

# THE VALUE OF METRORAIL AND VIRGINIA RAILWAY EXPRESS TO THE COMMONWEALTH OF VIRGINIA



September 2017

*Metrorail and the Virginia Railway Express (VRE), the state's only commuter railroad, are the backbone of Northern Virginia's transit system, moving approximately 293,000 people on an average weekday in Northern Virginia. These systems get people to work, help create thriving communities and relieve congestion on roadways. They also fuel economic development across Northern Virginia. High density development clustered around rail stations produces property tax and other revenues that help fund schools, parks, and a range of public services in our communities. The local economic value of high capacity transit is well studied, yet Metrorail and VRE also produce significant revenues for the Commonwealth of Virginia. In fact, the households and jobs supported by Metrorail and VRE generate over \$600 million in state general fund revenues.*

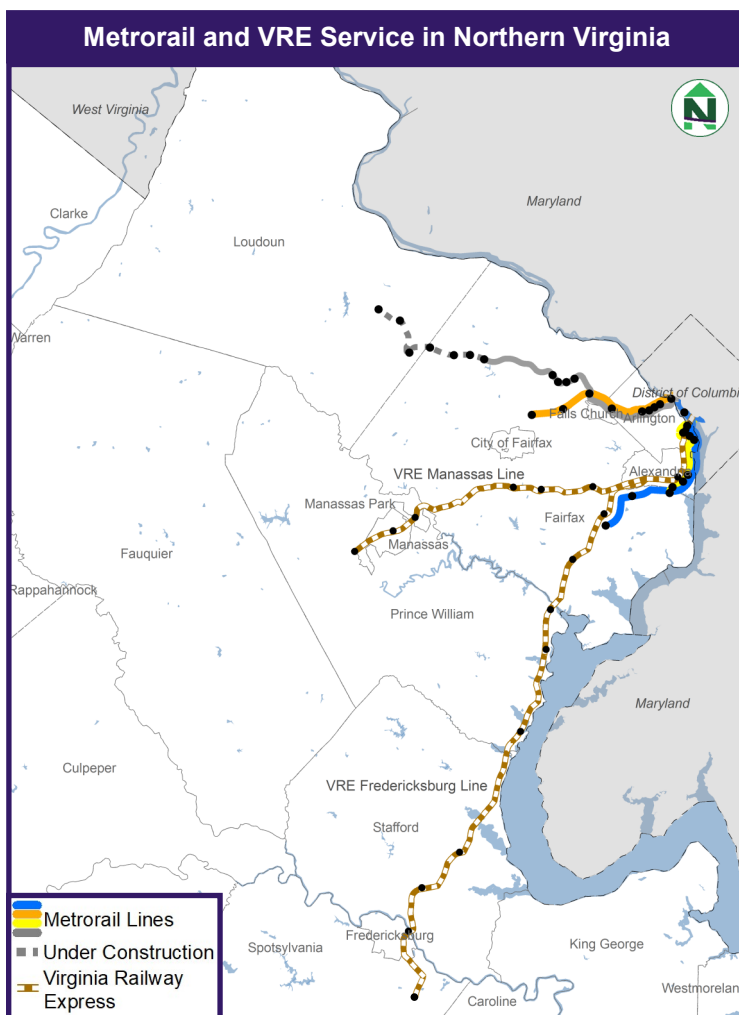


Figure 1 Source: NVTC

## OVERVIEW

NVTC's analysis finds that:

- The presence of Metrorail and VRE supports an additional 85,000 households and 130,500 jobs in Northern Virginia.
- Those households and jobs generate more than \$600 million annually in sales and income tax revenue that flow to the state's general fund.
- Given Virginia's annual transit operating and capital contribution to Metrorail and VRE (about \$170 million budgeted in fiscal year 2018), the return on investment to the Commonwealth exceeds 250 percent.
- \$600 million, which represents just over 3 percent of general fund revenues, covers Virginia's annual, general fund expenditures on state colleges and universities (about \$316 million) and state police (about \$266 million).

## BACKGROUND

The benefits that accrue to communities served by rail are well documented. Several studies — including one in [2011 by the Washington Metropolitan Area Transit Authority \(WMATA\)](#) and another

in 2017 by the Metropolitan Washington Council of Governments (COG) — demonstrate the value of transit to localities in the greater Washington, D.C. region. According to WMATA:

- \$235 billion of property value is within a half-mile of Metrorail stations.
- This land generates \$3.1 billion annually in property tax revenues.
- This land represents 28 percent of the jurisdictions' property tax base, but only 4 percent of their land.
- Proximity to Metrorail increases property values by 7 to 9 percent.

COG notes that \$25 billion of development has occurred near Metro stations over the past eight years.

With Metrorail experiencing track segment shutdowns to handle a backlog of deferred maintenance and as discussions about finding dedicated funding for WMATA gained traction in late 2016, NVTC planners considered whether the economic benefits associated with the rail system extended beyond the property taxes collected by local jurisdictions. The question arose as to what value Metrorail and VRE, which NVTC co-owns, bring to Virginia.

NVTC planners applied a model to determine the additional number of households and jobs that exist in Northern Virginia resulting from rail service. The model used the existing level of roadway congestion as a base and then determined the likely level of congestion and deterioration in travel times were Metrorail and VRE not available. Staff then rebalanced households and jobs in the region until they reached the level of congestion that currently exists on Northern Virginia's roadways.

Part of what distinguishes this study from previous ones, including [reports issued by NVTC in 1994 and 2005](#), is that it is dynamic rather than static, accounting for the level of activity that the regional transportation network can support. NVTC's approach is unique in that it evaluates the interaction between land use and transportation demand. The study found that the presence of Metrorail and VRE alone supports an additional 85,000 households and 130,500 jobs in Northern Virginia, which enhances the amount of sales and income taxes collected by the Commonwealth. The fact is that the entire state reaps dividends — to the tune of approximately \$600 million in general

fund revenues — from Metrorail and VRE service in Northern Virginia.

### *Where in Northern Virginia Do Metrorail Riders Live?*

Of the approximately 665,000 Metrorail riders per weekday, 30 percent live in Virginia. More than 90 percent of Virginia's average weekday riders come from NVTC jurisdictions — the counties of Arlington, Fairfax and Loudoun and cities of Alexandria, Fairfax and Falls Church. Given the extent of VRE service and other commuter connections, over 13,000 of Metrorail's average weekday riders live in Virginia outside of NVTC jurisdictions. Many of these riders live south and west of the compact area and use VRE to connect to Metrorail in Virginia or the District of Columbia. About a third of Virginia riders live within a half mile of a Metrorail station.

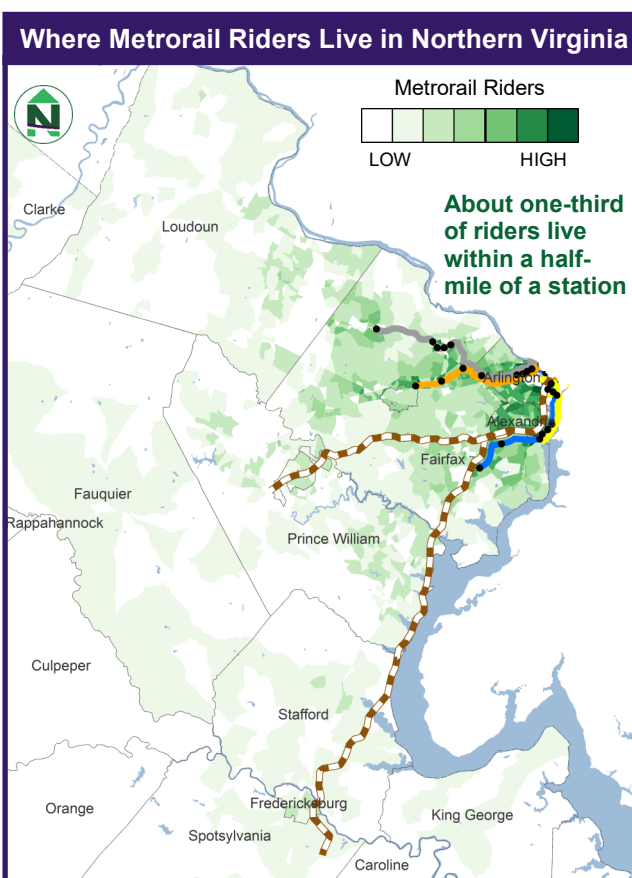


Figure 2 Source: NVTC and WMATA 2016 Metrorail Survey  
Ridership weighted by population per traffic analysis zone

### *Who rides Metrorail in Northern Virginia?*

Virginians access Metrorail stations by walking (38 percent), taking the bus (27 percent), and driving and parking (21 percent). Thirty-seven percent of Virginia riders are federal employees and 50

percent have household incomes greater than \$100,000. There are over 300,000 jobs within a half mile of Virginia Metrorail stations and Metrorail is commonly used by residents of the district, Maryland and Virginia to commute to these jobs.

**Where Metrorail Riders Live in Northern Virginia's Inner Suburbs**

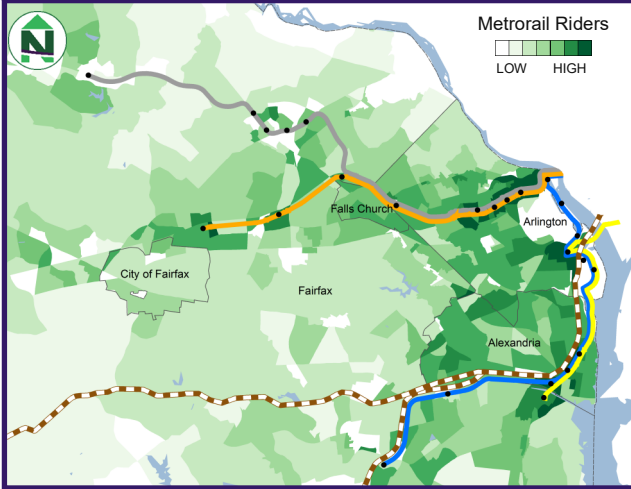


Figure 3 Source: NVTC and WMATA 2016 Metrorail Survey  
Ridership weighted by population per traffic analysis zone

**Where do VRE riders live in Northern Virginia?**

VRE provides roughly 20,000 trips on an average weekday. Given that VRE is a commuter railroad, its ridership extends farther in the region than Metrorail. Over 60 percent of VRE's riders come from Stafford, Fairfax, Prince William and Spotsylvania counties.

**How much does the Commonwealth spend on Metrorail and VRE?**

Virginia spends about \$170 million annually on Metrorail and VRE from its transit capital and operating funds, which total nearly \$380 million for all transit in the Commonwealth in fiscal 2018. The revenue for these funds comes from a variety of sources, including the recordation tax, retail sales and use tax, statewide motor vehicle fuels tax and 10-year Capital Project Revenue (CPR) bonds. The expected revenue sources for the CPR debt service payments are insurance premium taxes and the statewide motor vehicle fuels tax.

**How is WMATA funded in Virginia?**

In Virginia, WMATA is funded by the localities identified in the WMATA Compact: Fairfax and Arlington counties and the cities of Alexandria, Falls Church and Fairfax. Loudoun County will join in supporting Metro as the Silver Line Phase 2

**Metrorail Riders in Virginia by Household Income**

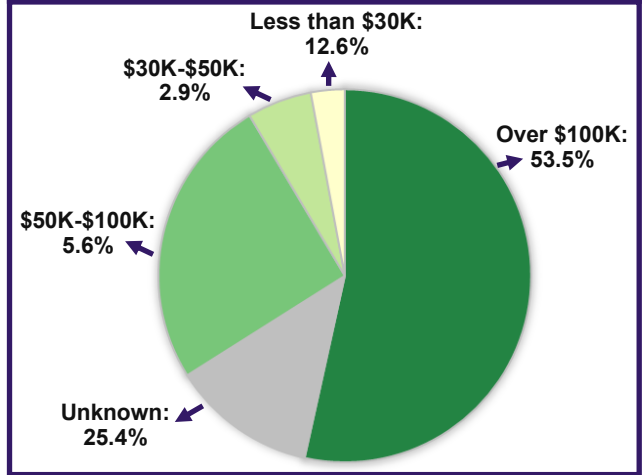


Figure 4 Source: WMATA 2016 Metrorail Survey

becomes operational. NVTC jurisdictions primarily use local funds to meet this obligation, with a considerable portion of expenditures reimbursed by the Commonwealth. Regardless of the availability of state funds, the local jurisdictions are responsible for meeting Metro's financial needs.

**Where VRE Riders Live in Northern Virginia**

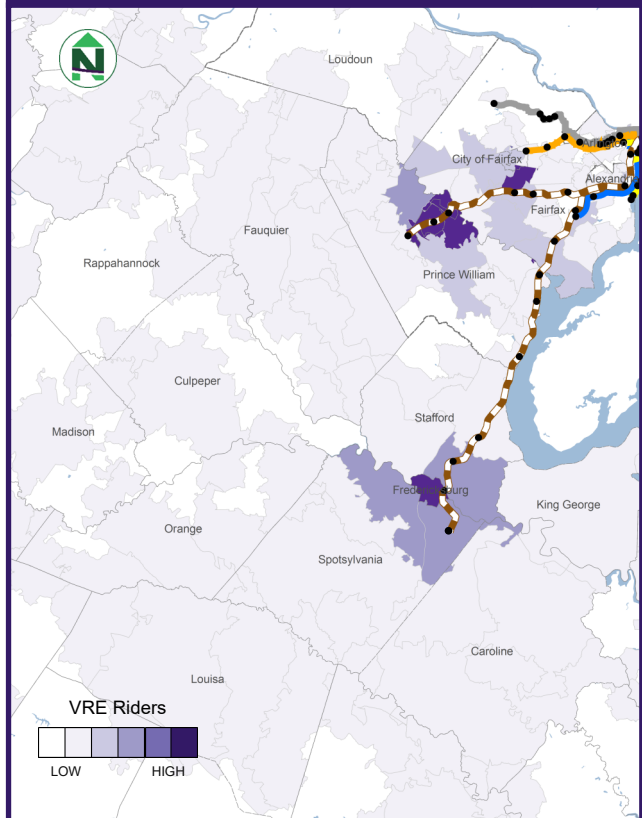


Figure 5 Source: NVTC and VRE 2016  
Ridership weighted by population per zip code

Funding sources for local government use include:

- General funds
- General obligation bonds
- Northern Virginia Transportation Authority 30-percent funds
- 2.1 percent regional gas tax revenues

In fiscal 2018, the Commonwealth budgeted about \$195 million for WMATA operating and capital subsidies. This funding is for all WMATA modes: Metrorail, Metrobus and MetroAccess. Based on the Department of Rail and Public Transportation’s (DRPT) funding methodologies, the commonwealth’s budget for Metrorail is \$146 million. The

funding comes from DRPT’s transit capital and transit operating funds.

State Support for WMATA, FY2018 (millions)			
	Metrorail	Metrobus/ MetroAccess	Total
Capital	\$ 26.6	\$13.1	\$ 39.7
PRIIA Match	\$ 49.5	-	\$ 49.5
Operating	\$ 69.9	\$35.5	\$105.4
Total	\$146.0	\$48.6	\$194.6

Table 1 Source: DRPT FY18 Six-Year Improvement Program and NVTC calculations. State support comes from DRPT transit capital and operating funds.

*How is VRE funded in Virginia?*

VRE’s capital and operating expenditures are funded by a combination of sources, including passenger revenue, federal formula transit and rail funds, Commonwealth of Virginia funds, local jurisdictional contributions, in-kind contributions, regional funding, local matches, and other revenues. In fiscal 2018, the Commonwealth budgeted over \$26 million for VRE operating and capital funding from DRPT’s transit capital and operating programs. VRE is eligible for and has received funding from DRPT’s rail programs and from the Virginia Department of Transportation’s SMART SCALE program for capital expansion projects.

Because they are not used for VRE’s current or ongoing capital and operating needs, these funds are not included in the table below.

State Support for VRE, FY2018 (millions)	
	Total
Capital	\$16.7
Operating	\$ 9.6
Total	\$26.3

Table 2 Source: DRPT FY18 Six-Year Improvement Program and NVTC calculations. State support comes from DRPT transit capital and operating funds.

**Threats to Rail Transit Funding in Northern Virginia**

**Regional Gas Tax**

A flaw in the 2.1 percent regional gas tax has led to a more than 40 percent decline in revenues between fiscal 2017 and 2013, when gas prices were at their highest. The regional gas tax – unlike the state tax, which no matter how low the price of gas goes has a fixed minimum – has no bottom threshold. Receipts from the regional gas tax are used by local jurisdictions to support their financial commitment to WMATA.

**Transit Capital Funding Shortfall**

With the expiration of CPR bonds, the amount available for transit capital investments in Virginia will begin to drop by \$110 million or more than 40 percent in fiscal 2019. Legislative action is needed to insure adequate support for all transit agencies in the Commonwealth, including NVTC jurisdictions that rely on these funds for reimbursement of their WMATA capital subsidies. This funding shortfall could jeopardize the Commonwealth’s ability to fund its \$50 million match required under the federal Passenger Rail Investment and Improvement Act of 2008.



**Methodology for Calculating the Value of Metrorail and VRE to the Commonwealth**

1) *Determine the existing level of roadway congestion*

Use the regional land use and transportation model to calculate the existing level of roadway congestion in Northern Virginia.

2) *Calculate the households and jobs supported by high capacity transit*

Remove Metrorail and VRE from the transportation model in Northern Virginia and recalculate roadway congestion. Rebalance households and jobs across the region until congestion reaches current levels.

3) *Estimate state revenues*

With the number of households and jobs supported by Metrorail and VRE calculated, estimate the annual contribution to Virginia’s general fund from state income and sales taxes.

**THE VALUE OF METRORAIL AND VIRGINIA RAILWAY EXPRESS TO COMMUTERS IN THE REGION**

In quantifying the value that Metrorail and VRE bring to the Commonwealth, NVTC determined the amount of land use and development that could be supported with only the current roadway and bus networks. The existing level of roadway congestion was used as the base level. The regional travel demand forecast model was then run without Metrorail and VRE to assess the likely level of congestion and deterioration in travel times. Households and jobs were removed to return the level of congestion to what exists today. Congestion was measured by the distance of the average commuter trip and the distribution of congested lane miles of travel.

Commuters have a travel time budget. Based on the congestion level, a specific trip can travel only so far in a given amount of time. Historical data shows little change in average commuter travel times for mature urban areas. The Metropolitan Washington Council of Governments (COG) does regional household travel surveys, which consistently show an average commuter trip travel time of about 30 minutes.

Existing Average Commuter Trip Distance for All Modes by Jurisdiction (miles)	
Jurisdiction	Average Commuter Trip Distance
Arlington	7.89
Alexandria	9.26
Fairfax	11.64
Loudoun	17.22
Prince William	17.06
Northern Virginia Combined	13.44

Table 3 Source: Transportation Planning Board V2.3.66 Travel Demand Forecast Model

Following the removal of Metrorail in Northern Virginia and VRE from the model, households and jobs were shifted to Maryland and the district. The model was run iteratively until the average commuter trip distance matched what currently exists. The level of congestion on the roadway network was also matched to the existing level.

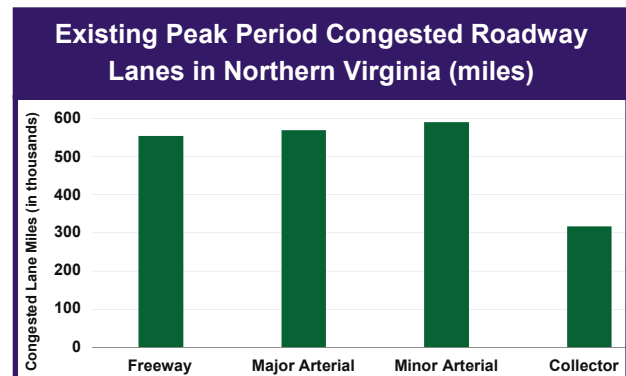


Figure 6 Source: Transportation Planning Board V2.3.66 Travel Demand Forecast Model

The first model runs removed rail transit in Northern Virginia and held to the existing land use totals. The results of these runs demonstrate the importance of rail in Northern Virginia. With the added congestion, commuters could not travel as far in the same amount of time. Their trip length decreased by about 5 percent, which is significant. By comparison, the trip length decrease projected by COG in 2040 with all funded regional projects was less than 5 percent.

The major impacts associated with a lack of rail transit in Northern Virginia are:

- 56,500 more lane miles of congestion on arterial roadways;
- 50 percent fewer transit trips in the peak period; and
- 80 percent decrease in jobs accessible by transit for Northern Virginia households.

Rail transit is an important option for commuters living inside the Beltway. Nearly half of Arlington County’s commuters use transit. That share drops to 28 percent without rail. Just under 40 percent of commuters in the City of Alexandria take transit. That number falls to 24 percent without rail. In Fairfax County, the percentage of commuters using transit drops from 17 to 6. Some of these commuters switch to buses, but the majority switch to automobiles. Without rail transit in Northern Virginia there is a loss of 130,000 daily transit trips.

Commuters Riding Transit		
Jurisdiction	Existing	Existing without Rail Modes
Arlington	49%	28%
Alexandria	38%	24%
Fairfax	17%	6%
Loudoun	4%	2%
Prince William	5%	3%
Northern Virginia Total	18%	8%

Table 4 Source: Transportation Planning Board V2.3.66 Travel Demand Forecast Model

### WHAT METRORAIL AND VIRGINIA RAILWAY EXPRESS SUPPORT IN NORTHERN VIRGINIA

The elimination of Metrorail and VRE from Northern Virginia’s transportation network significantly increased traffic congestion. Assuming that the regional total of jobs and households remains constant, achieving current levels of roadway congestion without rail transit required the rebalancing of 85,000 households and 130,500 jobs within the region to the areas of Maryland and the district with planned growth.

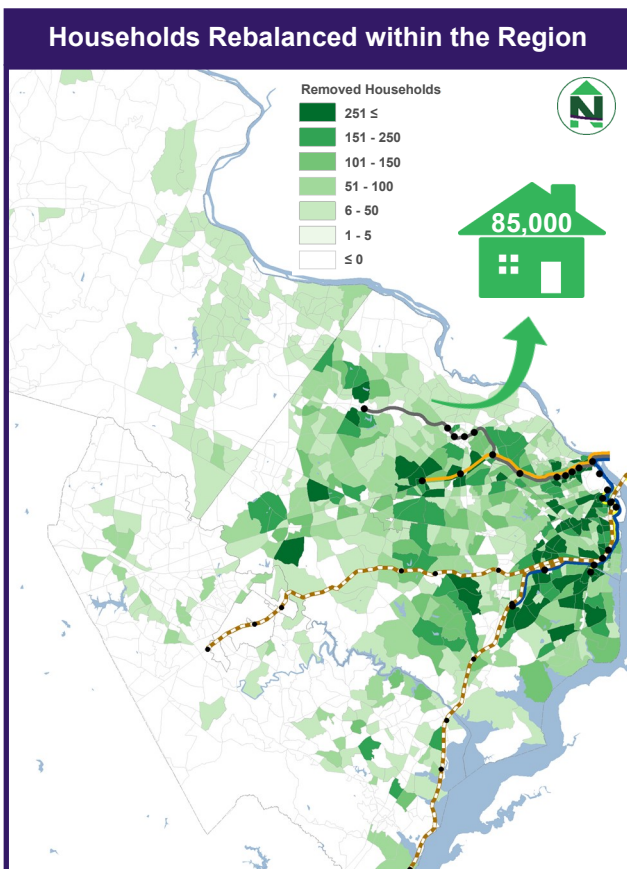


Figure 7 Source: NVTC

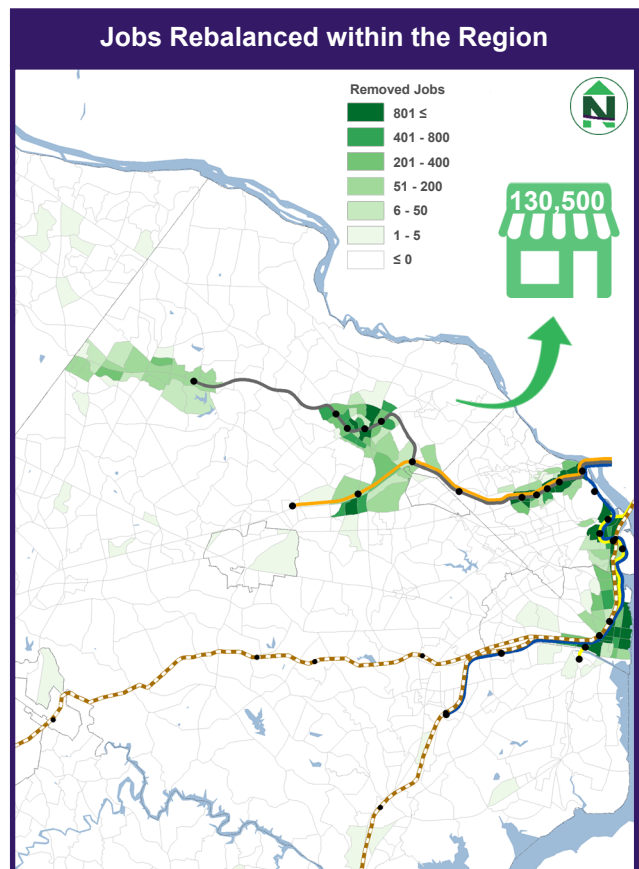


Figure 8 Source: NVTC

## THE VALUE OF METRORAIL AND VIRGINIA RAILWAY EXPRESS TO THE COMMONWEALTH

The land use supported by Metrorail and VRE generates over \$600 million in general fund revenues for Virginia. This is 3 to 4 percent of the \$18.2 billion collected in the state in fiscal 2016. For every dollar the Commonwealth invests in Metrorail and VRE, it receives \$2.50 in return.

Metrorail and VRE move large numbers of people, relieve congestion and are integral components of local land use and economic development plans. Rail transit attracts jobs and households to Northern Virginia. Whether in new apartment buildings in transit oriented developments near Metrorail stations or in more traditionally suburban

locations, these households pay income taxes to the Commonwealth of Virginia.

[Commonwealth Data Point](#) provides a frame of reference for understanding the magnitude of \$600 million dollars in general fund revenue. Looking at the [state's general fund expenditures by agency](#), this funding can be compared to various agency budgets.

By way of comparison, \$600 million is higher than the collective \$582 million in general fund spending on higher education and public safety in fiscal 2016. General fund expenditures totaled \$316 million for Virginia's universities, community college systems and the State Council for Higher Education and \$266 million for the Department of State Police.

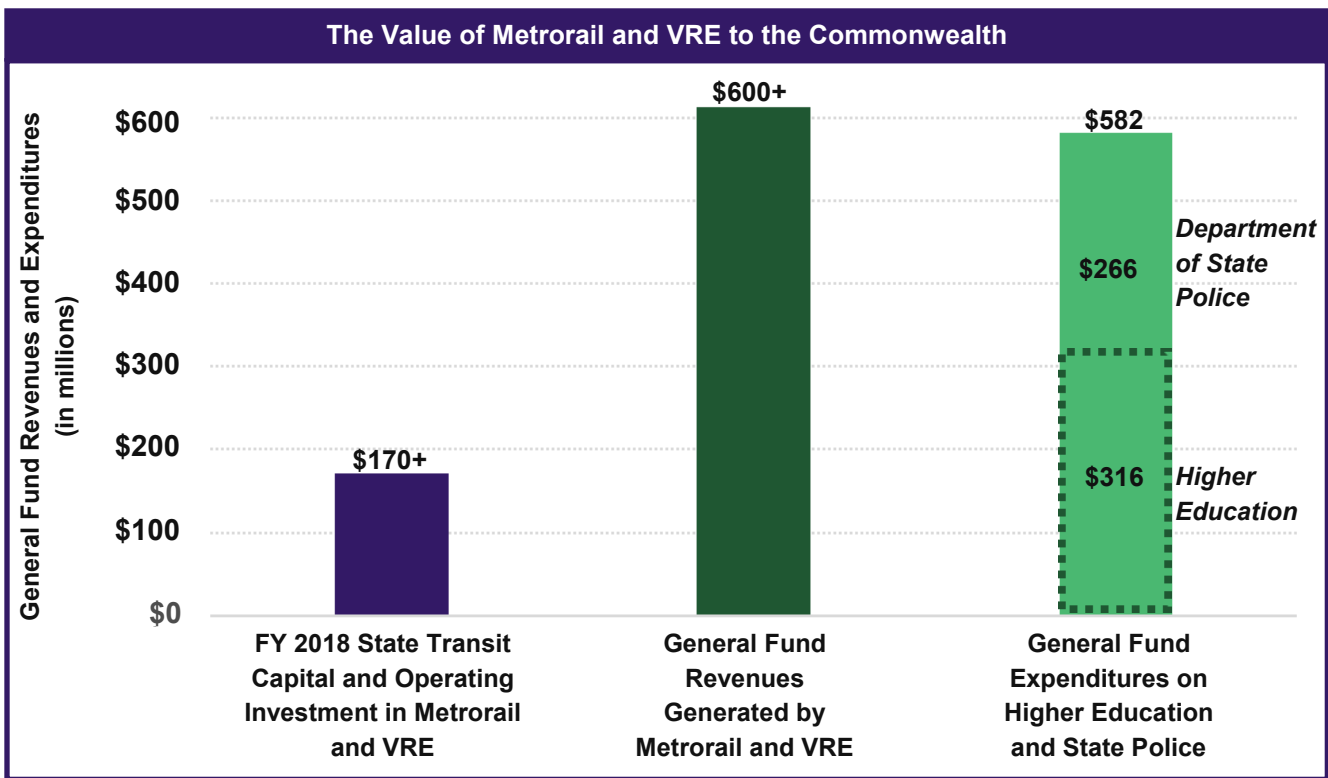


Figure 9 Source: NVTC, DRPT, and Commonwealth Data Point

### Technical Review Team

NVTC engaged staff at WMATA, the Transportation Planning Board, the Federal Transit Administration, George Mason University, and other organizations in a comprehensive technical review of the study's methodology and assumptions. These groups reviewed the work plan, technical approach, and findings and provided comments to NVTC on the study.



As the premier transit organization in Northern Virginia, NVTC brings the region together to plan, coordinate, and secure funding for transit systems that are financially sustainable and high performing. NVTC enjoys a special relationship with the Washington Metropolitan Area Transit Authority and Virginia Railway Express (VRE), as it is charged with the funding and stewardship of both. Founded in 1964, in part to represent the interests of the Commonwealth during the establishment of WMATA, NVTC continues to serve as Virginia's voice on the WMATA Board of Directors through its appointments to the panel. Following Metrorail's launch, NVTC began planning for a commuter rail service, VRE, which became operational in 1992. NVTC, as the railway's co-owner, appoints members to the VRE Operations Board. Learn more at [www.novatransit.org](http://www.novatransit.org)



Metrorail is the second largest, based on track mileage, and third busiest, based on passenger trips, heavy rail transit system in the U.S. The network includes six lines (four in Virginia), 91 stations (25 in Virginia) and 118 track miles (41 in Virginia). The Silver Line is the largest rail expansion project by route mileage since Metrorail's inception in 1976. Phase 1 opened in July 2014 and Phase 2, which will serve Dulles International Airport and Loudoun County, will open in 2020. Learn more at [www.wmata.com](http://www.wmata.com).



Virginia Railway Express (VRE) is the eighth largest, based on track mileage, and 10th busiest, based on passenger trips, commuter rail service in the U.S. It is a partnership of NVTC and the Potomac and Rappahannock Transportation Commission. VRE's mission is to provide safe, cost-effective, accessible, reliable, convenient and customer-responsive commuter rail service. It provides over 4.5 million rides annually in Northern Virginia and Washington, D.C. and is based in Alexandria. Learn more at [www.vre.org](http://www.vre.org).

**This report is a product of  
the Northern Virginia Transportation Commission**

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