ECONOMIC IMPACTS OF PUBLIC TRANSPORTATION IN THE COMMONWEALTH OF VIRGINIA

EXECUTIVE SUMMARY

Virginia Department of Rail and Public Transportation (DRPT)

February 2020

Photo 1

This study was prepared by Cambridge Systematics and the Virginia Department of Rail and Public Transportation (DRPT). The specific data and methods used to arrive at all conclusions summarized herein are presented at length in the full technical documentation of this study, titled “Economic Impacts of Public Transportation in the Commonwealth of VA, Technical Report”. All dollar figures presented are in 2018 dollars.

1. INTRODUCTION

This economic impacts study, completed by the Virginia Department of Rail and Public Transportation (DRPT) and Cambridge Systematics, examines how existing transit services and operations spending generate economic value to the state. The study utilized data on system performance, capital investments, and operating expenses for all 41 agencies providing transit services in the state, including the VRE commuter rail system and the Virginia portion of WMATA Metrorail system. The direct benefits of transit investments were estimated across a range of measures illustrating the comprehensive effects that the transit industry has on the state's economy. The economic impact of the direct benefits attributed to transit were estimated in terms of employment opportunities created, personal income earned, Gross State Product (GSP) generated, and tax revenue collected.

The study had two key objectives:

- To quantify how existing transit services generate economic value to the state; and
- To communicate the expected benefits that would come from continued investment to improve and expand transit throughout the state.

This Executive Summary provides an overview of the economic benefits and impacts that were realized in Fiscal Year 2018 (FY2018). Results are shown throughout this summary in 2018 dollars. **Key findings include:**

- A total of $1.5B was spent on transit in Virginia, including both operating and capital expenditures. Of this total, $1.2B in revenues came from public sources and $300K came from fares and other user fees.
- These transit investments led to $2.53B in direct benefits to the state, including travel time savings, transportation cost savings, avoided vehicle crashes, emissions reductions, fuel savings, employment benefits, and expenditure savings for transit riders.
- Transit investments generated roughly $3.4B in economic activity, measured by impact on Gross State Product (GSP).

Beyond these monetized economic impacts, the study reviewed a range of additional qualitative benefits attributed to the presence of transit, including positive effects on property values, public health, access to social services, the built environment, and economic development opportunities.

Photo 2

2. KEY FINDINGS

Every $1 of public investment in transit generates...

$2.86

... in economic activity statewide

(based on Gross State Product attributed to the transit sector)

Annual public investments in transit...

Support **26,940** Jobs

Create **$1.9B** in Labor Income

Generate **$3.4B** in Gross State Product (GSP)

Bring Back **$600M** in taxes

Every direct or contracted job in the transit sector supports...

4.10

... additional jobs in the state.

(based on the implicit jobs multiplier)

Every $1 of public investment in transit generates...

$2.11

... in economic benefits statewide

(based on monetized economic benefits attributed to the transit sector)

The presence and use of transit services generates...

$2.5B in monetized economic benefits statewide

$681M in Congestion Relief Savings

$60M in Traffic Crash Cost Savings

$297M in Transportation Cost Savings

$40M in Emissions and Fuel Consumption Savings

$1.5B in Income for Transit Dependent Riders

$400K in Roadway Maintenance Savings

In addition, the presence and use of transit in Virginia...

- Saves **11.3 million gallons** of fuel annually
- Saves **23.1 million hours** in highway travel time annually
- Brings **economic development opportunities** to the state
- Increases **property values** near high capacity services
- Attracts more **efficient, higher density development** around stops and stations

3. PUBLIC TRANSPORTATION IN VIRGINIA

Forty-one public transportation agencies currently provide transit services to communities throughout the Commonwealth of Virginia in the form of heavy rail, light rail, bus rapid transit, bus, paratransit, demand response, and ferry modes. Together these agencies receive over $1.2B in funds each year from federal, state, and local government sources to operate services, maintain capital assets in a state of good repair, and expand infrastructure.

In FY2018, these agencies (listed on the following page) together provided over 173 million trips, accounting for over 1.1 billion person miles traveled (PMT) and 60 million person hours traveled (PHT). To accommodate these trips, transit agencies provided more than 109 million vehicle revenue miles (VRM) and 6 million vehicle revenue hours (VRH).

The majority of transit travel took place in the Northern Virginia (NoVA) region of the state via WMATA Metrorail and Metrobus services. These services combined accounted for more than 63% of all transit trips and 52% of all person miles traveled in FY2018.

Virginia Transit Performance Metrics for All Agencies, FY2018

Figures in Millions

	Ridership	Vehicle Revenue Miles (VRM)	Vehicle Revenue Hours (VRH)	Person Miles Traveled (Estimated)	Person Hours Traveled (Estimated)
State Total (Not Including WMATA)	64.67	67.79	4.76	545.73	31.95
Washington Metropolitan Area Transit Authority (WMATA)	108.75	41.88	2.06	589.24	28.98
Grand Total	**173.42**	**109.67**	**6.82**	**1,134.97**	**60.93**

Photo 3

Public Transportation Agencies in Virginia	
Alexandria Transit Company (DASH)	Greene County Transit
Altavista Community Transit System (ACTS)	Greensville-Emporia Transit
Arlington County Transit (ART)	Hampton Roads Transit (HRT)
Bay Transit	Harrisonburg Department of Public Transportation (HDPT)
Blacksburg Transit (BT)	JAUNT
Blackstone Area Bus System (BABS)	Lake Country Area Agency on Aging
Bristol Virginia Transit	Loudoun County (LC Transit)
Central Shenandoah Planning District Commission (BRITE)	Mountain Empire Older Citizens (MEOC)
Charlottesville Area Transit (CAT)	Petersburg Area Transit (PAT)
Chincoteague Pony Express	Potomac and Rappahannock Transp. Comm. (PRTC)
City of Fairfax (CUE)	Pulaski Area Transit (PAT)
Danville Transit	RADAR
District Three Public Transit (Mountain Lynx)	Radford Transit
Fairfax County (Fairfax Connector)	STAR Transit
Farmville Area Bus (FAB)	Suffolk Transit
Four County Transit	Virginia Railway Express (VRE)
Fredericksburg Regional Transit (FRED)	Virginia Regional Transit (VRT)
Graham Transit	Winchester (WinTran)
Greater Lynchburg Transit Company (GLTC)	Williamsburg Area Transit (WATA)
Greater Richmond Transit Company (GRTC)	Washington Metropolitan Area Transit Authority (WMATA)
Greater Roanoke Transit Company (Valley Metro)	

Photo 4

Photo 5

Photo 6

Photo 7

In FY2018, transit agencies throughout the state spent over $1.5B on capital and operating expenses. Of this total, agencies spent $579M to support the wages and fringe benefits of over 7,000 employees, $486M on non-payroll operating expenses, and $483M on capital purchases. Non-payroll operating expenses included spending on supplies, materials, and services related to the general administration of a transit system. Capital expenses included the purchase of assets such as vehicles, facilities, equipment, and technology to support the provision of transit services.

Total Spending on Transit in Virginia, FY2018

Dollars in Millions

Item	Value
Capital Expenses	$483.2
Non-Payroll Operating Expenses	$486.1
Payroll Operating Expenses	$578.7
Total Expenses	**$1,548.0**

Transit agencies throughout the state provide transportation services that are vital to Virginia's economy. Direct spending by these agencies benefits residents, visitors, and businesses in the following ways:

- **Reducing Congestion and Providing an Alternative to Driving –** Transit use reduces overall vehicle travel, resulting in reduced congestion and travel delays on roadways. These reductions generate economic benefits to workers and employers alike.
- **Expanding Access to a More Productive Work Force –** Providing transit options increases the ability of workers to access jobs, and the ability of businesses to access labor pools. In addition, reduced congestion leads to savings and productivity gains from reduced travel times and lower operating costs for business travelers and industries transporting commodities.
- **Providing Affordable Mobility Options –** Transit provides affordable mobility options to all residents and visitors. This access is particularly salient for those individuals that may not have access to a personal vehicle, or that may not be able to drive due to age, physical condition, or other factors. The presence of transit provides these individuals a viable option to travel to and from employment opportunities and other important destinations.
- **Reducing Personal Transportation Costs –** The presence of transit as an option reduces vehicle ownership and operating costs for those that use transit modes and those that do not. Access to transit allows individuals the ability to forgo additional vehicle purchases yet still satisfy their mobility needs. For those that choose to drive, the reduced congestion attributed to transit use leads to monetary savings and productivity gains due to reduced overall congestion.
- **Stimulating the Local Economy and Creating Jobs –** Transit agency spending stimulates the local economy by providing income for business that support the transit industry, and by generating employment opportunities in the communities that have transit services.

4. OVERALL FINDINGS

This study assessed how existing transit services and operations generate economic value to the Commonwealth of Virginia. The study utilized data on system performance, capital investments, and operating expenses for all 41 agencies operating transit services in the state in FY2018 to arrive at the findings highlighted in this section. Study results are presented for statewide impacts as well as for three broad sub-regions of the state: Northern Virginia (NoVA) Urban Areas, Other Urban Areas, and Rural Areas.

ECONOMIC IMPACT COMPONENTS

Three components regarding the impact of transit on the economy were considered as part of this analysis:

- **Direct Impacts –** Economic benefits that are directly derived from the presence of transit (e.g. transit agency employment)
- **Indirect Impacts –** Industry-to-industry interactions in response to the changes in transportation investments, costs, and demands (e.g. employment with companies that support the transit industry)
- **Induced Impacts –** Changes in household spending as total income and population adjust based on the direct impacts of transit investment (e.g. the wages of transit employees lead to increased retail sales)

MONETIZED BENEFIT TYPES

The direct monetized economic benefits were categorized into the following types:

- **Enterprise Spending Benefits –** This includes the benefits associated with direct payroll, non-payroll, and capital spending by the agencies operating transit services in Virginia that ripple through the state economy.
- **Congestion Relief Benefits –** This includes benefits attributed to a reduction in the number of trips on roadways throughout the state due to the presence of transit as an option. Less congestion leads to reduced travel times and costs associated with delays.
- **Increased/Affordable Mobility Benefits –** This category captures the benefits that arise from providing additional, more affordable travel options to those living in communities with access to transit. This includes the economic activity generated by providing mobility, cost savings, and access to employment opportunities to those without access to personal vehicles.
- **Other Community Benefits –** This includes reduced costs associated with vehicle crashes, reduced emissions and fuel consumption, and reduced maintenance costs of roadway infrastructure.

ECONOMIC IMPACT CATEGORIES

The resulting economic impacts were reported in terms of the following categories:

- **Employment (Jobs) –** This is the estimate of the number of jobs (full and part time) by place of work generated by an investment. Full-time and part-time jobs were given equal weight in this analysis.
- **Labor Income –** This is a measure of wages and benefits associated with the additional employment generated.
- **Gross State Product (GSP) –** This captures the additional value created in the production process which includes employee compensation (labor income), proprietor income (i.e., payments received by self-employed individuals as income), other income types, and indirect business taxes.
- **Tax Revenue –** This is the increase in property and sales tax revenue to the local government, as well as changes in income tax revenues and taxes on production and imports for the federal and state government, that are realized when local resident and business activity changes.

Photo 8

STATEWIDE RESULTS

DIRECT MONETIZED BENEFITS

In FY2018 transit agencies throughout the state spent over $1.5B on capital and operating expenses, and this investment produced direct monetized benefits that totaled $2.5B. Compared with a scenario in which transit did not exist, the following benefits were calculated:

- **Congestion Relief Benefits –** The presence and use of transit in Virginia saved drivers $615.2M in travel time costs and $66.4M in delay costs.
- **Increased/Affordable Mobility Benefits –** The use of transit in Virginia saved $297.4M in transportation costs to transit riders. The presence of these services also allowed dependent riders who would have to forego their commute and work-related trips in the absence of transit to make $1.5B in labor income.
- **Other Community Impacts –** Transit use in Virginia saved $59.6M in vehicle crash costs, $27.5M in fuel consumption costs (1.3 million gallons of fuel), and $400,000 in pavement maintenance costs.

Direct Monetized Benefits Attributed to Transit in Virginia, FY2018

Dollars in Millions

Direct Monetized Benefits	Total
Congestion Relief: Travel Time Savings	$615.20
Congestion Relief: Avoided Cost of Delays	$66.40
Mobility: Net Vehicle Ownership Cost Savings	$297.40
Mobility: Foregone Employment Benefit	$1,452.30
Other: Net Traffic Crash Cost Savings	$59.60
Other: Net Emission Cost Savings	$12.80
Other: Net Fuel Consumption Savings	$27.50
Other: Net Pavement Maintenance Cost Savings	$0.40
Total Direct Benefits	**$2,531.59**

TOTAL ECONOMIC IMPACT

The total economic impacts of the presence and use of transit in Virginia included the creation of 28,940 full-time jobs, which generated $1.9B in labor income, leading to an increase of $3.4B in GSP, and bringing back $596M in tax revenue to state and local coffers. These economic impacts were generated from three sources of spending and direct benefits:

- **Enterprise Spending –** Transit agency spending of $1.5B in FY2018, supported the creation of 18,280 full-time jobs, generating $1.3B in labor income, $2.3B in GSP, and $373M in tax revenue
- **Congestion Relief Impacts –** Travel time and delay cost savings accruing to commute and business trips, which was valued at $681.5M in FY2018, supported the creation of 1,445 full-time jobs. These jobs generated $81M in labor income, $149M in GSP, and $30M in tax revenue.
- **Increased/Affordable Mobility Impacts –** The savings in transportation cost accruing to transit riders ($297M in FY2018) and the employment income generated by riders who depend on transit to get to work ($1.4B in FY2018) supported the creation of 9,215 full-time jobs. These jobs generated $496M in labor income, $951M in GSP, and $193M in tax revenue.

Total Economic Impacts Generated by Transit in Virginia by Impact Source, FY2018

Dollars in Millions

Impact Source	Employment (Full-Time Jobs)	Labor Income	GSP	Tax Revenue
Enterprise Spending	18,280	$1,297	$2,338	$373
Congestion Relief	1,445	$81	$149	$30
Increased/Affordable Mobility	9,215	$496	$951	$193
Total Economic Impact	**28,940**	**$1,873**	**$3,438**	**$596**

Photo 9

ECONOMIC JUSTIFICATION METRICS

To determine the relative impact of a public or private investment, economic justification metrics are often used to help conceptualize benefits and returns compared with costs. Three metrics that are relevant to this transit analysis include return on investment (ROI), benefit-cost ratio (BCR), and the implicit jobs multiplier of transit investments in Virginia.

These metrics were estimated by comparing the total public investment in transit to the total monetized economic benefits and economic impacts of transit in FY2018. Public investments were limited to the total local, state, and federal government dollars used to support transit, and do not include private revenues such as fares, advertising sales, and other user fees. The results of these estimations were as follows:

- **The Return on Investment (ROI) of Transit Spending was 2.86 -** Every dollar of public investment in transit generated $2.86 in economic activity (GSP) statewide.
- **The Benefit/Cost Ratio (BCR) of Transit Spending was 2.11 -** Every dollar of public investment in transit yielded an additional $2.11 in direct economic benefits statewide.
- **The Jobs Multiplier of the Transit Industry was 4.10 -** Every direct or contracted job within the public passenger transportation sector supported 4.1 additional jobs in the state.

Economic Justification Metrics for Public Investments in Transit in Virginia, FY2018

Dollars in Millions; Jobs and Metrics in Actual Values

Item	Value
Return on Investment (Impact on GSP/Total Public Cost)	**2.86**
Total Impact on Gross State Product (GSP)	$3,437.70
Total Public Cost (Total Costs – Total Other Revenue)	$1,202.00
Benefit/Cost Ratio (Monetized Benefits/Total Public Cost)	**2.11**
Monetized Direct Benefits	$2,531.60
Total Public Cost (Total Costs – Total Other Revenue)	$1,202.00
Total Costs (Expenses)	$1,548.00
Capital Expenses	$483.20
Non-Payroll Operating Expenses	$486.10
Payroll Operating Expenses	$578.70
Total Other Revenues (Fares, Advertising, Other)	$345.80
Jobs Multiplier (Total Jobs Created/Direct Jobs Created)	**4.10**
Direct Jobs Created	7,025
Total Jobs Created	28,940

REGIONAL RESULTS

This study also calculated the share of the economic benefits and impacts generated by public transportation spending and use in the following sub-regions throughout the state:

- **Northern Virginia (NoVA) Urban Areas:** Urbanized jurisdictions in the Metropolitan Washington region
- **Other Urban Areas:** Jurisdictions where more than 50% of the population lives in areas classified as urban
- **Rural Areas:** VA jurisdictions where more than 50% of the population lives in areas classified as rural

Sub-Region Designations by County and City for the State of Virginia

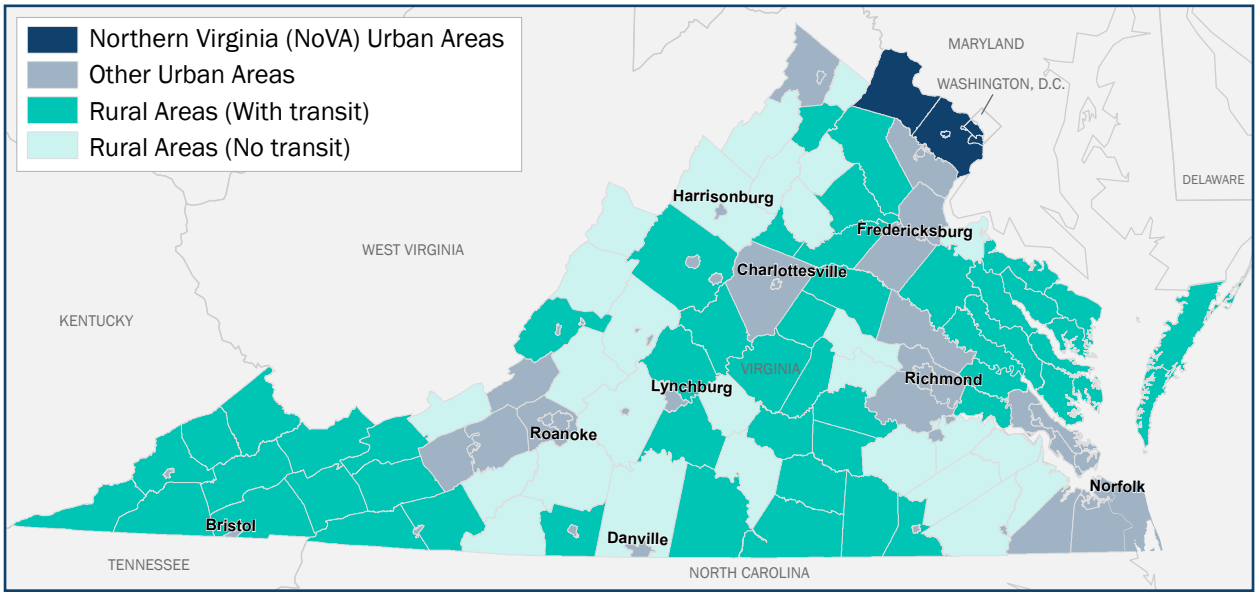

Photo 10

Photo 11

Photo 12

Direct Monetized Benefits Attributed to Transit in Virginia by Sub-Region, FY2018

Dollars in Millions

Metric	NoVA Urban Areas	Other Urban Areas	Rural Areas	State of Virginia
Congestion Relief: Travel Time Savings	$473.00	$137.70	$6.40	$615.20
Congestion Relief: Avoided Cost of Delays	$50.80	$14.90	$0.70	$66.40
Mobility: Net Vehicle Ownership Cost Savings	$227.70	$66.60	$3.10	$297.40
Mobility: Foregone Employment Benefit	$1,112.00	$325.20	$15.20	$1,452.30
Other: Net Traffic Crash Cost Savings	$45.70	$13.30	$0.60	$59.60
Other: Net Emission Cost Savings	$9.80	$2.90	$0.10	$12.80
Other: Net Fuel Consumption Savings	$21.00	$6.10	$0.30	$27.50
Other: Net Pavement Maintenance Cost Savings	$0.30	$0.09	$0.01	$0.40
Total Direct Benefits	**$1,972.10**	**$576.70**	**$26.90**	**$2,531.60**

Total Economic Impacts Generated by Transit in Virginia by Sub-Region, FY2018

Dollars in Millions; Jobs in Actual Values

Impact Category	NoVA Urban Areas	Other Urban Areas	Rural Areas	State of Virginia
Employment (Jobs)	22,088	6,464	388	28,940
Labor Income	$1,434	$408	$31	$1,873
GSP	$2,604	$791	$43	$3,438
Tax Revenue	$453	$133	$11	$596

Economic Justification Metrics for Public Investments in Transit by VA Sub-Region, FY2018

Dollars in Millions; Metrics in Actual Values

Metric	NoVA Urban Areas	Other Urban Areas	Rural Areas	State of Virginia
Return on Investment (Impact on GSP/Total Public Cost)	3.02	2.51	1.68	2.86
Total Impact on Gross State Product (GSP)	$2,604.00	$791.00	$43.00	$3,437.70
Total Public Cost (Total Costs – Total Other Revenue)	$861.10	$315.30	$25.80	$1,202.00
Benefit/Cost Ratio (Monetized benefits/Total Public Cost)	2.29	1.83	1.04	2.11
Monetized Direct Benefits	$1,972.10	$576.70	$26.90	$2,531.60
Total Public Cost (Total Costs – Total Other Revenue)	$861.10	$315.30	$25.80	$1,202.00

NORTHERN VIRGINIA (NOVA) URBAN AREAS

The majority of the monetized benefits and economic impacts found in this study are generated in the NoVA sub-region of the state due to the outsized presence of transit systems serving this area. Transit services in NoVA include the full extent of the WMATA Metrorail and Metrobus systems in Virginia, the VRE commuter rail service, and multiple large local bus systems operating within and between NoVA jurisdictions. The vast majority of all transit ridership, person vehicle miles and hours, and revenue miles and hours provided in the state in FY2018 occurred in this area. This study found the following specific results for the NoVA region:

In NoVA Urban Areas

Every $1 of public investment in transit generates...

$3.02
... in economic activity (ROI)

$2.29
... in economic benefits (BCR)

Public investments in transit ...

Support
22,088 Jobs

Create
$1.4B in Labor Income

Generate
$2.6B in GSP

Bring Back
$453M in taxes

The presence and use of transit generates...

$2.0B in monetized economic benefits

- **$473M** in Congestion Relief Savings
- **$524M** in Transportation Cost Savings
- **$1.1B** in Income for Transit Dependent Riders
- **$46M** in Traffic Crash Cost Savings
- **$31M** in Emissions and Fuel Consumption Savings
- **$300K** in Roadway Maintenance Savings

Photo 13

OTHER URBAN AREAS

The Other Urban Areas sub-region includes the large metropolitan areas of Hampton Roads, Richmond, and Roanoke, as well as a diverse collection of small to mid-sized cities throughout the state and the urbanized areas surrounding them. These areas are served by public transportation agencies that mostly operate fixed-route bus transit and complimentary paratransit services. A few Other Urban jurisdictions in the central part of the state are also served by the VRE commuter rail system, the Hampton Roads region is served by limited light rail and ferry services, and the Richmond area is served by a new BRT system.

In general, the availability of transit services in the jurisdictions that make up this sub-region is much lower than the NoVA urban areas, and patronage of these services is also lower. Nonetheless, these agencies provide vital connections and options to many individuals and communities throughout the state. This study found the following specific results for the Other Urban Areas sub-region:

In Other Urban Areas

Every $1 of public investment in transit generates...

$2.51 ... in economic activity (ROI)

$1.83 ... in economic benefits (BCR)

Public investments in transit ...

- Support **6,464** Jobs
- Create **$408M** in Labor Income
- Generate **$791M** in GSP
- Bring Back **$133M** in taxes

The presence and use of transit generates...

$577M in monetized economic benefits

- **$153M** in Congestion Relief Savings
- **$67M** in Transportation Cost Savings
- **$325M** in Income for Transit Dependent Riders
- **$13M** in Traffic Crash Cost Savings
- **$9M** in Emissions and Fuel Consumption Savings
- **$90K** in Roadway Maintenance Savings

Photo 14

RURAL AREAS

The Rural Areas sub-region includes low density "mostly rural" and "completely rural" communities which are generally supported by either deviated fixed route or demand response bus services that allow transit providers the flexibility to alter routes to meet rider demands.

The built environment in most of these communities is not designed to support population or job density high enough to justify robust transit services, so many of the agencies in these jurisdictions provide "life line" service to individuals that have no other viable means of transportation. This means that service frequencies for fixed route service and overall ridership are quite low compared with urban areas. This study found that the economic benefits and impacts associated with transit services in these areas are substantial, albeit lower than urban areas:

In Rural Areas

Every $1 of public investment in transit generates...

$1.68 ... in economic activity (ROI)

$1.04 ... in economic benefits (BCR)

Public investments in transit ...

- Support **388** Jobs
- Create **$31M** in Labor Income
- Generate **$43M** in GSP
- Bring Back **$11M** in taxes

The presence and use of transit generates...

$27M in monetized economic benefits

- **$7.1M** in Congestion Relief Savings
- **$3.1M** in Transportation Cost Savings
- **$15.2M** in Income for Transit Dependent Riders
- **$600K** in Traffic Crash Cost Savings
- **$400K** in Emissions and Fuel Consumption Savings
- **$10K** in Roadway Maintenance Savings

Photo 15

Photo 16

ADDITIONAL BENEFITS PROVIDED BY TRANSIT IN VIRGINIA

Transit provides numerous qualitative benefits that were not included in the monetized benefits summarized above. These include benefits to public health, social services, the built environment, tourism and hospitality, property values, and fiscal gains. The most notable qualitative benefits include the following:

- **Public Health –** Transit encourages physical activity (walking and cycling) in order to access transit stops and stations, and transit use improves air quality compared with personal vehicle use.

- **Social Services –** Transit provides a necessary travel option to important destination such as work, health care appointments, and other social services for individuals with disabilities or that otherwise have no other means of transportation. The presence of transit also provides an opportunity for seniors to be able to "age in place" and continue to live in their homes.

- **Built Environment –**
  - » **Incentive Zoning –** Transit encourages incentive zoning which creates incentives for increased
  - » Density, enticing private investments around transit stations.
  - » **Concentrated Development, Jobs and Residents –** Transit can encourage efficient land use throughout the state by incentivizing concentrated residential and commercial development.
  - » **Car Ownership and Parking –** Transit reduces the necessity of car ownership, reducing the demand for parking and the overall cost of living.

- **Tourism and Hospitality –** Tourism is a significant part of the state's economy and transit services provide visitors with safe and efficient transportation options.

- **Property Values –** Research has consistently demonstrated that proximity to fixed guideway transit increases property values for both residential and commercial properties.

- **Fiscal Gains –** Greater densities in TOD neighborhoods along with higher property values provide higher returns from residential and commercial property taxes.

- **Economic Development Opportunities –** Increasingly, large employers look for access to high quality transit as a prerequisite for location decisions. With this in mind, the presence of transit in Virginia allows the state to attract highly sought after economic development projects.

5. STUDY METHODOLOGY

The estimated economic benefits and impacts presented in this study were calculated by Cambridge Systematics utilizing data on Virginia transit agency performance and spending in Fiscal Year 2018. The methodology included the following steps:

1. **Data on Existing Conditions Were Compiled:** The study team defined transit agency spending and performance data for all Virginia transit services included in this analysis.

2. **The Expected Direct Economic Impacts Were Defined:** The study team identified the types of direct impacts and potential metrics to quantify them. Only those impacts that could be monetized were analyzed in greater detail in Steps 3 and 4.

3. **The Expected Direct Economic Impacts Were Measured:** The direct benefits accruing to transit users, highway users, and the general population of Virginia were measured based on transit use in FY2018. In doing so, this step assumed what travel behavior would look like if public transportation throughout the state were not an option. If transit did not exist in Virginia, some would-be transit riders would inevitably have to shift to other transportation modes while others would forego their trips entirely. The estimates of mode shift and foregone trips in the absence of transit were used to calculate the direct economic benefits generated by the existing public transit system today.

4. **Wider Economic Impacts Were Estimated:** This step translated the direct economic impacts into the necessary inputs needed to run an economic model. This study used the IMPLAN economic model to estimate the total economic impacts (direct, indirect, and induced). The results included estimated changes in Virginia's economy (jobs, personal income, Gross State Product, and tax revenues) due to the presence of transit throughout the state.

5. **Additional Transit Benefits Were Assessed:** In addition to the benefits and economic impacts addressed in Steps 2 through 4, other benefits that arise from the presence of transit were assessed. These benefits are generally difficult to reliably quantify but need to be considered in the decision-making process regarding transit investments. This analysis conducted a qualitative assessment of these additional benefits.

ECONOMIC MODELING

The IMPLAN economic model for Virginia was used to estimate the total economic impacts generated by the transit services in the state today. Economic data for IMPLAN included 536 industry sectors, which were classified on the basis of the primary commodity or service produced. Corresponding data sets were also produced for each county in Virginia, allowing analyses at the county level and for geographic aggregations such as clusters of contiguous counties. The model applies multiplier effects to changes in final demand for each industry within the defined economic area, attributable to a change in expenditures in one or more industries.

Photo 17

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