Transit Development Plan
City of Fairfax CUE

Final Report

DRPT Contract No. 505-13-CC0006

June 12, 2017

Prepared for

DRPT

Photo credit: City of Fairfax website.

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INTRODUCTION

A Transit Development Plan, often referred to as a TDP, serves as a "road map" for public transportation improvements in a community or service area in the upcoming years. The TDP is intended to improve the efficiency and effectiveness of the transit system and maximize the investment of public funds to achieve the greatest public benefit. The Virginia Department of Rail and Public Transportation (DRPT) requires public transit operators receiving state funding to prepare, adopt, and submit a TDP at least every six years. This short-range transit plan outlines the services that a grantee intends to implement, including estimates for future expenses and funding sources, during the six-year planning horizon. DRPT provides a set of TDP requirements that form the basis of this planning effort.

This TDP serves as a management and policy document for the City of Fairfax City-University Energysaver (CUE) bus system. The last TDP for CUE was completed in July 2010. This TDP update describes the service and capital improvements planned for Fiscal Years 2018 through 2023. It provides DRPT with an up-to-date record of CUE's capital and operating budgets. The TDP provides a basis for inclusion of CUE's capital and operating programs in the Commonwealth's Six Year Improvement Program (SYIP), the Statewide Transportation Improvement Program (STIP), and the Constrained Long Range Plan (CLRP).

The planning process for the TDP was guided by City of Fairfax staff, a CUE Transit Advisory Committee (TAC), and DRPT. These stakeholders met periodically to review project deliverables and provide input to ensure that the plan accurately reflects existing transportation conditions and needs, and outlines constructive recommendations to improve public transportation in the City of Fairfax.

This first chapter of the TDP update provides an overview of the transit program, background information, and data that was used for subsequent data collection, analysis, and recommendations for the six-year plan.

BACKGROUND

The City of Fairfax is an independent city in Northern Virginia, located about 20 miles west of Washington, D.C. Major roadways that run through or near the city borders include I-66, US 50 and US 29 (Fairfax Boulevard and Lee Highway), Route 236 (Main Street), and Route 123 (Chain Bridge Road). The city's proximity to these major arterials is a double-edged sword,

providing convenience for residents and businesses, but also inviting through traffic given the severe congestion on the interstate. Multiple transit operators serve the city including CUE, George Mason University (Mason Shuttles), Fairfax County (Fairfax Connector), and the Washington Metropolitan Area Transit Authority (Metrorail and Metrobus).

The City of Fairfax has a residential population approaching 25,000, and nearly 20,000 employees work in the city among 1,600 employers.[1] The city's residential population has experienced growth, increasing about 13% since the 2000 Census, with much of that increase occurring since 2010.[2] In 2014, older adults ages 65 and over comprised about 15% of the population, representing a notable proportion of residents who may choose to use alternative transportation as they age in place.[3]

Covering six square miles, the City of Fairfax has a population density of nearly 4,000 people per square mile, compared to about 200 persons per square mile for the Commonwealth of Virginia. The city's historical development of a street grid with short, walkable blocks and a mix of land uses including retail, housing, and recreational attractions in the city center provided a transit conducive environment that remains today.[4] Fairfax prides itself on its small town atmosphere, which includes a pedestrian friendly and walkable environment.[5] A recent survey indicated that nearly 70% of CUE riders walk to access the bus; at the end of the bus trip nearly half transfer to Metrorail, about one-quarter walk to their destination, and 20% transfer to another bus.[6]

Major trip generators for CUE services include George Mason University (also known as GMU or Mason), Vienna/Fairfax-GMU Metrorail Station, and Old Town Fairfax. Virginia's largest public educational institution, Mason, is located at the southern border of Fairfax. In 2015 Mason's Fairfax Campus had a student population of more than 6,000, anticipated to grow to 7,000 with the construction of new residential units.[7] Mason has a total of 34,000 students who attend classes at three campuses located in Fairfax, Arlington, and Prince William County. Mason provides an annual operating subsidy to the city that allows Mason students, faculty, and staff to ride for free with a valid Mason ID.

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[1] City of Fairfax Community Development & Planning. *Demographics and Statistical Profile.* Accessed August 2015.

[2] The City's growth from 2010 to 2014 was 8.6%, double that of the state. Source: US Census Bureau. *QuickFacts for Fairfax city, Virginia*. Accessed August 2015.

[3] US Census, *QuickFacts for Fairfax city, Virginia*, http://quickfacts.census.gov/qfd/states/51/51600.html

[4] City of Fairfax Website, City History, http://www.fairfaxva.gov/government/historic-resources/city-history.

[5] The City of Fairfax is rated as "very walkable" (score of 83) by Walk Score, which measures walkability on a scale from 0 - 100 based on walking routes to destinations such as grocery stores, schools, parks, restaurants, and retail, https://www.walkscore.com/score/the-city-of-fairfax.

[6] Based on data collected from April 2014 on-board rider surveys, conducted as part of the 2015 *George Mason University and City of Fairfax Transit Study*.

[7] GMU website. *Our Campuses*. Accessed August 2015.

Commercial and retail centers in the City of Fairfax include Fair City Mall, Fairfax Circle, Kamp Washington, Old Town Fairfax, and Pickett Shopping Center.[8] Other destinations just outside the city limits include Virginia International University, with an enrollment of 1,800 students[9], Northern Virginia Community College's Annandale Campus, with an enrollment of 23,000 students[10], Fairfax County Government Center, Inova Fairfax Hospital, and the Burke Centre Virginia Railway Express (VRE) Station.

HISTORY

Fairfax started CUE bus service in the early 1980s to address concerns regarding traffic congestion and parking, particularly on the Mason campus, as well as growing public transportation needs for the city. CUE provides the general public and university students and personnel with convenient and cost-effective transportation in the city, to the Vienna/Fairfax-GMU Metrorail Station, and to the Mason campus. In Fiscal Year (FY) 2015, CUE provided about 767,000 annual trips.[11]

Fairfax has had a long-standing partnership with Mason, which contributes funding for CUE. In FY 2015 Mason contributed $720,000 (19% of the CUE operating budget). In turn, Mason students, faculty, and staff ride the CUE for free. Other sources of funding for CUE's annual operating budget include the City of Fairfax (42%), DRPT (23%), and CUE fares (16%).[12] CUE does not receive any federal funding. Table 1-1 outlines CUE's operating expenses, operating revenues, and funding sources in FY 2015.[13]

The local funding for CUE is captured in the city's Transportation Tax Fund, which includes "30%" monies received from the Northern Virginia Transportation Authority (NVTA), pursuant to HB 2331, and revenue collected through a commercial and industrial property tax, pursuant to HB 3202 and HB 2479. The state funding for CUE is held in trust by the Northern Virginia Transportation Commission (NVTC).[14] Beginning in FY 2014, DRPT directed the city to account for state funds from DRPT in the annual budget. DRPT has always provided these funds to pay the city's subsidy to WMATA, but the accounting changed in FY 2014 so that these funds now come to the city (who transfers them back to NVTC to manage) rather than go directly to NVTC as had been done previously. The state funds now appear in the Transit Fund but are not included in the TDP's analysis of CUE's operating budget since they include

[8] Visit Fairfax website, http://visitfairfax.com/category/shopping/.
[9] Virginia International University website, http://viu.edu/our-university/about-viu/facts-and-figures.html.
[10] Northern Virginia Community College website, http://www.nvcc.edu/annandale/index.html.
[11] City of Fairfax Comprehensive Annual Financial Report (CAFR) for FY 2015.
[12] Percentages calculated based on revenue side of the budget, which totaled about $3.8 million in FY 2015, whereas the operating expenses totaled about $3.5 million.
[13] City of Fairfax CAFR for FY 2015.
[14] The state funding appears as an NVTC "grant" in the city's annual budget for CUE, shown under the Transit Fund.

state funding for both CUE and WMATA. The transfer amount that the city makes from NVTC to support CUE operations is shown as State Funding in Table 1-1.

Table 1-1: CUE FY 2015 Operating Budget

	FY 2015
Operating Expenses	
Salaries	$ 1,559,148
Fringe Benefits	$ 628,743
Contractual Services	$ 18,967
Internal Services	$ 1,181,703
Other Operating Expenses	$ 55,633
Depreciation and Amortization	$ 37,015
Total Operating Expenses	**$ 3,481,209**
Operating Revenues	
CUE Bus Receipts	$ 581,394
Advertising	$ 3,357
City Wheels	$ 416
Mason Contribution	$ 720,000
Total Operating Revenues	**$ 1,305,167**
Net Deficit	**$ 2,176,042**
Funding Assistance	
State Funding (transfer from NVTC)	$ 855,874
Local Funding (NVTA 30%)	$ 1,590,000
Total Funding Assistance	**$ 2,445,874**

Sources: City of Fairfax CAFR for FY 2015, and City FY 2017 Adopted Budget for revenue data (FY 2015 actuals).

The last TDP for CUE was completed in July 2010. Aside from maintaining service to the Vienna/Fairfax-GMU Metrorail Station and to Mason, no service recommendations have been implemented given financial constraints with the city budget. In July 2012 CUE implemented a service change to end weekday service earlier on the Gold 1 and Green 1 routes at 11:00 p.m. due to budget constraints. Several fare changes have been implemented since the 2010 TDP including:

- In April 2010 a ten-cent fare increase to $1.45 cash and $1.35 when using a SmarTrip card, and a discounted fare of $0.75.

- In October 2010 a 15-cent fare increase to $1.60 cash and $1.50 when using a SmarTrip card. (Discounted fare remained at $0.75.)

- In January 2011 a ten-cent fare increase to $1.70 cash. (SmarTrip fare remained at $1.50, and discounted fare remained at $0.75.)

- In July 2012 a ten-cent fare increase to $1.80 cash and $1.60 SmarTrip, and a discounted fare of $0.85.

- In July 2014 a five-cent decrease for the cash fare and a 15-cent increase for the SmarTrip fare to bring CUE fares on par with transit fares in the region ($1.75 cash or SmarTrip).

The capital improvements implemented since the last TDP include the replacement of one service vehicle in each FY 2012 and FY 2014 and six CUE buses in FY 2015.

GOVERNANCE

CUE is governed by the Fairfax Mayor and City Council, which is comprised of six council members. These elected officials serve two-year terms. The Mayor and City Council approve the CUE budget and provide guidance on service and fare changes. As of early 2016, CUE did not have a standing transit advisory committee (TAC) though one was established to guide the TDP update process. The TAC consisted of volunteer members representing the City Council, Mason, and riders.

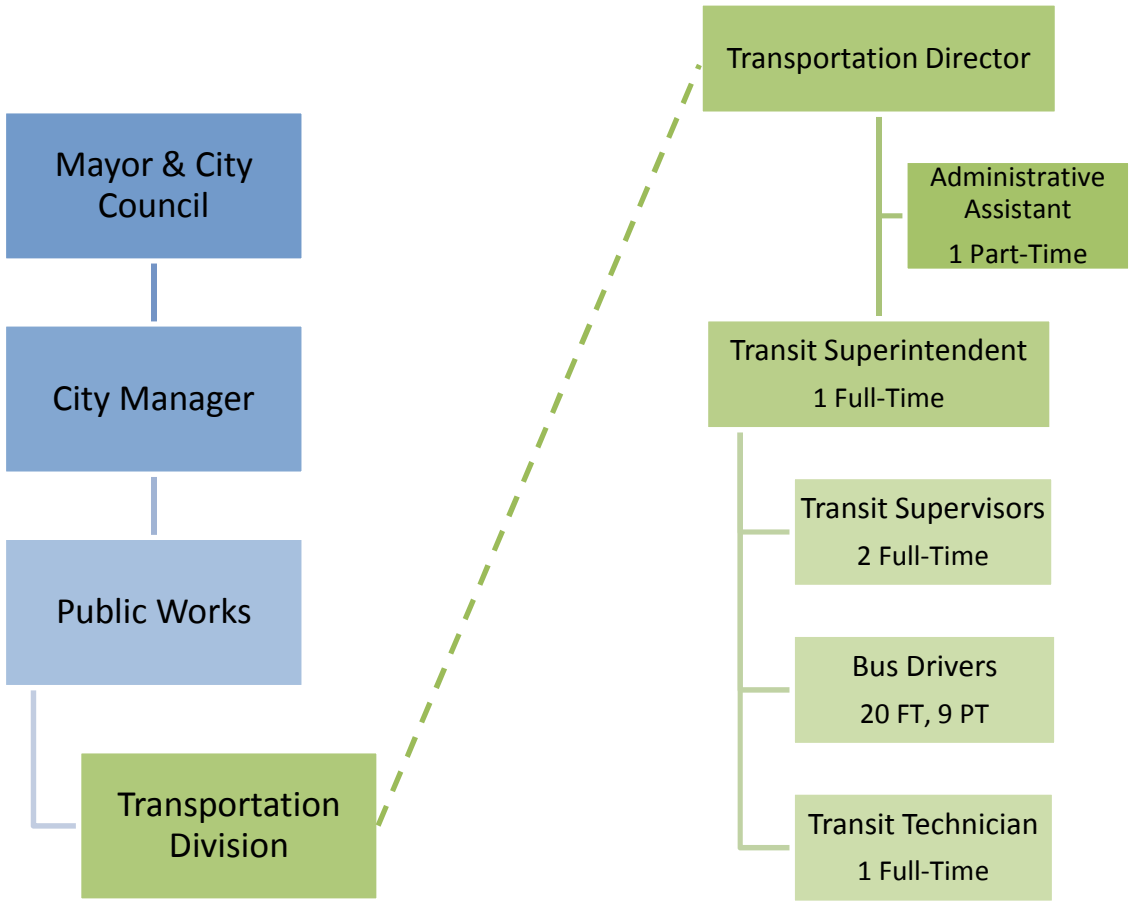
ORGANIZATIONAL STRUCTURE

CUE is owned and operated by the City of Fairfax. The Transportation Division within the city's Public Works Department is responsible for daily operations. Figure 1-1 provides the organizational structure for CUE.

The Transportation Director is responsible for developing the annual budget and grant application to DRPT, transit planning, and marketing activities. The Transit Superintendent and two Transit Supervisors supervise 20 full-time drivers, nine part-time drivers, and one transit technician. A half-time administrative assistant also supports CUE. In addition to operating the CUE bus services, the Transportation Division is responsible for maintaining and improving the city's multi-modal transportation network including sidewalks, bicycle paths, and roadways.[15] The Transportation Director spends about 10% of her time managing the CUE system.

[15] City of Fairfax website, Transportation Division, http://www.fairfaxva.gov/government/public-works/transportation-division.

Figure 1-1: CUE Organizational Chart



Note: Full and part time positions based on FY 2015 actuals in the city's 2017 Adopted Budget.

TRANSIT SERVICES PROVIDED AND AREAS SERVED

The City of Fairfax's multimodal transportation system including CUE provides important transportation connections within the city and to the Washington, D.C. region.[16] The city is served by multiple transit operators, documented below, though the focus of this TDP update is on the CUE bus system.

Fixed route service providers in the city include the City of Fairfax (CUE), Mason (Mason Shuttle), the Washington Metropolitan Area Transit Authority (WMATA), and Fairfax County (Fairfax Connector). Each of these providers also operates paratransit services for seniors and persons with disabilities including the City Wheels, Fastran, MetroAccess, Seniors-On-The-Go!, and TaxiAccess programs. Nearby rail service includes WMATA's Metrorail service,

[16] City of Fairfax website, http://www.fairfaxva.gov/government/public-works/transportation-division/transportation-planning-744.

available at the Vienna/Fairfax-GMU Station, located 1.5 miles north of the city border; and VRE's commuter rail service, available at the Burke Centre Station, located 3.5 south of the city border. The service information described in this section was based on route and service schedules as of May 2017.

CUE Bus

The City of Fairfax operates the CUE bus system, which runs two circulator routes primarily within the city limits connecting Mason and the Vienna/Fairfax-GMU Metrorail Station. Each route operates in the clockwise and counterclockwise directions simultaneously, making for a total of four routes. The Green route serves the eastern half of Fairfax, traveling along Fairfax Boulevard, Chain Bridge Road, Main Street, and Pickett Road. The Gold route travels through the western half of the city, along Fairfax Boulevard, Warwick Avenue, Jermantown Road, Main Street, and Old Lee Highway. The Green 1 and Gold 1 routes operate in the clockwise direction, whereas the Green 2 and Gold 2 routes run counterclockwise.

The Green and Gold routes are shown in Figure 1-2. On weekdays CUE operates from approximately 5:30 a.m. to 11:00 p.m. with about 30-minute headways throughout the day, except for the last trips of the day at hourly frequencies. Saturday service hours are from 8:00 a.m. to 8:50 p.m. with approximately one hour between buses. Sunday service hours are from 9:30 a.m. to 6:30 p.m., also with hourly frequencies.

Other Fixed Route Transit Services

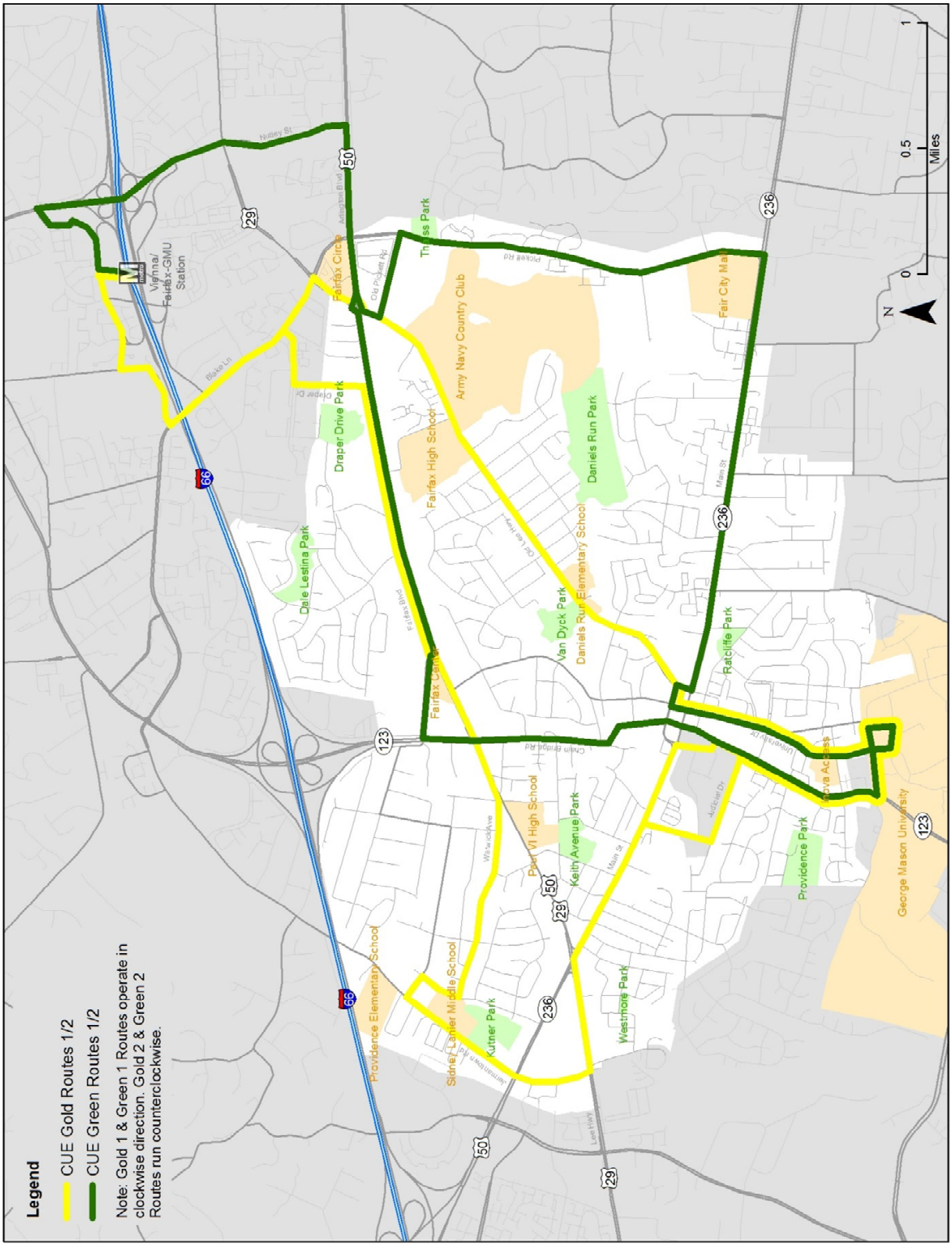
In addition to CUE, other fixed route transit services in the City of Fairfax include Mason Shuttles, Fairfax Connector, and Metrobus. The Northern Virginia Community College (NOVA) Shuttle, Metrorail, and VRE provide transit services in proximity to the city. These other transit services are briefly described below and portrayed in Figure 1-3.

Mason Shuttles

In 2003 Mason started a shuttle route to serve international students. This service, Mason Shuttles, has now expanded to five primary routes: Sandy Creek-Vienna Metro, Global Center Metro, Gunston's Go-Bus, Burke Centre VRE, and Fairfax/SciTech Campus. Mason Shuttles offers free transportation to Mason students, faculty, staff and contracted services employees. In 2017 Mason contracted with Reston Limousine to operate the service. The Mason Shuttle routes are described below.[17]

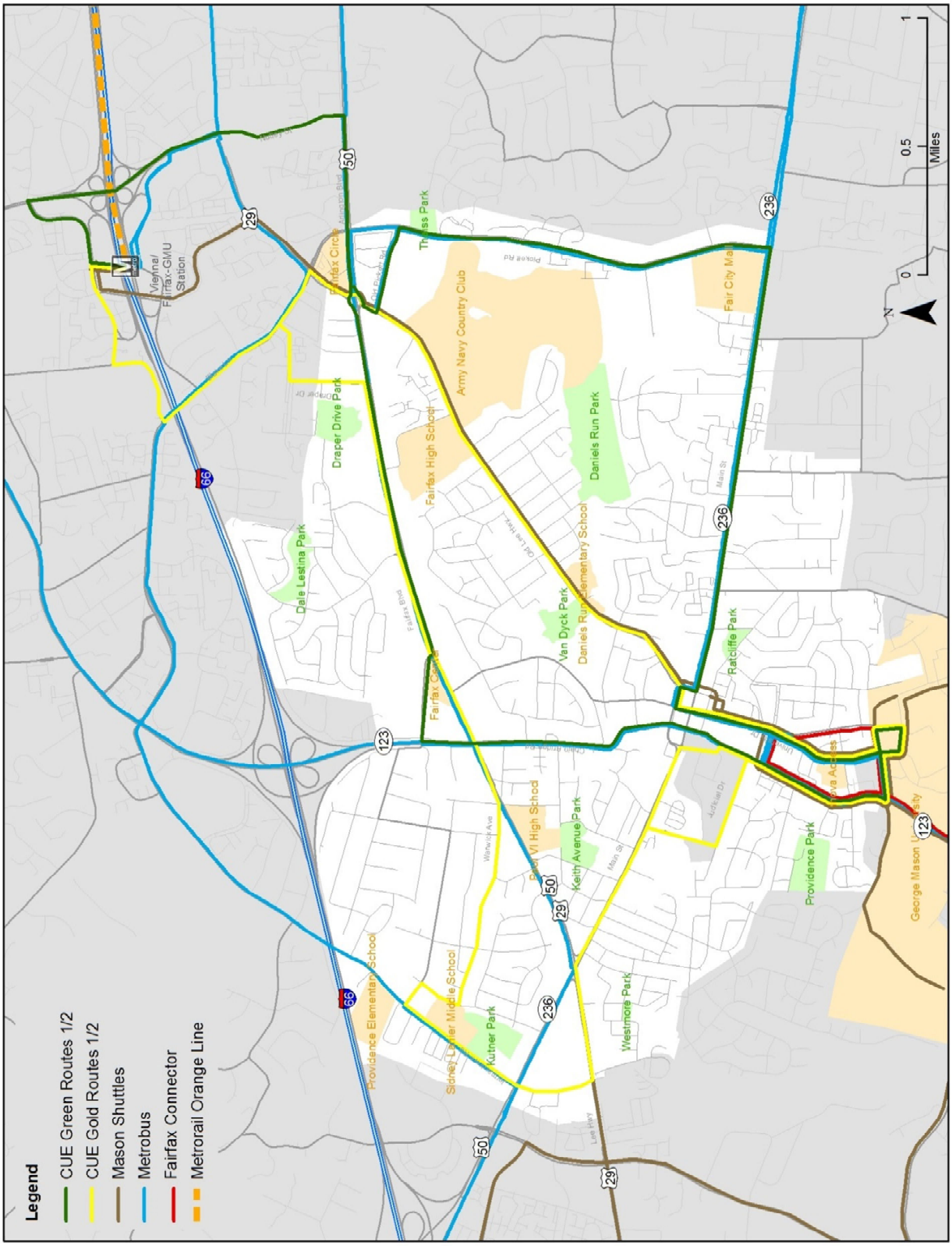
[17] Based on service descriptions and schedules, effective Spring 2016, provided on the Mason Shuttles website, http://shuttle.gmu.edu/index.html.

Figure 1-2: CUE Bus Routes



Sources: ESRI base layers, US Census 2015 TIGER/Line Shapefiles.

Figure 1-3: Other Transit Routes Serving the City of Fairfax



Sources: ESRI base layers, US Census 2015 TIGER/Line Shapefiles.

Sandy Creek-Vienna Metro

Formerly known as Metro to Mason, this route provides "local" service between Mason's Fairfax Campus and the Vienna/Fairfax-GMU Metrorail Station, including a stop at Mason's Commerce Building on University Drive. On weekends the shuttle also stops at Mason Townhouses (at Chain Bridge Road and West Street) and Fairfax Circle (at Lee Highway and Circle Woods Drive). There is late night service on Fridays, Saturdays, and Sundays when the CUE bus is not operating. Weekday service operates from 6:00 a.m. to midnight typically with 30-minute frequencies, though additional trips are provided to offer 10- to 15-minute frequencies during peak periods from Monday through Thursday. Weekend service starts at 8:00 a.m. and runs until midnight, with 30-minute intervals.

Global Center Metro

Formerly known as Metro Express, this route runs express between Mason's Fairfax Campus and the Vienna/Fairfax-GMU Metrorail Station, with stops at the Commerce Building and Fairfax Circle. It operates Monday through Thursday, providing 20-minute frequencies from 7:00 a.m. to about 11:00 p.m. Limited peak period service is provided on Fridays at hourly frequencies. The Metro Express does not operate in June, July, or August.

Gunston Go-Bus

The Gunston Go-Bus operates two routes, the Mason Route and the George Route, that connect the Fairfax Campus to area shopping centers. Daily service hours are from about 7:00 a.m. to 11:00 p.m. The Mason Route is timed to meet Fairfax Connector Route 605 for access to/from Reston Town Center.

Burke Centre VRE Express

This VRE express shuttle runs between the Burke Centre VRE Station and the Sandy Creek shuttle stop on Mason's Fairfax Campus. The shuttle only runs when the VRE train is in service. Mason Shuttle promotes this route as a parking shuttle bus, encouraging Mason riders to park at the VRE garage for free and take the shuttle to campus. The shuttle runs Monday through Friday from 7:10 a.m. to 11:30 a.m. and from 2:45 p.m. to 11:00 p.m.

Fairfax/SciTech Campus

This route travels between Mason's Fairfax and Prince William County campuses Monday through Friday, making several stops including Manassas Mall. The shuttle runs weekdays from 6:30 a.m. to midnight, with 30-minute service frequencies Monday through Thursday and hourly service on Fridays. Saturday and Sunday service is provided from 8:00 a.m. to 8:00 p.m. at two-hour headways in each direction.

Fairfax Connector

Fairfax County owns and operates the Fairfax Connector, which provides fixed route bus service to Fairfax County. Route 306 connects Mason and the City of Fairfax with the Pentagon Metrorail Station in Arlington, Virginia via Braddock Road. Service is provided midday on weekdays only at hourly headways. Peak hour service along this route is provided by Metrobus Route 17A, described below.

WMATA Metrobus

Several Metrobus routes serve the City of Fairfax: Routes 1C, 2B, and 29K/N. These Metrobus routes connect Fairfax and Mason to Fair Oaks Mall, Inova Fairfax Hospital, NOVA, Vienna/Fairfax-GMU Metrorail Station, Dunn Loring-Merrifield Metrorail Station, Pentagon Metrorail Station, and King St.-Old Town Metrorail Station.[18]

Route 1C: Fair Oaks - Fairfax Boulevard Line

This Metrobus local route runs along Fairfax Boulevard/Route 50 in Fairfax, providing connections to Fair Oaks Mall, Fairfax County Government Center, Inova Fairfax Hospital, and Dunn Loring Metrorail Station. The route operates daily from 4:00 a.m. to midnight on weekdays, from 6:00 a.m. to 11:00 p.m. on Saturdays, and from 7:00 a.m. to 10:00 p.m. on Sundays. Service is provided hourly, except for 30-minute frequencies provided during peak periods on weekdays.

Route 2B: Fair Oaks - Jermantown Road Line

This Metrobus local route serves the western part of Fairfax along Jermantown Road. The route connects to Fair Oaks Mall, Vienna/Fairfax-GMU Metrorail Station, and Dunn Loring-Merrifield Metrorail Station. On weekdays the route runs from 5:30 a.m. to midnight with 30-minute frequencies during peak periods and hourly frequencies during off-peak periods. Weekend service starts at about 6:30 a.m. and runs at hourly frequencies until 11:00 p.m.

Route 29K/N: Alexandria - Fairfax Line

This Metrobus major route serves the eastern part of Fairfax. Route 29K serves Main Street and Mason, while Route 29N serves the Vienna/Fairfax-GMU Metrorail Station via Pickett Road. Both routes provide daily connections to NOVA's Annandale Campus, Landmark Center, and the King St.-Old Town Metrorail Station. Weekday service operates from 5:30 a.m. to 11:30 p.m. with hourly frequencies serving the Vienna/Fairfax-GMU Metrorail Station and Mason. During the weekend Route 29N serves the Vienna/Fairfax-GMU Metrorail Station

[18] WMATA route descriptions and service characteristics were based on timetables effective late 2014, provided on the WMATA website, www.wmata.com/bus/timetables.

hourly from 7:00 a.m. to 11:00 p.m.; Route 29K serves Main Street hourly from 6:30 a.m. to 10:30 p.m.

Route 17A/G: Kings Park Line

This Metrobus commuter line does not directly serve the City of Fairfax, but riders may transfer from CUE to this route at Mason to reach Burke, Kings Park, North Springfield, and the Pentagon Metrorail Station. Route 17A provides about seven roundtrips per weekday during the peak periods and into the evening. The service is complemented by Fairfax Connector's Route 306, which provides midday service on the route. Headways are generally hourly, with 30- to 45-minute frequencies during peak periods. Route 17G runs express to Pentagon Metrorail Station and operates weekdays in the peak direction only. Six northbound trips toward the Pentagon Metrorail Station are provided in the morning peak period and ten southbound trips are provided back toward Mason in the evening peak period, at about 20-minute frequencies.

NOVA Shuttle

While this shuttle does not directly serve Fairfax or Mason, it is worth including for its potential impact on ridership between the Vienna/Fairfax-GMU Metrorail Station and NOVA's Annandale Campus. Historically NOVA students going to the Annandale Campus rode the CUE Green Route and transferred to Metrobus Route 29N to reach the Annandale Campus. NOVA began the NOVA Shuttle program in 2013, and all NOVA students, faculty, and staff with school identification may ride for free.[19] Route A provides a direct connection between the Annandale Campus and Dunn Loring-Merrifield Metrorail Station. Service is provided Monday through Thursday, with hourly frequencies from 7:40 a.m. to 5:00 p.m.[20]

WMATA Metrorail

The closest Metrorail station to Fairfax is Vienna/Fairfax-GMU, about 1.5 miles northeast of the city limits. The Orange Line serves the Vienna/Fairfax-GMU Station and provides direct connections to Falls Church, Arlington, downtown D.C., and Prince George's County, MD including Cheverly and New Carrollton. Other areas of the D.C. region are accessible by transferring to other Metrorail lines and regional transit services.

Previously Metrorail service operated from approximately 5:00 a.m. to midnight Monday through Thursday, 5:00 a.m. to 3:00 a.m. on Friday, 7:00 a.m. to 3:00 a.m. on Saturday, and 7:00 a.m. to midnight on Sunday.[21] Service frequencies ranged from three to six minutes

[19] "Free NOVA Shuttle." Accessed March 2016. Retrieved from http://blogs.nvcc.edu/elicommonreader/2013/09/11/free-nova-shuttle/.
[20] Based on the NOVA Shuttle schedule effective Spring 2016, available online at http://www.nvcc.edu/shuttle/index.html.
[21] WMATA. *Metrorail*. Accessed March 2016. Retrieved from http://www.wmata.com/rail/.

during peak periods, and up to 20 minutes during off-peak periods. However, in June 2016 WMATA launched its SafeTrack program to complete maintenance and track work, planned for a one-year period. During SafeTrack, Metrorail service ended at midnight every day, and the Orange Line experienced service reductions including single tracking and weekend line segment shutdowns at the Vienna/Fairfax-GMU Metrorail Station.[22]

About 5,200 daily parking spaces and 71 short-term metered spaces are available at the Vienna/Fairfax-GMU Metrorail Station. Bike parking and carsharing are also available. CUE riders can transfer at the station to 20 different local bus routes operated by Metrobus and Fairfax Connector. The CUE bus stops are located at the North Side bus bays of the station.[23]

Virginia Railway Express

The closest VRE station to Fairfax is Burke Centre, about 3.5 miles south of the city border. VRE's Manassas Line provides direct service to Alexandria and downtown D.C. This commuter rail service operates on weekdays only, with seven roundtrips serving Burke Centre daily. One additional roundtrip provided through Amtrak is available to VRE riders holding certain passes. Service is provided every 20 to 40 minutes during peak periods in addition to a few midday trips. About 1,500 parking spaces are available at the station, and parking is free. Bike racks are also provided. [24] Metrobus and Fairfax Connector serve the station, but the only transit connection toward the City of Fairfax is via Mason Shuttles, which serves Mason.

Transportation Services for Seniors and Persons with Disabilities

Older adults and persons with disabilities traveling to and from Fairfax have multiple transit options. Those who are able to use the wheelchair accessible CUE buses can do so at a reduced rate. Others may use the specialized transportation programs described below.[25]

City Wheels

The City of Fairfax operates an alternative transportation program, called "City Wheels", for city residents who are unable to use fixed route services. Individuals must apply to use the program and provide a physician's statement that documents a physical condition, which prevents the individual from using the conventional bus. Program participants purchase coupons from the city for use on private taxicabs, which provide curb-to-curb service within

[22] WMATA. *SafeTrack*. Accessed October 2016. Retrieved from http://www.wmata.com/rail/safetrack.cfm.
[23] WMATA. *Vienna/Fairfax-GMU*. Accessed March 2016. Retrieved from http://www.wmata.com/rail/station_detail.cfm?station_id=103.
[24] VRE. *Burke Centre*. Accessed March 2016. Retrieved from http://www.vre.org/service/stations/burke-centre/.
[25] City of Fairfax. *Transportation for Seniors and Persons with Disabilities.* Accessed March 2016. Retrieved from http://www.fairfaxva.gov/government/public-works/transportation-division/cue-bus/transportation-for-seniors-and-persons-with-disabilities.

city limits and to Mason's Fairfax Campus, the Vienna/Fairfax-GMU Metrorail Station, and Fair Oaks Hospital. The current fare for a one-way trip on City Wheels is $3.20.

Fastran

Fairfax County runs a dial-a-ride program, called "Fastran", to serve lower income county residents. Fastran primarily serves medical trips to locations in Fairfax County. Individuals must submit an application including income verification. Service is provided on weekdays between 10:00 a.m. and 2:00 p.m. using lift-equipped, wheelchair accessible vehicles.

Seniors-On-The-Go!

Fairfax County runs a taxi voucher program for moderate-income older adults ages 65 and older, called "Seniors-On-The-Go!" Individuals must be a resident of the City of Fairfax or Fairfax County and submit an application. Program participants purchase coupons from the county for discounted fares with private taxicabs. There are no restrictions for trip purposes or locations, though each participant may purchase a maximum of 16 coupon books per year (each coupon book costs $20 and has a value of $33).[26]

TaxiAccess

Fairfax County has a taxi voucher program called "TaxiAccess" for people with disabilities. Individuals must be a resident of the City of Fairfax or Fairfax County, currently registered with MetroAccess (described below), and submit an application. Similar to the Senior-On-The-Go! program, TaxiAccess participants purchase coupons from the county for discounted fares with private taxi companies. There are no restrictions for trips, but participants may only purchase a maximum of eight coupon books per year (each coupon book costs $10 for a value of $33).[27]

MetroAccess

MetroAccess is WMATA's paratransit service for individuals who are unable to used fixed route services due to a disability. MetroAccess operates as a shared ride, door-to-door service and can be used for any trip purpose, as long as the origin and destination are located within ¾ -mile of Metrobus and Metrorail services. The service days and hours are the same as Metrobus and Metrorail, and fares are double that of the fastest comparable fixed route fare (up to a maximum of $6.50 per one-way trip). Individuals must submit an application to use

[26] Fairfax County. *Seniors-On-The-Go!* Accessed March 2016. Retrieved from http://www.fairfaxcounty.gov/ncs/seniors.htm.
[27] Fairfax County. *TaxiAccess*. Accessed March 2016. Retrieved from http://www.fairfaxcounty.gov/ncs/taxiaccess.htm.

MetroAccess, including certification by a healthcare provider, and undergo an in-person interview and functional assessment.[28]

CUE's obligation to provide ADA complementary paratransit is currently met by MetroAccess. MetroAccess is also an option for eligible City of Fairfax residents who wish to travel outside of the City Wheels program service area.

FARE STRUCTURE

Riders may pay their fare on CUE by cash, WMATA SmarTrip card, or CUE bus ticket. The regular fare is $1.75 for a one-way trip, whether paying by cash or SmarTrip card. Reduced rates are also available:

- Children three years of age and under, accompanied by an adult – Free
- Mason students, staff and faculty with a valid Mason ID – Free
- MetroAccess members with a valid MetroAccess ID – Free
- Fairfax High School and Lanier Middle School students with Student Bus Pass – Free
- City of Fairfax students with a valid school ID or CUE Bus Student ID – 85¢
- Senior citizens ages 60 and older with a valid CUE Bus Senior Citizens ID - 85¢
- Persons with disabilities with a valid CUE Bus Disabled Citizen ID - 85¢

The City of Fairfax, in partnership with Fairfax Connector and Fairfax County Public Schools, launched a pilot program in 2016 to offer a Free Student Bus Pass to middle school and high school students to ride CUE and Fairfax Connector buses for free. The Student Pass is valid from 5:00 a.m. to 10:00 p.m. daily. Prior to this pilot, City of Fairfax middle school and high school students paid a reduced fare.

The reduced rates are only available when paying by cash or CUE bus ticket. Individuals wishing to pay the reduced fare must apply for the appropriate CUE Bus identification card. CUE bus tickets may be purchased in-person at the CUE bus administrative office or the Treasurer's Office at City Hall, or by mail. Both regular and reduced fare tickets are available in books of ten (no price discount when purchasing tickets).

The CUE bus system works in partnership with other local transit providers. Riders must use a SmarTrip card to receive free transfers between bus services and discounted transfers, by 50¢, between bus and Metrorail services within two hours of starting their trip.[29]

[28] WMATA. *MetroAccess Paratransit*. Accessed March 2016. Retrieved from http://www.wmata.com/accessibility/metroaccess_service/.
[29] City of Fairfax. *CUE Bus Rider Information*. Accessed March 2016. Retrieved from http://www.fairfaxva.gov/government/public-works/transportation-division/cue-bus/cue-bus-rider-information.

FLEET

CUE operates a fleet of twelve revenue vehicles and four non-revenue vehicles. Six hybrid-electric buses were purchased in 2009, and six clean diesel replacement buses were purchased in 2015. Exhibit 1-1 portrays one of the new clean diesel buses purchased in Fall 2015. All CUE buses are low-floor, accessible, and equipped with bike racks. Table 1-2 provides CUE's vehicle inventory in February 2016.

Exhibit 1-1: CUE Clean Diesel Bus

Source: CUE Transit Guide, effective September 2015.

Table 1-2: CUE Vehicle Inventory

Vehicle Number	Service Type	Year	Make	Model	Number of Seats	Number of Wheelchair Spaces	Condition	Mileage 2/5/16
827	Revenue	2009	Gillig	Lowfloor	32	2	Good	157,875
828	Revenue	2009	Gillig	Lowfloor	32	2	Good	183,436
829	Revenue	2009	Gillig	Lowfloor	32	2	Good	164,238
830	Revenue	2009	Gillig	Lowfloor	32	2	Good	184,965
831	Revenue	2009	Gillig	Lowfloor	32	2	Good	175,118
832	Revenue	2009	Gillig	Lowfloor	32	2	Good	177,605
833	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,988
834	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	3,014
835	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,976
836	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,960
837	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,935
838	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,997
292	Non-revenue	2007	Chevy	Trailblazer	5	n/a	Good	42,120
294	Non-revenue	2013	Ford	Explorer	5	n/a	Excellent	6,800
296	Non-revenue	2001	Chevy	Astrovan	8	1	Fair	44,824
298	Non-revenue	2012	Chevy	Colorado	5	n/a	Excellent	1,998

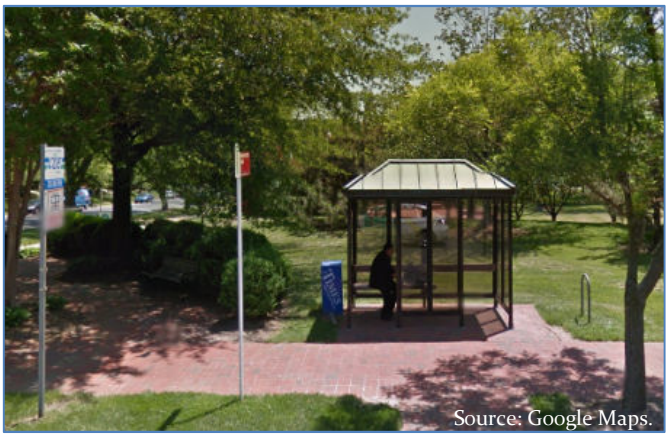
EXISTING FACILITIES

CUE bus operations are located at the City of Fairfax's Property Yard at 3140 Pickett Road.[30] The Property Yard includes a maintenance building with two bus bays and a bus wash facility. All CUE buses are stored, fueled, and maintained at this facility. The Transportation Director's office is located at City Hall at 10455 Armstrong Street. Figure 1-4 provides an aerial photograph of the city's Property Yard.

Figure 1-4: CUE Operations Facility Located at City Property Yard

The CUE bus system maintains almost 200 bus stops, with about 40 of them containing shelters. Amenities provided at bus shelters may include route maps, schedules, benches, trash receptacles, newspaper dispensers, and bicycle racks. Figure 1-5 portrays the bus shelter on Chain Bridge Road near Armstrong Street.

Figure 1-5: CUE Bus Stop and Shelter



[30] Fairfax City Website, http://www.fairfaxva.gov/government/public-works.

Transit Security Program

All CUE buses are equipped with five onboard cameras and GPS, which allow staff to monitor for any safety or security issues. The City Police are called when incidents occur on the bus or at the operations facility.

Intelligent Transportation Systems (ITS) Program

The primary ITS technology that CUE currently uses is NextBus Real Time Arrival. The NextBus system generates an estimated time when buses will arrive at each stop. Riders may access NextBus online, through the CUE website or through an application on their smartphone, or by phone. All CUE buses are equipped with AVL-based automated stop announcement systems. Drivers and transit superintendents communicate by two-way radio.

CUE buses are part of WMATA's online trip planner, allowing riders to plan their routes across jurisdictions and transit providers. Google Maps also has CUE bus routes and schedules in its transit planning tool.

Data Collection and Ridership and Revenue Reporting Methodology

CUE staff monitors service performance and tracks ridership, revenue, and on-time performance. CUE currently uses the SmarTrip farebox system onboard its vehicles to automatically collect data on ridership and fare revenue. This is the regional system hosted through WMATA. CUE staff accesses the data through an online portal and are able to generate a variety of reports, such as ridership and fare revenue collected by day or route. Ridership and fare revenue data are also available by fare type. As of October 2016, CUE has been participating in a regional effort led by WMATA to replace the technical components of the SmarTrip farebox system that are now obsolete.

Public Outreach

The Transportation Director serves as the main point of contact for public inquiries and comments regarding CUE. The public may provide input at City Council meetings including the annual budget process. Information regarding transit services is posted on buses, at bus shelters, and on the city's website. Additional news about the CUE system is published in the city newsletter and/or provided on the city's cable television channel. The Transportation Director conducts limited marketing by providing CUE information and promotional items at public events such as the city's annual Fall Festival and customer appreciation events.

CUE occasionally conducts surveys to gather community and rider input on its services, typically as part of larger transportation studies. Rider and household surveys completed in 2015 as part of the *George Mason University and City of Fairfax Transit Study* identified limited awareness of real-time passenger information and destinations served for both the CUE system and Mason Shuttles. The study recommended increasing marketing for the existing CUE and Mason Shuttle routes and the NextBus real-time passenger information service.

Chapter 2
Goals, Outcomes, and Standards

INTRODUCTION

This chapter presents the City of Fairfax's goals and outcomes for CUE, as well as performance standards that address the efficiency and effectiveness of the transit services CUE provides. It is important for CUE to have specific goals, outcomes, and service standards to guide and objectively measure if the system is accomplishing its mission. Goals are broad and general, providing policy guidance as to how the transit system's mission should be accomplished. Outcomes provide more specific and tangible direction as to how transit goals can be met.

CITY BUDGET – TRANSIT GOALS AND OUTCOMES

In its annual budget process the City of Fairfax outlines several goals and outcomes for the CUE bus system. The goals and outcomes in the FY 2017 Adopted Budget are outlined below and remain similar to those included in the 2010 TDP:

Goals:

- To provide the citizens of the City of Fairfax with effective transit service within the city and to the Vienna/Fairfax-GMU Metrorail Station and George Mason University.
- To meet the city's adopted goal of providing unsurpassed user-friendly, customer-focused business practices.
- To enhance quality of life measures and amenities with continued emphasis on recommendations of the Livability Task Force.
- To finalize and implement a more accelerated schedule for critical transportation projects involving state and federal funding.
- To continue emphasis on the reduction of the impact of increasing traffic through the city.

Outcomes:

- To provide convenient and frequent access to the Vienna/Fairfax-GMU Metrorail Station.

- To provide service seven days a week.
- To meet partnership requirements with George Mason University.
- To meet all published schedules.
- To meet all regional and local Americans with Disabilities Act (ADA) requirements.

TDP Goals and Outcomes

The following goals and outcomes for CUE reflect the transit related goals, outcomes, and strategies outlined in the city's comprehensive plan (2012). They also incorporate input collected from city officials and local stakeholders.

Goal 1:
Provide citizens of the city with effective transit service within the city and to the Vienna/Fairfax-GMU Metrorail Station and George Mason University.

Outcome 1.1 – Strive to maintain service performance standards outlined later in this chapter.

Goal 2:
Increase ridership to meet the city's objective to encourage use of public transportation as an alternative to the private automobile.

Outcome 2.1 – Implement service improvements to encourage new ridership in all population segments, with particular attention to older adults and individuals with disabilities.

Outcome 2.2 – Improve connections to other transit routes and facilities, including VRE stations and Fairfax Connector and Metrobus routes, and provide riders with access to major activity centers not directly served by CUE.

Outcome 2.3 – Encourage employers to provide transit subsidies or other transit incentives, such as pre-tax transit benefits and a guaranteed ride home program.

Goal 3:
Provide excellent transit information and customer service to meet the city's goal of providing unsurpassed user-friendly, customer-focused business practices.

Outcome 3.1 – Provide up-to-date bus schedule information on the city's web site and at major bus stops located along CUE bus routes.

Outcome 3.2 – Maintain a Customer Service phone number where information such as route information, schedules, and fares can be obtained.

Outcome 3.3 – Maintain a driver training program that emphasizes customer service best practices.

Goal 4:
Increase marketing and communications to riders and the general public.

Outcome 4.1 – Explore new opportunities to market CUE service to city residents including older adults, youth, and choice riders.

Outcome 4.2 – Explore new opportunities to market CUE service to city businesses to encourage their employees and patrons to use transit.

Outcome 4.3 – Partner with higher education institutions including George Mason University, Northern Virginia Community College Annandale Campus, and Virginia International University to promote CUE as a transit option for students, faculty, and staff.

Outcome 4.4 – Work with local middle schools and high schools to promote CUE as a transportation option for youth, including programs such as the Free Student Bus Pass.

Outcome 4.5 – Develop marketing efforts to increase awareness that real-time passenger information is available.

Outcome 4.6 – Highlight popular destinations and available transit options to increase awareness of places that are directly served by CUE or accessible through a transfer with other transit routes.

Goal 5:
Participate in community and economic development and infrastructure projects to promote transit-friendly development and ensure that CUE services are accessible.

Outcome 5.1 – Work with the City Community Development and Planning Department, promote transit-friendly design features in new development and redevelopment projects.

Outcome 5.2 – Work with the City Public Works Department, promote expansion of ADA-accessible sidewalks and crosswalks along pathways to access CUE stops.

Outcome 5.3 – Work with the City Economic Development Office, promote CUE as a community asset for new and existing businesses and commercial developments.

Goal 6:
Explore technology and infrastructure enhancements that increase the attractiveness of CUE service and contribute to city efforts to mitigate traffic congestion.

Outcome 6.1 – Implement priority treatment measures for transit vehicles when feasible, such as signal prioritization for CUE buses and cue-jumper lanes at congested intersections.

Outcome 6.2 – Implement transit facility enhancements to improve bus service in the city's major transportation corridors, including Fairfax Boulevard, Chain Bridge Road, Main Street/North Street Corridor, and Pickett Road. Old Lee Highway and University Drive/George Mason Boulevard are additional candidates for improved transit facilities.

Goal 7:
Continue to participate in regional transit efforts that reduce the impact of increasing traffic through the city.

Outcome 7.1 – Continue to coordinate on a regular basis regarding regional transportation issues with partners including Fairfax County, WMATA, Northern Virginia Transportation Commission (NVTC), and the Virginia Department of Rail and Public Transportation (DRPT).

Outcome 7.2 – Continue to work closely and coordinate with George Mason University's Parking and Transportation Department regarding university-related traffic and transit issues.

SERVICE PERFORMANCE STANDARDS

Service standards are benchmarks by which service performance is evaluated. Service standards are typically developed in several categories, such as service availability, productivity, and cost-effectiveness. The most effective standards are straightforward and relatively easy to calculate and understand. Transit systems use these standards and the performance evaluation process to guide decisions regarding service adjustments.

Virginia does not have established statewide performance benchmarks, criteria, or requirements. The 2010 TDP established service performance standards based on a review of historical CUE performance. These standards have been updated based on CUE's current performance (FY 2016 for operating data and FY 2015 for audited financial data) and a review of peer standards. The study team recommends that CUE staff use the standards below to monitor and evaluate CUE services over the six-year timeframe of this TDP update.

Availability

The following standards guide CUE's performance in service availability, and are based on current service characteristics (FY 2016) and outcomes that were established in the 2010 TDP:

Coverage

At least 70% of all city residents should be within ¼ mile of CUE service during peak travel hours. (One-quarter mile is considered a reasonable walking distance to access CUE service at the designated bus stops.)

Span of Service

Provide CUE service to city residents seven days a week, and maintain the system's service hours:

Weekday:	5:30 a.m. to 11:00 p.m.
Saturday:	8:00 a.m. to 8:30 p.m.
Sunday:	10:00 a.m. to 6:00 p.m.

*Note: Individual routes may start or end earlier or later.

Frequency

Provide, at minimum, the following service frequencies to the Vienna/Fairfax-GMU Metrorail Station and to George Mason University:

Peak Periods :	35 minutes
Off-Peak Periods:	65 minutes

*Note: CUE strives to provide 30 minute frequencies during peak periods when possible, though heavy traffic and congestion in the city have necessitated schedule adjustments.

Productivity

CUE has measured ridership productivity as passenger trips per revenue hour since the 2010 TDP. The standards for productivity by day of service have been updated to reflect current service performance (FY 2016), which indicated lower productivity due to the decline in CUE ridership in recent years:

Weekday:	20 passenger trips per revenue hour
Saturday:	18 passenger trips per revenue hour
Sunday:	15 passenger trips per revenue hour

While two factors generally affect this performance measure, ridership and revenue hours, CUE's level of service has remained stable since the 2010 TDP. Therefore the main driver behind the system's decreased productivity has been ridership decline (the causes of which are explored in the system evaluation in Chapter 3). Should CUE's level of service change in the future, these standards should be updated to reflect current ridership trends and revised service levels.

Cost Effectiveness

The 2010 TDP established two measures to examine CUE's financial performance: farebox recovery ratio and local subsidy required per passenger trip. These cost-effectiveness standards were reviewed against current performance (FY 2016) to determine their applicability, given changes in CUE's funding, costs, and ridership. The standard for farebox recovery ratio was updated slightly based on FY 2016 performance. The standard for local subsidy per passenger trip was updated to reflect increases in local funding and decreases in ridership in recent years. The study team for the TDP update also recommended adding the measure of operating cost per passenger trip, which examines the cost to provide service in relation to the amount of service that is consumed. The following are CUE's updated performance standards to examine cost-effectiveness:

Operating cost per passenger trip:	$4.54
Farebox recovery ratio:	17%
Local subsidy per passenger trip:	$3.01

The following factors have contributed to an increase in local funding for CUE:

- Starting in FY 2013, Mason increased its annual contribution by 33%.
- Starting in FY 2014, the city began receiving "30%" monies from NVTA (pursuant to HB 2331). The city maximizes the amount of 30% monies by transferring a portion of the excess proceeds from the sale of the city's water utility assets into the Transportation Tax Fund.

The city considers the above sources to be local funding for CUE. The NVTA 30% monies are captured in the city's Transportation Tax Fund. The city previously provided general fund support to CUE, but stopped doing so when it started receiving NVTA 30% funding in FY 2014. Excluding Mason's annual contribution, local funding for CUE increased by 270% from FY 2012 to FY 2015 due to the NVTA 30% funding. During this same period, CUE's ridership

decreased by about 16%. This combination resulted in a notable increase in CUE's local subsidy per passenger trip.

On-Time Performance

CUE measures on-time performance by monitoring the time that buses depart from the Vienna/Fairfax-GMU Metrorail Station. The study team recommended updating CUE's definition of "on-time" to zero to five minutes late. Buses departing earlier than the scheduled times will be considered "early," while buses departing six or more minutes late will be considered "late." The performance standard established in the 2010 TDP is still applicable based on FY 2016 performance:

90% on-time departures from the Vienna/Fairfax-GMU Metrorail Station

PROCEDURES FOR REVIEWING AND UPDATING GOALS, OUTCOMES, AND SERVICE STANDARDS

It is recommended that CUE staff examine the goals, outcomes, and service standards on an annual basis, updating them as needed. Updates could be based on changes in mission, actual performance as compared to the standards, or changes in available resources. This annual review should take place as part of the grant preparation cycle, so that any changes can be included in the annual TDP update.

Chapter 3
System Evaluation and Needs Analysis

INTRODUCTION

This chapter describes a particularly important component of the TDP – the evaluation of the current service and the transit needs analysis, both of which contributed to the development of service alternatives and improvements. Since one of the key purposes of the TDP is to improve the efficiency and effectiveness of transit services, the system evaluation helped identify areas for improvement in CUE's operational performance and any capital needs. The system evaluation included analysis of performance trends, comparison against peer transit agencies, and review of recent rider survey data.

The needs analysis examined demographic trends and planned land use changes to ensure that the recommended service improvements benefit the populations that need transit and serve developments that are conducive to transit use. The needs analysis also provided an important opportunity to engage the community to identify unmet transit needs and issues. The study team met with local stakeholders including elected officials, city staff, and local colleges and universities to determine how CUE might improve to meet additional transportation needs and draw new riders to use the service.

This chapter has the following major components, which are presented in the order shown below:

1. System performance and trends
2. Peer analysis of similar transit systems
3. Financial analysis
4. Recent compliance results
5. Analysis of demographics and land uses
6. Title VI analysis
7. Review of other planning documents
8. Public input

SYSTEM PERFORMANCE AND TRENDS

Trend Data

Table 3-1 summarizes the historical operating statistics for the CUE system from FY 2011 through FY 2015.

Table 3-1: CUE Systemwide Trend Data

Systemwide	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Passenger Trips	910,549	908,367	850,809	826,747	766,708
Revenue Hours	33,679	35,439	33,792	33,887	32,710
Revenue Miles	448,251	450,738	441,979	443,650	443,305
Operating Costs	$2,977,867	$2,977,927	$3,126,339	$3,472,495	$3,481,209
Trips/Hour	27.0	25.6	25.2	24.4	23.4
Trips/Mile	2.0	2.0	1.9	1.9	1.7
Miles/Hour	13.3	12.7	13.1	13.1	13.6
Cost/Trip	$3.27	$3.28	$3.67	$4.20	$4.54
Cost/Hour	$88.42	$84.03	$92.52	$102.47	$106.43

Sources: Passenger trips and operating costs from City of Fairfax 2015 Comprehensive Annual Financial Report (CAFR). Revenue hours from annual City of Fairfax Budgets, Transit Fund (actuals). Revenue miles from NVTC.

CUE experienced the following changes in the last five years:

- **Annual passenger trips** decreased by nearly 16% on the whole, though the largest year-over-year decreases occurred in FY 2013 (-6%) and in FY 2015 (-7%). A few factors likely contributed to this ridership trend, including a comparable decrease in boardings at the Vienna/Fairfax-GMU Metro station and fare increases. CUE's ridership trends are explored in more detail later in the chapter.

- **Annual revenue hours** remained relatively stable (-3% over the five-year period). Revenue hours increased by 5% in FY 2012, but saw a comparable decrease the next year when CUE shortened its weekday service span by one hour in the evenings. Revenue hours decreased again in FY 2015 by 3.5%.

- **Annual revenue miles** remained stable (-1% over the last five years), given that the coverage of CUE's routes has not changed.

- **Operating costs** appeared to increase by 17% on the whole, with the largest annual increases in FY 2013 (5%) and FY 2014 (11%). However a significant portion of this

increase was due to a change in accounting; namely the city added a management fee in FY 2014 to account for overhead costs (city staff time from other departments that contribute to CUE operations).
    - The city has always provided support services to CUE from other departments (e.g., accounting, human resources), but did not charge CUE because the city already provided general fund support to CUE. The city added the management fee (about $520,000, determined by auditors) to the CUE budget in FY 2014, the same year that the city began to receive NVTA 30% monies to support CUE.
    - Both the annual increases in FY 2013 and FY 2014 were related to personnel costs including merit increases for eligible employees.
    - The FY 2013 increase also covered higher motor pool expenses for maintenance of CUE vehicles, while the FY 2014 increase also covered costs to install surveillance cameras on CUE buses.

- **Productivity** measured in passenger trips per revenue hour decreased by about 13% in the last five years, largely due to ridership loss since the system's revenue hours has remained relatively stable. The greatest annual change in productivity occurred in FY 2012 (-5%), but this was mainly due to an increase in revenue hours as ridership was flat. Productivity steadily declined from FY 2013 through FY 2015 by -2%, -3%, and -4% each year.

- **Average system wide speed** remained stable at around 13 miles per hour (increase by 1.8% over the five-year period).

- **Cost per trip** increased by 39% on the whole, though CUE's cost per trip remains comparable to peer systems (discussed in the peer analysis). The largest year-over-year increases occurred in FY 2013 (12%) and FY 2014 (14%), following the increases in total operating costs those years (particularly the new city management fee in FY 2014) and accompanying decreases in ridership. FY 2015 also saw a notable increase in cost per trip by 8%, largely due to the decrease in ridership as the operating costs remained stable.

- **Cost per hour** increased by 20% in the last five years, largely due to the comparable increase in total operating costs. Again the largest annual increases occurred in FY 2013 (10%) and FY 2014 (11%), following the increases in total operating costs those years (particularly the new city management fee in FY 2014). FY 2015 saw a modest increase in cost per hour (4%), mainly attributable to a decrease in system revenue hours as total operating costs remained flat.

CUE monitors its cost-effectiveness through its farebox recovery ratio and local subsidy per passenger trip. For this evaluation, CUE bus receipts were considered fare revenue to calculate farebox recovery ratio, while the Mason contribution, general fund support, and local funding from NVTA 30% monies were considered local subsidies to calculate the local subsidy per

passenger trip. (The city provided general fund support through FY 2013, but stopped in FY 2014 when the city began receiving NVTA 30% monies.) This approach allowed the study team to 1) evaluate the impact of CUE fare revenues in covering operating expenses, and 2) determine the amount of local subsidy required, outside of fare and other local revenue (e.g., advertising), to operate the CUE system. Table 3-2 summarizes the system wide performance in the two measures from FY 2011 through FY 2015.

Table 3-2: CUE Systemwide Cost-Effectiveness Trends

System Wide	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
CUE Fare Revenue	$642,591	$606,669	$604,232	$573,091	$581,394
Operating Costs	$2,977,867	$2,977,927	$3,126,339	$3,472,495	$3,481,209
Farebox Recovery Ratio	**22%**	**20%**	**19%**	**17%**	**17%**
Mason Contribution	$540,000	$540,000	$720,000	$720,000	$720,000
Local Funding - General Fund	$18,972	$428,000	$115,181	--	--
Local Funding - NVTA 30%	--	--	--	$1,275,000	$1,590,000
Total Local Subsidy	**$558,972**	**$968,000**	**$835,181**	**$1,995,000**	**$2,310,000**
Passenger Trips	910,549	908,367	850,809	826,747	766,708
Local Subsidy/Trip	**$0.61**	**$1.07**	**$0.98**	**$2.41**	**$3.01**

Notes: CUE fare revenue included bus receipts only to calculate farebox recovery ratio. Total local subsidy included the Mason contribution, general fund support, and NVTA 30% monies (excludes other miscellaneous revenues such as advertising) to calculate local subsidy per passenger trip.
Sources: Fare revenue and local subsidies from annual City of Fairfax Budgets, Transit Fund (actuals). Operating costs and passenger trips from annual City of Fairfax CAFRs.

The following trends emerged in CUE's performance in cost-effectiveness over the last five years:

- **Fare revenue** collected on the CUE bus routes decreased by about 10%. Annual fare revenue did not decrease as much as ridership (-16%) over the five-year period due to multiple fare increases. The largest year-over year fare revenue decreases occurred in FY 2012 (-6%) and FY 2014 (-5%). As ridership remained flat in FY 2012, that year's decrease was likely due to riders switching to payment by SmarTrip card following an increase in the cash fare. The decrease in FY 2014 reflected the ridership decrease that year.

- **Farebox recovery ratio** decreased by 23%, reflecting the decrease in fare revenue (-10%) and simultaneous increase in operating cost (17%, largely due to accounting for the city management fee starting in FY 2014) over the five-year period. CUE experienced annual decreases in farebox recovery ratio from FY 2012 through FY 2014 (-5 to -15% each year). In FY 2015 the farebox recovery ratio increased slightly (1%), mirroring a similar increase in fare revenue while operating costs remained flat.

- **Local subsidy** increased three-fold, mainly due to the 30% monies received from NVTA starting in FY 2014, which resulted in more than a ten-fold increase in local funding that year. (The city no longer provides general fund support to CUE.) Mason also increased its annual contribution by 33% starting in FY 2013.

- **Local subsidy per trip** increased four-fold over the five-year period, largely due to the significant increase in local funding provided through NVTA 30% monies starting in FY 2014, but also impacted by the ridership decrease (-16%). The largest year-over-year changes in local subsidy per trip occurred in FY 2012 (73%) and FY 2014 (139%). In FY 2012 the city provided $428,000 in general fund support in addition to Mason's contribution. In FY 2014 the general fund support ended when the city started receiving the NVTA 30% monies to support CUE operations.

Systemwide Evaluation against Performance Standards

At the time of the system evaluation, FY 2015 data represented the most recent audited financial data available for CUE. Therefore the study team evaluated the recent performance of CUE based on FY 2015 data, noting changing trends where FY 2016 operating data was available. This evaluation also incorporated historical operating data, where available. Given this historical review, the system wide evaluation was conducted against the performance standards established in the 2010 TDP. Table 3-3 summarizes the results of CUE's FY 2015 performance evaluation. Note the performance standards described in Chapter 2 of this TDP update are based on CUE's current performance (FY 2016) and are recommended to evaluate CUE services moving forward (FY 2017 and beyond).

Table 3-3: CUE FY 2015 Systemwide Performance

Performance Area	Measure	FY 2015 System wide	2010 TDP Performance Standard	Evaluation
Service Coverage	Percentage of city residents within 1/4 mile of CUE route	71%	70%	Successful
Ridership Productivity	Weekday trips/revenue hour	22	25	Needs improvement
	Saturday trips/revenue hour	21	20	Successful
	Sunday trips/revenue hour	18	15	Successful
Cost-effectiveness	Farebox recovery ratio	17%	15%	Successful
	Local subsidy/passenger trip	$3.01	$1.40	Needs improvement
On-time Performance	Percentage on-time departures fm. Vienna Metro	88%	90%	Needs improvement

Sources: CUE data, City of Fairfax budgets, City of Fairfax 2015 CAFR, ACS 2010-2014 population data.

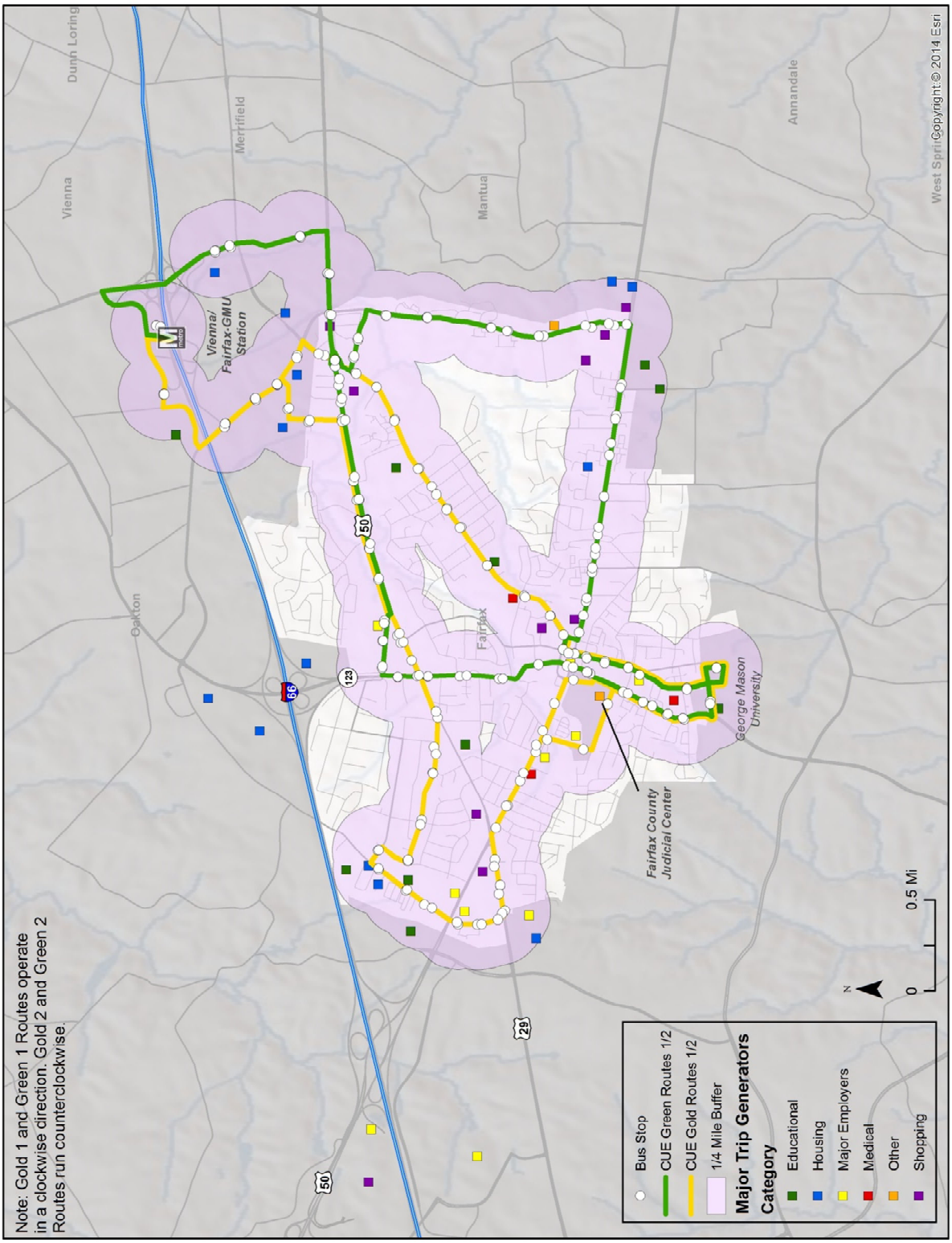
In FY 2015 the CUE system successfully met most performance standards, except for weekday ridership productivity, local subsidy per passenger trip, and on-time performance. The system's average on-time performance in FY 2015 was just below the performance standard, though the FY 2016 data showed improvement to meet the standard. The other results for weekday productivity and local subsidy per trip pointed toward a need to update these performance standards given notable changes in CUE's ridership and local funding since the 2010 TDP.

Service Coverage

Figure 3-1 displays a quarter-mile buffer around the CUE bus stops to indicate areas in the city that are in walking distance to CUE service. CUE's service coverage standard focuses on population coverage. Based on 2010-2014 American Community Survey data, 71% of the city population is in walking distance to CUE, exceeding the performance standard. In terms of geographic coverage, 76% of the city is located within walking distance to CUE service; much of the unserved area is comprised of industrial, park, and golf course property.[1]

[1] 2016 George Mason University and City of Fairfax Transit Study.

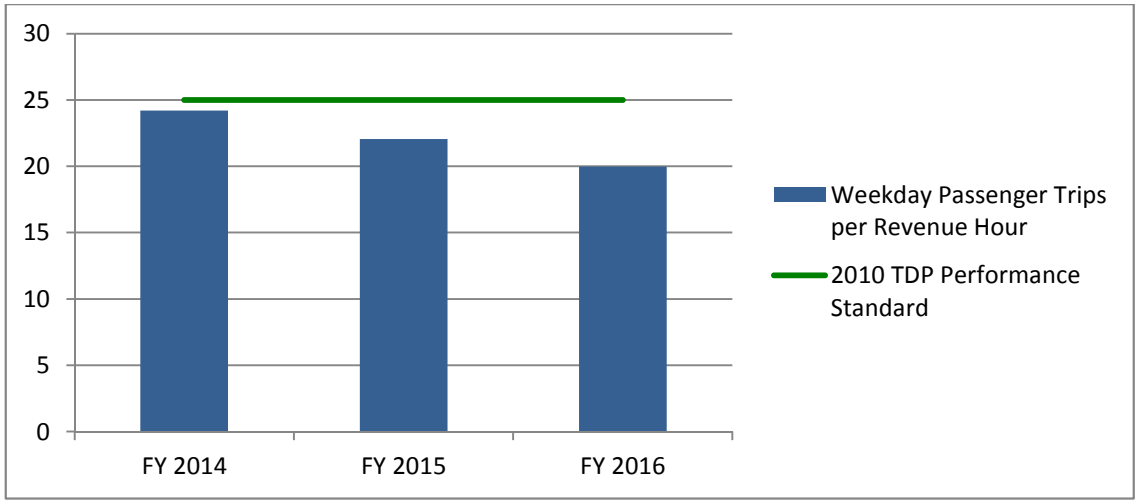
Figure 3-1: Areas in Walking Distance to CUE

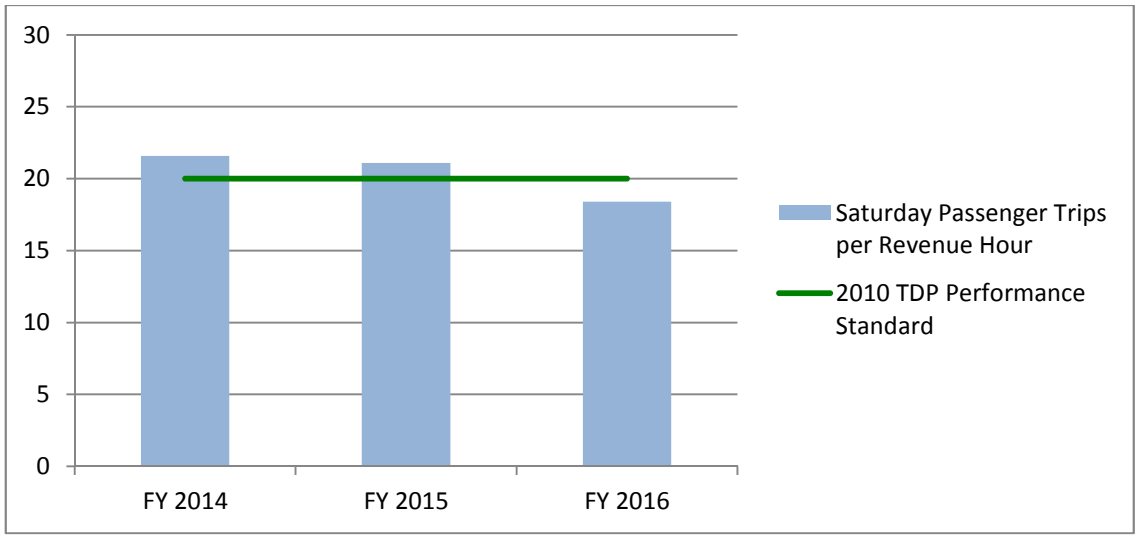


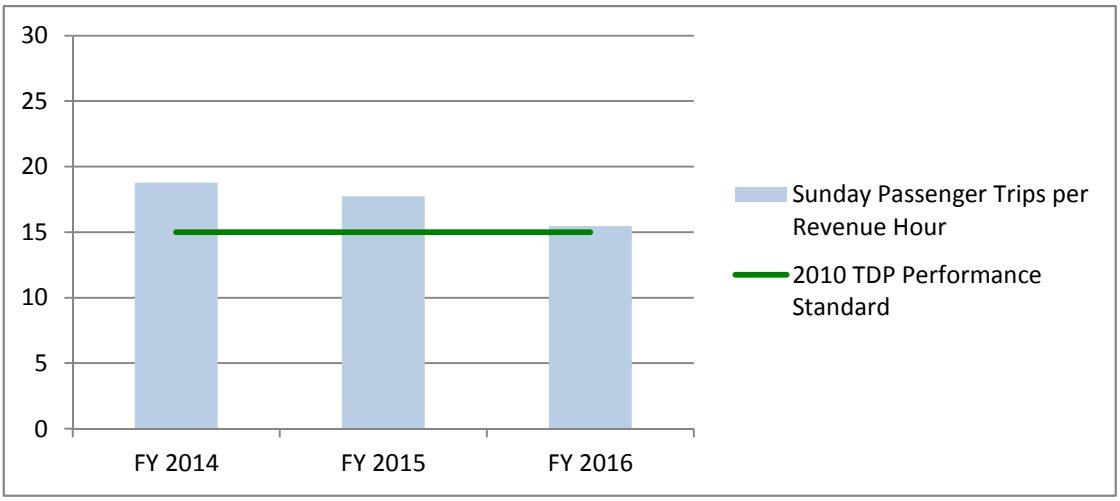
Ridership Productivity

Figure 3-2 presents CUE's productivity trends, measured in passenger trips per revenue hour, by day of service over the last three years. Weekday productivity has consistently underperformed against the standard developed in the 2010 TDP. Saturday productivity met the performance standard until FY 2016, when average Saturday boardings fell by 13%. Sunday productivity has met the performance standard in recent years. However CUE's productivity on all days of service has seen a downward trend. Since the level of service has not changed, the driving factor has been ridership decreases. Potential factors contributing to CUE's ridership decline are discussed below. These evaluation results indicated a need to update the performance standards for weekday and Saturday productivity.

Figure 3-2: CUE Systemwide Ridership Productivity Trends by Day of Service





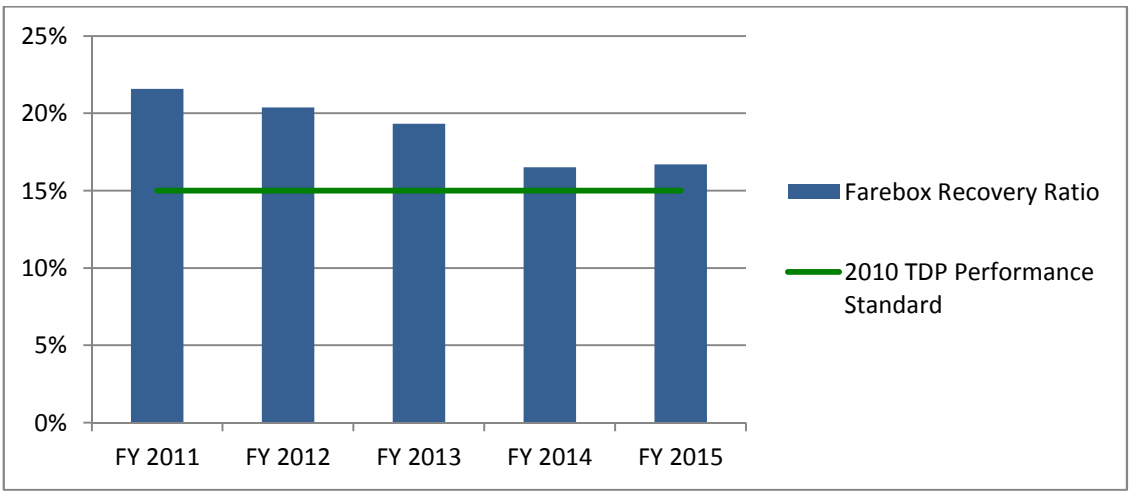


Sources: CUE ridership reports and daily scheduled revenue hours (assumed same hours for all three years).

Cost-Effectiveness

CUE has consistently met the performance standard for farebox recovery in the last five years, as shown in Figure 3-3.

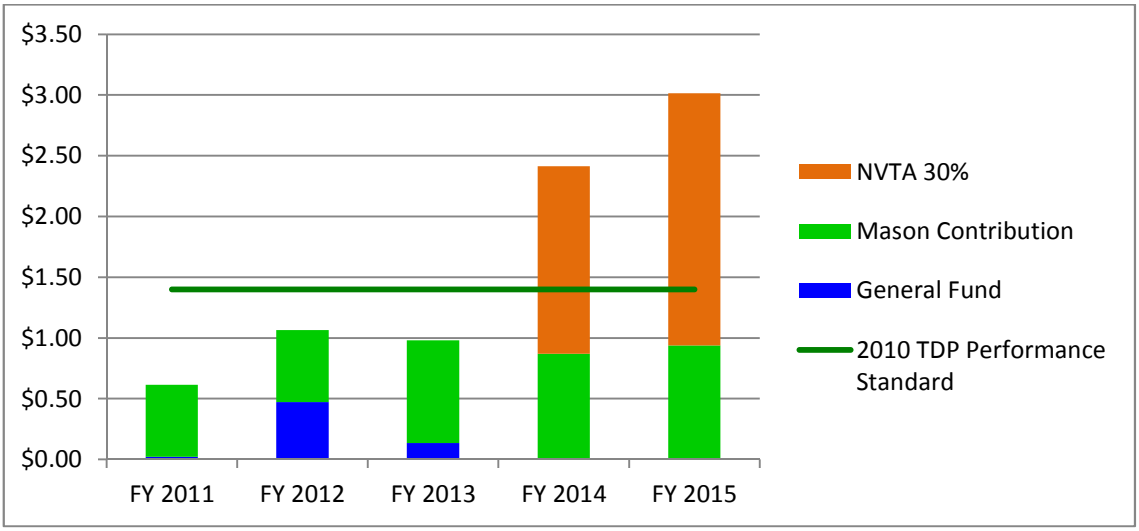
Figure 3-3: CUE Systemwide Farebox Recovery Ratio Trend



Sources: City of Fairfax budgets, City of Fairfax 2015 CAFR.

Figure 3-4 portrays CUE's performance in local subsidy per passenger trip including the different sources of local subsidies. CUE met the standards from FY 2011 through FY 2013, but exceeded the standard starting in FY 2014. That year the city began receiving NVTA 30% monies to fund CUE, and ended general fund support for CUE. The significant increase in local funding for CUE starting in FY 2014 was from NVTA 30% monies, not city dollars. Discussed in Chapter 2, there was a need to update the performance standard for local subsidy per passenger trip to capture the increase in local subsidy from NVTA 30% monies.

Figure 3-4: CUE Systemwide Local Subsidy per Trip Trend

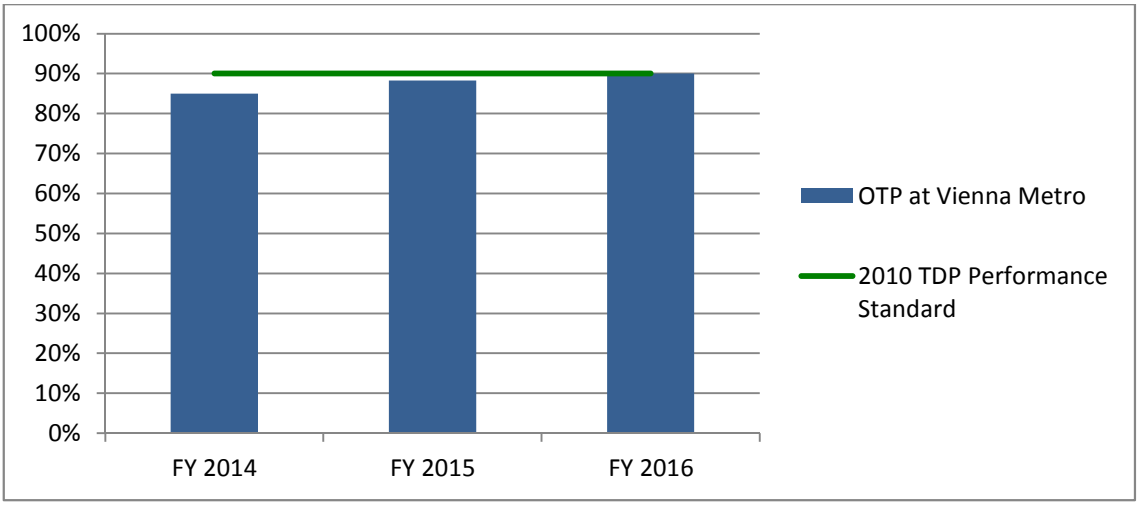


Sources: City of Fairfax budgets, City of Fairfax 2015 CAFR.

On-Time Performance

The system's average on-time performance at the Vienna/Fairfax-GMU Metrorail Station was below the performance standard of 90% in FY 2014 and FY 2015, but has gradually improved to meet the standard in FY 2016, as shown in Figure 3-5.

Figure 3-5: CUE Systemwide On-Time Performance (OTP) Trend



Sources: CUE data.

Ridership Trends

CUE's ridership has declined by about 16% in the last five years and by about 30% in the past decade. Exploring the factors behind this ridership decline was one of the city's top questions for this TDP update. The study team examined several potential contributors to this ridership trend including ridership at the Vienna/Fairfax-GMU Metrorail Station and on Metrorail overall, CUE fare increases, the availability of other transit services, gas prices, and the employment status of city residents. It was also important to examine regional transit ridership trends to provide a context for CUE's ridership decline.

Systemwide Ridership Trends

Table 3-4 summarizes ridership data for CUE over the past ten years, along with rail ridership at the Vienna/Fairfax-GMU Metrorail Station and Northern Virginia transit (bus and rail) ridership for comparison to regional transit trends.

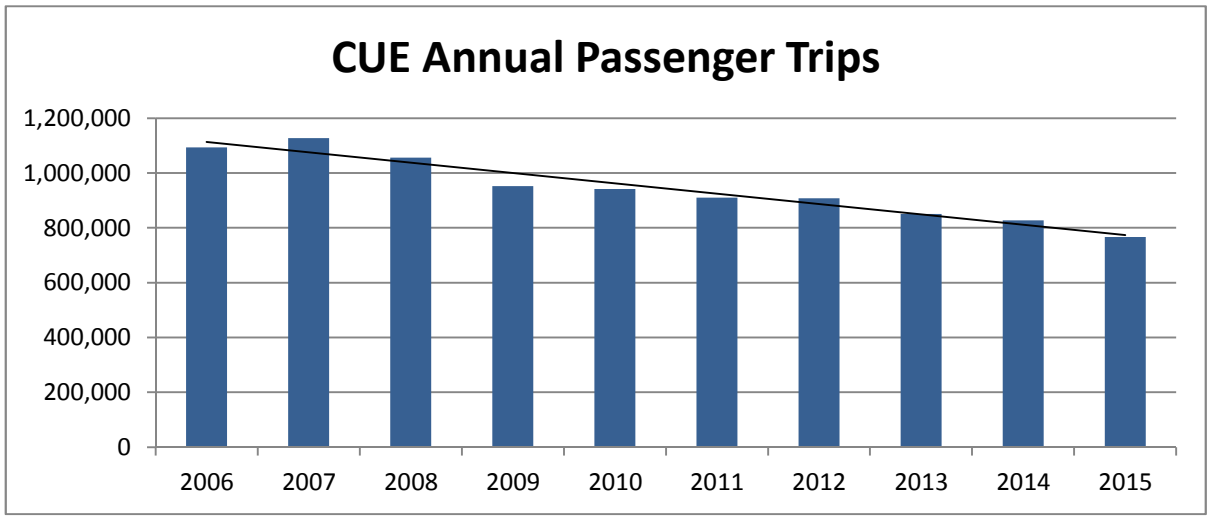
Table 3-4: Historical Ridership on CUE, at Vienna/Fairfax-GMU Metro, and in Northern Virginia

Year	CUE Annual Passenger Trips	Annual Number Change	Annual % Change	Vienna Metro Avg. Weekday Boardings	Annual Number Change	Annual % Change	Northern VA Annual Passenger Trips*	Annual Number Change	Annual % Change
2006	1,093,926			13,177			137,321,489		
2007	1,126,966	33,040	3%	13,143	-34	0%	137,544,235	222,746	0%
2008	1,055,664	-71,302	-6%	13,642	499	4%	142,892,715	5,348,480	4%
2009	952,072	-103,592	-10%	13,759	117	1%	147,283,444	4,390,729	3%
2010	941,694	-10,378	-1%	13,967	208	2%	143,642,607	-3,640,837	-2%
2011	910,549	-31,145	-3%	13,682	-285	-2%	144,843,232	1,200,625	1%
2012	908,367	-2,182	0%	13,773	91	1%	163,086,860	18,243,628	13%
2013	850,809	-57,558	-6%	13,141	-632	-5%	156,135,485	-6,951,375	-4%
2014	826,747	-24,062	-3%	12,947	-194	-1%	152,901,843	-3,233,642	-2%
2015	766,708	-60,039	-7%	11,458	-1,489	-12%	158,158,938	5,257,095	3%
% Change 2011-15			-16%			-16%			9%
% Change 2006-15			-30%			-13%			15%

*Northern Virginia Transit includes ridership on Metrorail and Metrobus in Virginia, Fairfax Connector, VRE, DASH, PRTC, CUE, ART, and Loudoun County Transit.
Sources: CUE data from City of Fairfax 2015 CAFR. Northern Virginia transit data from Northern Virginia Transportation Commission (NVTC). Vienna Metro data from WMATA (historical Metrorail average weekday passenger boardings).

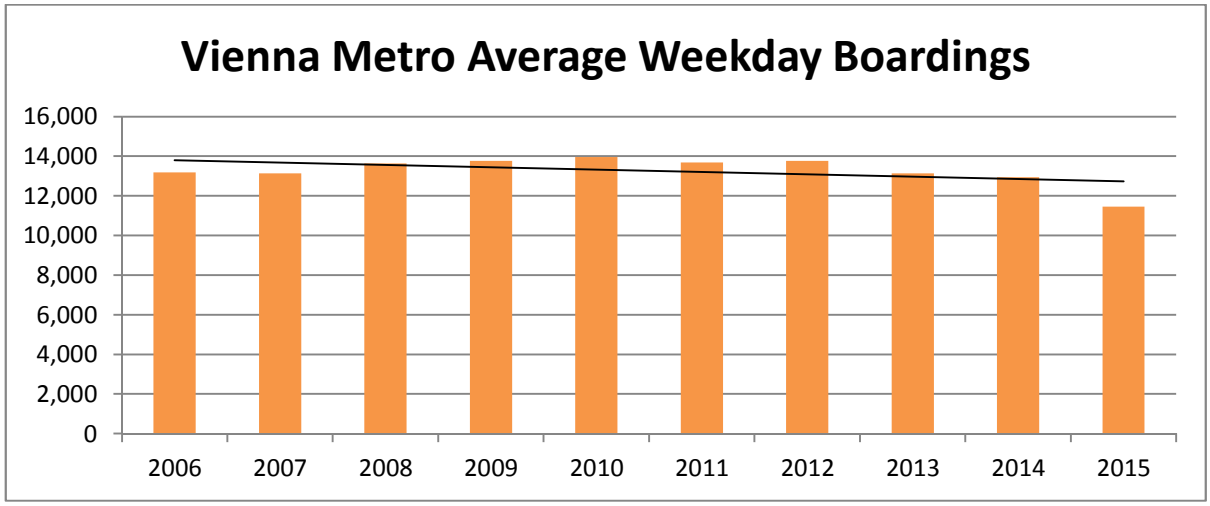
CUE experienced a significant ridership decrease of 30% between 2006 and 2015, with a more modest decline of 16% in the last five years. However it is worth noting that in terms of year-over-year changes, CUE's ridership held relatively stable (less than 5% change) for half of the past ten years. The largest annual ridership changes (between -6% and -10%) occurred in 2008, 2009, 2013, and 2015. The historical ridership trends for CUE, the Vienna/Fairfax-GMU Metrorail Station, and Northern Virginia are portrayed in Figures 3-6, 3-7, and 3-8, respectively. The Northern Virginia ridership includes Metrorail and Metrobus ridership in Virginia.

Figure 3-6: Historical Ridership on CUE (2006-2015)



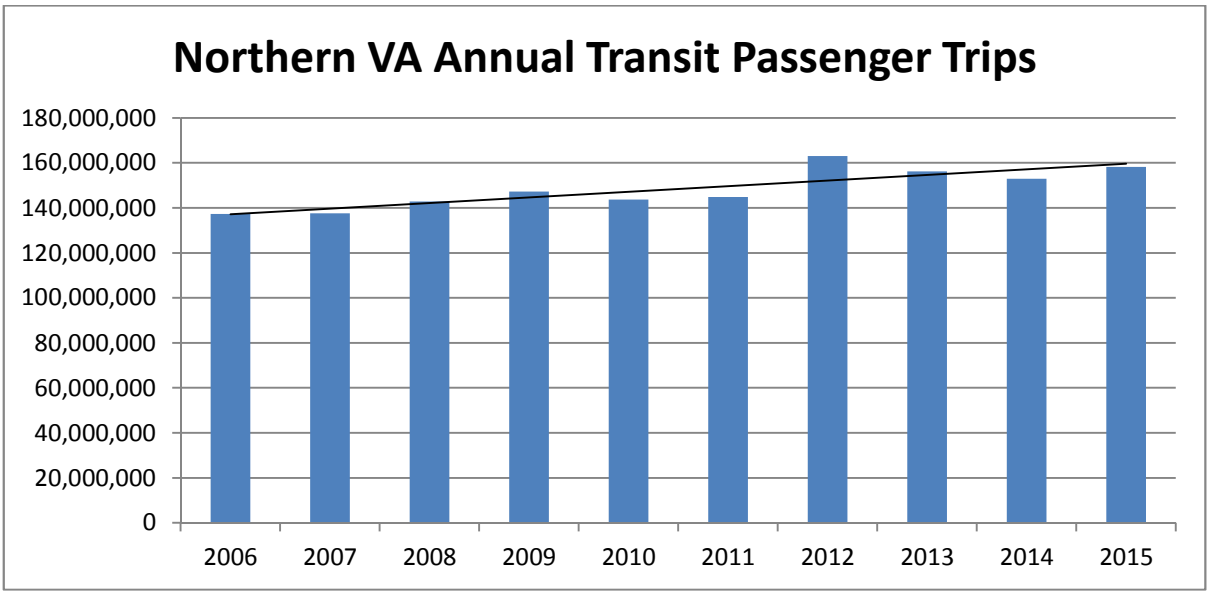
Source: City of Fairfax 2015 CAFR.

Figure 3-7: Historical Ridership at Vienna/Fairfax-GMU Metrorail Station (2006-2015)



Source: WMATA.

Figure 3-8: Historical Ridership in Northern Virginia (2006-2015)



Source: NVTC.

The Vienna/Fairfax-GMU Metrorail Station is a major trip generator for CUE service. Nearly half of surveyed CUE riders indicated that they transfer to Metrorail to reach their destination.[2] Recent on/off counts indicated that on weekday trips traveling inbound to the Vienna/Fairfax-GMU Metrorail Station 47% of CUE riders alighted at the metro station.[3] Given this data and the service design – all four CUE routes serve the Vienna Metro station, riders' usage of Metrorail service impacted CUE's ridership. From 2006 through 2015, ridership at the Vienna Metro station declined (-13%), though to a lesser degree than CUE ridership (-30%). In 2016 ridership at the Vienna Metro was anticipated to decline further as a result of WMATA's SafeTrack program. During SafeTrack disruptions of the Orange Line in June 2016, the Vienna Metro station experienced a 27% decrease in rail boardings during the morning peak period.[4]

The ridership trend at Vienna Metro was notable because it was the only local trend similar to CUE's ridership decrease over the past ten years. The Northern Virginia region experienced a 15% growth in transit ridership from 2006 through 2015. Neighboring transit systems including Fairfax Connector, DASH, and ART saw ridership growth, though to differing degrees (2% at

[2] Based on on-board survey conducted in April 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.
[3] Based on counts conducted from March to May 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.
[4] Siddiqui, Faiz. (June 8, 2016.) "Metro ridership continues to be down more than 25 percent at SafeTrack impacted stations." Accessed September 2016. Retrieved from https://www.washingtonpost.com/news/dr-gridlock/wp/2016/06/08/metro-ridership-continues-to-be-down-more-than-25-percent-at-safetrack-impacted-stations/

Fairfax Connector, 20% at DASH, and 205% at ART). However these individual transit systems are larger, provide different types of service, and expanded their services in the past decade, whereas CUE serves a smaller area and its level of service has remained stable. Fairfax Connector did see a 5% decrease in ridership from 2011 through 2015. Given that these neighboring transit systems also provide feeder service to Metrorail, they are expected to experience ridership declines related to the SafeTrack program in 2016 and possibly beyond.

Decline in Metrorail Ridership

A closer look at the annual ridership changes at the Vienna/Fairfax-GMU Metrorail Station indicated that ridership was stable in the first part of the decade, even as CUE experienced significant ridership decreases in 2008 and 2009. Therefore it did not appear that Vienna Metro ridership affected CUE ridership then. However the ridership trend at Vienna Metro in the past five years closely mirrored that of CUE ridership, as shown in Figure 3-9. Both experienced a 16% decline in ridership, which indicated that lower usage of the Vienna Metro station was likely a major contributor to CUE's ridership decline in the last five years.

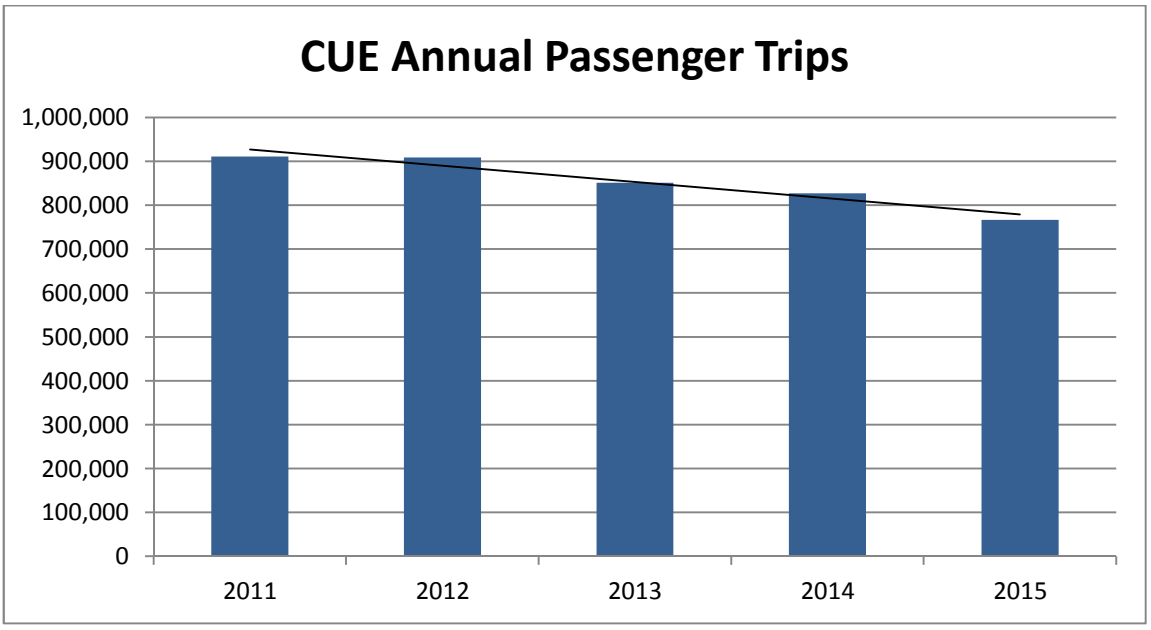
The decline in ridership at the Vienna Metro station reflected a systemwide trend for rail ridership. WMATA reported that rail ridership started to decrease in 2010, which significantly impacted bus riders as 75% also use Metrorail at some point during their trip. Rail ridership losses have been the worst on weekdays, inbound from Virginia and Maryland to D.C., from end of line stations, among frequent commuters, and among full fare passengers – characteristics that describe the profile of CUE riders who transfer to Metrorail (half of all riders). Rail ridership during off-peak periods has also fallen.[5]

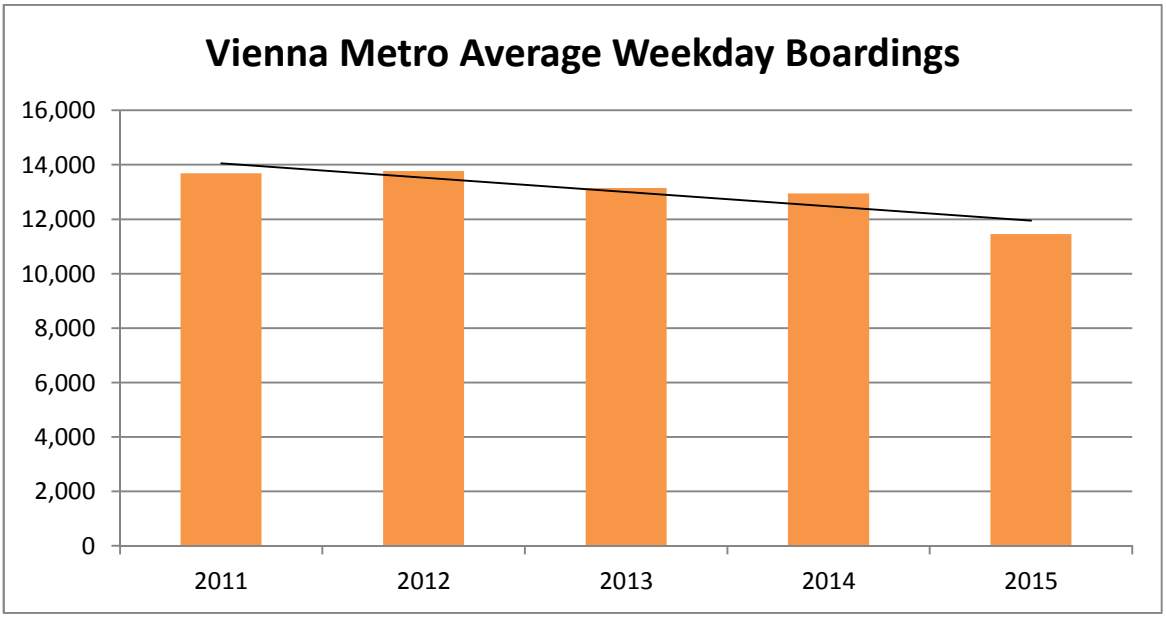
WMATA has seen a 25-30% decline in transfers between local bus and Metrorail in recent years, with CUE among the local transit systems seeing the largest declines. Decreasing service reliability has been a driving factor in riders using Metrorail less. Rail service reliability decreased following the Silver Line opening in 2014.[6] WMATA converted some Orange Line trains from Vienna to Silver Line trains, resulting in six fewer trains per hour during peak periods (inbound toward D.C. in the morning and outbound toward Vienna in the evening). The service frequency from Vienna decreased from an average of 3.5 minutes to 5.5 minutes.[7] Metrorail has also struggled with on time performance in recent years, with the Orange and Silver Lines experiencing the most delays.[8] In 2015 WMATA increased its single tracking to

[5] WMATA Regional Bus Workshop. July 27, 2016.
[6] Ibid.
[7] WMATA. (March 12, 2013.) "What will happen to the rail schedules with the Silver Line?" *PlanItMetro*. Accessed July 2016. Retrieved from http://planitmetro.com/2013/03/12/what-will-happen-to-the-rail-schedule-when-the-silver-line-opens/
[8] Repetski, Stephen. (April 25, 2016.) "Metro needs to do a better job fixing rail cars." And Timko, Peter. (March 9, 2016.) "Breakfast links: Spring break." *GreaterGreaterWashington*. Accessed July 2016. Retrieved from http://greatergreaterwashington.org/tag/on-time+performance/

complete track maintenance and rebuilding during the weekends, which translated to decreased frequencies and subsequently lower ridership.[9]

Figure 3-9: Historical Ridership on CUE and at Vienna Metrorail Station (2011-2015)





Sources: City of Fairfax 2015 CAFR and WMATA.

[9] WMATA Regional Bus Workshop. July 27, 2016. And Maiers, Travis. (February 2, 2016.) "Here's where Metro did all its weekend track work in 2015." *GreaterGreaterWashington*. Accessed July 2016. Retrieved from http://greatergreaterwashington.org/post/29341/heres-where-metro-did-all-its-weekend-track-work-in-2015/

Other reasons that WMATA riders cited they are riding less included a decreased sense of safety while riding the system, low quality service for the price paid, and less congestion on the roadways.

Availability of Other Transportation Services

The availability of other transit routes and alternative modes such as transportation network companies (e.g., Uber, Lyft) to serve the needs of CUE riders may have contributed to the system's ridership decline. Recent service changes included:

- New shuttle service provided by Mason,
- New shuttle service by Northern Virginia Community College (NOVA),
- Change in Metrobus route 29N, and
- New shuttle service by Virginia International University (VIU).

Mason Shuttles

Mason is the other major trip generator that CUE was designed to serve. About 45% of surveyed CUE riders indicated they were affiliated with Mason (mostly students).[10] Recent on/off counts indicated that on weekday trips traveling outbound to Mason 36% of CUE riders alighted at Rappahannock River Lane at Patriot Circle.[11] (These riders also have the option to access Mason Shuttle routes at this stop.)

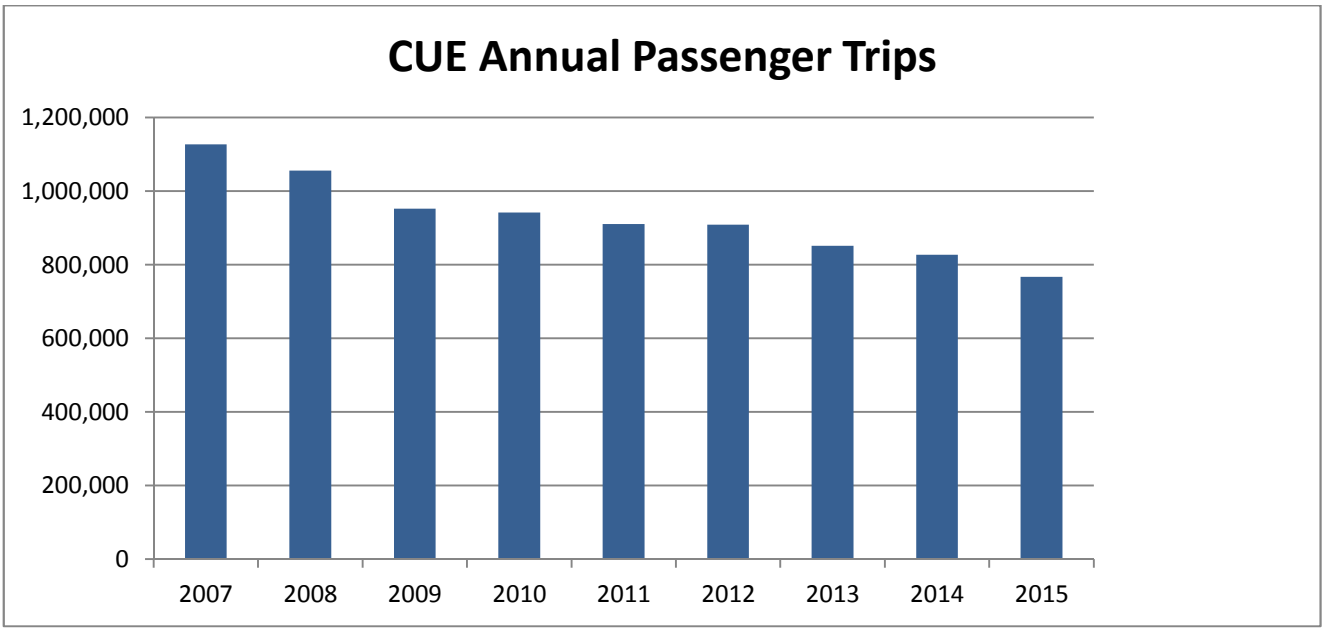
Mason began providing its own shuttle service, Mason Shuttles, in 2003. While this service was initially geared toward international students, it has grown to five routes serving the broader campus population. Two Mason Shuttle routes, Sandy Creek-Vienna Metro (formerly Metro to Mason) and Global Center Metro (formerly Metro Express), provide similar coverage to CUE's routes, connecting the Mason campus with the Vienna/Fairfax-GMU Metrorail Station. Sandy Creek-Vienna Metro began in 2007, while Global Center Metro began in 2012. The Mason Shuttle service runs more frequently than CUE, with 15 minute headways during peak periods and headways as low as five minutes when combining the Sandy Creek-Vienna Metro and Global Center Metro schedules; off-peak service operates every 20 to 30 minutes.

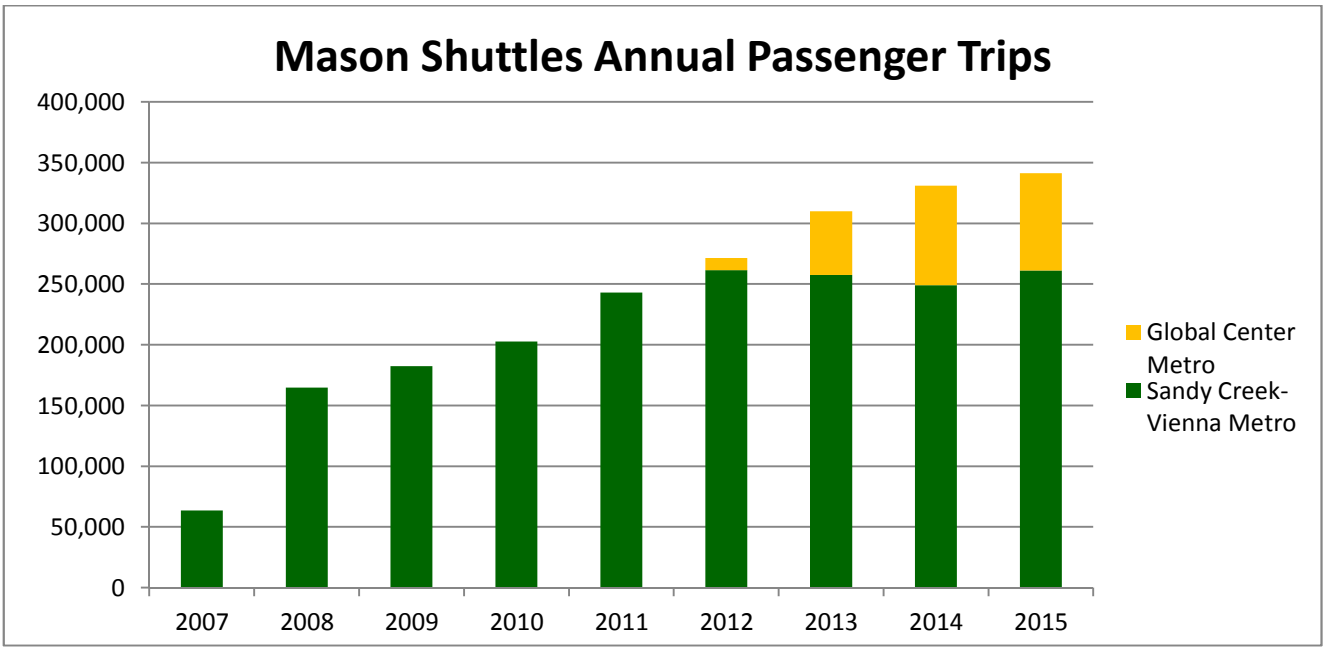
Figure 3-10 portrays the historical ridership for CUE compared with the Sandy Creek-Vienna Metro and Global Center Metro routes. CUE ridership decreased by 6% each in 2008 and 2013, following the introductions of the Sandy Creek-Vienna Metro and Global Center Metro routes, respectively. Ridership grew by 58% on Sandy Creek-Vienna Metro from 2008 through 2015, and by 53% on Global Center Metro from 2013 through 2015 (excluding the first years of

[10] Based on on-board survey conducted in April 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.
[11] Based on counts conducted from March to May 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.

service). For the two routes combined, ridership doubled from 2008 through 2015, and Mason Shuttles provides 341,000 trips annually between Mason and the Vienna Metro.

Figure 3-10: Historical Ridership on CUE and Mason Shuttles Routes (2007-2015)





Sources: City of Fairfax 2015 CAFR and Mason

This significant growth indicates that the new services likely contributed to CUE's ridership decline, but the two systems have been found to complement rather than compete with each other. Mason's transportation needs in terms of service area and demand exceed that which can be served by CUE. At the same time Mason cannot provide service to the same areas as CUE in a cost-effective manner. The current partnership between the city and Mason to fund CUE service is mutually beneficial, as the city is able to provide a higher level of service with Mason's contribution and the Mason community benefits from the coverage of the CUE service area.[12] In addition CUE provides an alternative for Mason Shuttle riders during peak times when the Sandy Creek-Vienna Metro and Global Center Metro trips are at capacity.

It is worth noting that Mason's goal is to reduce the number of trips taken by single occupancy vehicles by 10% by 2020.[13] Recent on/off counts indicated that CUE and the Sandy Creek-Vienna Metro and Global Center Metro routes have the capacity to meet current demand. When considering weekday average loads, all the CUE routes have capacity for additional riders though this means standing room only for some peak period trips; only a handful of Mason Shuttle trips experienced load factors greater than 75% of the vehicle capacity. However in the near term Mason plans to add on campus housing (1,000 beds), and forecasts an 8% increase in the campus population from 2016 to 2020. With space and cost constraints to build additional parking on campus, transit usage will play an important factor in helping Mason meet its transportation goal.[14]

NOVA Shuttle

In August 2013 NOVA began operating shuttle service including Route A, which connects the Annandale campus with Dunn Loring-Merrifield Metrorail Station. Where some NOVA students previously rode the CUE Green route and transferred to Metrobus 29N to reach the Annandale campus, Route A offered an alternative for a direct connection to Metrorail, albeit at the Dunn Loring station instead of Vienna/Fairfax-GMU. Ridership has grown about 20% since the route started. In FY 2016 Route A provided 41,082 passenger trips.[15] NOVA staff has observed that most Route A riders are students who live in the apartments near Merrifield and either walk or take Metrobus to access Route A. This input indicated that Route A serves a different market than CUE, and likely did not contribute much to CUE's ridership decline in the few years NOVA Shuttle has been operating.

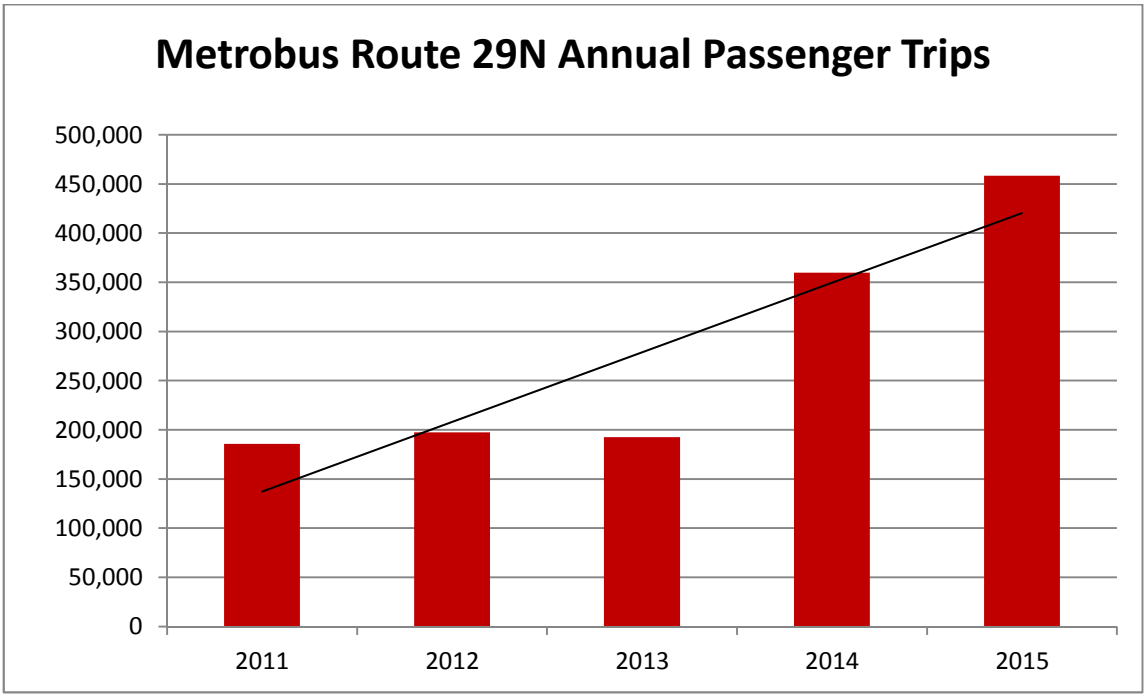
[12] 2016 George Mason University and City of Fairfax Transit Study.
[13] April 2016 Bi-Annual Mason Transportation Survey.
[14] Based on on/off counts, capacity analysis, and MASON population forecasts completed in the 2016 George Mason University and City of Fairfax Transit Study. Plans to add campus housing from May 2016 interview with MASON Parking and Transportation staff.
[15] Data from NOVA's Director of College Parking and Transportation.

Metrobus Route 29N

As mentioned above, historically NOVA students were known to use the CUE Green route and transfer to Metrobus 29N to reach the Annandale campus. These students were presumably coming from the Vienna/Fairfax-GMU Metro station, as the 29N traveled as far as Fairfax Circle. Effective December 29, 2013, WMATA extended the 29N route from Fairfax Circle to the Vienna Metro station, added six additional trips, and added Sunday service.[16] It is likely that the NOVA students who previously used CUE switched to the revised 29N to reach the Annandale campus through a one-seat ride, contributing to ridership loss on the CUE Green route starting in 2014.

Figure 3-11 portrays the historical ridership on Metrobus route 29N before and after the service changes. From 2011 through 2015, ridership on the 29N increased by 150%. The annual ridership increased by 87% following the December 2013 service changes. In 2015 ridership on the 29N grew by 28%, while ridership on CUE's Green routes combined decreased by -7%. This data indicated that the significant growth on the revised 29N likely contributed to ridership declines on the Green routes in recent years.

Figure 3-11: Historical Ridership on Metrobus Route 29N



Source: WMATA.

[16] Based on two sources: 1) WMATA. (December 2013.) *Metrobus service changes effective December 29 continue Better Bus improvement program*. Accessed July 2016. 2) WMATA. (July 2014.) *Metrobus Priority Corridor Study: 29K, 29N – Alexandria-Fairfax Line, 29C, 29E, 29G, 29H, 29X – Annandale Line*. Accessed July 2016.

VIU Shuttle

Virginia International University is a private, non-profit educational institution providing undergraduate, graduate, and English as a second language programs. In August 2015 VIU moved its main campus to Village Drive, off of Lee Highway, located about one mile west of the city boundary. Prior to this move, the campus buildings were located on Pender Drive, just outside the city boundary near Jermantown Road. Nearly all of VIU's students are international students who do not have a driver's license or have no access to a personal vehicle. Therefore much of the 1,300 student population relies on transportation alternatives including public transit.[17]

VIU conducts an annual transportation survey of students, faculty, and staff. Survey results from recent years indicated that 40-50% of the campus population lives in the City of Fairfax, and a similar proportion takes a bus to reach the campus. When VIU was located on Pender Drive, about 25% of these bus riders used CUE and another 20% used a combination of bus services including CUE, Metrobus, and Fairfax Connector. In January 2015 VIU started to offer a free shuttle connecting the Vienna Metro and select apartments in Fairfax to the campus. The 2015 survey results found that over 20% of individuals used the VIU shuttle, accompanied by a corresponding decrease in those using public buses (-13 percentage points). Among the VIU population still taking public buses to reach campus, the percentage using CUE decreased to 19% while the percentage using Metrobus increased.[18]

VIU's survey data indicated a decline in ridership of VIU patrons on CUE due to the relocation of its campus and the new VIU shuttle. When VIU was located on Pender Drive, students could take the Gold route and walk from Jermantown Road to reach the VIU buildings. Once the campus moved, students taking CUE had to walk or bike one mile to the new campus. Some students switched to Metrobus 1C, which stops closer to the new campus (0.3 miles) but requires crossing Lee Highway. The VIU shuttle is popular but demand exceeds capacity, and the university is actively searching for transit alternatives to better serve its new campus.

Alternative Modes

WMATA reported that the increasing popularity of alternative transportation modes, including transportation network companies (TNCs), carsharing, biking, and walking, has contributed to its ridership decline. City residents and CUE riders have likely participated in this regional trend, which potentially contributed to CUE's ridership decline.

Research on transportation trends in the region indicated that 16% of Northern Virginia residents used a TNC, such as Uber, in 2015. This percentage increased to 24% in 2016. Not only has the share of D.C. area residents using TNCs increased, but the average number of trips each

[17] Interview with VIU Facilities & Property staff in June 2016.
[18] Trends based on VIU transportation survey results from 2013 through 2015.

user takes has also increased from 3.1 to 5.2 one-way trips per month, a 68% increase in one year. TNC use in the region is particularly popular among 18-34 year olds (57% use it) and to a lesser extent 35-54 year olds (35% use it).[19] Given that 45% of CUE riders are affiliated with Mason (mostly students), student usage of TNCs potentially translated to fewer trips on CUE.

A review of the mode by which city residents commute to work over the last decade indicated increases in transit use and walking (by two percentage points each), while other modes remained constant.[20]

CUE Fare Increases

As described in Chapter 1, CUE implemented multiple fare changes from 2010 through 2014, primarily to increase CUE fares to be on par with WMATA and regional fares. The study team used fare elasticities to estimate the impact of these fare changes on CUE ridership. CUE's 2009 ridership was used as the baseline, and a fare elasticity of -0.40 was applied.[21] This fare elasticity represented the assumption that ridership will decrease 0.4% for every 1% increase in fares. Survey data from the last TDP[22] on riders who pay by cash or SmarTrip card was applied to the 2009 baseline to capture the ridership impacts of fare changes by medium.

Table 3-5 includes the results of the fare elasticity analysis, which estimated that the CUE fare changes implemented since the last TDP resulted in a total loss of about 73,000 passenger trips. This fare elasticity analysis estimated that the five fare changes implemented since 2010 resulted in a 12% decrease in ridership by individuals who paid a fare (excluding Mason ridership, which was not affected by the fare changes). About 60% of CUE riders today pay a fare.[23] Applying this proportion to CUE's 16% decrease in overall ridership from FY 2011 through FY 2015 translated to a 10% decrease in fare paying riders over the last five years, likely due to CUE's multiple fare increases.

[19] WBAResearch. *Transportation in the Washington, DC Area* (Fall 2015 and Spring 2016 surveys).
[20] Except for a decrease in carpooling. Based on a comparison of 2005-2009 and 2010-2014 American Community Survey data on means of transportation to work for City of Fairfax residents.
[21] Used a fare elasticity of -0.40 based on the following sources: Fare elasticity for intrasuburban bus routes was -0.38 according to Mayworm, Lago & McEnroe's study, Patronage Impacts of Changes in Transit Fares and Services (1980). Fare elasticity estimate for Alexandria, VA transit system was -0.412 according to the APTA study, Fare Elasticity and Its Application to Forecasting Transit Demand by Linsalata and Pham (1991). Average fare elasticity for bus systems is about -0.4 according to TCRP Report 95, Traveler Response to Transportation System Changes, Chapter 12, Transit Pricing and Fares (2004).
[22] Survey data from the last TDP more accurately reflected fare usage of CUE's 2009 ridership (the baseline for the analysis) than more recent survey data.
[23] Based on on-board survey conducted in April 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.

Table 3-5: Fare Elasticity Analysis

		Ridership Estimates Following Fare Changes In:						
CUE Riders	2009 Ridership	April 2010	October 2010	January 2011	July 2012	July 2014	Number Change from 2009-14	Percent Change from 2009-14
Cash Users	333,225	323,352	309,972	302,222	295,111	298,390	-34,835	-10.5%
SmarTrip Card Users	285,622	276,482	264,194	264,194	257,148	247,505	-38,116	-13.3%
Total Fare Paying Riders	**618,847**	**599,834**	**574,165**	**566,416**	**552,260**	**545,896**	**-72,951**	**-11.8%**

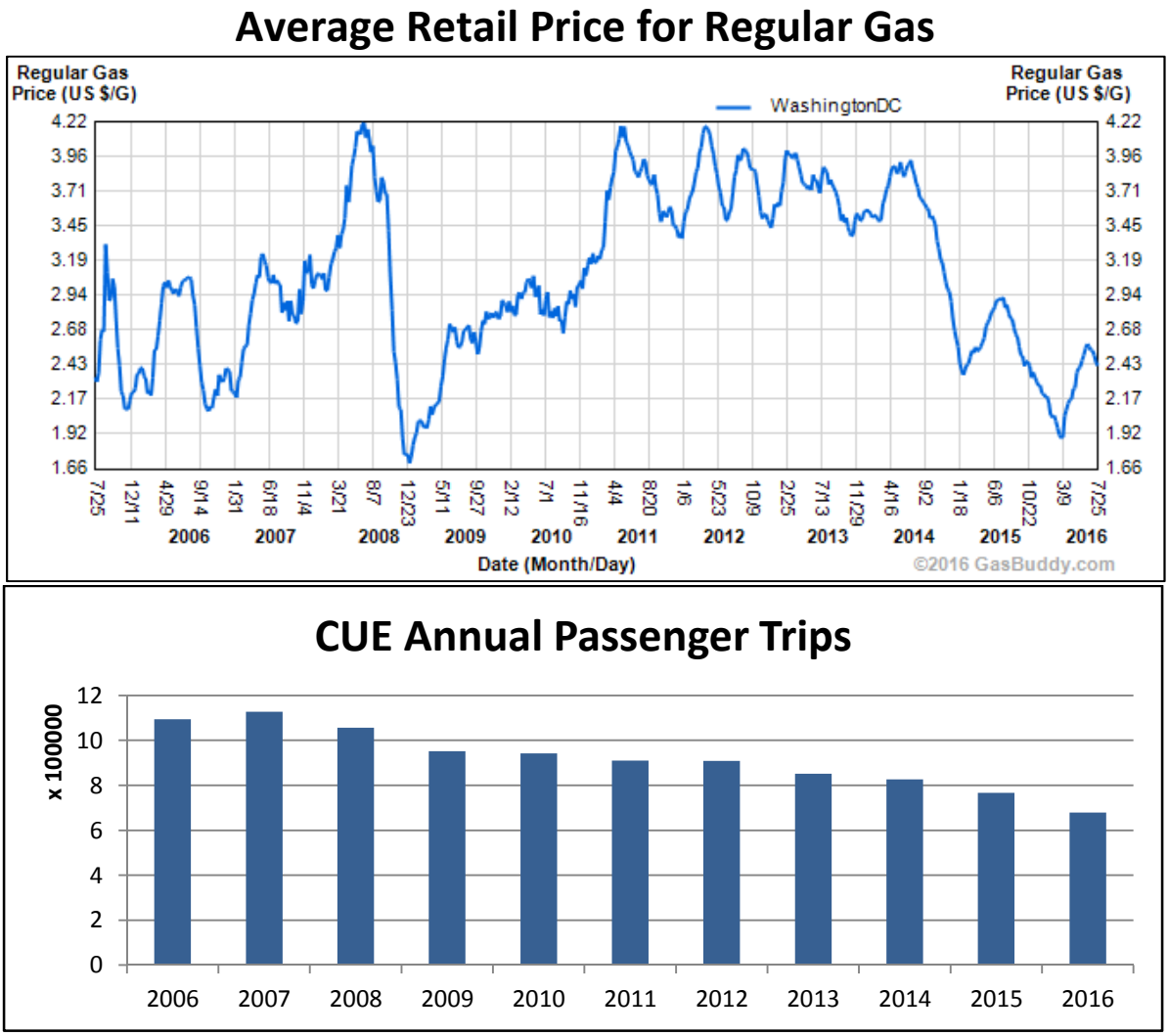
Source: KFH Group 2016 analysis using 2009 ridership from City of Fairfax 2015 CAFR, survey data on fare medium usage from last TDP, and fare elasticity from industry research.

Gas Prices

The study team also reviewed changes in gas prices over the last decade as another possible factor affecting transit ridership. When gas prices increase, choice riders are more likely to use transit. About 30% of CUE riders are considered choice riders, as they have a valid driver's license and a vehicle available, but choose to ride CUE instead of driving.[24] Figure 3-12 presents the trends in gas prices in the Washington, D.C. area compared with CUE ridership from FY 2006 through FY 2016.

[24] Based on on-board survey conducted in April 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.

Figure 3-12: Trends in Average Gas Prices and CUE Ridership



Sources: GasBuddy.com, City of Fairfax 2016 CAFR.

The comparison indicated that average gas prices likely played a factor in CUE's ridership trends at certain times: the increase in average gas prices from 2006 to 2007, the subsequent fall in 2009, and the decrease in gas prices again from 2012 through 2015 generally matched CUE's ridership trends. The gas price increases from 2009 through 2011 did not see a corresponding increase in CUE ridership, as might be expected, implying that other factors played a larger role affecting ridership during this period.

Employment Levels and SmartBenefits

Rider survey data indicated that work trips comprise about 38% of trips on the Gold routes and 26% of trips on the Green routes. The top destination reported by CUE riders was work,

followed by college or university (presumably Mason).[25] Therefore the study team examined the employment rate of city residents to determine if changes in employment levels may have impacted CUE's ridership decline over the last decade. City of Fairfax labor statistics from 2006 to 2015 are summarized in Table 3-6. On the whole the city's labor force remained stable, though the number of unemployed residents increased by 39% over the decade. This sizable percentage change was comparable to the -30% ridership decrease that CUE experienced over the time period.

Table 3-6: City of Fairfax Labor Statistics (2006–2015)

	2006	2007	2008	2009	2010		
Labor Force	13,230	13,902	14,413	14,525	12,663		
Employed	12,903	13,550	13,951	13,722	11,974		
Unemployed	327	352	462	803	689		
Unemployment Rate	2.5%	2.5%	3.2%	5.5%	5.4%		
	2011	**2012**	**2013**	**2014**	**2015**	**Percent Change 2011-15**	**Percent Change 2006-15**
Labor Force	12,712	12,938	13,117	13,293	13,242	4.2%	0.1%
Employed	12,087	12,382	12,573	12,747	12,788	5.8%	-0.9%
Unemployed	625	556	544	546	454	-27.4%	38.8%
Unemployment Rate	4.9%	4.3%	4.1%	4.1%	3.4%		

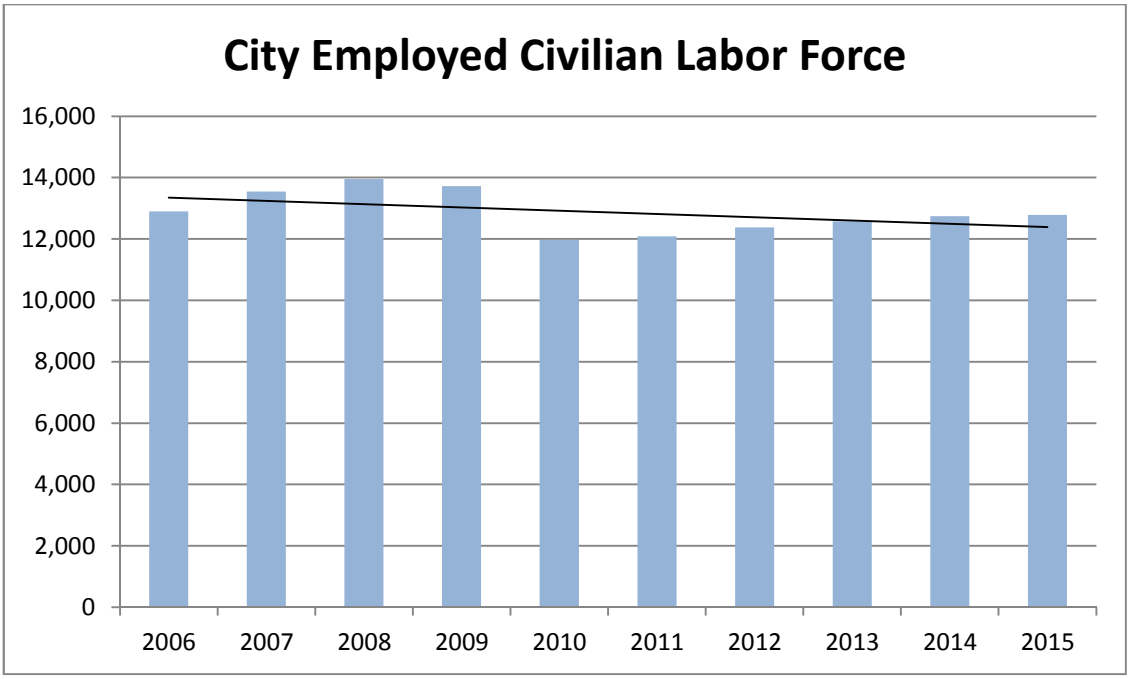
Source: Virginia Employment Commission, Local Area Unemployment Statistics.

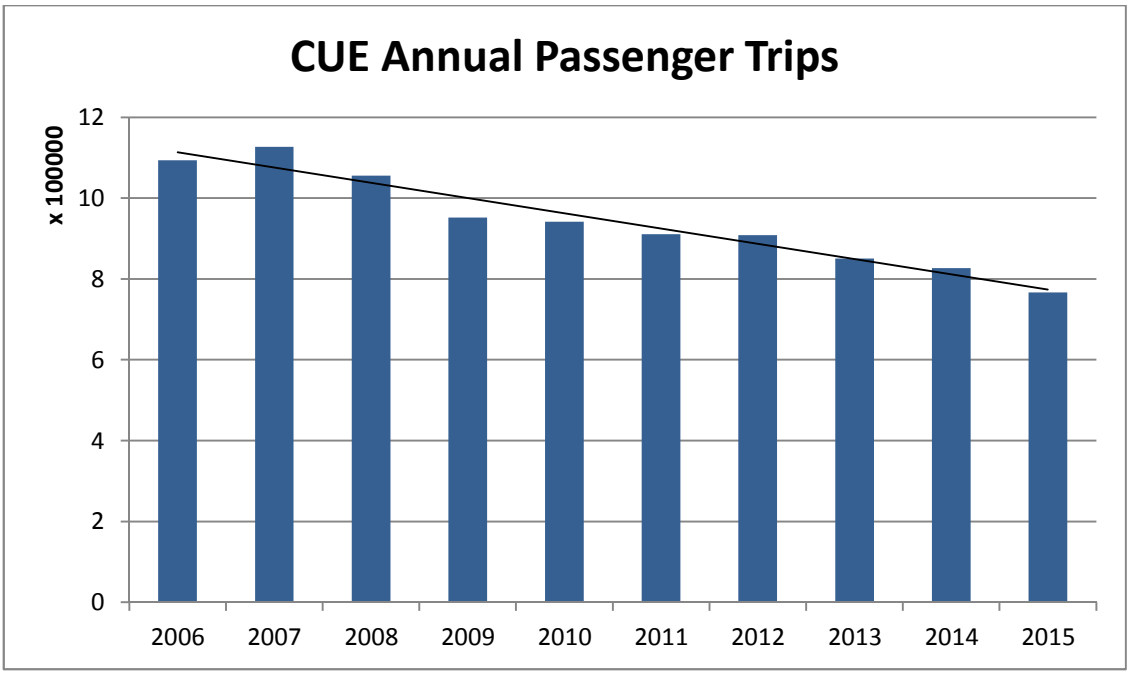
A closer look at the number of employed city residents and the city unemployment rate provided insights into year-over-year trends. Shown in Figure 3-13, the trend in the number of employed residents was similar to that of CUE ridership from 2006 to 2010. Both increased in 2007 and decreased in 2009 and 2010. However, the trends were contradictory from 2011 to 2015. While the number of employed residents increased, CUE ridership continued to decline.

Shown in Figure 3-14, the city's rise in unemployment rates also helped explain the decrease in CUE ridership from 2007 to 2010. However, CUE's ridership did not improve in 2011 and beyond, even as the city's unemployment rate fell. This data indicated that employment levels likely contributed to CUE's ridership decline in the first part of the decade – particularly the large decrease in 2009 – but not in recent years.

[25] Based on on-board survey conducted in April 2014 as part of the 2016 George Mason University and City of Fairfax Transit Study.

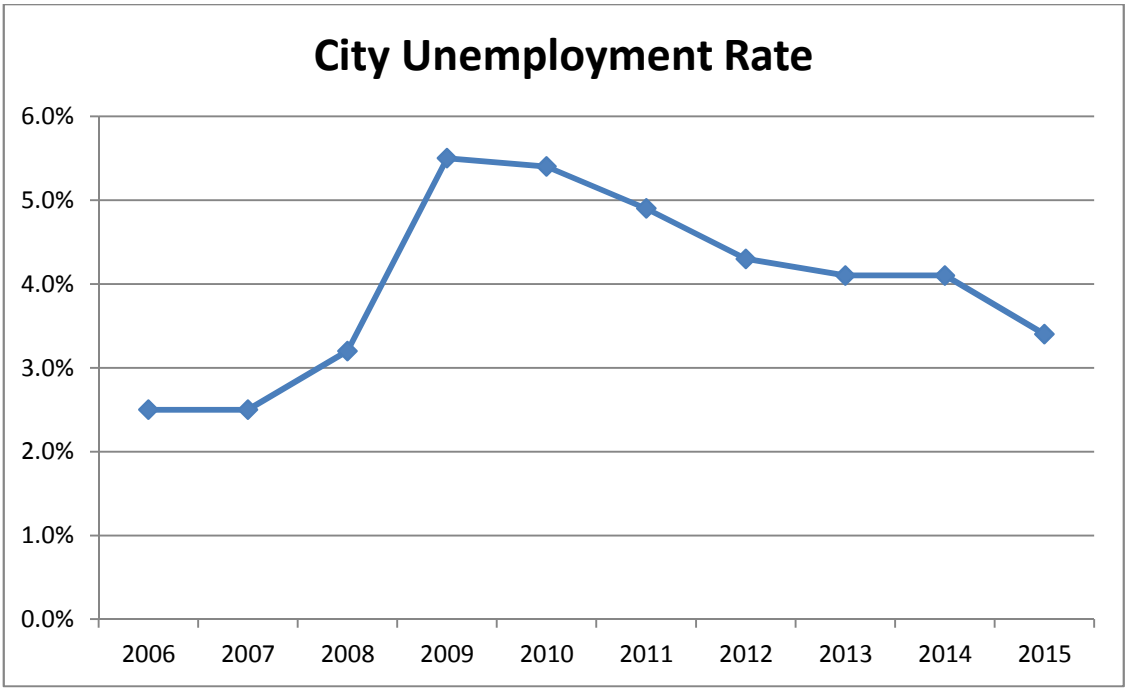
Figure 3-13: Trends in Employed City Residents and CUE Ridership

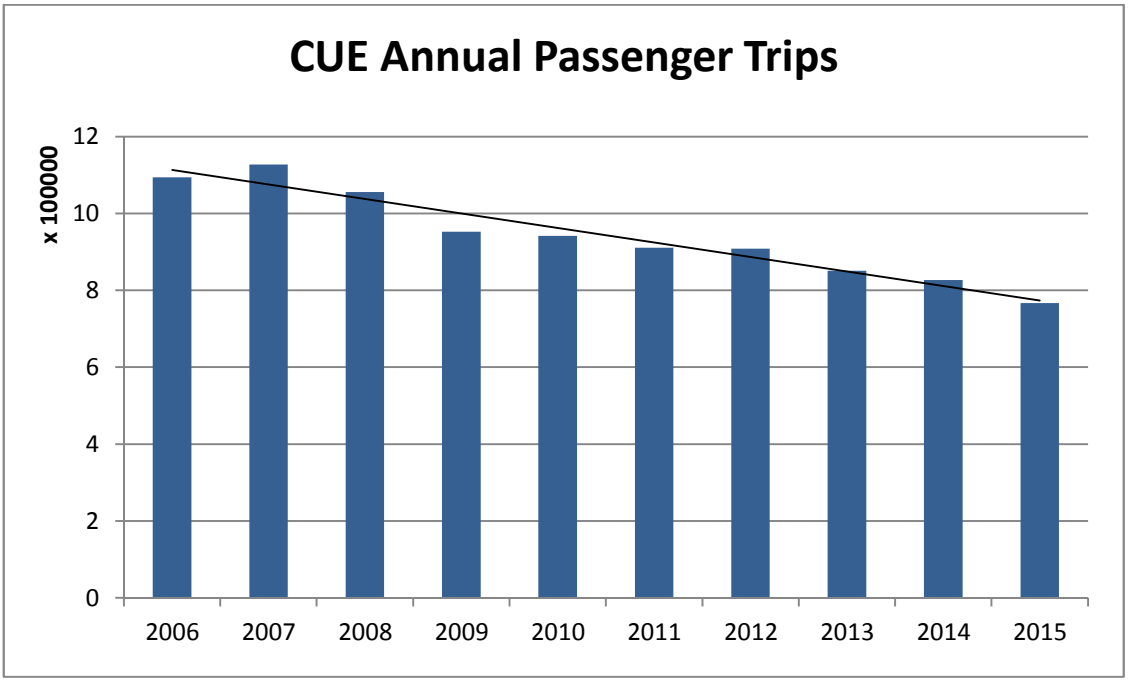




Sources: Virginia Employment Commission (Local Area Unemployment Statistics) and City of Fairfax 2015 CAFR.

Figure 3-14: Trends in City Unemployment Rate and CUE Ridership





Sources: Virginia Employment Commission (Local Area Unemployment Statistics) and City of Fairfax 2015 CAFR.

Another factor that possibly contributed to a decline in work related trips on CUE was changes in employer sponsored transit benefits, primarily distributed through WMATA's SmartBenefits program. The IRS sets the maximum allowable commuter benefit amounts for parking and public transportation costs. For five of the last ten years (2007, 2008, 2012, 2014, and 2015), the transit benefit was half of the parking benefit.[26] In those years, the difference in commuter benefits may have made driving more attractive to commuters and transit less attractive. For transit costs beyond the benefit amount, commuters had to pay out of pocket – which could be considerable for CUE riders commuting by Metrorail, as Vienna is an end of line station and Metrorail fares are distance based.

In reviewing year-over-year CUE ridership changes, the changes in transit benefits most likely impacted CUE ridership in 2014 and 2015. The allowable monthly transit benefit fell in 2014 from $245 to $130 and remained at the lower amount in 2015, corresponding to CUE ridership decreases in 2014 and 2015.

Ridership Trends by Route

The three-year trend in annual ridership by route including FY 2016 data is summarized in Table 3-7 and portrayed in Figure 3-15. All CUE routes experienced ridership decreases, with the largest declines on the Gold 2 and Gold 1 routes. The Gold routes experienced greater declines than the system average, while the Green routes experienced smaller declines over the three year period.

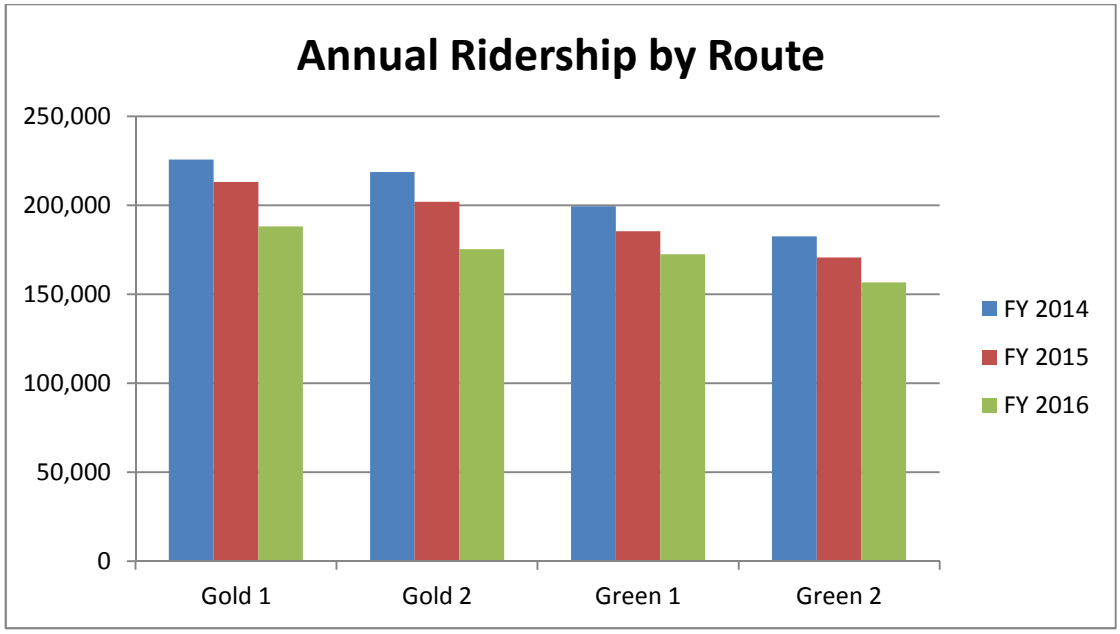
Table 3-7: Annual Ridership by Route (FY 2014 – FY 2016)

Route	FY 2014	FY 2015	FY 2016	3-Year Number Change	3-Year Percent Change
Gold 1	225,618	213,104	188,165	-37,453	-16.6%
Gold 2	218,713	201,965	175,398	-43,315	-19.8%
Green 1	199,356	185,358	172,437	-26,919	-13.5%
Green 2	182,552	170,732	156,649	-25,903	-14.2%
System Total	**826,239**	**771,159**	**692,649**	**-133,590**	**-16.2%**

Source: CUE ridership reports.

[26] Internal Revenue Service. Annual Employer's Tax Guide to Fringe Benefits.

Figure 3-15: Annual Ridership by Route (FY 2014 – FY 2016)



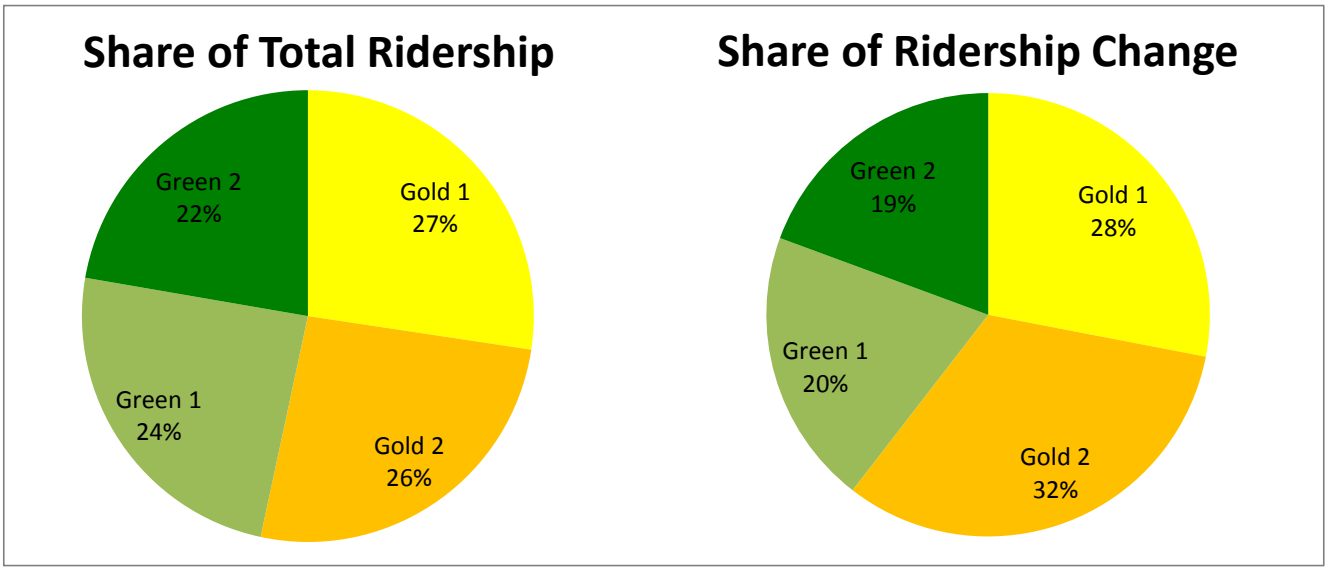
Source: CUE ridership reports.

The route-level trends were considered in the context of the proportion of system ridership that each route comprises. Figure 3-16 portrays the shares of system total ridership and system ridership change over the three year period. The larger ridership declines on the Gold routes may have been expected given they comprise larger shares of the system's ridership. However, when considering the proportion of the system's three-year ridership decrease attributable to each route, the Gold 2 lost notably more ridership than its share of system ridership; while the Green routes accounted for less of the system decline than their shares of system ridership. This finding points toward the need for extra effort to improve ridership on the Gold 2.

Outlined in Table 3-8, data on the route level ridership trends by day of the week showed that each route experienced different patterns of ridership loss over the three year period:

- The Gold 1 and Green 1 were fairly consistent in the amounts of ridership loss across the days of service, with the highest percentage losses in Sunday ridership (-19%).
- The Gold 2 experienced the largest loss in weekday ridership (-24%) and notable loss in Saturday ridership, but Sunday ridership was minimally impacted.
- The Green 2 experienced the highest loss in Sunday ridership (-29%), which was also the highest percentage change for the system by day. The weekday and Saturday ridership declines were comparable.

Figure 3-16: Share of System Ridership (FY 2014 – FY 2016 Average)



Source: CUE ridership reports.

Table 3-8: Average Daily Ridership by Route (FY 2014 – FY 2016)

	FY 2014			FY 2015			FY 2016			3-Year Change		
Route	Week-day	Sat.	Sun.	Week-day	Sat.	Sun.	Week-day	Sat.	Sun.	Week-day	Sat.	Sun.
Gold 1	788	291	171	730	283	162	652	245	138	-17.3%	-15.8%	-19.3%
Gold 2	791	266	158	690	275	164	602	225	152	-23.9%	-15.4%	-3.8%
Green 1	696	255	138	640	244	130	603	219	112	-13.4%	-14.1%	-18.8%
Green 2	630	245	153	585	232	129	541	213	108	-14.1%	-13.1%	-29.4%

Source: CUE ridership reports.

The amount of service provided on the routes remained stable in the past three years, so other factors including those discussed previously likely contributed to these ridership trends by day. The decline in ridership at the Vienna/Fairfax-GMU Metrorail Station and the improved service on Metrobus 29N were likely the main contributors, particularly to the loss in weekend ridership. Not only has the Vienna Metro experienced lower usage overall in recent years, but the level of weekend service provided across the Metrorail system has decreased in order to perform maintenance work and weekend ridership has declined accordingly.[27] The Metrobus

[27] Malouff, Dan. (September 9, 2013.) "Riders abandoning Metro on weekends." *Greater Greater Washington*. Accessed July 2016. Retrieved from http://greatergreaterwashington.org/post/20101/riders-abandoning-metro-on-weekends/.

29N also added new Sunday service, which directly overlaps with the CUE Green routes on Pickett Road connecting to the Vienna Metro.

Route Profiles

Table 3-9 summarizes the ridership productivity, cost-effectiveness, and on-time performance for each CUE route in FY 2015. The Gold 1 carried the most passengers in the system and performed best in productivity and cost-effectiveness. The Gold 2 performed the second best in these measures, followed by the Green 1 and Green 2, commensurate with their levels of ridership.

In terms of on time performance, the Gold 2 was in most need of improvement to meet the performance standard of 90%. FY 2016 data indicated improvements in on time performance for the Gold 2 (87%), Green 1 (92%), and Green 2 (91%) routes. In FY 2016 the Gold 2 remained the only route that did not meet the on time performance standard.

Table 3-9: FY 2015 Performance by Route

Route	Passenger Trips	Estimated Revenue Hours	Estimated Operating Expenses	Trips per Hour	Cost per Trip	On Time Performance at Vienna Metro
Gold 1	213,104	8,900	$943,400	24	$4.43	90%
Gold 2	201,965	8,700	$922,200	23	$4.57	84%
Green 1	185,358	8,800	$932,800	21	$5.03	89%
Green 2	170,732	8,300	$879,800	21	$5.15	90%

Note: Passenger trips and on time performance were directly provided by CUE. The study team estimated the annual revenue hours based on the daily scheduled hours and annual days of service, and also estimated the annual operating expenses using the revenue hours and system cost per hour (from the City of Fairfax 2015 CAFR). The system operating expenses using this approach were slightly higher than reported in the city CAFR, so the costs per trip shown above are anticipated to be slightly inflated.

Figures 3-17 through 3-20 present profiles of each CUE route including the major trip generators near the route.

Figure 3-17: Gold 1 Route Profile

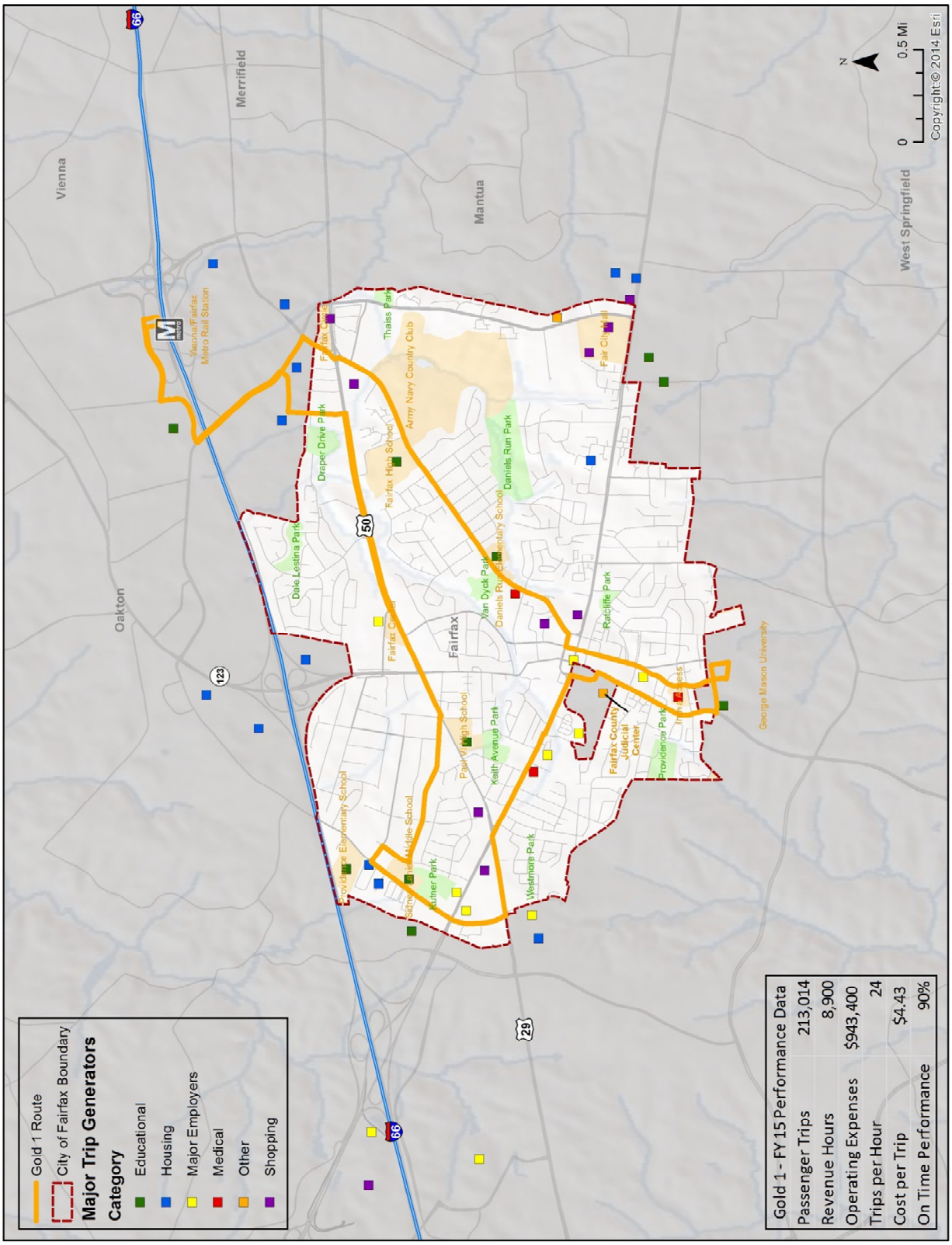


Figure 3-18: Gold 2 Route Profile

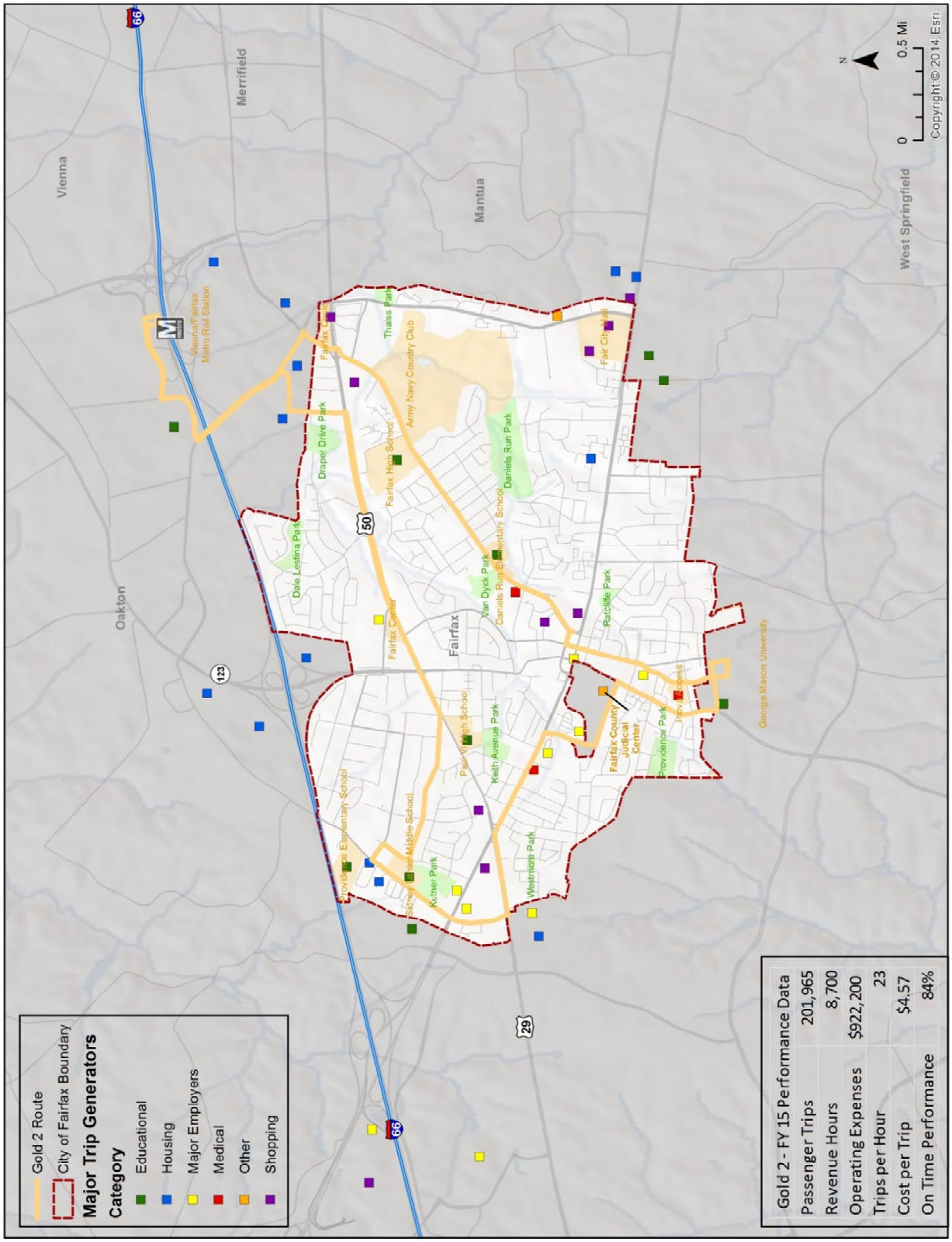


Figure 3-19: Green 1 Route Profile

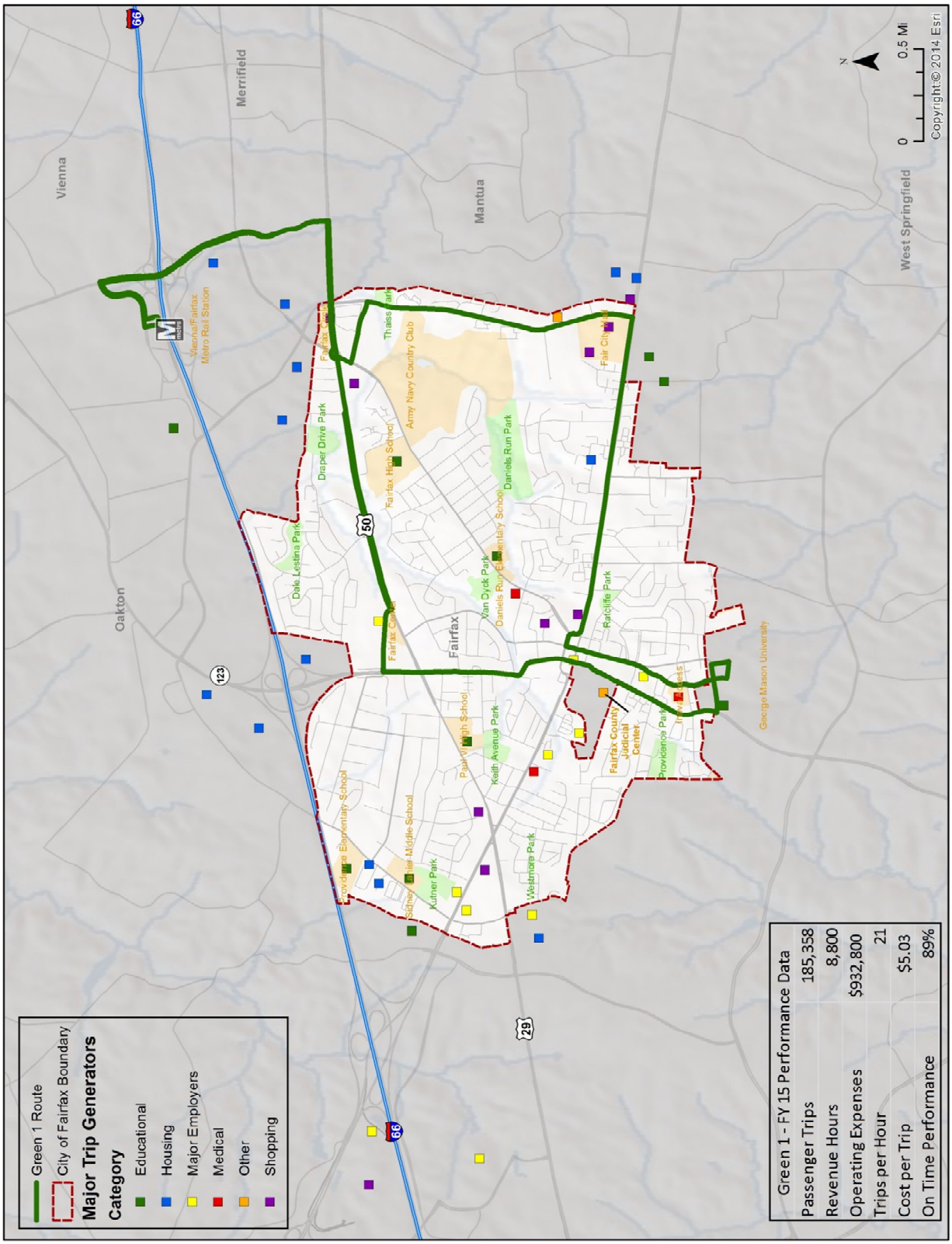
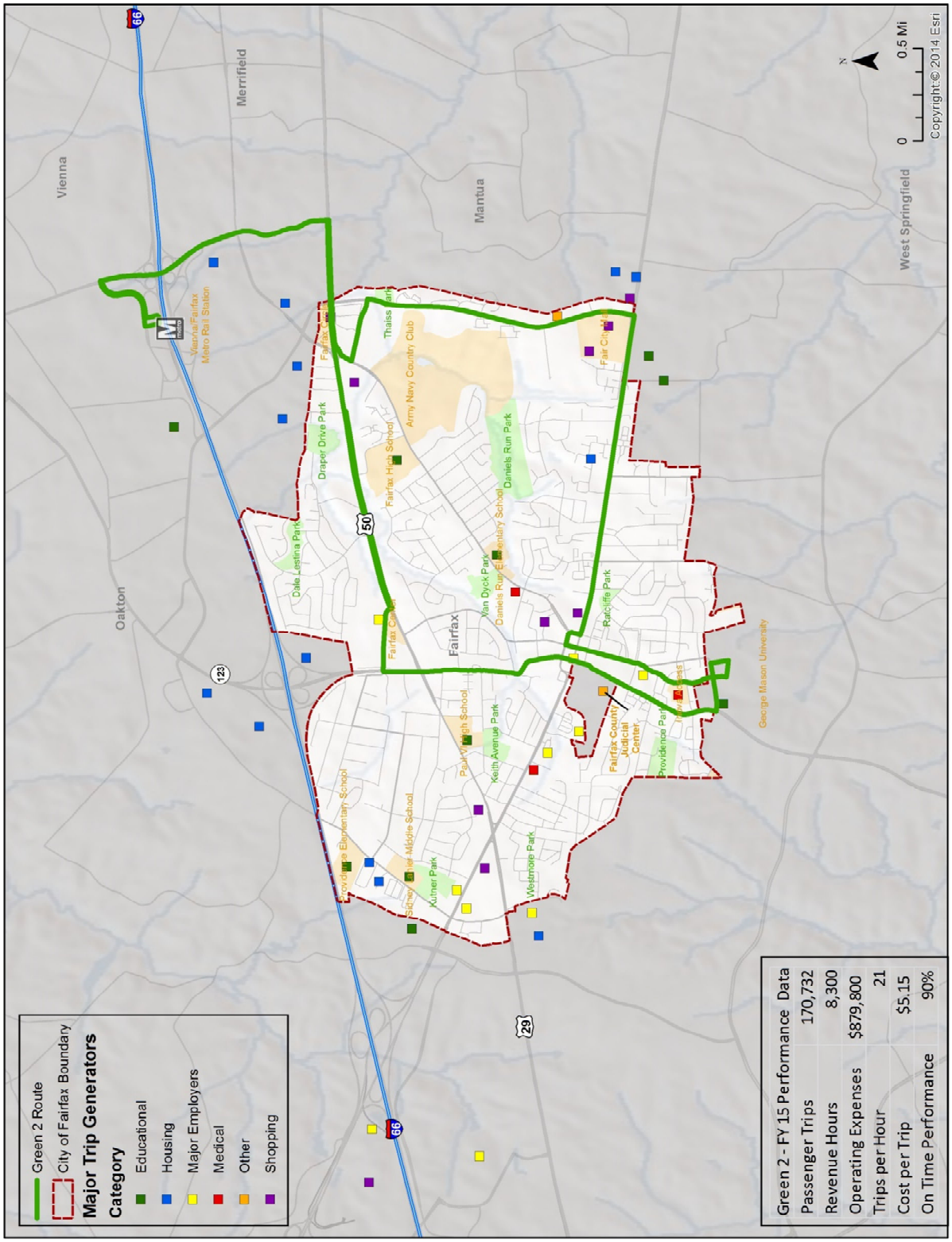


Figure 3-20: Green 2 Route Profile



Boarding/Alighting Counts

The 2016 *George Mason University and City of Fairfax Transit Study* conducted ridership counts on each CUE bus route to capture weekday and Saturday ridership activity. The counts were conducted by George Mason University Center for Social Science Research staff from March through May 2014. Exhibits 3-1 through 3-4 portray the ridership activity, including both boardings and alightings, by stop for each CUE route. Detailed tables of the counts by route and charts of the load by time period are included in Appendix A. Highlights regarding ridership activity along the routes are summarized below:

- On all routes the highest activity stops were at Mason (Rappahannock River Lane) and the Vienna Metro.

- Gold Routes

    - On weekdays the entire western half of the route from Chain Bridge Road to Fairfax Boulevard at Eaton Place experienced decent ridership activity, with high ridership activity observed along Jermantown Road. On the eastern half of the route, notable ridership activity occurred near Fairfax Circle and Old Lee Highway from Layton Hall Drive to Old Town Square.

    - Observed Saturday ridership was 35-40% lower than weekday ridership.

    - On Saturday ridership activity was more evenly distributed along the route, with high activity at shopping centers (Lee Highway and Jermantown Road) and residential areas (Jermantown Road and Old Lee Highway near the Army Navy Country Club).

- Green Routes

    - On the Green 1 more weekday ridership activity occurred on the eastern part of the route, particularly near Fairfax Circle, at the shopping centers on Pickett Road, and along Main Street, than on the western part. Aside from the Metro station and Mason, the highest boardings occurred at Fairfax Circle and the residential areas on the eastern end of Main Street. A significant amount of alightings occurred in Old Town Fairfax.

    - On the Green 2 weekday ridership was distributed more evenly along the route with similar high activity stops as the Green 1, including Fairfax Circle and the Pickett Road shopping centers.

    - Observed Saturday ridership was 55-60% lower than weekday ridership.

- The highest activity areas on Saturday were similar to weekday service. On the Green 1 a relatively high number of boardings was observed on Chain Bridge Road in Old Town in the direction of Vienna Metro. On the Green 2 fewer riders boarded at Mason and the highest boardings occurred at Foxcroft Apartments.

Trip patterns can be difficult to discern from the on/off counts, but CUE staff reported that the eastern part of the Gold routes along Old Lee Highway is primarily used for trips between Mason and the Vienna Metro; users take the Gold 1 or Gold 2 depending on their direction of travel. The Green routes and the western part of the Gold routes are used for local trips within the city beyond those originating or ending at Mason or Vienna Metro.[28]

The study team also reviewed the boarding/alighting counts to identify CUE stops with relatively high ridership that could be candidates for new bus shelters, shown in Table 3-10. Seven stops had more than 25 weekday boardings and may be considered first for new shelters. The other listed stops had 15 or more weekday boardings and may be considered for shelters as resources become available.

[28] An important distinction as the boarding/alighting counts included in the appendix made it appear as though all rider trips originated or ended at Mason or the Vienna Metro.

Table 3-10: Existing CUE Stops – Candidates for Bus Shelters

CUE Stop	Observed Weekday Boardings	Served By	Direction
Lee Highway and Rust Road	32	Gold 2	Outbound to Mason
Nutley St. at Pan Am Shopping	30	Green 1/2	Outbound to Mason
Jermantown Rd. at Gainesborough Ct.	29	Gold 2	Outbound to Mason
Lee Highway at Arthur Teachers	27	Gold 1	Outbound to Mason
Blake Ln. at Knightsbridge Dr.	26	Gold 1/2	Outbound to Mason
Main St. at Lyndhurst	26	Green 1	Outbound to Mason
Old Lee Highway at Willard Way	26	Gold 2	Inbound to Vienna Metro
Old Lee Highway at Old Pickett Rd.	22	Gold 2	Inbound to Vienna Metro
Jermantown Rd. at Comfort Inn	21	Gold 1	Inbound to Vienna Metro
Jermantown Rd. at James Swarts	20	Gold 1	Inbound to Vienna Metro
Nutley St. at Hermosa Drive	20	Green 1/2	Outbound to Mason
Jermantown Rd. at Fair Haven Ct.	19	Gold 2	Outbound to Mason
Jermantown Rd. at Kutner Park	18	Gold 2	Outbound to Mason
Main St. at Hallman St.	18	Gold 1	Inbound to Vienna Metro
Jermantown Rd. at Main St.	17	Gold 2	Outbound to Mason
Fairfax Blvd. at Chain Bridge Rd.	16	Gold 2	Outbound to Mason
Main St. at Fairfax Building	16	Gold 1	Inbound to Vienna Metro
Warwick Ave. at Meredith Dr.	16	Gold 1	Inbound to Vienna Metro
Blake Lane at Blake Lane Loop	15	Gold 1	Outbound to Mason
Blake Ln. at Lindenbrook Street	15	Gold 1/2	Inbound to Vienna Metro
Eaton Pl. at Best Western Hotel	15	Green 1	Inbound to Vienna Metro
Eaton Pl. at Office Park	15	Green 2	Outbound to Mason
Main St. at Tedrich Blvd.	15	Green 1	Outbound to Mason
Old Lee Highway at Library	15	Gold 1	Outbound to Mason
Old Pickett Rd. at Home Depot	15	Green 1	Outbound to Mason
Pickett Rd. at Colonial Ave.	15	Green 1	Outbound to Mason

Exhibit 3-1: Gold 1 Boardings and Alightings (2014)

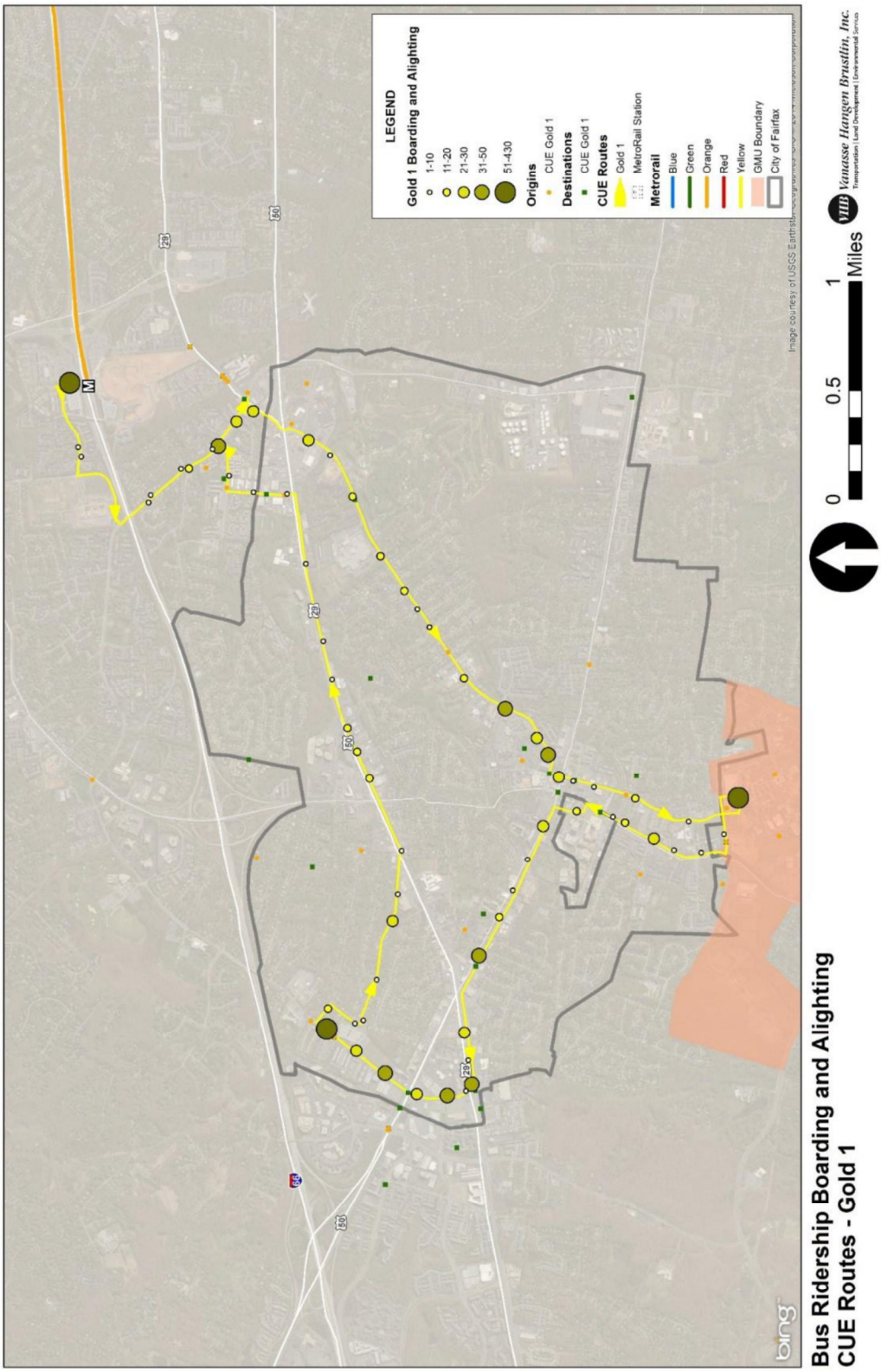


Exhibit 3-2: Gold 2 Boardings and Alightings (2014)

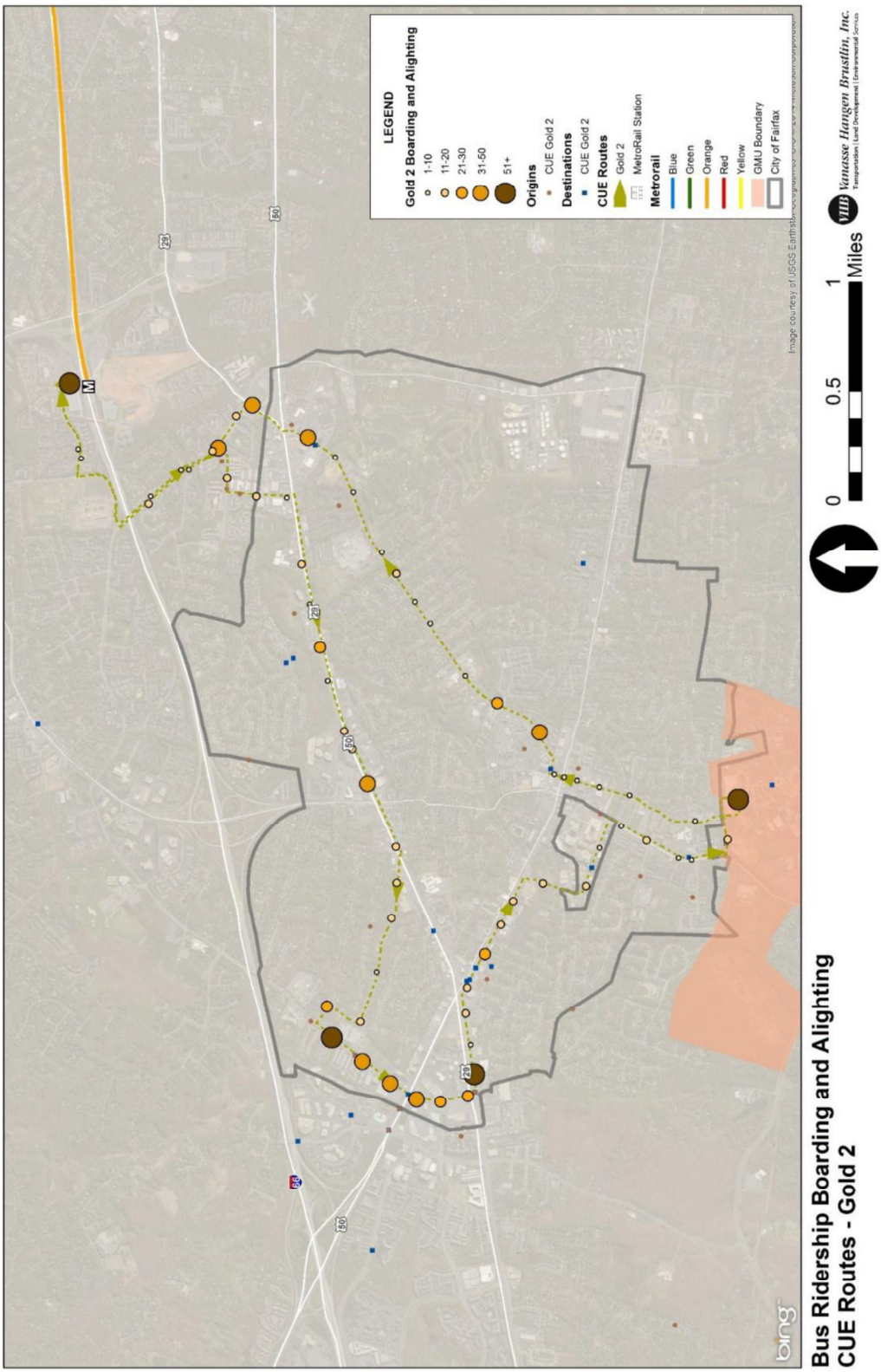


Exhibit 3-3: Green 1 Boardings and Alightings (2014)

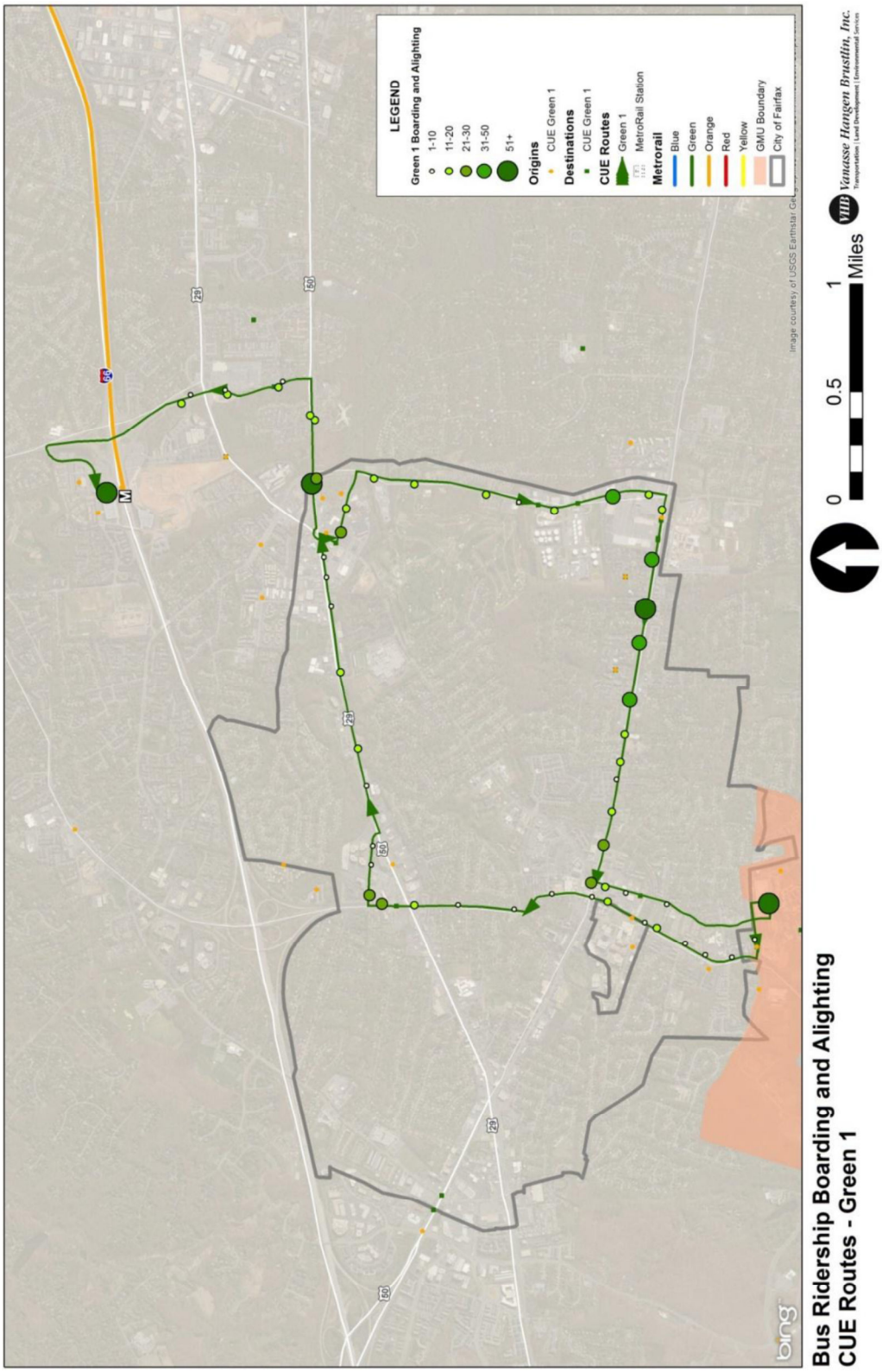
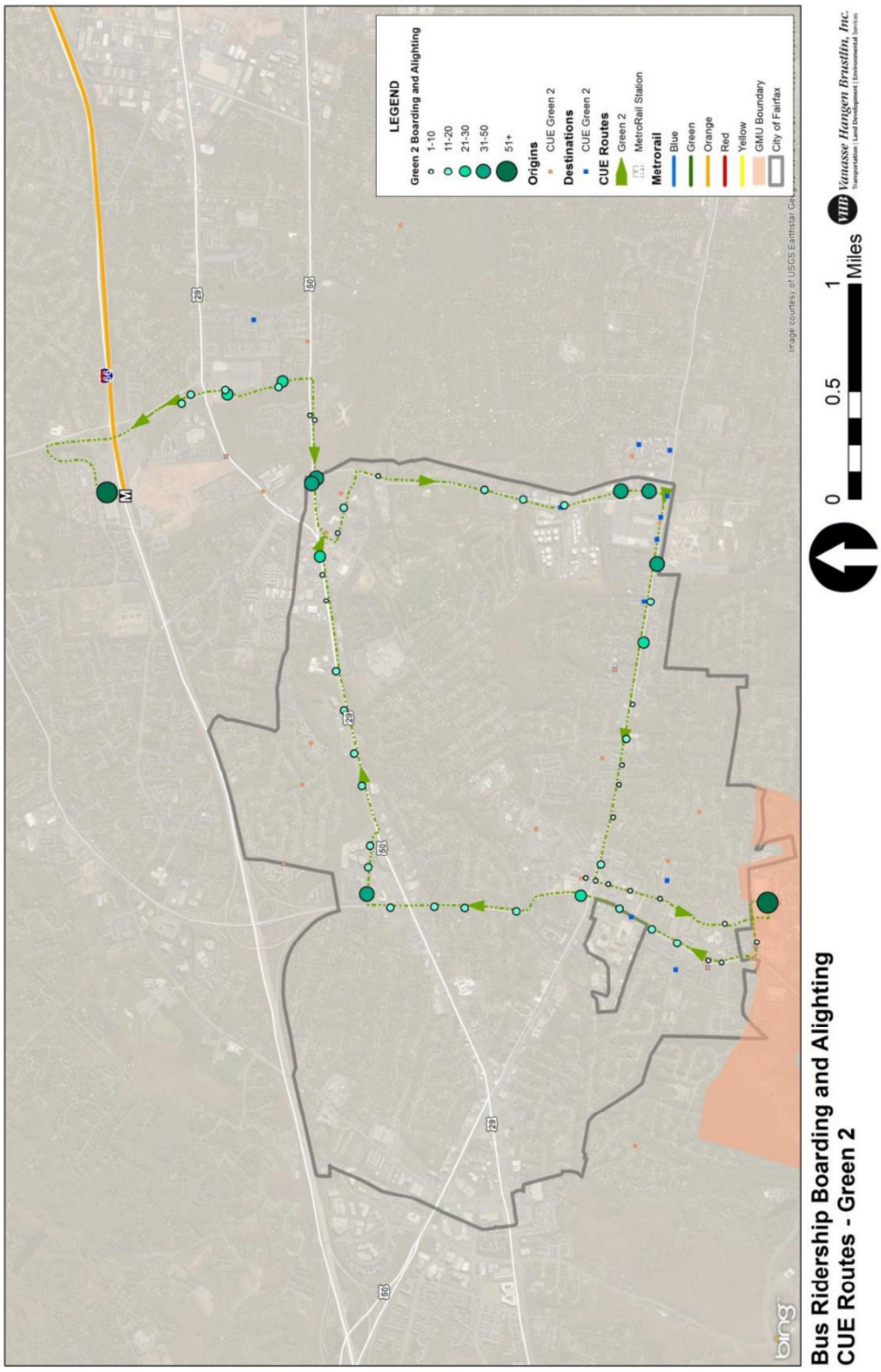


Exhibit 3-4: Green 2 Boardings and Alightings (2014)



Paratransit Service

City residents who are unable to use fixed route transit service due to a disability have several transportation options including the city's City Wheels program, Fairfax County's Fastran specialized transportation service, and WMATA's MetroAccess service. The City of Fairfax contracts with taxi companies to provide trips within the city limits and to Mason, the Vienna/Fairfax-GMU Metro station, and Fair Oaks Hospital. For trips to a destination in Fairfax County, the city's Human Service Coordinators certify eligible residents and refer them to Fastran. For other trips in the region, eligible residents may use WMATA's MetroAccess service as long as the origin and destination are located within three-quarters of a mile of Metrorail or Metrobus service and the trip occurs during the same hours of operation.

Table 3-11 summarizes the usage of the City Wheels program over the last five years. In FY 2016 City Wheels provided 150 trips. This represented a 35% decline over the five-year period, with a peak of 300 trips in FY 2013. Accordingly the costs to the city and the clients decreased by about 30% in the last five years. In FY 2016 the city subsidy for City Wheels was $9.36 per trip on average. The city's FY 2017 adopted budget decreased the funding for City Wheels by half, to $2,500, to better reflect recent demand.

The number of registered City Wheels clients has remained constant, at 32, during this time, though only a fraction actually use the service. Not only has the number of active clients declined by half in the past five years, but a review of the most recent years' data indicated that one or two users account for the majority (80-85%) of City Wheels trips and the other clients take occasional trips.

Table 3-11: City Wheels Trend Data

Fiscal Year	Number of Rides	Total Costs - City	Total Costs - Clients	Number of Registrants	Number of Active Clients	Subsidy per Trip
2012	230	$1,922	$736	32	11	$8.36
2013	304	$2,770	$973	32	12	$9.11
2014	270	$2,606	$864	32	7	$9.65
2015	216	$2,082	$691	32	6	$9.64
2016	150	$1,403	$480	32	5	$9.36
5-Year Change	-34.8%	-27.0%	-34.8%	0%	-54.5%	11.9%
3-Year Change (2014-16)	-44.4%	-46.1%	-44.4%	0%	-28.6%	-3.1%

Source: City of Fairfax.

Figure 3-21 displays the origins and destinations of City Wheels trips in FY 2016, along with the frequency of travel for specific trips. Residents currently use City Wheels service for trips to the Vienna/Fairfax-GMU Metrorail Station, medical appointments within the city and at Inova Fair Oaks Hospital, the pharmacy, and shopping centers.

Table 3-12 summarizes the operating data for MetroAccess trips taken by city residents in the last three years. In FY 2016 Fairfax residents took nearly 5,600 trips on MetroAccess. Fairfax residents have taken 15% more MetroAccess trips in the past three years, compared to a 44% decline in City Wheels trips over the same period. The number of city residents registered with MetroAccess has also increased by about 30%. The city's total subsidy and the subsidy per trip for MetroAccess service has declined since FY 2014, but the subsidy per trip remains five times higher than for City Wheels trips. Note that the city's subsidy for MetroAccess is covered by state funding held in trust by NVTC.

Table 3-12: Trend Data on MetroAccess Service for City of Fairfax Residents

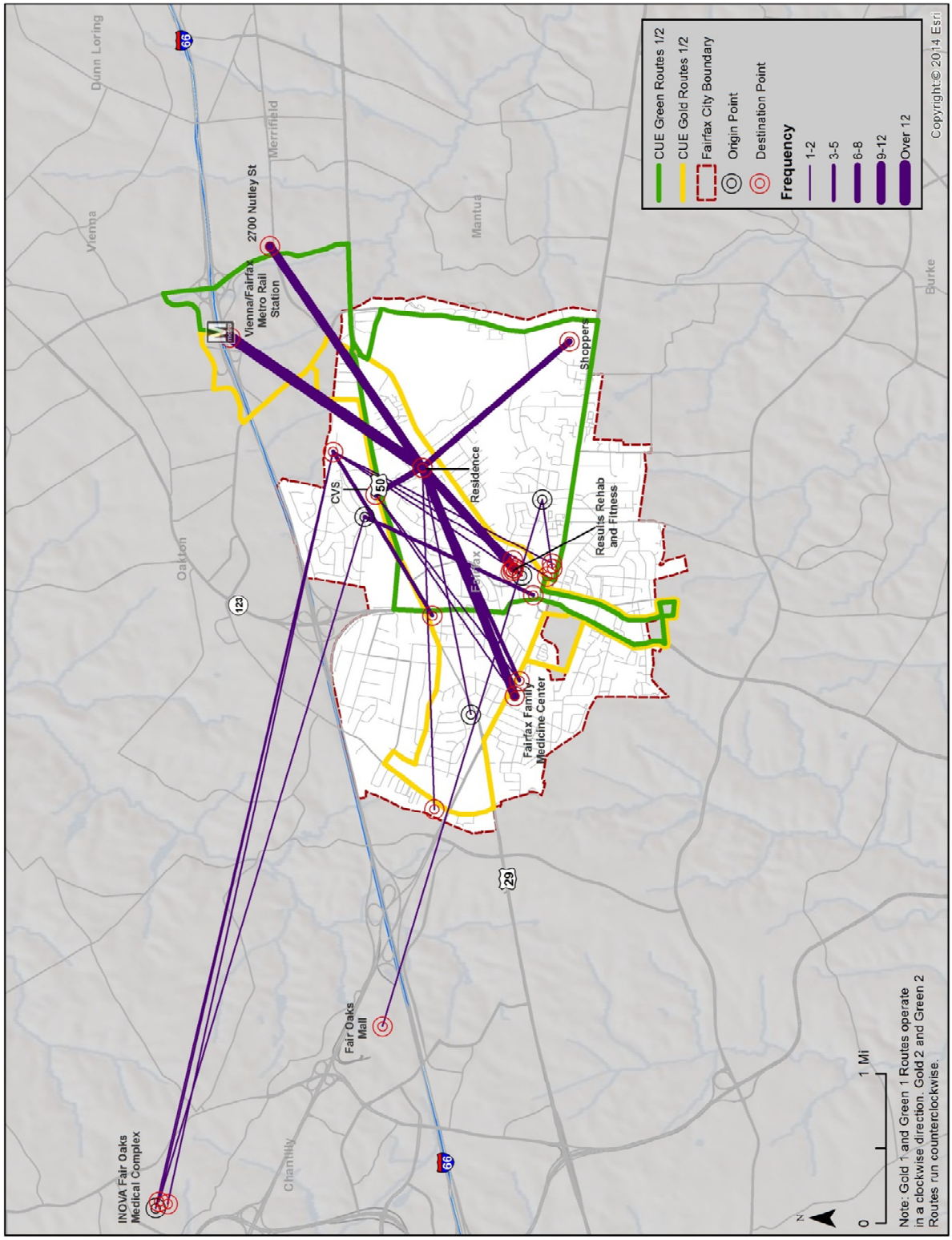
Fiscal Year	Trips Completed	City MetroAccess Subsidy	Fares Collected	Number Registrants	Subsidy per Trip
2014	4,841	$289,621	$10,577	91	$59.83
2015	5,017	$290,195	$10,468	103	$57.84
2016	5,563	$268,822	$11,549	118	$48.32
3-Year Change	14.9%	-7.2%	9.2%	29.2%	-19.2%

Notes: Annual data for FY 2014 estimated based on February through June 2014 data. The number of registrants represents the average number of registrants per month that year.

MetroAccess plays an important role in meeting the needs of city residents whose disabilities prevent them from using fixed route services. City Wheels also plays this role but to a smaller extent given the program's limited service area. FY 2016 data indicated that city residents are using MetroAccess for longer trips, 17 miles on average. (For reference, a one-way trip from Old Town Fairfax to downtown D.C. is about 20 miles.) Another key distinction between the two services is that MetroAccess meets the federal requirement for fixed route transit providers to provide ADA complementary paratransit services (according to USDOT regulation 49 CFR Part 37, Transportation Services for Individuals with Disabilities). City Wheels service, as it's currently provided, does not meet this requirement because 1) the program service area is smaller than that required for ADA complementary paratransit service – ¾ mile on either side of the fixed routes, and 2) the taxi contractors do not use accessible vehicles.

City Wheels meets the local transportation needs of city residents with disabilities in a more cost-effective way than MetroAccess. For this reason the study team recommends continuing

Figure 3-21: City Wheels Trip Origins and Destinations in FY 2016



the City Wheels program and promoting it to serve more residents and to meet specific unmet needs, including transportation for older adults and service to major destinations.

During the community outreach process for this TDP update, stakeholders identified transportation needs for older adults to access the Osher Lifelong Learning Institute (OLLI) at Mason and Green Acres Senior Center. The OLLI headquarters is located on Roberts Road, which has a large hill that poses dangerous conditions for elderly drivers and pedestrians crossing the street to reach OLLI. OLLI is located a half-mile from the CUE Green routes, and portions of the road have no sidewalks. Green Acres Senior Center is located on Sideburn Road, a one-third mile walk from the CUE stop on Rappahannock River Lane. Most of the path has sidewalks but requires walking through a parking lot and a cleared path in a wooded area. Neither of these locations is very accessible by existing CUE service, but could potentially be served through City Wheels.

The City's Human Services Coordinator also identified a need for low income individuals to get to the Fairfax County Government Center to sign up for social services. Currently individuals that live along Fairfax Boulevard have a one-seat ride using Metrobus route 1C. Residents in other parts of the city must take CUE and transfer to the 1C. Route 1C service runs at 30-minute frequencies during the peak periods and hourly during the off-peak period.[29] The travel time by transit can be three to five times longer than driving.

To clarify, MetroAccess would continue to meet the ADA complementary paratransit service requirement for the city, while an expanded City Wheels program would provide a cost-effective transportation option for eligible city residents. Neighboring jurisdictions including Fairfax County, Arlington County, and the City of Alexandria also operate their own paratransit service programs, which provide accessible trips at a lower cost and subsidy requirement for the municipalities.

PEER ANALYSIS

The purpose of this peer review was to compare CUE's performance with a group of similar transit agencies. The peer review helped identify areas in which CUE is performing better than its peers and areas that it is lagging.

CUE is a small and unique transit system, which operates two bi-directional routes within a six-mile square radius. Mason is a partner and major trip generator for CUE services, and the routes operate as feeder service to the Vienna/Fairfax-GMU Metrorail Station. It was difficult to identify peer agencies that match all these characteristics. Neighboring transit agencies may have routes similar to CUE's routes, but the systems serve larger areas and provide more diverse types of services. Smaller size systems elsewhere in Virginia may serve universities or

[29] Based on the schedule effective June 2016.

colleges, but do not provide feeder service to rail or face the same costs as operating in the D.C. region. In selecting the peers the study team prioritized transit agencies in the D.C. region, which serve suburban settings, provide feeder service to Metrorail, and face similarly high labor costs. In addition Annapolis Transit, Arlington Transit, DASH, and Harford Transit have a university or college presence in their service areas.

The following six transit agencies were used in this peer review:

- Annapolis Transit, City of Annapolis, Maryland
- Arlington Transit (ART), Arlington County, Virginia
- DASH, City of Alexandria, Virginia
- TransIT, Frederick County, Maryland
- Harford Transit, Harford County, Maryland
- Regional Transportation Agency of Central Maryland (RTA), serving Howard County, Anne Arundel County, Northern Prince George's County, and the City of Laurel, Maryland

The Federal Transit Administration's (FTA) National Transit Database (NTD) was used to compile data for this peer review. The study team assessed data from the agencies' FY 2014 annual profiles including service area statistics and bus-only operations and performance data. The key findings from the peer review were as follows:

- With nearly 827,000 passenger trips in 2014, CUE's ridership fell in the middle of the peer group.

- CUE's passenger trips per revenue hour, at 24.53, was the second highest among the peer group and well above the mean. CUE was one of the most productive agencies when compared to its peers.

- CUE's total operating expenses were the second lowest in the peer group, while its fare revenues including Mason's contribution were the third highest.

- CUE's passenger cost per trip, $4.17, was among the top three most cost-effective in the peer group and below the mean.

- CUE's farebox recovery ratio was 37.54%, the highest ranking among the peer group and notably higher than the mean of 21.47%. Fares and Mason's contribution covered more than one-third of CUE's operating costs.

- CUE's cost per revenue hour, $102.24, was the highest among its peers, 17% more than the next most expensive cost per hour.

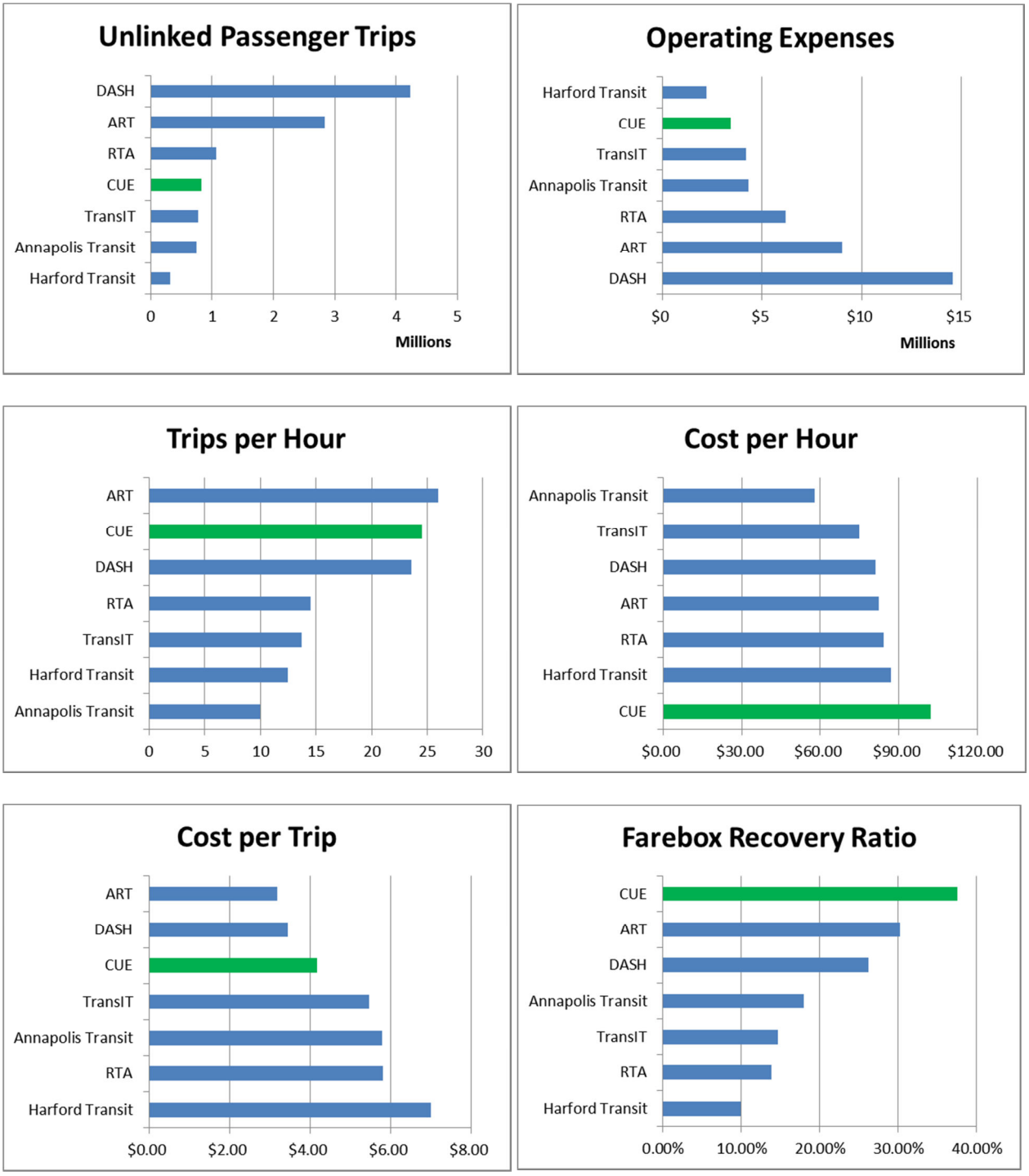
- CUE's cost per mile, $7.82, was third highest in the peer group and slightly greater than the mean.

The peer comparisons for select performance measures are portrayed in Figure 3-22. The complete peer data are presented in Table 3-13.

CUE generally performed well, particularly in ridership productivity and farebox recovery, in comparison to peer agencies in the D.C. region. The peer analysis found mixed performance in cost-effectiveness. CUE performed better than average in cost per trip, but worse than average in cost per mile and cost per hour. CUE's cost per revenue hour has increased by 20% in the last five years, mainly due to accounting for the city management fee starting in FY 2014 and due in part to increased personnel and vehicle maintenance costs. It is possible that the costs reported for some of the peers that contract out service (e.g., ART, DASH) do not include costs associated with oversight and administration (e.g., human resources, insurance), therefore the NTD derived costs per hour are understated. These peers also operate three to five times more revenue hours than CUE, and may be able to deliver more cost-effective service given economies of scale.

While not considered an industry peer, Mason Shuttles' performance was also compared to CUE as the two systems provide similar service connecting Mason and the Vienna/Fairfax-GMU Metro station. Summarized in Table 3-14, 2013 data for the Mason Shuttles system was compared to 2014 NTD data for CUE. CUE performed better than Mason Shuttles in productivity (9.37 more trips per hour) and cost per trip ($1.27 less per trip). However CUE's cost per hour was 24% more than that of Mason Shuttles, which contracts with Reston Limousine to operate the service.

Figure 3-22: CUE Performance against Peers for Select Measures



Source: 2014 NTD.

Table 3-13: Selected Peer Comparison

Agency	Service Area Pop.	Number Vehicles in Peak Service	Unlinked Passenger Trips	Revenue Miles	Revenue Hours	Operating Expenses	Fare Revenues
Annapolis Transit	130,600	17	748,205	806,508	74,828	$4,340,144	$778,860
Arlington Transit	210,000	39	2,837,023	1,094,223	109,343	$9,025,423	$2,726,909
City of Fairfax CUE	22,565	8	826,747	440,755	33,697	$3,445,055	$1,293,130
DASH (Alexandria)	139,966	60	4,238,784	1,530,544	179,684	$14,585,357	$3,822,560
TransIT (Frederick)	65,787	16	770,028	635,027	56,277	$4,215,177	$617,511
Harford Transit	218,590	15	313,676	463,141	25,196	$2,195,313	$217,294
RTA Central MD	284,952	17	1,062,781	1,111,266	73,246	$6,175,714	$853,192
Mean	**153,209**	**25**	**1,542,463**	**868,781**	**78,896**	**$6,283,169**	**$1,472,779**

Agency	Trips per Hour	Trips per Mile	Cost per Trip	Cost per Hour	Cost per Mile	Farebox Recovery Ratio
Annapolis Transit	10	0.93	$5.80	$58.00	$5.38	17.95%
Arlington Transit	25.95	2.59	$3.18	$82.54	$8.25	30.21%
City of Fairfax CUE	24.53	1.88	$4.17	$102.24	$7.82	37.54%
DASH (Alexandria)	23.59	2.77	$3.44	$81.17	$9.53	26.21%
TransIT (Frederick)	13.68	1.21	$5.47	$74.90	$6.64	14.65%
Harford Transit	12.45	0.68	$7.00	$87.13	$4.74	9.90%
RTA Central MD	14.51	0.96	$5.81	$84.31	$5.56	13.82%
Mean	**17.82**	**1.57**	**$4.98**	**$81.47**	**$6.84**	**21.47%**

Source: 2014 NTD.

Table 3-14: CUE Comparison with Mason Shuttles

Agency	Service Area Population	Unlinked Passenger Trips	Revenue Hours	Operating Expenses	Trips per Hour	Cost per Trip	Cost per Hour
City of Fairfax CUE	22,565	826,747	33,697	$3,445,055	24.53	$4.17	$102.24
Mason Shuttles	33,917	553,982	36,547	$3,011,585	15.16	$5.44	$82.40

Note: Mason Shuttles' service area population represents total Mason enrollment in Fall 2013. (Source: GMU Factbook 2013-2014.)
Sources: 2016 George Mason University and City of Fairfax Transit Study for Mason Shuttles data, and 2014 NTD for CUE data.

FINANCIAL ANALYSIS

Funding Sources

CUE is funded through local and state sources. Local funding sources include revenues from fares and advertising, NVTA 30% monies, and a contribution from Mason. State funding from DRPT is held in trust by NVTC on behalf of the city. This state funding includes state assistance for the local transit systems (operating and capital) and revenue generated from a 2.1% regional gas tax, which is dedicated for WMATA operating and capital expenses.[30] The City of Fairfax has an account at NVTC, which receives and disburses funding for CUE and the city's share of WMATA bus and rail services.

Operating Budget

The FY 2015 operating budget for CUE was $3.48 million. In FY 2015 state funding accounted for 23% of CUE's budget, local funding from NVTA 30% monies contributed 42%, Mason contributed 19%, and fares accounted for about 16%.[31] Operating revenues, including CUE fare revenue and Mason's contribution, have consistently covered about 40% of CUE's operating expenses in recent years.

Table 3-15 outlines CUE's budget for FY 2012 – FY 2015. The state funding that DRPT provides to WMATA on the city's behalf was not included in these budgets.

[30] NVTC. *Programs and Projects, Financial Management*. Retrieved from http://www.novatransit.org/programs/
[31] Percentages calculated based on revenue side of the budget, which totaled $3.76 million in FY 2015, whereas the operating expenses totaled $3.48 million.

Table 3-15: CUE FY 2012-FY 2015 Operating Budget

	FY 2012	FY 2013	FY 2014	FY 2015
Operating Expenses				
Salaries	$ 1,557,931	$ 1,529,670	$ 1,498,210	$ 1,559,148
Fringe Benefits	$ 563,035	$ 575,836	$ 594,997	$ 628,743
Contractual Services	$ 66,209	$ 61,101	$ 42,759	$ 18,967
Internal Services	$ 543,540	$ 732,050	$ 1,231,771	$ 1,181,703
Other Operating Expenses	$ 57,735	$ 60,193	$ 63,754	$ 55,633
Depreciation and Amortization	$ 189,477	$ 167,489	$ 41,004	$ 37,015
Total Operating Expenses	**$ 2,977,927**	**$ 3,126,339**	**$ 3,472,495**	**$ 3,481,209**
Operating Revenues				
CUE Bus Receipts	$ 606,669	$ 604,232	$ 573,091	$ 581,394
Advertising	$ 1,600	$ 100	$ -	$ 3,357
City Wheels	$ 832	$ 1,011	$ 1,088	$ 416
Miscellaneous	$ 9	$ -	$ -	$ -
Mason Contribution	$ 540,000	$ 720,000	$ 720,000	$ 720,000
Total Operating Revenues	**$ 1,149,110**	**$ 1,325,343**	**$ 1,294,179**	**$ 1,305,167**
Net Deficit	**$ 1,828,817**	**$ 1,800,996**	**$ 2,178,316**	**$ 2,176,042**
Funding Assistance				
State Funding (transfer from NVTC)	$ 1,039,435	$ 1,122,784	$ 224,602	$ 855,874
Local Funding – General Fund	$ 428,000	$ 115,181	--	--
Local Funding – NVTA 30%	--	--	$ 1,275,000	$ 1,590,000
Total Funding Assistance	**$ 1,467,435**	**$ 1,237,965**	**$ 1,499,602**	**$ 2,445,874**

Source: City of Fairfax CAFR for FY 2012 through FY 2015, and annual city budgets for revenue data.

Capital Budget

CUE's capital budget is included in the Transportation section of the city's Capital Improvement Program, which is updated annually during the city's budget process. In FY 2015 CUE's capital budget included $200,000 for hybrid bus batteries and $3 million to purchase six clean diesel replacement buses. In FY 2016 the only item in CUE's capital budget was $200,000 for the new electronic payment program (NEPP), a new fare collection system that would be integrated with WMATA and other regional transit agencies.[32] However this project was cancelled in April 2016. The city continues to work with other regional transit agencies on farebox upgrades since the technology has become obsolete.

[32] City of Fairfax Adopted Budget FY 2016.

The Capital Improvement Program in the city's FY 2018 Proposed Budget included:

- $100,000 for farebox upgrades in FY 2018
- $200,000 for transit improvements including new bus shelters, transit screens, and passenger amenities – contingent on receiving I-66 Inside the Beltway funds
- $3.6 million for replacement buses in FY 2021.[33]

Funding sources for CUE's capital projects include federal, state, and NVTC funding.

RECENT COMPLIANCE RESULTS

CUE does not receive any federal funding, and therefore has not undergone an FTA Triennial Review.

ANALYSIS OF DEMOGRAPHICS AND LAND USES

The study team analyzed current and future population trends in the study area, including a demographic analysis of population groups that often depend on transportation options beyond the automobile. In an effort to explore potential transit needs in areas directly adjacent to the city, where residents could access CUE, the study area for this analysis extended one-quarter mile[34] around the city into Fairfax County with I-66 being a northern boundary. This analysis included data sources from the 2010 U.S. Census and the American Community Survey (ACS) 2010-2014 5-year estimates.

Population Analysis

The following section provides a general population profile for the study area and identifies and evaluates underserved population subgroups.

Total Population

Table 3-16 shows the U.S. Census population counts for City of Fairfax from 1990 to 2010, compared with Fairfax County and the commonwealth. During this time both the city and the county experienced population increases. The City of Fairfax's population increased by about 3,000 persons or 15%, while Fairfax County's population increased by about 263,000 persons or

[33] City of Fairfax Proposed Budget FY 2018.
[34] Where a part of a Census block group intersected with the quarter-mile buffer around the CUE routes, the entire block group was included as part of the study area.

32%. The city's level of population growth over the 20 year period was about half that of the county and the state.

Table 3-16: Historical Populations

Place	1990 Population	2000 Pop.	2010 Pop.	1990-2000 % Change	2000-2010 % Change	1990-2010 % Change
City of Fairfax	19,622	21,498	22,565	9.6%	5.0%	15.0%
Fairfax County	818,584	969,749	1,081,726	18.5%	11.5%	32.1%
Virginia	6,187,358	7,078,515	8,001,024	14.4%	13.0%	29.3%

Source: U.S. Census, American Factfinder.

Figure 3-23 presents the study area's 2010 total population at the Census block level. The highest numbers of population by block are located near the city boundary. Several areas immediately outside the city have relatively high population numbers.

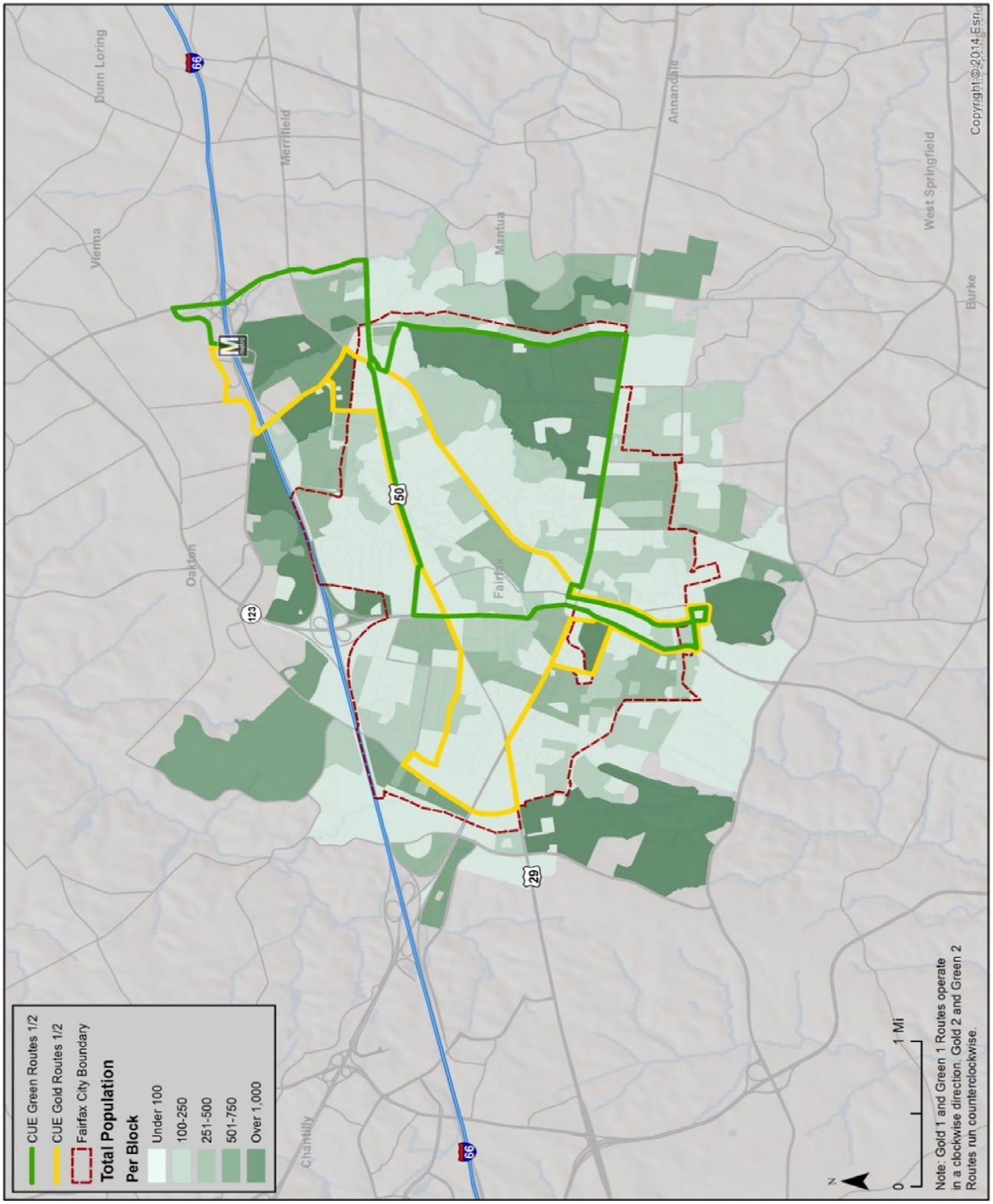
Since the 2010 Census, the city's population has steadily increased by 1-2% annually. From 2010 to 2015 the City of Fairfax's population increased by 6.4%, slightly higher than the growth rates for Fairfax County and Virginia. Table 3-17 illustrates recent population trends since the 2010 Census.

Table 3-17: Recent Population Trends

Place	2010	2011	2012	2013	2014	2015	2010-2015 % Change
City of Fairfax	22,565	22,696	23,109	23,496	23,694	24,013	6.4%
Fairfax County	1,081,726	1,105,914	1,121,445	1,134,972	1,139,045	1,142,234	5.6%
Virginia	8,001,024	8,110,783	8,193,374	8,267,875	8,328,098	8,382,993	4.8%

Source: U.S. Census Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2015.

Figure 3-23: 2010 Census Population

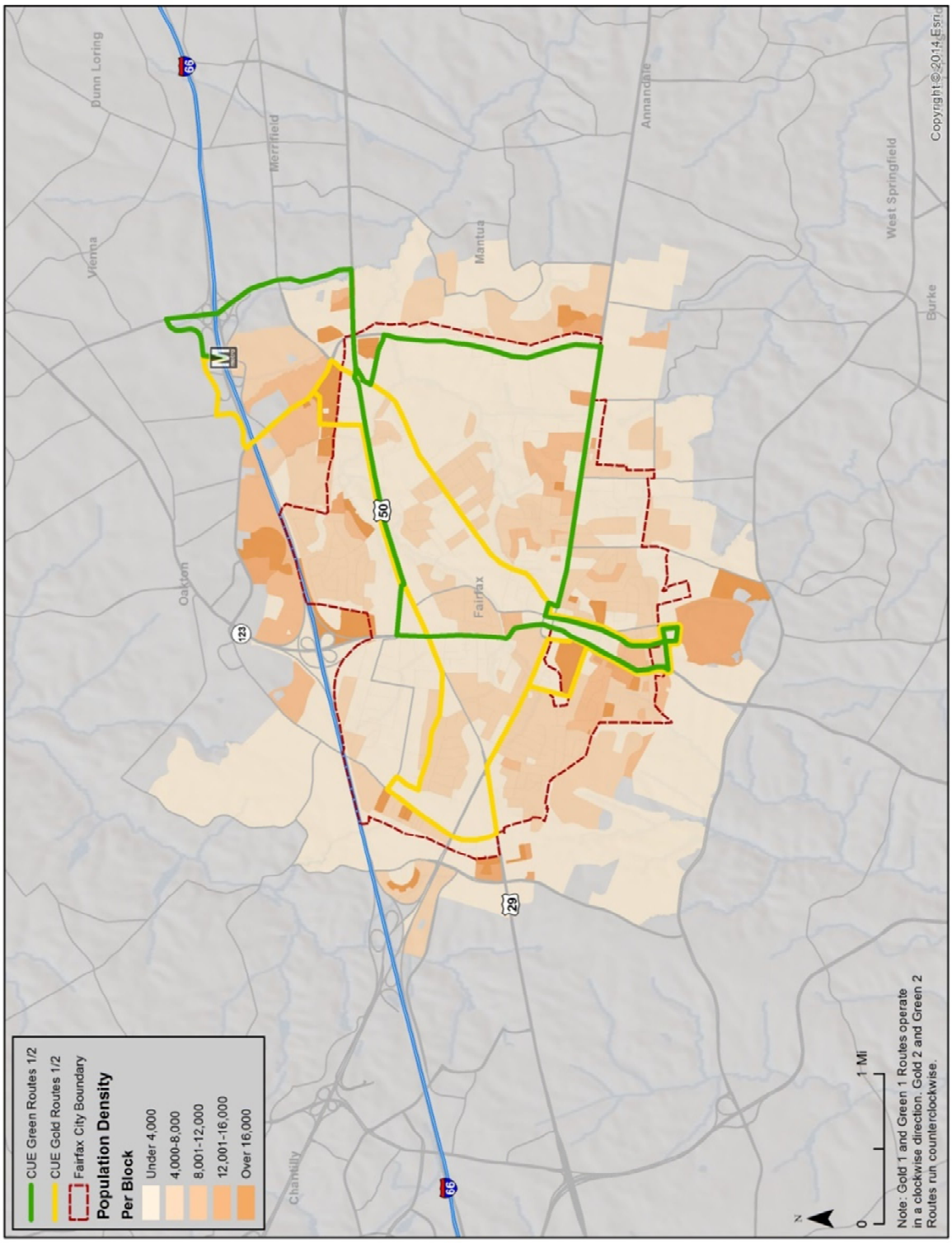


Population Density

Population density is one of the most important factors in determining the appropriate transportation service in a community. It is often used as an indicator for the type of transit services that are feasible within a study area. Typically areas with densities of 4,000 persons per square mile or more are good candidates for transit service and likely to generate strong transit ridership. An area with at least 2,000 persons per square mile will be able to sustain daily fixed route transit service. An area with a population density below 2,000 but above 1,000 persons per square mile may be a better candidate for deviated fixed route or demand response services.

Figure 3-24 shows the population density of the study area at the block level. Many areas in the city have densities greater than 4,000 persons per square mile and are already served by existing CUE routes. It is worth noting that some of the highest density blocks in the study area are located just outside the city boundary. While most of these areas are located within walking distance to existing CUE stops, there are some areas that are outside of walking distance. These areas are to the north, south, and west of the study area.

Figure 3-24: Population Density



Source: U.S. Census.

Population Forecast

Table 3-18 provides population projections by age group. A noteworthy trend for the City of Fairfax is that older adults (65 years and up) will comprise an increasingly larger share of the city's population in the future. While individuals 65 and older comprised about 14% of the city population in 2010, this will increase to 16% in 2020. By 2040, one in five city residents will be an older adult. The near term growth in the city's older adult population, 25% by 2020, is significantly higher than that of other age groups (2% each) and for the city population as a whole (5%). The large forecasted growth in the city's older adult population indicates a likely increase in senior transportation needs over the timeframe of this TDP update.

In the near term (2020), the city's youth and working adult (ages 20-64) populations are anticipated to increase slightly. While all age groups in the city are projected to grow, the growth will be smaller than that projected for the county and the commonwealth. In the long term, the city's population is projected to decrease slightly by -5%, mainly due to a decrease in working age adults (-17%). This trend differs from projections for Fairfax County and Virginia, which show continued growth through 2040.

Table 3-18: Population Forecast

	2010 Population		2020 Population Projection		2030 Population Projection		2040 Population Projection		% Change	
Age	**Pop.**	**%**	**Pop.**	**%**	**Pop.**	**%**	**Pop.**	**%**	**2010-2020**	**2020-2040**
City of Fairfax	**22,565**	-	**23,751**	-	**24,759**	-	**22,542**	-	**5.3%**	**-5.1%**
0-19	5,047	22.4%	5,155	21.7%	5,299	21.4%	5,567	24.7%	2.1%	8.0%
20-64	14,430	63.9%	14,733	62.0%	14,849	60.0%	12,251	54.3%	2.1%	-16.8%
65+	3,088	13.7%	3,863	16.3%	4,611	18.6%	4,724	21.0%	25.1%	22.3%
Fairfax County	**1,081,726**	-	**1,182,609**	-	**1,271,996**	-	**1,350,246**	-	**9.3%**	**14.2%**
0-19	285,405	26.4%	307,691	26.0%	327,502	25.7%	351,654	26.0%	7.8%	14.3%
0-64	690,031	63.8%	719,494	60.8%	754,185	59.3%	803,145	59.5%	4.3%	11.6%
65+	106,290	9.8%	155,424	13.1%	190,309	15.0%	195,447	14.5%	46.2%	25.8%
State of Virginia	**8,001,024**	-	**8,811,512**	-	**9,645,280**	-	**10,530,229**	-	**10.1%**	**19.5%**
0-19	2,083,685	26.0%	2,214,870	25.1%	2,396,544	24.8%	2,657,635	25.2%	6.3%	20.0%
20-64	4,940,402	61.7%	5,237,474	59.4%	5,481,396	56.8%	5,968,324	56.7%	6.0%	14.0%
65+	976,937	12.2%	1,359,168	15.4%	1,767,340	18.3%	1,904,270	18.1%	39.1%	40.1%

Source: U.S. Census, American Factfinder, Weldon Cooper Center for Public Service, Demographics & Workforce Group, November 2012.[35]

[35] The Weldon Cooper Center is currently pursuing funding to update the 2012 projections and release the updated projections by the end of 2016.

Transit Dependent Populations

Public transportation needs are defined in part by identifying the relative size and location of segments within the general population that are most likely to depend on transit services. This includes individuals who may not have access to a personal vehicle due to income status or are unable to drive due to age or disability. This demographic analysis highlights the geographic areas within the study area with the greatest need for transportation, and determines whether CUE is already serving these areas.

The study team ranked the Census block groups in the city by socioeconomic need. Several populations tend to rely more on public transportation: youth, older adults, low income individuals, individuals that live in households with no vehicles, and persons with disabilities. The demographic analysis examined need based on these populations individually and as a composite score. The block groups were classified relative to the study area as a whole using a five-tiered scale of "very low" to "very high." Block groups classified as "very low" were those below the study area's average, but could still have a number of potentially transit dependent persons. At the other end of the spectrum, block groups classified as "very high" had values greater than twice the study area's average. The exact specifications for each score are summarized below in Table 3-19.

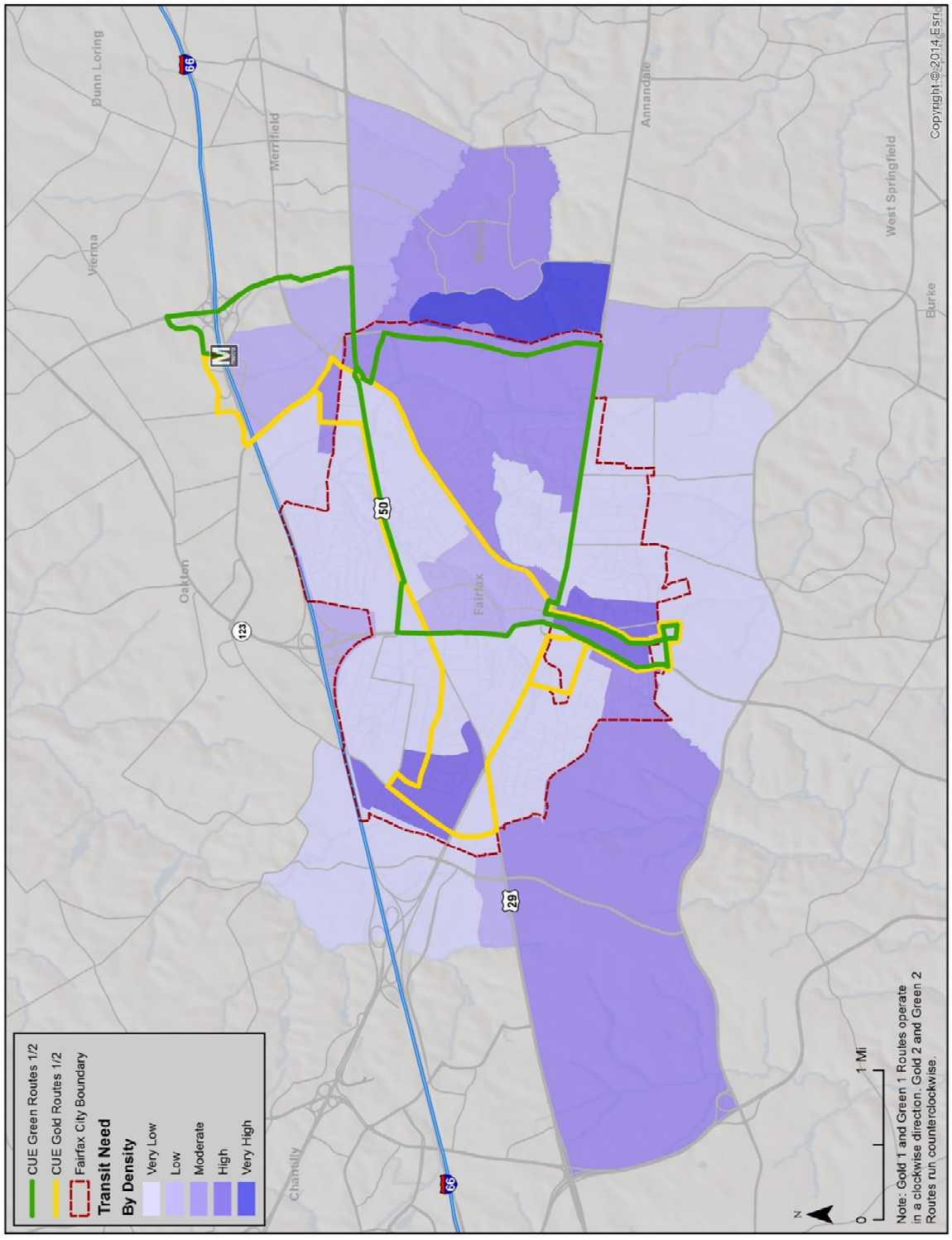
Table 3-19: Relative Ranking Definitions for Transit Dependent Populations

Amount of Vulnerable Persons or Households	Score
Less than and equal to the study area's average	Very Low
Above the average and up to 1.33 times the average	Low
Above 1.33 times the average and up to 1.67 times the average	Moderate
Above 1.67 times the average and up to two times the average	High
Above two times the average	Very High

Figure 3-25 displays the Transit Dependence Index (TDI) rankings for the study area, which represent the composite score for the transit-dependent populations[36]. The TDI rankings factor in the population density of the block groups, where higher densities are indicators of higher potential need. Very high transit need exists east of the city in the census-designated place Mantua. Part of the block group is within walking distance of CUE's Green routes. There are also two block groups with high transit need within the City of Fairfax, which are already served by CUE.

[36] With the exception of persons with disabilities, as this data was collected differently starting with the 2010 Census. Therefore need based on disability was examined separately.

Figure 3-25: Transit Dependence Index

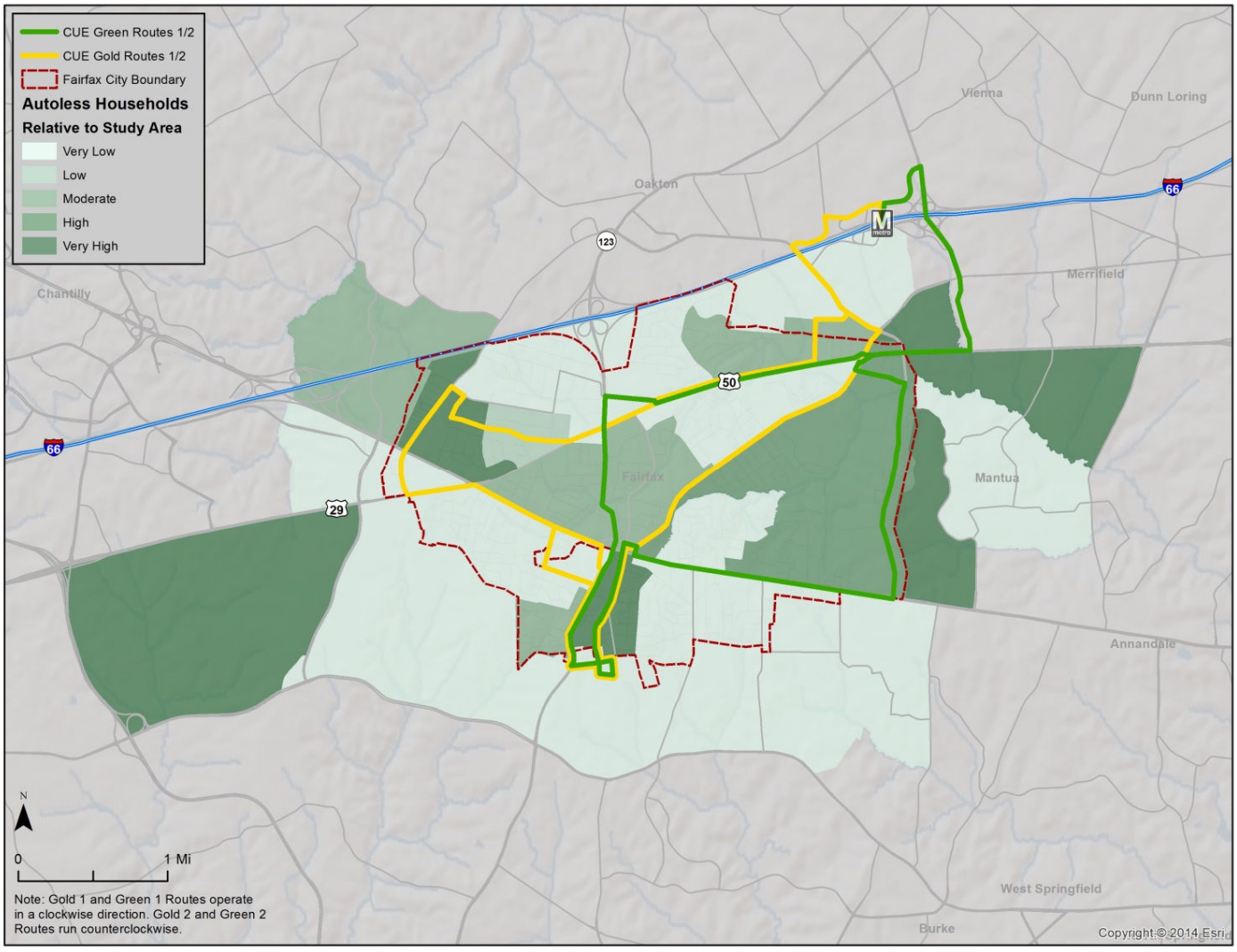


Source: ACS 2010-2014 estimates.

Autoless Households

Households without access to at least one personal vehicle are more likely to depend on the mobility offered by public transit. Several areas in the study area have very high numbers of autoless households. The areas around Jermantown Road and University Drive/George Mason Boulevard are already served by CUE. A high number of autoless households are located along Lee Highway just west of Fairfax City. These residential areas have some access to Metrobus service but poor access to CUE service, requiring a mile or more walk/bike to the nearest CUE stop. The block groups in Mantua are partially served by CUE, with some areas in walking distance. Figure 3-26 displays the relative number of autoless households by block group.

Figure 3-26: Autoless Households

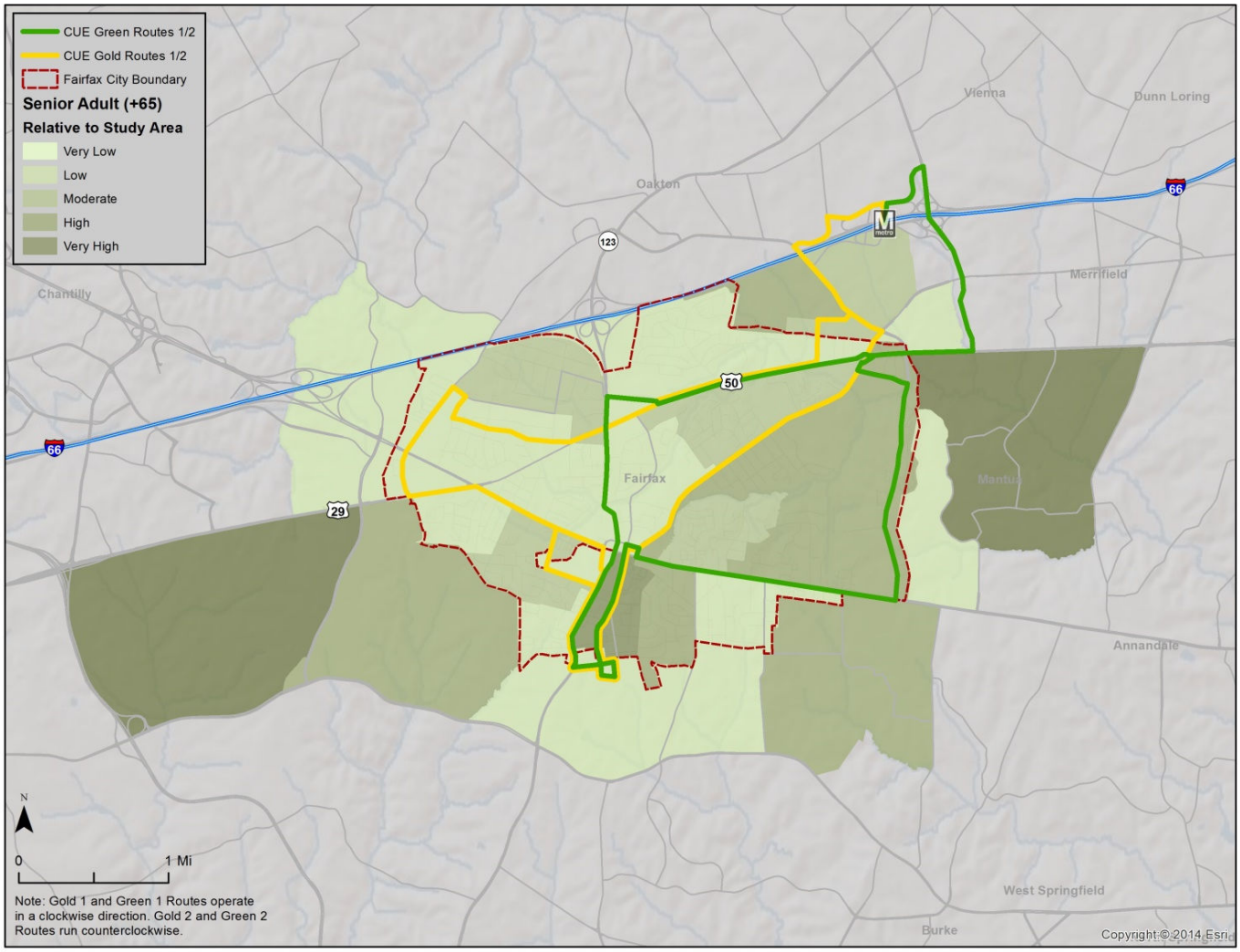


Source: ACS 2010-2014 estimates.

Senior Adult Population

Older adults age 65 and older may begin to decrease their use of a personal vehicle and rely on public transit. Very high numbers of older adults are located in the same areas as identified for autoless households, along Lee Highway west of Fairfax City and in Mantua. The high senior population located near University Drive/George Mason Boulevard is already served by CUE. The moderate need areas throughout the city are generally served by CUE though a few residential streets may be located beyond the quarter-mile walking distance. Figure 3-27 illustrates the senior adult population in the study area.

Figure 3-27: Distribution of the Senior Adult Population (Ages 65 and Above)

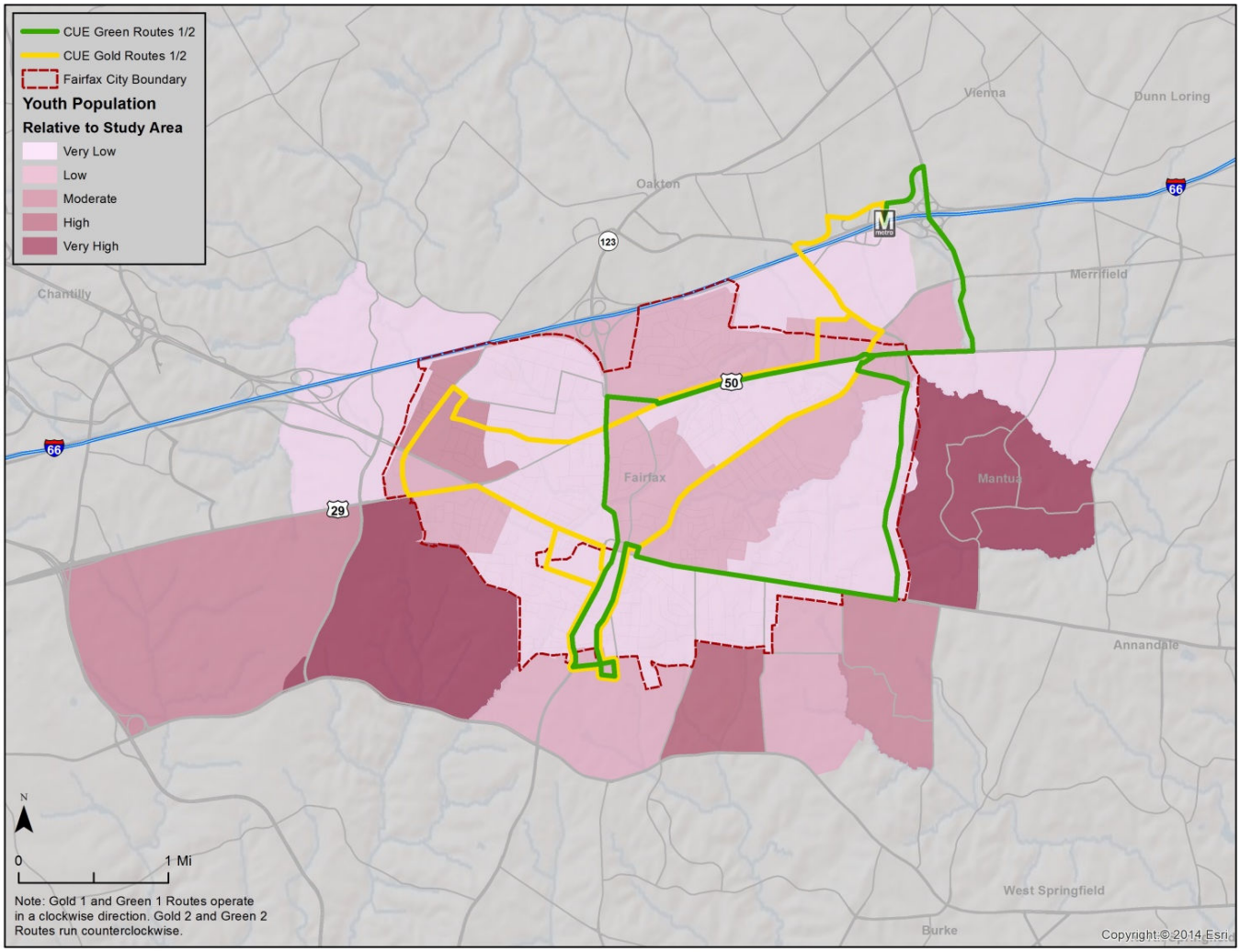


Source: ACS 2010-2014 estimates.

Youth Population

Persons ages 10 to 17 are often transit dependent as they either cannot drive or are just beginning to drive and may not have a personal automobile available. The City of Fairfax has a relatively small youth population, but areas to the east (Mantua) and west (Fairfax Villa) of the city have high concentrations of youth. These areas are mainly beyond walking distance to a CUE Route. Figure 3-28 illustrates the numbers of youth in the study area.

Figure 3-28: Distribution of the Youth Population (Ages 10 to 17)

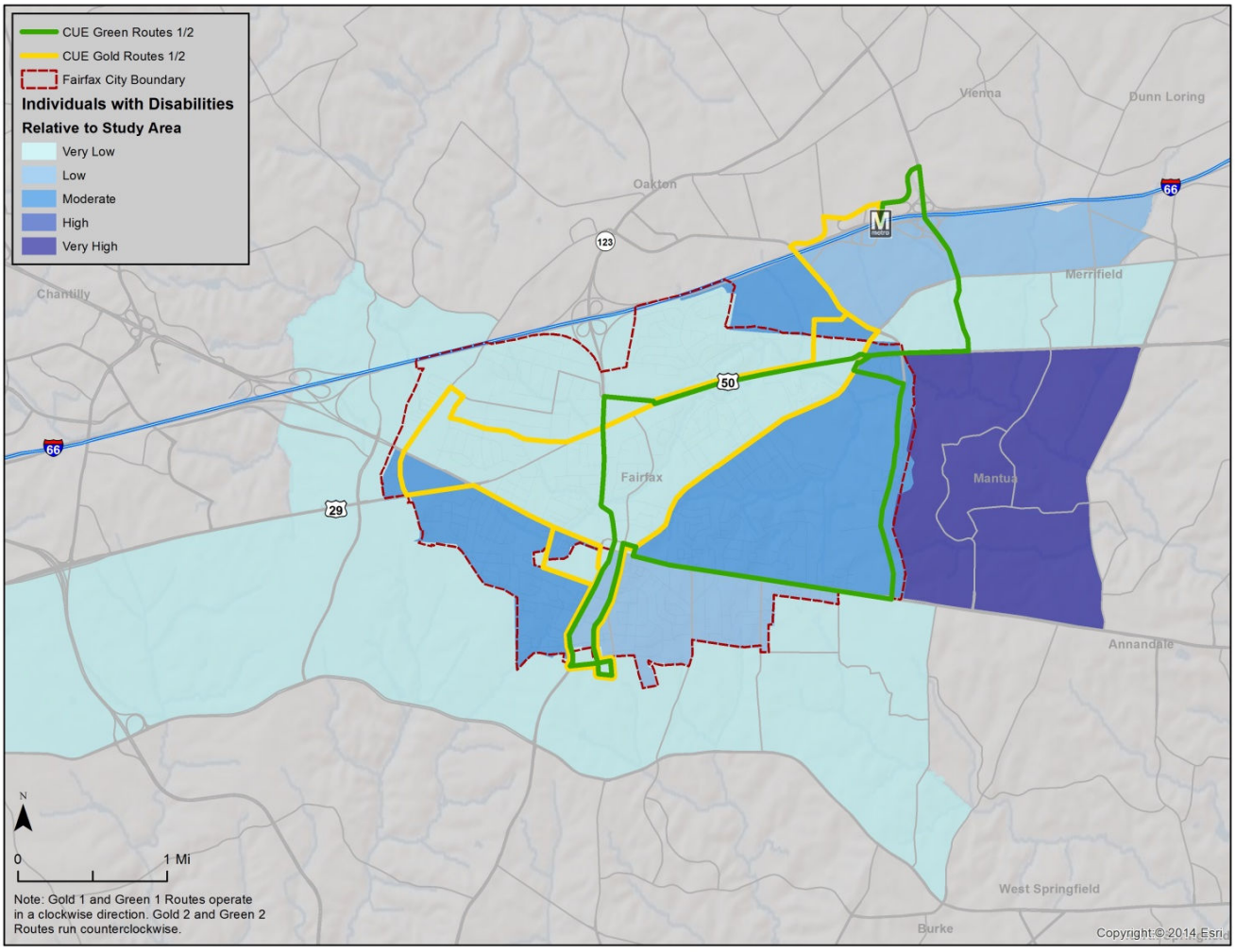


Source: ACS 2010-2014 estimates.

Individuals with Disabilities

Figure 3-29 illustrates the population of individuals, age 18 and above, with disabilities in the study area. The ACS was used to obtain data for individuals with disabilities at the census tract level. The ACS definition for adults with a disability included individuals with hearing, vision, cognitive, ambulatory, self-care, and independent living difficulties. Persons who have disabilities that prevent them or make it difficult to own and operate a personal vehicle often rely on public transit for their transportation needs. Mantua has a very high population of individuals with disabilities, and the majority of the area does not have good access to CUE. The moderate need areas within the city are already served by CUE, but some residential areas may not have good access to the routes depending on the accessiblity of pathways to the CUE stops.

Figure 3-29: Distribution of Individuals with Disabilities (Ages 18 and Above)

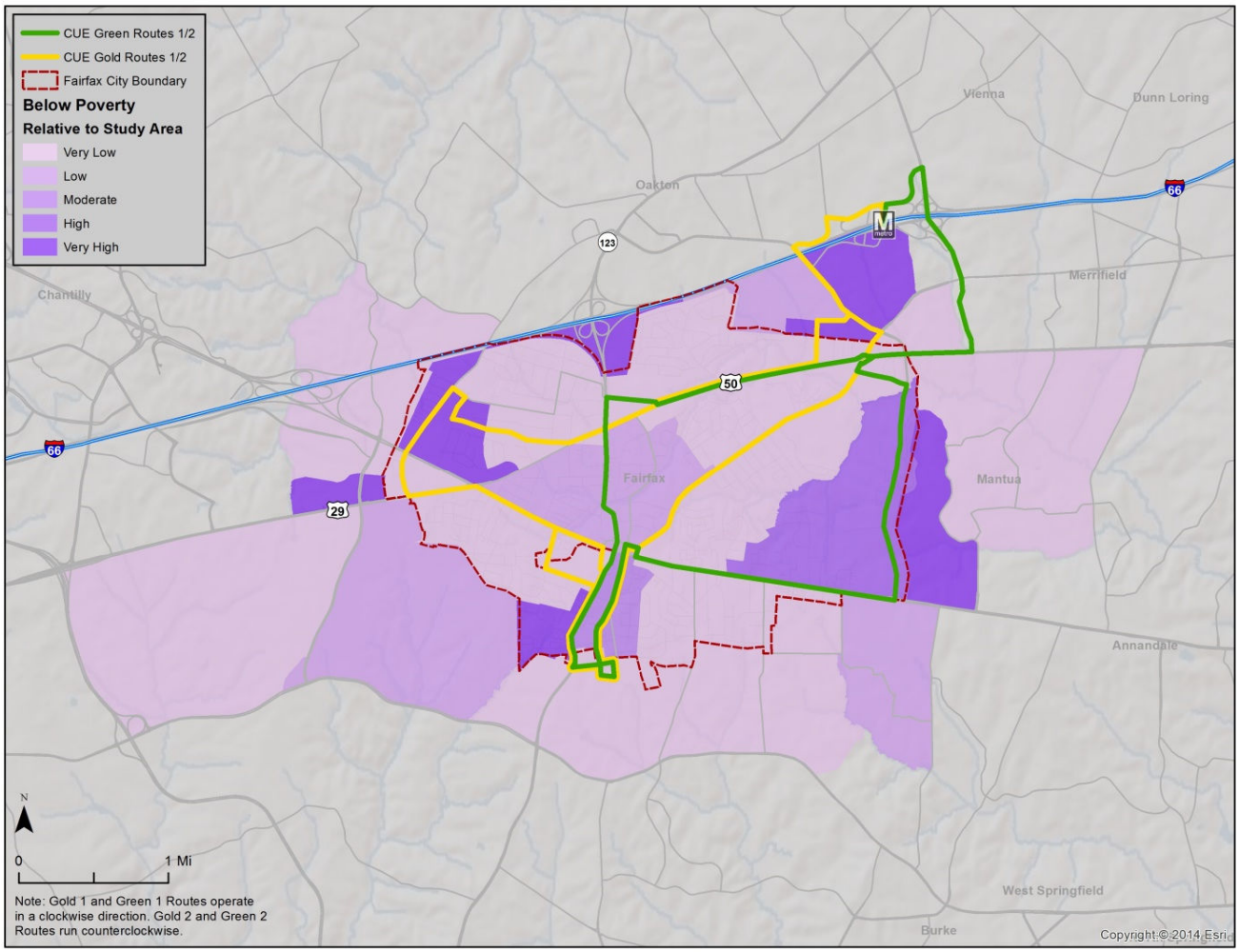


Source: ACS 2010-2014 estimates.

Low Income Individuals

Low income individuals may find it a financial burden to own and maintain a personal vehicle, thus relying on public transit as their primary means of transportation. For the purpose of this analysis, persons living below the federal poverty level were considered low income. The areas with very high numbers of low income residents within the city are located in the west near Jermantown Road and Warwick Ave and in the south off Chain Bridge Road near Canfield Street. Other high need areas adjacent to the city include residential areas along Lee Highway to the west, off Chain Bridge Road to the north, along Blake Lane to the northeast, and off Pickett Road to the west. Some of these areas are in reasonable walking distance to CUE, while others are farther than one-quarter mile. Figure 3-30 identifies the low income population in the study area.

Figure 3-30: Distribution of the Low Income Population



Source: ACS 2010-2014 estimates.

Land Use Profile

Identifying existing and planned land uses in the study area complemented the above demographic analysis by identifying the places that transit riders need to get to and from and future developments that may warrant new service.

Existing Major Trip Generators

Trip generators attract transit demand and include common origins and destinations, such as multi-unit housing, major employers, medical facilities, educational facilities, non-profit and governmental agencies, and shopping centers. Figure 3-31 identifies major trip generators in the study area.

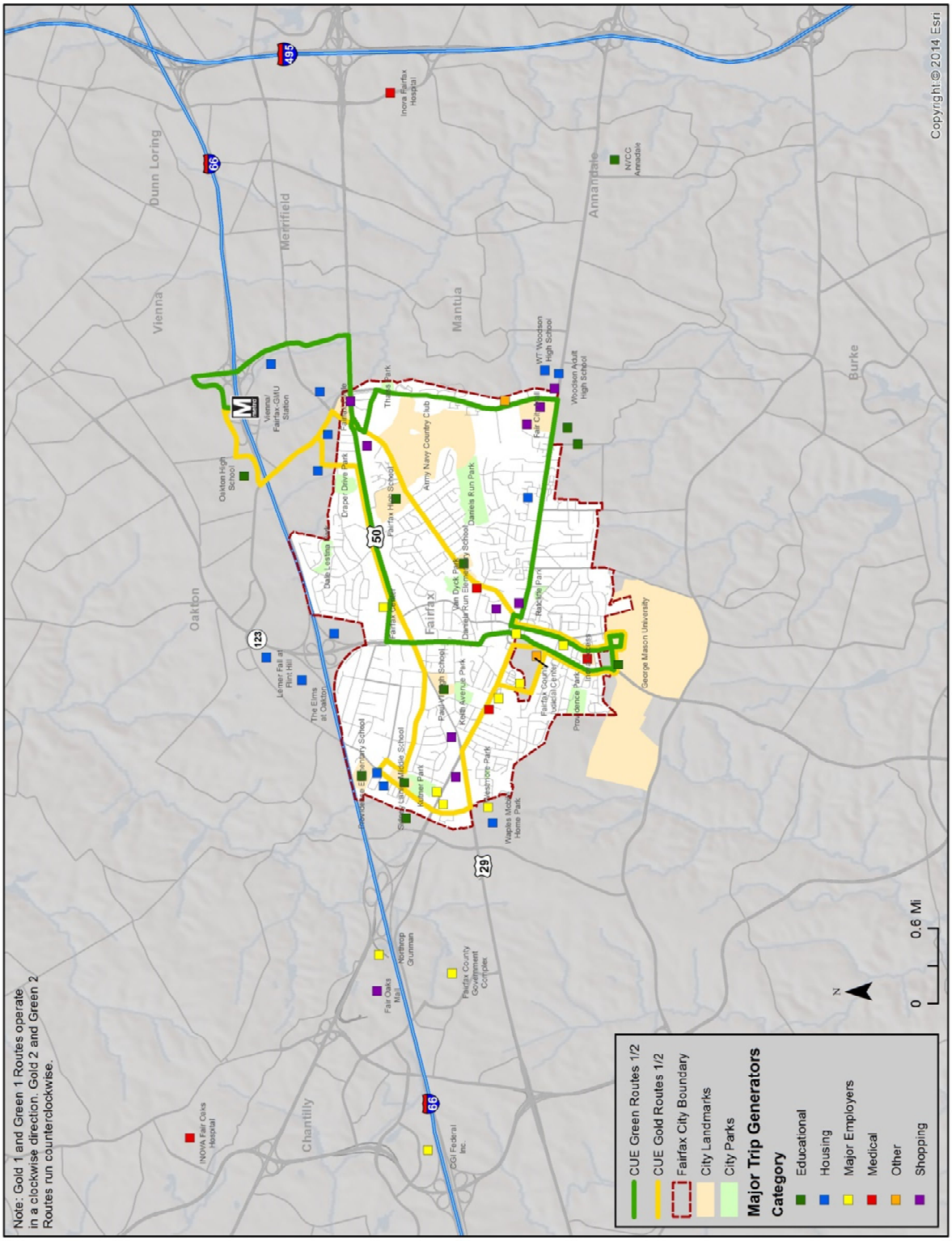
Educational Facilities

Many individuals that comprise the school age population are unable to afford or operate their own personal vehicle; therefore this population may use public transportation for their daily activities. Additionally, many faculty and staff members are associated with these institutions as a place of employment. Educational facilities that are located in or in close proximity to the study area include George Mason University, Northern Virginia Community College Annandale Campus (NOVA), Virginia International University (VIU), Fairfax High School, WT Woodson High School, Paul VI Catholic High School, Providence Elementary School, Sidney Lanier Middle School, Daniels Run Elementary School, Oakton High School, Woodson Adult High School, and Flint Hill Upper School. All of the educational insitutions are accessible by CUE, except for NOVA and VIU.

Multi-Unit/ High-Density Housing

Multifamily residents tend to drive fewer miles and use public transportation more frequently than residents of single-family housing. Multifamily housing units located within the study area or close to it include: Oakton Park Apartments, Hawthorne Village Condominiums, Fairfax Circle Villa Apartments, Dwell Vienna Metro Apartments, Circle Towers, Pinewood Plaza Apartments, Van Metre Fairfax Square Apartments, Margate Manor, Leiner Falls at Flint Hill, The Elms at Oakton, Gainsborough Court, Churchill Mews and Copperfield Square Apartments, Waples Mobile Home Park, and Cavalier Court. Most of these housing complexes have access to CUE, except for Oakton Park Apartments, the Elms at Oakton, and Learner Falls at Flint Hill located north of the city boundary.

Figure 3-31: Major Trip Generators



Source: City of Fairfax website and Virginia Employment Commission, Quarterly Census of Employment and Wages (QCEW), 4th Qtr.

Major Employers

Businesses or organizations that have at least 250 employees were considered the city's major employers. Many of the major employers include medical facilities and educational institutions such as INOVA Healthcare Systems and Mason. Other major employers in the area are the City of Fairfax, The Wackenhut Corporation, Ted Britt Ford Sales, Inc., Fairfax Nursing Center, Zeta Associates, Walmart, Fairfax County Government Center, CGI Federal Inc., Northrop Grumman Corporation, Safeway, and the U.S Postal Service.[37] All these major employers are served by CUE, except for Northrop Grumman, CGI Federal Inc., and the Fairfax County Government Complex located west of the city.

Medical Facilities

Medical facilities represent a significant destination for users of public transportation. Older adults and persons with disabilities often rely more heavily upon the services offered by medical facilities than other population segments. Medical facilities in the study area include Inova Fairfax Hospital, Inova Fair Oaks Hospital, Joseph Willard Health Center, Inova Emergency Care Center, and Fairfax County Health Department. Many of these medical facilities can be accessed by CUE except for Inova Fair Oaks Hospital (accessible by City Wheels) and Inova Fairfax Hospital (accessible by Metrobus Route 1C).

Shopping Centers

Shopping centers provide necessities such as food and clothing, and serve as an entertainment and employment destination. It is important that transit dependent populations have access to the goods and services that shopping centers provide. The shopping centers located in the area include Fair City Mall, Courthouse Plaza Shopping Center, Fairfax Circle Shopping Center, Fairfax Circle Plaza, Fairfax Marketplace, Pickett Shopping Center, Main Street Marketplace, Kamp Washington Shopping Center, Turnpike Shopping Center, and Fair Oaks Mall. The majority of the shopping centers in the area are served by CUE, except for Fair Oaks Mall (accessible by Metrobus Routes 1C and 2B).

Planned Development

The study team met with city planning staff members, who identified several planned developments that are most likely to be completed in the six-year timeframe of the TDP, summarized in Table 3-20. The short-term developments mostly add multi-family housing with some additional commercial development. All these developments will be served by the existing CUE routes.

[37] Virginia Employment Commission, Quarterly Census of Employment and Wages (QCEW), 4th Quarter 2015.

Table 3-20: Planned Development in the City of Fairfax

Planned Development	Description	Status/Timeframe
Mayfair (on Main St at East Street)	25 townhouse-style condominiums at the edge of the city's historic district	Under construction in 2016
Mount Vineyard (on Main Street at Oak Street)	132 dwelling units to replace aging apartment complex	Under construction in 2016
Fairfax Circle Plaza Shopping Center Redevelopment (on Fairfax Boulevard between Lee Highway and Blake Lane)	Redevelopment of 108,000 square feet of commercial space to include mixed uses: 400 multifamily apartments, 88,000 square feet of retail, and a grocery store	Under construction in 2016
The Enclave (off Pickett Road on Silver King Court)	80-unit condominium project	Approved, groundbreaking expected in 2016
Novus Fairfax Gateway (located between Fairfax Boulevard and Lee Highway near Kamp Washington)	Add over 400 luxury rental apartments and 29,000 square feet of commercial space	Approved, groundbreaking expected in 2017
Layton Hall (off Old Lee Highway on Layton Hall Drive)	Redevelop existing 110 unit apartment complex and add 250 units for a total of 360 units	Approved

Possible future developments/redevelopments may occur on parcels along Fairfax Boulevard, including Paul VI Catholic High School and Fairfax Shopping Center, on Old Lee Highway near Layton Hall Drive, in Old Town Fairfax including the Davies Property (315 multi-family units proposed), and off Chain Bridge Road near West Drive. These future developments are located along the existing CUE routes, except for the redevelopment of Paul VI Catholic High School, which is currently served by Metrobus Route 1C and located within walking distance (one-quarter mile) of the CUE Gold Route.

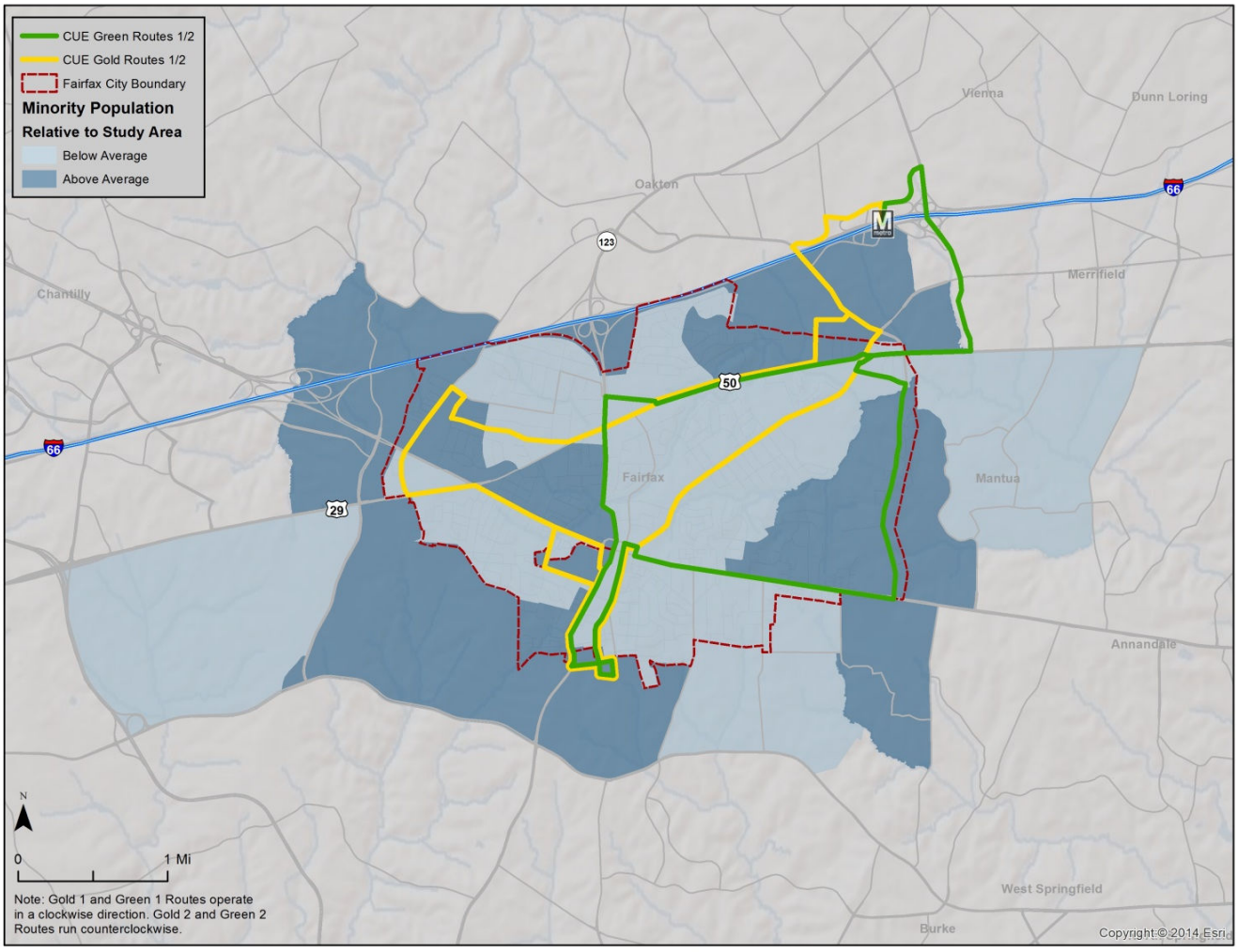
TITLE VI ANALYSIS

Title VI of the Civil Rights Act of 1964 prohibits discrimination on the basis of race, color, or national origin in programs and activities receiving federal subsidies. While CUE does not receive any federal funding, it is good practice to examine the impacts of its transit services on Title VI and environmental justice populations. The following section examines the minority and low income populations in the study area.

Minority Population

It is important to ensure that areas with an above average percentage of racial and ethnic minorities are not negativity impacted by any proposed alterations to existing public transportation services. In the study area, the average percentage of minority populations per Census block group is 32.77%. The existing CUE routes serve the above average areas located in the city. Several areas adjacent to the city border also have higher than average minority populations and could potentially benefit from improved access to CUE. Figure 3-32 illustrates the areas that have above and below average minority populations.

Figure 3-32: Distribution of the Minority Population

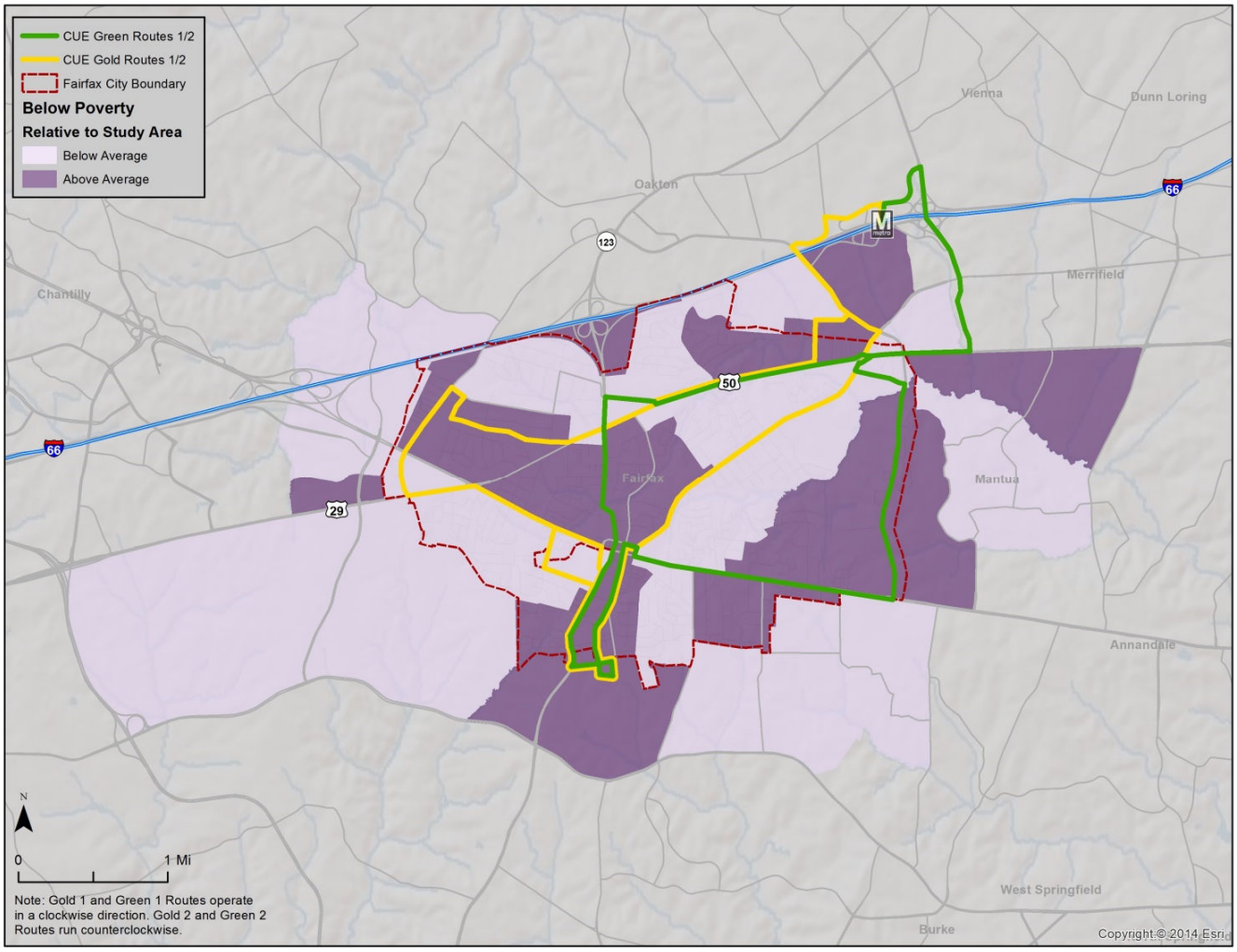


Source: ACS 2010-2014 estimates.

Low Income Population

The second group included in the Title VI analysis represents those individuals who earn less than the federal poverty level. In the study area, the average percentage of individuals living below the federal poverty level is 7.1%. Figure 3-33 depicts the areas with above and below average low income populations. CUE currently serves the above average areas in the city. Similar to the minority population analysis, areas adjacent to the city have above average low income populations and could benefit from better access to CUE.

Figure 3-33: Distribution of the Population Living Below the Poverty Level



Source: ACS 2010-2014 estimates.

Limited English Proficiency

In addition to providing public transportation for a diversity of socioeconomic groups, it is important to serve and disseminate information to those of different linguistic backgrounds. As shown in Table 3-21, about one-third of city residents speak a language other than English at home. Thirteen percent of the city's population is considered Limited English Proficient (LEP), or speaks English less than "very well."[38]

Of the languages spoken by LEP individuals, Spanish is the most prevalent; 6% of the city's residents speak Spanish and have a limited ability to read, write, speak, or understand English. CUE has already translated its rider brochure/system map into Spanish. The city may also consider conducting targeted outreach to populations with limited English proficiency to promote awareness and use of CUE services and engage these residents in transit decision-making processes.

Table 3-21: Limited English Proficiency Data for Study Area

	Fairfax City	
Total Population (Ages 5+)	21,806	
LEP Population	2,874	
Total Pop. Languages Spoken	**Number**	**Percent**
English Only	14,807	68%
Speak Other Languages	6,999	32%
Spanish	3,027	14%
Indo-European languages	1,567	7%
Asian/Pacific Island languages	1,960	9%
Other	445	2%
LEP Pop. Languages Spoken	**Number**	**Percent**
Spanish or Spanish Creole	1,269	6%
Korean	388	2%
Vietnamese	186	1%
Other Indic languages	184	1%
Arabic	151	1%
Chinese	148	1%
Other Languages (less than 100 people each)	548	3%

Source: ACS 2010-2014 estimates, Tables B16001 and B16004.

[38] As defined in FTA Circular 4702.1B, *Title VI Requirements and Guidelines for Federal Transit Administration Recipients*.

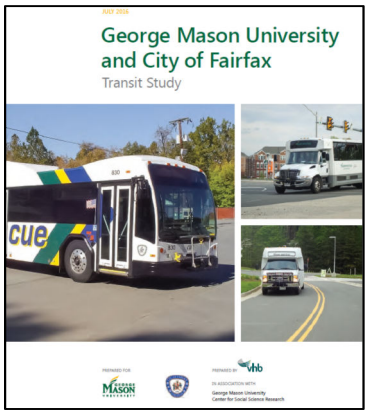
REVIEW OF OTHER PLANNING DOCUMENTS

The study team reviewed several transportation and planning studies to identify recommendations for transit and land use that might affect CUE or the city's transportation needs over the six-year planning horizon of the TDP.

Summaries of the plan's purpose and specific transit improvements pertinent to the City of Fairfax are presented below for the following plans:

- George Mason University and City of Fairfax Transit Study, 2016
- Fairfax County Transit Development Plan, 2016
- Metrobus Service Evaluation Study: 17/18 Lines, 2015
- Vision Fairfax Mason – Downtown Charrette, Final Report, 2015
- Technical Assistance Tool: Fiscal and Economic Health, 2013
- Fairfax Boulevard Commercial Development Market Analysis, 2013
- Livable Fairfax City – 2035 Comprehensive Plan, 2012
- George Mason University Transportation Master Plan, 2011
- I-66 Transit/TDM Study, 2009
- Fairfax Boulevard Master Plan, 2007

George Mason University and City of Fairfax Transit Study, 2016



This study was a joint effort by the city and Mason to review the utilization of CUE and Mason Shuttles and identify opportunities to improve efficiencies where the services overlap. The study included extensive analysis of the existing routes as well as rider and community surveys, the results of which are highlighted in other sections of this chapter. The report's recommendations regarding CUE included:

- Improved/Expanded Communications – ensure the CUE website is up to date and accessible for mobile device users; establish an email subscription service for service notifications; create a CUE social media account for direct communication with riders; develop social media policies

- Expanded Marketing – Raise awareness of the NextBus application that provides real-time passenger information; promote popular destinations along the routes through a trip planner application, Google Maps, social media, or printed materials.

- Move Bus Layover at Vienna Metro – Swap the layover locations of the Gold and Green routes to place the Gold routes, which are more similar to the Sandy Creek-Vienna Metro route, closer to the Mason Shuttle stop.

Fairfax County Transit Development Plan, 2016

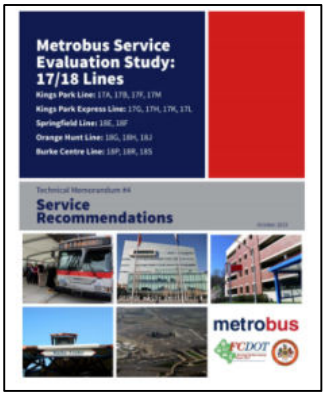
In March 2016 the Fairfax County Board of Supervisors approved the Fiscal Year 2016-2022 TDP. The TDP provides a 6-year roadmap for increasing transit access and capacity to include: enhancing existing services with cross-county and regional connections, adding transit service, addressing missing connections between activity centers, restructuring low performing routes, responding to ridership demand, and attracting new riders. Fairfax County is planning two new bus routes and one new transit facility that will serve the City of Fairfax and Mason:

- **313 Fair Oaks-Franconia-Springfield Metrorail/VRE Station.** The new route will provide connections to Fair Oaks Mall and the Fairfax County Government Center. The proposed alignment travels along Lee Highway (US-29) and Main Street through the city, serving the Fairfax County Judicial Complex and Mason. The 19-mile route also provides connections to Burke Centre VRE station and the Franconia-Springfield Metrorail/VRE Station. The route is planned to operate on weekdays and Saturdays for 18 hours and 13 hours, respectively. Service frequencies will be 30 minutes during peak periods and hourly during off-peak periods. Funding has been identified for the route, and implementation is recommended in FY 2017.

- **610 Centreville-George Mason University.** The new route will provide another connection to the Fairfax County Government Center, traveling through the city on a similar alignment as Route 313. The route also provides a connection to Centreville. Initial service is proposed to operate on weekdays for 18 hours, with 30 minute peak period headways. The TDP proposes to add future Saturday service, with an 11 hour service span and 30 minute headways. Funding for this route has not been identified.

- **George Mason University Fairfax Transit Center.** The Fairfax County Board of Supervisors approved the allocation of $1 million to construct a new transit center at Mason. The proposed transit center will have ten bus bays, bus shelters, benches, trash receptacles, and space for a future transit store.

Metrobus Service Evaluation Study: 17/18 Lines, 2015



In 2015 WMATA published the *Metrobus 17 & 18 Line Service Evaluation Study*. The study reviews capacity, productivity, and reliability service indicators to identify the need for customer facilities and improve service delivery for the 17/18 Lines. The 17A (Kings Park Line) and 17G (Kings Park Express Line) serve the City of Fairfax. The short-term recommendations for the 17A include adding six one-way trips in the morning peak and five one-way trips in the evening peak and extending the morning span of service. The short-term recommendations for the 17G include adding two one-way trips in the morning peak and a single one-way trip in the evening peak and extending the span of service during the morning and evening. Longer term recommendations include adding peak direction trips and providing hourly Saturday service on the 17A and starting service earlier in the afternoon peak period on the 17G.

Vision Fairfax Mason – Downtown Charrette, Final Report, 2015

In 2014 the City of Fairfax and Mason, in collaboration with the Northern Virginia Regional Commission, hosted a three-day charrette to explore the connectivity, livability, and sustainability between Mason and the city's historic downtown. In regards to transit, the following recommendations were proposed:

- Immediate Action: Open access to the public on late night Mason Shuttle routes.
- Short-Term (2-5 years): Establish Mason Shuttle bus stop in Old Town.
- Long-Term (5-10 years): No applicable transit recommendations.
- Very Long-Term (10-20 years): Rail connection from Mason to Metro through Old Town.

Technical Assistance Tool: Fiscal and Economic Health, 2013

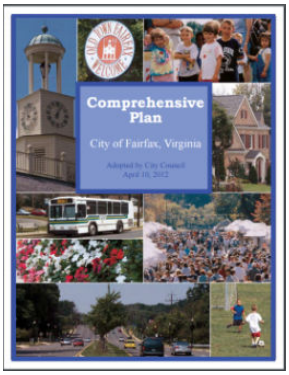
In 2013 Smart Growth America hosted a workshop with City of Fairfax stakeholders on fiscal and economic health. The purpose of the workshop was to identify specific strategies for revitalizing the Fairfax Boulevard corridor. Participants recommended that the city increase transportation alternatives to designated node(s) using CUE bus and other mechanisms. For

example, serving Fairfax Circle could entail improving the frequency of CUE service to Vienna Metro and adding express service.

Fairfax Boulevard Commercial Development Market Analysis, 2013

In 2012 the City of Fairfax commissioned Streetsense, a multidisciplinary design and strategy firm specializing in retail, restaurant, hospitality, and real estate solutions, to conduct a market analysis of commercial development. The report assessed three commercial nodes along Fairfax Boulevard: Kamp Washington located at the intersection with Main Street, Northfax at the intersection with Chain Bridge Road, and Fairfax Circle at the intersection with Old Lee Highway and Lee Highway. The analysis identified unmet demand for retail, office, and lodging at Kamp Washington and Northfax. CUE already serves these commercial nodes, and may evaluate increased transit need in the future as further development occurs.

Comprehensive Plan of the City of Fairfax, 2012



In 2012 the City Council adopted the Comprehensive Plan, which serves as the city's official policy guide for development over the next 20 years. The plan provides guidance for prioritizing, funding, and implementing the city's transportation projects. The city's transportation objectives include actively developing solutions to improve traffic safety and efficiency and encouraging the use of public transportation as alternatives to the private automobile. The CUE related strategies to achieve these objectives included 1) encouraging connections to other transit routes and facilities including VRE stations and Fairfax Connector and Metrobus routes to major activity centers, 2) encouraging new ridership in all population segments, with particular attention to older adults and individuals with disabilities, and 3) encouraging employers to provide transit subsidies.

The transportation plan proposes the following local initiatives:

- **CUE** – 1) improve access to bus stops, 2) implement service improvements including improved schedules, better coordinated bus-rail and bus-bus connections, and more frequent service, 3) provide passenger amenities including bus shelters, real-time bus arrival information, and information panels at stops, and 4) augment schedules to coincide better with Mason's evening classes and Sunday library hours.

- **Priority treatment** for transit vehicles along the Fairfax Boulevard Corridor, with preferential access to and from the Vienna/Fairfax-GMU Metrorail Station.

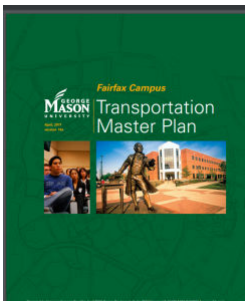
- **Enhanced public transit facilities and services** on the Chain Bridge Road Corridor, Main Street/North Street Corridor, Pickett Road, and University Drive/George Mason Boulevard.

- **Commuter park and ride facilities.** Examine sites along the City's western and southern periphery, and identify park and ride locations at existing retail parking and development areas.

- **Downtown intermodal information center** where transit riders could access service information on CUE and other transit services at an interactive display kiosk.

The transportation plan endorses the following regional transit initiatives, which are relevant in that CUE may provide additional feeder service: 1) westward extension of rail service in the Dulles and I-66 corridors; 2) extension and enhancement of VRE service in the I-95/I-66 corridors; and 3) establishment and enhancement of commuter parking facilities throughout the region.

George Mason University Transportation Master Plan, 2011



This campus transportation master plan identifies policies, programs, and projects intended to improve facilities and services that balance the needs of the various populations and user groups. The plan defines a transportation strategy and outlines a transportation improvement program to guide implementation. The following transit-related improvements are recommended:

- **Expanded CUE service replacement** – replace the Sandy Creek-Vienna Metro shuttle with CUE bus service exclusively.

- **Improvements to stops** – including the Rappahannock, Sandy Creek, and Lot C stops.

- **Circulator Shuttle** - off-campus services originating at the transit center, which would not circulate around the campus.

- **Burke Center Shuttle** – provide bus service to the VRE stations. Alternately, incorporate stop(s) on campus into the Burke VRE/Old Town Fairfax shuttle route.

- **Mason Shuttle maps** – develop and publish transit maps.

I-66 Transit/TDM Study – Final Report, 2009

This study identifies more transportation choices through transit and transportation demand management enhancements which will increase mobility in the I-66 corridor. A specific service recommendation affecting the city was for Metrobus express service originating at Fair Oaks Mall, traveling along Fairfax Boulevard through the city, terminating in the District of Columbia. Stops would be limited to two or three per mile, which would allow for an estimated 20 percent improvement in speed.

Fairfax Boulevard Master Plan, 2007

This plan outlines a model for corridor development along Fairfax Boulevard. The following guidelines and enhancements along Fairfax Boulevard will impact transit service:

- Allow transit vehicles to provide front-door service.
- Side medians of the multi-way boulevard provide good locations for transit stops – passengers alighting from buses have only to cross the park-like median and the slow-moving side access street to reach the front door.
- Planted median allows for provision of streetcar access.

PUBLIC INPUT

The 2016 *George Mason University and City of Fairfax Transit Study* conducted recent on-board and household surveys. Therefore the TDP update focused on collecting input from a range of stakeholders. The survey highlights and identified transportation needs are summarized below. The TDP update also engaged the community in reviewing the proposed service alternatives, and the input received is discussed in Chapter 5.

Rider Surveys

The George Mason University Center for Social Science Research conducted on-board surveys on all CUE routes in April 2014, during both weekday and weekend trips. 439 survey responses were collected on the CUE routes, which were all equally sampled. The rider survey effort found the following regarding trip characteristics and rider perceptions:

- **Resident Status.** Over 60% of CUE riders are city residents; half of these residents are affiliated with Mason (mostly students). Nearly 40% of CUE riders are not residents but travel to the city to conduct their daily business.

    - 45% of all CUE riders reported an affiliation with Mason.

- **Primary Mode.** Over half of CUE riders use bus as their primary mode of travel, and nearly 20% use Metrorail.

- **Transit Dependent Riders and Choice Riders**

    - Nearly half of CUE riders do not have a valid driver's license. For those that do have a driver's license, 65% do not have a vehicle available.
    - Roughly one-third of CUE riders that could drive (have a driver's license and vehicle available) choose to use transit.

- **Frequency of Use**. About 75% of riders use CUE every week, and the majority ride three days a week or more (one-third ride five days a week).

- **Accessing CUE and Final Destinations**

    - To access CUE service, about 65% of riders walk to the bus stop and 25% transfer from Metrorail.

    - To reach their destination, nearly half of CUE riders transferred to Metrorail, about 25% walked, and 20% transferred to another bus.

- **Trip Purpose.** Most riders use CUE to travel to work, home, or college/university.

- **Fare Medium.** Half of CUE riders pay by SmarTrip, over 40% ride fare-free using their Mason ID, and 7% of riders pay by cash.

- **Transit Information.** 45% of CUE riders obtain transit information through the internet or word of mouth. About 15% each obtain information through the printed schedules and the NextBus application.

- **Transportation Alternatives.** If CUE was not available, riders would use taxi service, Metrobus, walk, drive, or carpool. About 12% of riders would not make the trip if CUE was not available.

- **Reasons for Using CUE.** Riders rated these factors as most important in their decision to use CUE: cost of fares, proximity of route to origins/destinations, availability of transit throughout the day, and running on time.

Origin-Destination Analysis

Exhibits 3-5 and 3-6 portray the "true" origins and destinations of CUE riders (in yellow), respectively. Most origins and destinations are located in the CUE service area, though the maps demonstrate that CUE riders travel throughout the D.C. region to/from points along the I-66, U.S. 29, and U.S. 50 corridors into downtown D.C., along the Dulles Toll Road, and to Tysons Corner and Springfield.[39]

Transfer Analysis

The 2016 *George Mason University and City of Fairfax Transit Study* also completed a transfer analysis based on CUE's farebox information. FY 2013 data indicated that 22% of CUE riders transferred from another transit service. Of these transfers, more than half were from Metrorail, about 20% each from another CUE route or Metrobus, and 8% from Fairfax Connector.

[39] 2016 George Mason University and City of Fairfax Transit Study.

Exhibit 3-5: CUE Bus Trip Origins

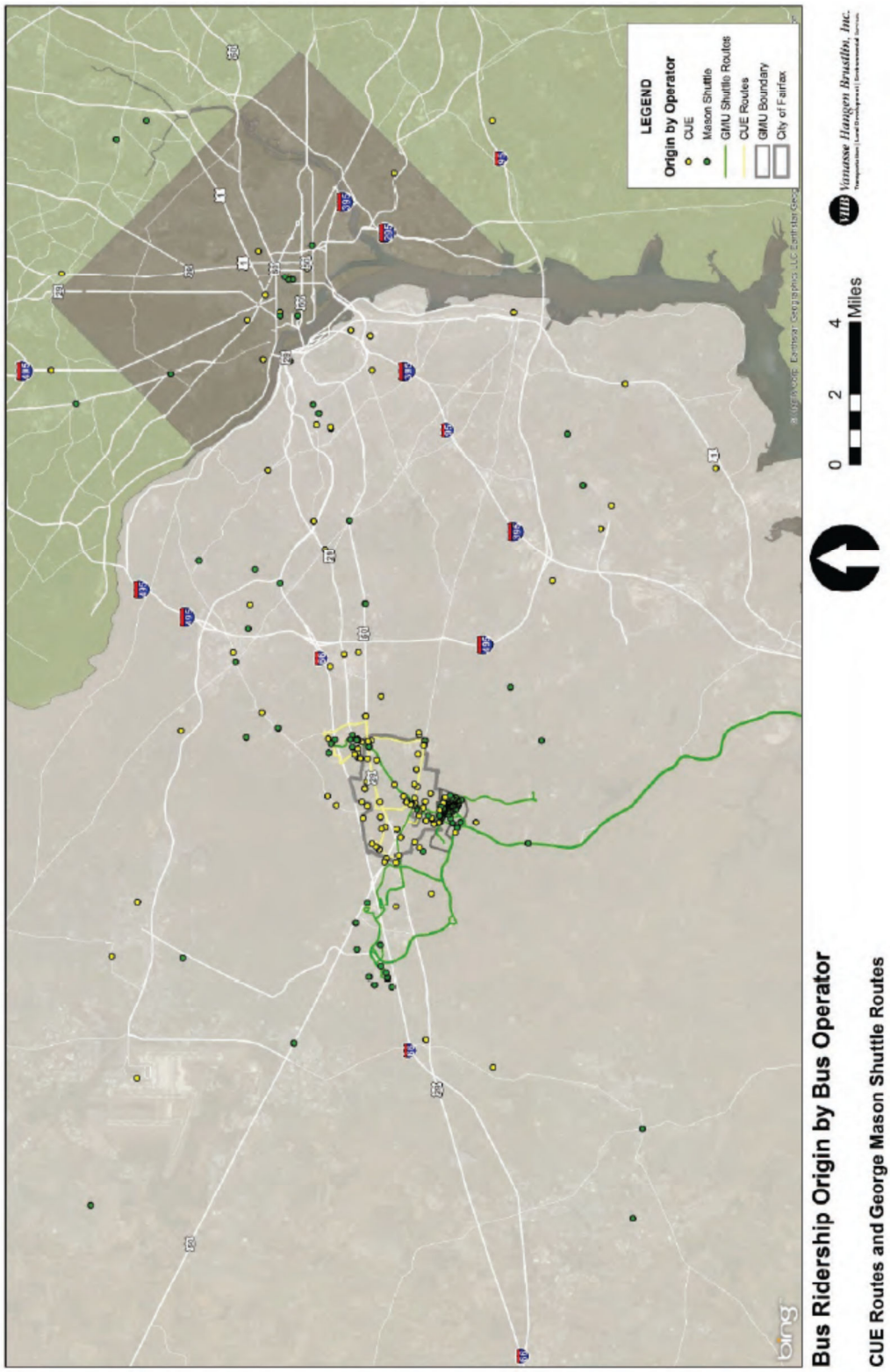
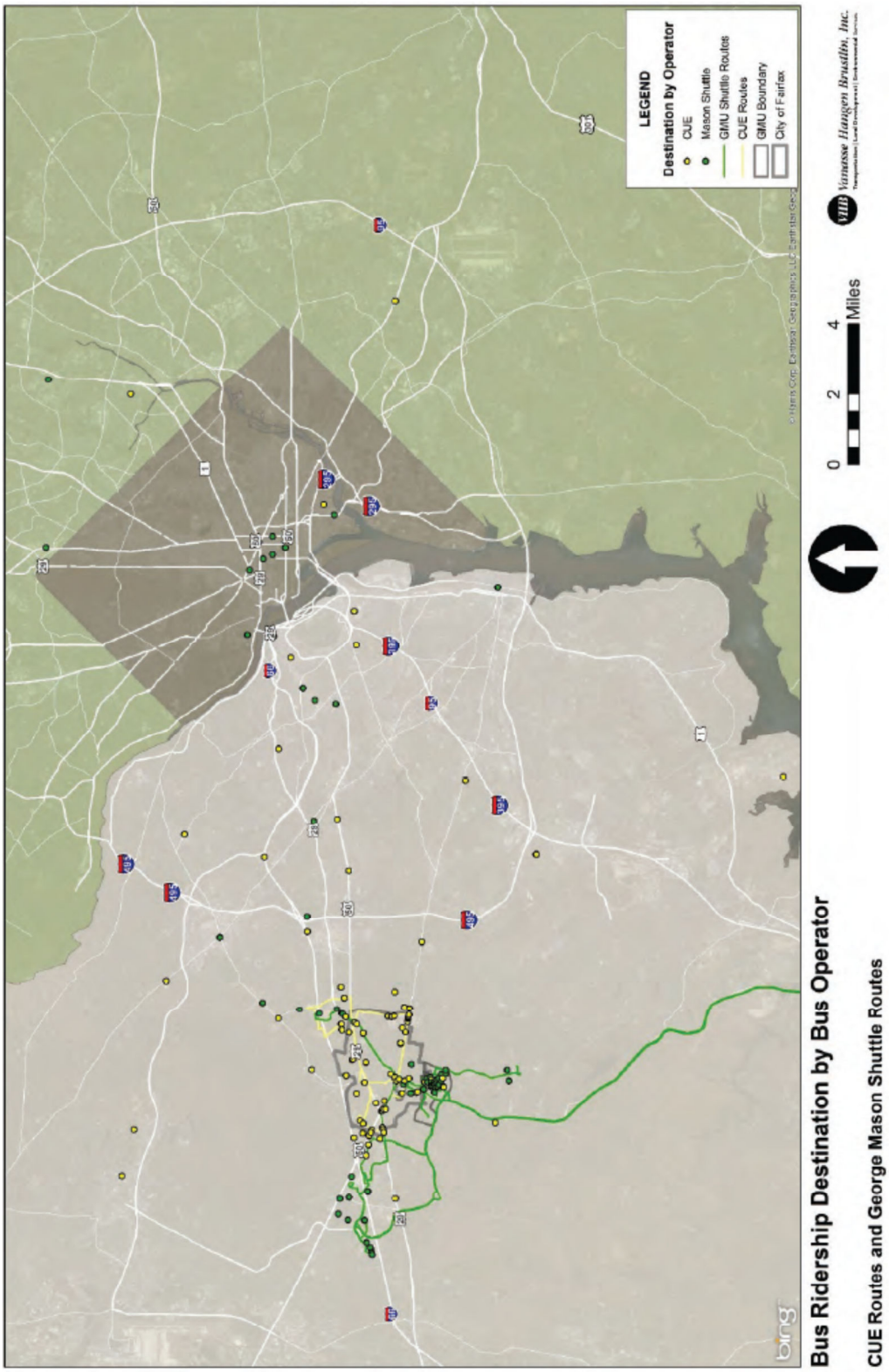


Exhibit 3-6: CUE Bus Trip Destinations



Household Surveys

The George Mason University Center for Social Science Research also conducted household surveys as part of the 2016 study to identify reasons that individuals do not use transit, as well as factors that may encourage choice riders to use transit more frequently. The household survey was conducted online and through hard copies in April and May 2014; 995 responses were collected, the majority of which were from city residents (and the remainder by individuals affiliated with Mason). Highlights from the household surveys included:

- High awareness of CUE services (98% of respondents), though more than half were not aware of the availability of real-time passenger information.
- Respondents were mainly satisfied with most aspects of CUE service; the top areas of dissatisfaction were wait times, the service area, and days and hours of service, and to a lesser extent on-time performance.
- The most common reason residents do not use CUE is their preference for other modes of transportation; other reasons were that the routes do not meet their needs and the travel time is too long, and to a lesser extent because destinations are too far and the frequency is low.
- Respondents requested CUE service to Fair Oaks Mall, the Fairfax Villa neighborhood, and Fairfax hospital.

Stakeholder Input

During May and June 2016, in-person interviews were conducted with local stakeholders to gain an understanding of transportation needs, challenges, and opportunities for the city. The stakeholders represented civic, educational, and human service agencies. CUE drivers and the Transit Superintendent were also interviewed to solicit input on methods to improve transit. The stakeholders that were interviewed are listed below.

- City Councilmember Janice Miller
- City Councilmember Jeffrey Greenfield
- City Manager Bob Sisson
- City Department of Community Development and Planning
- City Human Service Coordinator
- Mason
- Northern Virginia Community College
- Virginia International University
- CUE Superintendent and Operators

This section is organized to highlight the overarching themes that emerged from the in-person interviews. Input from the Transit Advisory Committee of the TDP update is also incorporated below.

Unmet Needs

- Low income individuals need to get to the Fairfax County Government Center Complex to sign up for social services.

- In the short term provide direct service to OLLI and Green Acres Senior Center – Note both are looking to move to transit accessible locations in the city within the next few years.

    - Peak attendance at OLLI is during midday
    - Residents living in the northern part of the city need to reach Green Acres

- Few other senior transportation needs identified – recurring theme was that older adults prefer to drive and it's hard to get them to try transit.

- Mason plans to add 1,000 beds to the Fairfax campus in the next five years, which will increase transportation needs.

- VIU students that live in the city (apartment complexes such as Circle Tower Apartments and Oakton Park Apartments and townhouses along Jermantown Road) need to reach the new campus off Lee Highway, about one mile west of the city; students also go to H-Mart and Main Street.

    - VIU students are international students, most of which are familiar with public transit and do not have a driver's license or access to a car.

    - VIU started operating a shuttle for students but demand exceeds capacity.

    - In the last three years VIU's student population has tripled to about 1,300.

- NOVA Annandale students and employees that live in the city are an untapped market.

- Service to Fair Oaks Mall and Fair Lakes.

- Hotels along Fairfax Boulevard have unmet transportation needs – Note these are actually located along CUE routes, so the need may be for increased marketing to tourists and hotel employees.

Service Improvements

- Change Gold routing to serve Fairfax Boulevard and Bevan Drive instead of Warwick Avenue.
- Increase service frequency.
- Streamline the routes (more linear) to attract ridership.
- Provide express service between city housing geared toward Mason students and the campus – the existing routes are circuitous.
- Extend CUE Green route to NOVA Annandale during midday to connect students to dining options on Pickett Road.

Opportunities for Increased Marketing

- To city residents and workers (e.g., travel training) to improve understanding of the destinations CUE currently serves.
- To Mason students to increase awareness that CUE is an option along with Mason Shuttles:
    - Improve students' understanding of destinations served by CUE outside of Old Town (e.g., Pickett Road).
    - Address perception of Mason students that the Gold Route takes longer than the Sandy Creek-Vienna Metro Route.
    - Market late night use of the CUE bus as an alternative to the 10:30 p.m. Sandy Creek-Vienna Metro trip, which is full.
    - Mason switched its real time information platform to Ride System, so students are no longer able to see both Mason Shuttles and CUE services on NextBus.
    - Mason is developing a Mobile Mason app – opportunity to add CUE information.
- If CUE were to extend service to NOVA Annandale, promote CUE as a transit option to reach the Annandale campus and promote dining options at Pickett Road to students.
- To Eaton Place employers, which are unaware that CUE serves their front doors.

- To youth (e.g., free Student Bus Pass available).
- Make bus schedules available in businesses.
- Develop marketing materials that feature CUE riders and why they take the bus.

Bus Stop and Operational Issues

- Bus stop improvements on Fairfax Boulevard.
- CUE Gold stop and Mason Shuttle stop are not located near each other at Vienna Metro station, which is a barrier to Mason students seeing CUE as an option. Note: In Fall 2016 CUE worked with WMATA and Fairfax Connector to rearrange the bus bays at Vienna Metro.
- It can be difficult to navigate small turning areas with the larger size CUE buses, which are needed to accommodate peak demand (sometimes standing room only). Consider using smaller buses during off peak periods.

Policy Issues

- Explore reciprocal use between CUE and Mason Shuttles.
- Lack of political will to extend service outside the City.
- Lack of political interest to increase operating costs (e.g., related to service expansion).

CONCLUSION

The extensive analyses of system performance, trends, and unmet needs performed in this TDP update and in the 2016 *George Mason University and City of Fairfax Transit Study* identified several issues that the service alternatives will seek to address:

- **Ridership decline and attracting ridership** – Ridership has decreased for the system as a whole, with the greatest drops on the Gold Routes and notable decreases in weekend ridership.
    - Decreased usage of the Vienna Metro station and Metrorail overall, the availability of other transportation services and alternative modes, fare increases, decreasing gas prices, and changing employment levels have contributed to CUE's ridership decline.

  - The study team will examine diversifying major destinations beyond Mason and the Vienna Metro and meeting specific needs for older adults and students to increase ridership and attract new ridership.

  - To attract new riders, service improvements should focus on decreasing travel times, serving additional destinations, and improving frequency.

- **On time performance** – Need to improve the Gold 2 Route to meet the performance standard.

- **Bus stop improvements** – Add bus shelters to stops with high ridership activity.

- **Awareness of real-time passenger information** – While community awareness of CUE service is high, there is a need to increase awareness of the availability of real-time passenger information through NextBus.

In addition, the analysis identified several opportunities for CUE:

- **Expand Communications and Marketing** – To various groups including university/college students, youth, and businesses.

  - The community survey found that respondents do not use CUE because they prefer other modes (presumably driving). CUE could develop marketing efforts targeted at getting residents and workers to "try transit."

  - CUE could increase its efforts to work with employers to provide transit benefits.

- **Better Serve Older Adults** – With individuals ages 65 and older being the city's fastest growing age cohort (from 2010 through 2020), CUE could be an important transportation option for this population. Barriers to address include unfamiliarity with using transit and the need to provide direct service to major destinations.

- **Service Area Expansion** – The demographic analysis and survey results indicated high transit needs in the areas immediately adjacent to the city boundary, including Mantua and Lee Highway west of the city. The study team will examine alternatives for the CUE routes and City Wheels.

- **Expand City Wheels** – Expand the program to serve additional populations, including older adults and low-income individuals, and destinations identified as unmet needs.

  - Currently only residents with a disability, who find it difficult or impossible to use conventional bus service due to a medical reason, are eligible for the

program. The needs analysis identified unmet needs for older adults to reach OLLI and Green Acres Senior Center and for low income individuals to reach the Fairfax County Government Center. City Wheels could be an alternative to meet these needs with the expansion of program eligibility.

- The City Wheels service could be expanded to specific destinations such as Fairfax County Government Center, Fair Oaks Mall, and Inova Fairfax Hospital, as a more cost-effective option than extending CUE routes outside the city.

- The city should work with the taxi contractors to provide accessible vehicles if needed.

Service alternatives to address these issues and opportunities are presented in detail in the next chapter.

Chapter 4
Initial Alternatives for Consideration

INTRODUCTION

This chapter presents the initial organizational and service alternatives that the City of Fairfax considered in improving CUE services over the six-year TDP horizon. The study team developed these initiatives with input from City of Fairfax staff and the CUE Transit Advisory Committee (TAC). The initiatives have been developed to support the goals and outcomes identified in Chapter 2, as well as the issues and opportunities identified through the system evaluation and needs analysis in Chapter 3.

Each initial alternative is described below including the advantages and disadvantages, a cost estimate, and a ridership estimate where applicable. Service alternatives are presented first, followed by organizational initiatives. These alternatives were a starting point for discussion of the projects to be included in the TDP, and were reviewed by the City Council, the TAC, and the public. The study team then incorporated the public and stakeholder input to refine or eliminate alternatives and developed recommendations to include in the final TDP.

SERVICE ALTERNATIVES

The TDP analyses and input collected from stakeholders and the TAC found that the existing CUE system generally performs well, meets the needs of existing riders, and provides a satisfactory level of service for the community. The main issue to address moving forward is how CUE can stem or reverse the trend of decreasing ridership in recent years. The analysis in Chapter 3 found that several factors have likely contributed to this trend: decreased use of the Vienna Metro station and Metrorail overall, availability of other transportation services and alternative modes, fare increases, decreasing gas prices, and reduced employer sponsored transit benefits. Nearly all these contributors are outside of CUE's control aside from fares, which were increased to match the regional bus fare for WMATA.

It is difficult to determine what the short-term impacts of WMATA's SafeTrack program on local bus ridership including CUE's will be. SafeTrack is reducing Metrorail capacity and lengthening rider's travel times for a one-year period, planned to end in summer 2017. WMATA has encouraged Metrorail riders, which comprise half of CUE's ridership, to find alternate travel options during this time.[1] The question remains as to whether riders will return to Metrorail at the end of SafeTrack, or continue to use their alternate transportation.

[1] WMATA. *SafeTrack*. Accessed October 2016. Retrieved from http://www.wmata.com/rail/safetrack.cfm.

This unknown is further complicated by WMATA's projected $275 million budget deficit for FY 2018, which could result in significant service cuts for Metrorail and Metrobus.[2]

Given this context, the study team following input from the TAC focused on service alternatives that could attract ridership by serving new markets and destinations, such as older adults going to OLLI or Green Acres Center and Northern Virginia Community College (NOVA) students coming into the city for dining and shopping. This section also includes schedule related and program based initiatives designed to increase ridership.

It is worth noting that some concepts were introduced, but not further developed based on feedback from the TAC and city staff:

- Restructuring CUE routes from the current loops to linear routes. While linear routes could provide faster travel times for some riders, they would likely increase the number of transfers for some riders and there is no natural hub in the city to facilitate transfers.

- Extending CUE to provide direct service to Virginia International University, located off Lee Highway about one mile west of the city. This extension would negatively impact CUE's core ridership by extending travel times.

- Extending CUE west to serve Fair Oaks Mall or Fair Lakes. This extension would dilute the city's economic development goals. Further, affordable alternatives including other transit services, Uber, and Lyft are available to access these destinations.

- Extending the Green Route to serve NOVA. This extension would negatively impact existing riders by extending travel times.

The initial service alternatives proposed for consideration are detailed below including:

- A summary of the service initiative,
- Potential advantages and disadvantages,
- An estimate of the operating and capital costs, and
- Net ridership estimates (if applicable).

Methodology for Cost and Ridership Estimates

The cost and ridership projections represent estimates for planning purposes. City staff will complete more detailed budgets and analyses of ridership impacts at the time that initiatives are implemented, based on current costs and any changes in ridership factors.

[2] WMATA. (October 13, 2016.) *FY2018 Operating Budget Prep Session*. Retrieved from http://wmata.com/about_metro/board_of_directors/board_docs/101316_4AFY2018BudgetPrep.pdf.

The operating cost estimates for these service alternatives were based on CUE's fully allocated costs, which account for all of the system's costs on a per unit basis. This approach may overstate the incremental cost of minor service expansions, as some administrative expenses likely would not increase with the addition of a few service hours. These cost estimates were based on CUE's FY 2015 operating cost of $106 per revenue hour.

In terms of capital cost estimates, it is worth noting that CUE currently has a 33% spare ratio (four spare revenue vehicles) and could potentially put two more buses into service and still have a 17% spare ratio (two spare vehicles), which is within industry guidelines. The capital cost estimates provided for each service alternative outline the costs associated with expansion vehicles, but depending on which alternatives are implemented and when, some service initiatives could be implemented using CUE's current fleet. The cost estimate per bus was based on CUE's 2015 purchase of clean diesel replacement buses, costing about $500,000 each.

The net ridership estimates were based on estimates for additional ridership, less potential ridership losses due to service changes where applicable. The estimates for additional ridership started with the number of individuals in the potential market for the service alternative. Then the study team applied transit mode shares of 2% (an industry standard in terms of the minimum portion of a general population that uses transit) and 5% (a conservative threshold for a high transit mode share[3]) to determine a range of the potential market that may use CUE services. Assumptions on the number of trips that may be taken per week (times 52 weeks in a year) were applied to the number of transit users based on the 2% to 5% mode share to estimate the annual additional ridership. Potential ridership losses due to service changes were based on observed boardings by stop or time of day, where available from the 2016 *George Mason University and City of Fairfax Transit Study*.

Most of the service alternatives will require an update to CUE schedules and maps and reprinting the Transit Guide, as well as an update to the NextBus programming. CUE staff will also need to develop communications and marketing materials to educate riders and the community on changes to existing service and new services.

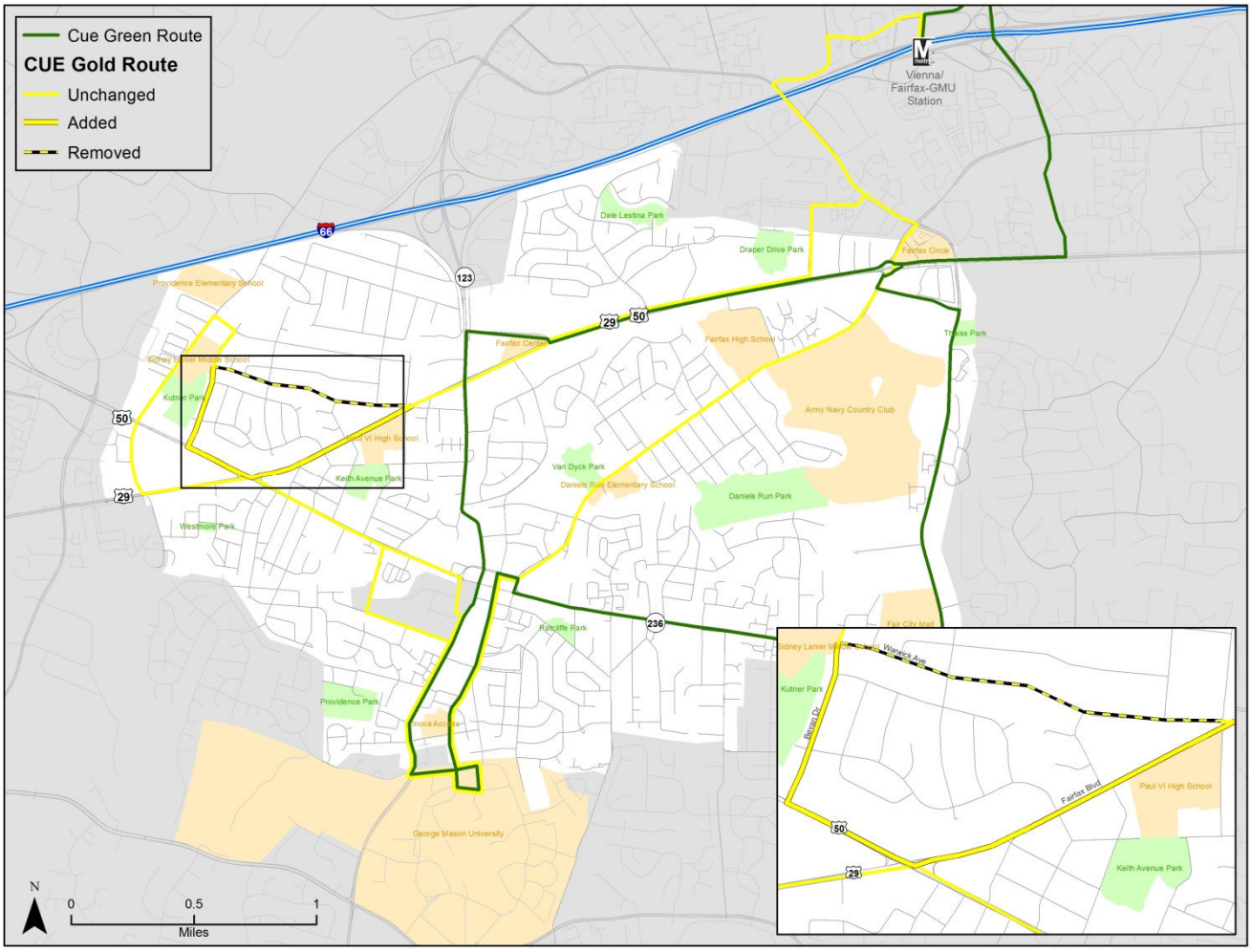
Service Change #1 – Modify Gold Routing to Bevan Drive and Fairfax Blvd.

The city Community Development and Planning staff suggested modifying the Gold Route to serve the new mixed-use Novus Fairfax Gateway development and the western portion of Fairfax Boulevard that is currently unserved. Novus Fairfax Gateway will add 403 rental

[3] In the recent household survey conducted as part of the 2016 *George Mason University and City of Fairfax Transit Study*, about 8% of respondents indicated that they use the bus "very often" and 9% indicated that they use the bus "somewhat often." In addition, 2010-2014 American Community Survey data on means of transportation to work indicated that 11% of employed city residents commute by public transportation.

apartments and 29,000 square feet of commercial space to the Kamp Washington area, with groundbreaking expected in 2017. This routing modification will also provide direct service to retail destinations, the Hampton Inn, the Breezeway Motel, and Paul VI Catholic High School located along Fairfax Boulevard. Paul VI Catholic High School plans to move out of the city in 2020, and mixed-use redevelopment is planned for the lot, possibly during the later years of the TDP timeframe. Figure 4-1 portrays the proposed routing modification.

Figure 4-1: Modified Gold Routing



Advantages

- Directly serves new mixed-use development in Kamp Washington and Fairfax Marketplace and hotels on Fairfax Boulevard, which currently do not have CUE service.

- Serves the "front door" of the Shops at Fairfax Boulevard (including HMart, Petco, and Panera Bread), whereas the current Gold routing serves the back of the shopping center.

Disadvantages

- Eliminates direct service on Warwick Avenue, which is a residential area of single family homes.
    - Recent ridership counts on CUE recorded 25-30 weekday boardings along Warwick Avenue on each the Gold 1 and Gold 2 routes.
    - Riders that currently board along Warwick Avenue would need to walk up to 0.4 miles further to reach the nearest Gold Route stop.
    - CUE will need to provide good communication regarding the route and bus stop changes to riders along Warwick Avenue.

Cost

- This initiative could be implemented within the existing service hours for the Gold Route using the existing buses, and would be cost neutral.

Ridership

- The net change in ridership is estimated to be up to -1,400 passenger trips per year.
    - Based on the number of new residential units at Kamp Washington and assumptions on transit mode share, it is estimated that the Gold routing modification will result in 5,000 additional passenger trips per year.
    - Based on observed boardings per stop, eliminating direct service on Warwick Avenue could result in a loss of 6,400 passenger trips per year.

Service Change #2 – Provide Scheduled Deviations to OLLI and Green Acres Center on Green Route

Stakeholders identified GMU's Osher Lifelong Learning Institute (OLLI) and the Green Acres Center as destinations that older adults need to reach, but are currently not directly accessible by transit. OLLI offers classes year round from about 9:40 a.m. to 3:40 p.m. Monday through Thursday and various clubs and activities on Fridays. Not only is parking at OLLI limited, but Roberts Road is a hill that can present poor driving conditions for older drivers.

Green Acres Center hosts senior activities each weekday from about 8:00 a.m. to 3:30 p.m., ending around 1:00 p.m. on Fridays. Both OLLI and Green Acres Center are looking to move to transit accessible locations in the city eventually, but this alternative could provide a good transit option in the meantime. It is worth noting that Green Acres Center is a five minute walk from the CUE stop at Mason, and the center already works with Fastran to provide transportation to seniors who need it.

This service alternative proposes to provide scheduled deviations to OLLI and Green Acres Center from Green Route 2, as more residential areas would be served before arriving at the destinations (though the cost would be the same to provide deviations from Green Route 1). The scheduled deviations would occur on weekdays, during midday trips only. Specific midday trips would be designated to serve OLLI to meet class schedules, while the other midday trips could serve Green Acres Center.

Each deviation to OLLI would require the CUE bus to travel an additional two miles including a viable turnaround via Still Meadow Road, while the deviation to Green Acres Center requires an additional 1.5 miles. Figure 4-2 portrays the proposed routing for the deviations.

Advantages

- Serves unmet need for older adults to reach key destinations identified through stakeholder input.

- Provides a safe and affordable transportation option to the city's older adult population, which is projected to be the fastest growing age group through 2020.

Disadvantages

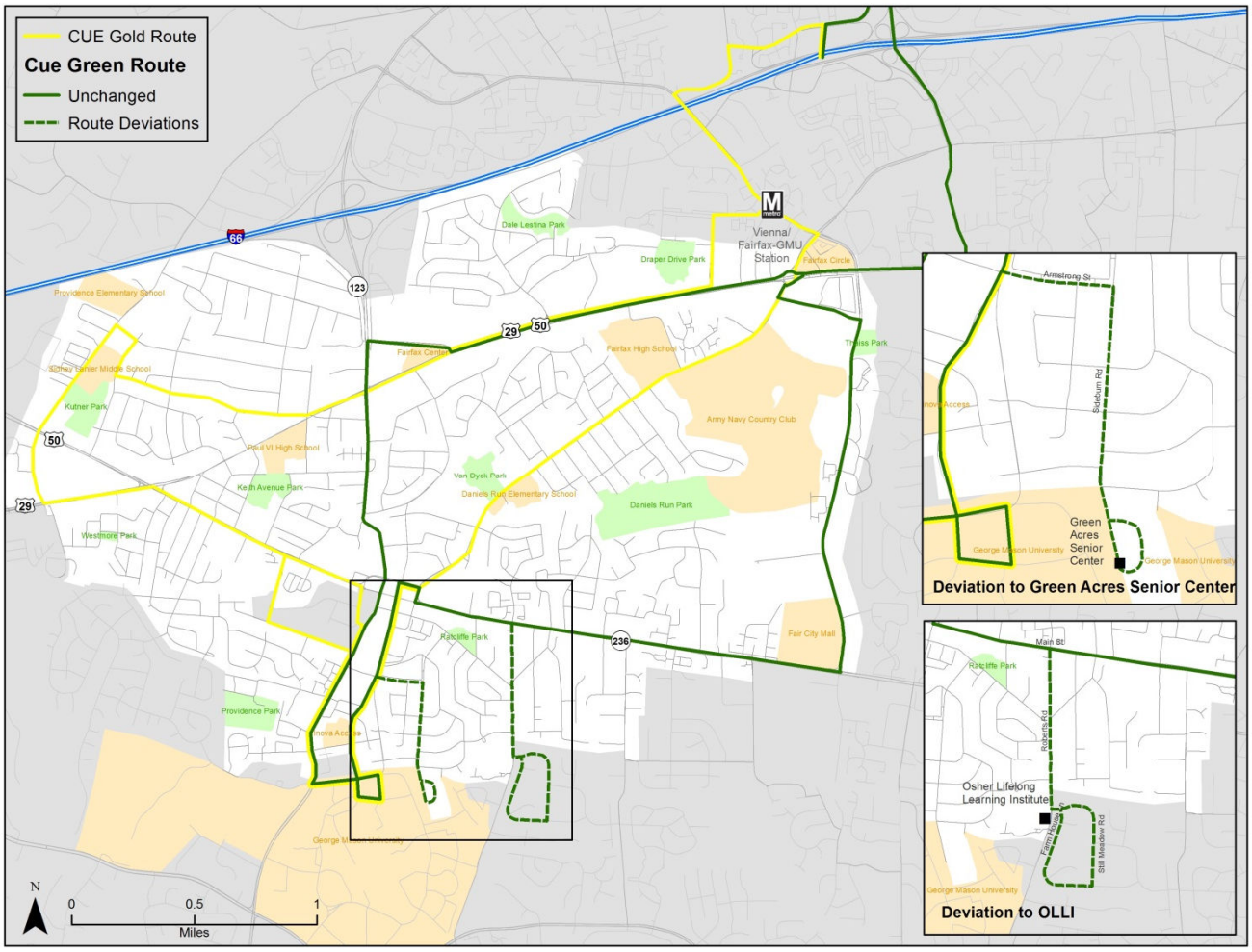
- Deviations would extend travel time for midday riders that travel on the segment between Mason and Roberts Road by about 10 minutes, potentially resulting in ridership loss. However, some riders could use Green Route 1 for a comparable travel time to the Vienna Metro.

Costs

- 1,800 additional service hours to provide scheduled deviations during midday will cost about $189,000 annually. This cost estimate is based on the need for an additional vehicle and driver during the midday.

    - However it is possible that the existing two buses on the Green Route 2 could provide the scheduled deviations or the schedule could be adjusted to use only two buses, in which case this initiative would be cost neutral. A cost neutral

Figure 4-2: Scheduled Deviations to OLLI and Green Acres Center on Green Route



initiative also relies on deviating to serve only one destination per trip (OLLI or Green Acres).

- If an additional bus is required, CUE could use its current fleet or purchase an expansion vehicle for $500,000.

Ridership

- The net change in ridership is estimated to range from a loss of -3,200 passenger trips per year to an additional 4,000 trips per year.
    - Based on the number of city residents that attend OLLI and Green Acres Center and assumptions on transit mode share, it is estimated that the scheduled deviations will result in 4,800-12,000 additional passenger trips per year.

- Based on observed boardings per stop and midday ridership on the Green Route 2, the scheduled deviations which will add travel time for riders already on the bus is estimated to result in a loss of 8,000 passenger trips per year.

New Service Alternative #1 – Feeder Service to Burke Centre VRE

Given the need for commuters to find travel alternatives to Metrorail during SafeTrack, the TAC suggested exploring service alternatives to the Burke Centre VRE Station, located 3.5 miles south of the city. This would be a new route for CUE, which would require further detailed analysis of costs and demand before implementation.

The Burke Centre VRE Station is on the Manassas Line, which provides connections to Alexandria, Crystal City, and downtown D.C. This alternative proposes service from Fairfax Circle and/or Jermantown Road, which are CUE's highest ridership areas with concentrations of residences (aside from Mason), to the Burke Centre VRE. Two routing options are proposed from Fairfax Circle, one serving OLLI and the other serving GMU. The proposed route from Jermantown Road serves GMU.

It is worth noting that Mason Shuttles already operates an express route to Burke Centre VRE from campus, which runs longer hours in the peak periods than the proposed CUE alternatives including a new late night trip. However, the Mason Shuttle route is promoted as a parking shuttle, given the free garage parking available at the VRE station, rather than a commuter service. The fall 2016 Mason Shuttle schedule only meets one northbound train in the morning and two southbound trains in the evening, with reasonable wait times.

Fairfax Connector also has a new route 313 planned for FY 2017, which is proposed to travel along Lee Highway (US-29) and Main Street through the city, serving the Fairfax County Judicial Complex and Mason, and connect to Burke Centre VRE Station. Service is proposed Monday through Saturday including 30 minute frequencies during peak periods and hourly frequencies during off-peak periods. As proposed, Fairfax Connector Route 313 would be less convenient for city residents as most would need to transfer from a CUE route to Route 313. Potential riders would likely find the minimum two-transfer trip (second transfer to VRE) and longer travel time unattractive.

Figure 4-3 portrays the route option from Fairfax Circle to Burke Centre VRE, and Figure 4-4 illustrates the proposed option from Jermantown Road. CUE could implement one of the routes or both. Each option is proposed to operate on weekdays during peak periods only, and would be scheduled to meet the northbound trains in the morning (five trips) and the southbound trains in the afternoon and evening (six trips). The proposed routes travel along existing CUE alignments and could increase service frequencies for local trips during peak periods. The alternatives could stop at existing CUE stops within the city and would run express between Mason and Burke Centre VRE.

Advantages

- Provides direct service from high ridership areas in the city to the nearest VRE station.
- Provides an alternative for Metrorail commuters, given the reduced capacity and reliability of Metrorail service.
- Where the alternatives overlap with existing CUE service, provides increased service frequency for local trips within the city during peak periods, including Fairfax Circle to downtown and Mason and Jermantown Road to Main Street and Mason.
    - Could help meet increased demand for transportation to/from Mason, which plans to add 1,000 beds to the Fairfax campus in the near term.
- The Fairfax Circle option will provide direct service to planned redevelopments at Fairfax Circle and Layton Hall, which will include 400 and 360 apartment units respectively.

Disadvantages

- Adds notable expenses, both operating and capital, as new service.

Costs

- Each proposed route will operate 2,800 hours of service, costing $297,000 annually.
-
- Each route will require two expansion vehicles for a capital cost of $1 million.
    - It is possible that CUE's existing fleet could be used to operate one route, as long as the two vehicles are not used for any other alternatives during the peak periods.
- If both options are implemented, the additional 5,600 hours of service will cost $595,000 annually, and four expansion vehicles will cost $2 million.

Ridership

- Based on the number of city residents that work in D.C. and Alexandria and assumptions on transit mode share, it is estimated that feeder service to the Burke Centre VRE will result in 18,200-44,700 additional passenger trips per year.

Figure 4-3: Fairfax Circle to Burke Centre VRE via Mason

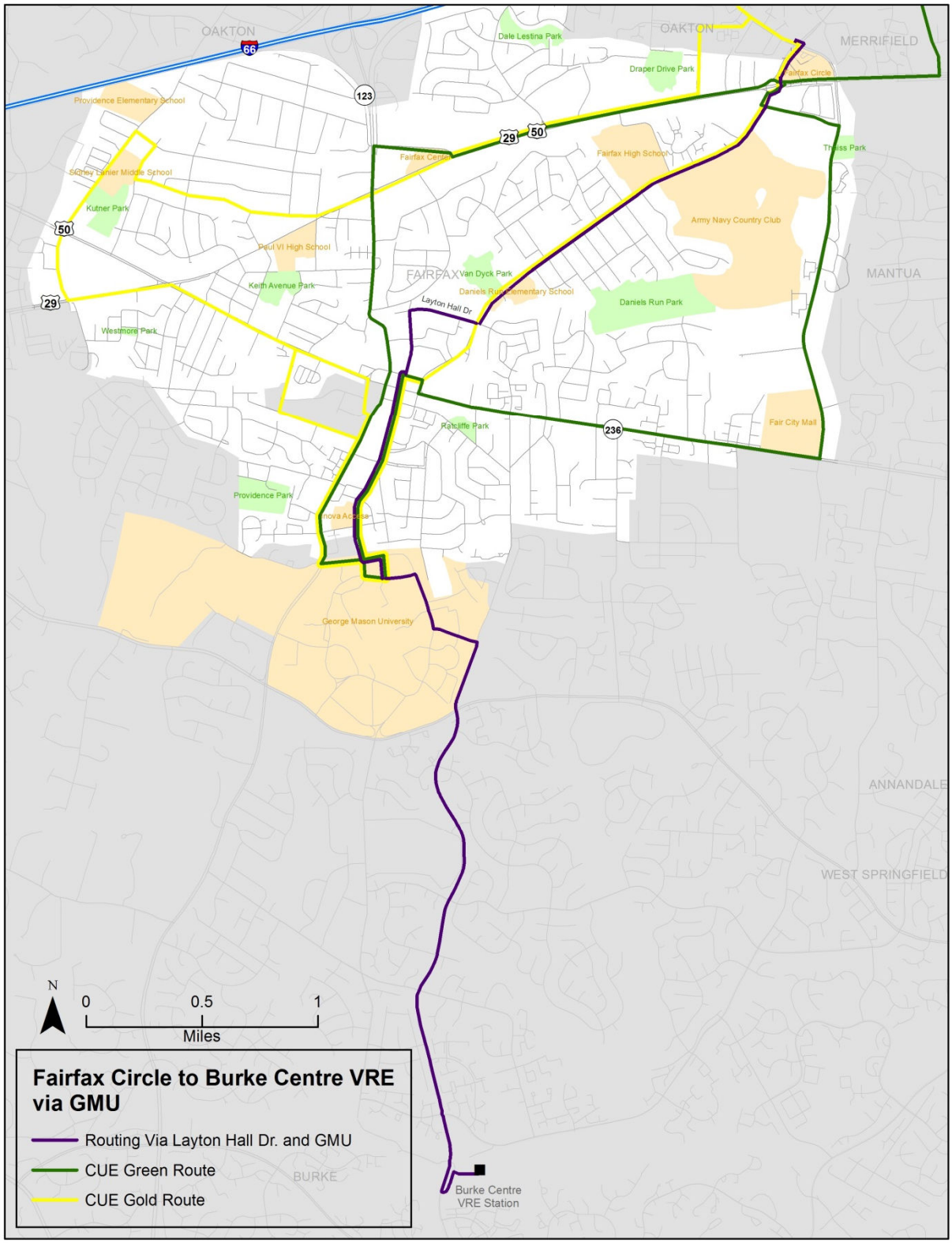
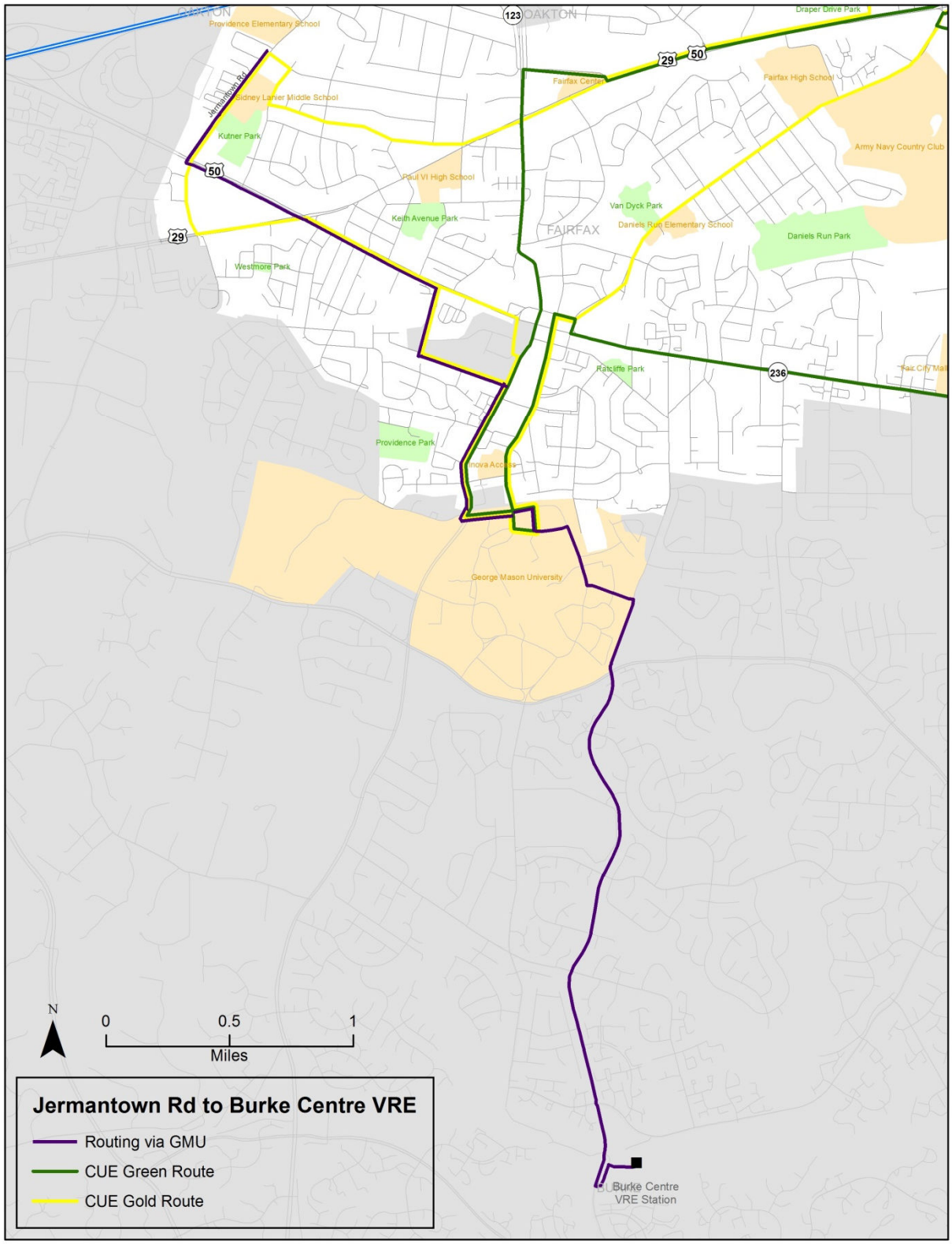


Figure 4-4: Jermantown Road to Burke Centre VRE via Mason



New Service Alternative #2 – Circulator Connecting NOVA to City Dining/Shopping

Stakeholders identified NOVA students as an untapped market for CUE, particularly to access dining and shopping options in the city. This alternative proposes for CUE to provide a new direct connection between NOVA (located two miles away) and the city through new circulator service. This would be a new route for CUE, which would require further detailed analysis of costs and demand before implementation.

Since Metrobus Routes 29K/N and NOVA's Route A Shuttle already provide transit options for commuting to NOVA, this service alternative focuses on providing a convenient transit option for students to access city dining and shopping destinations during their lunch period. Service is proposed to operate Monday through Thursday only to start, as NOVA's class offerings and student population at its Annandale campus are lower on Fridays.

It is worth noting that Metrobus 29K/N both provide an existing transit connection between NOVA and Pickett Road at a combined 30 minute frequency during the midday on weekdays. Metrobus 29K provides hourly service between NOVA and Old Town. Though these transit options exist, stakeholders from NOVA indicated that students would be more likely to use CUE for local trips to the city.

Figures 4-5 and 4-6 portray the options for new circulator service to either Pickett Road or Old Town. CUE would only implement one of these route options. The new circulator service is proposed to operate at 15-20 minute frequencies. Assuming no more than two vehicles will be used to implement this alternative, the circulator to Pickett Road could provide 15 minute frequency, and the circulator to Old Town could provide 20 minute frequency.

Advantages

- Serves a new market for CUE with potential for increased ridership without significant service expansion.
- Meets a need identified through stakeholder input.
- Supports economic development in the city by bringing NOVA students to Fair City Mall, Turnpike Shopping Center, Pickett Shopping Center, and Old Town.
- The proposed frequency of the circulator options is higher than existing Metrobus service and would be more attractive to students for a lunchtime trip.

Disadvantages

- Adds operating expenses.

Figure 4-5: NOVA Circulator to Pickett Road

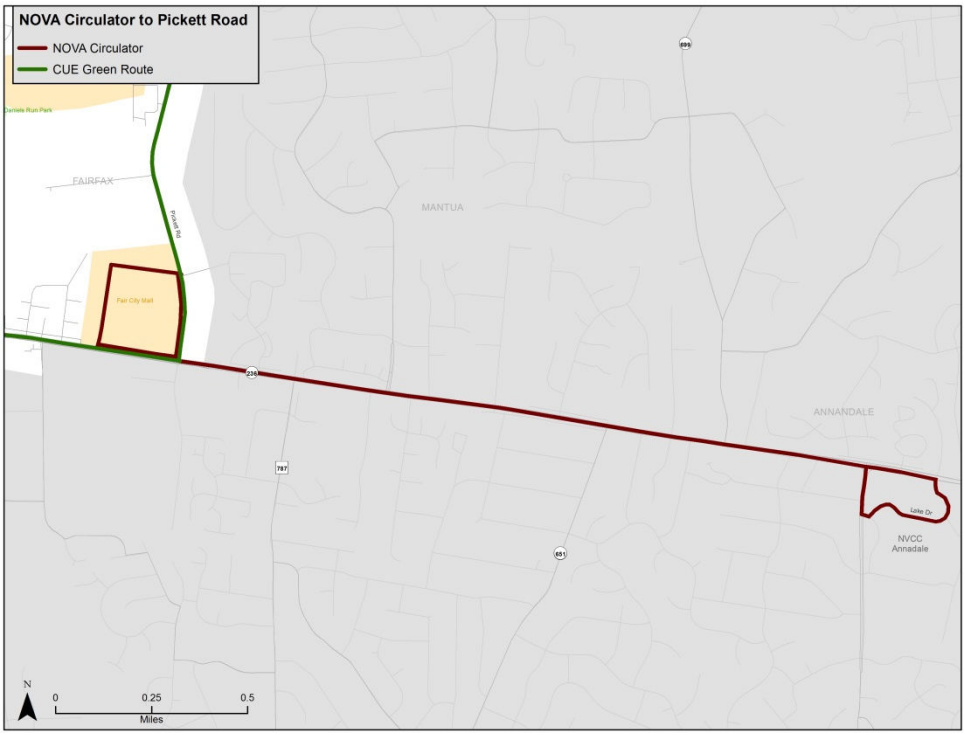
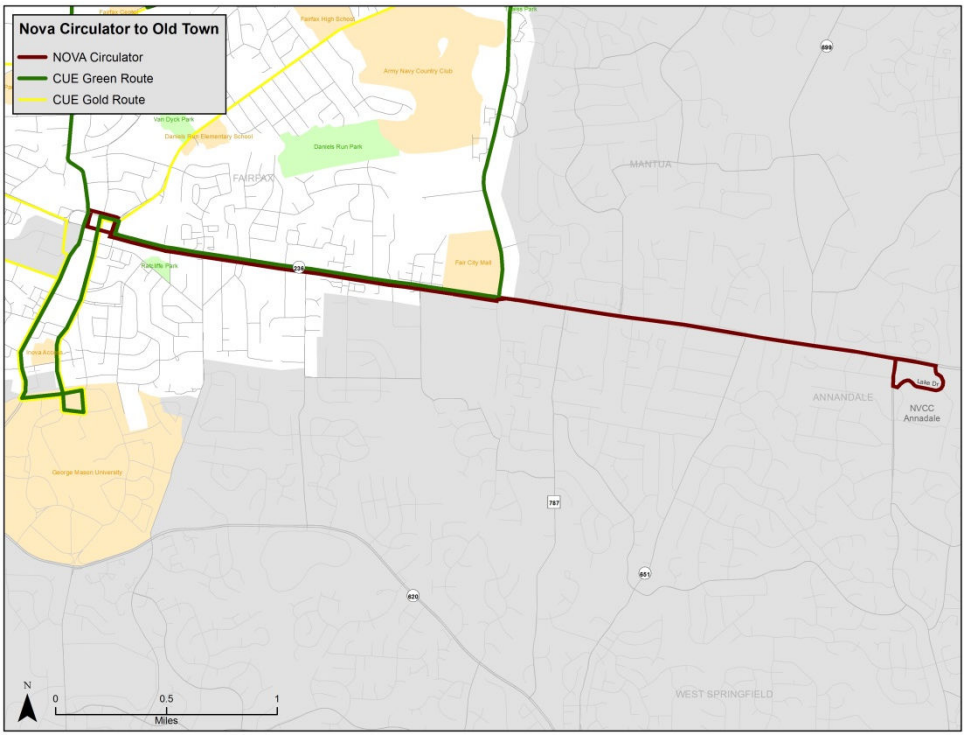


Figure 4-6: NOVA Circulator to Old Town



Costs

- Each circulator option will operate 1,500 hours of service and require two expansion vehicles, requiring $155,000 annually in operating costs and $1 million in capital costs.

Ridership

- Based on the number of full time equivalent students at NOVA's Annandale campus and assumptions about transit mode share, it is estimated that new CUE service connecting NOVA to city dining and shopping options will result in an additional 10,800 to 21,500 passenger trips per year.

Program Initiative #1 – Expand City Wheels Program

Some of the destinations to which riders and stakeholders requested service are located near the city, including Fairfax County Government Center, Inova Fairfax Hospital, and the Fairfax Villa neighborhood. Stakeholders also identified a need for older adults to reach OLLI and Green Acres Center. This initiative proposes to meet these needs by expanding the City Wheels program in terms of program eligibility and destinations served.

Currently City Wheels is only available to city residents with a disability, who cannot use conventional bus service, and the service area includes the city, the Vienna Metro, Mason, and Fair Oaks Hospital. This initiative proposes to expand program eligibility to older adults and low income individuals. New destinations including Fairfax County Government Center and Inova Fairfax Hospital could also be added to City Wheels. The city would need to work with its taxi contractors to ensure that they have capacity for additional trips and are able to provide accessible vehicles if needed.

Advantages

- Meets needs identified through community surveys and stakeholder input through an existing transportation program that is relatively cost effective and has been underutilized.
    - Serves needs for transportation to nearby destinations outside of city limits, without extending CUE bus service and lengthening travel times for existing CUE riders.
- The curb-to-curb transportation provided through City Wheels may be more attractive to older adults, some of whom have never used the CUE bus, may have difficulty using conventional bus service, or live too far from a CUE stop.

Disadvantages

- The city has decreased its funding for City Wheels in recent years given decreased demand, and would need to increase its funding if the program expands.

- Administrative time and costs to revise the City Wheels program description and application, process new applications received, and analyze program data.

    - It may be difficult to determine and monitor the eligibility of low income individuals (may need to recertify annually). CUE staff may refer to Fastran's application and certification process for low income individuals.

Costs

- Restoring the budget for City Wheels will cost $2,500 annually (for a total of $5,000). Initially restoring the $5,000 budget should be sufficient to meet additional demand from expanding and increasing marketing for City Wheels.

- However, if the program is expanded to make all city residents age 65 and above and low income residents eligible, the program budget will need to increase by an estimated $3,000 annually to meet increased demand.

Ridership

- Difficult to determine at this time. If the city conducts targeted marketing of the expanded City Wheels program to populations with identified needs (e.g., older adults going to OLLI and Green Acres Center, low income individuals going to Fairfax County Government Center, residents going to Inova Fairfax Hospital), the initial goal could be to increase ridership back to its peak level of 300 rides annually, or 150 additional trips compared to FY 2016 usage of the program.

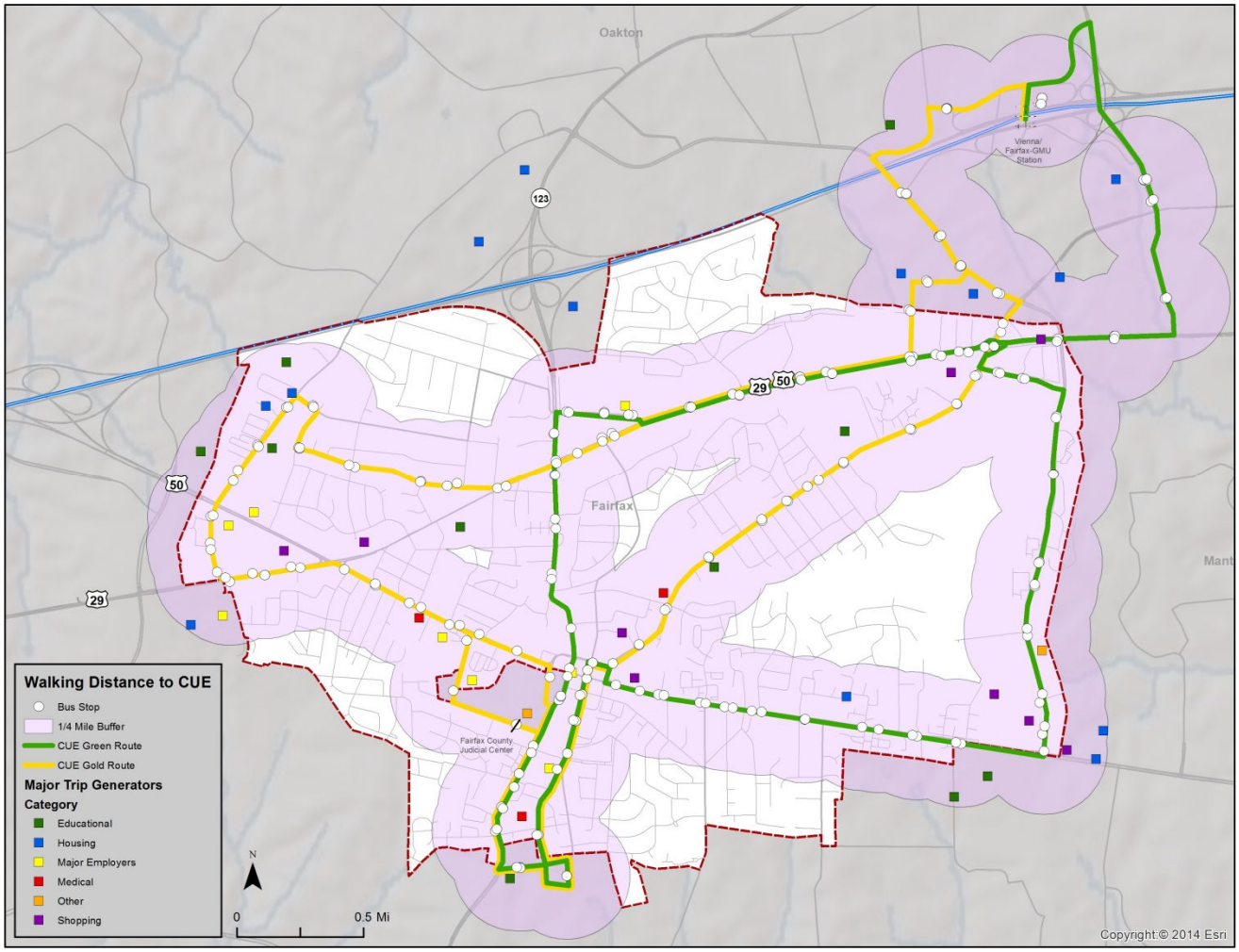
- In the later years of the TDP, with widespread marketing of the program, around 2,000 trips could be provided annually.

Program Initiative #2 – Partner with Other Modes for First/Last Mile Connection

The TAC identified the opportunity to increase CUE ridership by facilitating first and last mile connections to CUE stops. As shown in Figure 4-7, there are only a few residential areas of the city that are currently beyond a convenient walking distance (one-quarter mile) to CUE stops. This initiative proposes for the city to explore bicycling and the use of Transportation

Network Companies (TNCs), such as Uber and Lyft, to meet the first/last mile gap for those areas that do not have convenient access to CUE.

Figure 4-7: Areas within Reasonable Walking Distance to CUE Service



In 2014 the city and Mason conducted a Downtown Charrette, which recommended exploring a bicycle sharing program and identifying areas in need of bike racks. If the city pursues a feasibility study for bike sharing, it may expand the service area beyond downtown to include areas of the city that do not have convenient access to CUE service.

With the growing popularity of TNCs in recent years, transit agencies across the country have started developing partnerships with Uber and Lyft to meet transit needs and boost ridership. A peer review of these partnerships indicated that many transit agencies use TNCs to provide first/last mile connections to rail stations, while other partnerships focus on providing information on various transport options in one place to facilitate a seamless travel experience.

A few transit agencies are using TNCs for specific trips, such as providing a cost-effective alternative for paratransit trips or providing trips to low income workers for overnight shifts. The transit systems vary in whether they subsidize the trips provided by TNCs or the rider pays the full cost.

The Pinellas Suncoast Transit Agency in Florida offers the Direct Connect program, an example of a transit partnership with TNCs to provide a first/last mile connection to a bus stop. CUE could explore this option with Uber or Lyft. The partnership could be effective in boosting CUE ridership particularly if the city covers the cost of the TNC trip, which should be low if the TNCs are only traveling about one mile to the nearest CUE stop. Questions for such a partnership include whether city residents would use a TNC just to reach a CUE stop (as opposed to going straight to their destination using the TNC), and related, whether there is enough demand from city residents to make the partnership attractive for TNCs and their drivers.

If the city explores partnering with TNCs, it is worth comparing the cost of TNCs potentially operating the City Wheel program versus that of the current taxi contractors. However, TNCs also present a host of issues to work through including background checks for drivers and whether accessible vehicles are available.

Advantages

- Meets a need identified by the TAC for first and last mile connections to CUE, which could boost ridership.
- Partnering with TNCs utilizes a technology based transportation alternative that has become increasingly popular, especially among students and young adults.

Disadvantages

- Uncertainties as to whether residents would use a TNC just to reach a bus stop and if TNC drivers would find the arrangement attractive (given the low payment for such a short distance traveled).
- The city might need to fund a TNC partnership program to make it attractive to potential new CUE riders.
- Administrative time required to set up a TNC partnership and program.

Costs

- No additional costs are anticipated for CUE if the city is already pursuing a feasibility study for a bike share program.

- Costs for a TNC partnership, if the city subsidizes the first/last mile trips, will be determined pending discussions with Uber and/or Lyft. Costs could vary widely depending on eligibility guidelines for riders (e.g., available to any city resident or limited by age or disability, available only to residents beyond walking distance to CUE) and requirements of the TNCs.

Ridership

- Difficult to determine at this time. Ridership estimates could be developed pending results from the bike share feasibility study or data from potential TNC partners on the current usage of TNCs in the city.

ORGANIZATIONAL AND INFRASTRUCTURE INITIATIVES

Organizational initiatives include proposals for potential changes that affect the way that CUE service is administered, including infrastructure and technology projects, or staffed. Marketing and communications initiatives are also included to address a primary concern identified in the TDP analysis – CUE's recent ridership decline.

Organizational Initiative #1 – Add a Transit Planner Position

The Transportation Director oversees multiple modes in the city's transportation network, and is only able to commit a small portion of her time to the CUE bus system. While the Transit Superintendent and Transit Supervisors oversee daily operations, the Transportation Director needs assistance in transit planning, marketing, and community relations activities for CUE. This initiative proposes to add a part-time Transit Planner to the Transportation Division. This additional staff resource is especially needed for CUE to expand its marketing and communications, described below, in an effort to increase ridership. The Transit Planner can also help manage infrastructure and technology projects to be implemented over the six-year TDP timeframe.

Advantages

- Provides the staff resources needed to implement improvements to the CUE system, including service changes or new services and enhanced marketing and communications to address ridership loss.

- If assistance for CUE is provided through a part-time position, the Transit Planner's other time could be used to assist the Transportation Director with projects and planning for other transportation modes.

Disadvantages

- Adds operating expenses without a corresponding increase in the level of transit service.

Cost

- For a part-time Transit Planner, the annual salary and fringe benefits are estimated to cost $50,000.

Infrastructure Initiative #1 – Bus Stop Improvements

CUE currently maintains 198 bus stops, 43 shelters, and other passenger amenities including benches, lights, and arrival time display boards. Community stakeholders identified the need to improve bus stops along Fairfax Boulevard, the city's main commercial corridor and major focus for revitalization in recent years. The TAC discussed the need to provide bike racks at CUE stops to encourage bicycling for the first/last mile connection to bus service.

The study team identified CUE stops that are candidates for bus stop improvements based on the number of weekday boardings. The boarding/alighting data indicated that the following stops experience 20 or more weekday boardings (listed from highest to lowest weekday boardings):

- Lee Highway and Rust Road (Outbound to Mason)
- Nutley St. at Pan Am Shopping (Outbound to Mason)
- Jermantown Road at Gainesborough Court (Outbound to Mason)
- Lee Highway at Arthur Teachers (Outbound to Mason)
- Blake Ln. at Knightsbridge Drive (Outbound to Mason)
- Main St. at Lyndhurst (Outbound to Mason)
- Old Lee Highway at Willard Way (Inbound to Vienna Metro)
- Old Lee Highway at Old Pickett Road (Inbound to Vienna Metro)
- Jermantown Rd. at Comfort Inn (Inbound to Vienna Metro)
- Jermantown Rd. at James Swarts (Inbound to Vienna Metro)
- Nutley Street at Hermosa Drive (Outbound to Mason)

This initiative involves providing passenger waiting shelters and amenities at the above priority stops. The analysis in Chapter 3 identified 15 additional stops with 15 to 19 weekday boardings as candidates for bus stop improvements. Of these additional candidates, the following stops might be prioritized because they support development along Fairfax Boulevard or are adjacent to a transit trip generator:

- Fairfax Blvd. at Chain Bridge Road (Outbound to Mason)
- Eaton Place at Best Western Hotel (Inbound to Vienna Metro)
- Eaton Place at Office Park (Outbound to Mason)
- Old Lee Highway at Library (Outbound to Mason)

The possible shelter locations listed above are based on ridership or stakeholder requests, and do not reflect whether or not it is physically feasible to install the different types of passenger amenities at each particular location. The implementation of passenger amenities at each stop should take into consideration if there is enough right-of-way and adequate sidewalk and curb ramp connections.

Advantages

- Provides shelter from inclement weather for people waiting to ride the bus, as well as providing a place to sit down.

- Improves the visibility of the system and offers a marketing opportunity.

Disadvantages

- The only disadvantages are the capital cost to purchase and install the shelters as well as the ongoing maintenance costs.

Cost

- The cost to improve bus stops with passenger amenities can range from $200 to $15,000 depending on the level and type of improvements. In some instances it can exceed $15,000 if extensive engineering is required to install the amenities and comply with the Americans with Disabilities Act (ADA). Table 4-1 below provides cost estimates for potential stop improvements. For planning purposes, this initiative is estimated to cost $250,000 to install 15 shelters over the six-year TDP period.

Table 4-1: Estimated Bus Stop Improvement Costs[4]

Improvement	Unit Cost
Shelter with seating (installed)	$10,000 - $20,000
Bench (installed)	$400 - $700

[4] The estimated costs for shelters and benches are based on Montgomery County, Maryland's bus stop improvement costs.

Communications Initiative #1 – Increase Marketing of CUE Services to Specific Groups

The existing CUE services provide good coverage throughout the city, a one-seat ride for most trips, and decent service frequencies for the current level of demand. Recent public and stakeholder input indicated that some constituent groups are not aware of the places that CUE currently serves. These groups include Mason students, middle and high school students, employers located along Eaton Place, and hotels along Fairfax Boulevard. The demographic analysis indicated that older adults age 65 and older will be the city's fastest growing age cohort in the short-term. Recent surveys of the Fairfax and Mason communities found that the majority of locations to which respondents requested bus service are within walking distance of an existing CUE or Mason Shuttles stop.

This initiative proposes targeted marketing to specific groups to increase awareness of the places already served by CUE. Marketing activities may include:

- Setting up a CUE information booth to distribute the Transit Guide, informational materials, and swag at community events. When feasible bring a CUE bus to draw attention to the booth and help familiarize community members with the buses.
    - Potential events include Mason's student orientations and other campus events, middle school and high school orientations or events, and city sponsored events.
- Making sure CUE service information is included in the new Mobile Mason app that Mason is developing.
- Developing a brochure of transit options between Mason and the Vienna Metro that combines the schedules for Mason Shuttles' Sandy Creek-Vienna Metro and Global Center Metro routes and CUE's Gold routes. Similar to the Downtown Fairfax Dining guide that the city developed with Mason, the brochure will highlight CUE as a free alternative to Mason Shuttles, show that the travel times are similar, and promote the availability of NextBus.
- Working with hotels, employers, and schools to develop CUE brochures targeted to their constituents. This will likely involve working with city staff such as the Cultural Arts & Marketing Director and the Economic Development Director.
    - For example, a brochure for visitors staying at local hotels could highlight CUE service to the Fairfax Museum and Visitor Center, Old Town Fairfax, local dining and shopping options, Mason, and the Vienna Metro.

  - As another example, a brochure for Eaton Place employers could highlight (for their employees) CUE service to Vienna Metro and dining options in Downtown Fairfax.

- Meeting with student groups to educate them on how to use CUE and promote the Free Student Bus Pass Pilot Program.

- Meeting with employers to encourage them to provide transit subsidies or other transit incentives to their employees, and meeting with groups of employees to educate them on how to use CUE and their employer provided transit benefits.

- Offering travel training to potential new transit riders, which can include taking individuals or groups to ride CUE.
- Providing CUE Transit Guides and other marketing materials to developers of new multi-family residential buildings and commercial developments, so new residents and employees alike are aware of CUE as a transportation option.

- Developing marketing materials that feature CUE riders and why they take the bus, which can be shared at informational events with specific groups and through CUE's website.

- Conducting a "Try Transit" campaign that could be targeted to specific groups or the general public (residents and workers in the city). May include hosting fare free days or distributing free ride tickets or passes.

- Promote CUE as part of a citywide Transportation Demand Management (TDM) Program, which aims to reduce travel by single occupancy vehicles and encourage the use of alternative transportation modes.

Advantages

- Marketing activities are a cost-effective approach to boost ridership, compared to expanding CUE services.

- Potentially increases ridership by increasing awareness of existing CUE services.

- Develops positive relationships with community stakeholders to encourage long-term promotion of CUE services.

Disadvantages

- The proposed marketing activities may be time intensive – ideally suited for a Transit Planner to lead – and may incur low costs for producing materials, such as the targeted brochures.

- Minimal losses in fare revenue if CUE hosts fare free days or provides free rides as part of the "Try Transit" campaign.

Cost

- An industry standard is for transit systems to use 3% of their total operating budget for marketing activities. Assuming a more robust marketing effort might require 5% of the budget, the estimated annual costs (based on CUE's FY 2015 operating budget) range from $104,000 to $174,000.

Communications Initiative #2 – Increase Marketing of NextBus

Recent rider and household surveys indicated that while awareness of CUE service is high, both the usage and awareness of NextBus for real-time arrival information is low. The perception of long wait times is a common barrier to transit use; wait times for CUE were a top area of dissatisfaction in the recent household survey of city residents. If riders have accurate information on when the next bus will arrive at their stop, they can plan ahead to minimize their wait time.

CUE's NextBus system provides real-time arrival information through several venues:

- Online through a NextBus website, provided as a link from the CUE website;
- By phone, where riders can call and provide their stop number;
- By text, where riders can text and provide the transit agency and stop number; and
- By smart phone, via a free app or the NextBus website, where both options can automatically determine a rider's location to find the nearest stop.

This initiative proposes that CUE increases awareness of NextBus by:

1) Making NextBus more prominent at the top of the CUE homepage, rather than as a link on the left hand menu of the website.
2) Developing a "How to Use NextBus" flyer that outlines the different ways that NextBus information can be accessed. This flyer could be posted at CUE stops and distributed to specific groups, such as Mason students, along with the CUE Transit Guide.
3) Creating a short "How to Use NextBus" video tutorial, which may be posted on the CUE homepage and shown at community outreach events.

4) Create a QR code to CUE's NextBus website that can be included in marketing and communications materials.
5) Making NextBus prominent in any marketing and communications materials for CUE. For example, the NextBus phone number is currently provided in the bottom corner of the CUE route map in the Transit Guide, but no information is available on other ways that NextBus can be accessed.

Advantages

- Increases awareness and promotes usage among riders and the public of an existing resource.

- Potentially attracts new ridership if individuals know they can minimize their wait times for the bus.

Disadvantages

- Mason recently switched from providing real-time passenger information for Mason Shuttles through NextBus to Ride Systems, so riders have lost the ability to view both CUE and Mason Shuttle services through one system.

- The above approaches to increasing awareness of NextBus will require staff time and low costs for materials/video development.

Cost

- Part of CUE's marketing budget.

Communications Initiative #3 – Provide Information on Transit Options to Nearby Destinations

Public input received through recent surveys and stakeholder input during the TDP process included requests to several destinations near Fairfax, but outside the city limits. Participants requested CUE service to the Fairfax County Government Center Complex, Fair Oaks Mall, Fair Lakes, the Fairfax Villa neighborhood, Inova Fairfax Hospital, Virginia International University, and NOVA. Table 4-2 outlines the existing transit services available to these nearby destinations. The transit connections below do not include an extra transfer from CUE to the nearest Metrobus stop, which may be required depending on the rider's origin in the City of Fairfax.

Aside from the Fairfax Villa neighborhood, all the nearby destinations requested through public and stakeholder input have available transit connections. However the transit travel

times may be two to four times longer than driving, which means that these transit options are likely to be used only by individuals with no access to a personal vehicle.

This initiative involves providing information on the existing transit connections to nearby destinations to CUE riders and city residents, in place of expanding CUE service to these destinations. The information could be provided on CUE's website or through a flyer or brochure.

Table 4-2: Transit Connections to Nearby Destinations

Destination	Existing Transit Service
Fair Lakes	Transfer required from Metrobus 1C or 2B to Fairfax Connector 605 or 630
Fair Oaks Mall	Direct service on Metrobus 1C & 2B
Fairfax County Gov. Center	Direct service on Metrobus 1C
Fairfax Villa	None
Inova Fairfax Hospital	Direct service on Metrobus 1C
NOVA	Direct service on Metrobus 29K or 29N
Virginia International University	Nearby service on Metrobus 1C (closest stop requires 0.3 miles walk)

Advantages

- Cost-effective approach to increase awareness of available transit connections to nearby destinations, compared to expanding CUE service to these destinations.
- Minimal staff time and costs to develop and distribute informational materials.

Disadvantages

- Most transit connections to the nearby destinations will be lost if WMATA eliminates Metrobus routes 1C and 2B in the short-term.
- No fixed route transit service is available to the Fairfax Villa neighborhood.

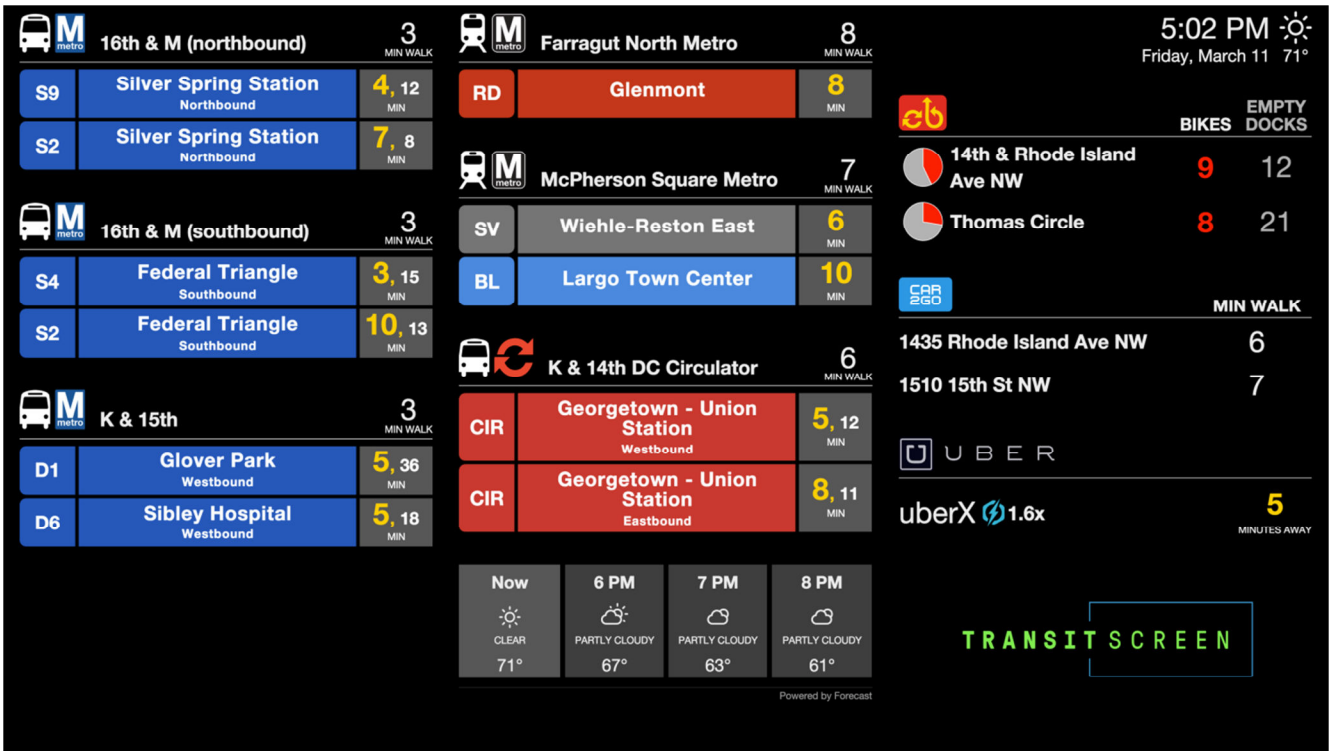
Cost

- Part of CUE's marketing budget.

Technology Initiative #1 – Place Dynamic Transit Information Signs at Strategic Locations

Related to the communications projects above is this initiative to implement technology such as TransitScreen, which provides real-time information on transportation choices including transit services, bike share, car share, and TNCs and wayfinding directions. This technology can link to NextBus to provide real-time arrival information on CUE and other transit services. Exhibit 4-1 provides a sample display from TransitScreen, which is typically shown through a large television-like monitor in central locations (e.g., lobby of apartment building, next to elevators in an office building).

Exhibit 4-1: Sample Dynamic Transit Information Sign



Source: TransitScreen website.

The city is already requiring developers to implement this type of technology as part of their TDM plans. Strategic locations to implement this transit information technology may include major employers, large apartment or condo buildings, shopping centers, and other high ridership transit stops including Mason.

Advantages

- Increases awareness and promotes usage of transit options including CUE among riders and the public.

- Potentially attracts new ridership if individuals know they can minimize their wait times for transit and see their options for alternative modes.

- Supports the city's strategy to provide transportation information through new technologies to encourage different travel behavior than relying on single occupancy vehicles, as outlined in the city's Comprehensive Plan.

- Initial capital and installation costs may be covered by developers for new developments and redevelopments.

Disadvantages

- Capital costs for the city to implement the technology at locations other than new developments and redevelopments.

- Monthly subscription costs for the software.

Cost

- Per unit, $3,000-$5,000 for capital costs and installation, plus $3,000 annually for subscription to software.

Technology Initiative #2 – New Electronic Fareboxes

CUE staff has identified a need to replace the electronic fareboxes on all CUE buses. The fleet is currently equipped with Cubic/GFI Odyssey fareboxes that are part of the regional SmarTrip system, maintained by WMATA on behalf of the local transit systems in the region. CUE was planning to deploy the New Electronic Payments Program (NEPP), following successful implementation on WMATA's bus fleet.[5] However in April 2016 WMATA decided to cancel NEPP, which would have allowed riders to pay fares using smart phones or credit cards with smart chips, following poor results from a pilot program.[6] WMATA is now pursuing other options to replace the technical components of the farebox that are now obsolete.

[5] WMATA. (May 24, 2012.) *Amendment of Solicitation/Modification of Contract for Solicitation No. FQ11248-3*. Accessed October 2016. Retrieved from https://www.wmata.com/business/procurement_and_contracting/solicitations/uploads/WMATA_FQ11248_3_Amendment_1.pdf.

[6] Di Caro, Martin. (April 15, 2016.) "Metro Dumps Next-Generation Fare Payment System After Faulty Trial." Accessed October 2016. Retrieved from http://wamu.org/news/16/04/15/metro_dumps_next_gen_fare_payment_system_after_faulty_trial.

There are two options for this initiative: 1) Keep CUE's existing fareboxes and purchase the technology to replace the control boards, estimated at $8,000 per unit; or 2) Purchase new fareboxes, estimated at $27,000 per unit.[7]

Advantages

- CUE system will continue to receive the benefits of electronic fareboxes including more accurate fare collection, the ability to track ridership by fare type or constituent group, and automated recording of fare information.
- Riders will continue to experience seamless fare payment and transfers between CUE and other transit providers in the region through the SmarTrip system.
- The control board upgrade should extend the use of SmarTrip for ten years or more.

Disadvantages

- A farebox upgrade is needed, but CUE is in a waiting mode as WMATA leads the regional effort to identify and implement the best solution.
- CUE staff may need training on operating and maintaining the control board upgrade including data collection.

Cost

- With 12 revenue vehicles, the option where CUE keeps the existing fareboxes is estimated to cost $100,000. The other option where CUE buys new fareboxes is estimated to cost $324,000. There will also be ongoing maintenance expenses associated with keeping the fareboxes operable.

SUMMARY OF INITIATIVES AND NEXT STEPS

The initial alternatives described in this chapter mainly focus on ways to increase CUE's ridership over the six-year TDP period. Tables 4-3 and 4-4 summarize the service and organizational alternatives, respectively.

[7] Costs provided by Jason Davis, Project/Asset Manager for Arlington Transit via personal communication on October 18, 2016. The $8,000 cost per unit represents the estimate for purchasing DCU3 control boards through Cubic. However, there are many unknowns at this time as WMATA explores farebox technology options. The $20,000 cost for a new farebox (not including the DCU3 control board) was based on Arlington Transit's 2015 cost for an Odyssey farebox.

The next step in the planning process was to solicit public input and for CUE staff and stakeholders to consider which of these initiatives are appropriate to implement during the six-year period.

Table 4-3: Summary of Service Alternatives for Consideration

Service Initiatives	Annual Operating Hours	Annual Operating Costs	Capital	Estimated Net Annual Ridership Change
Service Change – Modify Gold Routing to Bevan Drive & Fairfax Blvd.		Cost Neutral		-1,400
Service Change – Provide scheduled deviations to OLLI and Green Acres Center on Green Route[1]	1,800	$189,000	$500,000	-3,200 - 4,000
New Service – Feeder service to Burke Centre VRE	2,800 - 5,600	$297,000 - $595,000	$500,000 - $1 million	18,200 - 44,700
New Service – Circulator connecting NOVA to city dining/shopping[2]	1,500	$155,000	$1 million	10,800 - 21,500
Expand City Wheels Program		$2,500- $17,500		150-2,000
Partner with other modes for first/last mile connection		TBD		TBD

[1]This service change could potentially be cost neutral with schedule adjustments, if an additional bus is not required.
[2]This service alternative could potentially use CUE's existing fleet, depending on the other alternatives selected.

Table 4-4: Summary of Organizational Initiatives for Consideration

Organizational and Infrastructure Initiatives	One-Time Operating Cost	Annual Operating Cost	Capital
Add a part-time transit planner position (half the cost for a part-time position)		$50,000	
Bus stop improvements – Add 15 shelters with seating			$300,000
Increase marketing to specific groups, for NextBus, and information on transit options[1]		$104,000 - $174,000	
Place dynamic transit information signs at strategic locations		$3,000 per unit	$3,000 - $5,000 per unit
New electronic fareboxes			$100,000 - $324,000

Organizational and Infrastructure Initiatives	One-Time Operating Cost	Annual Operating Cost	Capital
Reprinting the transit guide to reflect service and schedule changes[2]	$5,000		

[1]Assumes marketing activities represent 3%-5% of annual operating costs.
[2]Estimated cost of $5,000 to print 10,000 Transit Guides. Assumes one Transit Guide update during TDP timeframe.

Chapter 5
Operations Plan

INTRODUCTION

The Operations Plan describes the service and infrastructure improvements and expansions that have been recommended for implementation by the City of Fairfax on its CUE bus system over the six-year planning period (FY 2017-FY 2022) covered by the Transit Development Plan (TDP). These recommendations address the operating, infrastructure, and transportation needs identified in Chapter 3, and reflect consideration of the alternatives presented in Chapter 4, including the results of a public outreach effort. The recommendations in this chapter are presented with an anticipated implementation year for planning purposes, though the initiatives that require additional funding will be subject to CUE's annual budget process. If funding is not available during the recommended year, the city can adjust the implementation schedule within the annual TDP update that it prepares for the Virginia Department of Rail and Public Transportation (DRPT).

The plan is organized into two broad categories: service initiatives; and organizational, infrastructure, and communications initiatives. This chapter presents an implementation schedule provided by year, following the descriptions of the initiatives. A summary table that includes planning estimates for revenue hours, revenue miles, ridership, and expenses for each initiative completes Chapter 5.

Following this chapter, Operations Plan, Chapter 6 will outline the capital needs associated with these projects, as well as the capital replacement needs for the current vehicle fleet and associated infrastructure. Chapter 7 provides the financial plan to support the City of Fairfax's CUE transit program over the six-year period.

PUBLIC INPUT

To obtain perspective on the public perception of these proposed initiatives, the study team joined with the City of Fairfax and the team performing the city's Multimodal Transportation Plan (which was performed concurrently with the TDP) at a series of three workshops held at different times and locations during early to mid-November 2016. A survey form (a copy is provided in Appendix B) was developed for distribution at the meetings, and participants were urged to complete a survey to document their input. In addition, presentation boards were developed that listed the alternatives from this chapter in summary form. Participants were given stick-on dots and asked to place them on the boards under one of the three

column headings: “Sounds Good”, “No Opinion”, or “I’m Against It”. It should be noted that attendance at all three meetings was light.

Exhibit 5-1 presents the meeting boards with the stickers demonstrating the input received (combined from all three meetings). As can be seen on the boards, there was some variation in responses. A summary of the responses is provided in Table 5-1.

The most favored alternatives were those calling for improved bus stops, including both improved amenities/real-time information and bikeshare stations at key stops. The service expansion to the Burke VRE station had the highest number of persons against it (although still more votes favored it than opposed it). The proposed rerouting of the Gold Route to service Fairfax Boulevard and Bevan Drive instead of Warwick Avenue had the largest number of “No Opinion” votes, and the fewest “Sounds Good” votes. The initiative for rerouting Green Route 2 mid-day trips to service Osher Lifelong Learning Institute (OLLI) and/or Green Acres and the limited expansion of City Wheels destination options both received the same level of support, slightly lower than the support for shelters and bikeshare at key stops.

Exhibit 5-1: Meeting Boards with Dot Prioritization

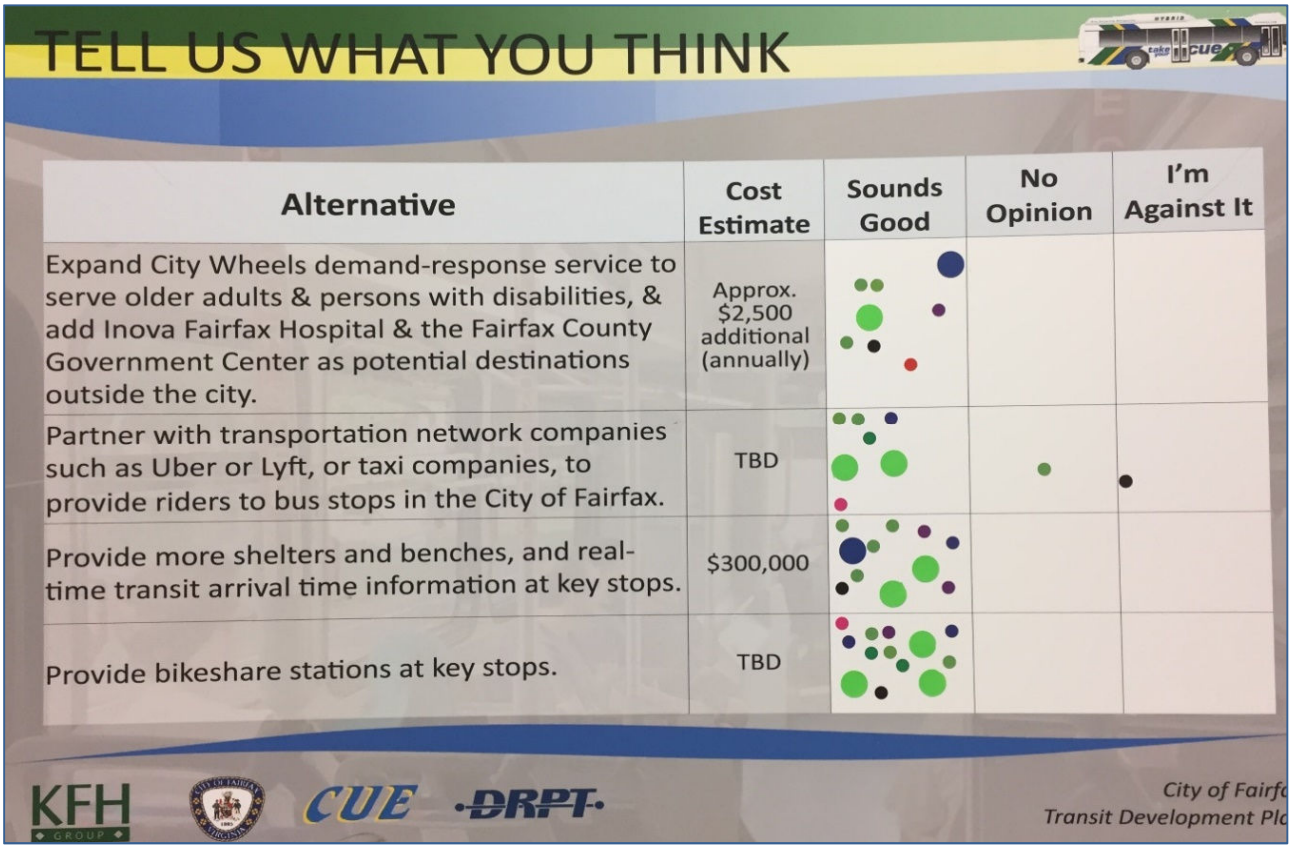
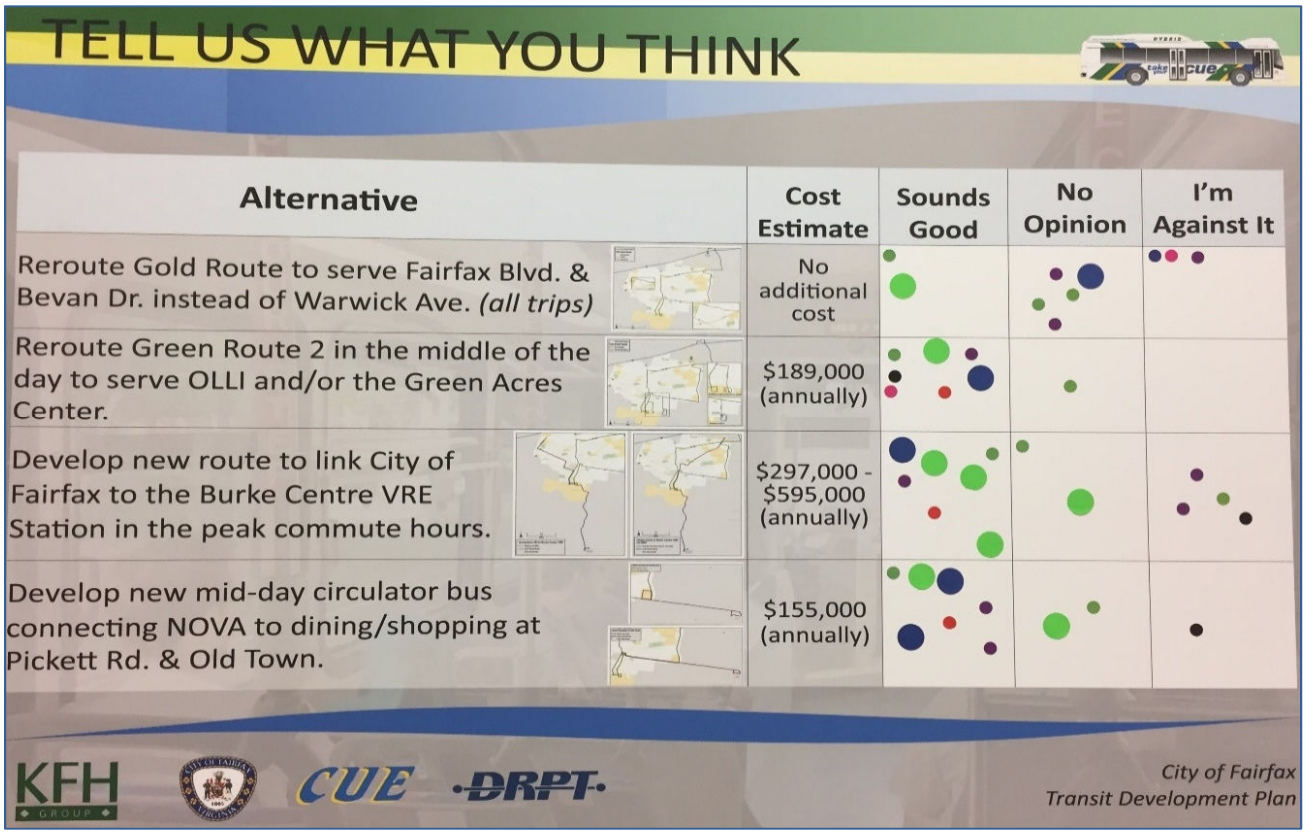


Exhibit 5-1: Meeting Boards with Dot Prioritization (continued)



Written surveys revealed that respondents are aware of CUE and do not have a desire for additional coverage. However, there was support for increased frequencies, and for expanded hours - earlier service to get riders to Vienna Metrorail by 5:30 a.m., a desire for the peak hour higher frequency service from Vienna to run later, a request for the Green 2 bus to run later, and general comments about more frequency (especially in peak hours) being needed to make transit use attractive. There was a specific call by a rider to keep the Gold Route on Warwick Avenue, noting that Fairfax Boulevard is already served by Metrobus. Survey respondents also favored improved stop amenities and bikeshare or secure bike parking at stops.

With limited participation at the workshops, and some potential bias in attendance at the workshops because of the focus of the Multimodal Transportation Plan on pedestrian and bicycle initiatives, the results of this input were considered as informing the assessment of the options, but not as definitive in terms of public preferences.

Table 5-1: Public Input on Alternatives (from Workshops)

Alternative	Sounds Good	No Opinion	I'm Against It
Reroute Gold Route to Serve Fairfax Blvd. and Bevan Drive instead of Warwick Ave. (all trips)	2	5	3
Reroute Green Route 2 in mid-day to serve OLLI and/or Green Acres Center	7	1	0
Develop new route to link City of Fairfax to Burke Centre VRE (peak hours)	7	2	4
Develop new mid-day circulator connecting NOVA to dining/shopping at Pickett Road and Old Town	7	2	1
Expand City Wheels, add Inova Fairfax Hospital and Fairfax Governmental Center as destinations	8	0	0
Partner with transportation network companies such as Uber and Lyft to provide rides to bus stops	6	1	1
Provide more shelters and benches, and real-time transit arrival time information at key stops	11	0	0
Provide bikeshare stations at key stops	13	0	0

RECOMMENDED ALTERNATIVES

Based on input received and the assessment of potential ridership and increased costs, the following alternatives were recommended for inclusion in the operations and capital plans.

Service Initiatives

Based on the assessment of service alternatives and the continuing policy of the city not to expand CUE fixed route services to locations outside the city limits (except for the Vienna Metrorail station), one of the proposed service options is recommended for inclusion in the plan.

Recommended: Modify Gold Route Routing to Serve Bevan Drive and Fairfax Boulevard

This modified routing is recommended for implementation once the Novus Fairfax Gateway development is complete, anticipated in 2019. It would support the higher-density Novus Fairfax Gateway development and the future redevelopment of the Paul VI school site as a mixed-use location. The net cost of this routing change is minimal.

Not Recommended: Scheduled Deviations to OLLI and Green Acres Center

This alternative is not recommended because there is a possibility that the loss of ridership from the longer travel time and circuitous routing could exceed the potential gain from new riders. There is a high degree of uncertainty about potential ridership impacts, and about the impact on schedule adherence if the service is operated as a deviation on existing schedules. If a supplementary bus is operated mid-day to minimize the schedule impact (at a cost of $189,000 per year), there is no ridership loss, and the highest projected ridership of 12,000 trips is considered, the cost per trip is still very high at $15.75 per trip - well above the system performance guidelines. At that cost level, use of City Wheels to provide trips for persons who do not have a private vehicle available and are unable to walk from the existing CUE stops would appear to be more cost-effective. In addition, it is quite likely that a resident who has difficulty walking from the CUE stop to these destinations would have as much difficulty walking to and from the CUE stop at the residential end of their trip - use of City Wheels would address the pickup end of the trip.

Not Recommended: Feeder Service to Burke Centre VRE

Given that the Fairfax Connector is planning a new route (Route 313) which will link the City with the Burke Centre VRE station, and that the Mason Shuttles already serve a portion of the potential market, this service is not recommended. With an annual cost of $297,000 in operating funds for each of the two routes, the projected ridership would result in a cost per trip of at least $13.31, well above the CUE performance standard of $4.54 per trip. In addition, operation of both routes would require purchase of two additional buses at a cost of $1 million. City residents who have an automobile available to access the Burke Centre VRE station will find that there is not a parking capacity issue. Finally, it would take two years to implement this service - it is hoped that the Orange Line services will have returned to normal, and that city residents will not be seeking alternatives to Metrorail.

Not Recommended: Circulator between NOVA, Pickett Road Shopping, and Old Town

This option is not recommended for several reasons. It would violate current city policy against providing service outside the city limits. It would provide supplemental service on routes already served by WMATA Metrobus 29K/N, although it would add mid-day frequency. This service would have to be in addition to existing routes, and would require additional capital of $1 million for additional buses. At the most optimistic ridership scenario, the operating cost per trip would be $7.21 ($155,000 in operating costs divided by 21,500 new trips), which exceeds the CUE performance standard of $4.54.

Program Initiatives

There are two program initiatives. One of the proposed program initiatives is recommended, the other is not currently recommended for city support though continued monitoring for opportunities is recommended.

Recommended: Limited Expansion of City Wheels Demand-Response Service

This change is designed to expand eligibility to older adults and low income individuals, and to provide trips for city residents to Inova Fairfax Hospital Fairfax County Government Center. In addition, the service should be promoted as a way for residents with mobility limitations to reach OLLI at Mason and Green Acres Senior Center, if they are unable to use CUE fixed route service and walk.

These changes will increase demand for contracted taxi services, and trips will be longer (and therefore more expensive) than previous trips. Initially the increased demand is to be addressed by restoring the previous $5,000 annual budget (an increase of $2,500 per year). However, if the program is expanded to make all those city residents ages 65 and older eligible, additional funding will be needed. For that reason it is recommended that the program budget be increased to $20,000 (incremental increase of $17,500) over the six-year planning period, with annual review to match funding to demand. Careful design of the eligibility requirements, trip purpose restrictions, and program parameters (user contributions, limited subsidy per trip, limits per user) will be needed to meet the needs while managing demand. The city might look toward Fairfax County's Fastran program in updating its application and eligibility process for low income residents.

Not Recommended: Partnering with Transportation Network Companies for First-mile/Last-mile Access to CUE Bus Stops

There are an increasing number of examples in which transit systems are partnering with Transportation Network Companies (TNCs) to offer a subsidy to the TNCs for last-mile/first-mile access to the line-haul transit services. This alternative called for development of such an arrangement between the City and one or more TNC providers to link areas of the city beyond a ¼-mile walk distance to the nearest CUE bus stop.

However, most of the city is within the ¼-mile walk distance to a CUE stop, so this alternative would really only be applicable to a limited area. In addition, as conceived, the TNC would be limited to providing a trip to a CUE stop, where the passenger would have to wait for a bus. Passengers accessing Metro would thus have two transfers, and would likely find it more attractive to simply have the TNC take them to the Metro. Most examples of transit partnerships with TNCs provide for that kind of service, but with the transit contribution limited to a subsidy on trips where there is no local fixed route service or at times when

providing fixed route service would not be cost-effective (such as late evenings, early morning, weekends).

The role of TNCs is likely to change significantly over the six years of the TDP, and there may be opportunities for the City to work with them to meet transportation needs. A potential CUE user attending one of the TDP workshops said that CUE did not start early enough to get him to the start of Metrorail service. The City could use TNCs to address such needs, or potentially for late night services—offering a one-seat ride to and from the station at a subsidized fare. TNCs could also potentially be providers under the City Wheels program. Such opportunities should be considered over the next six years as rate structures and partnering arrangements stabilize, and it becomes easier to create such arrangements and determine their cost-effectiveness.

Organizational and Communications Initiatives

Organizational, infrastructure, and communications initiatives include proposals for changes that affect the way that transit is guided, administered, managed, or staffed in the region, as well as those that consider additional facilities, technology, planning, and communications improvements. There are several initiatives recommended for implementation during the six-year TDP period that fall within these categories. These are described below, along with the overall cost and the recommended implementation year for each.

Organizational: Add a Transit Planner

As noted in Chapter 4, the Transportation Director provides oversight to all modes in the city, and has limited time availability to focus on the CUE bus system. Daily operations are overseen by the Transit Superintendent and Transit Supervisors, but the city needs support for transit planning (including coordination with other jurisdictions/systems), marketing, and community relations. This initiative would create a part-time Transit Planner position in the Transportation Division. This part-time position is estimated to require an additional $50,000 per year in direct salary and fringe benefits. Because a major task of this position is to support the expanded marketing and communications efforts designed to increase ridership, it is recommended beginning in FY 2018.

Communications Initiatives: Increase Marketing of CUE Services

This initiative is basically an increase in the overall level of effort of marketing CUE services. It includes implementation of all three initiatives described in Chapter 4: targeting marketing activities for specific groups, increased marketing of the NextBus real-time transit information, and marketing of transit services from the city to nearby transit destinations that are operated by other providers.

Targeted activities are designed to ensure that CUE is presented on a continuing basis to a variety of groups in the city, including specific employers/employees, Mason students, junior high and high school students, senior programs, developers, new residents, etc. Travel training to show residents how to use CUE is also a priority activity. Promoting NextBus is a matter of making changes in promotional activities to focus on the availability of real-time bus arrival information and how to use it. Providing specific information about other transit services will require staff time to develop ways to provide this information.

Many of these activities require only a limited expenditure of funds for creating a CUE information booth, providing information to app developers, printing transit guides, website improvements—but require a significant amount of staff time or temporary labor. This initiative works toward increasing the CUE marketing budget to 5% of the overall operating budget, initially $104,000 per year rising to approximately $174,000 per year over the TDP planning period. It is recommended that this initiative begin in FY 2018 to provide resources that can be used by the proposed part-time transit planner.

Infrastructure: Provide Additional Shelters and Benches

CUE currently has 198 stops with 43 shelters and many other passenger amenities such as benches, lighting, etc. Nevertheless, stakeholder and public input requested additional shelters, and placement of bike racks at stops to facilitate first-mile, last-mile connections by bicycle. As documented in Chapter 4, it is recommended that CUE prioritize the potential candidate stops for shelters based on the number of boardings at each stop, and at locations that support new development on Fairfax Boulevard or are adjacent to transit trip generators.

The boarding/alighting data collected for the TDP indicated that the following stops experience 20 or more boardings per day (listed from highest to lowest activity):

- Lee Highway and Rust Road (Outbound to Mason)
- Nutley St. at Pan Am Shopping (Outbound to Mason)
- Jermantown Road at Gainesborough Court (Outbound to Mason)
- Lee Highway at Arthur Teachers (Outbound to Mason)
- Blake Ln. at Knightsbridge Drive (Outbound to Mason)
- Main St. at Lyndhurst (Outbound to Mason)
- Old Lee Highway at Willard Way (Inbound to Vienna Metro)
- Old Lee Highway at Old Pickett Road (Inbound to Vienna Metro)
- Jermantown Rd. at Comfort Inn (Inbound to Vienna Metro)
- Jermantown Rd. at James Swarts (Inbound to Vienna Metro)
- Nutley Street at Hermosa Drive (Outbound to Mason)

Source: Foursquare Labs, Inc.

This initiative involves providing passenger waiting shelters and amenities at the above priority stops. The analysis in Chapter 3 identified 15 additional stops with 15 to 19 weekday boardings as candidates for bus stop improvements. Of these additional candidates, the following stops might be prioritized because they support development along Fairfax Boulevard or are adjacent to a transit trip generator:

- Fairfax Blvd. at Chain Bridge Road (Outbound to Mason)
- Eaton Place at Best Western Hotel (Inbound to Vienna Metro)
- Eaton Place at Office Park (Outbound to Mason)
- Old Lee Highway at Library (Outbound to Mason)

The possible shelter locations listed above are based on ridership or stakeholder requests, and do not reflect whether or not it is physically feasible to install the different types of passenger amenities at each particular location. The implementation of passenger amenities at each stop should take into consideration if there is enough right-of-way and adequate sidewalk and curb ramp connections.

A budget of $50,000 has been included for each plan year starting in FY 2019. This level of funding should allow CUE to add shelters, benches, and other bus stop improvements over the course of the TDP period. The typical costs for a number of different types of bus stop improvements are provided in Table 5-1.

Table 5-1: Estimated Bus Stop Improvement Costs

Improvement	Unit Cost
Shelter (installed)	$10,000- $20, 000
Bench (installed)	$1,500 - $2,500
4’ Wide Sidewalk	$17.50 - $25.00 per linear foot
Bicycle Racks	$200 - $500
Curb Ramps	$2,000 - $2,500

Communication/Technology: Dynamic Transit Information Signs at Strategic Locations

As part of the overall improvement in communications and information, this initiative is recommended as an additional means of providing real-time transit information at key locations around the city. The dynamic transit information sign is designed to provide users with real-time transit information about all the available transit options at a given location, including all bus services, bike-sharing options, transportation network companies, taxis, and car-sharing services. The city is already requiring developers to include this technology in their Transportation Demand Management (TDM) plans. Potential locations for this technology include high-density residential buildings, shopping centers, university stops,

major employers, or public institutions. Installing a unit at Mason could increase students' awareness of the Gold Route as an alternative to Mason Shuttles.

Implementation can occur as the city requires it as part of new development activity, or as the city identifies key public locations. Costs for city implementation include the staff time to arrange for and install the devices, the cost of the devices themselves, and installation (which may include construction of weather- and vandal- resistant housings). The estimated cost for installing a weatherproof outdoor TV is $3,000. There is generally an on-going subscription fee to the firms that provide the software, such as TransitScreen. Costs may also be affected by the ability of the city to require it as part of TDM plans for redevelopment or new development, or to share costs with other providers such as WMATA, Fairfax Connector, and Mason Shuttles. The city may implement a modest approach, installing dynamic transit information signs at two high ridership locations during the TDP timeframe.

Technology Initiative: Replace/Upgrade Electronic Fare Boxes

Electronic fare boxes automate the fare collection process by determining the exact fare required of the trip and then collecting and recording fares consisting of cash, electronic swipe cards, tickets, and passes. The fare boxes eliminate the need for drivers to handle fares and automatically record the amount of fares collected daily.

Another important feature of electronic fare boxes is the ability to handle electronic fare media. Current technologies include the "tap" technology, where the rider holds the fare card close to the reader (like WMATA's Smart Cards), and older "swipe" technology, where the fare card has a magnetic strip that is swiped through a reader. Electronic fare systems provide a good way for systems to record usage data from various constituent groups, such as university students or hospital employees.

CUE already has equipped its fleet with electronic fare boxes which were due to be replaced as part of the regional implementation of the New Electronic Payments Program (NEPP) as WMATA replaced its current SmarTrip system. However, WMATA has cancelled NEPP, and now systems in the region are faced with the need to replace either the entire farebox or the technical components of the existing farebox that are obsolete. Transit systems in the region are working with WMATA to develop a usable cost-effective option. However, WMATA has included $27,000 per bus for new fareboxes in its FY 2018 capital budget.

It is recommended that the City of Fairfax monitor the situation and work with regional partners to arrive at a solution that continues to provide for seamless fare collection across the region. $100,000 is included in the recommended FY 2018 budget for replacement of the control boards and other upgrades to allow continued usage of the existing fareboxes. Pending the regional effort led by WMATA, it is recommended that new fareboxes are purchased for the entire CUE fleet in FY 2021 to coincide with the replacement of half the fleet; the cost is estimated at $324,000.

SUMMARY OF FY 2018- FY 2023 INITIATIVES

Table 5-4 provides a summary of the proposed initiatives described within this chapter. The table is organized by year and includes the estimates of annual revenue hours, miles, and ridership (for service initiatives), and the cost estimates for all of the initiatives proposed for the six-year plan. The cost estimates are in current dollars. An inflation factor will be applied within the financial plan (Chapter 7).

Table 5-4: Summary of Proposed TDP Initiatives

	Planning Estimates						
TDP Initiatives	**Annual Revenue Hours**	**Annual Revenue Miles**	**Ridership**	**Annual Fully-Allocated Operating Costs**	**One Time Operating/ Planning/ Marketing Cost**	**Capital Costs**	**Proposed TDP Year**
Technology Upgrade for Fareboxes	*Capital Project*					$100,000	FY 2018
Add Part-time Transit Planner	*Organizational Support*			$50,000			FY 2018
Increased Marketing	*Planning/Marketing Project*			$104,000			FY 2018
Expansion of City Wheels Eligibility,			150	$2,500			FY2018
Subtotal, FY2018	**0**	**0**	**150**	**$156,500**	**$0**	**$100,000**	**FY 2018**
Provide Additional Shelters and Benches	*Capital Project*					$50,000	FY 2019
Part-time Transit Planner	*Organizational Support*			$51,500		$0	FY 2019
Increased Marketing	*Planning/Marketing Project*			$118,000		$0	FY 2019
Dynamic Transit Information Signs	*Technology Project*			$3,000		$3,000	FY 2019
Expansion of City Wheels Eligibility,			300	$5,500		$0	FY 2019
Subtotal, FY2019	**0**	**0**	**300**	**$178,000**	**$0**	**$53,000**	**FY 2019**
Modify Gold Route				No Change	$6,000	$0	FY2020
Provide Additional Shelters and Benches	*Capital Project*					$50,000	FY2020
Part-time Transit Planner	*Organizational Support*			$53,000		$0	FY2020
Increased Marketing	*Planning/Marketing Project*			$132,000		$0	FY2020
Dynamic Transit Information Signs	*Technology Project*			$3,000		$0	FY2020
Expansion of City Wheels Eligibility,			600	$8,500		$0	FY2020
Subtotal, FY2020	**0**	**0**	**600**	**$196,500**	**$6,000**	**$50,000**	**FY2020**
New Electronic Fareboxes	*Capital Project*					$324,000	FY 2021
Provide Additional Shelters and Benches	*Capital Project*					$50,000	FY 2021
Part-time Transit Planner	*Organizational Support*			$54,600		$0	FY 2021
Increased Marketing	*Planning/Marketing Project*			$146,000		$0	FY 2021
Dynamic Transit Information Signs	*Technology Project*			$3,000		$0	FY 2021
Expansion of City Wheels Eligibility,			1,000	$11,500		$0	FY 2021
Subtotal, FY2021	**0**	**0**	**1,000**	**$215,100**	**$0**	**$374,000**	**FY 2021**
Provide Additional Shelters and Benches	*Capital Project*					$50,000	FY 2022
Part-time Transit Planner	*Organizational Support*			$56,200		$0	FY 2022
Increased Marketing	*Planning/Marketing Project*			$160,000		$0	FY 2022
Dynamic Transit Information Signs	*Technology Project*			$6,000		$3,000	FY 2022
Expansion of City Wheels Eligibility,			1,500	$14,500		$0	FY 2022
Subtotal, FY2022	**0**	**0**	**1,500**	**$236,700**	**$0**	**$53,000**	**FY 2022**
Provide Additional Shelters and Benches	*Capital Project*					$50,000	FY 2023
Part-time Transit Planner	*Organizational Support*			$57,900		$0	FY 2023
Increased Marketing	*Planning/Marketing Project*			$174,000		$0	FY 2023
Dynamic Transit Information Signs	*Technology Project*			$6,000		$0	FY 2023
Expansion of City Wheels Eligibility,			2,000	$17,500		$0	FY 2023
Subtotal, FY2023	**0**	**0**	**2,000**	**$255,400**	**$0**	**$50,000**	**FY 2023**
Total Planned Improvements (FY2018-FY2023)	**-**	**-**	**-**	**$1,238,200**	**$6,000**	**$680,000**	
Current System Data (FY2015)	**32,710**	**443,305**	**771,254**	**$3,538,438**			
Total CUE Service, FY2023	**32,710**	**443,305**	**771,254**	**$3,793,838**			

Notes: Dollars are current, without inflation.

The financial plan (Chapter 7) provides the six-year budget with inflation.

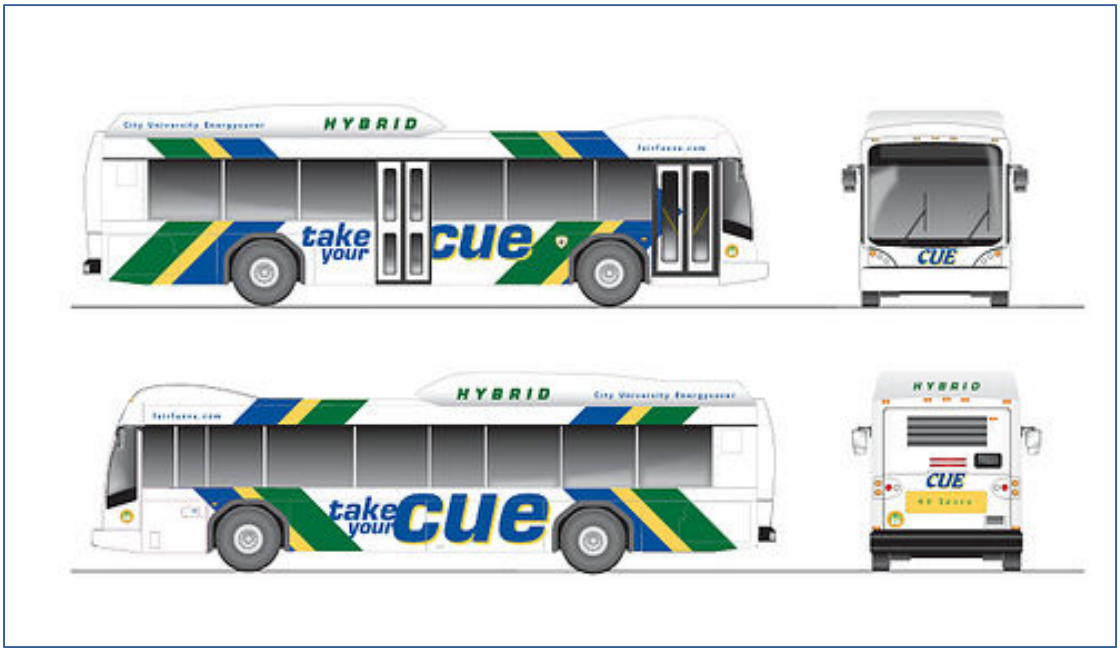
Chapter 6
Capital Improvement Program

INTRODUCTION

This chapter outlines the capital infrastructure projects needed to implement the service recommendations described in the Operations Plan (Chapter 5). The Capital Improvement Program (CIP) provides the basis for requests by the City of Fairfax to DRPT for federal and state funding for capital replacement, rehabilitation, and expansion projects. The recommended projects are those for which the City of Fairfax reasonably anticipates local funding to be available. The recommendations for different types of capital projects, including vehicles, facilities, passenger amenities, and technology and equipment are described below.

VEHICLE REPLACEMENT AND EXPANSION PLAN

This section presents details of the vehicle replacement and expansion plan, including vehicle useful life standards and estimated costs. A vehicle replacement and expansion plan is necessary to maintain a high quality fleet and dispose of vehicles that have reached their useful life.



Useful Life Standards

The capital program for vehicles was developed by applying FTA/DRPT vehicle useful life standards, which are developed based on the manufacturer's designated vehicle life-cycle and results of independent FTA testing. The standards indicate expected lifespans for different vehicle types. If vehicles are allowed to exceed their useful life they become much more susceptible to break-downs, which may increase operating costs and decrease reliability of scheduled service. DRPT's vehicle useful life policy for a number of different vehicle types is shown in Table 6-1.

Table 6-1: DRPT's Vehicle Useful Life Policy

Vehicle Type	Useful Life
Vans	Minimum of 4 Years or 100,000 Miles
Body on Chassis Vehicles	Minimum of 4 Years or 100,000 Miles
Light Duty Bus	Minimum of 4 Years or 150,000 Miles
Medium Duty Bus [1]	Minimum of 7 Years or 200,000 Miles
Supervisory Vehicle	Minimum of 4 Years or 100,000 Miles
Transit Coach	Minimum of 12 Years

(1) This vehicle type is not referenced in the S.5311 State Management Plan
Source: DRPT's Section 5311 State Management Plan (April 2009)

Vehicle Plan – Baseline Estimate

The CUE revenue fleet consists entirely of transit coaches with minimum useful life of twelve years and no associated mileage minimum. Using this standard, CUE does not have any revenue vehicles that are currently eligible for replacement, as the fleet consists of six Gillig transit coaches purchased in 2009 and six that were purchased in 2015. The older class of vehicles will be eligible for replacement in FY 2021, so are included in this TDP as replacement vehicles.

The City of Fairfax plans to replace these vehicles in Calendar Year (CY) 2021, using state funds supplemented by local funds.

Table 6-2 provides the existing fleet inventory with the estimated calendar year that each vehicle is eligible for replacement. The operating condition of the vehicles, as well as the availability of funding, will dictate the actual replacement year. While budgets are typically presented following fiscal years, vehicle's models are typically associated with calendar years. This plan reflects this practice, with the vehicle replacement schedule presented by calendar year and the budgets presented by fiscal year.

Table 6-2: CUE Fleet Inventory and Replacement Schedule

Vehicle Number	Service Type	Year	Make	Model	Number of Seats	Number of Wheelchair Spaces	Condition	Mileage 2/5/16	Replacement Year
827	Revenue	2009	Gillig	Lowfloor	32	2	Good	157,875	2021
828	Revenue	2009	Gillig	Lowfloor	32	2	Good	183,436	2021
829	Revenue	2009	Gillig	Lowfloor	32	2	Good	164,238	2021
830	Revenue	2009	Gillig	Lowfloor	32	2	Good	184,965	2021
831	Revenue	2009	Gillig	Lowfloor	32	2	Good	175,118	2021
832	Revenue	2009	Gillig	Lowfloor	32	2	Good	177,605	2021
833	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,988	2027
834	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	3,014	2027
835	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,976	2027
836	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,960	2027
837	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,935	2027
838	Revenue	2015	Gillig	Lowfloor	31	2	Excellent	2,997	2027
292	Non-revenue	2007	Chevy	Trailblazer	5	n/a	Good	42,120	2019*
294	Non-revenue	2013	Ford	Explorer	5	n/a	Excellent	6,800	2025*
296	Non-revenue	2001	Chevy	Astrovan	8	1	Fair	44,824	2013*
298	Non-revenue	2012	Chevy	Colorado	5	n/a	Excellent	1,998	2024*

*Replacement year based on maximum of 12 years expected life.

Vehicle Plan

The annual schedule for vehicle replacement and expansion, based on the implementation schedule provided in Chapter 5 and the vehicle useful life standards, is shown in Table 6-3. This schedule is based on estimates; actual vehicle purchases may vary depending upon service changes, funding availability, and unexpected economic shifts. Changes to this vehicle replacement and expansion schedule can be made by CUE within its annual TDP update to DRPT, if needed. As shown in the table, the most vehicle purchases are scheduled for CY 2021.

Table 6-3: Vehicle Replacement and Expansion Schedule

Number of Vehicles	CY 2017	CY 2018	CY 2019	CY 2020	CY 2021	CY 2022
Replacement	0	0	0	0	6	0
Expansion	0	0	0	0	0	0
Service	0	0	1	1	0	0
Total Vehicles	**0**	**0**	**1**	**1**	**6**	**0**

Estimated Vehicle Costs

Estimated vehicle replacement costs are presented in Table 6-4. These costs are based on vehicle costs experienced throughout the Commonwealth as referenced in the FY 2017 Six Year Improvement Program (SYIP). For FY 2018 through FY 2022, a two percent inflationary factor was applied. These cost estimates were used to develop the capital budget, which is included with the Financial Plan in Chapter 7. The plan includes replacement of the six coaches in 2021, as well as two service vehicles. Potential funding sources for the replacement vehicles include DRPT and local funds. All revenue vehicles purchased will be lift or ramp-equipped and have bicycle racks. It is possible that alternative fuel or propulsion systems such as battery-electric may be more widely available or less costly by 2021, but the estimated costs are based on the assumption that replacement coaches will be clean diesel similar to the vehicles purchased in 2015.

The Commonwealth recently implemented a tiered capital allocation policy, which is presented in Table 6-5. This policy results in different state funding match ratios for vehicles, infrastructure/facilities, and other capital items (which includes technology).

Table 6-4: Estimated Costs of New Vehicles

Fiscal Year	Estimated Vehicle Cost		
	Diesel/Gas		
	35-Foot Low-Floor Transit Bus	Service Vehicles - Ramp Minivan/SUV	Service Vehicles- Sedans/Other
2016	$493,156	$42,000	$30,000
2017	$512,883	$42,840	$30,600
2018	$533,398	$43,697	$31,212
2019	$554,734	$44,571	$31,836
2020	$576,923	$45,462	$32,473
2021	$600,000	$46,371	$33,122

Table 6-5: DRPT Tiered Capital Allocation

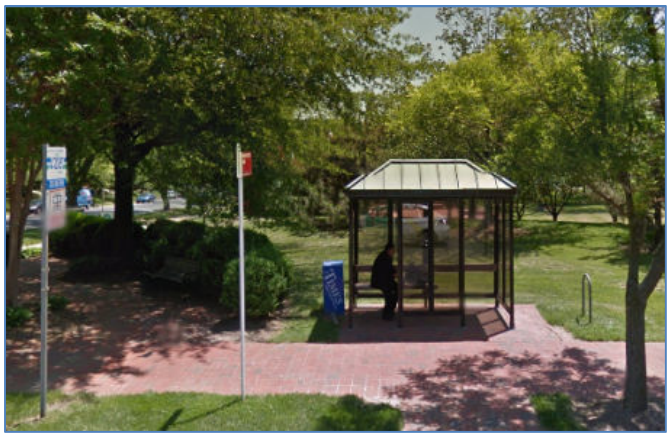
Tiers	FY 2018	FY 2019	FY 2020	FY 2021
1	68%	68%	68%	62%
2	34%	8%	6%	0%
3	17%	0%	0%	0%

FACILITIES

CUE is anticipated to continue using its existing facility in the City of Fairfax as its maintenance and operations base, and will continue to use WMATA's Vienna Metrorail station as its major passenger facility. The city will also continue to improve other passenger amenities as described in the next section.

PASSENGER AMENITIES

The provision of additional passenger shelters and benches is included in the six-year plan. A budget of $50,000 is included for each plan year. This level of funding should allow CUE to add shelters, benches, and other bus stop amenities over the course of the six-year period.



TECHNOLOGY AND EQUIPMENT

CUE is in the process of implementing dynamic transit information signs. This technology provides a real-time multi-modal transportation information screen that can be placed in buildings and other locations with potential concentrations of transit users. One manufacturer of this technology is TransitScreen. While the city is requiring developers of some projects to provide this technology, in the capital plan $6,000 for two units is included to install this technology at key locations. (The annual software subscription cost of $3,000 per unit is included in the operations plan.)

In addition, as described in the previous chapter, CUE and other Northern Virginia systems will likely be required to either replace the electronics of their existing fareboxes or replace the entire box with new technology in the near future. The TDP includes the estimated costs of entirely new fareboxes for the twelve revenue vehicles, though it is possible that a retrofit and upgrade (which would cost less) could be implemented in the short term depending on the regional fare collection system.

This capital plan includes $100,000 for replacement of the control boards and other upgrades to the existing fareboxes as an FY 2018 budget item in case it is needed to maintain compatibility with the regional fare collection system in the short run. It should be noted that WMATA's FY 2018 budgets include capital for farebox replacement on its buses, at an average cost of $27,000 per bus. This capital program calls for replacement of the fareboxes on CUE buses in FY 2021 to coincide with the replacement of 50% of the fleet vehicles—the new vehicles and the existing FY 2015 buses would receive new fareboxes at that time.

Chapter 7
Financial Plan

INTRODUCTION

This chapter provides a financial plan for funding existing and proposed City of Fairfax CUE transit services for the TDP's six-year planning period. The financial plan addresses both operations and capital budgets, focusing on the financially constrained project recommendations that were highlighted in Chapter 5. It should be noted that over the course of the six-year period there are a number of unknown factors that could affect transit finance, including the future economic condition of the city and state; the availability of funding from the Northern Virginia Transportation Commission (NVTC) and the Commonwealth Transportation Fund; and future legislation.

OPERATING EXPENSES AND FUNDING SOURCES

Table 7-1 provides a financial plan for the operation of CUE services under the financially constrained six-year plan. As discussed in the Operations Plan (Chapter 5), the financially constrained plan projects are moderate in scope, reflecting the current economic climate and the anticipated availability of local match. The top half of Table 7-1 summarizes annual revenue hours of service for the existing transit program as well as recommended operating projects, which are limited to a transit planning position, additional marketing, and a limited expansion of City Wheels service. The bottom half of the table provides operating cost estimates and funding sources associated with these service projects. A number of assumptions used in developing the operating cost estimates are described below.

For FY 2018, the first year of the plan, expenses and revenues are based on the proposed City of Fairfax budget. The projected number of revenue hours remains constant over the planning period, and it is assumed that operating costs to maintain the current level of service between FY 2019 and FY 2023 will increase at a 3% annual inflation rate. It is understood that neither DRPT nor the City of Fairfax is committing to these funding levels, but that they are planning estimates. Specific funding amounts for each year will be determined during the annual Six-Year Improvement Program (SYIP) adoption and budget cycle for the Commonwealth and the City.

State and local funding source amounts are based on net operating deficit. The net operating deficit is calculated by subtracting farebox revenue, advertising revenues, and the George Mason University (GMU) contribution from the total operating expenses. For FY 2018, the City budget projected the GMU contribution to be $750,000, which is assumed to remain

constant over the planning period. Farebox revenue amounts are based on the City's FY 2018 budget, which projects $550,000 in farebox revenue.

Table 7-1: City of Fairfax CUE Bus Financial Plan for Operations

Projects	FY 2017 Last Fiscal Year	FY 2018 Current Year Budget	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Projected Incremental Annual Revenue Hours							
Current Level of Service	33,000	33,000	33,000	33,000	33,000	33,000	33,000
Total Transit Revenue Hours	**33,000**	**33,000**	**33,000**	**33,000**	**33,000**	**33,000**	**33,000**

Projects	FY 2017 Last Fiscal Year	FY 2018 Current Year Budget	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Projected Operating Expenses							
Current Level of Service	$4,037,900	$3,711,500	$3,822,800	$3,937,500	$4,055,600	$4,055,600	$4,177,300
Expand Staff to Accommodate System Growth-Transit Planner	$0	$50,000	$51,500	$53,000	$54,600	$56,200	$57,900
Increase Marketing Budget	$0	$104,000	$118,000	$132,000	$146,000	$160,000	$174,000
Increase City Wheels-Expand Service	$0	$2,500	$5,500	$8,500	$11,500	$14,500	$17,500
Dynamic Transit Info Signs-Subscription	$0	$0	$3,000	$3,100	$3,200	$6,600	$6,800
Modify Gold Route-Planning/Marketing	$0	$0	$0	$6,000	$0	$0	$0
Total Projected Operating Expenses	**$4,037,900**	**$3,868,000**	**$4,000,800**	**$4,140,100**	**$4,270,900**	**$4,292,900**	**$4,433,500**
% Change Year by Year		**-4%**	**3%**	**3%**	**3%**	**4%**	**4%**

Anticipated Funding Sources	FY 2017 Last Fiscal Year	FY 2018 Current Year Budget	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
State	**$828,000**	**$728,000**	**$0**	**$0**	**$0**	**$0**	**$0**
DRPT (Transfer from NVTC)	$828,000	$728,000	$0	$0	$0	$0	$0
Local	**$3,247,400**	**$2,983,500**	**$4,000,800**	**$4,140,100**	**$4,270,900**	**$4,292,900**	**$4,433,500**
Revenues - Farebox + GMU Contribution	$1,301,500	$1,301,500	$1,301,500	$1,301,500	$1,301,500	$1,301,500	$1,301,500
Local Funds -NVTA 30%	$1,945,900	$1,682,000	$2,699,300	$2,838,600	$2,969,400	$2,991,400	$3,132,000
Total Projected Operating Funds	**$4,075,400**	**$3,711,500**	**$4,000,800**	**$4,140,100**	**$4,270,900**	**$4,292,900**	**$4,433,500**

CAPITAL EXPENSES AND FUNDING SOURCES

Replacement and Expansion Vehicle Expenses and Funding

Table 7-2 offers the financial plan for Tier 1 projects including vehicle replacement of revenue vehicles over the six-year period. Eligible activities for funding under Tier 1 include[1]:

- Replacement and expansion vehicles
- Assembly line inspection
- Fare collection equipment
- Automated passenger counters
- On-vehicle radios and communication equipment
- Surveillance cameras
- Aftermarket installation of farebox, radios, and surveillance cameras
- Vehicle tracking hardware and software
- Rebuilds and mid-life repower of rolling stock

Over this plan's six-year timeline, six replacement transit vehicles are recommended in addition to funding for the associated fare collection equipment and bicycle racks. NVTC is working with local transit operators in the region to determine a cost-effective regional farebox solution in the wake of WMATA's cancellation of its new fare system. It is not clear whether or not an interim solution requiring upgrading of existing fareboxes will be required -- $100,000 is included in the plan for FY 2018 for possible interim upgrades. In FY 2021, new electronic fareboxes, for both new buses and the six that are to be retained, are included as a separate line item capital expense.

Federal funding in the WMATA compact area is provided directly to WMATA by the Federal Transit Administration, therefore capital grants for local systems are eligible only for state match. The ratios for Tier 1 projects are anticipated to be 68% through FY 2020, and 62% in FY 2021 and after.

[1] DRPT FY2015 Revised Budget. http://www.drpt.virginia.gov/media/1293/fy15-drpt-agency-budget-revised.pdf

Table 7-2: City of Fairfax CUE Bus Projected Capital Expenses and Funding

Type of Vehicle	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Replacement						
35' Transit Coach	0	0	0	6	0	0
Expansion-None						
Sub-Total Vehicle Number	**0**	**0**	**0**	**6**	**0**	**0**
Vehicle Costs						
Replacement	$0	$0	$0	$3,600,000	$0	$0
Expansion	$0	$0	$0	$0	$0	$0
Sub-Total Vehicle Costs	**$0**	**$0**	**$0**	**$3,600,000**	**$0**	**$0**
Equipment Costs						
Farebox Upgrade [1]	$100,000	$0	$0	$0	$0	$0
New Fareboxes	$0	$0	$0	$379,000	$0	$0
Sub-Total Equipment Costs	**$100,000**	**$0**	**$0**	**$379,000**	**$0**	**$0**
Total Costs	**$100,000**	**$0**	**$0**	**$3,979,000**	**$0**	**$0**
Anticipated Funding Sources						
Federal	$0	$0	$0	$0	$0	$0
State*	$68,000	$0	$0	$2,467,000	$0	$0
Local	$32,000	$0	$0	$1,512,000	$0	$0
Total Funding	**$100,000**	**$0**	**$0**	**$3,979,000**	**$0**	**$0**

(1) Farebox upgrade to existing electronic fareboxes in FY 2018, new fareboxes in 2021 to coincide with vehicle replacement.

Bike racks are included in base vehicle costs.

*Tier 1 Funding Ratios: 68% State in FY 2018-2020, 62% in FY 2021 and after (Source: DRPT PowerPoint: Commonwealth Transit Funding Recent Events and Future Focus, Steve Pittard Fall 2015)

Infrastructure Facilities Expenses and Funding

Table 7-3 provides the financial plan for infrastructure facilities, considered Tier 2 capital projects. Eligible activities under this funding tier include[2]:

- Construction of infrastructure or facilities for transit purposes
- Real estate used for a transit purpose
- Signage
- Surveillance/security equipment for facilities
- Rehabilitation or renovation of infrastructure and facilities
- Major capital projects

The focus of Tier 2 projects for CUE is to continue improving passenger facilities by providing additional shelters and benches. In order to help improve bus stops throughout the service area, the TDP includes a budget of $50,000 per year starting in FY 2019. A total of fifteen new shelters, with bike racks, are planned at an average unit cost of $17,000.

Table 7-3: City of Fairfax CUE Bus Tier 2 Projected Capital Expenses and Funding

Capital Need	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Transit Infrastructure Facilities						
Additional shelters and benches (Tier 2)	$0	$50,000	$50,000	$50,000	$50,000	$50,000
Total Costs	**$0**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Anticipated Funding Sources						
State	$0	$4,000	$3,000	$0	$0	$0
Local	$0	$46,000	$47,000	$50,000	$50,000	$50,000
Total Funding	**$0**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**

*Tier 2 Funding Ratios: 34% State in FY 2018, 8% in 2019, 6% in FY 2020 and 0% after (Source: DRPT PowerPoint: Commonwealth Transit Funding Recent Events and Future Focus, Steve Pittard Fall 2015)

[2] DRPT FY2015 Revised Budget. http://www.drpt.virginia.gov/media/1293/fy15-drpt-agency-budget-revised.pdf

Other Capital Expenses and Funding Sources

Other capital expenses, considered Tier 3 capital projects, are presented in Table 7-4. Capital projects eligible for funding under this tier include[3]:

- All support vehicles
- Shop equipment
- Spare parts
- Hardware and software not installed on a vehicle
- Project development expenses for capital projects
- Office furniture and other equipment
- Handheld radios
- Landscaping
- Other transit-related capital items

The projected state match ratio for Tier 3 projects is 17% in FY 2018 and no state match after that - which will require one-hundred percent local funding. The plan calls for the replacement of two support vehicles, and the purchase and installation of transit screens or similar technology in key locations.

Table 7-4: City of Fairfax CUE Bus Tier 3 Projected Capital Expenses and Funding

Capital Need	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Support Vehicle						
Minivan/SUV	0	1	1	0	0	**0**
Sedan	0	0	0	0	0	**0**
Total Number of Support Vehicles	**0**	**1**	**1**	**0**	**0**	**0**
Sub-Total Cost of Support Vehicles	**$0**	**$44,600**	**$45,500**	**$0**	**$0**	**$0**
Other Capital Costs						
Dynamic Transit Info Screens	$0	$3,000	$0	$0	$3,000	$0
Sub-Total Equipment Cost	**$0**	**$3,000**	**$0**	**$0**	**$3,000**	**$0**
Total Support Vehicles and Equipment Costs	**$0**	**$47,600**	**$45,500**	**$0**	**$3,000**	**$0**
Anticipated Funding Sources						
State	$0	$0	$0	$0	$0	$0
Local	$0	$47,600	$45,500	$0	$3,000	$0
Total Funding	**$0**	**$47,600**	**$45,500**	**$0**	**$3,000**	**$0**

*Tier 3 Funding Ratios: 17% State in FY 2018,and 0% after (Source: DRPT PowerPoint: Commonwealth Transit Funding Recent Events and Future Focus, Steve Pittard Fall 2015)

Total Capital Expenses over TDP Timeframe

Table 7-5 presents a summary of the total capital program categorized by tier for the TDP period. Under each tier, the projects are listed by fiscal year. Actual project implementation will be determined each year based on statewide need and available funds.

Table 7-5: City of Fairfax CUE Bus Transit Capital Budget FY 2018-FY 2023

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Tier 1 Costs						
Replacement-Transit Coaches	$0	$0	$0	$3,600,000	$0	$0
Fareboxes	$100,000	$0	$0	$379,000	$0	$0
Sub-Total Cost	**$100,000**	**$0**	**$0**	**$3,979,000**	**$0**	**$0**
Tier 2 Costs						
Additional shelters and benches	$0	$50,000	$50,000	$50,000	$50,000	$50,000
Sub-Total Cost	**$0**	**$50,000**	**$50,000**	**$50,000**	**$50,000**	**$50,000**
Tier 3 Costs						
Support Vehicles	$0	$44,600	$45,500	$0	$0	$0
Dynamic Transit Screens	$0	$3,000	$0	$0	$3,000	$0
Sub-Total Cost	**$0**	**$47,600**	**$45,500**	**$0**	**$3,000**	**$0**
Total Capital Cost	**$100,000**	**$97,600**	**$95,500**	**$4,029,000**	**$53,000**	**$50,000**
Anticipated Funding Sources						
State	$68,000	$4,000	$3,000	$2,467,000	$0	$0
Local	$32,000	$93,600	$92,500	$1,562,000	$53,000	$50,000
Total Funding	**$100,000**	**$97,600**	**$95,500**	**$4,029,000**	**$53,000**	**$50,000**

Chapter 8
Monitoring and Evaluation

INTRODUCTION

As described in the introduction of Chapter 1, this TDP is a guiding document that should be reviewed and updated annually to reflect changes in community priorities, funding availability, or other factors that may impact CUE services. Several analyses regarding operations, service performance, community transportation needs, and service alternatives have been completed as part of the TDP process. Chapters 5 and 6 detailed the recommended operations and capital projects, respectively, and Chapter 7 provided the financial plan for these recommendations. It is important to remember that the TDP is a planning document. As such, when it comes time to develop grant applications and implement projects, CUE staff together with the CUE Transit Advisory Committee (TAC) and the City Council should revisit the TDP to ensure that the recommendations are appropriate and feasible given community needs and fiscal realities.

This chapter describes the processes that are recommended to periodically monitor and evaluate the progress that CUE has made each year in implementing the TDP. Such processes include integrating TDP projects with relevant planning documents, monitoring service performance, and submitting an annual update to DRPT. Monitoring and evaluation efforts are particularly important to ensure that CUE is meeting the goals, objectives, and standards that were described in Chapter 2.

COORDINATION WITH OTHER PLANS AND PROGRAMS

Chapter 3 included the review of transportation and land use plans developed by a number of agencies and municipalities throughout the region. The purpose of this review was to ensure that this TDP is consistent with local and regional transportation goals and efforts. If relevant plans are updated in the coming years, CUE staff or TAC representatives should seek to participate in efforts to ensure that projects recommended in this TDP are included in these area plans and studies where fitting. Many TAC members are involved as advisors or participants with other community groups.

At the state level, CUE should ensure that the recommended projects from this TDP are incorporated into the public transportation element of the DRPT State Transportation Improvement Program (STIP) and the Six-Year Improvement Plan (SYIP).

SERVICE PERFORMANCE MONITORING

Chapter 2 included goals and objectives, as well as several proposed performance standards for CUE. The purpose was to develop objective measurements that CUE can use to monitor transit service performance in the future and make performance-based service planning decisions.

Should any services fail to meet performance standards for two consecutive quarters, CUE should review the specific route or service and identify strategies to improve performance or update the performance standards as warranted by changes in circumstance.

The results of this regular monitoring should be shared with the CUE TAC and with DRPT through the annual TDP update.

ANNUAL TDP MONITORING

CUE conducts an annual goal-setting process built into its annual monitoring, with several specific tasks attached to each goal. CUE should continue this process, as it allows for continuous examination and adjustment of system goals and objectives. This process can also be used to evaluate CUE's status with regard to implementing the TDP.

DRPT guidance requires grantees to submit an annual TDP update that describes the progress that has been made toward implementing the adopted TDP and documents any changes. While the TDP has planned for the implementation of service improvements in particular years, the actual implementation may be delayed to future years if the proposed funding arrangements do not come to fruition or community priorities change. In this case, the TDP may need to be updated during the six-year planning period to reflect such changes. CUE's annual update to DRPT should document the results of the activities described above and include the following elements:

- Operating statistics for the twelve-month period, including the ridership attributed to new proposals implemented as a result of the TDP.
- Changes to system goals, objectives or service standards.
- A description of service or facility improvements that have been implemented during the twelve-month period.
- An update to the TDP recommendations to identify additional projects, deferment of projects to later years, or elimination of projects.
- Updates to the financial plan to more accurately reflect current funding scenarios.

Appendix A
Boarding/Alighting Counts

INTRODUCTION

The data from recent boarding/alighting counts conducted on the CUE routes are presented below in tables of on/off counts and charts portraying the load by time period. The counts were conducted by George Mason University Center for Social Science Research staff from March through May 2014, as part of the 2015 *GMU and City of Fairfax Transit Study*.

ON/OFF COUNTS

The 2014 ridership counts were collected on two weekdays and a Saturday for each CUE bus route.

Gold 1

Exhibit A-1: Gold 1 Weekday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Lane at Patriot Circle	121	0	121
University Drive & Chain Bridge Rd.	3	1	122
Chain Bridge Rd. at School St.	0	3	119
Chain Bridge Rd. at INOVA	5	5	120
Chain Bridge Rd. at West Dr.	8	14	114
Chain Bridge Rd. at Armstrong St.	8	5	117
Chain Bridge Rd. at Justice Drive	8	5	120
West St. at Fairfax Courthouse	1	2	119
Main St. at Fairfax Building	16	6	129
Main St. at Railroad Ave.	1	1	129
Main St. at Keith Ave.	3	7	125
Main St. at Oak St.	11	7	129
Main St. at Hallman St.	18	28	119
Lee Highway at Chipotle	14	7	127
Lee Highway at Hilltop Shopping Center	5	1	131
Lee Highway at Jermantown Rd.	12	22	121

Jermantown Rd. at Jermantown Sq.	7	3	124
Jermantown Rd. at James Swarts	20	13	131
Jermantown Rd. at Main St.	11	12	130
Jermantown Rd. at Comfort Inn	21	13	139
Jermantown Rd. at Fair Haven Ct.	17	8	148
Jermantown Rd. at Cavalier Ct.	50	16	182
Orchard St. at Bevan Dr.	3	9	175
Bevan Dr. at Lanier School	5	1	179
Warick Ave. at Bevan Dr.	1	0	181
Warick Ave. at Hill St.	5	3	183
Warick Ave. at Meredith Dr.	16	8	190
Warick Ave. at H/Mart Shop	8	2	196
Fairfax Blvd. at McLean Ave.	7	1	201
Fairfax Blvd. at Denny's Rest	11	9	203
Fairfax Blvd. at University Dr.	9	2	209
Fairfax Blvd. at Eaton Pl.	14	2	221
Fairfax Blvd. at 10201 Block	1	2	220
Fairfax Blvd. at Plantation Pkwy.	8	2	226
Fairfax Blvd. at Stafford Drive	3	1	227
Fairfax Blvd. at Rebel Run	4	6	226
Draper Dr. at Fairfax Blvd.	3	5	224
Draper Dr. at Beach St.	0	1	223
Kingsbridge Dr. at Kings Crown Ct.	4	6	221
Blake Lane at Lindenbrook St.	6	3	224
Blake Lane at Bel Glade	0	1	222
Blake Lane at Five Oaks Rd.	1	3	220
County Creek at Village Springs Lane	0	1	219
Vienna Fairfax-GMU Metro Station	0	219	0
	468	**468**	

Exhibit A-2: Gold 1 Weekday Counts – Outbound to GMU (Rappahannock River Lane)

Weekday - Outbound to Rappahannock

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	209	0	209
County Creek at Village Springs Lane	0	2	207
Blake Lane at Five Oaks Rd.	2	5	205
Blake Lane at Bel Glade	0	11	193
Blake Lane at Knightsbridge Dr.	6	28	171
Blake Lane at Blake Lane Loop	15	6	180
Lee Highway at Arthur Teachers	27	3	203
Old Lee Highway at Fairfax Circle Shopping	14	14	203
Old Lee Highway at Ridge Ave.	6	0	209
Old Lee Highway at Great Oak Drive	2	11	200
Old Lee Highway at Fairfax High School	14	2	212
Old Lee Highway at Brookswood Dr.	1	13	200
Old Lee Highway at Embassy Ln.	2	0	203
Old Lee Highway at Heritage Ln.	1	6	198
Old Lee Highway at St. Leo's Church	5	8	194
Old Lee Highway at Layton Hall Dr.	17	32	180
Old Lee Highway at Willard Way	12	15	176
Old Lee Highway at Library	15	35	156
University Dr. at Main St.	8	17	146
University Dr. at Sager Ave.	2	1	147
University Dr. at Fire Station No.3	0	5	143
George Mason Blvd. at Armstrong St.	5	9	138
George Mason Blvd. at School St.	0	2	137
Rappahannock Lane at Patriot Circle	3	140	0
	366	**366**	

Exhibit A-3: Gold 1 Saturday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	55	0	55
University Drive & Chain Bridge Rd.	3	2	56
Chain Bridge Rd. at School St.	2	2	57
Chain Bridge Rd. at INOVA	1	2	56
Chain Bridge Rd. at West Dr.	2	0	58
Chain Bridge Rd. at Armstrong St.	3	0	61
Chain Bridge Rd. at Justice Drive	3	2	63
West St. at Fairfax Courthouse	4	2	65
Main St. at Fairfax Building	0	4	61
Main St. at Railroad Ave.	1	2	60
Main St. at Keith Ave.	0	0	60
Main St. at Oak St.	1	3	58
Main St. at Hallman St.	8	4	62
Lee Highway at Chipotle	6	5	62
Lee Highway at Hilltop Shopping Center	10	5	67
Lee Highway at Jermantown Rd.	10	5	72
Jermantown Rd. at Jermantown Sq.	7	7	72
Jermantown Rd. at James Swarts	9	13	68
Jermantown Rd. at Main St.	10	13	65
Jermantown Rd. at Comfort Inn	7	11	60
Jermantown Rd. at Fair Haven Ct.	9	3	66
Jermantown Rd. at Cavalier Ct.	12	7	71
Orchard St. at Bevan Dr.	2	1	73
Bevan Dr. at Lanier School	3	13	63

Warick Ave. at Bevan Dr.	1	0	64
Warick Ave. at Hill St.	3	0	67
Warick Ave. at Meredith Dr.	4	0	72
Warick Ave. at H/Mart Shop	4	6	70
Fairfax Blvd. at McLean Ave.	4	2	73
Fairfax Blvd. at Denny's Rest	9	7	74
Fairfax Blvd. at University Dr.	0	2	72
Fairfax Blvd. at Eaton Pl.	2	7	68
Fairfax Blvd. at 10201 Block	0	1	67
Fairfax Blvd. at Plantation Pkwy.	3	3	67
Fairfax Blvd. at Strafford Drive	1	0	68
Fairfax Blvd. at Rebel Run	2	1	69
Draper Dr. at Fairfax Blvd.	6	3	72
Draper Dr. at Beach St.	0	2	70
Kingsbridge Dr. at Kings Crown Ct.	1	3	68
Blake Lane at Lindenbrook St.	1	3	66
Blake Lane at Bel Glade	1	0	67
Blake Lane at Five Oaks Rd.	0	0	67
County Creek at Village Springs Lane.	0	0	67
Vienna-Fairfax-GMU Metro Station	0	67	0
	213	**213**	

Exhibit A-4: Gold 1 Saturday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	58	0	58
County Creek at Village Springs Lane.	0	0	58
Blake Lane at Five Oaks Rd.	3	2	59
Blake Lane at Bel Glade	1	0	60
Blake Lane at Knightsbridge Dr.	0	2	59
Blake Lane at Blake Lane Loop	0	0	59
Lee Highway at Arthur Teachers	5	8	56
Old Lee Highway at Fairfax Circle Shopping	3	5	55
Old Lee Highway at Ridge Ave.	13	2	66
Old Lee Highway at Great Oak Drive	18	2	83
Old Lee Highway at Fairfax High School	6	0	89
Old Lee Highway at Brookswood Dr.	4	0	93
Old Lee Highway at Embassy Ln.	4	3	94
Old Lee Highway at Heritage Ln.	8	2	100
Old Lee Highway at St. Leo's Church	1	5	97
Old Lee Highway at Layton Hall Dr.	3	5	95
Old Lee Highway at Willard Way	2	6	91
Old Lee Highway at Library	8	11	89
University Dr. at Main St.	5	18	76
University Dr. at Sager Ave.	0	2	74
University Dr. at Fire Station No.3	3	2	76
George Mason Blvd. at Armstrong St.	0	0	76
George Mason Blvd. at School St.	0	5	71
Rappahannock Ln. at Patriot Circle	0	71	0
	145	**145**	

Gold 2

Exhibit A-5: Gold 2 Weekday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	108	0	108
George Mason Blvd. at School St.	2	2	108
University Dr. at Armstrong St.	3	5	106
University Dr. at Fire Station No. 3	4	2	108
University Dr. at Sager Ave	2	2	108
University Dr. at Main St.	7	3	112
University Dr. at North St.	7	2	117
Old Lee Highway at Willard Way	26	11	132
Old Lee Highway at Layton Hall Dr	15	13	135
Old Lee Highway at Daniel Run School	3	5	133
Old Lee Highway at Heritage Ln	4	1	136
Old Lee Highway at Embassy Ln	2	4	134
Old Lee Highway at Queen Anne Dr	10	1	143
Old Lee Highway and Cornell Road	1	8	136
Old Lee Highway at Great Oak Dr	7	3	141
Old Lee Highway at Ridge Ave	2	7	136
Old Lee Highway at Old Pickett Rd	22	15	143
Fairfax Blvd at Fairfax Circle Plaza	8	29	121
Blake Ln at Blake Ln Loop	6	11	117
Blake Lane at Lindenbrook Street	9	6	120
Blake Ln at Bel Glade	2	5	117
Blake Ln at Five Oaks Rd	2	8	112
County Creek at Village Springs Lane.	1	4	109
Vienna/Fairfax-GMU Metro Station	0	109	0
	255	**255**	

Exhibit A-6: Gold 2 Weekday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	191	0	191
County Creek at Village Springs Lane.	3	2	192
Blake Lane at Five Oaks Rd.	8	5	195
Blake Lane at Bel Glade	4	3	196
Blake Lane at Knightsbridge Dr.	20	12	204
Kingsbridge Dr at Kings Crown Ct	8	10	202
Draper Dr at Beech Dr	8	7	203
Draper Drive at Fairfax Blvd	2	4	201

Fairfax Blvd at Rebel Run	2	9	194
Fairfax Blvd at Stafford Dr	1	5	191
Fairfax Blvd at Plantation Pkwy	10	11	190
Fairfax Blvd at 10201 Block	1	3	187
Fairfax Blvd at Eaton Pl	5	8	184
Fairfax Blvd at University Dr	2	9	178
Fairfax Blvd at Chain Bridge Rd	16	16	178
Fairfax Blvd at McLean Ave	4	10	172
Warwick Ave at Burrows Ave	7	11	168
Warwick Ave at Meredith Dr	6	9	165
Warwick Ave at Hill St	6	2	168
Warwick Ave at Bevan Dr	6	6	169
Orchard St at Bevan Dr	9	12	165
Jermantown Rd at Gainsborough Ct	29	26	168
Jermantown Rd at Fair Haven Ct	19	17	170
Jermantown Rd at Kutner Park	18	20	168
Jermantown Rd at Main St	17	18	167
Jermantown Rd at James Swarts	12	14	165
Jermantown Rd at Lee Highway	11	11	165
Lee Highway and Rust Road	32	19	178
Lee Highway at Guitar Center	5	3	179
Lee Highway at Holly Street	8	10	177
Main St at Chesnut St	6	8	175
Main St at Hallman St	14	9	180
Main St at Oak St	6	6	181
Main St at Keith Ave	4	8	177
Judicial Dr at Main St	12	6	183
Judicial Dr at Page Ave	6	10	178
Judicial Dr at Court House	2	3	177
Chain Bridge Rd at Armstrong St	1	1	177
Chain Bridge Rd at West Dr	12	7	182
Chain Bridge Rd at Canfield Street	4	5	182
Chain Bridge Rd at School St	7	2	186
University Drive at Occoquan	1	13	175
Rappahannock Ln. at Patriot Circle (GMU)	0	175	0
	543	**543**	

Exhibit A-7: Gold 2 Saturday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	40	0	40
George Mason Blvd. at School St.	0	0	40
University Dr. at Armstrong St.	0	2	38
University Dr. at Fire Station No. 3	0	0	38
University Dr. at Sager Ave	2	1	38
University Dr. at Main St.	3	1	40
University Dr. at North St.	3	4	39
Old Lee Highway at Willard Way	11	2	48
Old Lee Highway at Layton Hall Dr	8	4	52
Old Lee Highway at Daniel Run School	11	3	59
Old Lee Highway at Heritage Ln	5	2	62
Old Lee Highway at Embassy Ln	0	0	62
Old Lee Highway at Queen Anne Dr	0	1	61
Old Lee Highway and Cornell Road	2	0	62
Old Lee Highway at Great Oak Dr	0	10	52
Old Lee Highway at Ridge Ave	3	1	54
Old Lee Highway at Old Pickett Rd	0	1	53
Fairfax Blvd at Fairfax Circle Plaza	2	9	46
Blake Ln at Blake Ln Loop	8	8	45
Blake Lane at Lindenbrook Street	0	7	38
Blake Ln at Bel Glade	2	2	38
Blake Ln at Five Oaks Rd	0	1	37
County Creek at Village Springs Lane.	0	0	37
Vienna/Fairfax-GMU Metro Station	0	37	0
	96	**96**	

Exhibit A-8: Gold 2 Saturday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	50	0	50
County Creek at Village Springs Lane.	0	0	50
Blake Lane at Five Oaks Rd.	1	0	51
Blake Lane at Bel Glade	0	0	51
Blake Lane at Knightsbridge Dr.	0	0	51
Kingsbridge Dr at Kings Crown Ct	6	4	53
Draper Dr at Beech Dr	6	1	58
Draper Drive at Fairfax Blvd	6	0	64
Fairfax Blvd at Rebel Run	1	3	62
Fairfax Blvd at Stafford Dr	2	11	53
Fairfax Blvd at Plantation Pkwy	2	3	52
Fairfax Blvd at 10201 Block	0	0	52
Fairfax Blvd at Eaton Pl	1	3	51
Fairfax Blvd at University Dr	0	0	51

Fairfax Blvd at Chain Bridge Rd	0	1	49
Fairfax Blvd at McLean Ave	1	1	49
Warwick Ave at Burrows Ave	2	0	51
Warwick Ave at Meredith Dr	4	3	52
Warwick Ave at Hill St	10	0	62
Warwick Ave at Bevan Dr	1	1	62
Orchard St at Bevan Dr	3	12	53
Jermantown Rd at Gainsborough Ct	1	1	53
Jermantown Rd at Fair Haven Ct	10	1	61
Jermantown Rd at Kutner Park	2	8	55
Jermantown Rd at Main St	21	4	72
Jermantown Rd at James Swarts	12	5	79
Jermantown Rd at Lee Highway	3	8	74
Lee Highway and Rust Road	12	9	76
Lee Highway at Guitar Center	5	4	77
Lee Highway at Holly Street	4	9	72
Main St at Chesnut St	5	3	74
Main St at Hallman St	7	7	74
Main St at Oak St	2	4	72
Main St at Keith Ave	3	0	75
Judicial Dr at Main St	2	0	77
Judicial Dr at Page Ave	0	3	75
Judicial Dr at Court House	3	3	75
Chain Bridge Rd at Armstrong St	1	3	73
Chain Bridge Rd at West Dr	1	8	66
Chain Bridge Rd at Canfield Street	1	7	61
Chain Bridge Rd at School St	0	5	55
University Drive at Occoquan	0	0	55
Rappahannock Ln. at Patriot Circle (GMU)	0	55	0
	191	**191**	

Green 1

Exhibit A-9: Green 1 Weekday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	90	1	89
University Drive & Chain Bridge Rd.	2	2	89
Chain Bridge Rd. at School St.	3	1	91
Chain Bridge Rd. at INOVA	6	1	96
Chain Bridge Rd. at West Dr.	4	3	97
Chain Bridge Rd. at Armstrong St.	7	5	99
Chain Bridge Rd. at Justice Drive	4	3	100
Chain Bridge Rd. at County Court	15	1	114
Chain Bridge Rd. at Main St.	1	2	113
Chain Bridge Rd. at Whitehead St.	6	2	116
Chain Bridge Rd. at Kenmore Dr.	1	0	117
Chain Bridge Rd. at Stratford Dr.	3	0	121
Chain Bridge Rd. at Fairfax Blvd.	7	10	118
Chain Bridge Rd. at Marriott Hotel	14	15	117
Eaton Pl. at Best Western Hotel	15	10	122
Eaton Pl. at 10306 Blvd.	3	0	125
Eaton Pl. at Fairfax Blvd.	2	1	127
Fairfax Blvd. at 10201 Block	3	4	126
Fairfax Blvd. at Plantation Pkwy.	8	4	129
Fairfax Blvd. at Strafford Drive	5	3	131
Fairfax Blvd. at Rebel Run	6	6	130
Fairfax Blvd. at Draper Drive	2	3	129
Fairfax Blvd. at Spring St.	4	6	127
Fairfax Blvd. at Campbell Drive	5	5	126
Fairfax Blvd. at Pickett Rd.	12	10	129
Arlington Blvd at Stonehurst Drive	9	5	133
Nutley St. at Barrick Drive	3	7	129
Nutley St. at Pan Am Shopping	3	5	127
Nutley St. at Lee Highway	3	5	125
Vienna-Fairfax-GMU Metro Station	0	125	0
	249	**249**	

Exhibit A-10: Green 1 Weekday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	164	0	164
Nutley St. at Hermosa Drive	11	0	175
Nutley St. at Pan Am Shopping	11	5	181
Nutley St. and Barrick St.	6	5	183
Arlington Blvd. at Stonehurst Dr.	11	0	193
Fairfax Blvd. and Pickett Rd.	45	23	215
Old Pickett Rd. at Home Depot	15	9	221
Old Pickett Rd. at JL Tree Service.	2	14	209
Pickett Road at Thaiss Park	4	7	206
Picket Rd. at Silver King Court	11	7	210
Picket Rd. at Barrister Keep	4	12	202
Picket Rd. at Post Office	2	5	200
Picket Rd. at Colonial Ave.	15	2	212
Picket Rd. at Mathy Dr.	15	23	204
Picket Rd. at Turnpike Shopping Center	11	5	210
Main St. at Pickett Rd.	11	7	214
Main St. at Whiteacre Rd.	26	23	216
Main St. at Lyndhurst	26	26	216
Main St. at Maple Ave.	26	21	221
Main St. at Stonewall Ave.	9	23	206
Main St. at Tedrich Blvd.	15	5	216
Main St. at Virginia St.	13	0	229
Main St. at Robert's Road	4	2	231
Main St. at Locust Rd.	4	7	228
Main St. Market Place	2	23	207
University Dr. at Main St.	6	19	195
University Dr. at Sager Ave.	4	12	187
University Dr. at Fire Station No.3	6	2	191
George Mason Blvd. at Armstrong St.	2	0	194
George Mason Blvd. at School St.	0	0	194
Rappahannock Ln. at Patriot Circle (GMU)	0	194	0
	480	**480**	

Exhibit A-11: Green 1 Saturday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	29	0	29
University Drive & Chain Bridge Rd.	0	0	29
Chain Bridge Rd. at School St.	0	5	25
Chain Bridge Rd. at INOVA	5	0	30
Chain Bridge Rd. at West Dr.	3	3	29
Chain Bridge Rd. at Armstrong St.	4	2	30
Chain Bridge Rd. at Justice Drive	4	1	33
Chain Bridge Rd. at County Court	13	3	42
Chain Bridge Rd. at Main St.	5	0	47
Chain Bridge Rd. at Whitehead St.	8	1	54
Chain Bridge Rd. at Kenmore Dr.	1	0	55
Chain Bridge Rd. at Stratford Dr.	0	1	54
Chain Bridge Rd. at Fairfax Blvd.	1	1	54
Chain Bridge Rd. at Marriott Hotel	0	2	52
Eaton Pl. at Best Western Hotel	6	0	58
Eaton Pl. at 10306 Blvd.	1	0	59
Eaton Pl. at Fairfax Blvd.	0	0	59
Fairfax Blvd. at 10201 Block	3	0	62
Fairfax Blvd. at Plantation Pkwy.	3	0	64
Fairfax Blvd. at Strafford Drive	3	0	67
Fairfax Blvd. at Rebel Run	0	0	67
Fairfax Blvd. at Draper Drive	0	2	65
Fairfax Blvd. at Spring St.	5	7	63
Fairfax Blvd. at Campbell Drive	0	14	49
Fairfax Blvd. at Pickett Rd.	8	5	52
Arlington Blvd at Stonehurst Drive	1	0	53
Nutley St. at Barrick Drive	3	3	52
Nutley St. at Pan Am Shopping	3	7	48
Nutley St. at Lee Highway	3	0	50
Vienna-Fairfax-GMU Metro Station	0	50	0
	109	**109**	

Exhibit A-12: Green 1 Saturday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	48	0	48
Nutley St. at Hermosa Drive	0	1	46
Nutley St. at Pan Am Shopping	7	0	53
Nutley St. and Barrick St.	5	1	57
Arlington Blvd. at Stonehurst Dr.	0	0	57
Fairfax Blvd. and Pickett Rd.	35	7	85
Old Pickett Rd. at Home Depot	16	3	98
Old Pickett Rd. at JL Tree Service.	5	1	102
Pickett Road at Thaiss Park	1	0	103
Picket Rd. at Silver King Court	3	4	102
Picket Rd. at Barrister Keep	8	0	111
Picket Rd. at Post Office	0	1	109
Picket Rd. at Colonial Ave.	5	3	111
Picket Rd. at Mathy Dr.	3	15	100
Picket Rd. at Turnpike Shopping Center	5	23	82
Main St. at Pickett Rd.	7	5	83
Main St. at Whiteacre Rd.	5	11	77
Main St. at Lyndhurst	7	12	72
Main St. at Maple Ave.	7	5	74
Main St. at Stonewall Ave.	9	3	80
Main St. at Tedrich Blvd.	1	1	80
Main St. at Virginia St.	1	9	72
Main St. at Robert's Road	0	3	69
Main St. at Locust Rd.	2	3	69
Main St. Market Place	6	9	65
University Dr. at Main St.	2	4	63
University Dr. at Sager Ave.	0	5	58
University Dr. at Fire Station No.3	0	1	57
George Mason Blvd. at Armstrong St.	0	3	54
George Mason Blvd. at School St.	0	0	54
Rappahannock Ln. at Patriot Circle (GMU)	0	54	0
	189	**189**	

Green 2

Exhibit A-13: Green 2 Weekday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	106	0	106
George Mason Blvd. at School St.	2	1	107
University Dr. at Armstrong St.	5	1	111
University Dr. at Fire Station No. 3	4	0	115
University Dr. at Sager Ave	1	1	115
University Dr. at Main St.	6	3	117
University Dr. at North St.	7	2	122
Main St. at East St.	11	2	131
Main St. at Locust St.	4	0	134
Main St. at Roberts Rd.	10	0	144
Main St. at Virginia St.	7	2	149
Main St. at Tedrich Blvd.	6	5	150
Main St. at Stonewall Ave.	1	0	151
Main St. at Maple Ave.	11	14	149
Main St. at Trapp Rd.	13	2	159
Main St. at Whitacre Rd.	20	15	165
Pickett Rd. at Picket Shopping Center	24	26	162
Pickett Rd. at Mathy Dr.	24	8	178
Pickett Rd. at Colonial Ave.	6	6	178
Pickett Rd. at Post Office	11	6	183
Pickett Rd at Shelly Krasnow Ln.	6	6	183
Pickett Rd. at Silver King Court	0	0	183
Pickett Rd. at Thaiss Park	2	1	185
Old Pickett Road at Foxcroft Apts	6	6	185
Old Pickett Rd. at Old Lee Highway	0	10	175
Fairfax Blvd. at Pickett Rd.	13	24	164
Arlington Blvd at Stonehurst Drive	1	1	164
Nutley St. at Barrick Drive	6	15	155
Nutley St. at Pan Am Shopping	8	6	157
Nutley St. at Lee Highway	8	9	157
Vienna-Fairfax-GMU Metro Station	0	157	0
	329	**329**	

Exhibit A-14: Green 2 Weekday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	134	0	134
Nutley St. at Hermosa Drive	9	3	140
Nutley St. at Pan Am Shopping	19	4	156
Nutley St. and Barrick St.	9	5	160
Arlington Blvd. at Stonehurst Dr.	1	5	155
Fairfax Blvd. and Pickett Rd.	21	14	162
Fairfax Blvd. at Campbell Dr.	13	9	165
Fairfax Blvd. at Spring St.	5	0	170
Fairfax Blvd. at Draper Dr.	5	5	169
Fairfax Blvd. at Rebel Run	11	7	174
Fairfax Blvd. at Stafford Dr.	9	5	178
Fairfax Blvd. at Plantation Pkwy.	5	15	167
Fairfax Blvd. at 10201 Block	3	10	161
Eaton Pl. at Office Park	15	4	172
Eaton Pl. at 10306 Block	8	9	171
Eaton Pl. at Chain Bridge Rd.	9	27	153
Chain Bridge Rd. at Orchard St.	3	13	143
Chain Bridge Rd. at Fairfax Blvd.	10	10	143
Chain Bridge Rd. at Providence Way	2	14	132
Chain Bridge Rd. at Kenmore Dr.	5	6	130
Chain Bridge Rd. at Main St.	6	17	119
Chain Bridge Rd. at County Court House	5	12	112
Chain Bridge Rd. at Armstrong St.	3	10	105
Chain Bridge Rd. at West Dr.	11	9	108
Chain Bridge Rd. at Canfield St.	3	5	106
Chain Bridge Rd. at School St.	1	1	106
University Dr. at Occoquan	3	3	106
Rappahannock Ln. at Patriot Circle (GMU)	0	106	0
	329	**329**	

Exhibit A-15: Green 2 Saturday Counts – Inbound to Vienna/Fairfax-GMU Metro

Stop	ON	OFF	LOAD
Rappahannock Ln. at Patriot Circle (GMU)	16	0	16
George Mason Blvd. at School St.	0	0	16
University Dr. at Armstrong St.	0	0	16
University Dr. at Fire Station No. 3	0	1	15
University Dr. at Sager Ave	6	0	21
University Dr. at Main St.	13	4	30
University Dr. at North St.	0	0	30
Main St. at East St.	7	0	37
Main St. at Locust St.	0	0	37
Main St. at Roberts Rd.	6	4	39
Main St. at Virginia St.	1	5	35
Main St. at Tedrich Blvd.	3	0	38
Main St. at Stonewall Ave.	1	0	39
Main St. at Maple Ave.	9	9	39
Main St. at Trapp Rd.	1	3	38
Main St. at Whitacre Rd.	10	7	41
Pickett Rd. at Picket Shopping Center	13	7	48
Pickett Rd. at Mathy Dr.	4	4	48
Pickett Rd. at Colonial Ave.	4	1	51
Pickett Rd. at Post Office	0	1	50
Pickett Rd at Shelly Krasnow Ln.	7	8	49
Pickett Rd. at Silver King Court	3	1	50
Pickett Rd. at Thaiss Park	12	0	62
Old Pickett Road at Foxcroft Apts	19	3	79
Old Pickett Rd. at Old Lee Highway	9	3	85
Fairfax Blvd. at Pickett Rd.	12	16	80
Arlington Blvd at Stonehurst Drive	0	3	77
Nutley St. at Barrick Drive	4	9	72
Nutley St. at Pan Am Shopping	4	4	73
Nutley St. at Lee Highway	0	7	66
Vienna-Fairfax-GMU Metro Station	0	66	0
	167	**167**	

Exhibit A-16: Green 2 Saturday Counts – Outbound to GMU (Rappahannock River Lane)

Stop	ON	OFF	LOAD
Vienna-Fairfax-GMU Metro Station	53	0	53
Nutley St. at Hermosa Drive	1	0	54
Nutley St. at Pan Am Shopping	7	7	54
Nutley St. and Barrick St.	4	0	58
Arlington Blvd. at Stonehurst Dr.	0	0	58
Fairfax Blvd. and Pickett Rd.	13	8	63
Fairfax Blvd. at Campbell Dr.	5	5	63
Fairfax Blvd. at Spring St.	3	0	66
Fairfax Blvd. at Draper Dr.	0	0	66
Fairfax Blvd. at Rebel Run	0	2	64
Fairfax Blvd. at Stafford Dr.	7	3	68
Fairfax Blvd. at Plantation Pkwy.	0	0	68
Fairfax Blvd. at 10201 Block	8	15	60
Eaton Pl. at Office Park	0	10	50
Eaton Pl. at 10306 Block	7	5	52
Eaton Pl. at Chain Bridge Rd.	0	2	50
Chain Bridge Rd. at Orchard St.	5	3	52
Chain Bridge Rd. at Fairfax Blvd.	3	3	52
Chain Bridge Rd. at Providence Way	4	7	49
Chain Bridge Rd. at Kenmore Dr.	5	0	54
Chain Bridge Rd. at Main St.	8	2	61
Chain Bridge Rd. at County Court House	0	2	59
Chain Bridge Rd. at Armstrong St.	5	5	59
Chain Bridge Rd. at West Dr.	0	5	54
Chain Bridge Rd. at Canfield St.	0	2	52
Chain Bridge Rd. at School St.	0	5	47
University Dr. at Occoquan	0	2	46
Rappahannock Ln. at Patriot Circle (GMU)	0	46	0
	139	**139**	

LOAD BY TIME PERIOD

The following charts were developed as part of the load analysis in the 2015 *GMU and City of Fairfax Transit Study*. CUE uses two different size buses on its routes. The capacity of the smaller size 30 foot buses, with a seated capacity of 28 passengers and a maximum capacity of 50 including standees, was used as a conservative figure in this load analysis.

Exhibit A-17: Gold 1 Weekday Load Analysis

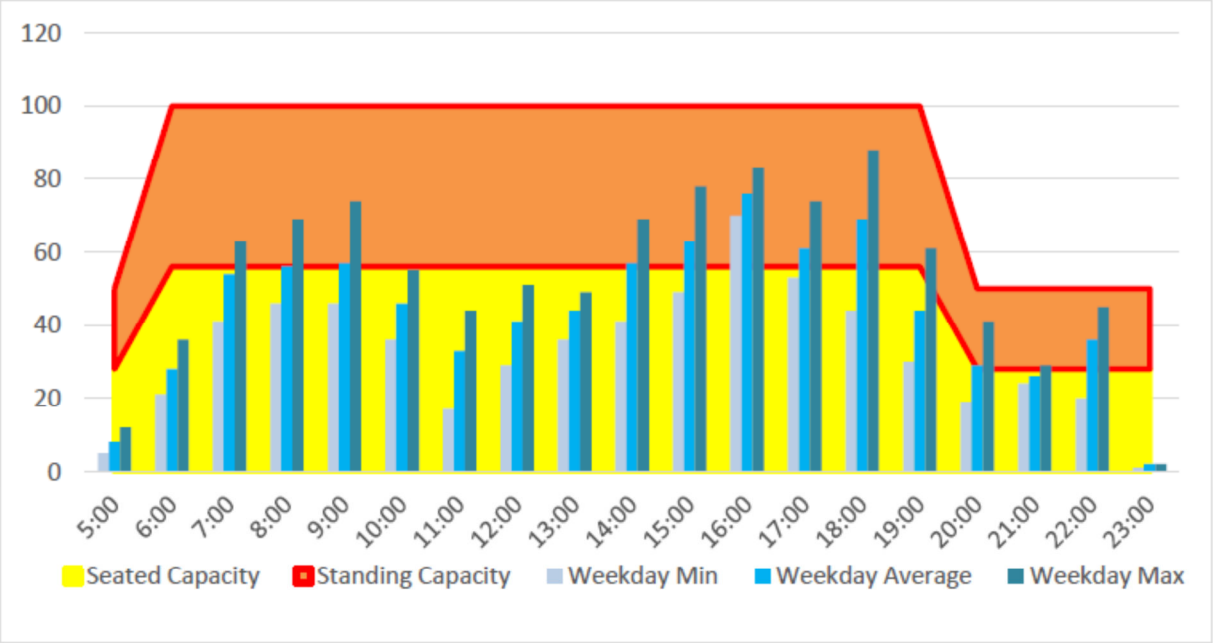


Exhibit A-18: Gold 2 Weekday Load Analysis

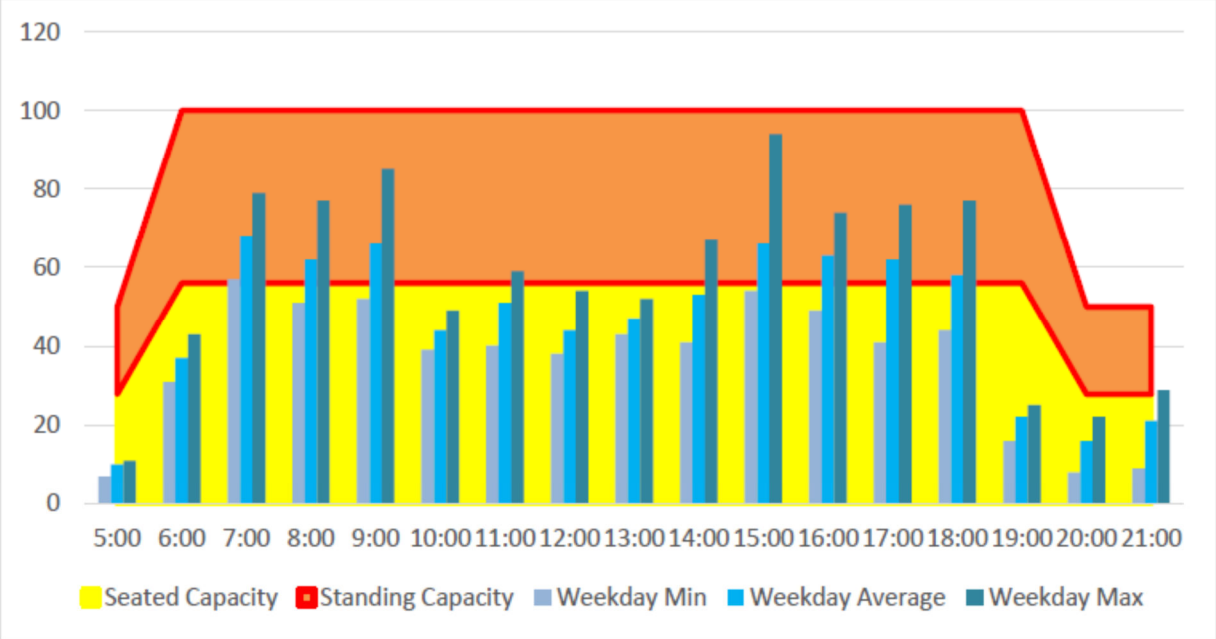


Exhibit A-19: Green 1 Weekday Load Analysis

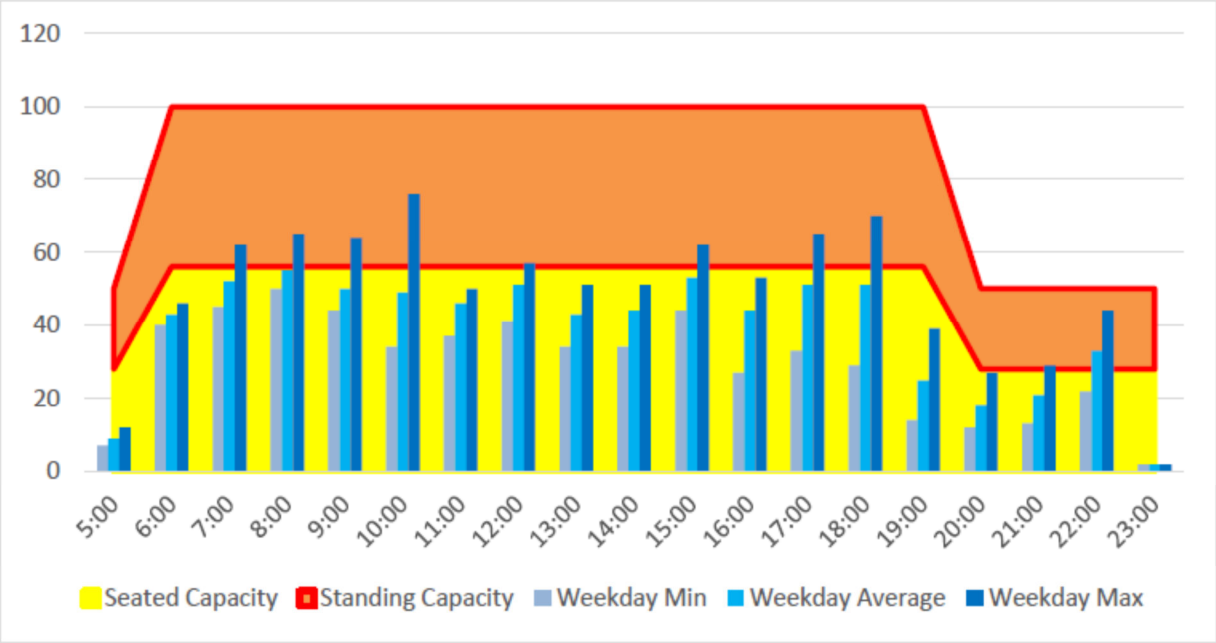
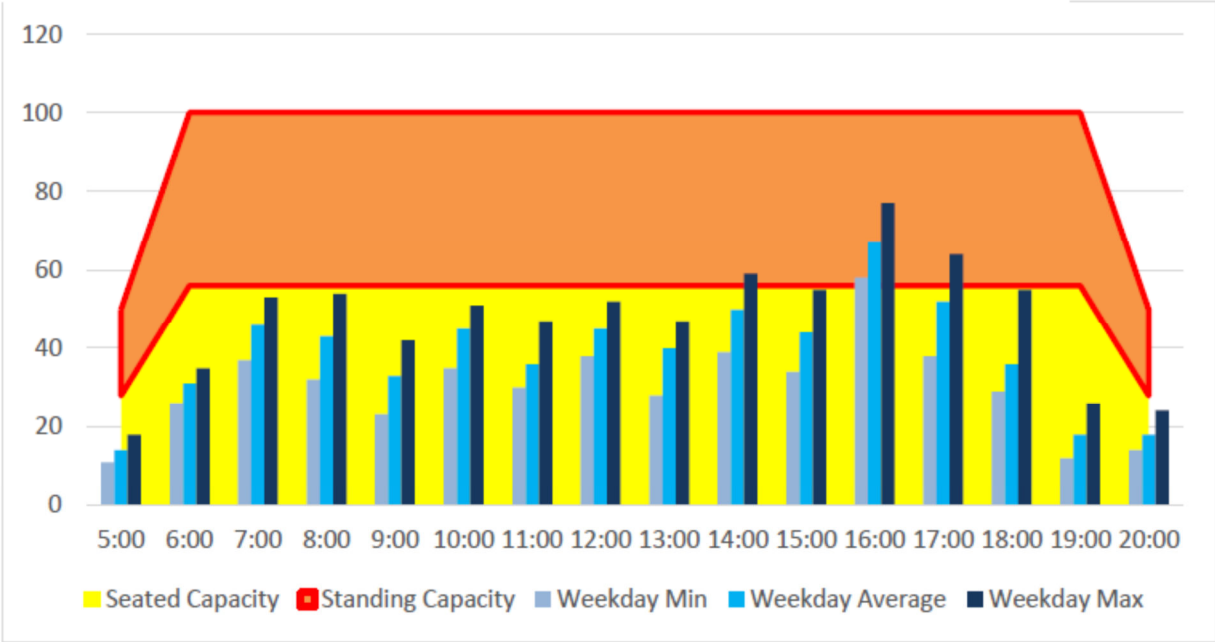


Exhibit A-20: Green 2 Weekday Load Analysis



Appendix B
CUE TDP Community Survey

City of Fairfax CUE Bus Community Transportation Survey

The City of Fairfax, working with the Virginia Department of Rail and Public Transportation, is developing a Transit Development Plan for its CUE bus service. The Transit Development Plan will serve as a guide for the local transit system, providing a roadmap for implementing service and organizational improvements during the next six years. To inform this effort, we are conducting a Community Transportation Survey to better understand transit needs in the City of Fairfax.

Please help us learn more about your transit needs and wishes by completing this survey.

1. What modes of transportation do you use more than 3 times per week? *(Please check all that apply.)*
❑ Car ❑ Taxi ❑ Walk ❑ Bicycle ❑ Uber/Lyft
❑ Public transportation ❑ A friend or family member
❑ Other: _____

2. Are you aware of the services provided by the City's CUE bus system? ❑ Yes ❑ No
Please rate your overall impression of CUE bus services? ❑ Positive ❑ Neutral ❑ Negative

3. Do you use any of the following public transportation services? *(Please check all that apply.)*
❑ CUE Bus – Green ❑ Metrorail
❑ CUE Bus – Gold ❑ Metrobus – 29N
❑ George Mason Shuttles ❑ Metrobus – 2B
❑ City Wheels ❑ Metrobus – 1C
❑ Fairfax Connector ❑ Metrobus – 17A/G
❑ Fastran ❑ Taxis
❑ VRE Commuter Rail ❑ Vanpools or carpools
❑ Uber/Lyft
❑ Other: _____

4. If you do currently use public transportation services, how frequently do you use them?
❑ 5 days/week or more
❑ 1-4 days/week
❑ Less than 1 day/week

5. Are there specific destinations you need to go to on a regular basis that transit does not serve?
❑ Yes ❑ No

If yes, where: _____

6. Are you aware that Fairfax CUE provides real-time information about the scheduled arrival time and location of each bus at each stop through its website http://www.nextbus.com/#!/fairfax/gold2/sta/gmu:
❑ Yes ❑ No

7. If you **DO NOT** currently use public transportation, what improvements would be needed for you to ride public transportation? *(Please check all that apply.)*
❑ Better service availability from _____ to _____ (Provide specific locations.)
❑ More frequent service ❑ Shorter travel time
❑ Longer hours of service ❑ Fewer transfers
❑ Better service reliability ❑ Improved information
❑ Safer vehicles ❑ Less crowded vehicles
❑ Guaranteed ride home for emergencies/overtime
❑ Shelters/Benches/lighting at stops I use
❑ Bikeshare/secure bike parking at stops
❑ Park and ride facilities
❑ Other: _____

8. Where would you look to get information about public transportation? (Please check all that apply.)
❑ Website ❑ Bus Stops ❑ Brochure
❑ Email ❑ Direct Mail ❑ City/County Office
❑ TV ❑ Social Media ❑ Smartphone
❑ Radio ❑ Newspaper ❑ Friends/Family
❑ Outdoor Ads ❑ Other _____

9. Are you part of the George Mason University community? ❑ Yes ❑ No
If so, are you a: Student ❑ Yes ❑ No
Staff Member ❑ Yes ❑ No
Faculty Member ❑ Yes ❑ No

10. Please provide any additional comments you may have concerning public transportation for the City of Fairfax:

_____

_____

_____

11. If you would like to receive updates about the Fairfax CUE Transit Development Plan, please provide your contact information:
Name: _____ Email: _____

Completed survey can be returned to staff or mailed to: KFH Group, 4920 Elm Street, Suite 350, Bethesda, MD 20814
Thank you!