel or travel route, or through the elimination of the trip altogether, while still enabling the underlying activities.

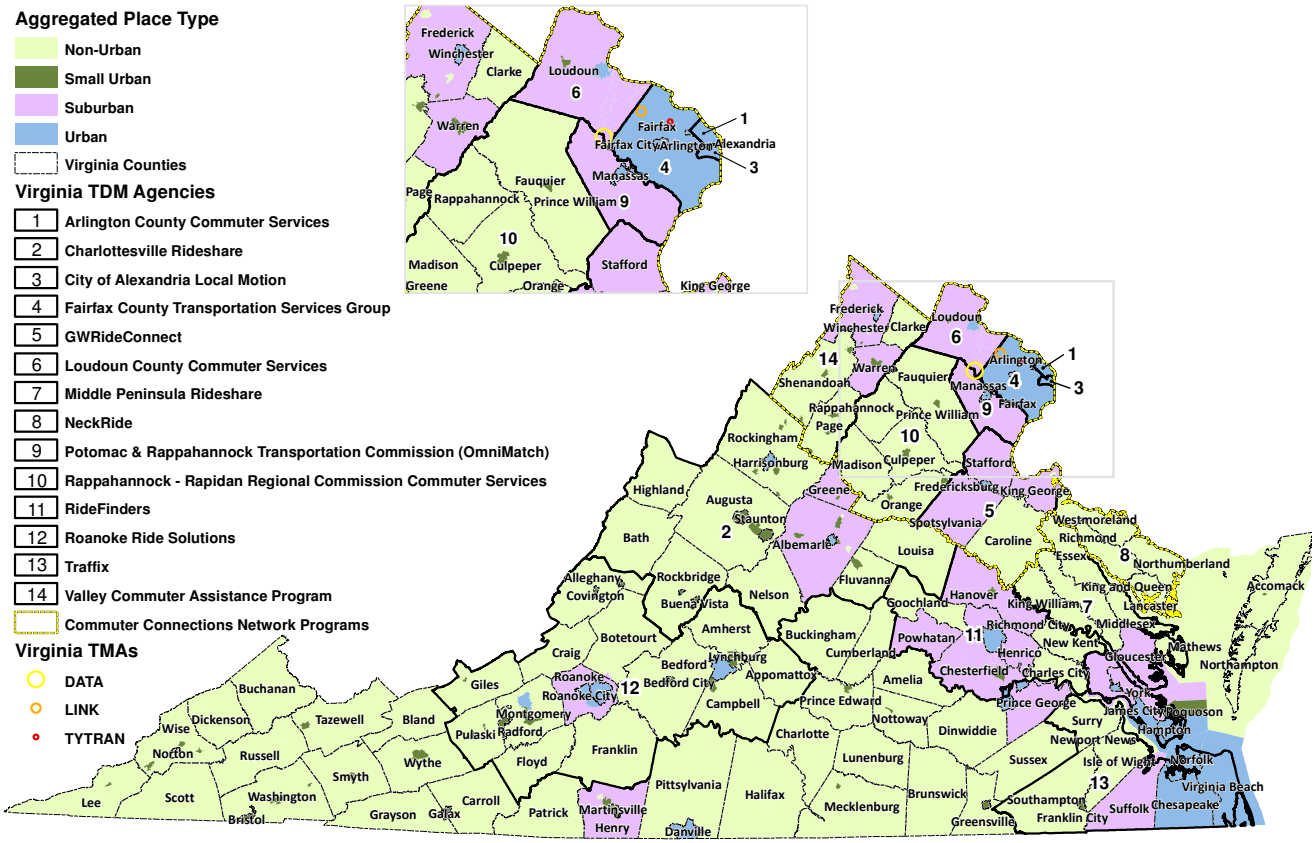
TDM services are provided in Virginia through a unique partnership between DRPT, Virginia Department of Transportation (VDOT), MPOs, PDCs, TMAs, and city and county local governments. Federal and private agencies provide services that complement these ongoing programs. Temporary or special TDM services are often provided through transportation management programs (TMP) in conjunction with individual transportation construction projects or events.

In addition to funding TDM programs throughout the Commonwealth, DRPT provides regional and statewide TDM services. Through the Telework!VA program, DRPT provides resources to employers, employees and TDM programs on how to establish and manage a telework program to reduce or eliminate commuting time by working from home or some other remote workplace, and how to take advantage of Virginia's telework tax credit administered by the Virginia Department of Taxation. DRPT also provides, funding and marketing support for Amtrak Virginia and guidance to state agencies on Commuter Choice transit and vanpool benefits.

If everyone who carpools in Virginia today drove alone, **the added vehicles would create two lanes of parked traffic from Richmond to Orlando!**

Current TDM programs and TMAs are shown in **Figure 2-7.** TMAs are non-profit organizations that provide TDM services in a particular area, such as a commercial/business district, airport or town center. They are generally operated as public-private partnerships and provide a variety of services that encourage more efficient use of transportation and parking resources to the businesses, workers, customers and residents of the TMA's service area.

Figure 2-7. TDM Programs



2.3. Applying Intelligent Transportation Systems to Bus and Rail Transit

A third program area supported by the Commonwealth, Intelligent Transportation Systems (ITS), is the application of advanced communication and information technologies, and corridor and congestion management strategies to optimize the performance of multimodal transportation systems. ITS applies directly to transit agencies and also has broad multimodal applications in Virginia's largest transportation corridors such as I-66 and I-95, where it is part of aggressive Integrated Corridor Management Programs (see text box).

For transit operators, ITS is used to monitor vehicle, track and roadway conditions, inform travellers of options so they can better plan trips and help manage traffic flow. Transit operators across Virginia are continuing to deploy a variety of technologies for improving transit service planning and operations. Operators deploying ITS technology range from small rural services to large urban operators. They are using ITS to improve on-time performance, route-planning, and customer service, while mitigating the need for investment in new infrastructure and vehicles/rolling stock, and reducing operating costs.

Virginia has been at the forefront of the industry with a number of significant ITS projects including:

- Regional participation in the WMATA SmarTrip program
- Deployment of an automatic route deviation system on commuter buses of the Potomac Rappahannock Transportation Commission
- Partnering with VDOT in developing Interstate Corridor Management Programs along the state's most congested Interstate highway corridors in northern Virginia

DRPT has been active in supporting the ITS efforts of Commonwealth public transportation operators. The agency prepared an *Intelligent Transportation Systems Strategic Plan* (August 2009) and is helping to facilitate the proliferation of interoperable systems among transit operators in the state. The ITS Strategic Plan was updated for FY12 in May 2011. Going forward, ITS projects will be coordinated with transit agencies six year capital plans and incorporated into their Transit Development Plans (TDP) rather than a stand alone grant program.

Integrated Corridor Management (ICM): Integrated Corridor Management is the coordination of individual network operations between parallel facilities that creates an interconnected system capable of cross network travel management. VDOT realized that the key to managing corridors effectively is achieving integration among the operations of different networks in the corridor rather than focusing on the optimization of individual networks. A coordinated effort between networks along a corridor can effectively manage the total capacity of a corridor in a way that will result in reduced congestion and increased trip reliability.

Source: 2035 Virginia Surface Transportation Plan

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3. Planning Context and Investment Considerations

Understanding where the Commonwealth is today and how it may change in the future creates the context for responsible planning recommendations. Changes that are occurring in Virginia's economy and its demographics will place ever-greater demands on our transportation system, one that is already straining to meet the state's current mobility demands. This places increasing demand on our public transportation programs, including TDM efforts, to be a sustainable part of the overall system. This chapter examines the context within which this Plan has been crafted and also looks at considerations that have influenced the Plan's development.

3.1. Virginia's Public Transportation Needs Are Growing

Transportation is an economic and social activity, and increasing demand for transportation infrastructure and services is driven by a number of key factors. Principal among these are growth in population and employment, and changes in economic activity. Population density and growth trends for the future have particular significance for public transportation services in the Commonwealth.

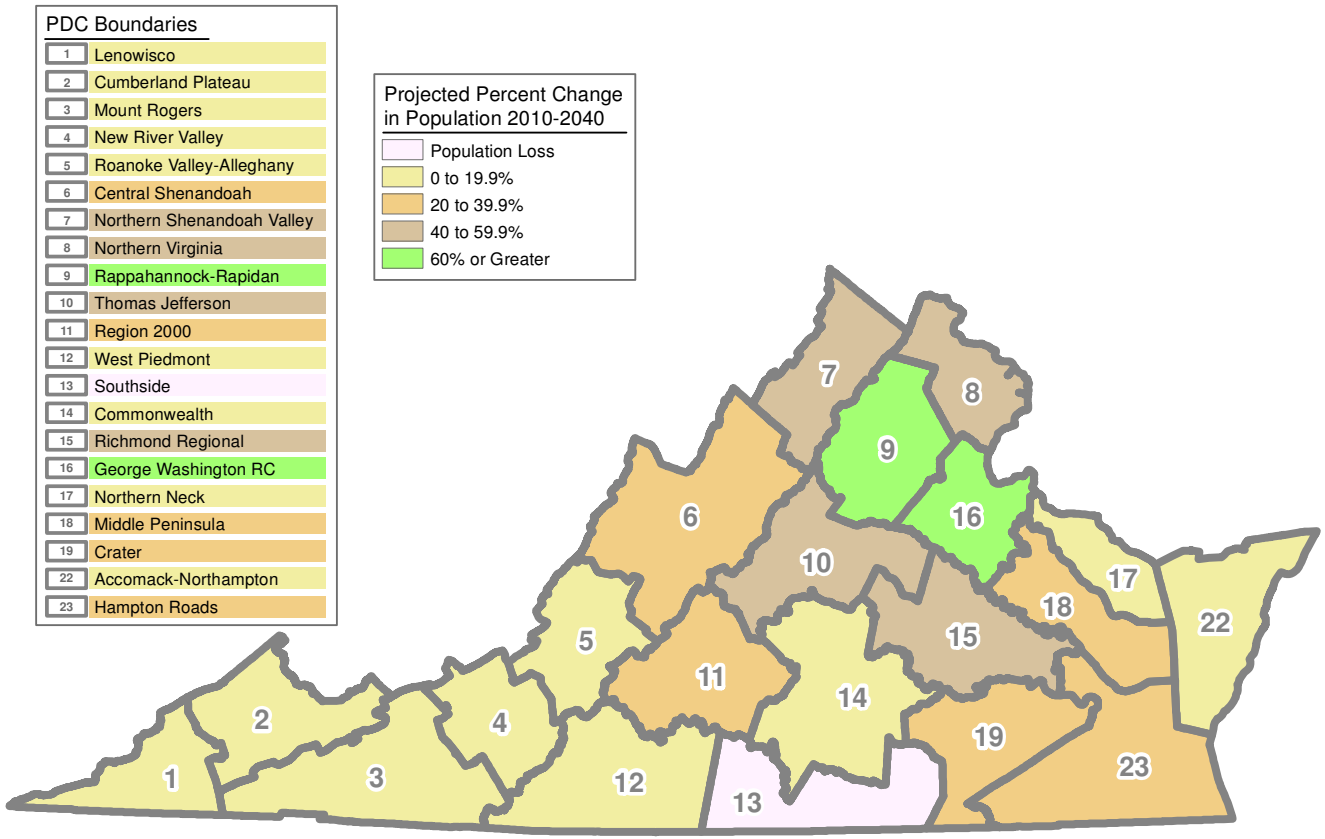
Anticipated population and employment growth is expected to result in higher demand for public transportation services and viable mobility options in lieu of driving. Population increases in the urban crescent of Northern Virginia, Richmond and Hampton Roads will result in an increased demand for high capacity transit and TDM resources such as carpools/vanpools, ride matching services and telework. At the same time, areas with lower population growth still have increasing public transportation needs, specifically in relation to demand responsive services and human services transportation.

3.1.1. Population is Growing and Changing

Between 2010 and 2040, Virginia's population will increase by nearly 3 million residents, a 37 percent increase. **Figure 3-1** shows the population gain in this time period for each of the 21 Planning District Commissions. The Commonwealth's expected population growth rate far exceeds that of the U.S. as a whole (25 percent) during the same time period. In many of the state's urban areas, where seven out of 10 Virginians currently reside, growth is projected to be significantly higher.

Like the rest of the United States, the population in Virginia is also aging. The proportion of persons age 65 and over will increase from about 12 percent in 2010 to 18 percent by 2040, resulting in Virginia having approximately 2 million individuals age 65 or older in 2040 compared to about 1 million in 2010. This has serious implications for the transportation system as a whole and especially for public transportation. Older individuals, including more and more baby boomers, are less likely to want or be able to drive personal automobiles, which are currently the state's dominant mode of transportation. Increases in the senior population and/or non-driver population will lead

Figure 3-1. Projected Population Change 2010-2040, by PDC



to increased demand for demand response and fixed route services. The relative attractiveness of various urban and rural areas to these aging transit-dependent user groups can have a significant impact on public transportation services.

To the extent that the senior population ages in place and continues to reside in auto-dependent areas, public transportation will need to address the particular needs of this demographic group. Losing the ability to drive poses significant hardship, and reduced mobility results in greater loneliness and depression, as well as decreased access to medical care.

A third significant change to Virginia's population also mirrors national trends. Generation Y, also known as the Millennial generation – those born between the late 1970s and 1990s – is the fastest growing segment of the workforce and is larger than the baby boomer generation. Generation Y's expectations of where they want to live and work will continue to challenge Virginia's transportation systems for decades. Overall, Generation Y has shown that it prefers pedestrian-friendly urban communities to areas promoting auto dependency and is more committed to using public transportation, often in support of a more urban lifestyle. As this group moves into and becomes the largest segment of the workforce, there will be more demand on public transportation to meet its needs.

According to the 2010 US Census, over 60% of Virginians now live in the Northern Virginia, Richmond, or Hampton Roads metropolitan areas. **One in four Virginians lives in Northern Virginia.**

3.1.2. Concentrations of Low-Income and Minority Populations Require Consideration

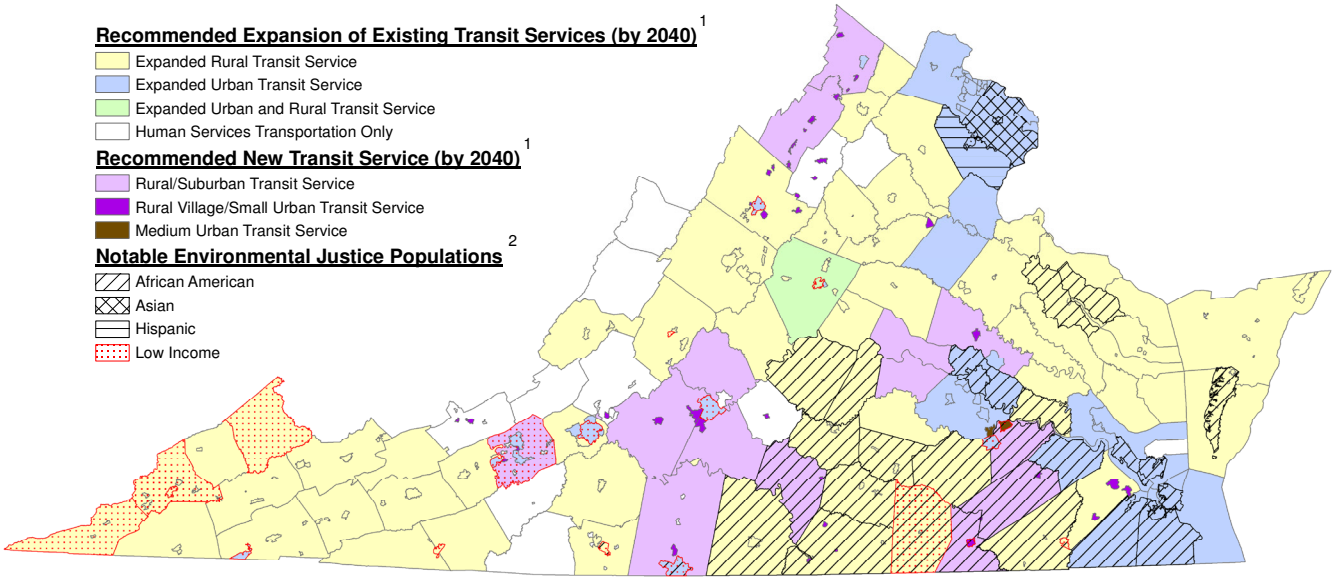
Virginia has significant numbers of low income, minority, and limited English proficiency populations. Consistent with federal requirements,

DRPT conducts its programs in a manner consistent with Title VI of the Civil Rights Act of 1964. Section 601 of Title VI provides that no person shall "on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Notable concentrations of Title VI populations, including Environmental Justice and Limited English Proficiency (LEP) populations were identified in various counties and independent cities throughout Virginia.

Figure 3-2 shows areas across the Commonwealth where new or expanded transit services are recommended, along with the locations of minority and low-income populations. As shown on the figure, minority and low-income populations would benefit from recommended service enhancements. As specific projects and programs are implemented in the future, they will be evaluated to determine the potential for disproportionately high and adverse impacts on any minority or low-income populations. Overall, the outcomes of the plan will benefit the residents of Virginia, including minority and low-income populations, by providing transit and TDM services that provide travel options and increase access to jobs, health care, and education.

LEP populations were also considered in the development of the Statewide Transit and TDM Plan. Over 660,000 adults in Virginia lack the ability to read and understand written information in English[13] and over 200,000 Virginians speak English less than "very well," as defined by the US Census Bureau.[14] Spanish is by far the most common language spoken by LEP populations in Virginia. Public transportation access is crucial to people, including LEP persons, who rely on transit services to access health care, education, and employment. Further LEP analysis and outreach will be conducted as required as the recommendations from this plan are implemented (i.e., when service changes are implemented by individual transit agencies).

Figure 3-2. Minority and Low-Income Populations and Recommended Transit Services



Notes: 1. Based on population growth and performance.
2. Areas where the percentage of the population made up of the identified EJ population exceeds 50% or exceeds the statewide percentage by at least 10 percentage points.

[13] National Center for Education Statistics, 2003
[14] US Census Bureau, American Community Survey 5-Year Estimates (2006-2010), Table B16004

3.1.3. Urban Areas are Attracting More Population

Virginia's major metropolitan areas are growing at a much faster rate than the rest of the state. In addition to attracting people from within the Commonwealth, Virginia's urban areas continue to attract residents from outside the state to take advantage of the growing number of jobs. This trend toward urbanization is expected to continue. The highest growth rates between 2010 and 2040 are projected in Northern Virginia, the Rappahannock-Rapidan and Northern Shenandoah areas (just outside Northern Virginia), Richmond, Hampton Roads and Fredericksburg. As shown in **Table 3-1,** Virginia's urban areas – Northern Virginia, Richmond, Hampton Roads and Fredericksburg (part of the George Washington Planning District Commission) – will be home to over 2.1 million new residents by 2040.

Historically, as urban areas become more developed, public transportation increases its share of total travel. Urban areas that have mixed-use development with an appropriate level of density containing residential, employment, retail, and commercial are well suited for fixed-route transit service. In many of Virginia's urban areas, improving and expanding transit service goes beyond just accommodating the demand from residents and employment. In these areas, transit investment is seen as one solution for managing congestion and air quality issues. In a recent survey of Hampton Roads residents, for example, 38 percent of respondents chose "expanding the transit system" as the primary way to reduce transportation congestion in the region, making it the number one choice.[14]

Table 3-1. Projected Population Growth in Virginia's Urban Areas

Planning District Commission	2010 Population	Projected 2040 Population	Population Growth, 2010-2040	Percent Change, 2010-2040
8 – Northern Virginia	2,230,623	3,261,110	1,030,487	46.2%
15 – Richmond Regional	1,002,696	1,404,943	402,247	40.1%
16 – George Washington	327,773	648,002	320,229	97.7%
23 – Hampton Roads	1,629,452	2,006,820	377,368	23.2%
Sub-total, 4 Urban PDCs	5,190,544	7,320,875	2,130,331	41.0%
Remaining 17 PDCs	2,810,480	3,494,728	684,248	24.3%
State Total	8,001,024	10,954,387	2,953,363	36.9%

Source: Virginia Transportation Research Council

3.1.4. Small Urban and Rural Areas Will Need More Public Transportation

While not experiencing the degree of growth expected in the state's highest growth areas, smaller urban and rural areas will be experiencing similar demographic shifts that increase the need for public transportation services. As population increases and ages, providing travel options will require new transit services in areas of the Commonwealth that are currently without service as well as expanding and diversifying the services of existing transit systems. Smaller operators will see demand grow, especially for demand response and human services transportation. In some of these areas, public transportation is truly an economic lifeline, providing the only means to get to jobs, receive medical care, and remain vital members of the community.

3.1.5. Jobs Growth Will Occur in Urban Areas

Total employment within the Commonwealth is anticipated to increase by 2.5 million jobs over the next 25 years, from 5.2 million in 2010 to 7.8 million in 2035. This is a 49 percent increase, compared to an increase in population of 28 percent over the same period.

Employment growth is expected to follow a trend similar to population migration to urban areas. From 2006 to 2035, the areas experiencing the strongest gain in jobs will overlap with the four highest growth Planning District Commission areas. **Table 3-2** summarizes projected employment growth during the study period. As shown, job growth will track closely with population growth shown above, with 85% of Virginia's job growth expected to occur in the four most urban PDCs (Northern Virginia, Richmond, Hampton Roads and George Washington – Fredericksburg).

Table 3-2. Projected Employment Growth

Planning District Commission	2010 Employment	Projected 2035 Employment	Employment Growth, 2010-2035	Percent Change, 2010-2035
8 – Northern Virginia	1,724,160	3,007,614	1,283,454	74.4%
15 – Richmond Regional	700,290	1,067,653	367,363	52.5%
16 – George Washington	166,590	315,979	149,389	89.7%
23 – Hampton Roads	1,066,790	1,419,270	352,480	33.0%
Sub-total, 4 Urban PDCs	3,657,830	5,810,516	2,152,686	58.9%
Remaining 17 PDCs	1,548,640	1,943,223	394,583	25.5%
State Total	5,206,470	7,753,739	2,547,269	48.9%

Source: *Socioeconomic and Travel Demand Forecasts for Virginia and Potential Policy Responses: A Report for VTrans2035: Virginia's Statewide Multimodal Transportation Plan* (Virginia Transportation Research Council, June 2009)

3.1.6. Roadway Congestion Continues to Increase

As reported by DRPT in its annual report to the General Assembly, Virginia's significant population growth will likely bring with it ever-greater traffic congestion. The Commonwealth's dependency on the car as the primary means of travel, in general, and single occupancy vehicle travel (SOV) auto travel, in particular, translates into increasing levels of roadway congestion. Recognizing the correlation between an increasing population, expanding development patterns, and vehicles on the road is a key to understanding the congestion equation. Despite a strong push to increase Virginia's roadway supply, the Commonwealth cannot keep pace with demand, especially in rapidly-growing urban areas. The lack of highway funding and lack of space for more roadways creates an imbalance. The result is an increasing level of congestion and a decreasing level of access and mobility. In this situation, Virginia has great opportunity to enhance mobility and to manage congestion by continuing to invest in public transportation and TDM services.

3.2. Key Transit Investment Challenges and Strategies for Meeting Future Needs

In responding to the social and demographic context described above, DRPT and the Commonwealth's transit and TDM service providers face significant operational, structural, and financial challenges.

Through planning, program administration activities and reporting by transit operators, DRPT works to understand operators' individual needs, as well as prepare for asset replacement, service improvements and expansion. This information is instrumental when planning for and programming state and federal funds to meet current and future public transportation needs and to reflect a statewide perspective in public investment.

Looking forward to the year 2040, there seems little doubt that demand for transit service and TDM programs will be sustained resulting from the forecasted growth in population and employment levels in every planning district in the state. In addition, the aging of "Baby Boomers" and the increasing number of Generation Y members in the workforce are at the forefront of demographic trends that will lead to more citizens demanding access to high quality public transportation. Moreover, there is built up demand for housing and employment sites that can accommodate higher population and job density and a greater mix of land uses, and that are adjacent to transit service to facilitate travel on public transportation.

To ensure that transit operators can meet existing and future demand for quality public transportation and mobility options, DRPT is focusing on maintaining the Commonwealth's current transit assets, maintaining acceptable levels of service, and looking toward the future

to keep up with population growth and economic conditions. Needs for transit system improvements and continued funding can be broadly encompassed in terms of maintaining transit assets in a State of Good Repair, expanding existing transit and TDM capacity, and supporting implementation of major transit capital investments.

3.2.1. Bring Public Transportation Assets into a State of Good Repair

Achieving a State of Good Repair (SGR) for transit rolling stock and facilities through additional investments and applying best practices in asset management will provide a strong foundation for effective service and future system expansion. By ensuring that assets are in good condition, Virginia will help transit operators keep their operating and maintenance costs under control, and ensure that the service offered to the public is both reliable and attractive. Clearing the backlog of deferred maintenance on facilities and infrastructure, and replacing aging vehicles, are key components of this strategy.

Addressing State of Good Repair Backlog

Deferred maintenance, the practice of delaying non-essential maintenance activities, takes assets out of SGR over time. When funding is constrained and political pressures resist raising fares or cutting service, transit operators have to choose between providing service and putting funds into maintenance. Sometimes scarce funds go to meeting service needs and maintenance suffers. Equipment and infrastructure are pushed to serve longer.

Virginia currently has a $190 million backlog of deferred maintenance and replacement of vehicles that are reaching the end of their useful lives. If this backlog is not addressed, it can seriously impact the effectiveness and efficiency of service delivery. As the backlog grows, SGR will increasingly consume the budgets of transit agencies statewide, causing much-needed service to suffer. DPRT currently contributes $50 million annually to WMATA's Metro Matters program to address SGR needs for vehicles and other facilities.

State of Good Repair

The Federal Transit Administration has suggested the following definition as a starting point for SGR:

An asset or system is in a state of good repair when no backlog of capital needs exists – hence all asset life cycle investment needs (e.g., preventive maintenance and rehabilitation) have been addressed and no capital asset exceeds its useful life.[12]

Federal Transit Administration Useful Life Standards for Transit Vehicles

- **Large, heavy-duty transit buses** *(approximately 35'-40', and articulated buses):* at least 12 years of service or an accumulation of at least 500,000 miles.
- **Medium-size, heavy-duty transit buses** *(approximately 30'):* 10 years or 350,000 miles.
- **Medium-size, medium-duty transit buses** *(approximately 30'):* 7 years or 200,000 miles.
- **Medium-size, light-duty transit buses** *(approximately 25- 35'):* 5 years or 150,000 miles.
- **Other light-duty vehicles such as small buses and regular and specialized vans:** 4 years or 100,000 miles.
- **Rolling stock** *(Metrorail rail cars, VRE locomotives and rail cars):* a minimum of 25 years of revenue service.

Source: *FTA Circular 9300.1B, "Capital Investment Program Guidance and Application Instructions"; "Requirements Related to Fixed Guideway Rolling Stock:Service Life Policy", Fixed Guideway Modernization Program, FTA Capital Grant Program*

Benefits of Achieving State of Good Repair

Aggressively pursuing a State of Good Repair will provide a range of significant benefits to the Commonwealth's transit systems and overall transportation system:

- **Safety** – Operating safe and secure transit service is the foundation of the Commonwealth's public transportation network. Despite transit's outstanding safety record relative to private automobile travel, even isolated incidents can discourage use of public transportation. Adequate maintenance and infrastructure renewal (e.g., vehicle overhaul) are necessary for safe operation.
- **Service Reliability** – SGR affects transit service reliability. A transit service's on-time performance is partly dependent on the condition of vehicles and their guideways (roads or rails). Providing good customer information requires up-to-date electronic information systems that are well-maintained. Retaining and attracting riders depends on service reliability and customer service.
- **Operating Expenses and Revenues** – Achieving SGR helps control operating expenses. Scheduled preventive maintenance has demonstrated significant lifetime cost savings over ad-hoc or deferred maintenance. The age and condition of vehicles also affects how often they are taken out of service for repairs and maintenance. These disruptions in vehicle availability can increase the number of vehicles and number of service hours needed to meet passenger demand. If service is performing poorly due to breakdowns, this impacts reliability and in turn decreases ridership and farebox revenue.
- **Federal requirements** – Federal Transit Administration (FTA) programs such as "New Starts" place an emphasis on SGR in their review criteria. The most recent federal transportation authorization bill, Moving Ahead for Progress in the 21st Century Act (MAP-21), authorized $2.1 billion in FY 2013 for SGR Grants (Section 5337). Local transit operators with good SGR strategies in place can better position themselves in competing for federal capital funding opportunities.
- **Environmental performance** – Vehicles and equipment in a state of good repair generally have better performance in terms of their environmental impact and energy efficiency. Newer and well-maintained engines operate more efficiently and produce fewer emissions than those lacking timely maintenance or that are past their useful life.

3.2.2. Meet Future Travel Demand through Expanded Transit Capacity

In order to keep up with existing and anticipated future transit demand and to extend to areas currently without service, investments must be made in existing transit systems. These investments will be tailored to particular regions of the state based on their underlying population and demographic trends, as illustrated in **Figure 3-1**. It is important to note that transit services and improvements are provided by local governments and transit operators with assistance from DRPT and the federal government. Decisions about the type and scope of services to be provided are made at the local level.

Low Growth Jurisdictions (0-20 percent population growth between 2010 and 2040)

In areas expecting low growth in population, capacity expansion will focus on introducing new or expanded economic lifeline service using demand response vehicles and coordinated human services transportation, with minimal fixed route transit service. These additional services will meet critical needs of an aging population and a workforce in need of non-automobile job access. Transit capacity expansion will support critical investments in economic development even in areas with limited overall population growth.

Medium Growth Jurisdictions (20-40 percent population growth between 2010 and 2040)

In areas expecting medium growth in population, capacity expansion will focus on expanding fixed route coverage in terms of frequency, service span, and communities served. Within highly urbanized medium growth areas (e.g., Hampton Roads), additional new rapid transit services would be proposed. In addition, DRPT's strategies include introducing new or expanded economic lifeline service using demand response vehicles and

coordinated human services transportation, and providing transportation demand management services to help manage increasing congestion. These additional services will help ensure that significant economic growth and land use planning is supported by solid transportation investment.

High Growth Jurisdictions (40-60 percent population growth between 2010 and 2040)

In areas expecting high growth in population and increasing urbanization, capacity expansion will focus on expansion of fixed route coverage for existing transit systems, as well as significant investment in transportation demand management services to manage congestion and improve mobility. Within highly urbanized high growth areas (e.g., Northern Virginia), additional new rapid transit services (e.g., BRT and rail service) would be implemented. These additional services will allow for significant impact on regional transportation networks, and support land use and economic development planning that rely on transportation choice. Significant increase in frequency and duration of service is anticipated in these high growth jurisdictions, including a moderate increase in the share of overall transportation provided by transit.

Very High Growth Jurisdictions (above 60 percent population growth between 2010 and 2040)

In areas expecting very high growth in population, capacity expansion will focus on expansion of fixed route coverage and major rapid transit capacity investment (e.g., extensions from nearby highly urbanized areas), as well as significant investment in TDM services to help manage significant congestion and improve mobility. These additional new rapid transit services, as well as significant increases in frequency and coverage of existing service, will play a critical role in land use and economic development planning for the high growth regions. A significant increase in the share of overall transportation demand provided by transit is anticipated.

Benefits of Expanded Transit Services

Taken together, these capacity expansion strategies will improve the quality of life throughout Virginia, provide vital transportation links, and support regional economic development.

- **Economic Opportunity** – Readily available transit service to a broad sector of the population improves access to jobs and opportunity for economic success, a benefit both to workers and employers, who have access to a deeper labor pool. This applies both to fixed-route bus or rail services and to TDM strategies that promote ride sharing and other avenues to job access.
- **Expanded Mobility** – Accessible, reliable transit services allow a broader segment of the general population with improved access to medical, educational, and social opportunities that may not be available without an automobile.
- **Environmental Stewardship** – Expanded transit and TDM service results in more trips being made by modes other than the automobile. Reduced reliance on automobiles results in improved air quality, water quality, and ultimately may reduce the need for additional roadway construction.

3.2.3. Address Significant Growth with Rapid Transit Capital Projects

Especially in high and very high growth jurisdictions, the anticipated growth in population and jobs will result in increased demand on transportation systems, both road and transit. Highway expansion alone cannot meet the significant growth in travel within the Commonwealth. DRPT has supported the work of planning leaders in the major metropolitan areas of Northern Virginia, Hampton Roads, and Richmond to develop transit vision plans that identify major rapid transit capital projects that will address transportation and land use challenges into the future. Several such projects are high on regional priority lists (e.g., Dulles Corridor, Columbia Pike Transit Project, Crystal City-Potomac Yard Streetcar, HRT TIDE Extension, and GRTC Broad Street Bus Rapid Transit projects). These vision plans have also identified other projects that build on the significant planning efforts already underway in congested travel corridors across the state.

Developing new services and systems that encourage more people to use transit, such as streetcars, light rail and bus rapid transit, suburban express bus routes to major employment centers and rural demand-response services in communities with no public transit options is crucial. These types of investments will increase mobility options and mobility in congested urban areas, provide mobility to people who cannot drive, provide transportation choices and encourage economic development and employment.

Benefits of Transit Capital Project Funding

More than any other transit investment, funding for major transit capital projects can shape the way the Commonwealth's major cities develop and the quality of life that is provided. Strictly from the perspective of serving growing transportation demand and addressing congestion, major capital projects remove significant numbers of vehicles from saturated highways. While well-planned fixed-route bus service can ease peak travel period congestion, major capital projects can eliminate or greatly delay addition of travel lanes of highway. And as land development patterns around transit stations evolve, the transit investment can provide incentives for land redevelopment that leads to higher densities, greater variety of land use, reduced use of automobiles, and a high quality of life.

Whether they're building brand-new systems or expanding the core capacity of existing systems, transit investment will help restore economic vitality, transit industry officials say. **For each billion dollars invested in infrastructure projects such as transit major capital projects, approximately 36,000 jobs are created or sustained.**

APTA's President and CEO Michael Melaniphy says, "The majority of federal funding goes toward capital projects, and what that results in is 76 percent of the federal funding that goes to public agencies for transit flows directly to the private sector."

3.2.4. Reduce Auto Reliance and Increase Transit System Efficiency and Effectiveness through Expanded TDM Efforts

TDM is an increasingly important support element of the transportation system in Virginia and throughout the United States. It focuses on the provision of commuter services, strategies and policies aimed at reducing the need to drive alone, such as:

- Encouraging companies to establish flexible work hours and work-from-home (telework) options;
- Matching up carpoolers and setting up vanpools;
- Working with VDOT to build and expand park and ride lots;
- Working with rural communities to expand commuter transit services;
- Working in urban and small urban areas to develop employer services programs and promote transit services;
- Promoting planning strategies such as transit-oriented development; and
- Coordinating regional TDM plans and programs.

The successful implementation of these strategies results in a more efficient use of road space by fewer vehicles, a reduction in rush hour traffic by shifting some trips to off-peak hours, and the elimination of some trips altogether with telework. By better managing peak transportation demand, pressures on both roadway and transit systems can be alleviated without additional capital expense. Indeed, the value and importance of TDM has been captured at the highest levels of Commonwealth transportation planning, the 2035 Virginia Surface Transportation Plan (VSTP). As shown in **Table 3-3,** the 2035 VSTP calls for application of broad TDM services varying by general area type, from urban core areas such as in Northern Virginia to non-urban, rural areas.

Table 3-3. TDM Service Levels Based on the 2035 VA Surface Transportation Plan

Urban Core	Suburban / Feeder	Small Urban	Non-Urban
• Build on existing transit options and bike/walk options • Develop suburban transit links for inbound / reverse commute • Address short-trip lengths • Strong focus on employment end outreach • Target both commute trips and non-work travel of residents • Integrate TDM into local planning, MTPs, LRTPs • Increase parking management • Promote alternative work hours and telework at employment • Enhance cross-jurisdictional coordination for TDM	• Expand non-SOV use for non-work trips in suburban centers • Strong focus on employment outreach in suburban centers • Promote feeder area ridesharing for long-distance commutes • Promote telework to employers and residents • Expand transit options; develop transit links to urban and suburban employment • Integrate TDM into the land development process; encourage mixed-use • Integrate TDM into local planning, MTPs, LRTPs • Enhance cross-jurisdictional coordination for TDM	• Expand employer outreach, especially in suburban centers • Primary focus on resident/commute travel • Promote carpool and vanpool for long-distance commutes to areas outside region • Promote telework to residents • Develop transit links to urban and suburban employment • Integrate TDM into the land development processes; encourage mixed-use • Integrate TDM into local planning, MTPs, LRTPs • Enhance cross-jurisdictional coordination for TDM	• Primarily residence-based programs for commuting within and outside the area • Promote telework to residents • Establish modest commute outreach in areas with no current program • Support long-distance commute markets • Coordinate with neighboring employment areas for outbound commuting • Integrate TDM into local planning, MTPs, LRTPs

Benefits of Expanded TDM Programs

As they have been extended across Virginia, TDM programs and the strategies that they deploy have resulted in significant consumer and agency cost-savings, congestion relief, and improved mobility. By linking together long-distance commuters into carpools, vanpools, and commuter buses, commuting costs have been greatly reduced and employment opportunity has been expanded. As with transit services, TDM programs offer benefits in terms of economic opportunity, expanded mobility, and environmental stewardship.

Every vanpool takes 8-10 single occupant vehicles off of our highways.

3.3. Virginia's Transit and TDM Service Gaps

Expectations of Virginia's citizens, its corporate residents, and its transit and TDM agencies regarding transit and TDM service levels, plus state and federal guidelines regarding State of Good Repair and human services transportation, allow planners to establish a set of service standards that become a basis for evaluating existing service levels and future funding needs.

This section describes the methodology used to identify those areas that currently have service that may be underserved, as well as those areas that are not served, but may warrant new service now or in the future.

3.3.1. Transit and TDM Service Standards

To identify transit service gaps that if closed would benefit the Commonwealth, DRPT examined standards for various types of transit services and sought to match those standards to Virginia's varying demographic and development conditions. Virginia has a range of development area types with different types of transit services operating in the various jurisdictions. For this study, these area types have been defined as being urban core, urban/suburban, small urban, and non-

urban. The gap analysis identified performance measures by jurisdiction with transit service based on riders per hour, rider per capita, and hours per capita by area type. **Table 3-4** identifies the range of public transportation services that are appropriate in various area types. The analysis considered the following conditions:

1. **Unserved Areas:** areas or regions that do not currently have transit service but meet defined population and population density thresholds.
2. **Existing Underserved Areas:** regions that currently have transit service, but may be underserved based on performance measures including:
   - Population density
   - Substandard service-hours per capita
   - Riders per capita
   - Riders per hour
3. **Transitioning Areas:** some regions in the future that may shift from one area type designation to another, such as a suburban county becoming an urban county, and thus existing transit services may not be sufficient to accommodate demand for more intensive transit services. Thus, the final step in identifying gaps looks at areas that shift to new area types by 2040 and compares the existing service characteristics for the new area types to the 2040 characteristics for population density, riders per hour, riders per capita and hours per capita.

Table 3-4. Transit Service Categories by Area Type

Service Category	Area Type	Urban Core				Urban / Suburban			Small Urban	Non-Urban	
	Service Type	Urban Core	Large Urban	Medium Urban	Urban County	Urbanizing	Suburban	Emerging	Small Urban	Rural Village	Rural
Demand	Urban	✔	✔	✔	✔	✔	✔	✔	✔	✔	
	Response							✔	✔	✔	✔
Local Route Services	Fixed Route	✔	✔	✔	✔	✔	✔	✔	✔		
	Deviated Fixed Route				✔	✔	✔	✔	✔	✔	
	Circulators	✔	✔	✔	✔	✔	✔		✔		
	Urban BRT	✔	✔	✔	✔						
Regional Bus	Commuter/Express Bus	✔	✔	✔	✔	✔	✔	✔	✔	✔	
	Rural Regional								✔	✔	
	Regional BRT	✔	✔	✔	✔	✔	✔	✔			
Rail Services	Streetcar	✔	✔								
	Light Rail	✔	✔		✔						
	Heavy Rail	✔	✔		✔						
	Commuter Rail	✔	✔	✔	✔	✔	✔	✔			
	Intercity Pass. Rail	✔	✔		✔						

In addressing TDM needs, the services provided by the Commonwealth's 16 TDM agencies were arrayed against the demographic and development conditions that they are serving. These services were compared to an array of TDM strategies considered necessary to meet goals outlined in VTrans 2035 (mobility, connectivity and accessibility, economic vitality, environmental stewardship, and coordination of transportation and land use) and recommended TDM service levels (**Table 3-3**). The array of recommended strategies for various general area types in the Commonwealth is shown in **Table 3-5.** Considering expected population and employment growth through the year 2040, a targeted set of TDM strategies was identified for each PDC in the Commonwealth.

3.3.2. Transit Service Gap Analysis

In reviewing transit services currently provided across the Commonwealth and in considering how the service standards described above should be extended into the future, it is clear that mere continuation of current levels of transit service will not be sufficient if Virginia is to continue to prosper. This conclusion applies both to transit services available to the general population, such as fixed-route bus service, and to the human services life-line services that are critical to low income populations. Significant parts of the Commonwealth that are currently without any transit service have either sufficient population or development density to warrant it. Other areas, primarily Virginia's smaller cities, do provide transit service but not to levels that meet targeted standards. And as cities and towns grow over the next 30 years, some will develop size and density that warrant more aggressive service, such as greater route frequency or conversion to higher capacity services such as bus rapid transit or light rail. Recent transit visioning initiatives by citizens and stakeholders in Hampton Roads and Northern Virginia have identified multiple high-capacity transit investments that are seen to be crucial to efforts to reduce congestion, support development goals, and enhance economic opportunities for area residents.

As shown in **Figure 3-3,** significant gaps exist across the Commonwealth between transit standards and the services that are now being offered. And without increased attention, those service gaps will continue to grow, stymieing efforts to address expected population and employment growth, congestion resulting from increased urbanization, and changes in the mobility needs of our residents. Experience both here and across the nation has shown that investment in transit to close these gaps will pay dividends in terms of expanded economic opportunity, reduced congestion, and environmental stewardship. **Table 3-6** offers a sense of the increased investment needed to "grow" transit in Virginia, beyond a low-investment status quo approach which would result in a reduced percentage of trips being made by transit, to a moderate scenario that maintains current transit mode share (percentage of travellers using transit) by tracking transit spending with population growth, to a high investment scenario that seeks to expand transit mode share by reaching targeted performance standards.

These various investment scenarios will be examined in detail in the next chapter.

Table 3-5. Appropriate Statewide TDM Strategies

Service Category	Aggregated Areas	Urban	Small Urban	Suburban / Feeder		Non-Urban	
	Primary Market for TDM Strategies	Employees and Residents	Employees and Residents	Employees	Residents	Employees	Residents
Transportation Information	Retail/Mobile Store	✔					
	Call Center/Help Line	✔	✔	✔	✔	✔	✔
	Radio/TV/Paper	✔	✔	✔	✔	✔	✔
	Websites/Social Media	✔	✔	✔	✔	✔	✔
	Real-time Travel Information	✔	✔	✔	✔		✔
Employer Services	Commute Planning	✔	✔	✔		✔	
	Telework Support	✔	✔	✔		✔	
	Commuter Benefit Programs	✔	✔	✔		✔	
	CWS/AWS	✔	✔	✔		✔	
Education & Outreach	Transit Marketing	✔	✔	✔	✔	✔	✔
	Corridor-level Programs	✔	✔	✔	✔		✔
	Bike	✔	✔		✔		
	Walk	✔	✔	✔	✔		
	New Resident Kits	✔	✔		✔		
Ridesharing	Ridematching	✔	✔	✔	✔	✔	✔
	Vanpool Subsidy	✔	✔	✔		✔	
	Slug Lines	✔	✔	✔			
Infrastructure	Park & Ride Lots		✔	✔			
	Private Shuttles	✔		✔		✔	
	Carshare	✔		✔		✔	
	Bikeshare	✔					
Financial Incentives	Goal-based programs	✔	✔	✔	✔	✔	
Support Services	Guaranteed Ride Home	✔	✔	✔	✔	✔	✔
Land Use & Zoning	TDM conditions for development approval	✔	✔	✔	✔	✔	
	Parking management	✔		✔		✔	

Figure 3-3. Long Term Transit Enhancement Needs

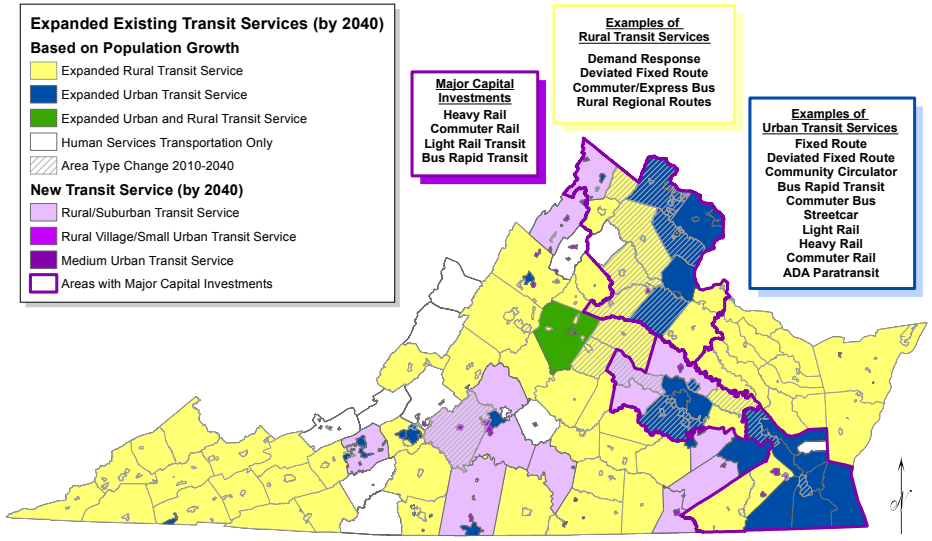


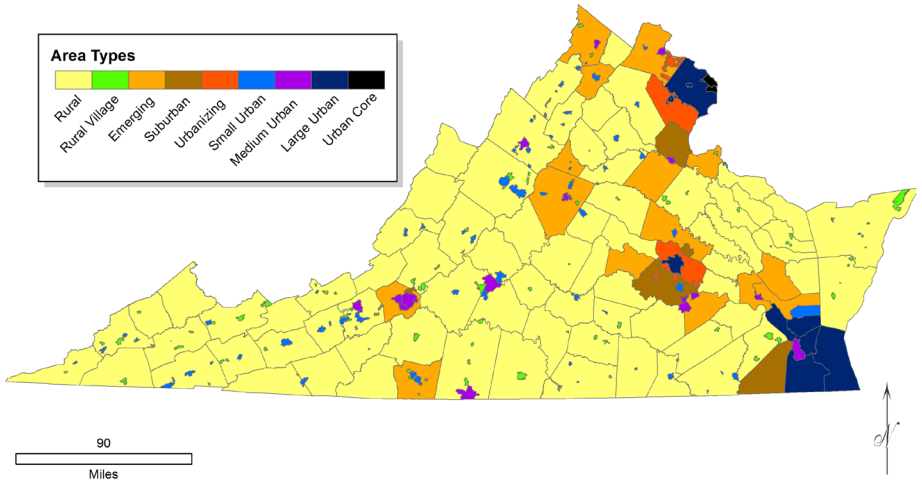
Table 3-6. Transit Needs Summary, by Scenario

	Low Investment (Loss of Mode Share)	Moderate Investment (Maintain Mode Share)	High Investment (Increased Mode Share)
Provide State of Good Repair (Vehicles to be replaced by 2040)	29,360 vehicles; facilities and fixed assets	35,053 vehicles; facilities and fixed assets	38,406 vehicles; facilities and fixed assets
Enhance Transit Capacity (Hours of service provided to meet mode share targets)	208,793,576 revenue hours	290,766,533 revenue hours	316,510,341 revenue hours

3.3.3. Targeting Transit Service Capacity Growth to Area Type

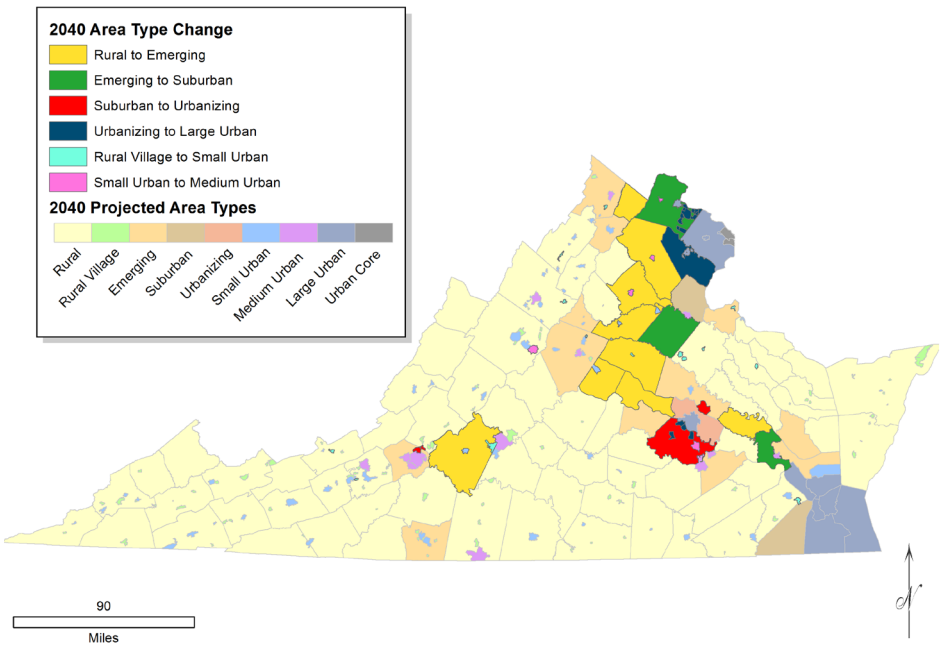
In order to identify transit gaps and needs across the Commonwealth, the Commonwealth was divided into 319 distinct areas based on 2010 Census geographies. These 319 areas have been classified into nine area type categories ranging from "Rural" to "Urban Core" based on population densities from the 2010 Census. **Figure 3-4** identifies area type classifications across the Commonwealth.

Figure 3-4. Virginia Commonwealth 2010 Area Type Designation



Each PDC (see **Figure 3-1,** 21 PDCs) across the Commonwealth contains varying numbers of area types. These area types have the potential to change from one type to another between year 2010 and 2040 resulting from population and employment growth, land use changes and other jurisdictional growth management policies. **Figure 3-5** illustrates projected changes in area type designation over the plan period.

Figure 3-5. Virginia Commonwealth 2040 Area Type Change



Transit service needs have been projected for areas not currently served as well as areas currently underserved based on population and employment densities, existing service levels, transit service performance standards, and existing area type transit mode share capture. **Table 3-7** identifies the number of areas under each area type designation, those currently served by some form of transit service, and the number of new areas identified for new transit services by year 2040.

Table 3-7. Existing and Proposed Transit Services by Area Type Designation

Area Type	Total Area Types	Area Types with Existing Transit (2012)	% of Type with Existing Transit (2012)	Area Type with Proposed New Transit (2040)	% of Type with Existing & Proposed Transit Service (2040)
Rural	74	54	73%	6	81%
Rural Village	102	61	60%	5	65%
Emerging	15	11	73%	4	100%
Suburban	7	5	71%	2	100%
Ubanizing	18	18	100%	0	100%
Small Urban	73	49	67%	18	92%
Medium Urban	17	15	88%	2	100%
Large Urban	11	11	100%	0	100%
Urban Core	2	2	100%	0	100%
Grand Total	**319**	**226**	**71%**	**37**	**82%**

3.3.4. TDM Gap Analysis

With regard to TDM services, gaps were identified for each TDM agency based on the area being served. Gaps were identified by comparing TDM strategies currently provided by the agencies to recommended strategies identified for each aggregated area type. In order to increase the impacts of the current programs and close gaps quickly and efficiently, base program enhancements were emphasized for the more commonly provided TDM strategies across all are types, such as websites/social media, employer outreach (especially telework), ridesharing, and guaranteed ride home. Gaps in provision and education about real time travel information, park-and-ride lots, private shuttles, carshare, bikeshare, and TDM conditions during development approval were highlighted in appropriate locations. Gaps in vanpool subsidy reflect the anticipated changes due to the establishment of the National Transit Database (NTD) Vanpool initiative in Northern Virginia.

Reflecting funding shortfalls, gaps are present for TDM agencies across the state, regardless of the area types. In addition, six Commonwealth PDCs currently have no TDM programs, although experience shows that even non-urban or small-town areas benefit from TDM programs. Gap closure in these areas would require establishment of new services at optimal levels for each aggregated area type. Unserved PDCs include:

- PDC 1 (Lenowisco)
- PDC2 (Cumberland Plateau)
- PDC 3 (Mount Rogers)
- PDC 13 (Southside)
- PDC 14 (Commonwealth Regional Council)
- PDC 22 (Accomack – North Hampton)

Projected TDM Gaps for Future Conditions

Optimal conditions achieved after gap closure will form the base program for the TDM agency. To maintain recommended conditions over time, the base program will need to grow in proportion with the population. Base program growth rates would be based upon population growth rates. As population grows over time, certain areas will cross the threshold and be classified as a different area type. This new classification will create a need for new or enhanced types or levels of service. The TDM programs in these areas will need to be enhanced to meet recommended levels for the new area type.

In addition to the base program, enhanced strategies may be identified to address unique conditions or goals. These enhancements may be temporary (i.e., for a specified time period) or may upgrade the base program to keep up with changing technology or transportation requirements.

In the next chapter, a series of investment strategies that might allow DRPT and its transit and TDM partners to address these service gaps will be examined. This will show that the cost of maintaining the status quo in a rapidly growing state may have a real dampening effect on efforts to address congestion, provide mobility, and enhance economic opportunity.

4. Transit Improvement Investment Scenarios and Anticipated Funding

This chapter describes the three investment themes that form the basis for the recommended transit and TDM improvements, presents the three investment scenarios developed for each theme, identifies transit and TDM needs through the year 2040, and describes anticipated funding for capital and operating costs, including funding gaps.

4.1 Investment Themes and Scenarios

The transit and TDM recommendations in Chapter 5 are informed by the planning context described in the previous chapter and based on the following three investment themes that will provide Virginia with a comprehensive approach to address its transportation challenges:

Promote State of Good Repair – The intent of the SGR element is to ensure that large asset investments made by the Commonwealth and its local transportation partners are preserved over time to allow continuing service reliability and public safety. SGR has two main components: preventative maintenance and timely replacement of equipment. Achieving SGR for Virginia's transit systems, as identified in the Federal Transit Administration useful life standards, is critical to achieving the Commonwealth's transportation goals. The estimate for SGR is based on DRPT's asset inventory and includes both current backlog and future SGR needs to address expanding services and continued replacement needs.

> *"An asset or system is in a state of good repair when no backlog of capital needs exist – hence all asset life cycle investment needs (e.g., preventative maintenance and rehabilitation) have been addressed and no capital asset exceeds its useful life."*
>
> Federal Transit Administration (FTA)

Enhance Statewide Capacity for Transit and TDM – This investment theme will expand transit and TDM services through both capital investment and operating and maintenance expenses to meet increasing demand and economic opportunity. Service capacity enhancements include:

- Extension of transit and TDM services into regions of the Commonwealth that do not currently have service however meet certain minimum thresholds for receipt of services;
- Improvement of existing services in areas that currently receive service yet fall below service standard thresholds; and
- Expansion of service to reflect anticipated population growth or evolution of some regions to area types that would benefit from more intensive levels of transit service.

Invest in Major Transit Capital Projects – Investing in rapid transit systems such as streetcars, light rail, and bus rapid transit will increase mobility options in congested urban areas. Major capital projects include capital

costs of construction, right of way acquisition, and equipment purchase (both rolling stock and supporting systems), plus continued operating and maintenance costs, to address high-capacity needs in heavily developed areas of the Commonwealth. For this analysis, completed transit vision plan recommendations from Richmond and the Hampton Roads region, plus the Super NoVa Transit/TDM Vision Plan recommended transit network, have been taken into consideration. Because actual technologies have not been determined for many project corridors, a range of major capital investments has been developed, reflecting a likely low to high range of technology costs for any given corridor.

For each of the three investment themes described above, three investment scenarios have been developed. The investment scenarios are named to reflect their relative level of investment, with increasing levels of investment having a correspondingly higher impact on increasing transit mode share (i.e., the percentage of travellers using transit), as follows:

Low Investment Scenario (Loss of Mode Share) – This scenario assumes minimal investment in transit and TDM services. Transit capacity expansion consists of improvements identified in each transit operator's six-year Transit Development Plan (TDP) through 2018. No additional transit expansion is assumed beyond 2018. This scenario addresses SGR needs for existing facilities and vehicles and any new facilities and vehicles associated with new service that is identified in TDPs. It also includes major transit capital projects currently under development. For TDM, it continues existing programs, growing existing TDM agency budgets to reflect expected inflation rates.

Moderate Investment Scenario (Maintain Mode Share) – This scenario includes expansion of transit capacity to meet service needs associated with population growth and increasing urbanization through 2040. It addresses SGR for all existing and future vehicles and facilities. It also includes major transit capital projects, assuming lower cost solutions (e.g., BRT) where applicable. For TDM, it includes extension of services into geographic areas not currently receiving TDM service, at levels consistent with average services of existing programs, and grows TDM services at the rate of population growth.

High Investment Scenario (Increased Mode Share) – This highest investment scenario includes all investments in the Moderate Investment Scenario, plus additional capacity enhancements that are designed to increase transit modal share. Major transit capital projects assume higher cost alternative solutions (e.g., light rail and commuter rail instead of BRT or express bus) where applicable. For TDM, this scenario funds new or improved TDM strategies consistent with recommended area-type programs, in addition to the investments in the Moderate Investment Scenario.

4.2 Transit Funding Needs

This section discusses the transit needs identified for each investment theme under each of the investment scenarios, as well as the capital and operating costs developed for each option.

4.2.1 State of Good Repair

State of Good Repair is a nationwide challenge for all modes of transportation, and achieving and maintaining SGR is a particular focus of attention of many states and localities. Funding for system expansion often takes precedence over asset maintenance and replacement. Funding limitations have frequently compelled transit operators to defer all but critical maintenance in order to provide more service.

DRPT collects inventory data from transit operators, which provides the basis for determining total vehicle replacement need. Backlog replacements are based on a combination of vehicles that exceeded their useful life as of 2011 as well as the level of ongoing replacement needed to keep additional assets from exceeding their useful life in 2012. Ongoing replacements keep the state's transit fleet from exceeding its useful life once the backlog is addressed. Based on review of DRPT's statewide asset inventory, which includes a total of 5,552 vehicles, 1,926 vehicles, including buses, rail cars, vans, support vehicles, and Virginia's share of WMATA vehicles, are in need of replacement as of FY 2012 (**Table 4-1**). This equates to an SGR backlog that includes nearly 35 percent of the total asset inventory. In addition, the total fleet will need to be scheduled for regular replacement through FY 2040. Without this investment over the next 28 years, the average age of transit assets

will increase. Transit operators will face higher average maintenance costs on these older assets, and the operators may be forced to consider service reductions or fare increases to cover the added costs.

Transit needs associated with the SGR investment theme consist of three elements: 1)addressing the backlog of existing equipment and facilities that are beyond their useful lifecycles, 2)preventative maintenance and rehabilitation of existing equipment and facilities, and 3)maintaining SGR for new assets added to the inventory (e.g., new service expansion buses). Vehicle replacement needs for the SGR investment theme under each investment scenario are shown in **Table 4-1.**

Table 4-1. State of Good Repair Vehicle Replacement Needs

Investment Scenario	Backlog	Ongoing Replacement by Interval Period					Total
	2012	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2012-2040
Low	1,926	5,107	6,684	5,727	4,943	4,973	29,360
Moderate	1,926	5,107	7,118	7,144	6,852	6,907	35,053
High	1,926	5,107	7,303	7,887	7,794	8,389	38,406

Simply bringing existing assets into SGR is a start, but it will not be adequate for the Commonwealth in the long term. Virginia's population is projected to grow significantly between now and 2040. If no additional transit service is added, current capacity will be saturated and many people who would normally be attracted to transit will find other means to travel, putting increased pressure on highways and other infrastructure. This context forms the basis for the next investment theme – expanding statewide transit capacity.

4.2.2 Transit Capacity Enhancements

Supporting existing service is only a first step in planning for Virginia's public transportation future. As highlighted in Chapter 3, Virginia's population is projected to grow by 37 percent between 2010 and 2040, putting significant pressure on transit operators to increase service. Even maintaining transit's current mode share with a larger population base will require transit operators to significantly expand their service capacity. Concentrated population growth in the Northern Virginia, Richmond, and Hampton Roads areas will put particular strain on the carrying capacity of those regions' transit systems unless investment is made to expand them.

In 2010, there were nearly 181 million transit trips made in Virginia, or an average of nearly 23 transit trips per person. Applying this same level of transit usage (which is a very conservative estimate, especially in urbanized areas) to the projected population in 2040 results in over 244 million transit trips in 2040. This level of transit trip demand will far exceed the capacity of existing transit services. In fact, transit use in 2012 has already increased to more than 24 trips per person (see **Table 4-3**). In addition, a recent analysis of the carrying capacity of transit service in Northern Virginia found that a number of bus routes and Metrorail lines already exceed capacity when arriving at major transfer stations during peak travel periods.

WMATA is addressing the long-term need to increase its system carrying capacity through its Beyond Metro Matters program. The current goal, according to the 2011 Metrorail Fleet Management Plan (version 4B, October 2011), is to achieve eight-car configurations (the largest carrying capacity permitted by the length of the platforms in the system's stations) for 75 percent of Metrorail trains by 2018 (with purchase of 130 Series 7000 cars) and one hundred percent by 2019 (with purchase of 90 additional Series 7000 cars). In 2013, WMATA drafted *Momentum,* a strategic plan that will guide Metro's decisions over the next ten years. One of the capital initiatives presented in the plan is to operate all eight-car trains during rush hour by acquiring additional railcars, power capacity, and railcar storage. This will allow trains to carry 35,000 more passengers per hour during peak periods, which is equivalent to building 18 new lanes of highways into Washington, D.C.

The Transit Capacity Enhancement investment theme further refines the gap analysis described in the previous chapter to identify existing and new transit service needs through 2040. Several transit operators have put in place ambitious plans to increase carrying capacity with additional expansion buses or more scheduled trips, as reflected in their TDPs. For the Low Investment Scenario, TDP improvements identified

in fiscally constrained plans are implemented through 2018. Following implementation of these identified improvements, transit service levels are held constant through 2040.

The Moderate Investment Scenario for this theme includes improvements identified in the TDPs (same as Low Investment Scenario), as well as growth that tracks with projected population growth based on existing transit revenue hours per capita. Additional service is allocated in areas that are currently underserved based on the average revenue hours per capita for the area type. New service is allocated in areas not currently served by transit if an area meets the average population and population density of similar area types in the Commonwealth that are served by transit. In addition, new service is allocated to areas that do not meet minimum population and population density criteria, but have a high percentage of minority or low-income populations. This is important because in many small urban and rural areas, transit provides critical services that are an economic lifeline to key population segments, including many with limited or no access to automobiles. Service to these populations provides vital access to medical care, social services, and employment.

The High Investment Scenario has the same criteria as the Moderate Investment Scenario, but additional investments are applied in areas with above average performance (i.e., area types in the top 50% in terms of current riders per hour). **Table 4-2** shows the public transit and human services revenue hours associated with each investment scenario. The Moderate Investment Scenario represents a 39 percent increase in total revenue hours over the Low Investment Scenario, while the High Investment Scenario represents a 52 percent increase.

A comparison of existing public transit ridership by PDC to projected ridership for each of the three investment scenarios for milestone year 2040 is shown in **Table 4-3.** As shown in the table, all but four PDCs would see a decrease in per capita ridership in 2040 under the Low Investment Scenario, with the most significant decrease occurring in Northern Virginia (loss of over 15 riders per capita). Riders per capita remain constant or increase for all PDCs under the Moderate and High Investment Scenarios. Figure 4-1 graphically depicts the overall projected ridership per capita in 2040 for each investment scenario compared to existing (2012) riders per capita. There is a decrease in riders per capita in 2040 for the Low Investment Scenario, compared to the existing measure of 24.3 riders per capita. Riders per capita increase to 30.2 and 33.9 for the Moderate and High Investment Scenarios, respectively.

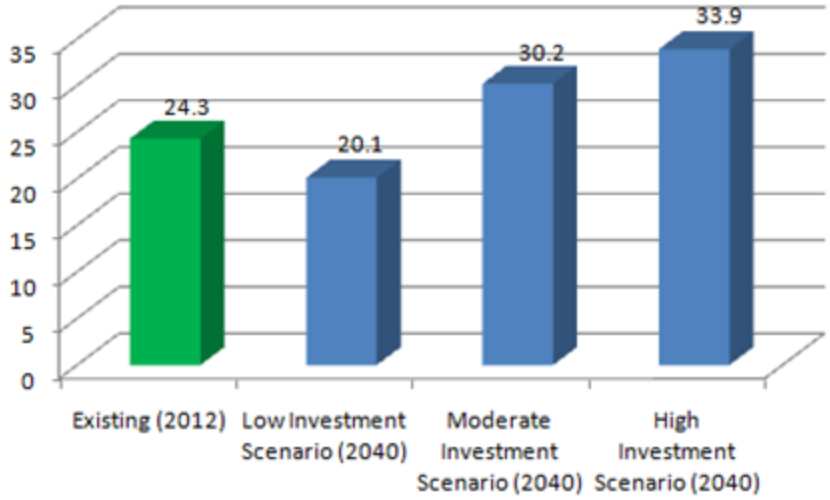
Table 4-2. Transit Capacity Enhancements - Total Revenue Hours by Investment Scenario

Investment Scenario	Service	Total Revenue Hours by Interval Period					Total	% Change over Loss of Mode Share
		2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040	
Low	Public Transit	36,194,013	37,796,962	37,796,962	31,497,468	31,497,468	174,782,872	N/A
	Human Services	7,288,008	7,288,008	7,288,008	6,073,340	6,073,340	34,010,704	N/A
	Total	**43,482,021**	**45,084,970**	**45,084,970**	**37,570,808**	**37,570,808**	**208,793,576**	**N/A**
Moderate	Public Transit	37,053,036	48,875,689	57,931,437	51,508,391	54,938,224	250,306,776	43%
	Human Services	7,676,839	8,246,147	8,746,045	7,694,003	8,096,723	40,459,757	19%
	Total	**44,729,875**	**57,121,835**	**66,677,482**	**59,202,394**	**63,034,945**	**290,766,533**	**39%**
High	Public Transit	40,063,449	54,754,449	64,514,828	56,684,455	60,033,404	276,050,584	58%
	Human Services	7,676,839	8,246,147	8,746,045	7,694,003	8,096,723	40,459,757	19%
	Total	**47,740,288**	**63,000,596**	**73,260,596**	**64,378,458**	**68,130,126**	**316,510,341**	**52%**

Table 4-3. Projected Ridership and Riders per Capita – Milestone Year 2040 Compared to Existing

PDC	PDC Name	Existing (2012)		Annual Riders by Investment Scenario - Milestone Year 2040					
				Low		Moderate		High	
		Riders	Riders per Capita	Riders	Riders per Capita	Riders	Riders per Capita	Riders	Riders per Capita
1	Lenowisco	57,136	0.6	57,604	0.6	57,860	0.6	58,997	0.6
2	Cumberland Plateau	178,561	1.6	190,767	1.6	197,960	1.7	217,727	1.8
3	Mt. Rogers	290,178	1.5	293,729	1.5	380,504	1.9	435,299	2.2
4	New River Valley	3,691,015	20.7	5,837,719	28.5	6,578,837	32.1	7,596,293	37.1
5	Roanoke Valley – Alleghany	2,468,247	9.0	3,224,178	10.8	3,496,699	11.7	3,751,561	12.5
6	Central Shenandoah	2,022,459	7.1	2,610,526	7.2	3,826,231	10.6	4,402,646	12.2
7	Northern Shenandoah	135,280	0.6	194,307	0.5	1,163,598	3.3	1,262,522	3.6
8	Northern Virginia	144,435,414	64.8	164,112,064	49.6	235,418,066	71.1	269,517,246	81.4
9	Rappahannock – Rapidan	72,095	0.4	76,999	0.3	756,920	2.5	803,580	2.6
10	Thomas Jefferson	2,659,221	11.3	3,296,719	9.4	4,119,572	11.8	4,564,997	13.1
11	Region 2000	3,040,447	12.0	3,145,195	10.5	3,729,098	12.5	4,291,614	14.3
12	West Piedmont	288,166	1.2	367,433	1.4	809,473	3.1	816,834	3.1
13	Southside	14,085	0.2	14,331	0.2	80,697	0.9	85,892	1.0
14	Commonwealth Regional Council	161,200	1.5	164,893	1.4	268,371	2.2	304,058	2.5
15	Richmond Regional	13,528,521	13.5	17,655,110	12.4	27,082,209	19.0	29,841,804	21.0
16	George Washington Regional	1,449,736	4.4	1,935,090	2.8	5,088,542	7.5	5,523,592	8.1
17	Northern Neck	58,541	1.2	58,541	1.0	66,065	1.1	66,439	1.1
18	Middle Peninsula	87,173	1.0	87,173	0.7	110,737	0.9	118,155	0.9
19	Crater	661,116	4.0	724,044	3.3	2,320,354	10.5	2,446,088	11.1
22	Accomack – Northampton	74,012	1.6	68,335	1.2	91,224	1.7	101,889	1.9
23	Hampton Roads	18,732,181	11.5	15,866,569	7.9	35,007,176	17.3	35,575,034	17.6
	Total	**194,104,785**	**24.3**	**219,981,326**	**20.1**	**330,650,193**	**30.2**	**371,782,268**	**33.9**

Figure 4-1. Projected 2040 Riders per Capita by Investment Scenario Compared to Existing (2012)



4.2.3 Major Transit Capital Projects

The third investment theme responds to the demands of a growing population and economy by providing investment in major rapid transit capital projects, with a focus on managing congestion and increasing transit market share. Without this investment, Virginia's efforts to manage congestion in urban areas will be dramatically limited. Investments in major rapid transit capital projects, including modes such as Metrorail, BRT, light rail, streetcar, and commuter rail, are focused on attracting significant numbers of new riders to public transit.

As mentioned previously, major transit capital projects considered in this analysis include recommendations from vision plans completed for Richmond and the Hampton Roads region, as well as recommendations developed for Northern Virginia as part of the Super NoVa study. The Low Investment Scenario only includes major capital projects that are currently under development (Metrorail Dulles Corridor, Crystal City-Potomac Yard Streetcar, Columbia Pike Transit Project, HRT TIDE Extension to Virginia Beach, and the Richmond Broad Street BRT).

For the Moderate Investment Scenario, capital projects identified in the vision plans for Richmond and Hampton Roads are included in the timeframes for implementation identified in the vision plans. Projects identified for Northern Virginia are phased in equally over the 28-year planning period of this plan (through 2040). For corridors that have yet to be formally studied and for which a modal technology has not been selected, the Moderate Investment Scenario assumes the low end of the technology range (e.g., BRT). The High Investment Scenario includes the same major capital projects as the Moderate Investment Scenario, but it assumes the high end of the technology range (e.g., light rail transit and commuter rail) for unstudied corridors.

4.2.4 Transit Costs

Each of the three investment themes results in increased capital and operating costs. Capital costs include both capital costs needed to expand capacity and complete major capital projects, and to replace existing infrastructure and rolling stock that has reached the end of its expected service life. Operating and maintenance costs include those expenses that must be incurred to provide new and ongoing services for both capacity enhancements and major capital projects. **Tables 4-4** and **4-5** present the transit capital and operating costs, respectively, for each investment scenario over the life of the plan (through 2040).

Table 4-4. Summary of Transit Capital Costs 2013-2040 (Millions YOE* $)

Investment Scenario	State of Good Repair	Transit Capacity	Major Transit Capital Projects	Total
Low	$10,617	$1,057	$4,300	$15,974
Moderate	$11,398	$1,997	$29,038	$42,432
High	$11,599	$2,135	$40,396	$54,130

*Year of Expenditure

Table 4-5. Summary of Transit Operating Costs 2013-2040 (Millions YOE* $)

Investment Scenario	State of Good Repair	Transit Capacity Enhancements	Major Transit Capital Projects	Total
Low	n/a	$38,358	$5,393	$43,751
Moderate	n/a	$54,735	$6,553	$61,288
High	n/a	$60,965	$6,612	$67,577

*Year of Expenditure

4.3 TDM Funding Needs

TDM is an increasingly important support element of the transportation system in Virginia and throughout the United States. It focuses on the provision of commuter services, strategies, and policies aimed at reducing the need to drive alone, or to drive at all. Better management of peak transportation demand can alleviate pressures on both roadways and transit systems without additional capital expense.

TDM needs were developed for each investment scenario, as shown in **Table 4-6.** The Low Investment Scenario maintains existing TDM programs (described in Chapter 2) based on the most recent budget available for each program with no expansion of services. These costs were escalated to year of expenditure dollars at 3% per year (inflation) through 2040 to calculate costs for the Low Investment Scenario.

The Moderate Investment Scenario closes geographic gaps to provide TDM services statewide while maintaining existing service levels. In addition, TDM services are increased to keep pace with projected population growth and associated area type changes over time. For areas that currently have TDM services, the operating budgets for existing TDM program as calculated in the Low Investment Scenario were used to estimate the cost to maintain existing service levels in these areas. These costs were escalated by the projected annual rate of population increase for the PDC in which each program operates. For areas that do not currently have TDM services, an average cost of existing TDM services for each area type was applied to area types in unserved areas. The total annual cost for each PDC was escalated to year of expenditure dollars using a 3% annual rate of inflation.

The High Investment Scenario includes the investments as the Moderate Investment Scenario, but increases TDM services to recommended service levels based on area type. New per capita TDM costs were calculated for the High Investment Scenario to close service gaps identified in existing programs.

4.4. Summary of Transit and TDM Funding Needs

Total funding needs through 2040 for the transit and TDM investment themes described above range from $60 billion for the Low Investment Scenario to $123 billion for the High Investment Scenario. **Table 4-7** summarizes the capital and operating costs associated with each investment theme and investment scenario, for both transit and TDM.

4.5. Anticipated Funding and Funding Gaps

The previous sections in this chapter define three investment scenarios as possible long-term strategies for addressing transit needs in the Commonwealth. The discussion of transit and TDM needs focused on total capital and operating costs, regardless of funding source. This section further analyzes the needs in order to understand the funding that is currently available, as well as the funding gaps that would result for each scenario if additional revenue sources are not identified. Operating and capital funding are discussed separately since these categories have difference revenue sources at the state level and are generally managed separately by most transit operators.

The federal government provides formula-based funding and discretionary funding for public transportation through programs administered by FTA. Formula grant programs establish how much funding a grantee receives as determined by formula (established in law or administratively), while discretionary grant programs are given to a grantee by Congress or FTA based on competition. There are a number of federal funding sources that are used for planning, capital, and operating assistance for transit systems in Virginia. The only ongoing

Table 4-6. TDM Costs by PDC for Each Investment Scenario (Thousands YOE* $)

PDC	PDC Name	2013 Annual Costs			2013 - 2040 Total Costs		
		Low	Moderate	High	Low	Moderate	High
1**	Lenowisco	$0	$65	$138	$0	$2,792	$5,946
2**	Cumberland Plateau	$0	$79	$167	$0	$3,450	$7,340
3**	Mount Rogers	$0	$134	$285	$0	$5,873	$12,530
4**	New River Valley	$58	$58	$378	$2,471	$2,690	$17,469
5	Roanoke Valley - Alleghany	$58	$58	$846	$2,471	$2,605	$37,818
6	Central Shenandoah	$94	$96	$562	$4,023	$4,635	$30,223
7	Northern Shenandoah	$174	$182	$469	$7,482	$9,889	$26,043
8	Northern Virginia	$12,968	$12,968	$16,329	$551,443	$634,674	$887,147
9	Rappahannock-Rapidan	$120	$127	$263	$5,160	$7,447	$20,607
10	Thomas Jefferson	$94	$97	$525	$4,023	$5,113	$27,496
11	Region 2000	$58	$59	$567	$2,471	$2,741	$27,327
12**	West Piedmont	$0	$248	$505	$0	$10,893	$22,522
13**	Southside	$0	$59	$126	$0	$2,529	$5,386
14**	Commonwealth Regional Council	$0	$73	$156	$0	$3,386	$7,208
15	Richmond Regional	$1,742	$1,802	$2,450	$74,805	$92,374	$130,864
16	George Washington Regional	$728	$779	$751	$31,257	$48,250	$47,074
17	Northern Neck	$66	$67	$75	$2,815	$3,086	$3,484
18	Middle Peninsula	$74	$74	$159	$3,177	$3,756	$8,158
19**	Crater	$0	$203	$462	$0	$10,717	$22,439
22**	Accomack - Northampton	$0	$32	$68	$0	$1,510	$3,212
23	Hampton Roads	$1,093	$1,116	$6,077	$46,912	$53,531	$287,328
	Total	**$17,326**	**$18,378**	**$31,359**	**$738,510**	**$911,943**	**$1,637,619**

*Year of Expenditure
**No existing TDM programs in these PDCs

project receiving federal major capital funding within Virginia is the current construction of Phase I of the Dulles Corridor Metrorail Project, which will extend WMATA's Metrorail system from the Orange Line in Fairfax County to Tysons Corner. The total federal commitment (including Phase 2 that will extend the Metrorail to Dulles Airport/Route 772) is approximately $975 million, or roughly sixteen percent of the total project budget.

State sources of funding for public transportation, including grant programs, taxes, and bond funds, are used to support capital, operating, and planning expenses.

Local funds are one of the key sources of funding for transit, both capital and operating expenditures. Typically, these funds come from the general funds of the jurisdiction(s) in which the service operates. The source revenue for jurisdiction general funds are generally property taxes, local sales taxes, and to a smaller degree meal and cigarette taxes. In Northern Virginia, there is a gas tax (2% of retail price of motor fuel) dedicated to transportation. In Alexandria, Arlington, the City of Fairfax, Fairfax County, and Falls Church, this tax is dedicated to the local responsibility for WMATA. In the other jurisdictions, the amount of gas tax revenue dedicated to transit varies by jurisdiction. Fare revenues are another source of local funding for public transportation.

Table 4-7. Summary of Transit and TDM Capital and Operating Costs 2013-2040 (millions YOE* $)

Investment Scenario	State of Good Repair	Transit Capacity Enhancements	TDM Enhancements	Major Transit Capital Projects	Total
Capital Costs					
Low	$10,617	$1,057	—	$4,300	$15,974
Moderate	$11,398	$1,997	—	$29,038	$42,432
High	$11,599	$2,135	—	$40,396	$54,130
Operating Costs					
Low	—	$38,358	$739	$5,393	$44,489
Moderate	—	$54,735	$912	$6,553	$62,201
High	—	$60,965	$1,638	$6,612	$69,215
Grand Total					
Low	$10,617	$39,414	$739	$9,694	$60,464
Moderate	$11,398	$56,732	$912	$35,591	$104,633
High	$11,599	$63,100	$1,638	$47,007	$123,344

*Year of Expenditure

4.5.1 Operating Fund Forecast

Virginia transit operators receive their operating funding from a variety of sources, including passenger fares, support from federal and state grants, local government funding, and certain ancillary sources such as advertising revenue. The Commonwealth is an important partner in funding transit operations. Currently, the state provides formula-based funding from two primary sources – a portion of Virginia's Transportation Trust Fund (TTF) and a dedicated portion of the state recordation tax.

Prompted by legislation first introduced by Governor McDonnell, the General Assembly enacted a transportation funding bill that is anticipated to raise millions of dollars a year for mass transit, passenger rail, and roads construction and maintenance. Transportation legislation (HB 2313), signed by the Governor in the spring of 2013, will (in general terms):

- Replace the 17.5 cent per gallon tax on gasoline with a 3.5% tax on gasoline and a 6.0% tax on diesel fuel at the wholesale level.
- Raise the state sales and use tax from 5% to 5.3% and designate the increased revenues for the Commonwealth Mass Transit Fund, the Intercity Passenger Rail Operating and Capital Fund, and the Highway Maintenance and Operating Fund.
- Increase the motor vehicle sales tax (the "titling tax") over time, from 3.0% to 4.15%.
- Increase the amount of general fund revenue paid to transportation over time, from 0.5% to 0.675%.
- Apply regional taxing provisions to any planning district commission meeting certain thresholds including population, registered vehicles and transit ridership.
- Prohibit tolling on I-95 south of Fredericksburg pursuant to the Interstate System Reconstruction and Rehabilitation Pilot Program without General Assembly approval.
- Impose a $64 annual registration fee on alternative fuel vehicles and hybrids.
- Draw funds for transportation from future internet sales tax proceeds if Congress passes the Marketplace Equity Act. If the Act fails, the revenue would be replaced through an additional 1.6% tax applied to the wholesale gasoline tax.
- Ensure transportation funds generated by the bill are used only for transportation.

Based on a 1986 allocation adopted by a special session of the Virginia legislature, 14.7 percent of Virginia's TTF is allocated to transit. According to the Code of Virginia at the time that the Statewide Transit and TDM funding analysis was conducted, the TTF revenue was allocated to operating (73.5%), capital (25%), and special programs (1.5%). The trust fund was expected to provide $110.3 million in operating revenue in FY 2013. Virginia also allocates a portion of the recordation tax to transit operations. This tax source was expected to generate approximately $25 million in FY 2013.

In addition to HB2313, the 2013 General Assembly passed Senate Bill 1140 (SB1140), which requires the Commonwealth Transportation Board (CTB) to allocate revenues generated for the Commonwealth Mass Transit Trust Fund for 2014 and succeeding years.

The Commonwealth Mass Transit Trust Fund is directed to implement performance-based funding for mass transit for revenues generated above $160 million in 2014 and after. SB1140 creates a Transit Service Delivery Advisory Committee (TSDAC) to advise DRPT on the distribution of such funds and how transit systems can incorporate the metrics into their transit development plans.

The transit funding portion of SB1140 is drafted as follows:

- Funds are to be distributed among operating, capital, and special projects in order to respond to the needs of the transit community;
- At least 72 percent is to be allocated to support operating costs of transit providers and distributed by the CTB based on service delivery factors, based on effectiveness and efficiency, as established by the CTB;
- Funds for special programs, which include ridesharing, transportation demand management assistance, are not to exceed 3 percent of the funds and may be allocated to any local governing body, planning district commission, transportation district commission, or public transit corporation, or maybe used directly by DRPT;
- 25 percent of the funds are to be allocated and distributed utilizing a tiered approach evaluated by the TSDAC along with the Director of DRPT and established by the CTB for capital purposes based on asset need and anticipated state participation level and revenues;
- The CTB may consider transfer of funds capital and special projects to operating assistance in times of economic distress or statewide special need
- The DRPT may reserve a balance of up to five percent of the Commonwealth Mass Transit Fund revenues in order to assure better stability in providing operating and capital funding to transit entities from year to year;

The TSDAC consists of two members appointed by the Virginia Transit Association, one member appointed by the Community Transportation Association of Virginia, one member appointed by the Virginia Municipal League, one member appointed by the Virginia Association of Counties, and three members appointed by the DRPT Director, to advise the Department in the development of a distribution process for the funds allocated based on performance and tiering, as well as how the transit systems can incorporate these metrics in their transit development plans. The TSDAC is directed to meet at least annually and hold at least one public hearing. Prior to the CTB approving the service delivery factors, the Director of DRPT along with the Chair of the TSDAC briefs the Senate Committee on Finance, the House Appropriations Committee, and the Senate and House Committees on Transportation on its findings and DPRT's recommendations. Before redefining any component of the service delivery factors, the CTB consults with the Director of DRPT, the TSDAC, and interested stakeholders and provides for a 45-day public comment period. Prior to approval of any amendment to the service delivery measures, the CTB is directed to notify the aforementioned committees of the pending amendment to the service delivery factors and its content.

The financial analysis for this study used the 1986 allocation model and funding revenues to forecast transit operating revenue from state sources in FY 2013 of $150 million. Operating revenues from federal and local sources in FY 2013 are estimated at $77.8 million and $642.5 million, respectively. A summary of operating revenues over the life of the plan (2013-2040) is presented in **Table 4-8.** Note that local operating revenues vary slightly by investment scenario based on the increased fare revenues anticipated from enhanced services.

Table 4-8. Summary of Operating Revenues by Source ($ millions)*[1]

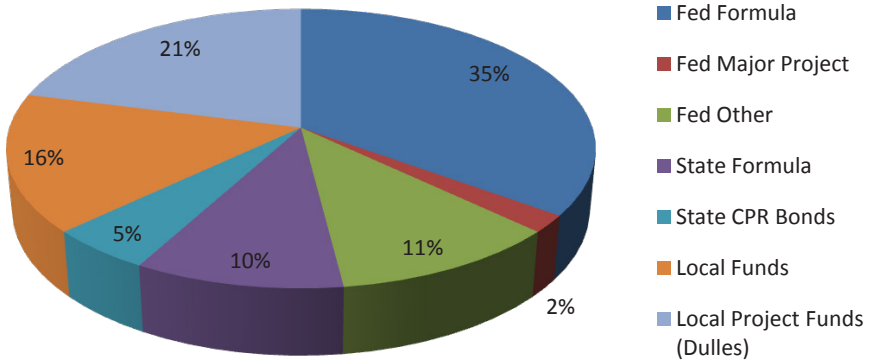
Investment Scenario	Period Interval[2]					Total
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
Federal Total	$429.1	$466.3	$531.2	$497.8	$552.8	$2,477.2
State Total	$828.6	$929.0	$1,058.1	$991.6	$1,101.2	$4,908.6
Local Total – Low Investment Scenario	$4,076.5	$4,726.0	$5,425.9	$5,085.2	$5,647.3	$24,960.8
Local Total – Moderate Investment Scenario	$4,081.3	$4,925.3	$6,444.4	$6,348.7	$7,295.0	$29,094.6
Local Total – High Investment Scenario	$4,124.4	$5,116.9	$6,775.4	$6,651.5	$7,605.7	$30,273.8
Grand Total – Low Investment Scenario	**$5,334.3**	**$6,121.3**	**$7,015.1**	**$6,574.6**	**$7,301.3**	**$32,346.6**
Grand Total – Moderate Investment Scenario	**$5,339.1**	**$6,320.6**	**$8,033.6**	**$7,838.1**	**$8,949.0**	**$36,480.4**
Grand Total – High Investment Scenario	**$5,382.2**	**$6,512.2**	**$8,364.6**	**$8,140.9**	**$9,259.7**	**$37,659.6**

*Revenues are presented in future year dollars.
[1] NOTE: State funding projections shown do not include revenue generated from HB2313.
[2] NOTE: The first three intervals are 6-year intervals, while the last two intervals are 5-year intervals.

4.5.2 Capital Fund Forecast

Capital funding for Virginia's transit operators comes from a variety of sources, including support from federal and state grants, local government funding, and dedicated gas tax revenues (in the case of Northern Virginia). Overall capital funding projected over the life of this plan is shown in **Figure 4-2.**

Figure 4-2. Capital Revenues by Source, 2013-2040



The state provides important capital funding support to transit operators, enabling them to leverage federal and local resources. The state capital program has two major funding categories – the capital portion of the TTF allocation and transportation funding bonds. The TTF is projected to support capital allocations of approximately $35 million in FY 2013. The state bond program is authorized to issue up to $3 billion of bonds, the proceeds of which may be used for highway and transit projects. Based on current allocations, DRPT projects $172 million in bond proceeds in FY 2013.

For capital assistance funding in 2014 and beyond, 25% will be distributed utilizing a tiered approach based on asset need and anticipated state participation level and revenues. The tier distribution may be evaluated by the TSDAC and the DRPT Director every three years.

State capital revenue forecasts for FY 2012 totalled nearly $207 million. Capital assistance from federal and local sources in FY 2013 is estimated at $290.3 million and $984.9 million, respectively. It is important to note that the near-term local jurisdictional transit capital revenue forecasts include local funding for the Dulles Corridor Metrorail Project; local capital revenue forecasts decrease significantly after FY

2018. A summary of capital revenues over the life of the plan (2013-2040) is presented in **Table 4-9.**

Table 4-9. Summary of Capital Revenues by Source ($ millions)*[1]

	Period Interval[2]					Total
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
Federal Total	$1,369.3	$1,154.7	$1,315.2	$1,232.6	$1,368.8	$6,440.6
State Total	$958.5	$247.4	$281.8	$264.1	$293.3	2,045.0
Local Total	$3,177.9	$404.3	$460.5	$431.6	$479.3	$4,953.5
Grand Total	**$5,505.7**	**$1,806.4**	**$2,057.5**	**$1,928.2**	**$2,141.3**	**$13,439.1**

*Revenues are presented in future year dollars.
[1] NOTE: State funding projections shown do not include revenue generated from HB2313.
[2] NOTE: The first three intervals are 6-year intervals, while the last two intervals are 5-year intervals

4.5.3 Funding Gaps

This section compares the revenue forecasts described above with the capital and operating expense projections developed for each investment scenario to estimate the unconstrained funding gaps. Even with the new transportation revenues, the projected revenues are not sufficient to outweigh the gap.

Operating Expenses

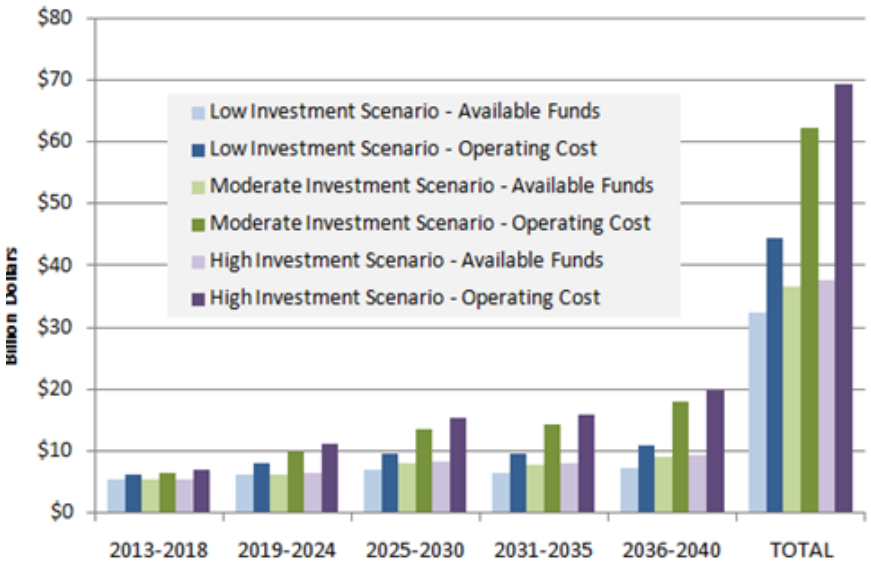
Operating deficits exist across all investment scenarios for all funding sources. Increases in operating costs from the Low (Loss of Mode Share) to the Moderate (Maintain Mode Share) to the High (Increased Mode Share) Investment Scenarios result in increased deficits on an annual basis across the plan period through year 2040. **Table 4-10** presents a comparison of operating gaps by investment scenario by funding source. Overall, the operating funding gap increases by 112 percent between the Low and Moderate Investment Scenarios, and by another 23 percent between the Moderate and High Investment Scenarios. The operating funding gaps are shown graphically on **Figure 4-3.**

Table 4-10. Summary of Operating Cost Funding Gap by Funding Source, by Investment Scenario (million YOE*$)[1]

Funding Source by Investment Scenario	Period Interval[2]					Full Plan (2013-2040)	
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	Total	Annual Average
Federal							
Low	$(4)	$(93)	$(138)	$(158)	$(207)	$(601)	$(21)
Moderate	$(24)	$(241)	$(437)	$(512)	$(717)	$(1,932)	$(69)
High	$(61)	$(323)	$(546)	$(612)	$(832)	$(2,374)	$(85)
State							
Low	$(562)	$(872)	$(1,105)	$(1,136)	$(1,376)	$(5,050)	$(180)
Moderate	$(600)	$(1,248)	$(1,917)	$(2,126)	$(2,830)	$(8,722)	$(311)
High	$(785)	$(1,579)	$(2,346)	$(2,536)	$(3,313)	$(10,560)	$(377)
Local							
Low	$(333)	$(1,001)	$(1,416)	$(1,617)	$(2,125)	$(6,492)	$(232)
Moderate	$(440)	$(2,107)	$(3,236)	$(3,768)	$(5,515)	$(15,067)	$(538)
High	$(814)	$(2,786)	$(4,051)	$(4,530)	$(6,440)	$(18,621)	$(665)
Total							
Low	$(899)	$(1,967)	$(2,659)	$(2,910)	$(3,707)	$(12,143)	$(434)
Moderate	$(1,064)	$(3,597)	$(5,590)	$(6,406)	$(9,063)	$(25,720)	$(919)
High	$(1,660)	$(4,689)	$(6,943)	$(7,678)	$(10,586)	$(31,555)	$(1,127)

* Year of Expenditure
[1] NOTE: State funding projections shown do not include revenue generated from HB2313.
[2] NOTE: The first three intervals are 6-year intervals, while the last two intervals are 5-year intervals.

Figure 4-3. Operating Cost vs. Available Funds by Investment Scenario



The state has historically provided at least 20 percent of each agency's reported operating expenses. However, under all three investment scenarios, annual operating expenses increase at a greater rate than available state operating revenues, resulting in a lower state share of operating expenses, averaging between 8 and 11 percent. **Table 4-11** illustrates the reduced level of state operating assistance as a percentage of total operating costs for each investment scenario. Decreasing state share percentages result from two primary causes - revenues increasing at a slower rate than costs, and service level increases related to transit capacity enhancements designed to meet future travel needs. This table also identifies state funding needs to achieve the recommended minimum state share of 20 percent of eligible operating expenses, which ranges from $4.0 billion for the Low Investment Scenario to $8.7 billion for the High Investment Scenario.

Table 4-11. Commonwealth Operating Assistance – State Percentage Share of Total Operating Expenses and State Funding Needed to Meet 20% Recommended Minimum[1]

Investment Scenario	Period Interval[2]					Full Plan (2013-2040)	
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	Total	Annual Average
State Funding Percent of Operating Costs							
Low	13.5%	11.5%	10.9%	10.5%	10.0%	11.4%	11.4%
Moderate	13.1%	9.5%	7.8%	7.0%	6.1%	8.9%	8.9%
High	12.0%	8.4%	6.9%	6.3%	5.6%	8.0%	8.0%
State Funding Need to reach 20% of Eligible Costs – Million YOE* $ (Recommended Minimum)							
Low	$420	$688	$875	$902	$1,095	$3,980	$142
Moderate	$453	$1,051	$1,658	$1,845	$2,482	$7,488	$267
High	$562	$1,282	$1,964	$2,128	$2,810	$8,745	$312

* Year of Expenditure
[1] NOTE: State funding projections shown do not include revenue generated from HB2313.
[2] NOTE: The first three intervals are 6-year intervals, while the last two intervals are 5-year intervals.

Capital Expenses

Capital funding will have to increase substantially over the current and historic levels between today and year 2040 in order to fully implement the recommended needs associated with any of the three investment scenarios. With the exception of federal funding for the Low Investment Scenario (2019 – 2040), capital deficits exist across all investment scenarios for all funding sources. Increases in capital costs from the Low to the Moderate to the High Investment Scenarios result in increased deficits on an annual basis across the plan period through year 2040. **Table 4-12** presents a comparison of capital gaps by investment scenario by funding source. Overall, the capital funding gap increases by 1,083 percent between the Low and Moderate Investment Scenarios, and by another 36 percent between the Moderate and High Investment Scenarios.

In conclusion, approximately 73 percent of overall Low Investment Scenario operating expenses are addressed through the allocation of forecast revenue streams. On the capital side, approximately 84 percent of capital expenses are covered by forecast revenues. For the Moderate Investment Scenario, approximately 59 percent of the operating expenses are addressed while only 32 percent of the capital expenses are covered. The High Investment Scenario reflects funding for 54 percent of operating expenses and 25 percent of capital expenses.

Table 4-12. Summary of Investment Scenario Capital Cost Funding Gap, by Funding Source (million YOE* $)[1]

Investment Scenario	Period Interval[2]					Full Plan (2013-2040)	
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	Total	Annual Average
Federal Funding Sources							
Low	$(778)	$(169)	$(78)	$(67)	$(270)	$(1,362)	$(49)
Moderate	$(1,708)	$(1,757)	$(2,455)	$(2,303)	$(6,871)	$(15,095)	$(539)
High	$(1,966)	$(2,091)	$(3,218)	$(2,990)	$(10,779)	$(21,043)	$(752)
State Funding Sources							
Low	$140	$(317)	$(317)	$(304)	$(432)	$(1,231)	$(44)
Moderate	$(323)	$(1,005)	$(1,466)	$(1,271)	$(3,631)	$(7,696)	$(275)
High	$(430)	$(1,159)	$(1,814)	$(1,609)	$(5,578)	$(10,591)	$(378)
Local Funding Sources							
Low	$(260)	$60	$111	$97	$49	$57	$2
Moderate	$(722)	$(572)	$(1,017)	$(793)	$(3,098)	$(6,202)	$(222)
High	$(816)	$(721)	$(1,349)	$(1,128)	$(5,041)	$(9,056)	$(323)
Total							
Low	$(897)	$(427)	$(284)	$(274)	$(653)	$(2,535)	$(91)
Moderate	$(2,753)	$(3,334)	$(4,939)	$(4,367)	$(13,600)	$(29,993)	$(1,035)
High	$(3,213)	$(3,971)	$(6,381)	$(5,727)	$(21,398)	$(40,690)	$(1,453)

* Year of Expenditure
[1] NOTE: State funding projections shown do not include revenue generated from HB2313.
[2] NOTE: The first three intervals are 6-year intervals, while the last two intervals are 5-year intervals.

Table 4-13 identifies total and Commonwealth funding gaps for each Investment Scenario, reflecting overall capital and operating resource allocation needs.

Table 4-13. Transit and TDM Funding Gaps by Investment Scenario (millions YOE* $)[1]

Investment Scenario	Funding Needs / Revenues	Capital Funds (Millions YOE$)	O&M Funds (Millions YOE$)	
			Transit	TDM
Federal Funding Sources				
Low	Total Funding Needs	$15,974	$43,750	$739
	Total Projected Revenue	$13,439	$31,865	$482
	Total Funding Gap	$2,535	$11,885	$257
	State Funding Gap (Maintain State share)	**$1,231**	**$3,980 (20%)**	**$177 (80%)**
State Funding Sources				
Moderate	Total Funding Needs	$42,432	$61,289	$912
	Total Projected Revenue	$13,439	$35,998	$482
	Total Funding Gap	$28,993	$25,291	$430
	State Funding Gap (Maintain State share)	**$7,696**	**$7,488 (20%)**	**$316 (80%)**
Local Funding Sources				
High	Total Funding Needs	$54,129	$67,578	$1,637
	Total Projected Revenue	$13,439	$37,178	$482
	Total Funding Gap	$40,690	$30,400	$1,155
	State Funding Gap (Maintain State share)	**$10,591**	**$8,745 (20%)**	**$896 (80%)**

* Year of Expenditure
[1] NOTE: State funding projections shown do not include revenue generated from HB2313.

5. Recommended Transit/TDM Improvement Program

This chapter offers a series of recommendations for transit and TDM program improvements that will address Virginia's transportation goals and assure Virginians of a public transportation system that will meet current and future needs. These recommended improvements have their foundation in the planning context of Chapter 3 and in the assessment of the benefits likely to accrue from continued Commonwealth investment in transit and TDM services at the levels defined in evaluation of investment scenarios in Chapter 4.

5.1. Commonwealth Transportation Goals and Recommended Investment Themes

The foundation for these recommendations is the Commonwealth's transportation goals that were defined in Chapter 1, goals related to the following that span all modes of transportation:

- Safety and Security
- Preservation and Management
- Mobility, Accessibility and Connectivity
- Environmental protection and quality of life
- Economic Vitality
- Livable communities

The recommended transit system improvements are grouped around three themes that will provide Virginia with a comprehensive approach to facing its transportation challenges:

- Achieving and maintaining an ongoing State of Good Repair (SGR) for infrastructure and rolling stock
- Expanding statewide transit and TDM capacity to meet the needs of a growing economy and population
- Investing in major transit capital projects to assist in managing congestion and achieving land use and quality of life goals

The degree to which these three themes address the Commonwealth's five goals is summarized in **Table 5-1.**

Table 5-1. Transit Recommendations Meet Commonwealth Transportation Goals

Commonwealth Transportation Goals	Achieving an Ongoing State of Good Repair	Expanding Statewide Transit and TDM Capacity	Investing in Major Transit Capital Projects
Safety and Security	✔	✔	✔
Preservation and Management	✔	✔	✔
Mobility, Accessibility and Connectivity	✔	✔	✔
Environmental protection and quality of life		✔	✔
Economic Vitality	✔	✔	✔
Livable Communities		✔	✔

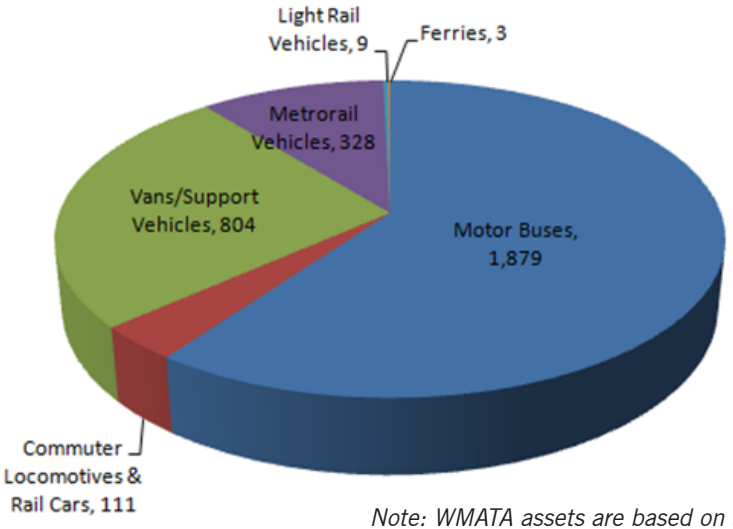
5.2. Recommendation Theme A - Ensure a State of Good Repair for transit system physical assets; commit to an ongoing investment to address SGR backlog and then continue maintaining transit assets in a SGR

The first category of recommendations has to do with preservation of investments already made in Virginia's public transportation system. SGR is a nationwide challenge for all modes of transportation, and achieving and maintaining a SGR is a particular focus of attention of many states and localities. Funding for system expansion often takes precedence over asset maintenance and replacement. Funding limitations have frequently compelled transit operators to defer all but critical maintenance in order to provide more service.

Recommendation 1: Commit to an ongoing investment to address the existing SGR backlog and then continue maintaining transit assets in a SGR

Virginia already has a sizable investment in transit, providing critical support to economic development, and providing economic lifeline service to many. Virginia's existing transit operators provide approximately 16.5 million trips per month with over 3,100 vehicles (includes WMATA vehicles dedicated to Virginia) and ancillary facilities. In dollar terms, these vehicles are the largest portion of transit assets deployed throughout the Commonwealth, serving large urban, small urban and rural areas, as illustrated in **Figure 5-1** and **Table 5-2.**

Figure 5-1. 2012 Current Vehicle Inventory



Note: WMATA assets are based on an estimate of vehicles

Table 5-2. Current (2012) Vehicle Inventory

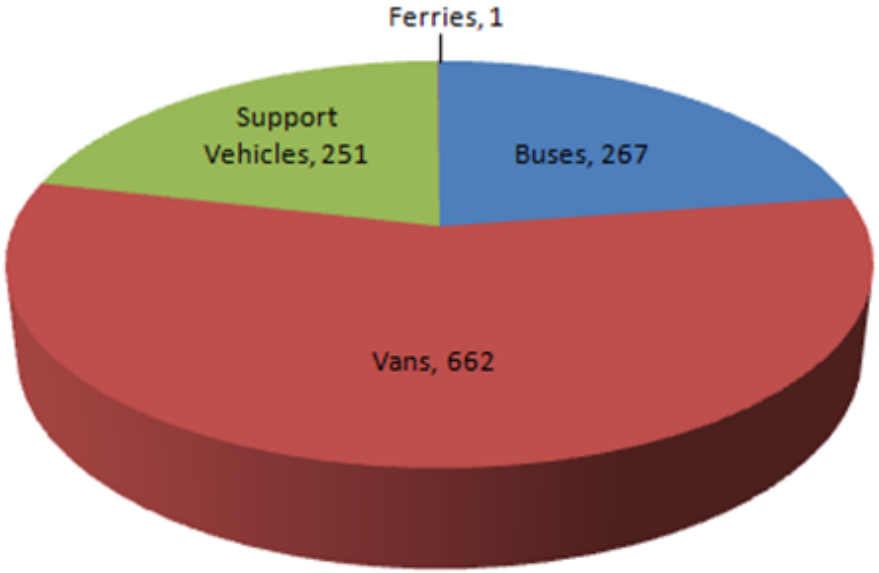
Operator and Vehicle Type	Total	Large Urban	Medium Urban	Small Urban	Rural
Washington Metropolitan Area Transit Authority (WMATA)*					
Metrorail	328	328	—	—	—
Metrobus	373	373	—	—	—
MetroAccess	68	68	—	—	—
Virginia Railway Express (VRE)					
Commuter Rail Cars	91	91	—	—	—
Commuter Locomotives	20	20	—	—	—
HRT The Tide					
Light Rail Vehicles	9	9	—	—	—
All Other Virginia Operators					
Buses	1,506	1,109	145	195	57
Vans / Small vehicles	736	298	115	75	248
Ferries	3	3	—	—	—

*Note: WMATA assets are based on an estimate of vehicles necessary to provide Virginia's share of service.

Investment to maintain a SGR for the life of this plan fall into two broad categories: backlog replacements and ongoing replacements. The first category aims to plan replacements such that as few outdated assets as possible are used in service in the future. The second would improve current transit system performance and safety levels by replacing equipment as it reaches the end of its useful life.

While Virginia has recently utilized bond funding to accelerate asset replacement, the state still had an estimated SGR backlog of $189.5 million in 2012, as shown in **Figure 5-2.** This represents the costs to replace aging fleets of buses and other transit vehicles in the Commonwealth. More detailed information about vehicle replacement needs to achieve and maintain a SGR for public transit operators was presented in Chapter 4.

Figure 5-2. Distribution of $189.5 Million Vehicle Backlog, 2012



Virginia's transit SGR need reflects both bus and rail transit vehicle replacement and captures capital replacement plans of Virginia Railway Express (VRE), Washington Metropolitan Area Transit Authority (WMATA), and Hampton Roads Transit (HRT), as follows:

- VRE is in the process of replacing all of its rail cars; 21 cars are identified for replacement by 2018, while the remaining cars are anticipated to be replaced as funding becomes available through 2024.
- WMATA is engaged in its own state of good repair program, which benefits Virginia, Maryland and the District of Columbia. WMATA's ongoing asset replacement needs include the regular replacement of its rail cars. Virginia will bear a share of the responsibility to replace these rail cars, which has been estimated based on current capital allocations. Virginia currently contributes $50 million annually to WMATA to address SGR needs. Virginia would also share in the replacement of WMATA's Metrobus and MetroAccess fleet. The Metrobus replacement schedule is based on a 15-year useful life (which assumes 7.5 year mid-life overhauls), and MetroAccess replacement is based on a four-year useful life.
- HRT's The Tide light rail line SGR costs include facilities and equipment repair and replacement programs to maintain high quality service through the plan period.

The total cost to achieve and maintain a SGR for Virginia's existing transit assets, as well as vehicles and facilities added to the system as part of capacity enhancements and major capital investments recommended in this plan, is estimated at approximately $11.6 billion between 2012 and 2040. This investment will be allocated across the various asset categories as shown in **Table 5-3.**

Table 5-3. State of Good Repair Capital Cost Needs (2012-2040, millions YOE*$)[1]

Replacement Category	Ongoing Replacement by Period Interval						Total
Operator & Vehicle Type	2012	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
Washington Metropolitan Area Transit Authority (WMATA)							
Vehicles & Fixed Assets	N/A	$1,032.7	$1,210.3	$1,435.9	$1,407.3	$1,631.4	$6,717.7
Virginia Railway Express (VRE)							
Commuter Rail Cars	N/A	$74.4	$71.6	$21.2	$2.6	$76.8	$246.6
Commuter Locomotives	N/A	$0.0	$0.0	$0.0	$0.0	$134.0	$134.0
HRT The Tide LRT Project							
Fixed Assets	N/A	$3.0	$8.6	$34.6	$25.1	$25.1	$96.4
All Other Virginia Operators							
Large Urban	125.1	$198.8	$439.5	$463.5	$727.9	$660.4	$2,490.2
Medium Urban	9.1	$32.8	$448.3	$114.5	$89.7	$74.7	$360.0
Small Urban	9.3	$24.2	$85.6	$147.2	$166.3	$96.0	$519.4
Rural	9.1	$25.0	$37.8	$53.6	$82.4	$57.5	$256.3
Human Services Operators							
Large Urban	17.5	$26.2	$47.9	$69.6	$65.5	$72.3	$281.5
Medium Urban	0.4	$1.7	$2.7	$3.8	$3.8	$5.8	$17.7
Small Urban	15.9	$15.1	$38.8	$46.2	$47.0	$62.2	$209.3
Rural	3.1	$9.8	$11.4	$18.6	$17.5	$23.2	$80.5
Total SGR Costs	189.5	$1,443.7	$2,002.5	$2,408.7	$2,635.0	$2,919.4	$11,599.1

*Year of Expenditure

[1] NOTE: Includes cost to achieve and maintain a SGR for Virginia's existing transit assets, as well as vehicles and facilities added to the system as part of capacity enhancements and major capital investments recommended in this plan.

5.3. Recommendation Theme B - Expand Statewide Transit and TDM Capacity to meet population growth and service standards.

The second category of recommendations would expand the capacity of current general and human services public transportation, including TDM services, to address population growth, extend human services capacity into currently unserved areas, and especially in rapidly growing major urban areas, would increase the percentage of trips made by transit, thereby slowing the growth of roadway congestion.

Recommendation 2: Expand statewide transit capacity to meet the needs of a growing economy and population – expand services and enhance mode share.

As detailed in **Chapter 4,** continued support of existing service is only a first step in planning for Virginia's public transportation future. The current system forms the cornerstone, but it does not have the capacity to absorb projected demand from increasing population and changing demographics of the Commonwealth.

Studies of the carrying capacity of transit service in Northern Virginia have found that a number of bus routes and Metrorail lines exceed capacity when arriving at major transfer stations at certain hours of the morning peak period. More alarming was the fact that population growth alone would cause many more routes to pass the 100 percent to 120 percent threshold for their carrying capacity at these transfer stations as early as 2015 if no investment were made to expand their carrying capacity.[15] This includes service on local and commuter bus routes, Metrorail and the commuter rail. WMATA is working to increase its system carrying capacity through its Metro Matters and Beyond Metro Matters programs. Other operators in the region have put in place ambitious plans to increase carrying capacity with additional expansion buses or more scheduled trips, as reflected

[15] Table 1 – Capacity Utilization by Cordon Point/Terminal Point – Current and Future Years, Technical Memorandum 4: Northern Virginia Capacity Analysis (page 13 of 49)

in the Transit Development Plans and Long-Range Plans developed by Alexandria, PRTC and Loudoun County, among others.

Other operators in the region have put in place ambitious plans to increase carrying capacity with additional expansion buses or more scheduled trips, as reflected in the Transit Development Plans and Long-Range Plans developed by Alexandria, PRTC and Loudoun County, among others.

Population growth will strain carrying capacity on transit service outside of Northern Virginia as well. A recent analysis looked at passenger trip levels versus the carrying capacity[16] of the service supplied during the peak period and found that demand for transit service by 2015 will exceed, or nearly exceed, carrying capacity in four regions, including Richmond and Hampton Roads.[17] Monthly ridership levels in Richmond and Hampton Roads could expand by 24 percent and 19 percent, respectively, from 2010 to 2035 based on their projected population growth.

To meet the demand for service due to a growing population and economy, DRPT focuses in part on expanding passenger-carrying capacity on existing transit systems. The recommended level of investment is consistent with the High Investment Scenario and will expand a blend of transit modes in the state, with a concentration on the expansion of bus and demand response services, to provide the needed capacity for additional passengers in as many regions as possible.

This recommendation focuses on adding expansion buses, rail cars or vans and related facilities to expand capacity of existing transit service, rather than on developing new infrastructure, such as new rail lines or dedicated bus rapid transit lanes.

Investment in major transit capital projects is included as a separate recommendation (Theme C).

Capacity expansion investments include:

- Growing the statewide transit fleet by 2040 by 91 percent and adding 64 percent more revenue hours to service (see **Table 5-4**)
- Maintaining the increased transit fleet in a state of good repair

Details of the recommended investment are provided in **Table 5-5.** Total capital investment between 2013 and 2040 is estimated to be $2.1 billion, across all sources of funding, and total operating investment from all sources of funding is projected to total nearly $61 billion.

Table 5-4. Additional Vehicles and Revenue Hours Recommended for Capacity Expansion, by Interval Period[1]

Area Type 2012	Base Year 2012	Interval Period						Year 2040	2040 Growth over 2012 Base
		2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040		
	Vehicles	Expansion Vehicles Added During Each Interval Period							
Large Urban	1,840	384	828	180	150	205	1,747	3,587	95%
Medium Urban	296	150	90	42	50	65	397	693	134%
Small Urban	788	282	174	48	30	25	559	1,347	71%
Rural	430	60	234	18	15	35	362	792	84%
Total	3,354	876	1,326	288	245	330	3,065	6,419	91%
	Revenue Hours	Revenue Service Hours Added During Each Interval Period (thousands)							
Large Urban	4,971	3,928	15,300	23,531	22,170	24,996	89,924	10,231	106%
Medium Urban	559	921	2,098	2,699	2,644	3,122	11,475	1,225	119%
Small Urban	935	1,481	3,526	4,454	3,977	4,254	17,691	1,818	94%
Rural	408	190	839	1,297	1,186	1,361	4,872	698	71%
Total	6,873	6,520	21,754	31,981	29,977	33,733	123,962	13,972	103%

[1] NOTE: Recommended level of investment is consistent with the High Investment Scenario.

[16] Carrying capacity was based on each operator's typical vehicle placed into service at peak hours
[17] Table 3.3 Estimated Capacity Utilization Rates –Urban Transit Systems in Virginia, Technical Memorandum Three (page 48 of 96)

Table 5-5. Capital and Operating Cost for Recommended Capacity Expansion, by Interval Period (millions YOE* $)[1]

	Total Cost by Interval Period[2]					Total
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
Capital Cost						
Large Urban	$463.9	$412.0	$195.1	$182.4	$253.1	$1,506.7
Medium Urban	$91.4	$39.0	$22.9	$30.1	$44.9	$228.2
Small Urban	$168.3	$70.3	$20.4	$12.4	$18.5	$289.8
Rural	$10.4	$52.5	$9.8	$9.7	$27.9	$110.2
Total Capital Cost	$734.1	$573.6	$248.2	$234.5	$344.5	$2,134.9
Operating Cost						
Large Urban	$5,541.8	$8,727.7	$12,051.8	$12,493.2	$15,426.8	$54,241.3
Medium Urban	$358.9	$534.7	$708.3	$757.6	$967.6	$3,327.1
Small Urban	$258.2	$438.7	$586.7	$589.1	$702.5	$2,575.3
Rural	$79.0	$132.5	$187.0	$189.1	$233.9	$821.6
Total Operating Cost	$6,237.9	$9,833.7	$13,533.8	$14,029.1	$17,330.8	$60,965.3
TOTAL Cost						**$63,100**

*Year of Expenditure
[1] NOTE: Recommended level of investment is consistent with the High Investment Scenario.
[2] NOTE: The first three intervals are 6 years, but the last two intervals are 5 years

Recommendation 3: Add new human services transportation in jurisdictions that currently provide no service and in those that do not provide sufficient service

All areas of the state face a growing need for transit service, whether due to rapid economic and population growth or due to specific demographic characteristics. Transit plays a critical role in enhancing economic development by providing service that helps in managing congestion and supporting economic activity. However, in many small urban and rural areas, transit also provides critical services that are an economic lifeline to key population segments, including many with limited or no access to automobiles. Service to this population segment provides vital access to medical care, social services and day-to-day activities such as shopping, as well as a tool in supporting economic growth in workplaces and service industries that can rely on transit to get their workers and customers to their businesses.

While Virginia has many small urban and rural areas that already provide transit service, much of it demand response, in many cases this service is not sufficient to meet the current and future needs of residents and workers. In many other cases, transit service is not provided at all, even though demographic conditions would suggest that transit service is merited. These two issues form the human services transportation component of recommended capacity expansion within the state.

The Surface Transportation Plan makes two recommendations for capacity expansion to address gaps in transit service: (1) provide human services transportation to jurisdictions that currently provide no service, and (2) expand human services transportation in jurisdictions that currently provide limited service.

Recommendation 3a: Provide human services transportation to jurisdictions currently without service

Numerous small urban and rural jurisdictions throughout Virginia have characteristics indicative of the need for transit service but do not currently provide it. A small but significant initial investment in transit vehicles, limited support facilities and annual operating funding could provide service and bring an economic lifeline to as many as 37 jurisdictions throughout Virginia.

Recommendation 3b: Expand human services transportation to target service standards in jurisdictions currently providing limited service

Service must also be expanded in numerous small urban and rural jurisdictions throughout Virginia that currently do not provide sufficient service based on their characteristics. Additional service is warranted based on the level of transit provided in Virginia communities with similar

demographic characteristics and assuming that the average level of service per capita in these communities is an achievable minimum in currently underserved communities. A small but significant investment in transit vehicles, related support facilities and annual operating funding could fund an improvement in human services transportation in these communities.

From 2013 to 2040, the following investments are anticipated as a result of implementation of Recommendations 3a and 3b:

- Adding 341 vehicles (mainly vans and small buses) and related support facilities
- Providing ongoing replacement of vehicles and renewal of related support facilities (included in SGR and asset renewal programs)
- Providing an average of 230,000 additional annual revenue hours of new service over the 28-year plan period

Human service vehicle and service hour needs are included with the needs identified in **Table 5-4,** and capital and operating costs for human services transportation are included in **Table 5-5.** This investment allows significant additional transit service for rural and small urban communities that will face increasing demand for transit among key segments of their population.

Recommendation 4: Expand TDM and other programs that improve overall transportation system efficiency

As Virginia's population continues to expand, DRPT will find it more efficient to address some of the Commonwealth transportation needs through targeted investments in TDM and ITS. TDM programs exist today in most parts of the state and are important in addressing congestion and increasing transit's role in meeting statewide transportation needs. TDM programs play an important role in helping to achieve the Commonwealth's transportation goals by facilitating carpooling, vanpooling, bicycling, telework, and all forms of transit.

Recommendation 4a: **Increase state investment in TDM programs.**

Recent TDM strategic planning efforts have identified significant opportunities to impact travel behavior by increasing state TDM investment. Currently, the state invests approximately $15 million statewide in TDM programs. Of this funding, $4 million is from the state's Transportation Efficiency Improvement Fund grant, $1 million is from local government/agency matching funds, and $10 million is from federal (Congestion Mitigation Air Quality [CMAQ] funding given to the state and allocated for TDM) and state funds. This plan envisions increasing funding for TDM over the life of the plan to achieve a high level of investment (consistent with the High Investment Scenario) in the state's four urban PDCs and a moderate level of investment (consistent with the Moderate Investment Scenario) for the remainder of the state.

Arlington County Commuter Services (ACCS) has found it can effectively demonstrate significant reductions in vehicle trips taken and vehicle miles traveled, along with reduced CO2 emissions and fuel savings. On the average workday in FY 2011, ACCS achieved the following benefits:

» Daily reduction of over 40,000 vehicle trips
» Daily reduction of over 672,000 vehicle miles traveled
» Saved over 28,000 gallons of fuel daily (nearly 7.2 million gallons annually)
» Annual reduction of CO2 emissions by over 79,750 tons

Source: *"ACCS Making an Impact FY2011",* from the ACCS Mobility Lab, August 15, 2012 (http://mobilitylab.org/2012/08/15/accs-making-an-impact-fy2011/)

These investments would be focused on providing new TDM services in areas not currently served by a TDM program, expanding programs to keep pace with projected population growth, and enhancing programs in urban areas where existing TDM programs have demonstrated great success in reducing vehicle trips. The cost for these TDM capacity enhancements would total approximately $1.4 billion over the life of the plan (through 2040), as shown in **Table 5-6.** Assuming 80% state participation, the state's share of TDM investments would be in the range of $1.1 billion for the plan duration through 2040.

Table 5-6. Total TDM Costs for Recommended Program (Million YOE* $)

	Total Cost by Interval					Total
	2013-2018	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
TOTAL TDM Costs	**$187.0**	**$239.1**	**$304.1**	**$316.3**	**$388.9**	**$1,435.5**

*Year of Expenditure

Recommendation 4b: Implement an ongoing investment program in Intelligent Transportation Systems (ITS), along with associated technical assistance.

DRPT completed an ITS strategic plan in 2009, which includes recommendations for approximately $6.5 million in near-term investments, plus $0.5 million per year in ongoing research and technical assistance. These recommendations include coordinating projects across many transit operators, as well as research in support of transit. Recommended projects include on-board equipment such as Computer Assisted Dispatch/Advanced Vehicle Locator systems, Automatic Passenger Counters and On-Board Camera deployment. This plan was updated in May 2011 for FY12. Going forward, ITS projects will be coordinated with transit agencies six year capital plans and incorporated into their Transit Development Plans (TDP) rather than a stand alone grant program.

Off-board investments included maintenance and yard management systems, scheduling and run-cutting software, real-time traveller information and next bus arrival displays.

ITS projects are especially likely to evolve over the life of the Statewide Transit and TDM Plan, but the need for a program that allows efficient and coordinated investment in important technology solutions is clear. Tremendous benefits to transit operators throughout the Commonwealth can be achieved by encouraging joint procurement and common standards on projects of mutual benefit to transit operators.

5.4. Recommendation Theme C - Invest in Major Rapid Transit Capital Projects to Assist in Managing Congestion and to Achieve Livable Community Objectives

The first four recommendations form a critical foundation for the final recommendation. Establishing a State of Good Repair, stabilizing operating funding for local transit operators, expanding capacity to meet increased population, filling in significant gaps in service in rural and small urban areas with human services transportation, and providing key investments in TDM and ITS will prepare Virginia's transit operators to respond to the demands of a growing population and economy. The remaining recommendation focuses on support for funding major rapid transit capital projects, as this investment is essential to responding to the demands of a growing population and economy by maintaining and increasing the current transit market share. Without such an investment, Virginia's efforts to manage congestion in urban areas will be dramatically limited.

Recommendation 5: Study, plan, and construct major rapid transit capital projects

To maintain or enhance transit mode share over the long term, as an active strategy to manage congestion, will require investment in major transit capital projects in each of the Commonwealth's three major metropolitan areas. The final recommendation is to provide investment in major rapid transit capital projects, with a focus on managing congestion and increasing transit market share. These investments are primarily in modes such as Metrorail, BRT, Light Rail, Streetcar, and Commuter Rail and are focused on attracting significant numbers of new riders to public transit.

The level of investment for this recommendation is generally consistent with the Moderate Investment Scenario presented in the previous chapter, but the actual level of investment may vary depending on the Locally Preferred Alternative selected in consultation with local governments for corridors that have not yet been formally studied. That scenario includes the following major transit capital projects that are currently under development:

- Metrorail Dulles Corridor (Phases I and II)
- Crystal City-Potomac Yard Streetcar
- Columbia Pike Transit Project
- Hampton Roads Transit TIDE Extension
- Richmond Broad Street BRT

The total capital cost to implement these projects is estimated at $4.3 billion between 2013 and 2040, with an additional $4.6 billion in operating expenses.

In addition, projects identified in vision plans for the Richmond, Hampton Roads, and Northern Virginia regions are included in this recommended investment program. From a funding perspective, projects identified for Richmond and Hampton Roads are programmed for implementation in the timeframe identified in the respective vision plan. Projects identified for Northern Virginia as part of the Super NoVa Transit/TDM Vision Plan are phased in equally over the 28-year planning horizon of this plan (through 2040). For corridors identified in the vision plans that have yet to be formally studied and for which a modal technology has not been selected, the recommended level of investment is given as a range between the Moderate and High Investment Scenarios. It should be noted that implementing lower technology options could save over $10 billion over the life of the plan, but would still provide projects to manage congestion along critical corridors and increase transit market share.

The addition of major transit capital projects from regional vision plans brings the total estimated capital cost to between $29 billion and $40 billion over the 28-year planning period, and the total estimated operating expenses to between $6.5 billion and $6.6 billion.

Noteworthy in investment in major transit capital projects is the potential non-transportation benefit of enhanced, sustainable redevelopment of communities served by these investments. More than any other transportation investment, support of major transit projects offers opportunity to create sustainable communities around transit stations that reduce the need for auto travel, improve access to transit, and create dynamic new development, becoming true engines for economic development and opportunity.

5.5. Total Cost of Recommendations

Together, the five recommendations in the three areas of SGR, expanded capacity, and major transit capital investments described above will enable the Commonwealth to sustain and expand quality public transportation services that meet the needs of all Virginians. The capital costs associated with the recommendations are presented in **Table 5-7,** and operating costs are presented in **Table 5-8.** Funding strategies are discussed in Chapter 6.

Table 5-7. Capital Costs for Recommendations (millions YOE* $)[1]

	Total Cost by Interval Period[2]					Total Cost
Recommendation Theme	2013-2018[2]	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
A – State of Good Repair	$1,633	$1,902	$2,409	$2,635	$2,919	$11,599
B – Expand Statewide Capacity						
Transit	$734	$574	$248	$235	$345	$2,135
TDM	n/a	n/a	n/a	n/a	n/a	n/a
C – Major Transit Capital Projects	$5,985 - $6,351	$2,615 - $3,202	$4,478 - $5,781	$3,452 - $4,786	$12,509 - $20,276	$29,038 - $40,396
Total	**$8,264 - $8,719**	**$5,141 - $5,778**	**$6,996 - $8,438**	**$6,295 - $7,655**	**$15,741 - $23,540**	**$42,432 - $54,130**

*Year of Expenditure
[1] NOTE: The first three intervals are 6 years, but the last two intervals are 5 years
[2] Includes SGR Backlog for 2012

Table 5-8. Operating and Maintenance Costs for Recommendations (millions YOE* $)

	Total Cost by Interval Period[1]					Total Cost
Recommendation Theme	2013-2018[2]	2019-2024	2025-2030	2031-2035	2036-2040	2013-2040
A – State of Good Repair	n/a	n/a	n/a	n/a	n/a	n/a
B – Expand Statewide Capacity						
Transit	$6,238	$9,834	$13,534	$14,029	$17,331	$60,965
TDM	$187	$239	$304	$316	$389	$1,435
C – Major Transit Capital Projects	$580 - $590	$1,083 - $1,094	$1,414 - $1,427	$1,417 - $1,429	$2,059 - $2,072	$6,553 - $6,612
Total	**$7,005 - $7,015**	**$11,156 - $11,167**	**$15,252 - $15,265**	**$15,762 - $15,774**	**$19,779 - $19,792**	**$68,953 - $69,012**

*Year of Expenditure
[1] NOTE: The first three intervals are 6 years, but the last two intervals are 5 years

Multimodal System Design Guidelines

DRPT has developed the Multimodal System Design Guidelines to provide a holistic framework for multimodal planning at the regional, local, and corridor scale. The guidelines provide a step-by-step process of identifying centers of activity, designating connected networks for all travel modes, and designing and retrofitting specific corridors that fit with the surrounding context. Communities throughout Virginia can find these guidelines helpful in planning for connected regional transportation networks that serve all travel modes.

As a component of the guidelines, DRPT developed Transit Service Design Guidelines to aid its procedures for evaluating applications for new transit service. The guidelines encourage local transit providers to consider factors such as household and employment density, station-area characteristics, and development trends while planning their transit services. In accordance with the principles set forth by the guidelines, transit providers and local governments are increasingly coordinating their planning efforts.

6. Future Funding Opportunities

The transit and TDM program enhancements recommended in Chapter 5 would provide long-term benefits to communities and travellers throughout the Commonwealth, by maintaining equipment in a State of Good Repair, expanding transit and TDM services to achieve desirable performance standards, and supporting major transit capital projects designed to reduce congestion and support regional development visions. But as has also been noted, this recommended program would exceed financial resources that would be available under existing transit funding measures. The funding gap remains even after the new transportation revenue discussed in Chapter 4.

In light of the anticipated funding situation, a key question must be addressed as part of this Plan: what reasonable funding opportunities could be pursued to address transit and TDM needs and provide a reliable, on-going funding stream for DRPT and its partner communities and agencies? To examine this question, this chapter builds on the forecasts of currently available funding streams presented in Chapter 4 to develop a set of funding recommendations that support and complement the service recommendations, addressing both total capital and operating costs, regardless of funding source.

Operating and capital funding are discussed separately, as they have different revenue sources at the state level and are generally managed separately by most transit operators. However, it should be acknowledged that there are often trade-offs between the capital and operating budgets in transit, and funding decisions regarding one budget may affect the other.

6.1. Total Funding Needs and Funding Gaps for Service Recommendations

The total costs to implement the service recommendations presented in Chapter 5, along with projected funding gaps and additional revenue needed to maintain the desired state share of total funding, are summarized in **Table 6-1.** The total funding needs range from $111.3 billion to $123.1 billion over the next 28 years, and exceed current revenue projections by approximately $61.5 billion to $72.0 billion. As shown in the table, additional DRPT revenue required to maintain the desired state share varies depending on the project type, but ranges from $17.2 billion to nearly $20.1 billion over the 28-year planning period. These funding gap projections do not include the revenue generated from HB2313, as new revenue projections were not available at the time of the funding analysis.

Table 6-1. Total Costs and Funding Gaps for Recommendations, 2013 - 2040 (millions YOE* $)[1]

Funding Needs/Revenues	Capital Funds	O & M Funds		Total 2013-2040
		Transit	TDM	
Total Funding Needs	$42,772 - $54,130	$67,518 - $67,577	$1,435	$111,385 - $123,142
Total Projected Revenue	$13,439	$35,998 - $37,178	$482	$49,919 - $51,099
Total Funding Gap	$29,333 - $40,691	$30,399 - $31,520	$953	$61,466 - $72,043
State Funding Gap (maintain state share)[2]	$7,751 - $10,591 (state % varies)	$8,733 - $8,745 (20%)	$734 (80%)	$17,218 - $20,070

*Year of Expenditure

[1] NOTE: State funding projections shown do not include revenue generated from HB2313.

[2] NOTE: This is the *additional* state funding required to maintain the state share after identified existing state revenues have been applied.

6.1.1. Operating Funding

Virginia transit operators receive their operating funding from a variety of sources, including passenger fares, support from federal and state grants, local government funding, and certain ancillary sources such as advertising revenue. As shown in Chapter 4, current combined state, federal, and local revenue sources between 2013 and 2040 are expected to generate between $32.3 billion and $37.7 billion for operating expenses (depending on the investment scenario).

The state is an important partner in funding transit operations. State operating funds provided just over a 20 percent match to total reported transit agency costs from the last completed fiscal year (FY 2012). This formula-based funding has two primary sources – a portion of Virginia's Transportation Trust Fund and a dedicated portion of the state recordation tax.

Commonwealth revenues to address operating expenses for the 2013 - 2040 period are expected to be $4.9 billion. Yet as Chapter 5 detailed, total statewide operating needs between 2013 and 2040 to achieve the recommended service standards are projected to be $69.0 billion. To fund this operating budget at a 20 percent state match to total expenditures (except for an 80 percent match for new TDM operating expenses), the state would require additional revenue in the range of $8.7 billion (dependent on level of major capital investment) beyond current projections.

As discussed in Chapter 4, DRPT is currently developing performance measures for distribution of operating assistance to transit agencies.

6.1.2. Capital Funding

Similar to operating funds, Virginia transit operators receive their capital funding from a variety of sources, including support from federal and state grants, local government funding, and dedicated gas tax revenues (in the case of Northern Virginia). But as with operating funds, capital funds provided from existing revenue sources fall short of providing needed funding for recommended capital programs. Across both primary sources of capital funding, DRPT is expected to have approximately $2 billion of capital funding available from 2013 to 2040. As Chapter 5 detailed, total statewide capital budget needs to achieve the recommended service standards for State of Good Repair, expanded transit capacity, and major transit capital projects between 2013 and 2040 are projected to be $42.7 to $54.1 billion (dependent on level of major capital investment). The gap (the difference between needs and available funding) is $29.3 to $40.7 billion, or approximately $1.0 to $1.5 billion annually in year of expenditure dollars.

While even the short-term (2013 to 2018) shortfall in funding is significant, when bond proceeds begin to diminish and are no longer available, the shortfall in funding between what is projected and what is needed just for State of Good Repair broadens markedly.

As discussed in Chapter 4, DRPT is currently developing performance measures for distribution of operating assistance to transit agencies.

6.2. Funding Recommendations

To provide DRPT with the power and flexibility needed to address the public transportation and TDM needs facing Virginia over the coming three decades, a set of funding measures are recommended:

- Recommendation 1 would provide state formula operating funding at a minimum of 20 percent of total operating expenses;
- Recommendation 2 would encourage expansion of transit service;
- Recommendation 3 would fund a State of Good Repair program; and
- Recommendation 4 would establish a fund dedicated to major transit capital projects. SB 1140 passed by the General Assembly as part of the Governor's Transportation Package in 2013 created this fund.

Each recommendation is described below.

Funding Recommendation #1: Based on performance, provide state formula operating funding of a minimum of 20 percent of reported expenses in order to provide minimum adequate operating and maintenance funding.

The primary recommendation of this statewide plan is to provide state formula operating funding of at least 20 percent of total projected operating expenses, which is consistent with historical levels, and well below the levels intended by the 2007 legislative addition of the recordation tax to the operating revenue account. At a firm, reliable minimum level of 20 percent state match, local transit operators can better plan for operations, needed fleet and facility replacements, and service expansion.

Between now and 2040, DRPT would require an average of $476 million of additional annual funding in order to fully implement the transit and TDM capacity enhancements recommended in Chapter 5. Approximately 36 percent of this annual total, or $173 million, would be spent simply to operate the present level of service in the state. The remaining new funding would expand the number of revenue hours for the existing service to pace the state's population growth, add more TDM service to better manage congestion, add ITS applications to improve the quality of transit service, and provide enhanced or new human services transportation in rural areas. As demand for service grows into the future, more funding will be needed by DRPT's local partners.

Funding Recommendation #2: Establish a transit enhancement fund to encourage expansion of transit service when agencies are meeting or exceeding performance measures.

Transit Development Plans, Long Range Plans, and corridor strategic planning have all noted the high demand for increased transit service. Establishing a transit enhancement fund, similar to the current rail enhancement fund, will encourage expansion of transit service in concert with local partners.

Overall transit and TDM expansion needs over the 2013 to 2040 time frame exceed $64.5 billion:

- $63.1 billion for population driven capacity expansion ($2.3 billion average per year in year of expenditure dollars)
- $1.4 billion for TDM and ITS expansion ($51.3 million average per year in year of expenditure dollars)

On an annualized basis, this total additional funding need would average $2.3 billion per year in year of expenditure dollars.

The establishment of this fund should have appropriate local and federal participation, depending on the specific project type. Some projects may clearly be strong candidates for pursuit of federal funds – these projects may have as much as 50 to 80 percent federal funding, depending on the size of the project and the federal program under which they are funded. In other projects, federal participation may be limited and these projects would be better candidates to be pursued solely with state and local funding.

Expected federal funding match would be 50 percent for most projects, including population-driven capacity expansion and ITS expansion. This average is based on historical experience, and is almost certainly a blend of projects with matches as high as 80 percent and others with match well below 50 percent. The human services transportation expansion would not anticipate federal funds, as those would be state-initiated expansion projects.

The local match expectation is 20 percent of the non-federal share on most bus vehicle replacements, maintenance facilities, and other critical State of Good Repair projects. (If the project receives 50 percent federal funding, this means the local match for the entire project would be 10 percent.) SGR projects of secondary importance will also require a higher local match, which is estimated at 50 percent of the non-federal share.

Funding Recommendation #3: Recommend a State of Good Repair program in partnership with local transit grantees using a funding strategy consistent with existing federal, state and local shares (dependent on capital expenditure).

While existing federal funds are fully programmed, SGR can only be effectively accomplished with an expanded federal program. While reauthorization of federal programs is unlikely to result in the highest federal share of 80 percent for all SGR projects, DRPT seeks to achieve 50 percent federal participation for non-vehicle SGR projects. Vehicle replacement SGR will continue to assume the existing federal, state and local shares.

State of Good Repair consists of existing backlogged needs as well as future SGR needs based on existing assets and new assets added to the statewide transit system between now and year 2040. Existing SGR needs in year 2012 equal $189.5 million. Anticipated SGR needs between now and year 2040 total $11.4 billion, or approximately $408 million annually in year of expenditure dollars. Under the tiered approach, SGR projects would receive the highest priority.

Funding Recommendation #4: Establish a capital fund for major transit capital projects based on tiered approach developed by the TSDAC.

While Funding Recommendation #2 establishes a transit enhancement fund to support transit capacity expansion and TDM and ITS expansion, this final funding recommendation would provide support for major rapid transit capital projects. This investment is essential to maintaining and increasing transit market share in the face of increasing population, especially in Virginia's urban areas. Regional vision plans have identified several corridors in the Commonwealth for major capital investment.

Expected federal funding match would be 50 percent for most projects. For major new rapid transit capital projects, local jurisdictions will need to demonstrate significant financial commitment, and the match expectation generally will be 50 percent of the non-federal share. State funding generally provides the remaining 50 percent of the non-federal share (25 percent of the total project cost). These funding ratios may vary for projects designed for economic development purposes since state funding is primarily used to address transportation needs.

As discussed in Chapter 5, major transit capital project needs in the 2013-2040 timeframe range from $29 billion to $40 billion, depending primarily on the technology that is finally deployed. On an annualized basis, this total funding need averages $1.0 billion to $1.4 billion per year in year of expenditure dollars.

Governor McDonnell's 2013 Transportation Funding and Reform Package (discussed earlier in Chapter 4) includes a $64 annual registration fee for alternative fuel vehicles and hybrids, half of which would be dedicated to the Intercity Passenger Rail Operating and Capital Fund to support projects such as the extension of passenger rail service to Roanoke and light rail service to Virginia Beach. Governor McDonnell's plan also commits up to $300 million to the Dulles Metrorail Extension Project through dedicating an additional 0.3 cents of the state's portion of the existing sales tax to transportation.

6.3. How the Funding Recommendations Address Service Needs

The funding recommendations in this chapter are specifically designed to address the five recommendations on service needs outlined in Chapter 5. **Table 6-2** illustrates how each service need area will be addressed by the proposed funding recommendations.

Funding Recommendation #1 (return to minimum 20% state operating funding) applies to two of the five service recommendations. By guaranteeing a consistent level of operating funding to local transit operators, the state will help to fund existing services, allow capacity expansion with confidence that future operations will be supported, and support human services transportation.

Funding Recommendation #2 (a transit enhancement fund) demonstrates commitment to the recommendations under Recommendation Theme B to expand stateside transit and TDM capacity

to meet population growth and service standards. Dedicated funding for transit enhancement and expansion, outside of the annual appropriation process, would allow for needed capital and operating investment in overall capacity, in human services transportation, and in ITS and TDM programs.

Funding recommendation #3 (an SGR funding program) would provide strong support for service recommendation 1. A robust SGR program will help existing transit service be delivered more effectively (by ultimately lowering operating costs), and an SGR funding program will demonstrate a firm commitment to achieving and maintaining a State of Good Repair on transit systems across the state.

Funding recommendation #4 (a major capital transit fund) demonstrates commitment to service recommendation 5. Dedicated funding for major transit capital projects, outside of the annual appropriation process, would allow for needed capital investment to manage congestion and increase transit market share in the Commonwealth's major metropolitan areas.

Table 6-2. How Funding Recommendations Address Service Needs

Service Recommendations	Funding Recommendations			
	1. Provide state formula operating funding of a minimum of 20 percent of reported expenses	2. Establish a transit enhancement fund to encourage expansion of transit service	3. Recommend a State of Good Repair program in partnership with local transit grantees	4. Establish a major transit capital fund for major capital investments
1. Commit to an ongoing investment to achieve and maintain SGR			✔	
2. Expand statewide transit capacity	✔	✔		
3. Add new human services transportation	✔	✔		
4. Expand TDM and ITS programs		✔		
5. Study, plan, and construct major rapid transit capital projects				✔

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7. Conclusions

The changes that are occurring in Virginia's economy and its demographics in the coming decades will place new demands on the Commonwealth's overall transportation system. Public transportation systems in particular, which are already straining to meet the state's current mobility demands, must respond to challenges such as these:

- Expected above-average increases in the state population will increase the demand for public transportation. The Commonwealth's population is expected to grow significantly more than the nation, increasing 37 percent by 2040, to 10.9 million people. In the state's urban areas, where seven out of 10 Virginians currently reside, growth is projected to be significantly higher. This is already straining mobility on all facets of our surface transportation system.
- Expected increase in the elderly population's share of state population will increase the demand for public transportation. Like the rest of the nation, the population in Virginia is also aging. The proportion of persons age 65 and over will increase from about 12 percent to 18 percent, resulting in Virginia having approximately double the number of individuals age 65 years or older in 2040 (2 million compared to about 1 million in 2010). This has serious implications for the transportation system as a whole and especially for public transportation. Older individuals, including more and more baby boomers, are less likely to want or be able to drive personal automobiles, which are currently the state's dominant mode of transportation.
- Expansion of the "Generation Y" segment of the workforce is expected to increase demand for public transportation in urban transit-oriented communities. The third change to Virginia's population also mirrors national trends. Generation Y, also known as the Millennial generation – those born between the late 1970s and 1990s – is the fastest growing segment of the workforce and is larger than the baby boomer generation. Generation Y's expectations of where they want to live and work will continue to challenge Virginia's transportation systems for decades. Overall, Generation Y prefers pedestrian-friendly urban communities to areas promoting auto dependency and is more committed to using public transportation, often in support of a more urban lifestyle. As this group moves into and becomes the largest segment of the workforce, there will be more demand on public transportation to meet its needs.
- Congestion is increasing, with little chance of relief, especially in major urban areas. Over the next 25 years, two-thirds of Virginia's I-95 infrastructure will be at or above capacity, resulting in an increase in travel times of as high as 40 percent. The result is an increasing level of congestion and a decreasing level of access and mobility. In this situation, Virginia has great opportunity to enhance mobility and to manage congestion by continuing to invest in public transportation and TDM services.

DRPT and the Commonwealth's transit and TDM service providers can play a major role in responding to these challenges. To respond, by

providing mobility to enhance economic opportunity and quality of life and by making the overall transportation system more efficient, three broad programs and policy objectives should be pursued:

1. **Transit and TDM must expand to meet demand and to sustain and grow the economy.** This includes expanding existing services and participating in major transit projects. Public transportation is experiencing an increase in demand in Virginia. In the state's major metropolitan areas (Northern Virginia, Richmond and Hampton Roads), which are attracting an increasing share of the state's population, the potential to save on personal expenses and travel time have made public transportation options more attractive. In less urban and rural areas, public transportation provides an essential economic lifeline, serving those who cannot or choose not to drive single occupancy vehicles**.**
2. **Transit must remain safe, reliable, and cost efficient, by ensuring a state of good repair.** Virginia currently (as of 2012) has a $190M backlog of deferred maintenance and replacement of vehicles and facilities and infrastructure that are reaching the end of their useful lives. If this backlog is not addressed, it can seriously impact the effectiveness and efficiency of service delivery. As the backlog grows, keeping assets in a state of good repair will increasingly consume the budgets of transit operators statewide, causing much-needed service to suffer.
3. **Transit and TDM must contribute to operational efficiencies both for transit and highways.** The Commonwealth's TDM programs should be optimized to increase mobility and improve efficiency. Other operational efficiencies should be pursued, including:
    - Changes in land use policies to encourage shorter commutes
    - Intelligent Transportation Systems to improve transit operations

    These programs and policies need to be aggressively addressed in order to alleviate some of the pressures on both roadway and transit systems without significant additional capital cost.

Based on the above considerations, to ensure that the existing and future demand for quality public transportation and mobility options is met, DRPT is working with transit and TDM service providers to focus on maintaining current transit assets, maintaining acceptable levels of service and looking toward the future to keep up with population growth and economic conditions. To support their efforts, this plan defines **four key investment strategies** that should be addressed to meet our mobility needs and congestion problems.

1. **Maintain service by supporting operating costs and bringing existing assets into a State of Good Repair.** Addressing a backlog of deferred, non-essential maintenance and regularly servicing and replacing vehicles, facilities and other infrastructure will improve service performance and reliability, critical factors for attracting and retaining ridership.
2. **Expand capacity statewide to meet the needs of a growing economy and population.** No matter how well maintained the current system is, it will not be able to absorb projected demand from the Commonwealth's increasing population and changing demographics. In light of expected population growth and increased travel demand, even just maintaining transit's current mode share will require more investment and more capacity.
3. **Address urban area growth by investing in major rapid transit capital projects to assist in managing congestion.** In the Commonwealth's major urban areas, where projected population growth exceeds 40 percent between now and 2040, encouraging more people to use transit through investment in innovative rapid transit alternatives will be critical because highway expansion alone simply cannot meet the mobility needs. Equally important is the impact such projects can have on promoting high quality urban development patterns.
4. **Reduce auto reliance and increase transit efficiency through expanded TDM efforts.** By better managing peak transportation demand, pressures on both roadway and transit systems can be alleviated without additional capital expense. As they have been

extended across Virginia, TDM programs and the strategies that they deploy have resulted in significant consumer and agency cost-savings, congestion relief, and improved mobility. Through a wide range of creative strategies, TDM investment has been shown to provide key transportation benefits:

- Economic opportunity
- Expanded mobility
- Environmental stewardship

Optimizing assets and deploying them where they will provide the greatest benefit is the best way to leverage the Commonwealth's existing investment and support future growth and economic prosperity.

A thoughtful strategy that emphasizes maximizing system performance while judiciously expanding service will serve the Commonwealth well. Addressing the identified needs with adequate funding will ensure that Virginians have a public transportation system that effectively contributes to economic vitality and quality of life.

To respond to the Commonwealth's public transportation needs and to capture the opportunities provided by its partnership with a robust transit and TDM community, DRPT is recommending an aggressive investment program (presented in detail in Chapter 5). If implemented, these recommendations would result in:

- Optimum State of Good Repair of rolling stock and facilities, ensuring safety and reliability;
- Expanded transit and TDM capacity across the Commonwealth, improving service to meet desirable service standards, extending service into currently warranted but unserved areas, and increasing mode share in rapidly growing areas. This would include both general transit and economic lifeline services; and
- Partnership with local governments to build high-capacity rapid transit projects

Implementing these recommendations will have a high financial cost, but they promise our residents and businesses large benefits in terms of expanded economic opportunity, improved personal mobility, and enhanced highway and transit system efficiency.

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