



2022 Commuter Choice Annual Report Technical Memorandum



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1. Introduction

This memorandum describes how the Northern Virginia Transportation Commission (NVTC) calculated the benefits of projects funded to date by the Commuter Choice program as identified in the Project Performance portion of the [2022 Commuter Choice Annual Report](#). Table 1 summarizes the number of projects funded through Commuter Choice through fiscal year (FY) 2022. These projects were evaluated primarily on their ability to support corridor improvement goals of moving more people (also referenced as “maximizing person throughput”) and implementing transit and other transportation improvements that improve mobility, support new and diverse travel choices, and enhance transportation safety and travel reliability.

Table 1: Commuter Choice Funded Projects

<u>Category</u>	<u>Number of Projects</u>
Total Commuter Choice Projects	53
I-66 Commuter Choice since FY 2017	36
I-395/95 Commuter Choice since FY 2020	17
Projects with Performance Included in the FY 2022 Annual Report	
Projects in Service in Spring 2022, I-66	13
New or Enhanced Bus Service	10
Access to Transit	1
Transportation Demand Management	2
Projects in Service in Spring 2022, I-395/95	9
New or Enhanced Bus Service	8
Transportation Demand Management	1

The 2022 Annual Report presents Commuter Choice projects’ benefits in two ways. As in the last two years, the report presents the additional people moved through the I-66 Inside the Beltway and I-395/95 corridors each weekday by projects active in spring 2022, the time of year that NVTC’s project agreements specify annual performance data collection. Moving more people is one of the overarching improvement goals and serves as a reasonable proxy for the attractiveness and effectiveness of the transportation improvements created. In spring 2022, 13 operational projects in the I-66 corridor moved 846 additional people through the corridor each weekday, while in the I-395/95 corridor, nine operational projects moved 3,173 more people each weekday, for a total of 4,019 more people each weekday across the two program corridors.

The 2022 Annual Report, for the first time, also estimates the benefits that Commuter Choice projects have provided to Northern Virginia’s economy and quality of life since the first projects began operation in 2017. The total benefits, estimated using nationally recognized tools and factors applied to the usage of each project and how commuters shifting to the project would be reasonably likely to adjust their travel, are:

- 894,135 hours of total travel time savings for commuters
- \$23,981,379 in regional economic benefits from reduced travel delay
- 82,577,555 fewer vehicle miles traveled
- \$11,627,363 in fuel expenditures saved
- 101 automobile crashes avoided
- A 69% reduction in greenhouse gas (GHG) emissions relative to drive-alone travel
- 3,548,208 total project trips

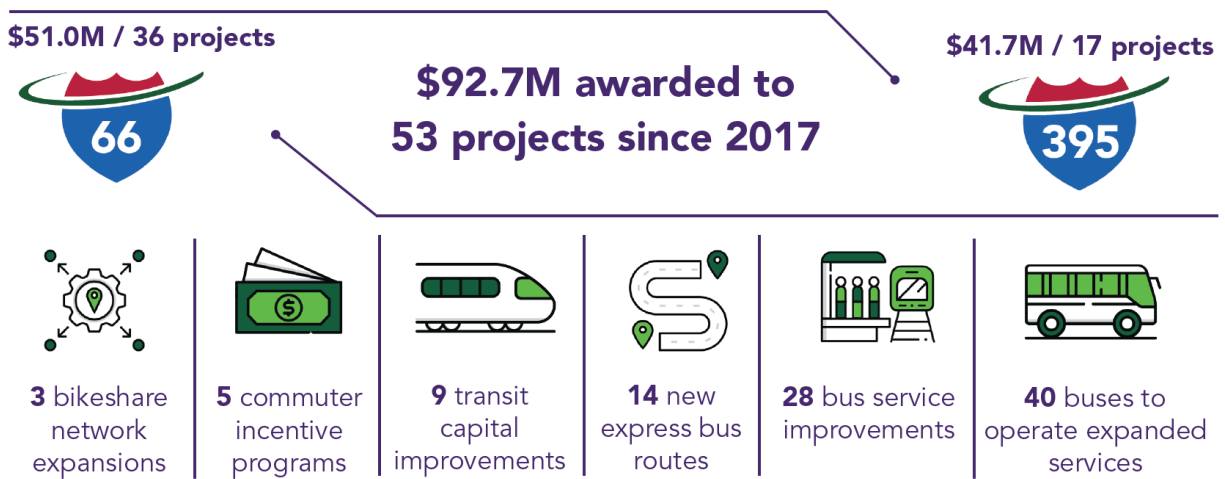
2. Background

Commuter Choice invests toll revenues in public transit and other multimodal transportation projects along two expressway corridors, I-66 Inside the Beltway and I-395/95, that benefit the corridors’ toll payers by moving more people and expanding transportation options. NVTC manages Commuter Choice in partnership with the Commonwealth of Virginia and, on the I-395/95 corridor, the Potomac and Rappahannock Transportation Commission (PRTC).

Commuter Choice Awards to Date

Through FY 2022, Commuter Choice had funded 53 projects, some of which have received multiple installments of funding support, totaling \$92.7 million of reinvestment of toll revenues into multimodal improvements. About \$36 million has been awarded for long-lived capital assets including bus purchases, park-and-ride lot construction and capital improvements to bus stops that will benefit commuters for years to come. I-66 Commuter Choice funded 36 projects in four rounds of funding while I-395/95 Commuter Choice funded 17 projects in two rounds of funding. The totals do not include the \$15.1 million I-66 Commuter Choice FY 2023-2024 Program of Projects that was approved in June 2022 for implementation beginning in FY 2023.

Figure 1: Commuter Choice Awards Through FY 2022



NVTC has classified each project funded to date under one of the following categories, even though many projects include elements of more than one category:

- **New or Enhanced Bus Service** - Up to 24 months of operating subsidies for new commuter, local and on-demand bus routes or improvements to existing routes, such as more frequent service or route extensions. New and enhanced bus service projects often include the purchase of buses needed to operate the expanded service, while some include improvements to bus stops or park-and-ride facilities served by the route.
- **Access to Transit** - Pedestrian and bicycle access improvements, such as bikeshare system expansions, from residential areas to nearby transit stations, hubs and stops.
- **Rail Capital** - Capital improvements to Metrorail and Virginia Railway Express facilities, such as construction or expansion of rail stations.
- **Transportation Demand Management (TDM)** - Campaigns to reduce drive-alone commute trips. While earlier projects focused on education and outreach on alternative options, NVTC now requires standalone TDM projects to center on direct incentives to commuters to entice changes in their travel behavior.
- **Roadway Operations** - Operational and safety strategies and capital improvements to roadways that parallel or connect with I-66 inside the Beltway or I-395/95. Projects to implement dedicated bus lanes are included in the roadway operations category.

NVTC received performance data in 2022 for projects in three of these categories: New or Enhanced Bus Service, Access to Transit and TDM.

Project Selection Process

NVTC’s Commuter Choice project selection process strongly emphasizes the outcomes of a multiple-measure technical evaluation approach. The technical evaluation process effective¹ in

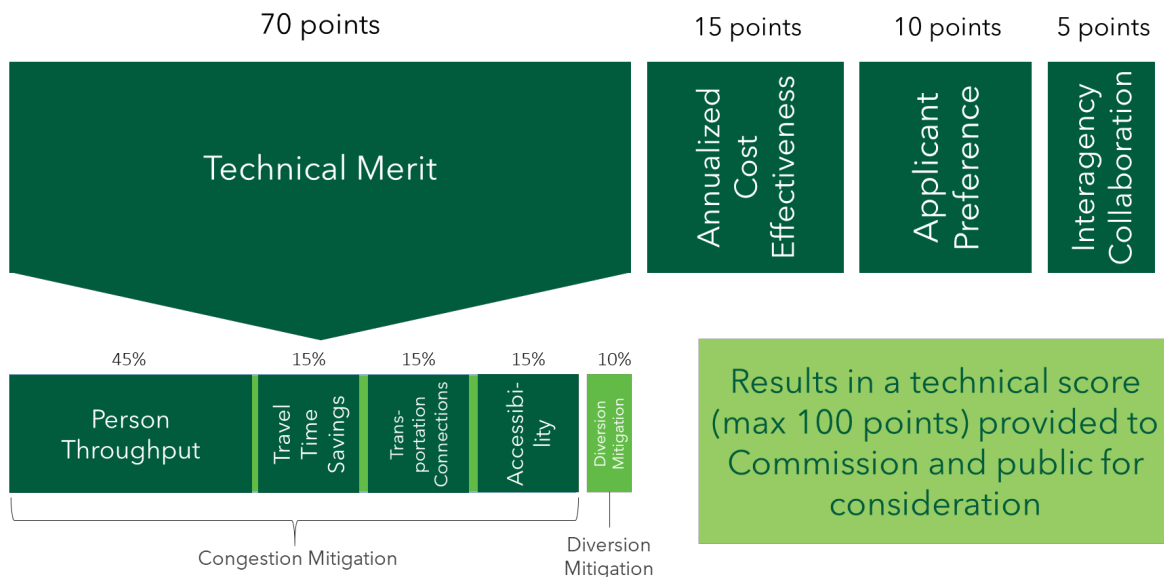
¹ Adopted in 2019. However, prior processes also allotted the most emphasis to the Technical Merit factors that derive from the corridor improvement goals [identified in the two corridor programs’ governing memoranda of agreement.](#)

FY 2022 (Figure 2 below) allots 70 of the 100 possible points to factors related to how well proposed projects meet corridor improvement goals. The factors capture:

- The efficiency by which the project would move more people,
- The travel time savings that commuters would realize from using the project relative to a non-tolled driving trip,
- The extent to which the project would improve connections between modes of transportation,
- The extent to which the project would improve access to regional activity centers, and
- The ability of the project to absorb car trips that might be diverted onto parallel streets due to tolling or high-occupancy vehicle restrictions.

Other criteria in the process capture the project’s cost effectiveness (in terms of the technical merit score relative to the funding request, taking the useful life of project elements into account), whether the proposed project is the applicant’s top priority out of those that they submitted for funding consideration and whether the project has been coordinated or discussed with other jurisdictions or public transportation providers in the region.

Figure 2: Commuter Choice Technical Evaluation Process



NVTC’s Strategies to Maximize Program Benefits

NVTC has implemented program-wide strategies to maximize the benefits of Commuter Choice funds to I-66 Inside the Beltway and I-395/95 toll payers and mitigate the risks of underperforming projects. For one, NVTC limits operations projects of any type - not just transit services, but also bikeshare operations and TDM campaigns - to a maximum of 24 months of support at a time. Projects must successfully re-compete under a subsequent call for projects to receive a further installment of operating support. The 24-month limit provides grant recipients a reasonable amount of time to develop a viable service but limits the program’s commitments where services cannot meet performance expectations despite good-faith efforts by grant recipients.

For TDM projects, NVTC found that generalized outreach and education campaigns did not allow for ready quantification of the number of commuters that began using transit or alternatives to driving alone as a result of the campaign. NVTC therefore now requires standalone TDM strategies to focus on direct incentives to commuters, as these can be targeted specifically to toll payers and have directly measurable usage outcomes that do not require surveying. NVTC is working individually with recipients to address the lack of quantifiable person-throughput benefits with TDM projects that were funded prior to adoption of the definition.

About 78% of Commuter Choice's total funding awarded to date has been for bus service improvements, largely peak-period focused, inclusive of bus purchases and other related capital elements. While some commuter transit markets are rebounding well, NVTC continues to encourage eligible applicants to pursue Commuter Choice funding for capital projects that support the program's goals. Such projects can benefit toll payers over decades of useful life and the overall project benefits are thus less susceptible to short-term fluctuations in travel demand. Additionally, the percentage of available Commuter Choice funding in each corridor that may be allocated to transit operations is limited, which necessitates a variety of project types.² Eligible types of capital project include construction or expansion of park and ride lots, bus stop enhancements, transit priority improvements and improvements to Metrorail and/or Virginia Railway Express facilities.

Annual Performance Requirement

The Memoranda of Agreement (MOA) with the Commonwealth of Virginia that govern the Commuter Choice program (dated [2021](#) for the I-66 corridor program and dated [2022](#) for the I-395/95 corridor) require NVTC and, for the I-395/95 corridor, PRTC, to submit an annual report on Commuter Choice to the Commonwealth Transportation Board. The MOAs for both corridors require the report to address the following:

1. *A description of projects selected for funding in the past fiscal year and the benefits that were the basis for evaluation and selection of each such project;*
2. *A review of projects funded in past fiscal years describing the degree to which the expected benefits were realized or are being realized;*³
3. *For any project that is not providing substantially similar benefits to those that were the basis for its evaluation and selection, an evaluation of the viability of a plan to modify the project or redeploy the assets to other eligible projects that are expected to provide greater benefits; and*
4. *Proposed uses of residual, unobligated balances of program funds carried over from prior years and interest earned on such funds.*

² Both corridors' governing memoranda of agreement limit overall allocations to transit operations to a maximum of 50% of available funds over any nine-year period. NVTC uses Federal Transit Administration definitions of transit operations that focus narrowly on the costs directly attributable to service provision.

³ Required beginning in 2020 for the I-66 corridor program and 2022 for the I-395/95 corridor program. NVTC now reports performance data for both corridors.

The summary figures in the Project Performance portion of NVTC's [2022 Commuter Choice Annual Report](#) present both the average number of additional people moved each weekday (person throughput)⁴ by projects that were in service in spring 2022 and an estimate of the broader range of Commuter Choice projects' benefits to date, based on project person-throughput figures reported each year and comparing travel using each respective project relative to driving alone. The person-throughput results in particular, as summarized in the Annual Report and detailed in this memorandum, allow for an assessment of how well funded projects are realizing their anticipated benefits:

- Maximizing the number of people moving through the corridor is one of the two overarching improvement goals for each corridor's program. Person-throughput increases also serve as a reasonable proxy for the less tangible improvement goal of implementing transit and other transportation improvements that improve mobility, expand transportation options and enhance transportation safety and travel reliability.
- Each project's estimated person-throughput increase is therefore the clearest indication of its anticipated ability to support the corridor improvement goals and benefit toll payers, as well as a clear target for measuring actual project performance. The estimate is a significant part of the eligibility review (in terms of assuring that the project will benefit toll payers) and technical evaluation.⁵ For funded projects, this throughput increase is then specified in the project agreement and the performance measures identified in the agreement are intended to allow NVTC to compute an actual increase from the performance data provided by the recipient.

NVTC's companion [Commuter Choice Annual Report website](#) summarizes the status of each of the active projects included in the computation and, in cases of projects that are not performing at or close to targets, describes steps NVTC and recipients are taking to address the performance concerns.

The estimates of the total number of trips taken on projects to date and reductions in vehicle-miles traveled, travel time and automobile crashes, meanwhile, help depict the program's support for the mobility, safety and reliability aspects of the improvement goals. The benefit estimates, the approaches to which are detailed in Section 4, are high-level and strictly contextual. Most would be difficult to measure empirically; individual projects are not evaluated or tracked against them.

The throughput results and benefit estimates provide a comprehensive view of Commuter Choice's benefits to I-66 and I-395/95 toll payers and more broadly to Northern Virginia's economy and quality of life.

⁴ Defined as the number of additional people moving through the corridor - including by expressway, parallel commuter routes and/or parallel rail transit lines - as a result of the project.

⁵ NVTC works closely with applicants to ensure that the throughput estimates carried into the eligibility review and technical evaluation are reasonable, using transit ridership forecasting tools, past project performance and professional judgment.

Typical Project Performance Reporting Requirement

Grant recipients are required to provide performance data to NVTC annually to determine the actual increase in person throughput for each funded project.⁶ Each project agreement identifies specific performance measures that will allow NVTC to compute the throughput increase, as well as days for which to report data to provide a representative picture of usage of the project. Where possible, the performance reporting parameters are consistent among similar projects. An example of typical performance reporting parameters for an enhanced bus service is as follows:

- Performance Measures: Report average morning peak-period inbound ridership for the expansion trips. Report average total daily ridership for the expansion trips.
- Collection Period: Data should be collected over a two-week period in March or April. Chosen period should not include any holiday periods and the weekday average should be calculated from Tuesdays, Wednesdays, and Thursdays during the period.
- Reporting: Report data to NVTC in a technical memorandum outlining the following:
 1. Data collection methodology
 2. Data collection dates
 3. Results - data
 4. Notes (if necessary)

Most projects, regardless of category, specify a similar data collection period. Mid-week (Tuesday, Wednesday, or Thursday) days in March and April typically represent commute travel at its peak, given schools in session and no major holidays.

Summary Findings

Table 2 summarizes the morning peak period and daily person throughput increases for the transit, access to transit and TDM projects that were in service in spring 2022 by corridor. The daily totals correspond to those in the [FY 2022 Annual Report](#)'s Project Performance section.

Table 2: Person Throughput Improvements for Projects in Service in FY 2022

Metric, Operational and Completed Projects	Both Corridors (I-66 and I-395/95)	I-66 Corridor Projects Only	I-395/95 Corridor Projects Only
Total Actual Throughput Improvement, AM Inbound	1,185	409	776
Total Weekday Ridership Increase	4,019	846	3,173

⁶ For transit service projects, the reporting requirement applies to active service improvements. Capital and certain other project types require reporting for five years from opening or implementation of the project.

Table 3 presents the estimated program-wide benefits by corridor.

Table 3: Estimated Program Benefits by Corridor

Metric	Both Corridors (I-66 and I-395/95)	I-66 Corridor Projects Only	I-395/95 Corridor Projects Only
Total Travel Time Savings for Project Users (hours)	894,135	645,695	248,440
Total Travel Time Cost Savings	\$23,981,379	\$17,860,768	\$6,120,611
Total Vehicle Miles Traveled Reduction	82,577,555	60,457,127	22,120,429
Total Fuel Expenditure Savings for Commuters	\$11,627,363	\$8,392,604	\$3,234,759
Total Vehicle Crashes Avoided	101	76	25
Percentage GHG-Equivalent Emissions Reduction	69%	70%	69%
Total Project Trips	3,548,208	2,153,163	1,395,045

3. Throughput Computation Methodology and Results

NVTC computed the person throughput increase for each transit, access to transit and TDM project that was in service in spring 2022 based on the performance target/reporting requirements specific to the project and data provided by each grant recipient. Information on the scope of each project and the specific uses of Commuter Choice funding is provided on the [Commuter Choice Annual Report website](#).

New Bus Service Projects

All the new bus service projects currently supported by Commuter Choice provide only peak-period, peak-direction service (i.e., inbound toward Arlington or D.C. during the morning rush hours and outbound in the reverse direction in the afternoon rush hours). NVTC obtained

ridership data from grant recipients at the trip level or aggregated by morning or afternoon service. The calculation methodology, actual throughput, and goal throughput (based on full service) for the ten new bus service projects that were active in spring 2022 are shown in Table 4. Descriptions of all Commuter Choice-funded bus service improvements are available as part of the [Commuter Choice 2022 Annual Report](#).

Table 4: FY 2022 Person Throughput Improvements for New Bus Service Projects

Project	Grantee	Corridor	Calculation Method	Person Throughput		
				AM Inbound		Daily Actual
				Goal	Actual	
Fairfax Connector Express Bus Service between Vienna/Fairfax-GMU and Pentagon Metrorail	Fairfax County	I-66	Averages of reported total AM and daily midweek ridership, March 22-31, 2022	170	71	141
Enhanced Bus Service from Government Center to DC	Fairfax County	I-66	Averages of reported total AM and daily midweek ridership, March 22-31, 2022	276	41	82
New Bus Service from Haymarket to Rosslyn	OmniRide	I-66	AM and daily average midweek ridership from April 19-28, 2022	125	29	60
Loudoun County Transit Metro Connection from New Purcellville Park and Ride	Loudoun County	I-66	AM and daily average midweek ridership, May 3-12, 2022	50	11	23
New Bus Service from Purcellville to DC	Loudoun County	I-66	AM and daily average midweek ridership, May 3-12, 2022	30	24	48
New Bus Service from Stone Ridge to Pentagon	Loudoun County	I-66	AM and daily average midweek ridership, May 3-12, 2022	40	10	20
New Bus Service to the Pentagon with Gambrell and Backlick North Park and Ride Improvements	Fairfax County	I-395/95	Averages of reported total AM and daily ridership, March 22-31, 2022	125	62	123

Project	Grantee	Corridor	Calculation Method	Person Throughput		
				AM Inbound		Daily Actual
				Goal	Actual	
New Bus Service from Staffordboro to Downtown D.C.	OmniRide	I-395/95	AM and daily average midweek ridership from April 19-28, 2022	52	137	271
New Bus Service from Staffordboro to the Pentagon	OmniRide	I-395/95	AM and daily average midweek ridership from April 19-28, 2022	60	150	282
New Bus Service from Stringfellow to L'Enfant Plaza	Fairfax County	I-66	Averages of reported total AM and daily ridership, March 22-31, 2022	200	51	101

Enhanced Bus Service Projects

Generally, all enhanced bus service projects were required to report average weekday ridership. However, Commuter Choice supports a range of bus service enhancements, including:

- Route extensions to existing bus routes
- Discrete additional trips on existing commuter bus routes (e.g., two additional morning peak-period trips and two additional afternoon peak-period trips)
- Shorter headways on existing bus routes (e.g., buses arrive every 10 minutes during rush hours rather than every 15 minutes)

The throughput computation approach therefore varied depending on the nature of the enhancements and the data that grantees provided. The nature of the service enhancement, calculation methodology, actual throughput, and goal throughput (based on full service) for the eight enhanced bus service projects operating in Spring 2022 are summarized in Table 5. Descriptions of all Commuter Choice-funded bus service improvements are available as part of the [Commuter Choice 2022 Annual Report](#).

Table 5: FY 2022 Person Throughput Improvements for Enhanced Bus Service Projects

Project	Grantee	Corridor	Calculation Method	Person Throughput Increase		
				AM Inbound		Daily Actual
				Goal	Actual	
Enhanced Bus Service from Gainesville to DC	OmniRide	I-66	AM and daily average midweek ridership from April 19-28, 2022	94	11	27

Project	Grantee	Corridor	Calculation Method	Person Throughput Increase		
				AM Inbound		Daily Actual
				Goal	Actual	
Enhanced Bus Service from Gainesville to Pentagon	OmniRide	I-66	AM and daily average midweek ridership from April 19-28, 2022	218	138	295
Stone Ridge Enhanced Transit	Loudoun County	I-66	AM and daily average midweek ridership, May 3-12, 2022	76	13	27
Enhanced Bus Service from Dale City to Ballston	OmniRide	I-395/95	AM and daily average midweek ridership from April 19-28, 2022	28	35	61
Enhanced Bus Service on Prince William Metro Express	OmniRide	I-395/95	AM and daily average midweek ridership from April 19-28, 2022	80	51	176
Enhanced Bus Service on Route 1 Local	OmniRide	I-395/95	AM and daily average midweek ridership from April 19-28, 2022	16	13	88
Enhanced Bus Service from Van Dorn Metro to the Pentagon	City of Alexandria / DASH	I-395/95	Increase over expected ridership levels absent the service improvement, April 19-28, 2022	137	235	1,320
Enhanced Bus Service from Mark Center to Potomac Yard	City of Alexandria / DASH	I-395/95	Increase over expected ridership levels absent the service improvement, April 19-28, 2022	71	54	774

Access to Transit

One operational access to transit project, a bikeshare expansion in the City of Falls Church, reported performance information for FY 2022, as shown in Table 6. Descriptions of all Commuter Choice-funded access to transit projects, including projects that did not report performance data because they have not yet been fully implemented, are available as part of the [Commuter Choice 2022 Annual Report](#).

Table 6: FY 2022 Person Throughput Improvements for Access to Transit Projects

Project	Grantee	Corridor	Calculation Method	Person Throughput Increase		
				AM Inbound		Daily Actual
				Goal	Actual	
Expanded Transit Access, Bike Share	City of Falls Church	I-66	Average peak-period, peak-direction trips between City stations and Metrorail, Arlington or D.C., April 2022	36	5	13

Transportation Demand Management (TDM)

NVTC computed person-throughput improvements for three TDM projects active in FY 2022, as shown in Table 7. Descriptions of all Commuter Choice-funded TDM projects, including projects that did not report performance data, are available as part of the [Commuter Choice 2022 Annual Report](#).

Table 7: FY 2022 Person Throughput Improvements for TDM Projects

Project	Grantee	Corridor	Calculation Method	Person Throughput Increase		
				AM Inbound		Daily Actual
				Goal	Actual	
Expanded TDM Outreach on the I-66 Corridor	Arlington County	I-66	Number of Sustain and Save commuter incentive participants in April 2022	1,300	5	10
TDM Strategy - I-66 Corridor Vanpool Parking Benefit	OmniRide	I-66	N/A; no vanpools enrolled as of spring 2022	98	0	0
I-395/95 Corridor Vanpool Monthly Incentive	OmniRide	I-395/95	AM and daily ridership averages from trip-level ridership data from all Tue., Wed. and Thur., April 12-21, 2022	105	39	78

4. Regional Benefits Estimation Approach and Results

NVTC followed the approaches outlined in this section to estimate the regional economic and quality of life benefits of Commuter Choice funding to date. The benefits were aggregated across the last six fiscal years - 2017 to 2022 - and reflect all projects that reported person-throughput data in at least one of the years. [Appendix A](#) shows the projects included in the regional benefit estimations and for which fiscal years, based on when NVTC received throughput performance data from the recipient. NVTC performed the computations on a per-project, per-year basis.

The benefit estimates are intended to be high-level and contextual, as noted in Section 2. In lieu of being able to measure the benefits empirically, which would be challenging to impossible given their nature, NVTC estimated most by contrasting how commuters might reasonably travel with and without each project based on professional judgment, then aggregating the results across all projects and years. For some of the benefits, NVTC applied factors from nationally recognized tools to the savings in travel times and vehicle mileage. Fundamental to the analysis for each project was the identification of a sample morning peak-period commute trip from a hypothetical residential location to a hypothetical worksite that would plausibly involve travel on or via the project. NVTC constructed these trips consistent with the guidelines that it follows⁷ to estimate the travel time savings for proposed Commuter Choice projects, using Google Maps, transit timetables and information from Commuter Choice funding applications to develop the trips and obtain information on the length and duration of the legs. For consistency, the hypothetical worksites were all at an eastern point in Arlington County (Rosslyn, Crystal City or the Pentagon), unless the project was a transit service bringing commuters directly into downtown Washington, D.C.

The home-to-work trip without each project, referenced in the sections below as the “baseline” scenario, was assumed in all cases for simplicity and consistency to be a drive-alone, non-toll paying trip from end to end. The trip with the project, referenced as the “project” scenario, generally entailed one of the following:

- For Commuter Choice new and enhanced transit service projects, as well as transit-focused incentive campaigns: Drive-alone travel from the home location to a nearby transit stop, station or park-and-ride, then a ride on the project transit service to the worksite, possibly involving additional transit transfers if needed to reach the worksite. (If the project was a new or enhanced local bus route, where driving to access the route would be unlikely, the home location was assumed to be directly along the route.)
- For Commuter Choice vanpool-focused projects: Drive-alone travel from the home location to a transit stop, station or park-and-ride, then a vanpool ride (using toll roads as applicable) to the worksite.
- For Commuter Choice access to transit projects: Walk or bicycle travel using the project from the home location to a transit stop, station or park-and-ride facility, then travel via transit to reach the worksite. No driving is assumed for access to transit projects.

Figure 3 illustrates these “baseline” and “project” trips.

⁷ Section 4.2.1.2 of the [Commuter Choice Recipient Handbook](#)

Benefits arise where Commuter Choice projects afford commuters shorter travel times and/or less travel by personal vehicle than non-toll drive-alone trips. For projects where Commuter Choice is funding the transit service, in particular new or enhanced bus service, the benefit estimations appropriately account for the greenhouse gas and vehicle miles traveled (VMT) implications of the operation of transit buses in passenger-carrying (referenced as “revenue”) service. (For any legs of a trip using an existing transit service that is not funded by Commuter Choice, there is no attributable VMT increase since the service would operate in any case.)

Figure 3: Comparison of Sample ‘Baseline’ and ‘Project’ Hypothetical Home-to-Work Trips

Commuter Choice Project Type	Baseline Trip Scenario Components	Project Trip Scenario Components	
New or Enhanced Bus Service	Drive Alone	Drive Alone	Transit
Vanpool	Drive Alone	Drive Alone	Vanpool
Access to Transit	Drive Alone	Bike/Walk	Transit

The sections below outline the computation approach for each category of benefit, at the level of each project for each year that data was available.

Annual Trips

NVTC first computed the project’s daily person-throughput increase from the performance data provided by the recipient for the year in question. In cases where only morning peak-period data was reported, NVTC doubled the morning peak-period result. To convert daily to annual trips, NVTC multiplied the daily figure by 261, the approximate number of non-holiday weekdays per year.⁸

Vehicle Miles Traveled Reduction

NVTC then computed the reduction in annual VMT for the project. First, the “baseline” automobile VMT was computed as the one-way home-to-work driving distance multiplied by the number of annual project trips. As noted above, each “baseline” trip was assumed to be non-toll, drive-alone. The number of baseline annual vehicle trips is therefore the same as the number of annual trips on the project. The one-way distance used in the calculation was the average length in miles of the Google Maps non-toll routing options.

For any legs of the “project” trip involving automobile travel, the VMT was computed in the same fashion (the one-way driving distance multiplied by the number of annual project trips). And for trip legs involving vanpools, the number of trips was divided by 4, simulating the typical minimum occupancy of a vanpool.

⁸ While any individual commuter is unlikely to make the same trip on every possible workday of the year, there are assumed to be enough prospective riders making similar trips so that the volume of daily trips is reasonably consistent over the course of the year.

If the Commuter Choice project included the operation of transit service, the attributable annual bus VMT was computed by the following steps, to reflect the full revenue operation of the service regardless of its usage:

- a. Estimate weekday morning bus VMT by multiplying the end-to-end bus route distance by the number of weekday morning bus trips supported by Commuter Choice;
- b. Convert the figure to daily by doubling it;
- c. Convert the figure to annual by multiplying by 261, the approximate number of non-holiday weekdays per year.

NVTC drew from funding applications for the number of trips and traced the transit routing as closely as possible in Google Maps to obtain the end-to-end distance.

Finally, the annual VMT reduction was obtained by subtracting the total annual “project” VMT (including drive-alone, bus and/or vanpool elements) from the annual “baseline” (drive-alone) VMT.

Figure 4 shows a sample VMT reduction computation for a Commuter Choice bus service project.

Hours of Delay Saved

NVTC estimated delay savings for each project by first computing the travel time savings (if any) for each trip by subtracting the end-to-end “project” trip travel time from the end-to-end “baseline” trip travel time, both in minutes. For driving segments, the travel time was assumed to be the midpoint of the full range of potential non-toll travel times identified by Google Maps, reflecting the variability of day-to-day travel. For trips with multiple segments by transit, the overall travel time included waiting time between the segments.

To convert from minutes per trip to hours per year, NVTC multiplied the per-trip time difference by the number of annual project trips, then converted from minutes to hours by dividing by 60.

Regional Economic Benefits from Reduced Travel Delay

NVTC performed a similar computation to that for hours of delay saved, but just involving the in-vehicle portions of the “baseline” and “project” trips - in other words, when the commuter was aboard a moving vehicle, as opposed to waiting for a bus or train (or walking or bicycling).

The resulting total annual difference in in-vehicle travel times was multiplied by \$29.40, the assumed average value of a Northern Virginia commuter’s hour of travel time saved. The figure represents the [United States Department of Transportation’s \(USDOT\) time savings valuation](#) for business travel.⁹ While USDOT suggests use of a lower personal travel value for commute trips, the business travel value aligns more closely with how area commuters are more likely to value their time based on predominant income levels.¹⁰

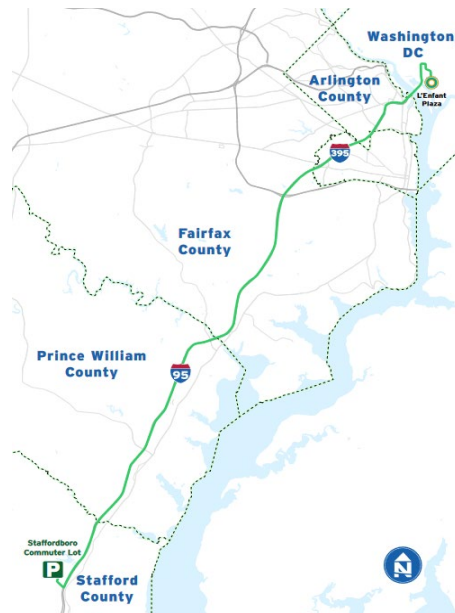
⁹ 2016 Revised Departmental Guidance on Valuation of Travel Time in Economic Analysis. Figures were provided in 2020 dollars.

¹⁰ Specifically, the levels assumed in the Metropolitan Washington Council of Governments’ regional travel demand forecasting. See the [User’s Guide for the COG/TPB Gen2/Version 2.4 Travel Demand](#)

Figure 4: Sample Vehicle Miles Traveled Reduction Computation

The steps to estimate the VMT reduction associated with OmniRide’s Staffordboro to Downtown D.C. express bus service, a Commuter Choice-funded route, for FY 2022 were as follows. For this project, the hypothetical ‘home’ location was in a residential area two miles from the Staffordboro Commuter Lot, where the route picks up passengers in the morning. The work location was assumed to be directly along the route at L’Enfant Plaza in downtown D.C.

1. Baseline automobile VMT: Google Maps’ sole non-toll routing option from home to work is 40.8 miles, using the general-purpose lanes on I-395/95. There were estimated to be 70,731 trips on the OmniRide route during FY 2022, based on 271 reported daily trips in spring 2022 multiplied by 261. (All baseline trips are assumed to be drive-alone, so there is no adjustment to the number of trips for vehicle occupancy.) Baseline automobile VMT is therefore 2,885,825, the result of multiplying 40.8 by 70,731.
2. Project automobile VMT: As noted above, the home location is two miles from the Staffordboro lot according to Google Maps. All project trips are assumed to access the lot by driving alone. Project automobile VMT is therefore 141,462, the result of multiplying 2 by 70,731.
3. Project bus VMT: Tracing the OmniRide route in Google Maps provides an approximate end-to-end length of 41.5 miles. OmniRide operates four morning one-way trips on the route, all supported by Commuter Choice, so the route’s VMT on a weekday morning is 207.5 (41.5 multiplied by 4). NVTC doubled the morning figure to reach the estimated daily bus VMT of 415. Converting the daily figure to annual by multiplying by 261 yields an annual project bus VMT of 108,315 (415 multiplied by 261).
4. Annual VMT reduction: The baseline VMT is 2,885,825 and the total project VMT is 249,777, comprising the project automobile VMT of 141,462 and the project bus VMT of 108,315. The annual VMT reduction, from subtracting the project VMT from the baseline VMT, is 2,636,048.



[Forecasting Model](#), p. 181. The hourly rate of \$27.70, corresponding to households earning between \$50,000 and \$100,000, was assumed to be most applicable (in 2007 dollars; not inflated to current levels).

Automobile Crashes Avoided

NVTC computed the difference in annual automobile VMT between the “baseline” and “project” scenarios and multiplied it by the incidence in 2020 of Northern Virginia automobile crashes. The rate was 1.11 crashes per 1,000,000 VMT.¹¹

Greenhouse Gas Emissions Reductions

NVTC used the nationally recognized [California Life-Cycle Benefit/Cost Analysis Model](#) (Cal-B/C)¹² Excel-based tool to convert the annual VMT changes for each project into estimated greenhouse gas emissions reductions. Cal-B/C identifies the quantity of tailpipe emissions in grams per mile for the greenhouse gases carbon dioxide (CO₂) and nitrogen oxides (NO_x).¹³ The emission rates are specific to vehicle type (car or bus) and average travel speed.

To estimate annual “baseline” and “project” greenhouse gas emissions in metric tons:

1. NVTC computed the average travel speed for automobile travel in the “baseline” trip in miles per hour, using the end-to-end travel distance and travel time.
2. NVTC obtained CO₂-equivalent emissions for the “baseline” trip by adding together the following:
 - a. The baseline annual automobile VMT multiplied by Cal-B/C’s grams/mile CO₂ emissions factor for the average travel speed, converted from grams to metric tons of emissions by dividing by 1,000,000, and
 - b. The baseline annual automobile VMT multiplied by Cal-B/C’s grams/mile NO_x emissions factor for the average travel speed, converted from grams to metric tons of emissions by dividing by 1,000,000 and multiplied by 298 to convert the NO_x emissions to CO₂-equivalent.¹⁴
3. NVTC then performed steps 1 and 2 for the “project” trip:
 - a. For automobile travel, the computation incorporated the project annual automobile VMT and average automobile travel speed in miles per hour.
 - b. For operation of bus transit funded by Commuter Choice, the computation incorporated the total annual revenue bus VMT and the average end-to-end bus travel speed in miles per hour per revenue trip (from the trip distance traced in Google Maps and the one-way travel time provided in online timetables).

The difference in CO₂-equivalent emissions between the “baseline” and “project” travel was computed for each project. As the absolute impact of a number of metric tons reduced does not have a widely recognized basis for comparison, NVTC aggregated the results across all projects and fiscal years to obtain a percentage reduction in emissions.

¹¹ [2010-2020 Summary of Crash Data](#). The Virginia Department of Transportation’s Traffic Engineering department maintains the data.

¹² Developed by the California Department of Transportation and compliant with 2022 USDOT guidance on benefit-cost analyses.

¹³ Cal-B/C includes projections for various vehicle model years. NVTC used model-year 2024 projections, the closest available to today.

¹⁴ [EPA Greenhouse Gas Equivalencies Calculator](#).

Fuel Expenditure Savings

NVTC first estimated the number of gallons of fuel that commuters saved annually on their automobile travel under the “project” trip relative to the “baseline” trip using Cal-B/C’s factors for fuel consumption based on average travel speed.¹⁵ For each scenario, NVTC estimated commuters’ annual fuel consumption in gallons by multiplying the applicable Cal-B/C fuel consumption factor (provided in gallons per mile) for the automobile portion of the trip by the annual automobile VMT. NVTC then obtained the fuel consumption reduction by subtracting the “project” fuel consumption from the “baseline” fuel consumption. NVTC multiplied this difference by \$4, equivalent to early 2022 per-gallon prices (when this analysis was begun), to obtain an estimated total fuel expenditure savings for each project in each year.

5. Conclusion

This technical memorandum documents NVTC’s methodology to monitor, report and evaluate person throughput performance for Commuter Choice projects to support the figures included in the Project Performance portion of the [2022 Commuter Choice Annual Report](#). NVTC presented the person-throughput performance for projects active in spring 2022, reflecting a single, straightforward measure that aligns with the corridor improvement goals that any Commuter Choice project must support – specifically, maximizing person throughput and implementing multimodal improvements that improve mobility, support new and diverse travel choices, and enhance transportation safety and travel reliability. NVTC also, for the first time, estimated the benefits since 2017 of Commuter Choice funding to Northern Virginia’s economy and quality of life.

NVTC found that the 22 transit, access to transit and TDM projects in service in Spring 2022 moved 4,006 more people each weekday through the I-66 Inside the Beltway and I-395/95 corridors. Further, NVTC estimated the following benefits to date of Commuter Choice funding using nationally recognized tools and factors applied to the usage of each project and how commuters shifting to the project would be likely to adjust their travel:

- 894,135 hours of total travel time savings for commuters, amounting to \$23,981,379 in regional economic benefits from reduced travel delay
- 82,577,555 fewer vehicle miles traveled
- \$11,627,363 in fuel expenditures saved
- 101 automobile crashes avoided
- A 69% reduction in greenhouse gas emissions
- 3,548,208 total project trips

¹⁵ Cal-B/C includes projections for various vehicle model years. NVTC used model-year 2024 projections, the closest available to today.

Appendix A: Projects Included in the Regional Benefits Estimation

Project	Grantee	Corridor	Fiscal Years (20-)					
			17	18	19	20	21	22
Enhanced Bus Service on AT-1 Plus: West End to Van Dorn Metro	DASH	I-395				X	X	
Enhanced Bus Service from Van Dorn Metro to the Pentagon	DASH	I-395						X
Enhanced Bus Service on AT-9: Mark Center to Potomac Yard	DASH	I-395				X	X	
Enhanced Bus Service from Mark Center to Potomac Yard	DASH	I-395						X
New Bus Service to the Pentagon with Gambrell and Backlick North Park and Ride Improvements	Fairfax County	I-395				X	X	X
New TDM Outreach Campaign for Military Facilities	NVRC	I-395				X		
Enhanced Bus Service from Dale City to Ballston	OmniRide	I-395				X	X	
Renewal of Enhanced Bus Service from Dale City to Ballston	OmniRide	I-395						X
Enhanced Bus Service on Prince William Metro Express	OmniRide	I-395				X	X	X
Enhanced Bus Service on Route 1 Local	OmniRide	I-395				X	X	
Renewal of Enhanced Bus Service on Route 1 Local: Quantico to Woodbridge VRE	OmniRide	I-395						X
New Bus Service from Staffordboro to Downtown D.C.	OmniRide	I-395				X	X	
Renewal of Bus Service from Staffordboro to Downtown D.C.	OmniRide	I-395						X
New Bus Service from Staffordboro to the Pentagon	OmniRide	I-395				X	X	
Renewal of Bus Service from Staffordboro to the Pentagon	OmniRide	I-395						X
I-395/95 Corridor Vanpool Monthly Incentive	OmniRide	I-395						X
Metrobus Route 2A Peak Period Expansion	Arlington County	I-66		X	X			
Enhanced Bus Service on Metrobus 3Y: Lee Highway-Farragut Square	Arlington County	I-66				X		
Route 55 Peak Period Service Expansion	Arlington County	I-66		X	X			
Expanded TDM Outreach on the I-66 Corridor	Arlington County	I-66						X
Expanded Transit Access, Bike Share	City of Falls Church	I-66				X	X	X
Metrobus Route 3T Extension and Service Expansion	City of Falls Church	I-66			X	X		

Project	Grantee	Corridor	Fiscal Years (20-)					
			17	18	19	20	21	22
Bicycle Parking Improvements at Manassas VRE Station	City of Manassas	I-66				X		
Fairfax Connector Government Center - Downtown DC, Route 699	Fairfax County	I-66		X	X			
Fairfax Connector Express Bus Service between Vienna/Fairfax-GMU and Pentagon Metrorail	Fairfax County	I-66			X	X	X	X
Enhanced Bus Service from Government Center to DC	Fairfax County	I-66				X	X	X
New Bus Service from Stringfellow to L'Enfant Plaza	Fairfax County	I-66					X	X
Loudoun County Stone Ridge Enhanced Transit	Loudoun County	I-66	X	X	X			
Loudoun County Transit Metro Connection Route 88X Extension to Dulles South	Loudoun County	I-66			X	X		
Enhanced Bus Service from Stone Ridge to DC	Loudoun County	I-66				X		X
Loudoun County TDM	Loudoun County	I-66		X	X			
Loudoun County Transit Metro Connection from New Purcellville Park and Ride	Loudoun County	I-66			X	X	X	
New Bus Service from Stone Ridge to Pentagon	Loudoun County	I-66						X
New Bus Service from Purcellville to DC	Loudoun County	I-66						X
Renewal of Purcellville Metro Connection Bus Service	Loudoun County	I-66						X
Gainesville to Pentagon Commuter Service	OmniRide	I-66	X	X	X			
Enhanced Bus Service from Gainesville to DC	OmniRide	I-66				X	X	X
Enhanced Bus Service from Gainesville to Pentagon	OmniRide	I-66				X	X	
OmniRide Linton Hall Metro Direct Bus Service Enhancement	OmniRide	I-66				X	X	
New Bus Service from Haymarket to Rosslyn	OmniRide	I-66				X	X	
Renewal of Bus Service from Gainesville to Pentagon/Navy Yard	OmniRide	I-66						X
I-66 Corridor Vanpool Monthly Incentive	OmniRide	I-66						X
Renewal of Bus Service from Haymarket to Rosslyn	OmniRide	I-66						X

Appendix B: I-66 and I-395 Cordon Count Data Analysis

As an addition to the project performance information presented in the 2022 Commuter Choice Annual Report, NVTC hereby also presents an update to the [2019 Corridor Performance Report](#), highlighting the changes in broader travel trends over time in the I-66 Inside the Beltway (ITB) and I-395 corridors. The Corridor Performance Report and this update use travel volume counts taken during the morning rush hour in each corridor, inclusive of expressways and parallel arterials and rail lines, across all modes of travel to help depict how tolling and Commuter Choice funded projects are influencing commuters' transportation choices and the overall numbers of people and vehicles moving through each corridor.

Travel volume counts have now been taken in the I-66 ITB corridor in 2015 and in both the I-66 ITB and I-395 corridors in 2019 and 2021. When they were being planned, the 2021 counts, which took place in November, were anticipated to capture large regional employers' implementation of return-to-office plans following the COVID-19 pandemic. Many of these plans were instead implemented in early- to mid-2022, so this update presents an incomplete picture of post-pandemic travel in the two corridors. Between the time of the November 2021 counts and June 2022, for instance, monthly Northern Virginia transit boardings grew by about 40%, with more growth expected into the fall. The next set of counts, anticipated to take place in fall 2023, should provide a more meaningful basis for analysis and conclusions.

The I-66 ITB corridor¹⁶ showed a slight shift towards more efficient travel, with more people moved in fewer vehicles, from 2015 to 2019; however, in 2021, overall travel in the corridor was down substantially. Compared to 2019, the total number of people moving inbound during the morning rush hour decreased by 59%, while the associated number of vehicles decreased by 35%. Overall, 38% of the corridor's morning rush-hour inbound trips were made by transit or high-occupancy vehicle (HOV; defined in this corridor as two or more people in the vehicle) in 2021, compared to 65% in 2019 and 64% in 2015.

The I-395 corridor also recorded a decline in travel in 2021 compared to 2019, though comparatively modest. The total number of people moving through the corridor was down 49% and the number of vehicles decreased by 19%. About 20% of the I-395 corridor's morning rush hour inbound trips were made by transit or HOV (defined in this corridor as three or more people in the vehicle) in 2021 compared to the 60% of transit or HOV trips made in 2019. The relative drop in HOV travel was much larger than that for transit.

¹⁶ 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 5). 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 2021

Figure 5 shows the main roadways in the I-66 ITB corridor. Overall, about 24,000 people and 18,000 vehicles traveled inbound through the I-66 ITB corridor during the corridor’s three-hour weekday morning peak-period (7:00 to 10:00 a.m.) as of late 2021. Between 2015 and 2019, the number of people moving through the corridor had grown by about 700 people (1.2%) while the number of vehicles decreased by about 750 (2.7%). From 2019 to 2021, the number of people moving through the corridor decreased by about 35,000 (59% decrease) and the number of vehicles by about 9,500 (35% decrease), reflecting continued impacts of the pandemic and continued high levels of remote work. Figure 6 depicts the changes in volume over time.

Figure 5: I-66 Corridor Traffic Count Locations

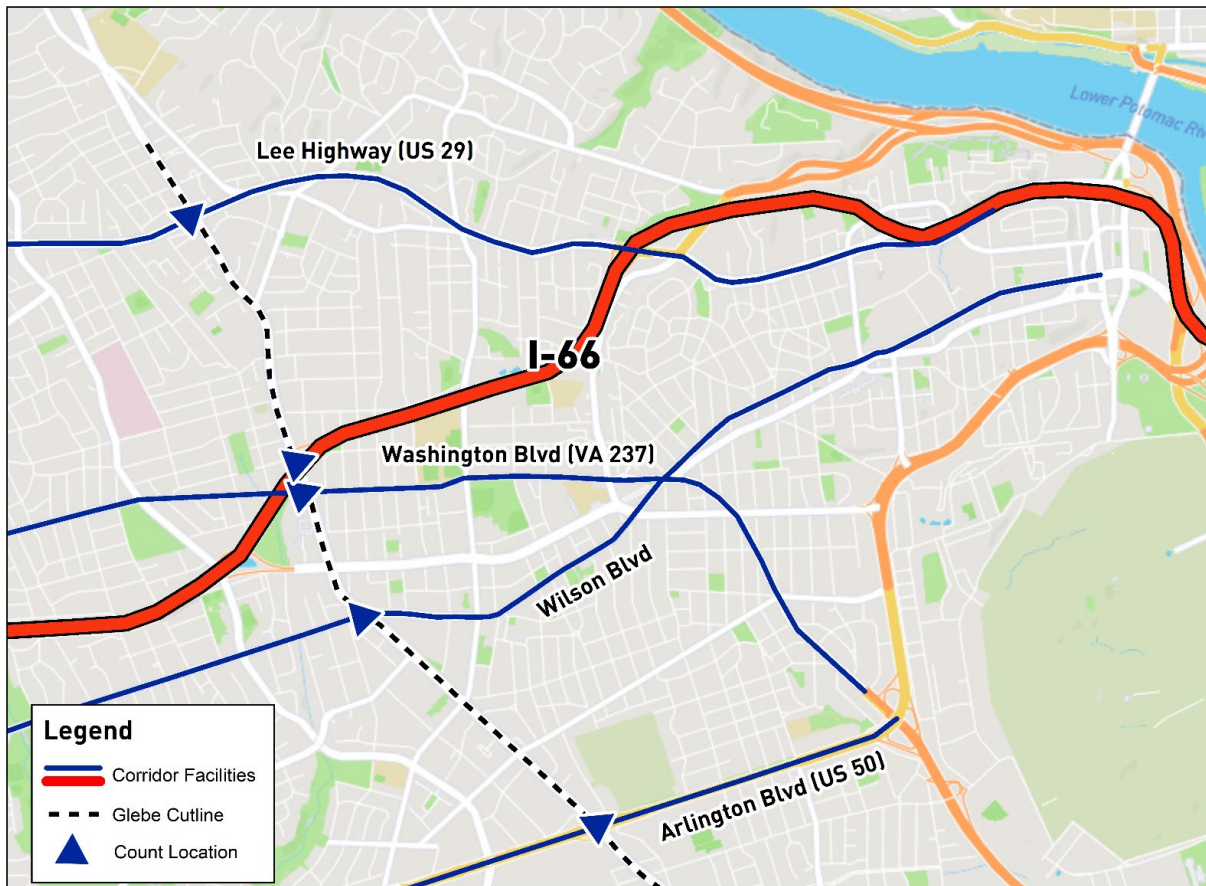
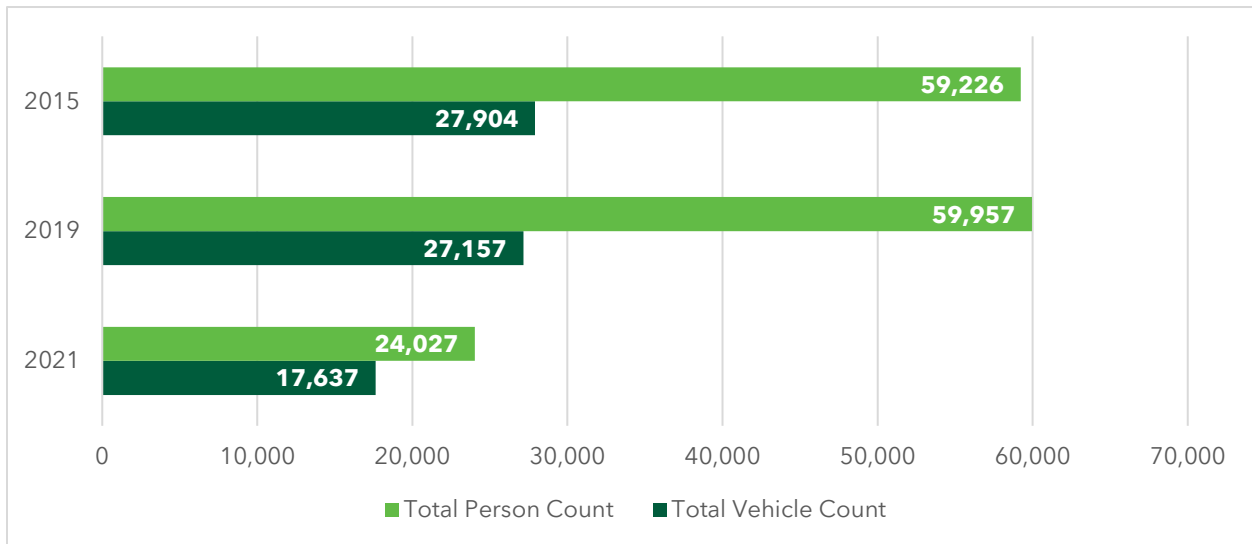


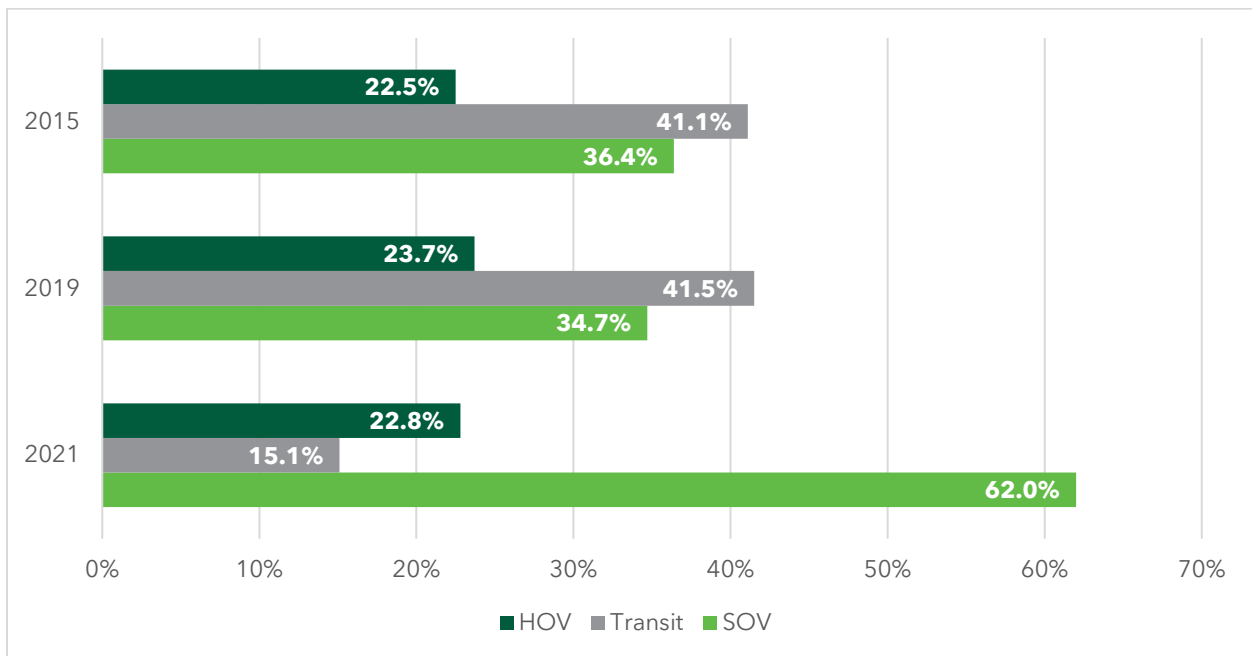
Figure 6: Change in I-66 ITB Corridor Travel Volumes, 2015 to 2021



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2015, April 2019 and November 2021 traffic counts

A majority of the trips in the corridor in 2021 were made by single-occupancy vehicle (SOV), as shown in Figure 7. HOV and transit trips accounted for 38% of the corridor’s inbound trips during the morning peak hour in 2021, while SOV trips made up 62% of trips. The share of trips by transit in particular decreased by about 26% relative to both 2015 and 2019. The HOV and transit mode shares and their shifts are discussed more below.

Figure 7: I-66 ITB Corridor Mode Share, 2015 to 2021



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2015, April 2019 and November 2021 traffic counts

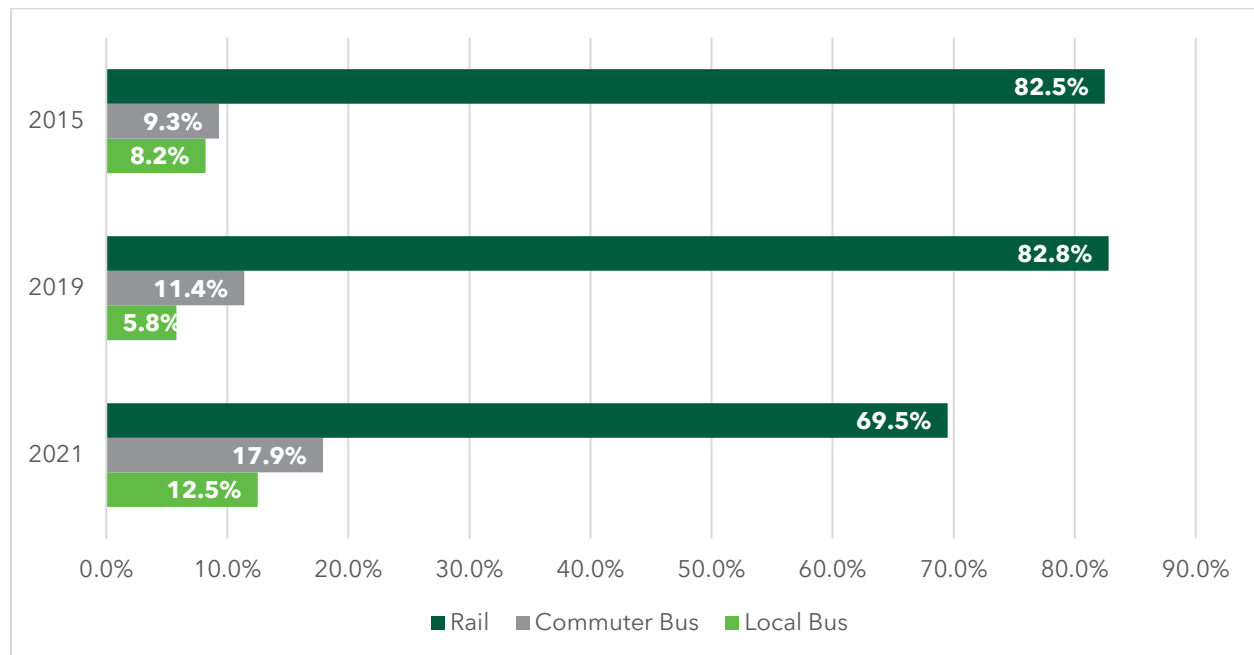
HOV Mode Share

Approximately 23% of the I-66 ITB corridor’s inbound weekday morning peak-period trips were made by HOV, defined for this corridor as an automobile with two or more occupants, as of late 2021. The HOV mode share was nominally higher in 2021 than 2015. The average auto occupancy along I-66 dropped from 1.54 in 2019 to 1.17 in 2021, however, indicating a decrease in larger carpools in the corridor.

Transit Mode Share

Nearly 3,700 inbound trips were made by transit in the I-66 ITB corridor during the weekday morning peak period as of late 2021. Transit accounted for 15% of all inbound morning peak period trips, which is a 26% decrease in the share from both 2015 and 2019. Rail is still the predominant transit mode in the corridor, making up about 70% of transit trips, though passenger volumes on each of the transit modes were substantially lower. In 2019, for instance, transit supported about 25,000 total inbound passenger trips each morning. Figure 8 shows the change in the distribution of transit ridership between 2015 and 2021.

Figure 8: Distribution of I-66 ITB Corridor Transit Trips by Transit Mode



Source: Metropolitan Washington Council of Governments Transportation Policy Board April 2015, April 2019 and November 2021 traffic counts

I-66 Commuter Choice

I-66 Commuter Choice has funded numerous transit improvements and other alternatives to driving alone. Table 8 identifies the 15 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 November 2021, when the most recent set of I-66 ITB corridor counts occurred. Some of the transit services were not operating at full service levels due to continued reduced demand.

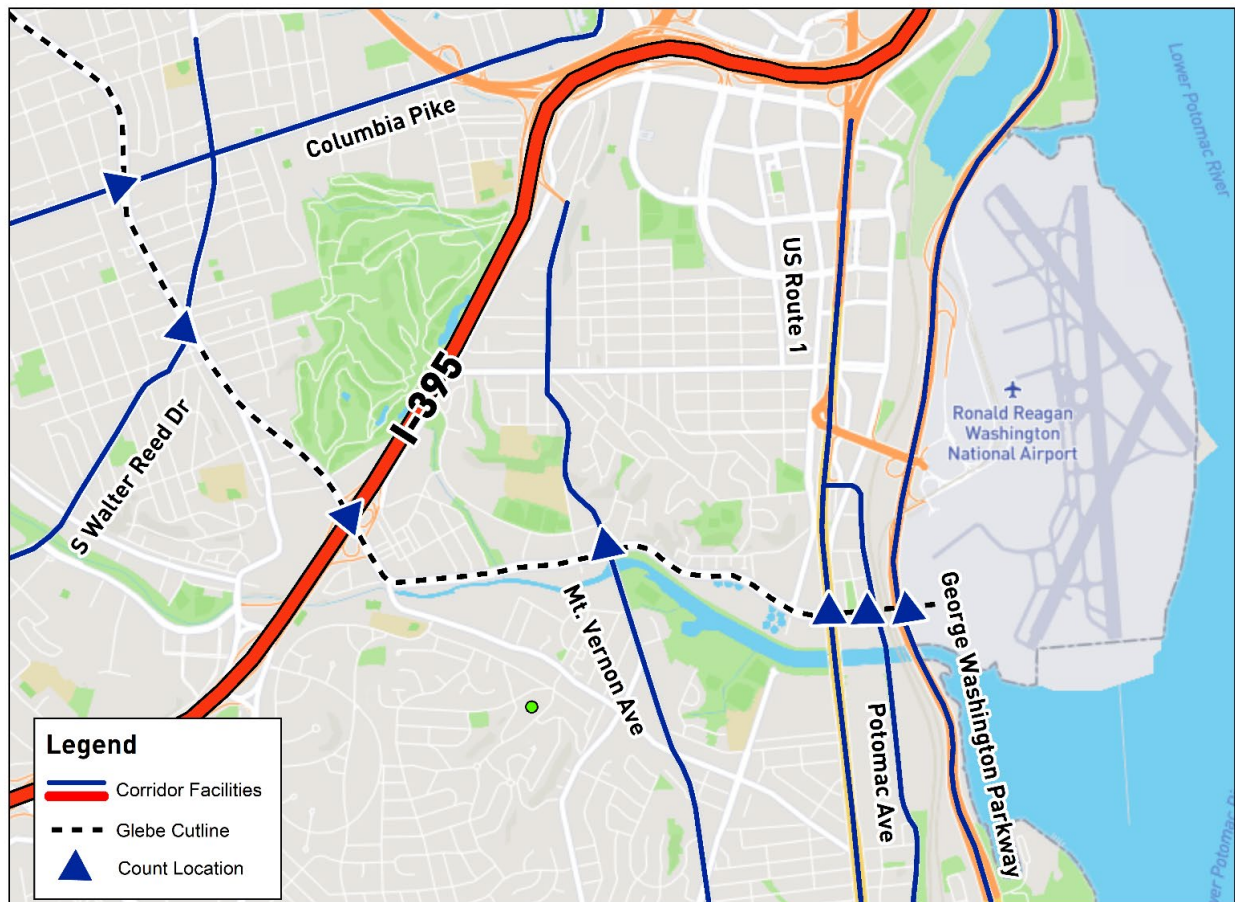
Table 8: Commuter Choice Projects Underway in the I-66 Corridor, November 2021

Projects	Status as of November 2021	Type of Project	Recipient
Expanded TDM Outreach to the I-66 Corridor	Campaign began September 2017	Transportation Demand Management	Arlington County
Expanded Transit Access; Bike Share	Operation began May 2019	Access to transit	City of Falls Church
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
I-66 Corridor Vienna/Merrifield Bike Share Expansion	Implementation underway	Access to Transit	Fairfax County
New Bus Service from Stringfellow to L'Enfant Plaza	Service began August 2020	New Bus Service	Fairfax 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
Gainesville to Pentagon Commuter Service	Service began December 2016	New Bus Service	OmniRide
New Bus Service from Purcellville to DC	Service began August 2021	New Bus Service	Loudoun County
New Bus Service from Stone Ridge to Pentagon	Service began January 2021	New Bus Service	Loudoun County
Gainesville to Pentagon Commuter Service	Service began December 2016	New Bus Service	OmniRide
Enhanced Bus Service from Gainesville to DC	Service began December 2019	Enhanced Bus Service	OmniRide
New Bus Service from Haymarket to Rosslyn	Service began July 2021	New Bus Service	OmniRide
TDM Strategy - I-66 Corridor Vanpool Parking Benefit	Campaign underway	Transportation Demand Management	OmniRide

Changes in I-395 Corridor Travel, 2019 to 2021

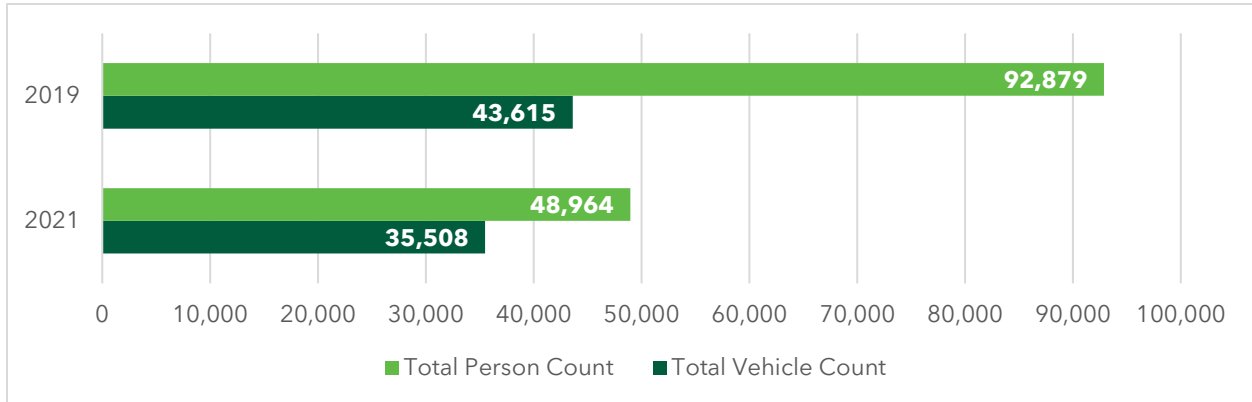
Figure 9 shows the main roadways in the I-395/95 corridor. Approximately 49,000 people and 36,000 vehicles moved inbound through the corridor¹⁷ each weekday during the corridor’s three-hour weekday morning peak-period (6:15 to 9:15 a.m.) as of late 2021. The 2021 figures reflect about 45,000 fewer people (49% decrease) and 8,000 fewer vehicles (19% decrease), as shown in Figure 10. Many commuters in the I-395 (and I-95 to the south) corridor are bound for military facilities, including the Pentagon, which called personnel back to the office at least part-time relatively early in the pandemic.

Figure 9: I-395/95 Corridor Traffic Count Locations



¹⁷ 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 9). 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.

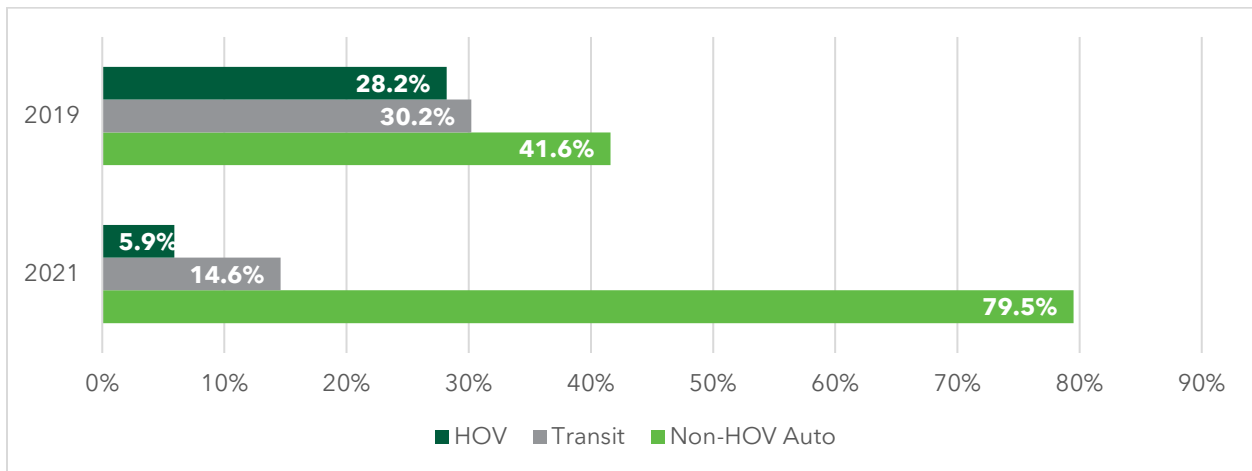
Figure 10: Change in I-395/95 Corridor Travel Volumes, 2019 to 2021



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2019 and November 2021 traffic counts

Transit and HOV, the latter defined for the I-395 corridor as automobiles occupied by three or more people, together accounted for almost 21% of the corridor’s inbound morning peak period trips in late 2021. In 2019, they accounted for 58% of trips, as shown in Figure 11. The shares of trips for both means of travel decreased sharply, the latter in particular, as discussed further below.

Figure 11: I-395/95 Corridor Mode Share, 2019 to 2021



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2019 and November 2021 traffic counts

HOV Mode Share

Approximately 6% of the I-395 corridor’s inbound morning peak period trips were made by HOV, defined for this corridor as an automobile with three or more occupants, as of late 2021.¹⁸

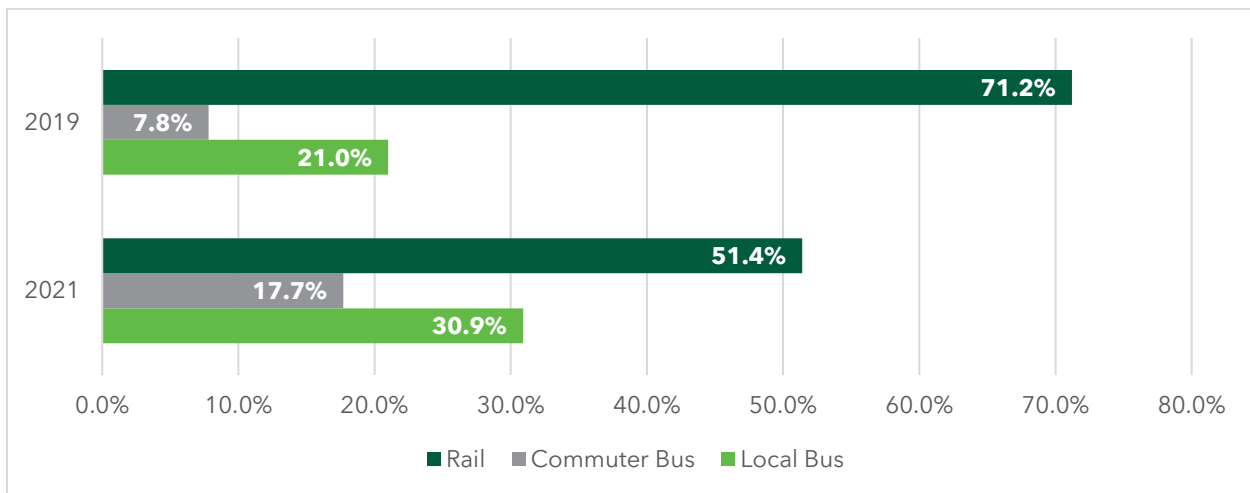
¹⁸ Uncertain is the extent to which a change in the 395 Express Lanes count location may have contributed to an undercount of HOV travel in 2021. The location used in 2019, which afforded good visibility into the median lanes from the side, has since been obscured by a soundwall. The new

The corridor’s high HOV share of trips in 2019 reflected the preponderance of casual carpooling or “slugging,” which allowed travelers willing to share a vehicle with other commuters to save significant time on their commutes via the then-I-395 HOV lanes. The practice largely ceased during the pandemic and anecdotally was just beginning to rebound at the time that the November 2021 counts were taken.¹⁹ The average automobile occupancy for the overall I-395 corridor at that time was 1.18 persons per vehicle, lower than the 1.52 average in 2019.

Transit Mode Share

About 7,200 inbound trips were made by transit in the I-395 corridor during the morning peak period as of late 2021. Transit accounted for about 15% of all inbound morning peak period trips in the corridor. Rail accounted for 51% of transit trips, with the remainder by bus. The increase in the share of transit trips by bus from 2019 to 2021 may have reflected the relatively quick rebound in ridership on some OmniRide commuter routes, particularly two Commuter Choice-funded Stafford County routes that had not been in place when the 2019 counts were conducted, as well as DASH’s comprehensive network restructuring, partly Commuter Choice-supported service expansion and transition to fare-free operation that took effect in September 2021. In 2019, transit supported about 29,000 total inbound passenger trips each morning.²⁰ The comparison between 2019 and 2021 peak period transit mode share is shown in Figure 12.

Figure 12: Distribution of I-395/95 Corridor Transit Trips by Transit Mode, 2019 to 2021



Source: Metropolitan Washington Council of Governments Transportation Policy Board, April 2019 and November 2021 traffic counts

location only allowed a view into the front of vehicles and the count contractor reported concerns with glare.

¹⁹ For instance, a [July 2021 media report](#) noted interest among I-395/95 corridor commuters in resuming casual carpooling but few riders so far.

²⁰ Ridership on Arlington Transit (ART) and DASH local buses was underreported in 2019 due to a manual counting error.

I-395/95 Commuter Choice

Table 9 identifies the 10 I-395/95 Commuter Choice-funded transit service improvements and other efforts 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 November 2021, when the most recent set of I-395/95 corridor counts occurred. Some of the transit services were not operating at full service levels due to continued reduced demand.

Table 9: Commuter Choice Projects Underway in the I-395/95 Corridor, November 2021

Projects	Status as of November 2021	Type of Project	Recipient
Enhanced Bus Service from Mark Center to Potomac Yard	Enhanced service began September 2021	Enhanced Bus Service	DASH
Enhanced Bus Service from Van Dorn Metro to the Pentagon	Enhanced service began September 2021	Enhanced Bus Service	DASH
New Bus Service to the Pentagon with Gambrill and Backlick North Park and Ride Improvements	Service began January 2020	New Bus Service/ Park and Ride Lot	Fairfax County
New TDM Outreach Campaign for Military Facilities	Campaign began October 2019	Transportation Demand Management	NVRC
Enhanced Bus Service from Dale City to Ballston	Enhanced service began November 2019	Enhanced Bus Service	OmniRide
Enhanced Bus Service on Prince William Metro Express	Enhanced service began November 2019	Enhanced Bus Service	OmniRide
Enhanced Bus Service on Route 1 Local	Enhanced service began November 2019	Enhanced Bus Service	OmniRide
New Bus Service from Staffordboro to Downtown D.C.	Service began November 2019	New Bus Service	OmniRide
New Bus Service from Staffordboro to the Pentagon	Service began November 2019	New Bus Service	OmniRide
TDM Strategy - I-395/95 Corridor Vanpool Monthly Incentive	Campaign began July 2021	Transportation Demand Management	OmniRide

Conclusions and Discussion

Travel volumes in both the I-66 ITB and I-395/95 corridors decreased significantly between spring 2019 and fall 2021, principally due to continued increased remote work following the COVID-19 pandemic. Transit and HOV travel, the latter in the I-395 corridor in particular, decreased more sharply than SOV travel.

The fall 2021 counts do not present a complete picture of post-pandemic travel conditions as they were conducted prior to many large employers, including most civilian federal agencies, implementing initial return-to-office plans. NVTC observed a continued gradual ridership increase on Northern Virginia transit in general and on many Commuter Choice-funded transit services over the several months since the counts were conducted. At the same time, Northern Virginia's transit operators continue to evaluate how best to target service to changing ridership needs - which appears to include a greater share of demand in off-peak periods. The

fall 2021 counts also show a sharp decline in HOV travel in the I-395 corridor relative to 2019, largely reflecting the ceasing of casual carpooling (“slugging”) during the pandemic.

Future Updates

NVTC staff plans to continue to update this report biannually to help local decision-makers understand the impacts of tolling and increased investment in expanded travel options. The next set of counts, in fall 2023, will hopefully provide a more complete representation of post-pandemic travel in the I-66 ITB and I-395 corridors.

B-1. Methodology

In spring 2015 and 2019 and fall 2021, 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, 2019, and 2021 and the I-395 corridor in 2019 and 2021. 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 2021 counts along the I-66 ITB corridor were an update to the 2019 Mode Share Study: I-66 Inside the Beltway. The traffic count locations, data processing approaches, technical methodologies, and assumptions of the current count closely aligns with the 2019 study. The 2021 I-395 counts were an update to the 2019 Mode Share Study: I-395 corridor. The traffic count locations, data processing approaches, technical methodologies, and assumptions of the current count closely aligns with the 2019 study.

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 three consecutive weekdays in the middle of the week, in November during a normal workweek. The data compiled all vehicle and person movement crossing the cutlines, including passenger counts on local, express, and commuter bus routes (in some cases collected via automatic passenger counter devices on the buses). Metrorail and VRE ridership data were obtained from the providers for the same dates as the traffic counts.

The analyses in this report for each corridor focus on the three-hour portion of the count period with the highest travel volumes. This approach provides the clearest indication of the impacts of tolling and increased commute options on travel volumes and behavior.

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.