

# *TransAction2040*

Transportation for Today and Tomorrow

## NORTHERN VIRGINIA TRANSPORTATION PLAN



November 2012

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## Plan Background

### *Plan Purpose*

The Northern Virginia Transportation Authority (NVTA) is charged with preparing a regional transportation plan for Northern Virginia, including transportation improvements of regional significance. The NVTA revises and amends this plan every five years. The TransAction 2040 Northern Virginia Regional Transportation Plan represents an update of the TransAction 2030 Northern Virginia Regional Transportation Plan, which was endorsed by the NVTA in 2006. TransAction 2040 is designed to extend the planning horizon, allowing for consistency with the National Capital Region Transportation Planning Board (TPB) Financially Constrained Long-Range Plan (CLRP). TransAction 2040 includes new projects and introduces a revised evaluation and prioritization process, along with a benefit-cost (b/c) analysis. Like the plan that preceded it, TransAction 2040 is intended to provide a guide for funding future transportation projects in Northern Virginia.

### *Vision and Goals*

The TransAction vision, adopted by the Transportation Coordinating Council in 1999, is for an improved multimodal transportation system that facilitates achievement of specific regional goals.

*In the 21<sup>st</sup> century, Northern Virginia will develop and sustain a multimodal transportation system that supports our economy and quality of life. It will be fiscally sustainable, promote areas of concentrated growth, manage both demand and capacity, and employ the best technology, joining rail, roadway, bus, air, water, pedestrian, and bicycle facilities into an interconnected network.*

These seven goals developed for the TransAction 2040 Plan build on the goals from the TransAction 2030 Plan and are used to guide the assessment and prioritization of projects included in TransAction 2040:

- Provide an integrated, multimodal transportation system;
- Provide responsive transportation service to customers;
- Respect historical and environmental factors;
- Maximize community connectivity by addressing transportation and land use together;
- Incorporate the benefits of technology;
- Identify funding and legislative initiatives needed to implement the Plan; and
- Enhance Northern Virginia relationships among jurisdictions, agencies, the public, and the business community.

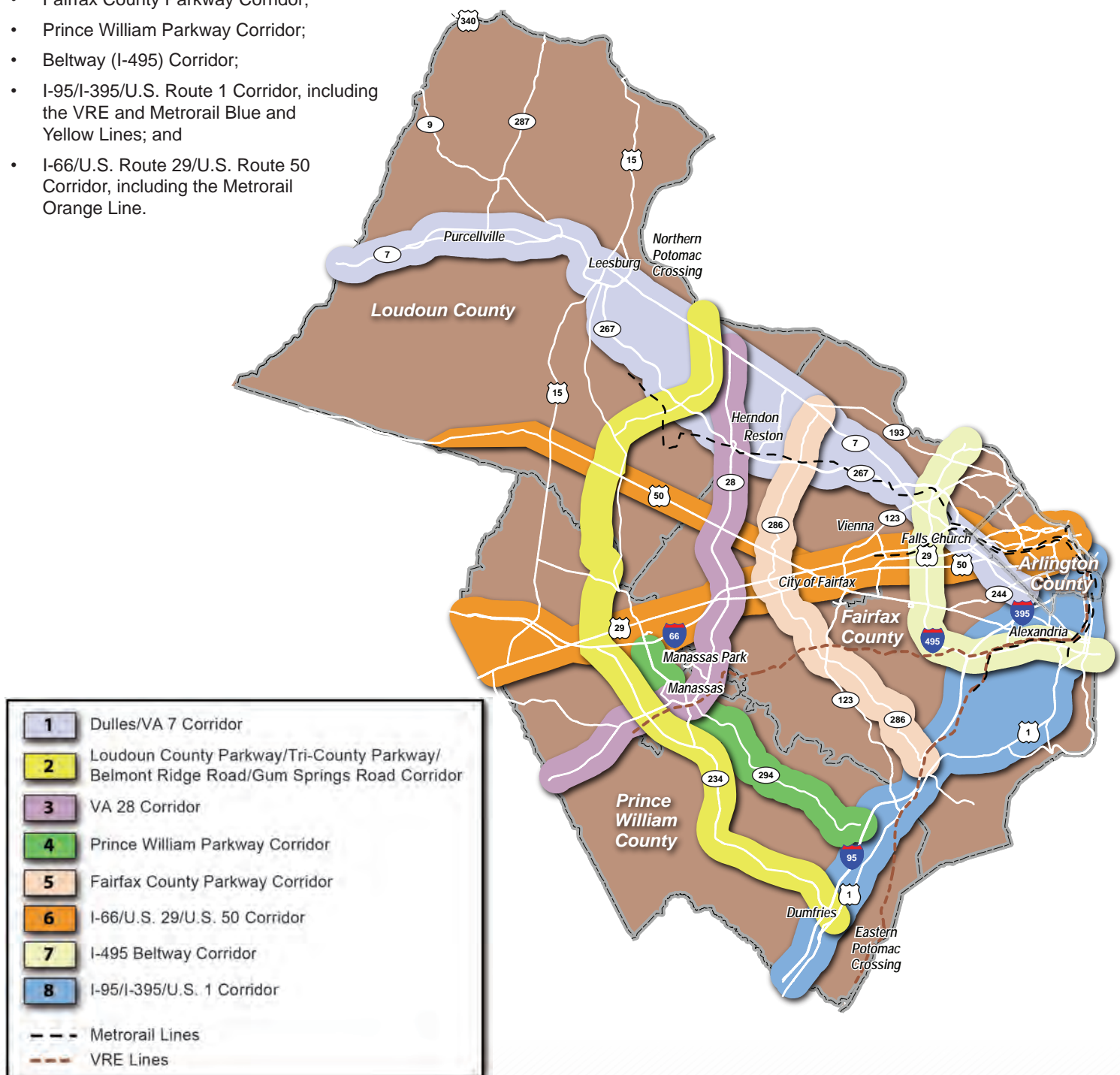


# TransAction 2040 Plan Area

## Communities and Facilities Covered in TransAction 2040

TransAction 2040 covers the counties of Arlington, Fairfax, Loudoun, and Prince William; the cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park; and the towns of Dumfries, Herndon, Leesburg, Purcellville, and Vienna. The plan includes a category of non corridor-specific improvements as well as roadway, transit, bicycle, and pedestrian projects in the eight corridors specified below:

- Virginia Route 7 and Dulles Toll Road Corridor, including the future Metrorail Silver Line;
- Virginia Route 28 Corridor;
- Loudoun County Parkway/Tri-County Parkway/Belmont Ridge Road/Gum Springs Road Corridor;
- Fairfax County Parkway Corridor;
- Prince William Parkway Corridor;
- Beltway (I-495) Corridor;
- I-95/I-395/U.S. Route 1 Corridor, including the VRE and Metrorail Blue and Yellow Lines; and
- I-66/U.S. Route 29/U.S. Route 50 Corridor, including the Metrorail Orange Line.

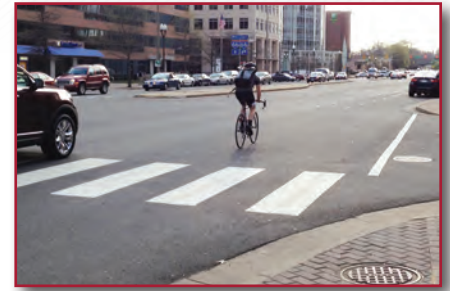


# TransAction 2040 Plan Methodology

To identify future transportation improvements that are cost effective and meet the goals for the Northern Virginia and Metropolitan Washington region, a number of project activities were undertaken.

## Individual Project List

TransAction 2040 Subcommittee members identified transportation system improvement projects in the plan area and their associated cost estimates. Two primary types of projects identified for TransAction 2040 included: 1) projects developed in the TransAction 2030 Plan; and 2) new projects since the TransAction 2030 Plan effort. The NVTA approved a proposed project list which details transportation needs across modes, including transit, highway, bicycle, pedestrian, intelligent transportation systems (ITS), and travel demand management (TDM). The projects range in size from small, localized improvements to major new highways or LRT lines. The final project list includes over 100 highway projects, which add 785 lane miles and include numerous bicycle/pedestrian improvements; more than 50 transit projects; and over 40 additional projects specifically to improve bicycle/pedestrian travel.



Corridor	Highway	Transit	Bicycle/Pedestrian
Dulles/VA 7 Corridor	18	5	4
Fairfax County Parkway Corridor	7	1	0
I-495 Beltway Corridor	5	4	5
I-66/U.S. 29/U.S. 50 Corridor	22	14	7
I-95/I-395/U.S. 1 Corridor	21	22	9
Loudoun County Parkway/Tri-County Parkway/Belmont Ridge Road/Gum Springs Road Corridor	7	1	6
Prince William Parkway Corridor	3	0	0
VA 28 Corridor	15	2	3
Other	9	9	8

## Analyze Projects Using the Regional Computer Model

Once the proposed TransAction 2040 projects were identified, the regional computer model for travel forecasting adopted by the National Capital Region TPB was used to forecast travel patterns under three scenarios. Each of the scenarios was tested to see how the different combinations of transportation projects would impact regional mobility.

### Scenario 1: Current

Existing land use and transportation network.

### Scenario 2: Baseline

Year 2040 land use and transportation network representing all projects in the CLRP in place, including the Silver Line and I-495 Express Lanes.

### Scenario 3: Build

Year 2040 land use and transportation network, including all projects in the CLRP and all proposed TransAction 2040 projects.





## Preliminary Project Prioritization

A project scoring approach was developed using a comprehensive set of qualitative and quantitative evaluation measures and a benefit/cost (b/c) analysis. A project prioritization process was then conducted within corridors and by project type (e.g., bicycle/pedestrian, transit, highway).

Fifteen evaluation criteria were used to consider potential program and project benefits: Freight Movement, Improved Bicycle and Pedestrian Travel Options, Multimodal Choices, Urgency, Project Readiness, Reduce Vehicle Miles of Travel (VMT), Safety, Person Throughput, Reduce Roadway Congestion, Reduce Time Spent Traveling, Environmental Sensitivity, Activity Center Connections, Land Use Support Transportation Investment, Management and Operations, and Cost Sharing. Each project was given a “low,” “medium,” or “high” score depending on how well it met each of the evaluation criteria.

Once each project was scored, a b/c methodology was employed, which considered the project score as well as the project cost. To calculate the b/c rating, the total score of each project was divided by a project cost index. The project cost index normalizes project costs (expressed in dollars) into a 100-point scale to allow for a common scale of the benefit and costs, ensuring the process provides comparability between the benefit and cost.

## Revise Project List

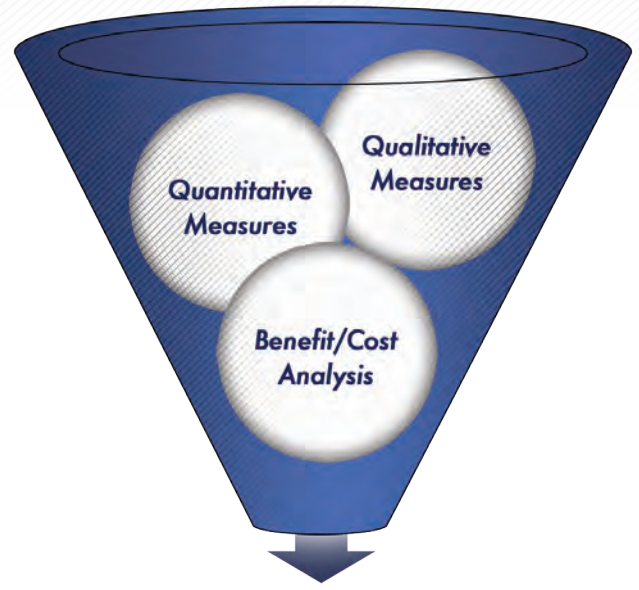
An Open House was held for the public and stakeholders to review the prioritized list of projects and help NVTa determine project priorities and suggest additional transportation projects. Based on this input and input from the oversight committees, 10 additional actions were included, adding to the TransAction 2040 project list.

## Analyze New and Revised Projects

Using the regional computer model, projects resulting from the additional actions were tested in Scenario 4, Build 2 to see how they would impact regional mobility.

## Finalize Project Prioritization

Together, the score and the benefit/cost rating for all of the projects can inform decisions about priorities for investments, recognizing that there remain challenges to funding all desired transportation improvements.

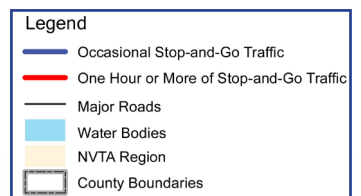
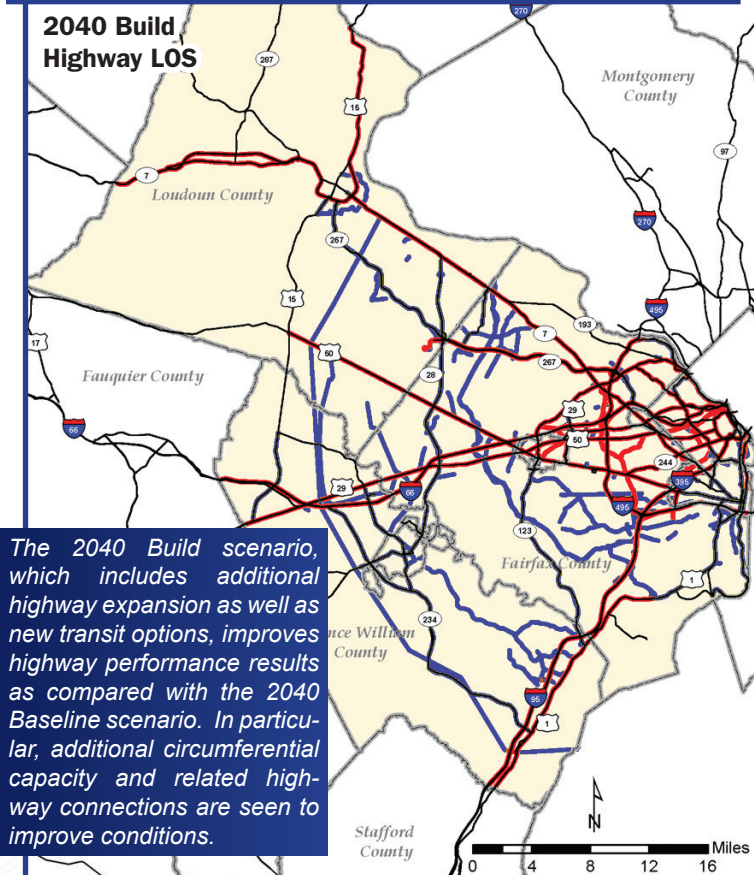
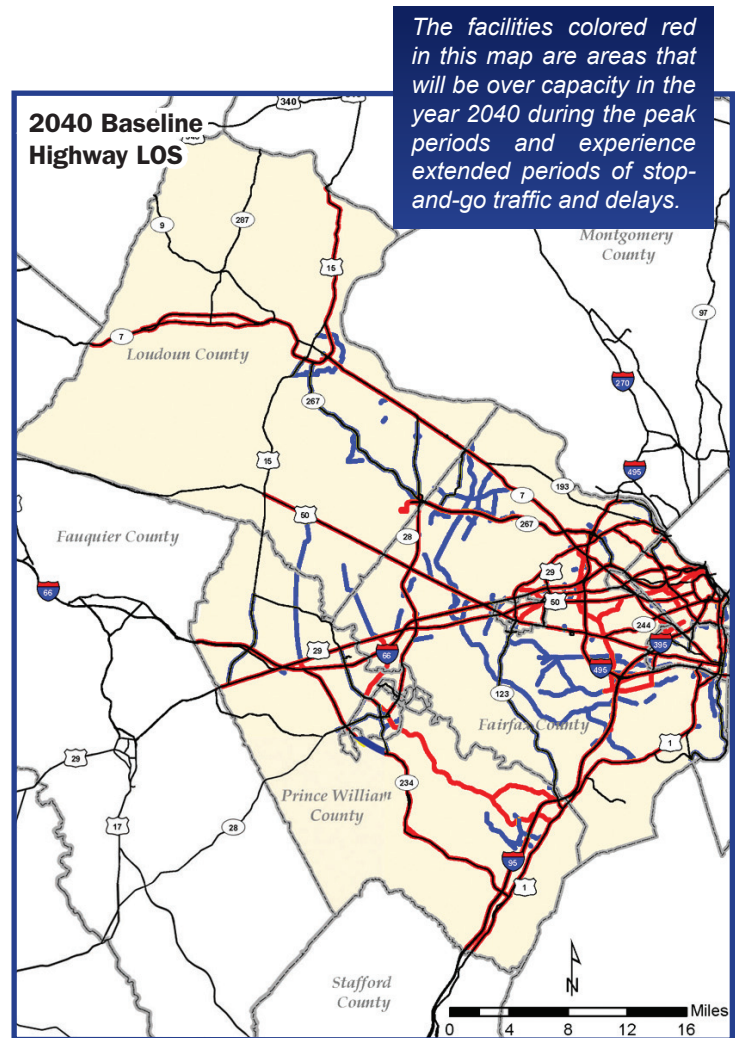
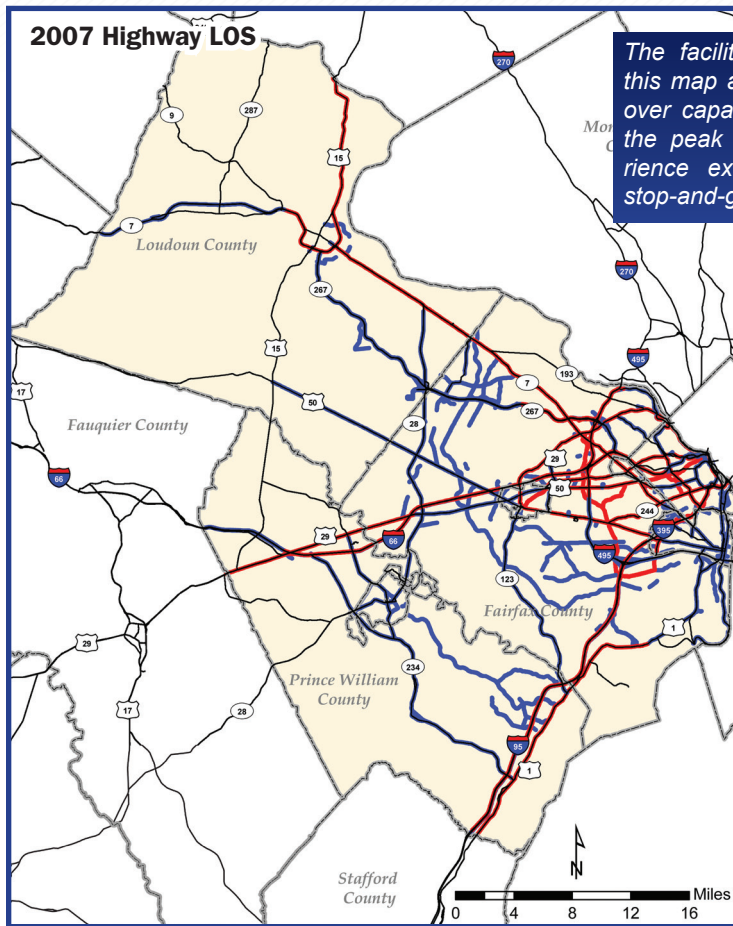


### Scenario 4: Build 2

Year 2040 land use and transportation network, including all projects in the CLRP, proposed TransAction 2040 projects, and additional actions. Some of these additional actions are not in jurisdictional comprehensive plans and would require further study before additional action was taken.

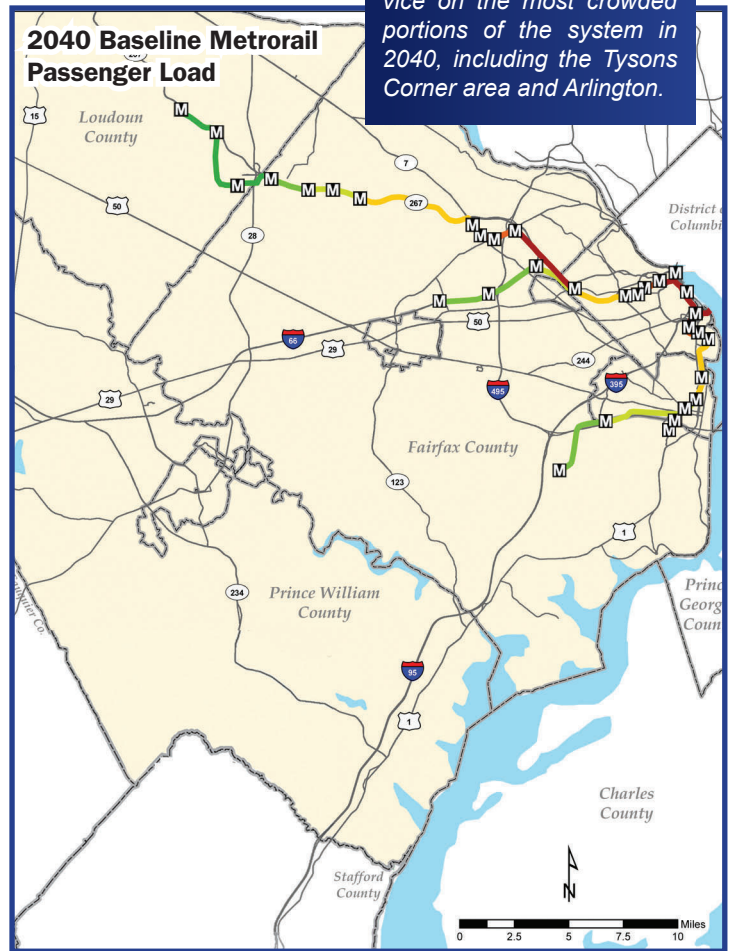
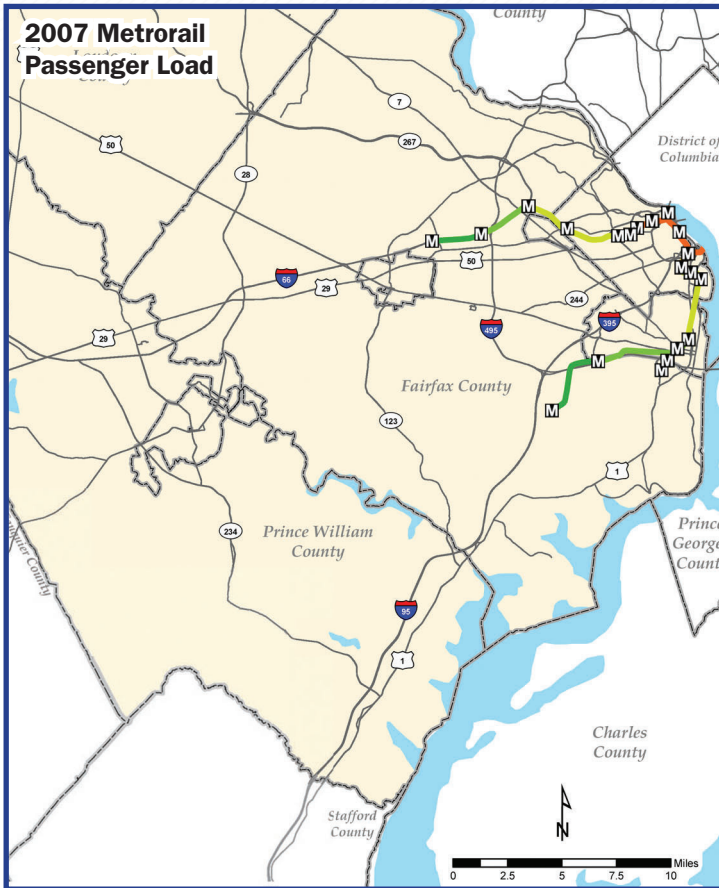


# Highway System Performance

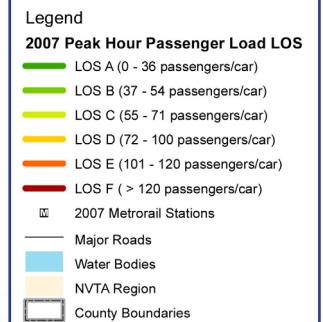




# Metrorail System Performance



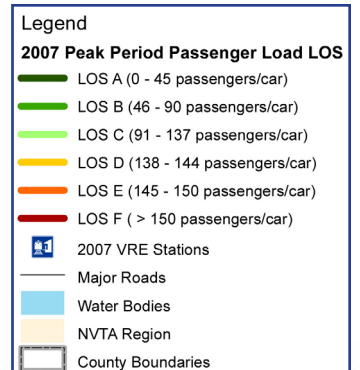
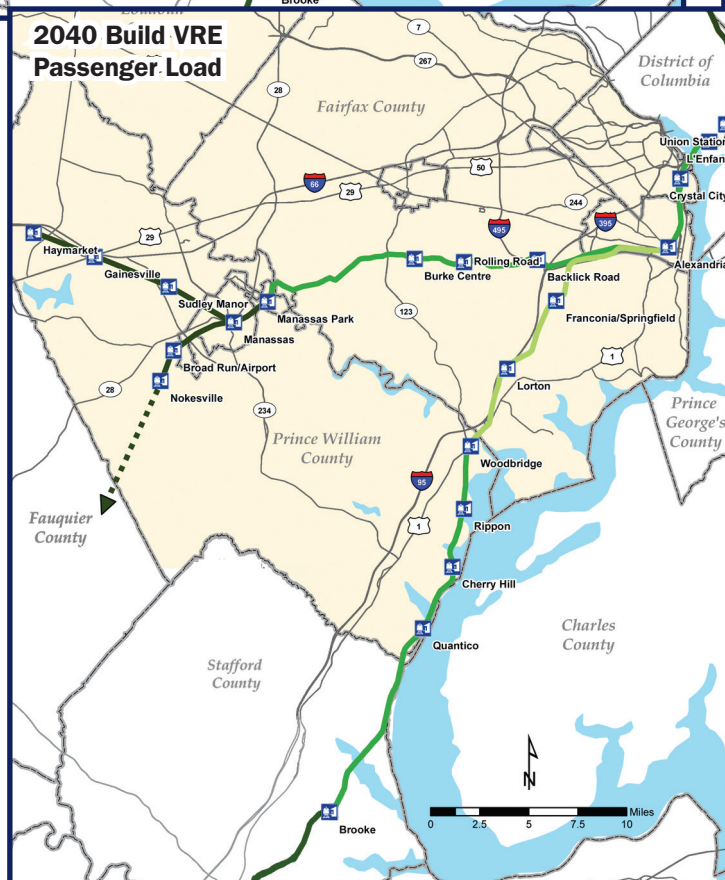
The proposed improvements to the Metrorail system included in the TransAction 2040 project list improve the level of service on the most crowded portions of the system in 2040, including the Tysons Corner area and Arlington.



# VRE System Performance



The proposed VRE expansions and improvements included in the TransAction 2040 project list help alleviate congestion on crowded trains in 2040, especially on the Fredericksburg line.





# Technical Evaluation Findings

## Regional and Corridor Level Observations

The technical evaluation and travel demand modeling show a number of findings at the regional and corridor level:

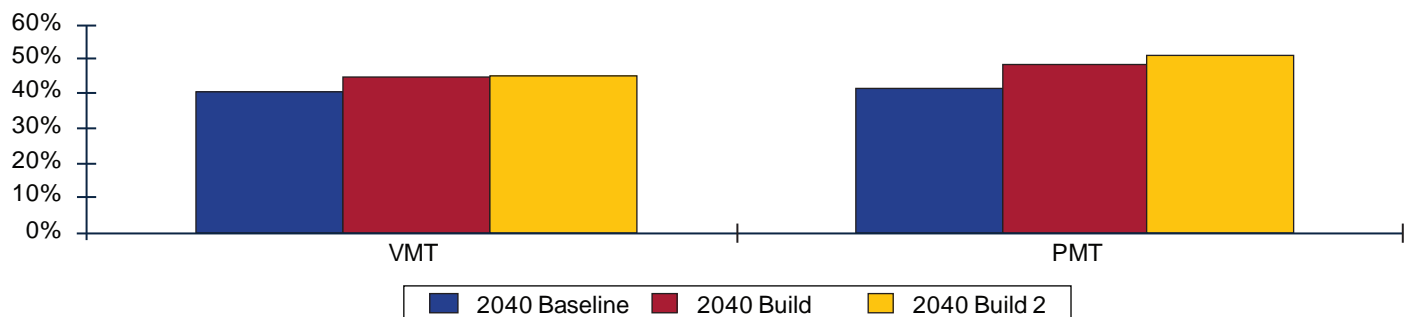
- All corridors have expanded multimodal capacity.
- The increased activity and travel pattern changes that are forecast for 2040 result in increased travel. Many corridors experience worsening congestion under the 2040 Baseline.
- The TransAction 2040 projects do help, although there is still congestion present.
- On the transit side, TransAction 2040 offers extensive improvements that result in improved level of service.
- TransAction 2040 does not eliminate congestion, but it does expand mobility options and improves travel conditions as compared with the 2040 Baseline scenario.
- Comparing 2007 to 2040 Baseline, more vehicle travel occurs on congested roadways in nearly all of the corridors.
- Comparing 2040 Baseline to 2040 Build, more vehicle travel occurs on uncongested roadways in virtually all of the corridors; this shows that the Build projects help reduce congestion.
- Despite major improvements, the 2040 Build scenario still has higher levels of congestion than 2007.

Further evaluation included an assessment of person miles of travel (PMT), vehicle miles of travel (VMT), work trip mode share, and job accessibility. Major observations are described and shown in graphs.

## Person Miles of Travel and Vehicle Miles of Travel

- PMT increases in all of the 2040 scenarios compared to 2007 conditions, indicating increased multimodal travel opportunities in both of the Build scenarios.
- In each of the 2040 scenarios, PMT increases more than VMT, clearly indicating that more people are using alternatives, such as bus, rail, and ridesharing, to single occupancy vehicles (SOV).

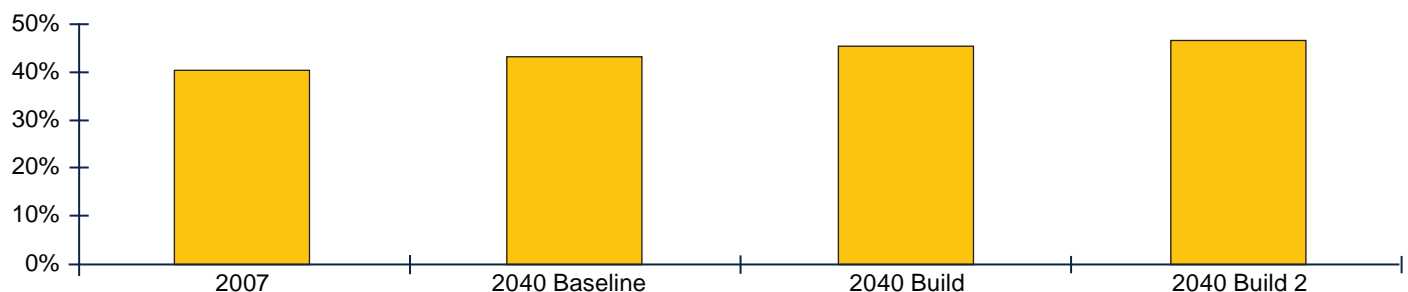
### Increase in Travel Compared to 2007



## Work Trip Mode Share

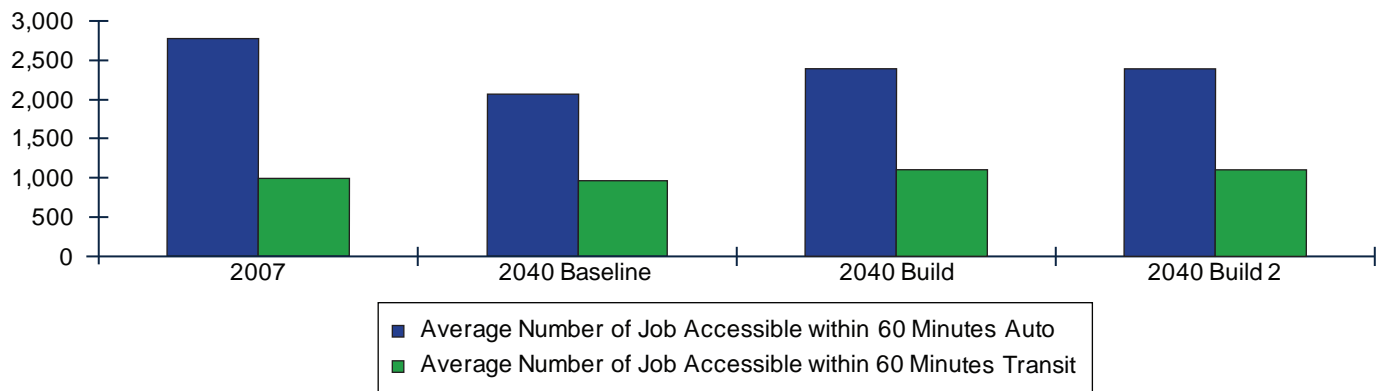
- Mode share (percentage of trips) for non-SOV modes, including transit and HOV, also increases for work trips in 2040.
- Projects in both of the Build scenarios further increase the use of alternative modes, such as bus, rail, and ridesharing.

### Percent Non-SOV Work Trips



## Job Accessibility

- The figure shows the number of regional jobs (including downtown D.C.) that are accessible to households in the NVTJ jurisdictions.
- Due to increased congestion by 2040, the 2040 Baseline scenario shows a decrease in accessibility, or increase in travel, as compared to 2007 results.
- Projects in both of the Build scenarios decrease congestion and improve accessibility for automobiles compared to the 2040 Baseline scenario.
- Projects in both of the Build scenarios include major transit investment projects, increasing transit accessibility over the 2040 Baseline scenario.



## Cost Estimates

TransAction 2040 combined the cost estimates for projects currently in the Northern Virginia portion of the CLRP with estimates for the additional TransAction 2040 improvements. The Northern Virginia CLRP projects and the TransAction 2040 additional recommended improvements represent nearly \$42 billion in transportation infrastructure and service expansion and \$44 billion in highway and transit operations and preservation from 2011 to 2040. All figures are in 2011 dollars.

Project Type	Capital Costs (2011 \$)	Operating Costs (2011 \$)	Total Costs (2011 \$)
<b>Northern Virginia Portion of Region's Constrained Long-Range Plan<sup>(a)</sup></b>			
	(2011-2040)	(2011-2040)	(2011-2040)
Highway	\$7.7 billion	\$21.1 billion	
Transit	\$10.9 billion	\$18.5 billion	
<b>Total</b>	<b>\$18.5 billion</b>	<b>\$39.7 billion</b>	<b>\$58.2 billion</b>
<b>TransAction 2040 Additional Projects<sup>(b)</sup></b>			
Project Types	(2011-2040)	(2040)	(2011-2040)
Highway	\$9.3 billion	\$16 million	
Transit	\$13.2 billion	\$312 million	
Bicycle/Pedestrian	\$640 million	\$1.2 million	
Technology	\$58 million	\$1.0 million	
<b>Total</b>	<b>\$23.2 billion</b>	<b>\$330 million<sup>(c)</sup></b>	<b>\$27.5 billion<sup>(d)</sup></b>
<b>Combined Project List</b>			
	(2011-2040)	(2011-2040)	(2011-2040)
<b>Total</b>	<b>\$41.7 billion</b>	<b>\$44.0 billion</b>	<b>\$85.7 billion</b>

<sup>(a)</sup> CLRP "Operating Costs" includes costs identified as for "Preservation." Data Source: Analysis of Resources for the 2010 Financially Constrained Long-Range Transportation Plan for the Washington Region, Cambridge Systematics, November 2010.

<sup>(b)</sup> Figures include all projects in the Build 2 Scenario.

<sup>(c)</sup> Figure represents the reported annual operating cost for all projects in year 2040. Total operating cost for the period 2011 to 2040 is estimated as \$4.3 billion based on aggregating the annual operating cost for each project multiplied by the number of operating years for the project as derived based on its project readiness ratings.

<sup>(d)</sup> Determined by adding the capital cost and derived operating cost for the indicated period.



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## Acknowledgments

### Northern Virginia Transportation Authority Membership

Hon. Martin Nohe, NVTa Chairman, Prince William County  
Hon. William D. Euille, NVTa Vice Chairman, City of Alexandria  
Hon. R. Scott Silverthorne, City of Fairfax  
Hon. Sharon Bulova, Fairfax County  
Hon. Harry J. “Hal” Parrish, II, City of Manassas  
Hon. Bryan Polk, City of Manassas Park  
Hon. David Snyder, City of Falls Church  
Hon. Suzanne Volpe, Loudoun County  
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Hon. Adam Ebbin, Virginia Senate  
Hon. Joe T. May, Virginia House of Delegates  
Hon. Thomas Davis Rust, Virginia House of Delegates  
Kerry Donley, Governor’s Appointee  
Gary Garczynski, Governor’s Appointee, CTB Member  
Garrett Moore, VDOT  
Thelma Drake, VDRPT  
Robert Lazaro, Town of Purcellville  
Hon. Mary Margaret Whipple, Virginia Senate \*  
Hon. Jane Seeman, Town of Vienna \*  
Hon. Scott K. York, Loudoun County \*  
Hon. Robert F. Lederer, City of Fairfax \*

\* Former Members

## Oversight Bodies and Coordination

Four oversight bodies have been involved throughout the TransAction 2040 update process, providing valuable feedback on the technical evaluation, key findings, and public materials. Membership for the TransAction 2040 Subcommittee, Planning Coordination Advisory Committee (PCAC), the Technical Advisory Committee (TAC), and the Jurisdiction and Agency Coordination Committee (JACC) included representatives from:

Arlington County	Prince William County
City of Alexandria	Town of Dumfries
City of Fairfax	Town of Herndon
City of Falls Church	Town of Leesburg
City of Manassas	Town of Purcellville
City of Manassas Park	Town of Vienna
Fairfax County	Virginia Railway Express
Loudoun County	Virginia Department of Transportation
Northern Virginia Transportation Commission	Virginia Department of Rail and Public Transportation
Potomac and Rappahannock Transportation Commission	Washington Metropolitan Area Transit Authority