



**2019 Corridor Performance Report**  
for the I-66 Inside the Beltway and I-395 Corridors

DRAFT

Presented to the Commission on March 5, 2020





## Introduction

The Commuter Choice program, a partnership between the Northern Virginia Transportation Commission (NVTC) and the Commonwealth of Virginia, invests toll revenues from two expressway corridors with dynamic tolling, I-66 Inside the Beltway (ITB) and I-395/95, in transit and other multimodal improvements that benefit toll payers. Commuter Choice aims to improve travel in the congested Northern Virginia region by supporting projects that move more people, expand transportation options, improve transit service and increase connectivity within the existing transportation network. The program began in each corridor around the same time as tolling: in the I-66 ITB corridor in late 2017, when peak-period, peak-direction tolling of all lanes began, and the I-395/95 corridor in late 2019, when all-day, peak-direction tolling began on the 395 Express Lanes. Both toll facilities exempt high-occupancy vehicles (HOVs)<sup>1</sup> and buses from tolls, and the Commuter Choice program has funded numerous strategies to encourage travel by these and other non-single occupancy vehicle modes. The Commission requests periodic evaluations of the impacts of both tolling and Commuter Choice funded projects on commuters' transportation choices as well as the overall numbers of people and vehicles moved through each corridor.

This report presents an initial evaluation of the impacts of tolling and Commuter Choice funding in the I-66 ITB corridor, as well as the baseline data for the I-395 corridor before the beginning of Express Lanes tolling and Commuter Choice funding. The bases for the report's findings are traffic counts taken in each corridor during the morning rush hour in the inbound direction. The counts captured the numbers of people and vehicles, including buses, traveling along the expressways and parallel arterial routes. Ridership counts for each corridor's Metrorail and Virginia Railway Express (VRE) lines augmented the traffic counts to provide a full depiction of mobility in each corridor.<sup>2</sup>

The I-66 ITB corridor<sup>3</sup> moved more people more efficiently in 2019 than in 2015. The total number of people moving inbound during the morning rush hour increased by 1.2% while the associated number of vehicles decreased by 2.7%; indicating a higher share of trips were made by transit and HOV. Overall, 65% of the corridor's morning rush-hour inbound trips were made by transit or HOV in early 2019, compared to 64% in early 2015. The Commuter Choice program's funding support for several successful new and enhanced express bus routes contributed to a sharp increase in commuter bus ridership, which offset a comparable decline in local bus ridership. Overall, rail transit ridership increased.

About 60% of the I-395 corridor's morning rush-hour inbound trips were made by transit or HOV in early 2019. Average automobile occupancy was high for trips on I-395, which reflected the corridor's mature casual carpooling or "slugging" culture and the three-person occupancy requirement to use the HOV lanes that were subsequently converted to the high-occupancy/toll (HOT) Express Lanes. Besides Metrorail and VRE, the corridor's transit options before Express Lanes tolling and Commuter Choice funding included robust, well-used local bus service on arterials such as Columbia Pike and several express routes operating along I-395 to the Pentagon and downtown D.C.

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<sup>1</sup> In the I-66 Inside the Beltway corridor, an automobile must have two or more occupants (HOV-2+) to receive the exemption. In 2022, the requirement will increase to three or more occupants (HOV-3+) when the currently under-construction I-66 Outside the Beltway Express Lanes open to traffic. I-395's Express Lanes already carry an HOV-3+ requirement.

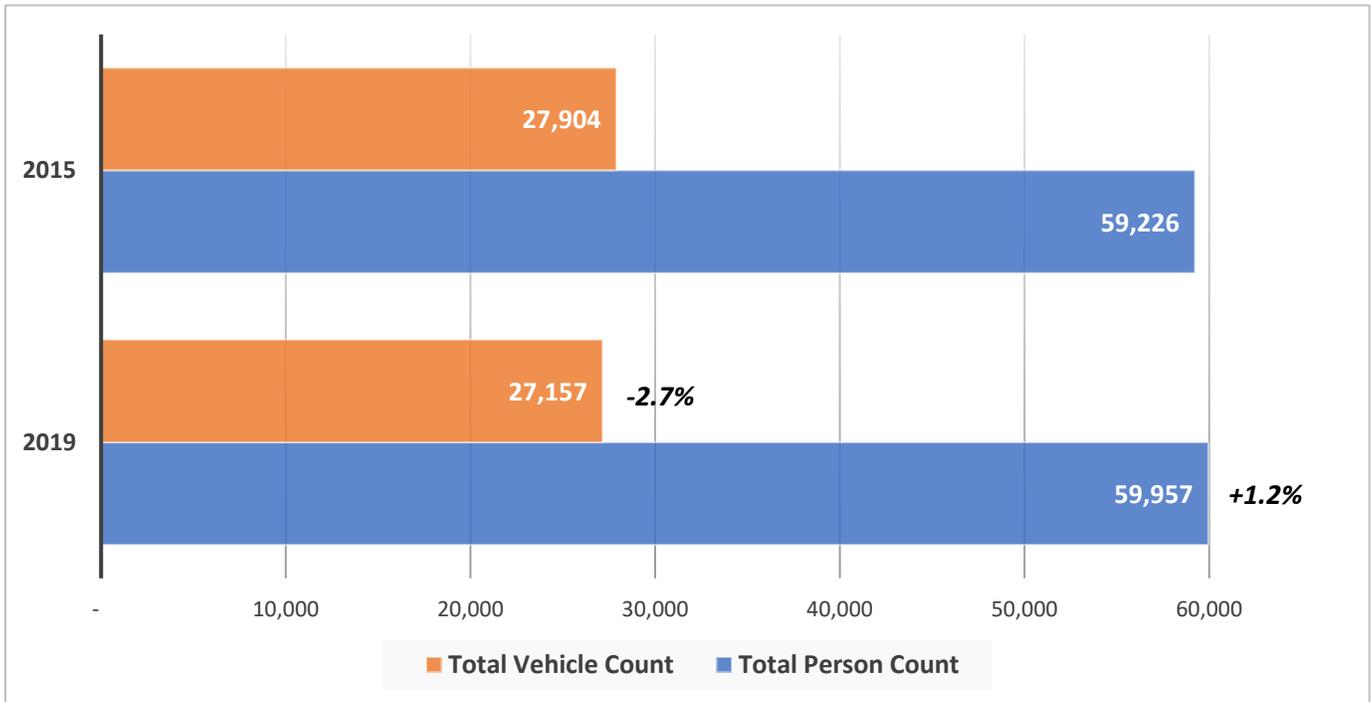
<sup>2</sup> The counts captured all trips entering each corridor at Glebe Road. While the counts included nonmotorized trips (i.e., by walking or bicycle), the shares of trips entering the corridors by these modes were insignificant.

<sup>3</sup> The I-66 ITB corridor includes I-66, Lee Highway (U.S. 29), Washington Blvd. (Va. 237), Wilson Blvd. and Arlington Blvd. (U.S. 50) for the purposes of this analysis. Counts of the numbers of inbound vehicles and people, including buses and their passengers, were taken along each of these thoroughfares at Glebe Road (see Figure 2). Inbound ridership counts were also obtained for the Metrorail Orange and Silver Lines between the East Falls Church and Ballston stations and the VRE Manassas Line at the line's outer stations proximate to I-66. Appendix A describes the count methodology in more detail.

### Changes in I-66 Inside the Beltway Corridor Travel, 2015 to 2019

Overall, about 60,000 people and 27,000 vehicles move inbound through the I-66 ITB corridor during the 6:30 to 9:30 a.m. weekday morning peak period as of early 2019. These figures represent an increase of about 700 people, or 1.2%, and a decrease of about 750 vehicles, or 2.7%, relative to early 2015 (see Figure 1). More people are therefore moving through the corridor in fewer vehicles than in 2015. Figure 2 shows the main roadways in the corridor.

FIGURE 1. CHANGE IN I-66 ITB CORRIDOR TRAVEL VOLUMES, 2015 TO 2019



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2015 and April 2019 traffic counts

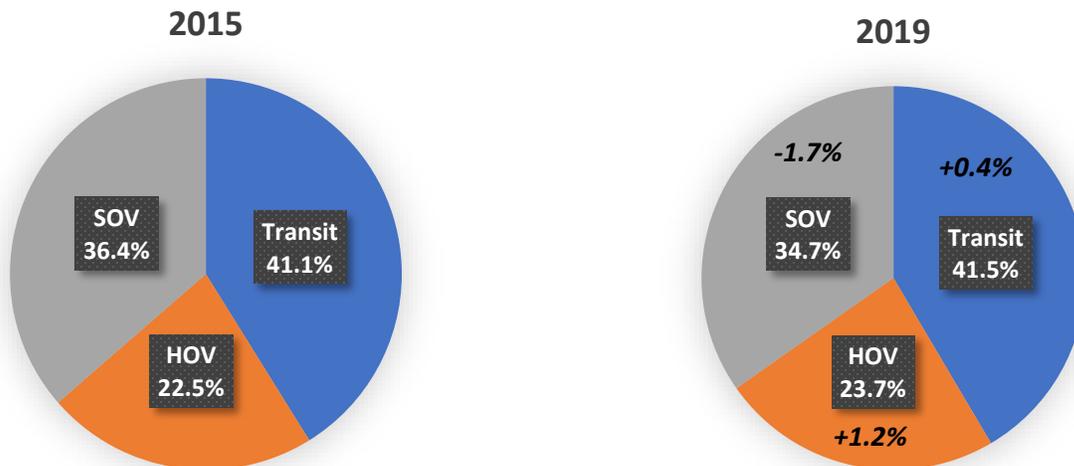
FIGURE 2. I-66 CORRIDOR TRAFFIC COUNT LOCATIONS



Source: NVTC

The corridor’s mode shares shifted slightly between 2015 and 2019 toward transit and HOVs, as shown in Figure 3. Together these modes accounted for 65.2% of the corridor’s inbound trips during the morning peak period. The HOV and transit mode shares and their shifts are discussed more below.

FIGURE 3. I-66 ITB CORRIDOR MODE SHARE, 2015 AND 2019



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2015 and April 2019 traffic counts

### HOV Mode Share

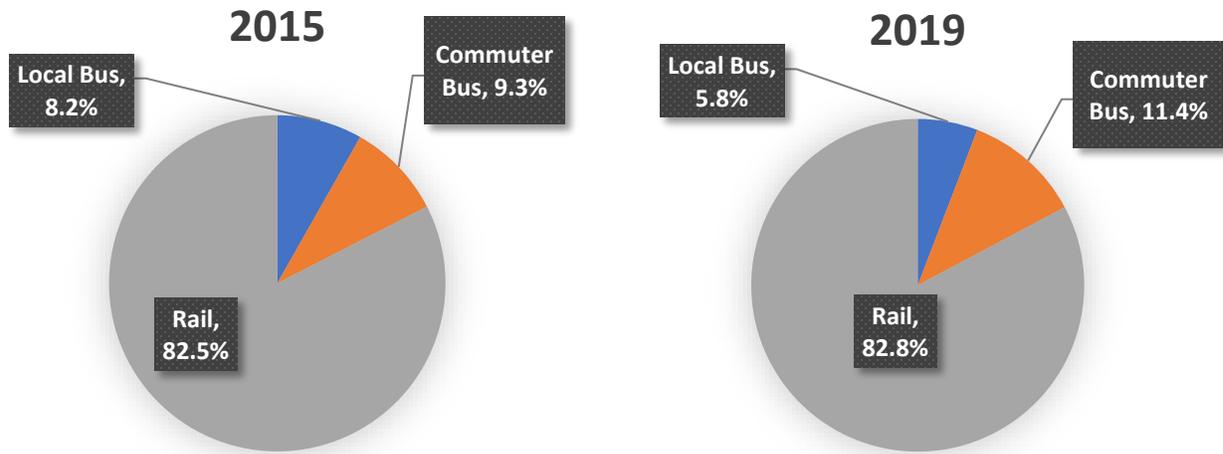
Approximately 23.7% of the I-66 ITB corridor’s inbound weekday morning peak-period trips are made by HOV, defined for this corridor as an automobile with two or more occupants, as of early 2019. The HOV mode share increased by 1.2% between early 2015 and early 2019. Average automobile occupancy showed very modest increases from 1.25 to 1.29 persons per automobile in the corridor and from 1.52 to 1.54 persons per vehicle along I-66 specifically. Notably, automobile occupancy along I-66 was steady despite peak-period, peak-direction restrictions limiting use to HOVs and buses (with some exceptions) in 2015. Now single-occupancy vehicles can use I-66 for peak-period, peak-direction travel with the payment of a dynamic toll.

### Transit Mode Share

Nearly 25,000 inbound trips are made by transit in the I-66 ITB corridor during the weekday morning peak period as of early 2019. Transit accounts for 41.5% of all inbound morning peak period trips, an increase of 0.4% since early 2015. Rail is the predominant transit mode in the corridor, with about 83% of transit trips. Metrorail, which in turn accounts for 88% of rail trips, saw a 2% increase in ridership between 2015 and 2019, while VRE ridership increased by 7%. Bus ridership accounts for the remaining 17% of transit trips. Overall bus ridership was flat between 2015 and 2019, with a 26% gain in commuter bus ridership offsetting a 28% decrease in local bus ridership.<sup>4</sup> Figure 4 shows the change in the distribution of transit ridership between 2015 and 2019.

<sup>4</sup> For the I-66 ITB corridor, local buses include Arlington Transit and Metrobus routes operating on arterial roads. Commuter buses consist of Fairfax Connector, Loudoun County Transit and OmniRide express routes operating on I-66, some with over-the-road coach buses.

FIGURE 4. DISTRIBUTION OF I-66 ITB CORRIDOR TRANSIT TRIPS BY TRANSIT MODE, 2015 AND 2019



Source: NVTC analysis of Metropolitan Washington Council of Governments Transportation Policy Board April 2015 and April 2019 traffic counts

Appendix B of this report further explores the relationship between new, Commuter Choice-funded commuter bus services and the I-66 ITB corridor’s rail transit options. In general, commuter bus and rail services in the corridor appear to complement each other such that the overall ridership base using these types of services is growing, as opposed to competing for the same riders.

#### Commuter Choice on the I-66 Corridor

The Commuter Choice program on the I-66 corridor has funded numerous multimodal transportation improvements and campaigns to encourage the use of alternatives to driving alone. Table 1 identifies the 16 projects that were underway – that is, operational transit services, capital projects that were in the process of being implemented, and outreach campaigns that had begun – as of April 2019, when the second set of I-66 ITB corridor counts occurred. The projects included four new or enhanced commuter bus routes with strong ridership since inception (see Appendix B for further discussion of two of these services), incremental improvements to three local bus routes along parallel arterials, two new or enhanced shuttle bus routes to the Metrorail Silver Line, and two outreach campaigns.



TABLE 1. COMMUTER CHOICE PROJECTS UNDERWAY IN THE I-66 CORRIDOR, APRIL 2019

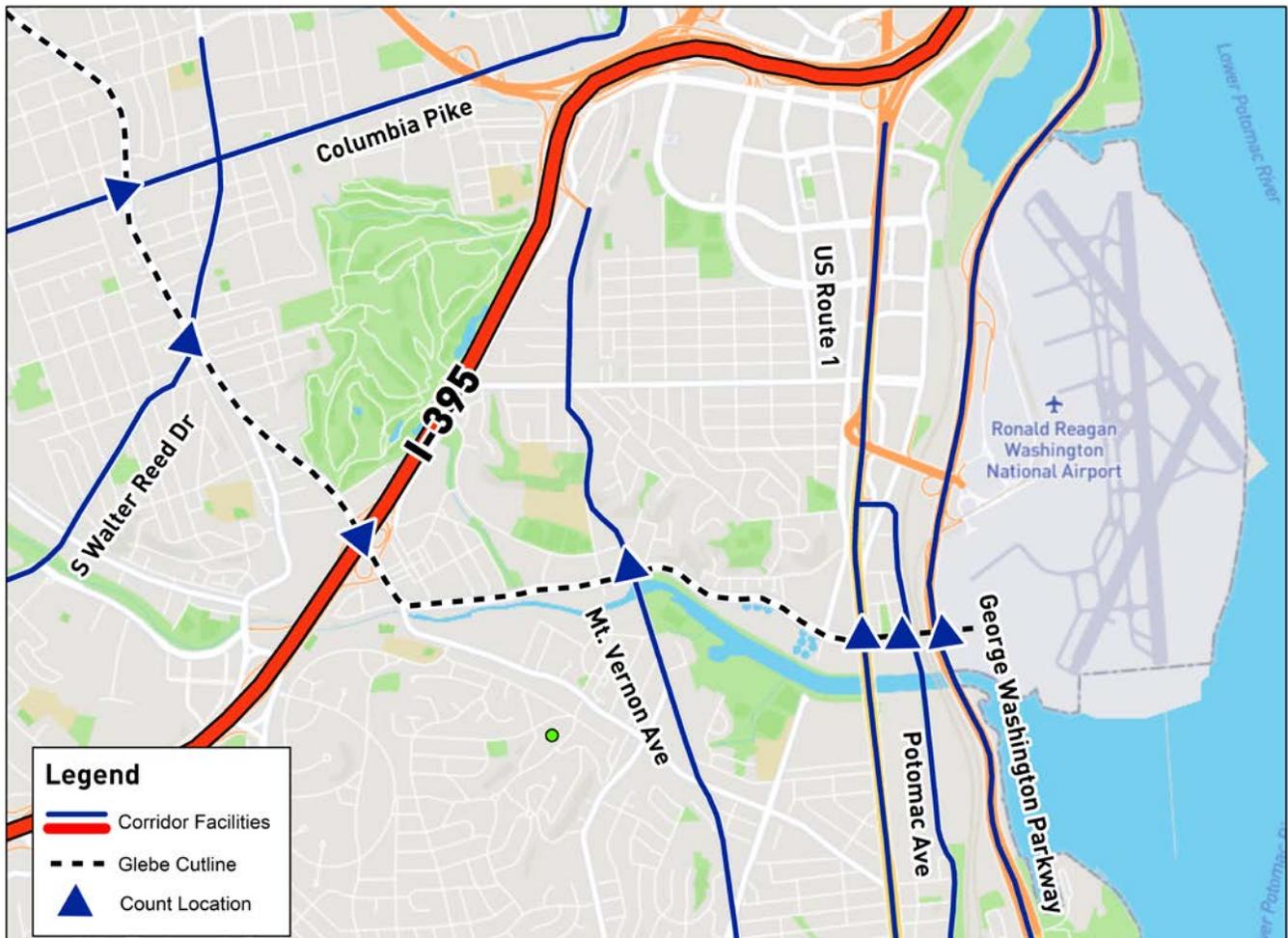
<b>Projects</b>	<b>Status as of April 2019</b>	<b>Type of Project</b>	<b>Recipient</b>
Multimodal Real-Time Transportation Information Screens	Implementation underway	Transportation Demand Management	Arlington County
Bus Stop Consolidation	Implementation underway	Enhanced Bus Service	Arlington County
Metrobus Route 2A Peak Period Expansion	Enhanced service began June 2017	Enhanced Bus Service	Arlington County
Route 55 Peak Period Service Expansion	Enhanced service began June 2017	Enhanced Bus Service	Arlington County
Expanded TDM Outreach to the I-66 Corridor	Campaign began September 2017	Transportation Demand Management	Arlington County
I-66 Corridor ITS Enhancements	Implementation underway	Transportation System Management	Arlington County
Traffic Management Center	Implementation underway	Transportation System Management	Arlington County
Fairfax Connector Government Center - Downtown DC, Route 699	Service began December 2017	New Bus Service	Fairfax County
Fairfax Connector Express Bus Service between Vienna/Fairfax-GMU and Pentagon Metrorail	Service began January 2019	New Bus Service	Fairfax County
Metrobus Route 3T Extension and Service Expansion	Enhanced service began January 2019	Enhanced Bus Service	Falls Church
Loudoun County Stone Ridge Enhanced Transit	Service began July 2017	Park and Ride Lot	Loudoun County
TDM Program	Campaign began December 2016	Transportation Demand Management	Loudoun County
Loudoun County Transit Metro Connection from New Purcellville Park and Ride	Service began November 2018	New Bus Service	Loudoun County
Loudoun County Transit Metro Connection Route 88X Extension to Dulles South	Enhanced service began October 2018	New Bus Service	Loudoun County
Bicycle Parking Improvements at Manassas VRE Station	Implementation underway	Access to Transit	Manassas
Gainesville to Pentagon Commuter Service	Service began December 2016	New Bus Service	OmniRide

Source: NVTC Commuter Choice project progress reports

### I-395 Corridor Travel, 2019

Approximately 93,000 people and 44,000 vehicles move inbound through the I-395 corridor<sup>5</sup> each weekday during the 6:00 to 9:00 a.m. morning peak period as of early 2019. Figure 5 shows the main roadways in the corridor.

FIGURE 5. I-395 CORRIDOR TRAFFIC COUNT LOCATIONS

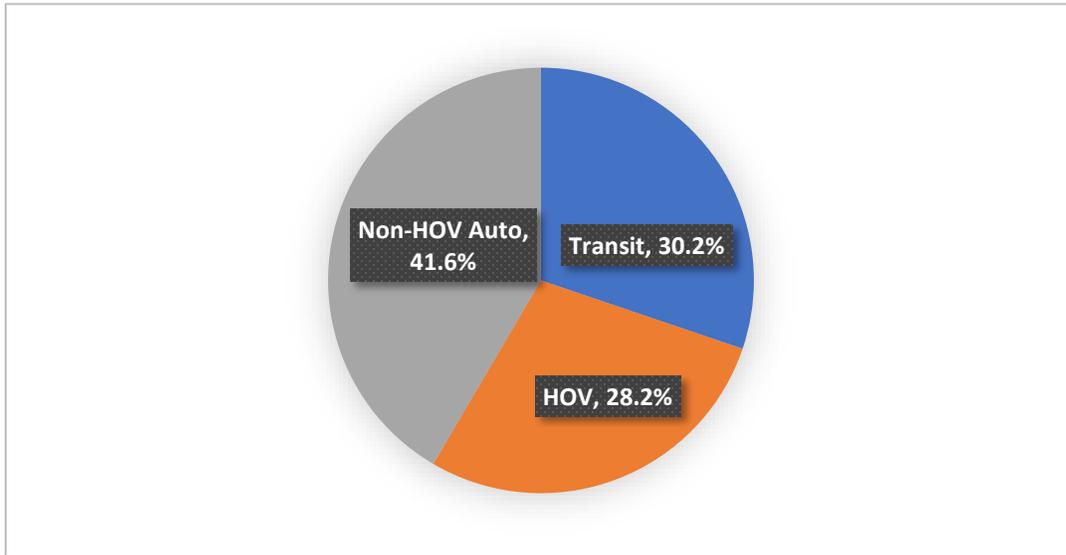


Source: NVTC

<sup>5</sup> The I-395 corridor includes I-395, Columbia Pike, S. Walter Reed Drive, Mt. Vernon Ave, U.S. 1, Potomac Avenue, and George Washington Parkway for the purposes of this analysis. Counts of the numbers of inbound vehicles and people, including buses and their passengers, were taken along each of these thoroughfares at Glebe Road (see Figure 5). Inbound ridership counts were also obtained for the Metrorail Blue and Yellow Lines between the Braddock Road and Ronald Reagan Washington National Airport stations, as well as the VRE Fredericksburg Line between the Alexandria and Crystal City stations. Appendix A describes the count methodology in more detail.

Transit and HOV, the latter defined for the I-395 corridor as automobiles occupied by three or more people, together account for almost 60% of the corridor’s inbound morning peak period trips, as shown in Figure 6 and discussed further below.

FIGURE 6. I-395 CORRIDOR MODE SHARE, 2019



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2019 traffic counts

### HOV Mode Share

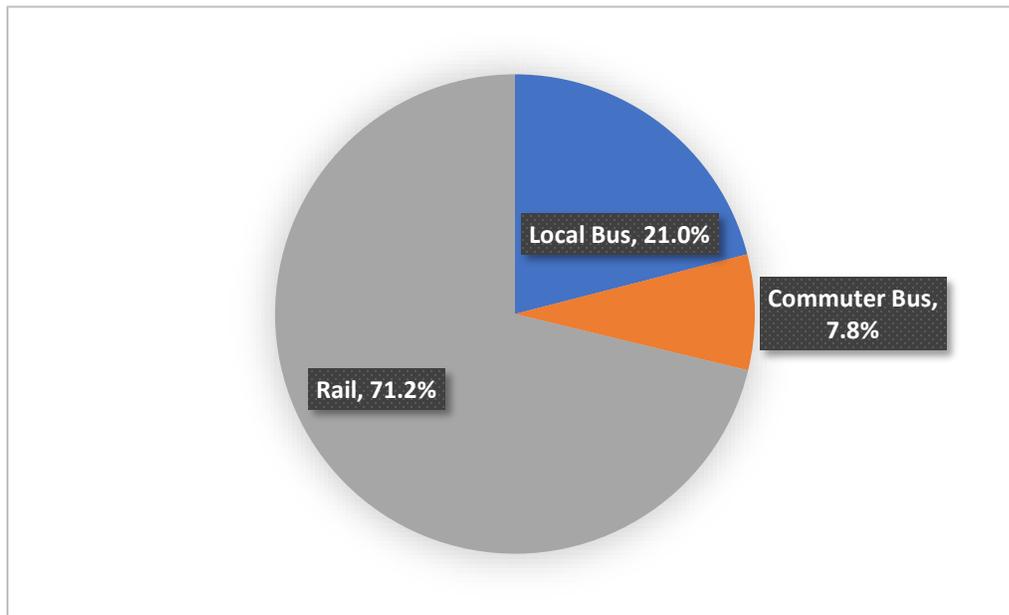
Approximately 28.2% of the I-395 corridor’s inbound morning peak period trips are made by HOV, defined for this corridor as an automobile with three or more occupants, as of early 2019. At the time of the counts, the reversible peak-direction median lanes along I-395 were restricted to HOVs and buses; since these lanes became the 395 Express Lanes in late 2019, non-HOVs can access the lanes with payment of a dynamic toll. The HOV restrictions resulted in a high average automobile occupancy along I-395 itself, at 1.85 persons per vehicle, as of early 2019. The average automobile occupancy for the overall I-395 corridor is 1.51 persons per vehicle.

### Transit Mode Share

Nearly 29,000 inbound trips are made by transit in the I-66 ITB corridor during the morning peak period as of early 2019. Transit accounts for 30.2% of all inbound morning peak period trips. Rail accounts for 71% of transit trips, with the remainder by bus, as shown in Figure 7. Bus services as of early 2019 include frequent, high-ridership local routes on arterials such as Columbia Pike and several express routes using the median HOV lanes that have since become the 395 Express Lanes.<sup>6</sup>

<sup>6</sup> For the I-395 corridor, bus ridership counts were assigned to the Local Bus or Commuter Bus category according to the type of service that each transit agency predominantly operates in the corridor. All Metrobus, Arlington Transit and DASH ridership was therefore assigned to the Local Bus category, as most or all of these agencies’ service in the corridor is on arterials. All Fairfax Connector and OmniRide ridership was assigned to the Commuter Bus category, as these agencies’ routes in the corridor are solely express routes using I-395.

FIGURE 7. DISTRIBUTION OF I-395 CORRIDOR TRANSIT TRIPS BY TRANSIT MODE, 2019



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2015 and April 2019 traffic counts

### Commuter Choice on the I-395/95 Corridor

At the time of the early 2019 counts, the Commuter Choice program had not yet expanded to the I-395/95 corridor. However, two of the first-round projects – additional trips on an OmniRide commuter route and operations of Arlington County’s Pentagon Commuter Store – represent continuations of efforts that were underway at the time of the counts using state funding during I-395 construction. Additional transit improvements, consisting of new express bus routes and enhancements to existing local routes, began implementation in fall 2019, just before non-HOV tolling in the 395 Express Lanes began.

### Conclusions and Discussion

#### I-66 Inside the Beltway Corridor

The shift toward transit and HOVs in the I-66 ITB corridor aligns with the goals of the Transform66 Inside the Beltway program, which included the implementation of peak-period, peak-direction tolling and the Commuter Choice program. Overall, more people are moving through the corridor and commuters are benefitting from increased travel options. The latter is most apparent in the 26% increase in the corridor’s commuter bus ridership between 2015 and 2019 due to the introduction of new Commuter Choice-funded services that have proven popular with commuters. These services help improve access to regional job centers and reduce traffic congestion by providing a convenient and reliable alternative to driving. (Appendix B intently examines the new and enhanced bus services in relation to rail transit and finds that the two modes are complementing each other by increasing the base of transit riders rather than competing.) Other transit ridership trends in the I-66 ITB corridor generally align with broader regional trends, particularly the stabilization of peak-period Metrorail ridership, continued growth in demand for VRE service and declines in local bus ridership.

Expanded transportation demand management campaigns that the Commuter Choice program funded in Arlington and Loudoun counties may also have contributed to the modest shift toward HOVs in the I-66 ITB corridor, as these campaigns seek to make commuters more aware of and incentivize transit, ridesharing and other alternatives to driving alone. The



ability of single-occupancy vehicles to use I-66 ITB for peak-period, peak-direction travel with payment of a toll does not seem to have affected the corridor's average automobile occupancy.

The Commuter Choice program has funded additional projects in the I-66 ITB corridor that were not yet active at the time of the April 2019 counts. The subsequent analysis in 2021 should capture the effects of additional bus service enhancements, access to transit initiatives such as bikeshare expansions, and further transportation demand management efforts.

#### I-395 Corridor

The I-395 corridor has an established casual carpooling or "slugging" culture that extends back to the early 1970s when HOVs were allowed into what had been median bus-only lanes along I-395. Average automobile occupancy along I-395 is high as a result of the long history of HOV restrictions in these lanes. The ability of non-HOVs to access the Express Lanes with payment of a toll suggests that average automobile occupancy is unlikely to shift upward significantly in future counts. The corridor also has extensive transit options, including Metrorail, VRE and a variety of bus services, from frequent, high-ridership local routes on major arterials such as Columbia Pike to express routes that use the 395 Express Lanes. The inaugural Commuter Choice projects in the I-395/95 corridor include new and enhanced express bus routes and improvements to service levels along local bus routes that feed into rail stations and express bus hubs. These improvements could contribute to higher ridership and a more significant peak-period mode share for transit in the corridor.

#### Future Updates

NVTC staff plans to update this report biannually to help local decision-makers understand the impacts of tolling and increased investment in multimodal transportation improvements. The next update in 2021 will capture the impacts of two additional years of multimodal investments in the I-66 ITB corridor, as well as the completion of a third inbound travel lane in a portion of the corridor. The report will also allow for a before-and-after comparison of the I-395 corridor since the opening of the Express Lanes and implementation of the first set of Commuter Choice-funded bus service improvements and transportation demand management strategies.



## Appendix A: Methodology

In spring 2015 and 2019, the Metropolitan Washington Council of Governments' Transportation Planning Board (TPB) technical staff conducted mode share studies on behalf of the Virginia Department of Transportation (VDOT). The study areas included the I-66 ITB corridor in 2015 and 2019 and the I-395 corridor in 2019. These studies were performed as part of the TPB Virginia Technical Assistance Program in support of NVTC's Commuter Choice program.

The counts sought to quantify the number of vehicles and people crossing through the corridor. The counts included all modes of ground transportation, including motorized and non-motorized modes. The 2019 counts along the I-66 ITB corridor were an update to the 2015 Mode Share Study: I-66 Inside the Beltway. The traffic count locations, data processing approaches, technical methodologies, and assumptions of the current count were consistent with the 2015 study. The I-395 count was the initial baseline count for this corridor, done before tolling was implemented in the fall of 2019.

The counts were taken along a cutline, an artificial boundary that is defined to capture movements through a defined corridor at a specific point. Glebe Road (Va. 120) served as the cutline because it roughly bisects the corridors in the middle and provides a reasonable cordon line. The counts were taken manually from 5:00 a.m. until 10:00 a.m. over two consecutive weekdays in the middle of the week, in April during a normal workweek. The data compiled all vehicle and person movement crossing the cutlines, including passenger counts on local, express, and commuter routes. Metrorail and VRE ridership data were obtained from the providers for the same dates as the traffic counts.

### STUDY AREA

The I-66 ITB corridor is defined as a system of west-east highways leading from Northern Virginia suburbs into employment destinations in the core area of the Washington Metropolitan region. The I-66 ITB corridor consists of the following five highways from north to south, with counts taken at Glebe Road: Lee Highway (U.S. 29), Washington Boulevard (Va. 237), I-66, Wilson Boulevard, and Arlington Boulevard (U.S. 50).

The I-395 corridor is defined as a system of generally south-north or southwest-northeast highways leading into employment destinations in the core area of the Washington Metropolitan region. The following seven highways defined the I-395 corridor from west to east: Columbia Pike, S. Walter Reed Drive, I-395, Mt. Vernon Ave, U.S. 1, Potomac Avenue, and George Washington Parkway.



## Appendix B: White Paper: Do Commuter Buses Complement or Compete with Metrorail in the I-66 Corridor?

### Introduction

The Northern Virginia Transportation Commission’s (NVTC’s) Commuter Choice program allocates toll revenue to multimodal transportation strategies that increase person throughput and expand transportation choices along I-66 Inside the Beltway (ITB) and along I-395/95. Since the program’s inception along the I-66 ITB corridor in 2017, the program has funded several new and expanded commuter bus services that run in parallel to portions of the existing WMATA Metrorail Orange and Silver lines in the I-66 corridor. For instance, eight of the twelve funded projects in the I-66 Commuter Choice Round Three (Fiscal Year 2020) program were commuter bus services that originate outside of the Beltway and provide service to employment centers in downtown Washington D.C., the Pentagon, and Rosslyn.

In March 2019, NVTC’s Program Advisory Committee asked staff to examine whether these commuter bus services are attracting riders that otherwise would be using Metrorail. This white paper answers the question at a high level and concludes that commuter bus services are not taking riders away from Metrorail. Rather, commuter bus services and Metrorail are serving different markets, and both have enjoyed ridership gains over the last two years.

### Rail and Commuter Bus Services in the I-66 Corridor

Transit services in the I-66 corridor include Metrorail, which has nine stations between Vienna and Rosslyn, and numerous local and express bus routes. To date, Commuter Choice on the I-66 corridor has funded a total of nine commuter bus routes operating through the full I-66 ITB corridor. Each of these routes is operated by Fairfax Connector, Loudoun County Transit or OmniRide. Table B-1 presents typical service characteristics of these commuter routes in relation to Metrorail. In general, Metrorail offers frequent all-day service between multiple destinations, whereas commuter bus service provides point-to-point peak-period express service from a wider geographic range of areas in Northern Virginia, tailored to specific commuter markets.

TABLE B-1. METRORAIL AND COMMUTER BUS SERVICE CHARACTERISTICS

Metrorail	Commuter Bus Service
<ul style="list-style-type: none"> <li>• Nine stations in the inner portion of the I-66 corridor, generally every half-mile to mile apart, some with large park and ride garages</li> <li>• Station-to-station service serving a range of land uses and trip purposes, with multiple major employment centers along the lines in Arlington and D.C.</li> <li>• All-day, frequent, bi-directional service, every 12 minutes or better</li> <li>• Paid parking at stations with garages</li> <li>• Capacity of up to 1,500 passengers per trip</li> </ul>	<ul style="list-style-type: none"> <li>• Point-to-point express bus service from smaller park &amp; ride lots beyond the Beltway and the western end of Metrorail</li> <li>• Destinations are specific employment centers in Northern Virginia and D.C.</li> <li>• Only peak-period, peak-direction service, generally every 15 to 60 minutes</li> <li>• Free parking at park and ride lots</li> <li>• Capacity of up to 50 passengers per trip</li> </ul>

This analysis focuses on two of the most established and highest-ridership Commuter Choice-funded routes, Fairfax Connector’s Route 699 and OmniRide’s Gainesville to Pentagon Commuter Service.

- Fairfax Connector Route 699:** Route 699 began operating in December 2017. It connects the Fairfax County Government Center park and ride lot with the George Washington University campus, U.S. Department of State, and World Bank in Washington, D.C. (see Figure B-1). The route provides 11 morning rush-hour inbound trips and 11 afternoon rush-hour outbound trips, with departures roughly every 20 minutes. One of these trips in each direction was added at the end of March 2019 in response to steadily growing ridership.

FIGURE B-1. FAIRFAX CONNECTOR ROUTE 699



Source: NVTC Commuter Choice project profile

- OmniRide Gainesville to Pentagon Commuter Service:** This service began operating in December 2016. It connects the rapidly growing community of Gainesville with the Pentagon (see Figure B-2). Service began with four morning rush-hour inbound trips and four afternoon rush-hour outbound trips. After a year, an additional inbound and outbound trip were added. In May 2018, as construction ramped up on I-66 Outside the Beltway, fares on the route were cut in half.

FIGURE B-2. GAINESVILLE TO PENTAGON COMMUTER SERVICE



Source: NVTC Commuter Choice project profile

### Factors in Mode Choice – Rail or Commuter Bus?

National research and market surveys specific to the I-66 corridor were reviewed to help assess whether Commuter Choice-funded commuter bus services may be attracting riders that would otherwise use Metrorail. A few key factors affect I-66 corridor commuters’ transit mode choice in situations where they have options:

- **Total travel time.** In general, transit is most competitive for commute trips when it offers travel times comparable to or faster than driving<sup>7</sup>. Commuters in all modes along the I-66 corridor value the timeliness of their trip above all other factors<sup>8</sup>.
  - **In- versus out-of-vehicle travel time.** Travelers (not just in the I-66 corridor) perceive the portions of their trips spent outside of a vehicle – for instance, waiting to board transit, transferring, and walking between transit stops – to take longer than they do, often by a factor of two or more<sup>9</sup>. In other words, one minute of out-of-vehicle time feels like two or more minutes of in-vehicle time. This disparity is due to such considerations as the discomfort, exertion and uncertainty that can be associated with these portions of a trip.
- **Reliability.** Dependable arrival times are a principal consideration for I-66 corridor commuters that use commuter bus and rail services<sup>10</sup>.

<sup>7</sup> Transit Cooperative Research Program: Report 95 – Traveler Response to Transportation System Changes Handbook, Third Edition, Chapter 3 (2004)

<sup>8</sup> Transform66: Outside the Beltway, Market Survey (2014)

<sup>9</sup> National Cooperative Highway Research Program: Report 365 - Travel Estimation Techniques for Urban Planning (1998)

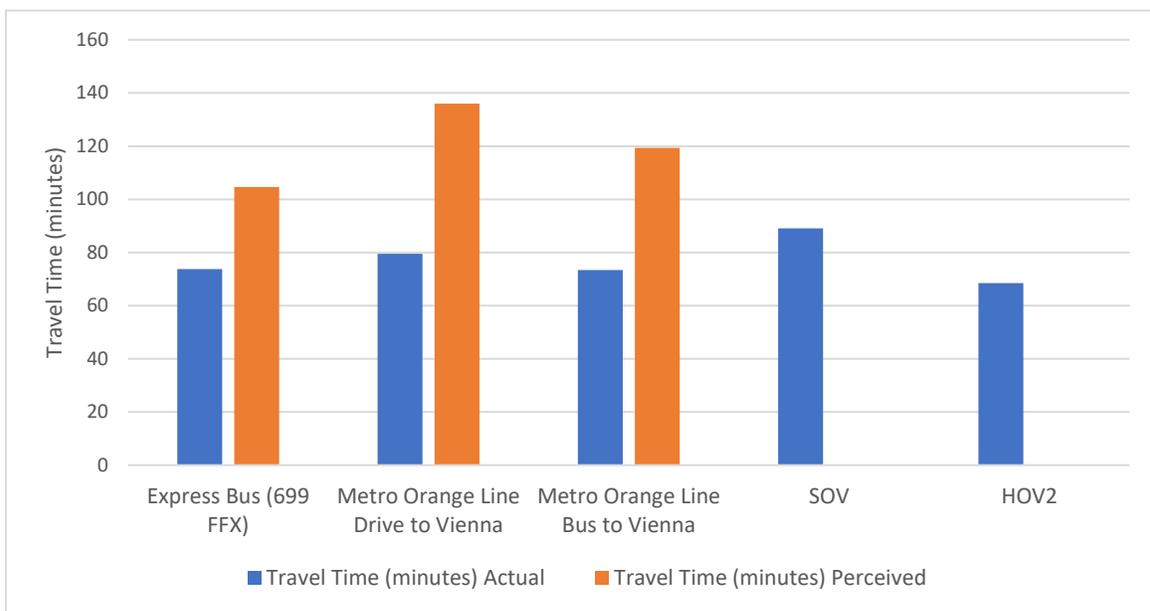
- Cost.** Saving money on commuting is important for I-66 commuters, but less so than minimizing travel time<sup>10</sup>. Most commuters in the corridor (74%) are from households with annual incomes above \$100,000. A slight majority (52%) receive travel subsidies that reduce or eliminate the out-of-pocket costs of commuting<sup>8</sup>. These two characteristics tend to be associated: 82% of Northern Virginia transit benefit recipients that use Metrorail are from households with incomes above \$75,000<sup>11</sup>.

### Travel Time Comparisons for Rail and Commuter Bus Transit Options

Since I-66 commuters place a premium on travel time savings and reliability, staff analyzed the modeled actual and perceived travel times associated with sample morning rush-hour inbound trips using the Fairfax Connector Route 699 and OmniRide Gainesville to Pentagon Commuter Service<sup>12</sup>. These were compared to rail transit (Metrorail and/or Virginia Railway Express) alternatives for each. In both examples, the impact of walking, waiting, and transferring transportation modes results in a longer perceived time for multi-segment transit rides. Additionally, Commuter Choice-funded commuter bus routes will be the most attractive option for some I-66 commuters to minimize their perceived travel times.

Figure B-3 compares approximate travel times for a trip from the Fair Oaks/Fairfax Corner area, near the junction of I-66 and U.S. Highway 50, and the intersection of Virginia Ave. and 23<sup>rd</sup> St. NW in Foggy Bottom<sup>12</sup>. For this trip, the actual transit travel times are comparable to each other (as well as to driving in a high-occupancy vehicle, which benefits as the buses do from a designated lane outside of the Beltway). The express bus option offers the shortest perceived travel time of the

FIGURE B-3. FAIR OAKS/FAIRFAX CORNER TO FOGGY BOTTOM TRAVEL TIME COMPARISON



Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019  
Options with the shortest travel times are likely to be most attractive to commuters.

<sup>10</sup> I-66 Transit/TDM Study Final Report (2009)

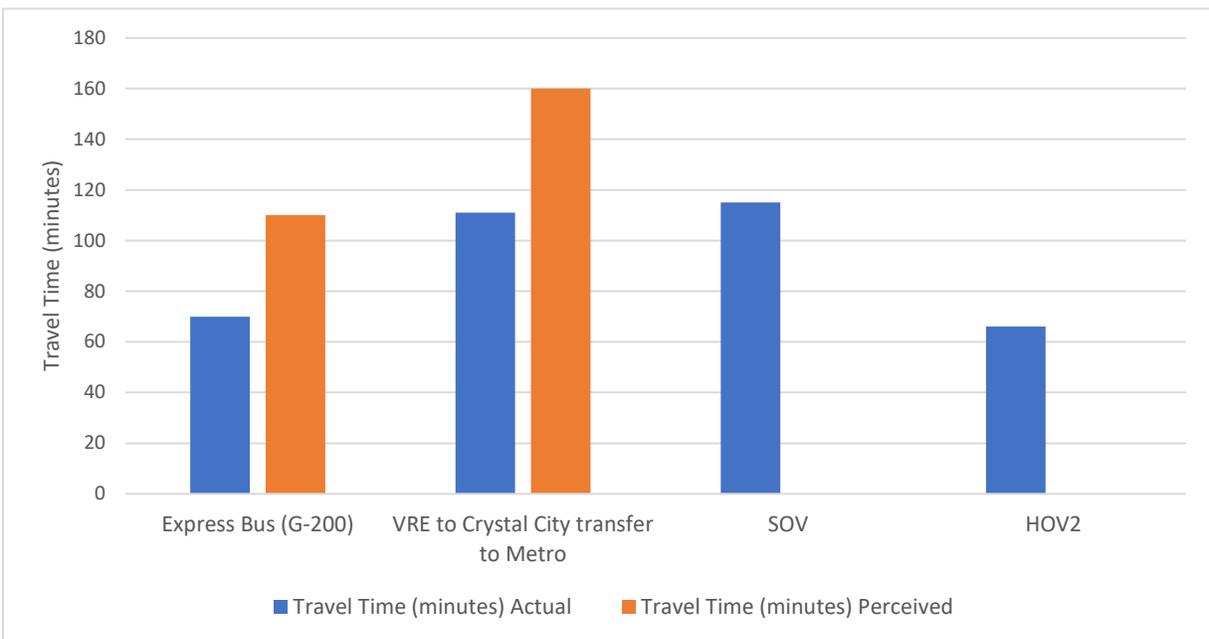
<sup>11</sup> WMATA Metrorail Survey (2016)

<sup>12</sup> The transit options were developed using the regional travel demand model (MWCOG Version 2.3.75). See the Appendix for additional explanation of this approach and detailed itineraries for each transit option.

transit options due to the avoidance of a transfer at Vienna, which for driving carries a large perceived travel time penalty due to the time needed to park in the garage and complete the walk to the rail platform that may take several minutes.

Figure B-4 shows a similar comparison for travel from Gainesville to the Pentagon<sup>12</sup>. Here, the express bus option represents a significant time savings over riding VRE to Crystal City and then transferring to Metrorail for the trip, both in terms of actual and perceived travel times. Access and wait times would result in a much longer trip for any commuters that opt to use the rail option. Were the express bus not available, commuters prioritizing time savings on this trip would likely opt for a non-transit mode rather than use rail.

FIGURE B-4. GAINESVILLE TO PENTAGON TRAVEL TIME COMPARISON



Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019  
Options with the shortest travel times are likely to be most attractive to commuters.

### Ridership Trends Since 2017: Metrorail and Commuter Bus

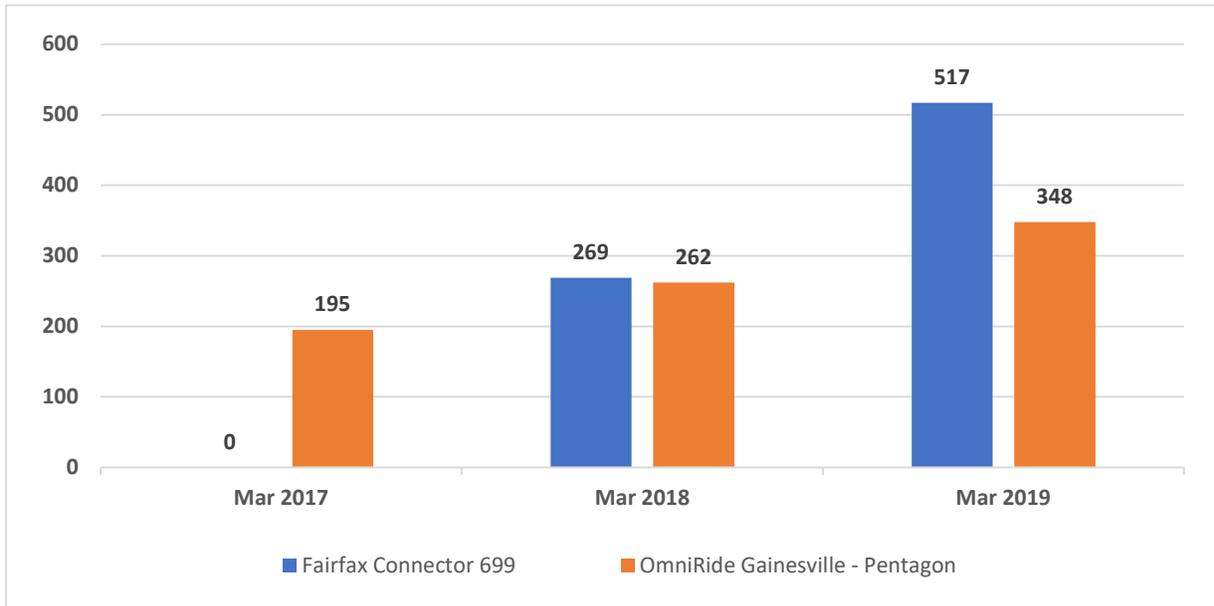
Ridership is growing both at Metrorail stations in the I-66 corridor and on the two Commuter Choice-funded commuter bus routes discussed above. Between March 2017 and March 2019, average weekday ridership increased by approximately 5,000 trips across the nine Metrorail stations, while the two commuter bus routes gained approximately 700 additional trips. This finding affirms the notion that the bus services are serving distinct markets from Metrorail, such that they are not taking riders away from it. (Some I-66 commuters may opt to continue using Metrorail even with more commuter bus options<sup>13</sup>.)

Figure B-5 shows that ridership on both the Fairfax Connector Route 699 and OmniRide Gainesville to Pentagon Commuter Service has grown steadily. The March 2019 ridership figures equated to an average of 26 passengers per trip on the

<sup>13</sup> The I-66 Multimodal Study: Inside the Beltway Survey (2012) and the Transform 66 Outside the Beltway Market Survey (2014) revealed a greater preference for using Metrorail for future commuting (31% of respondents) than express buses (9%).

Fairfax Connector Route 699 and 35 passengers per trip on the OmniRide Gainesville to Pentagon Commuter Service, indicating good usage.

FIGURE B-5. AVERAGE WEEKDAY RIDERSHIP, FAIRFAX CONNECTOR 699 AND OMNI RIDE GAINESVILLE TO PENTAGON



Source: Fairfax Connector and OmniRide

Figure B-6 charts total Metrorail weekday ridership at the nine I-66 corridor stations from Vienna to Rosslyn over the same period. Overall weekday ridership has increased by approximately 7% since early 2017, around the time that the first Commuter Choice projects were beginning service and prior to the introduction of peak-period, peak-direction tolling<sup>14</sup>. The overall Metrorail system experienced a roughly 4% increase over the same period.

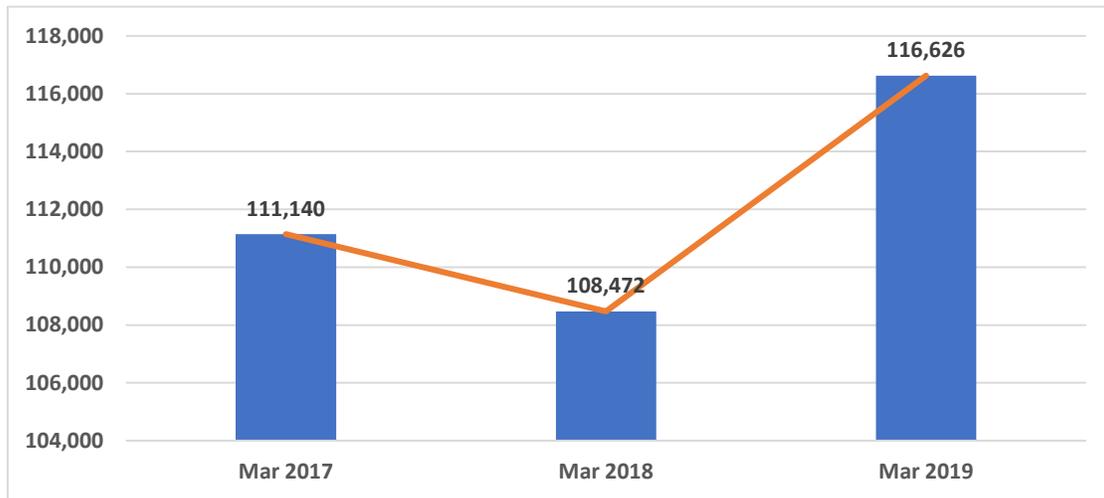
## Conclusions

This white paper has discussed the differences in nature of commuter bus and Metrorail service in the I-66 corridor, examined factors that affect mode choice, and summarized corridor ridership trends.

- ✓ **Commuter buses and Metrorail appear to be complementing each other rather than competing.** Both modes are experiencing ridership increases. Even with more commuter bus options, many commuters that were already using Metrorail have indicated that they would continue to do so. The expanded commuter bus services open additional transit markets that in some cases are not well-served by other transit options.
- ✓ **Commuter bus and Metrorail serve different markets at different scales.** Commuter buses serve focused markets with peak-direction, peak-hour service direct to job centers. Metrorail carries more riders and provides all-day, more frequent service with multiple boarding and alighting points along the routes.

<sup>14</sup> The increase in Metrorail ridership between 2017 and 2019 is more pronounced than the 2015-to-2019 trend. discussed in the main portion of this report. Ridership on the system declined between 2015 and 2017 due in part to system reliability issues and the subsequent SafeTrack repair campaign, which reduced Orange Line service for a portion of 2016.

FIGURE B-6. METRO RAIL I-66 CORRIDOR RIDERSHIP



Source: WMATA

Figures represent total average weekday entrances and exits across the nine stations between Vienna and Rosslyn.

- ✓ **For some trips, commuter buses will offer the shortest perceived travel times.** Commuters in the I-66 corridor value short travel times and reliability above all other factors that may affect their choice of mode of transportation. Commuter buses can allow commuters to avoid having to transfer, which travelers perceive to be burdensome due to the discomfort, effort and uncertainty involved.
- ✓ **In recent years, as tolling and new commuter bus services have been introduced on the I-66 corridor, both express bus and Metrorail ridership have increased.** Ridership on two of the Commuter Choice program’s most established commuter bus services is increasing, with good average passenger loads, though modest relative to the corridor’s Metrorail ridership. Metrorail ridership in the corridor has grown at a faster rate than that of the overall Metrorail system in the last two years.



## Appendix B-1: Travel Time Comparison Methodology and Assumptions

As discussed in this appendix, commuter bus services and Metrorail in the I-66 corridor appear to be complementing each other rather than competing for riders, as ridership is growing on both modes. For some trips, commuter bus services provide shorter perceived (if not actual) travel times than rail-based alternatives. To illustrate the effect of time spent out-of-vehicle on perceived travel times, NVTC staff used the Metropolitan Washington Council of Governments' regional travel demand model to identify transit itineraries ("paths") for the two sample morning commutes described in the "Travel Time Comparisons for Rail and Commuter Bus Transit Options" section of this white paper. The modeled paths show the actual (modeled) time for each segment of a typical weekday morning commuter trip and the perceived time the traveler experiences for each segment. The perceived time is developed from regional traveler survey data and calibrated based on transit ridership counts.

The transit itineraries for the two sample morning commutes are described below, with charts to depict the actual and perceived time associated with each portion of the trip. The model's assumptions, for instance how far in advance of a bus or rail departure a traveler will arrive at the station, may differ from how some individual travelers using these options would behave. Some of the waiting and transfer times provided by the model may also differ from what a publicly accessible trip planner such as Google Maps would identify. Still, NVTC staff believes that the model was the most appropriate tool for this exercise, as it provides a reasonable basis for comparing approximate door-to-door travel times for different travel options and captures the burden of out-of-vehicle time in a way that other trip planners cannot.

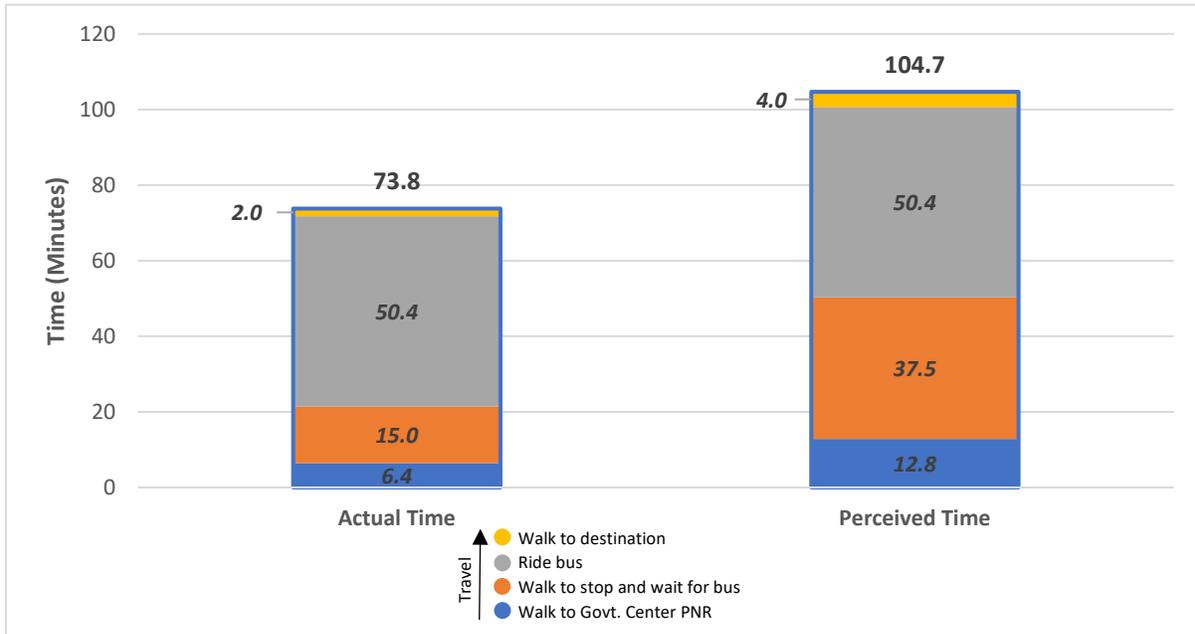
### Fair Oaks/Fairfax Corner to Foggy Bottom Travel Time Comparison

The transit options for this sample trip are as follows:

- Express Bus (figure B-7): walk to the Government Center park & ride lot, wait for the 699 bus, then ride the bus to D.C. and walk the final distance.
- Metro Orange Line Drive to Vienna (figure B-8): drive to the Vienna station, park, walk to the rail platform, ride the Orange Line into D.C. and walk the final distance.
- Metro Orange Line Bus to Vienna (figure B-9): walk to the Government Center park & ride lot, wait for a Fairfax Connector bus to the Vienna station, ride the bus, transfer to rail, ride the Orange Line into D.C. and walk the final distance.

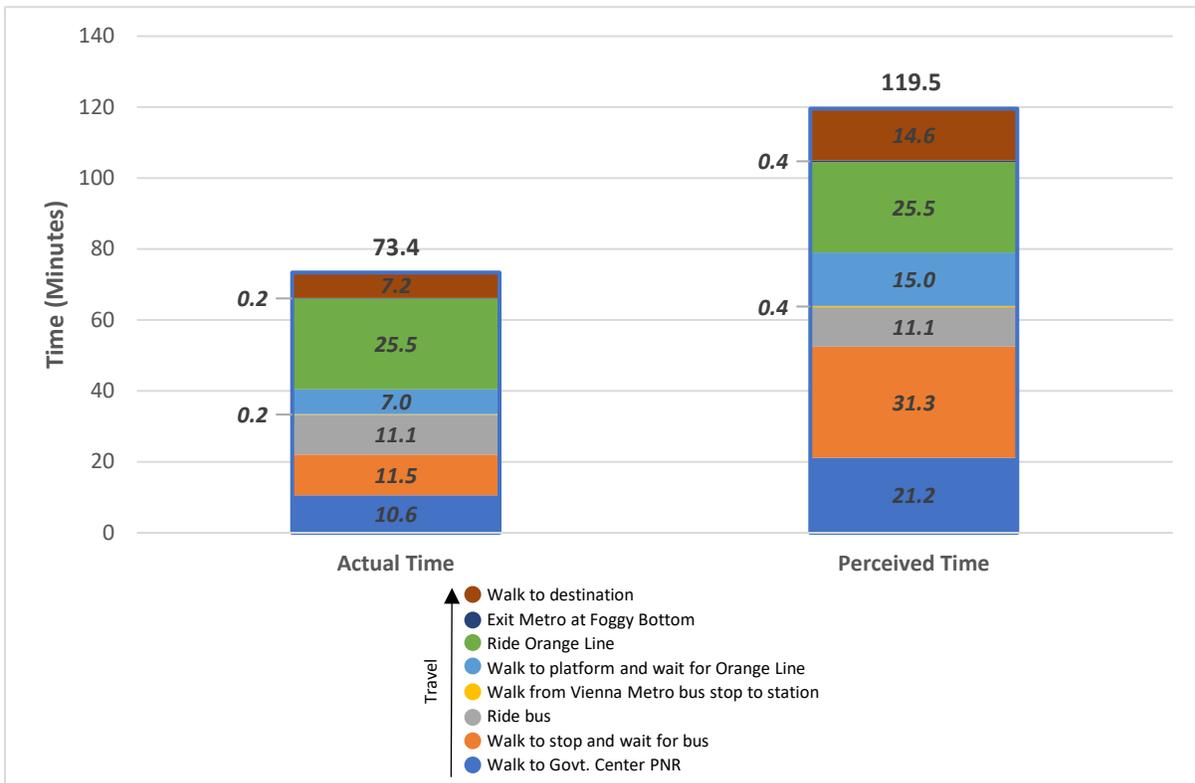
The three options have similar actual travel times of 73 to 79 minutes. However, the express bus option has the smallest perceived time penalty (a 42% premium relative to actual travel time, compared to 63% and 71% for the Metrorail-based options).

FIGURE B-7. FAIR OAKS – FOGGY BOTTOM: EXPRESS BUS OPTION



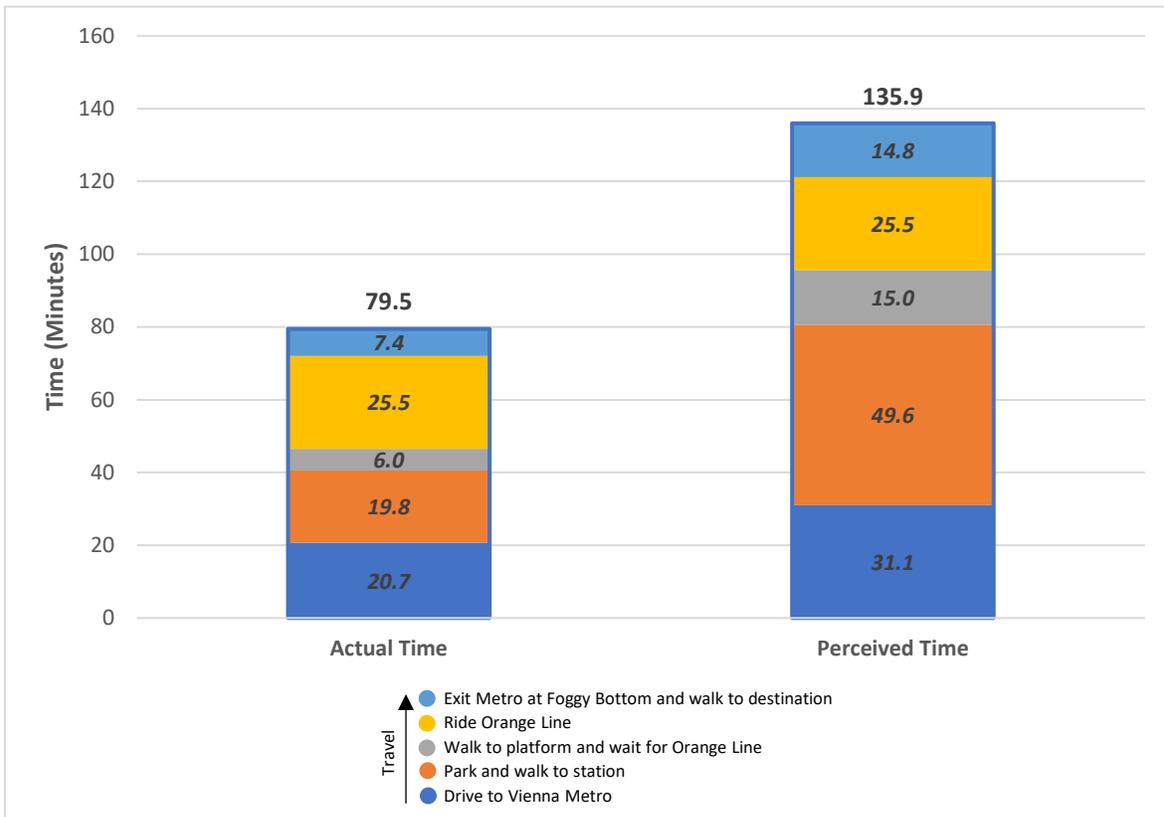
Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019

FIGURE B-8. FAIR OAKS – FOGGY BOTTOM: METRO ORANGE LINE BUS TO VIENNA OPTION



Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019

FIGURE B-9. FAIR OAKS – FOGGY BOTTOM: METRO ORANGE LINE DRIVE TO VIENNA OPTION



Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019

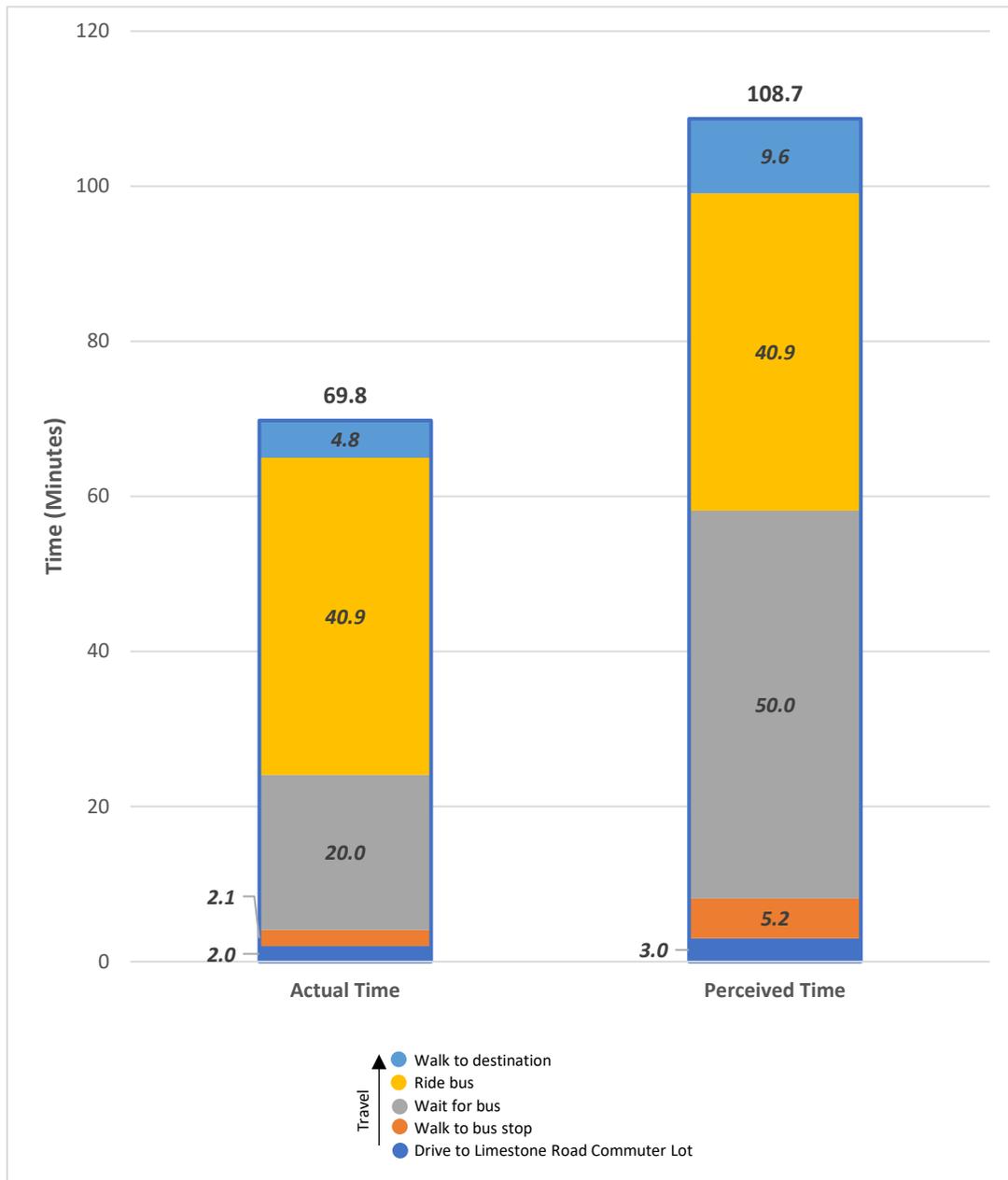
Gainesville to Pentagon Travel Time Comparison

The transit options for this sample trip are as follows:

- Express Bus (G-200; figure B-10): drive to the commuter lot at Route 619 and Limestone Road, wait for the express bus, ride the bus, and walk to the Pentagon from the bus terminal.
- VRE to Crystal City, Transfer to Metro (figure B-11): drive to the Broad Run VRE station, wait for the train, ride to Crystal City, transfer to Metrorail, ride Metrorail to the Pentagon station, walk to the Pentagon.

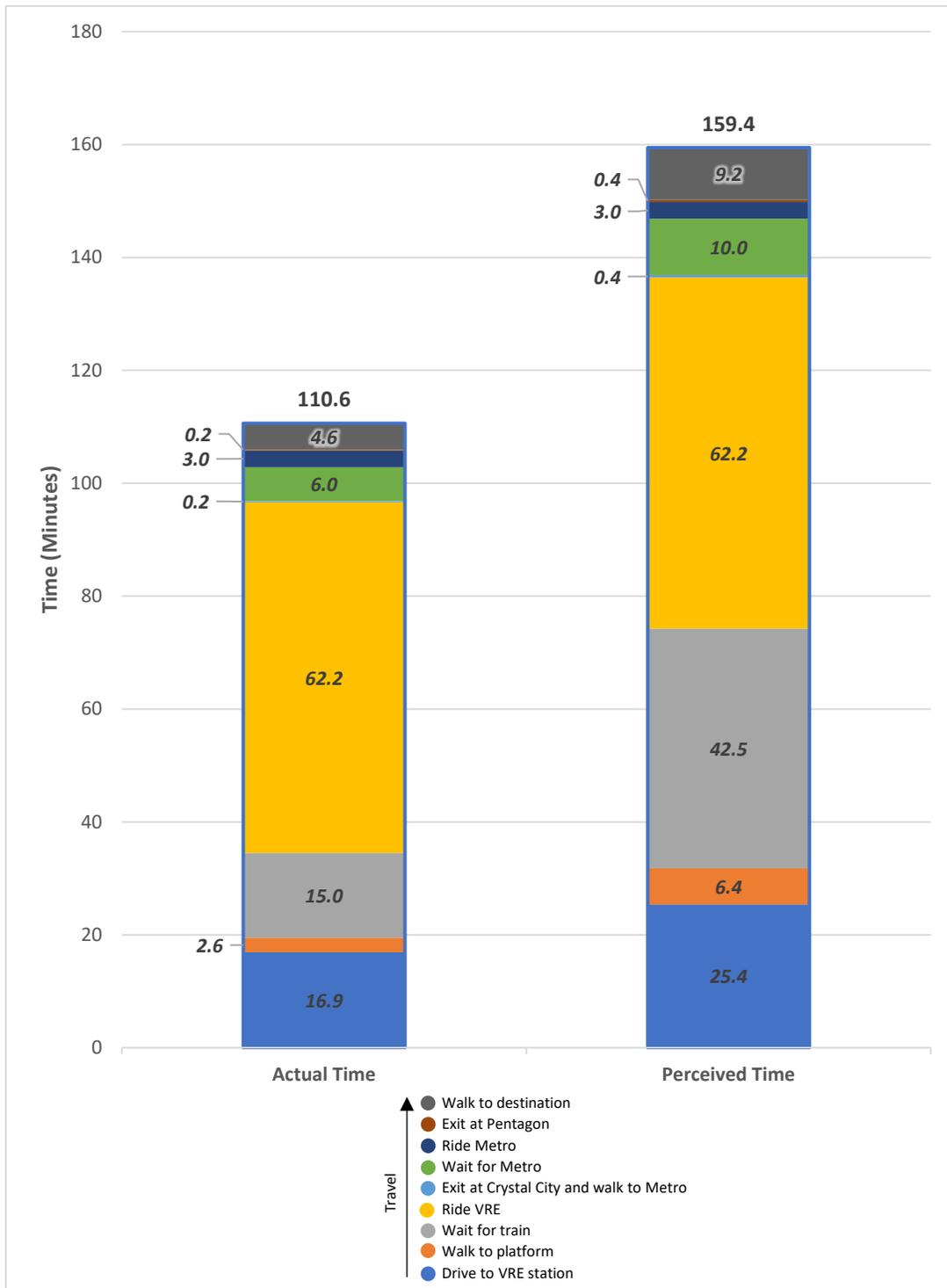
Here, the express bus option offers a significantly faster trip than the rail alternative, in terms of both actual and perceived travel times.

FIGURE B-10. GAINESVILLE – PENTAGON: EXPRESS BUS (G-200) OPTION



Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019

FIGURE B-11. GAINESVILLE – PENTAGON: VRE TO CRYSTAL CITY, TRANSFER TO METRO OPTION



Source: Metropolitan Washington Council of Governments regional travel demand model, Version 2.3.75, run July 2019