

US29 Bus Rapid Transit (BRT) Project

Montgomery County, Maryland

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PROJECT OVERVIEW

Project Name: US 29 Bus Rapid Transit (BRT) Improvements Project

Project Type: Premium, limited-stop Bus Rapid Transit service and Bikeshare

Project Description: The Montgomery County Department of Transportation (MCDOT) is implementing a bus rapid transit (BRT) system along US 29 that meets the immediate needs of transit populations along this busy corridor. The US 29 Bus Rapid Transit (BRT) Improvements Project will transform mobility options with the implementation of a 14-mile, premium, branded, limited-stop BRT service.

This new service will improve transit travel time and increase opportunity for a broad range of users, including a significant number of minority and low-income riders living along a highly congested corridor.

The project will improve passenger transit mobility by connecting riders to high density housing and employment centers. This project is vital to the success of significant new private development and employment in the recently adopted White Oak Science Gateway Master Plan.

The project is funded in part by a $10 million from the U.S. Department of Transportation's TIGER (Transportation Investment Generating Economic Recovery) discretionary grant program.

Total Capital Cost: $31,500,000
Federal TIGER Funds: $10,000,000
County Contribution: $21,500,000

PROJECT DESCRIPTION

The US 29 Bus Rapid Transit (BRT) Improvements Project will transform mobility options with the implementation of a **14-mile, premium, limited-stop BRT service** on the eastern edge of Montgomery County, Maryland. This project will improve transit reliability and opportunities for low-income and minority populations, enhance planned mixed-use redevelopment transforming an auto-oriented single-purpose development into vibrant, mixed-use urban centers, provide access to a fast-growing jobs corridor, and enhance the quality of life for over 120,000 people who live within a half-mile of this highly congested suburban corridor. The project is funded in part by a $10 million from the U.S. Department of Transportation's TIGER (Transportation Investment Generating Economic Recovery) discretionary grant program.

US 29 BRT PROJECT OVERVIEW

- **Frequent all-day service**
  - Running every 7.5 minutes during the peak period and every 15 minutes during the off-peak.
  - A proposed span of service from 5am to midnight, 7 days/week.
- **Uses Existing Roadway**
  - Uses existing bus-on-shoulder lanes on US 29 in the northern section of the corridor.
  - Operates in mixed traffic in the southern section of US 29 and along Lockwood Drive, Stewart Lane, Briggs Chaney Road, and Castle Boulevard.
- **Transit Signal Priority (TSP)** will be installed at up to 15 intersections along the corridor to provide traffic signal benefits to BRT vehicles where appropriate, reducing travel time and increasing reliability.:
- **Uniquely Branded Vehicles and Stations**
  - Sleek, articulated BRT vehicles with multiple-door level boarding and interior bike accommodation

Project Key Elements

- 14 Miles
- 11 BRT Station Locations
- Uses Existing Shoulder Lanes
- Transit Signal Priority (TSP) at 15 intersections
- 13,000 estimated riders per day
- 10 New Bikeshare Stations

- 11 stations locations (18 station platforms) with level-boarding, off-board fare payment, and real time travel information.
- **Bike and pedestrian improvements** to facilitate station access, including 10 new Capital Bikeshare stations

US 29 BRT Corridor

Unlike other parts of the region, the US 29 Corridor has not benefited from recent growth. The recently approved **White Oak Science Gateway Master Plan** provides a path to bring vibrant mixed-use developments to the area. At one million people, Montgomery County has the largest population of any county in Maryland, and it's growing: after adding more than 166,000 people between 2000 and 2015,[1] the County is projected to add another 162,000 people between 2015 and 2040.[2] This fast-paced growth has spurred new investment and planning in the County's lower-density suburban auto-centric communities and corridors, aiming to increase quality of life and reduce crippling traffic congestion for both County residents and regional commuters. The US 29 BRT Corridor, located on the eastern side of the Montgomery County near the borders with Howard and Prince George's County, is a critical part of that investment and planning.

The US 29 BRT will link a continuous corridor of suburban centers, highway developments, shopping centers, federal offices, residential neighborhoods, regional park-and-rides, and a highly dense residential and jobs center in Silver Spring. Over 120,000 people live within half of a mile of US 29 planned BRT stations, and the racial and income diversity of corridor[3] residents is indicative of the continuing diversification of suburbs nationwide. The corridor is **65 percent minority, 32 percent foreign born, and 30 percent of households classified as "very low-income."**[4] As housing prices surge in neighboring Washington D.C., corridors like US29 in Montgomery County and other suburban jurisdictions have become home for previous residents of the nation's capital, newly arrived immigrants, and others seeking more affordable residential locations beyond the Capital Beltway.[5]

Despite its diverse and growing population, the US 29 corridor still has the infrastructure from a

US29 Corridor

120,00+ people

Highly Diverse
65% minority
32% foriegn born

Over **12 percent** of households have **NO access to a car**

61,000+ jobs

30% of corridor households earn **less than half of the area median income**

Bus trips on corridor can take up to **60% longer** than automobile trips

previous generation, including both auto-centric development and **intense traffic congestion** due to the corridor's role as both a vital intra-county connection and a commuter route to Washington, D.C. Of the 366,000 trips per day start in the corridor area, 46 percent are single-occupancy vehicle and 10 percent are transit.[6]

Despite the automobile-oriented development patterns, US 29 is the busiest transit corridor in Maryland. The regional, local, and commuter buses carry over 11,000 daily trips on the US 29 Corridor.[7] However, bus travel on the corridor is subject to the same lengthy delays as automobiles, reducing the reliability and usefulness of transit for both commuter and non-work trips.[8] In fact, bus trips on the corridor are, on average 20 percent longer than automobile trips, and can be as much as 60 percent longer during peak periods.[9]

The process of **re-developing a 3,000 acre suburban center** along US 29, the White Oak Science Gateway, into a series of mixed-use, transit-friendly developments that embrace the existing assets of the corridor while reducing roadway congestion has begun. To be truly successfully, a vital component of this redevelopment is a BRT corridor. The US 29 Corridor currently lacks a transit connection from Burtonsville to Silver Spring that can support its planned growth.

*"A Bus Rapid Transit system is **essential to achieve the vision of this Master Plan**. Improving transit service within existing corridors is intended to reduce congestion and reliance on autombiles while improving transportation capacity and meeting demands for existing and future land uses."*

-White Oak Science Gateway Master Plan

PROJECT HISTORY

The US 29 BRT Improvement Project is the product of a multi-year planning effort to bring a high quality, convenient and reliable transit to the US 29 corridor. Montgomery County Department of Transportation's **Countywide Bus Rapid Transit Study** (2011) recommends BRT for the US 29 corridor, as does the **Countywide Transit Corridors Functional Master Plan**, which was adopted in 2013. In 2014, Montgomery County Department of Transportation (MCDOT) began working with the Maryland State Highway Administration (SHA) and the Maryland Transit Administration (MTA) to study the possibility of BRT implementation on the corridor with $3.5 million in state assistance.

In order to give community stakeholders a critical voice in the BRT system planning process, Montgomery County formed two Citizen **Corridor Advisory Committees (CACs)** for the US 29 corridor. Over the last two years, the State and County have held 19 public meetings with CACs on US 29, a group of approximately 60 community members who represent the neighborhoods along the corridor. The Committees, which advise on BRT design, study assumptions, transit access, coordination with other modes, public involvement planning, and community needs, helped the project team develop a **Preliminary Purpose and Needs** document for a US 29 Bus Rapid Transit Corridor in 2015. During US 29 BRT planning, Montgomery County has incorporated other jurisdiction's goals as outlined by Washington Metropolitan Area Transit Authority's Priority Corridor Network (WMATA PCN), the TIGER I grant, and neighboring BRT plans. The input from CAC members and other stakeholders has shaped the project that is being advanced as an outcome of the planning process.

In response to the corridor's immediate need and with input from the CACs, MCDOT developed a plan to implement BRT on US 29. In early 2016, Montgomery County Executive Ike Leggett announced recommendations for better transit on the County's corridors, including $6.5 million in the County's Capital Budget for the planning and design of a US 29 BRT on existing pavement, with the intent of "Getting this route up and running less than four years."

Maryland Department of Transportation (MDOT) released the **US 29 BRT Draft Corridor Study Report (CSR)** for the US 29 Bus Rapid Transit (BRT) project in January 2017. One notable finding of the CSR was that implementation of managed lanes in the southern portion of the corridor would require additional analysis. As a result, these **managed lanes are not included as part of the County's BRT project on US 29**. The US 29 BRT will use existing Bus on Shoulder north of Tech Road and existing travel lanes south of Tech Road. The project will include BRT stations, new vehicles, Transit Signal Priority (TSP), and station-area bike/pedestrian improvements.

Completion of the CSR, which focuses on a 2040 horizon year, was a significant milestone and represented a point of transition from long range planning into design of more immediate transit improvements for the US 29 corridor. The more immediate BRT implementation is based on the County Executive's vision described last March for implementation using existing

infrastructure as much as possible by 2020. Moving forward, MCDOT will lead the implementation of the US 29 BRT, drawing upon the findings documented in the CSR such as station locations and service plans.

In March 2017, MCDOT held a series of **Public Open Houses** in three locations on the corridor, as an opportunity for additional conversation with people interested in the County's plans to improve transit service on the corridor. MCDOT plans to make meeting materials available as a "virtual" open house on the BRT website.

The US 29 *Purpose and Need* document is the product of working with our Citizen Corridor Advisory Committees (CACs) for over a year.

THE CORRIDOR – A SECTOR SNAPSHOT

BRT on US 29 will serve three distinct sectors of the corridor: Silver Spring, White Oak, and Burtonsville/Fairland. Each of these sectors has unique characteristics, both in the built environment and use:

- **Silver Spring**: Densely built urban environment near Washington, D.C. that serves as a regional activity center with private and government jobs, social services, healthcare, a large community college campus, and access to local and regional transit, including commuter rail and heavy rail to DC, Virginia, and Maryland. With 15,000 daily boardings, the Silver Spring Metro Station is the busiest station in the County. Downtown Silver Spring has a current Non-Auto Driver Mode Share of (NADMS) 53 percent.

- **White Oak:** Transitioning from an auto-centric 3,000-acre regional activity center north of Silver Spring with over 27,000 jobs, including the Food and Drug Administration (FDA) and the White Oak Federal Research Center to an urban focused development. The White Oak Science Gateway Master Plan[10], developed with community input, provides guidance for the area to be redeveloped as three walkable mixed use activity centers. US29 will be the first of three BRT corridors to serve White Oak. In addition to the FDA, the area's largest employers include a new Washington Adventist Hospital, Kaiser Permanente, and Verizon.

13,500+ Federal Jobs in White Oak and Silver Spring

White Oak is a new Transportation Management District with a NADMS goal of 30 percent for new development.

- **Burtonsville/Fairland**: Near the intersection of three Maryland counties, currently serves as a Commuter Park and Ride hub for the region; the Burtonsville Crossroads Neighborhood Plan[11] is helping to shape the rural/suburban area into a neighborhood center with community services.

Corridor Needs

Limited Appeal of Existing Transit Services

Transit trips currently account for 10 percent of total trips on the corridor.[12] Current on time performance for local corridor transit services averages 45-77%.[13] As transit demand and ridership in the US 29 corridor continues to grow, high-quality transit service is needed to maintain current transit riders and attract new riders. Current transit is noncompetitive when compared to automobile use for "choice" riders on the US 29 corridor. Without an attractive system, the amount of automobile travel will increase, which leads to greater traffic congestion and reduced bus performance and greatly detracts from the vision of the White Oak Science Gateway.

Roadway Congestion and Safety

Traffic congestion currently impedes bus and rider mobility and results in unpredictable bus service, longer travel times, and delayed schedules. Corridor-wide enhancements to address efficiency and reliability are needed to improve mobility for transit riders. Currently, bus travel times along the corridor take, an average, over 20 percent longer than automobile trips, with some segments reaching as high as 60 percent longer.[14] White Oak has limited options for new vehicular connections. This area is particularly constrained by existing development, ownership patterns, the large federal property, and environmental resources. These physical constraints limit opportunities to improve circulation and connectivity, which forces all local traffic onto the major highways.

Statement of Need

- Limited appeal of existing transit services despite a strong market for transit trips
- Roadway congestion and safety
- Limited connectivity of facilities for pedestrians and bicyclists
- Planned growth within the study area
- Transit-dependent community with limited options for mobility

System Connectivity

A high-quality, continuous transit service from Silver Spring to Burtonsville that can support the surrounding mixed used development along the corridor is needed to connect transit customers to local and regional employment and activity centers. The US 29 corridor serves as both a **job location**, with 61,000 jobs along the corridor in 2010 (projected to over 81,000 in 2040), and a **job connection** to the more than 3.8 million jobs in the greater Washington, DC region. Transit service is essential to support future the development of mixed-use communities along the corridor, including the planned White Oak Science Gateway development. The US 29 BRT will have ridership in both directions during the peak period due to the growing job market in White Oak as well the traditional suburban commute to downtown.

Quality of Life

Transit improvements are needed throughout the US 29 corridor to create a transportation network that enhances choices for transportation users and promotes positive effects on the surrounding communities and residents' quality of life. Twelve percent of

households on the corridor do not have access to a car, and an additional 38 percent of households on the corridor only have access to one car.[15] Median income is 22 percent below the County average in the White Oak Science Gateway area and 42 percent of bus riders use more than 30 percent of their income on housing costs. A 2014 Washington Post profile of the increasing poverty in the eastern edge of Montgomery County notes that "[t]he economic downturn in Montgomery was accompanied by record immigration, with many newcomers leaving white-collar jobs in their home countries only to find few decent job opportunities here. Meanwhile, rents in the District and close-in suburbs spiked faster than outside the Capital Beltway, and government voucher programs made the suburbs more accessible to the poor. *But accessible does not necessarily mean hospitable*. From Briggs Chaney Road, the Silver Spring Metro station is nine miles away, connected by a bus route that can take more than 45 minutes." (emphasis added)[16]

How BRT Can Help

Improve the Quality of Transit Service

US 29 BRT will improve the quality of transit service by increasing travel speed, reliability, frequency and ease of use thus better serving existing riders and attracting new riders.

- Improved transit reliability: Current on time performance for local corridor transit services averages 45-77%. US 29 BRT will improve reliability through use of Bus on Shoulder lanes, Transit Signal Priority (TSP), and more efficient operations (level multiple-door vehicle boarding, limited stops, off-board fare collection).
- Travel time savings: The more efficient operation of BRT on US 29 is expected to result in a 22-35% corridor travel time savings over current local bus service.[17]
- New and existing riders: In 2020, the US 29 BRT is expected to have 13,000 daily weekday riders, 3,950 of which will be new transit riders shifting from autos. In 2040, this grows to 5,700 new riders and 20,000 boardings.[18] This number of daily boardings exceeds the ridership for most BRT lines in the United States.

***"BRT is crucial to Montgomery County's future if we are to** reduce traffic congestion, spur business growth and attract a talented workforce to build on our innovative economy, **provide affordable transportation options for people of all incomes,** create a reliable intra-county bus trapid transit system and fight climate change through reduced greenhouse gas emissions. Many of our current plans for walkable, livable new mixed use communities hinge on providing a robust and efficient transit system."*

-Ike Leggett, County Executive

- Efficiency: An element of the US 29 BRT project will be to examine local service along and around the corridor for operational efficiency improvements, potentially increasing the level of transit service to surrounding communities.

Improve Mobility Opportunities and Choices

US 29 BRT will improve mobility options and choices by strengthening the north/south transit connectivity to existing and proposed transit systems and major employment and activity centers thus improving neighborhood, local and regional connectivity.

- Increased access to job opportunities: The US29 BRT corridor has over 61,000 jobs today, including **13,500+ federal jobs**, and is projected to have 81,000 jobs by 2040. The metropolitan region has over 3.8 million jobs today, and is projected to have over 5.4 million jobs by 2040.
- Transit connectivity: The US 29 BRT will provide major links to the region's transit modes, including the Red Line on the Metrorail system, MARC Commuter Rail, numerous county and intercity bus routes; commuter buses; planned Bus Transit Priority Corridor in Washington, D.C.; and the future Light Rail line (the Purple Line) connecting the outer edges of the Metrorail system. US 29 will be the first of three planned BRT corridors to serve White Oak area. Additionally, Montgomery and Howard Counties are exploring a future bi-county service expansion.
- Pedestrian and Bike Access: Ten new Capital Bikeshare stations will further connect the US 29 corridor to Capital Bikeshare's 350+ stations throughout Montgomery County, Washington, D.C., Arlington, Virginia, and Alexandria, Virginia, including 66 bikeshare stations in the County. Montgomery County offers low-income residents free Bikeshare memberships, training, helmets, and route planning.

Enhance Quality of Life

US29 BRT will enhance quality of life by improving access to housing and jobs and better serving transit demand and transit dependent populations.

Project Goals

- Improve the quality of transit service
- Improve mobility opportunities and choices
- Enhance quality of life
- Support master planned development
- Sustainable and cost effective

- **Upward Mobility:** US 29 BRT biggest impact will be felt among those who rely on the service to access jobs and other social services. A Harvard Study showed that commute times were the single strongest factor in the odds of escaping poverty.[19] In the short term, faster service on US 29 will reduce travel times and provide transit dependent populations more flexibility in their daily lives. In the long term, the US 29 BRT will create the framework for upward mobility.

- **Better Access:** The US 29 BRT corridor will provide immediate, positive benefits to the diverse populations living along the corridor. Within approximately a ½ mile of US 29 BRT stations, residents will have access to **six** public schools, **one** regional community college campus, **four** community and recreation centers, **two** Regional Service Centers, which coordinate Montgomery County direct service delivery, focusing on the needs of each region, **three** public libraries, **five** health centers providing healthcare for low-income families and 61,000 jobs, including jobs at **nine** federal offices and **16** shopping centers. Expanded mid-day service will help make these connections for all residents, not just typical commuters.

Ladders of Opportunity

For residents along the corridor, US 29 BRT will

- Increase transit access and reliability
- Increase regional connections and access to a fast-growing jobs corridor
- Support mixed-use developments in suburban corridors (reducing the need for a vehicle to access critical services)
- Improve quality of life through decreased travel times and congestion-related negative impacts, such as greenhouse gas emissions.

US 29 is a snapshot of America's increasingly diverse suburban areas

The census block groups and tracts within ½ mile of planned US 29 BRT stations are:

- 65% minority
- 32% foreign born
- 30% Very Low Income (Households with an annual income of less than $30,000)
- 12% of households have access to zero vehicles
- 38% of households have access to only one vehicle
- 31% of those over the age of 5 speak a language other than English at home
- Home to over 9,000 senior citizens and over 11,000 people with disabilities

Support Master Planned Development

US 29 BRT will support master planned smart growth development.

- White Oak Science Gateway: This project is vital to the success of significant new private development and employment in the recently adopted White Oak Science Gateway Master Plan, which includes the relocation of Washington Adventist Hospital, the

consolidation of the Food and Drug Administration (FDA) at the White Oak Federal Research Center (FRC), and 300 acres of private development. In addition to the FDA, which now has 8,100 employees on site, the area's largest employers include Washington Adventist Hospital, Kaiser Permanente, and Verizon.[20]

- Economic Benefits: The US 29 BRT project is estimated to result in $269-520 million of economic net benefit.[21] Development of the White Oak Science Gateway will benefit substantially from the presence of high quality transit service such as the US 29 BRT.

Sustainable and Cost Effective

US 29 BRT is a sustainable and cost effective transportation solution that addresses both physical and financial constraints.

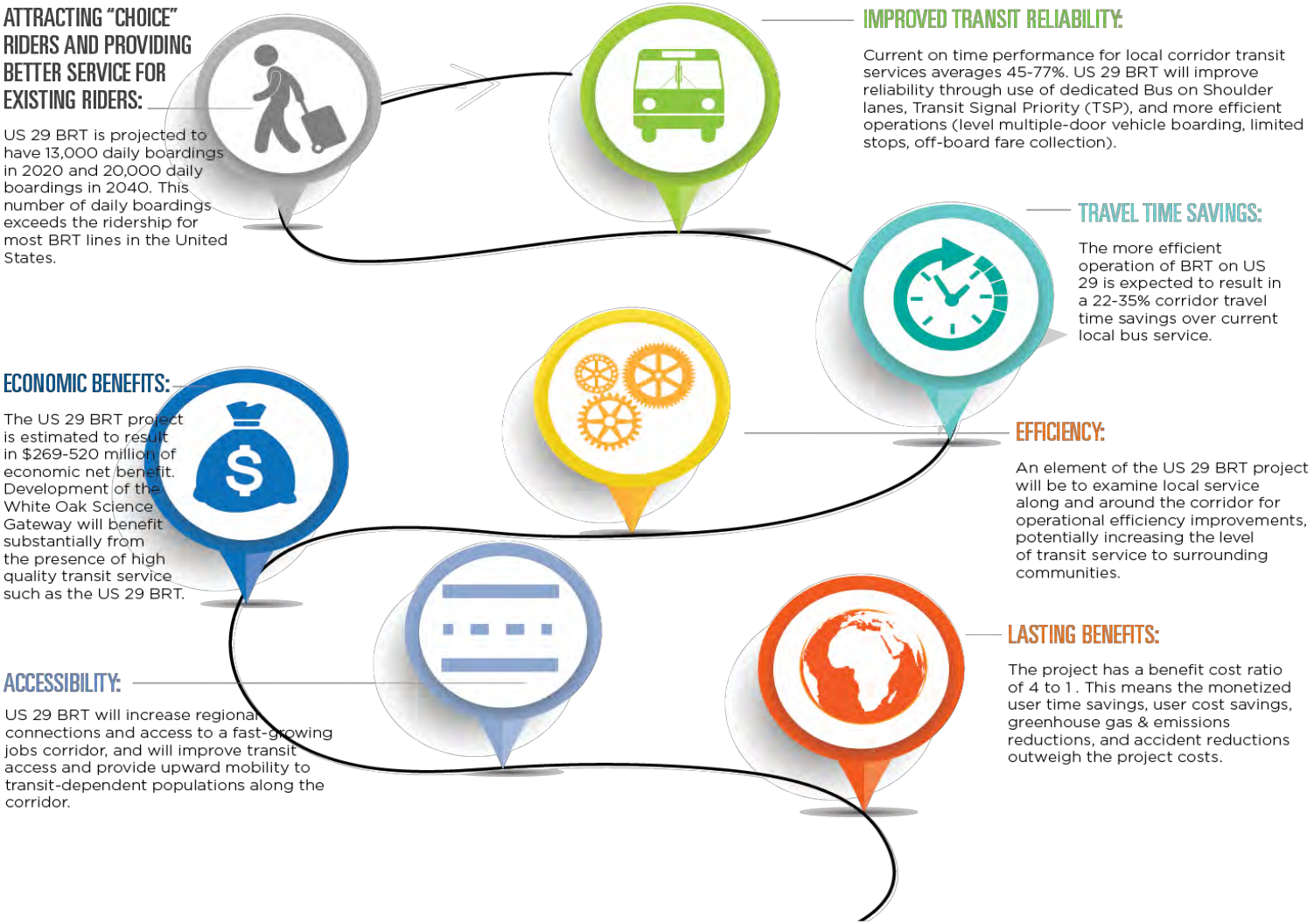
- Minimal Impacts: To capitalize on existing assets and minimize impacts, US 29 will be implemented primarily within existing right of way (ROW). Stations may be built outside of the existing curbs and may require some additional property.

- Better Health: US 29 BRT will improve air quality by reducing regional auto vehicle miles traveled (VMT) and related emissions. In 2040, the BRT will result in an average weekday savings of 33,353 VMT and an average annual savings of 9,672,382 VMT. The resulting value of the air quality savings is approximately $1.09 million (at a 3 percent discount rate).

- Lasting Benefits: The project has a benefit cost ratio of 4 to 1. This means the monetized user time savings, user cost savings, greenhouse gas & emissions reductions, and accident reductions outweigh the project costs.

BENEFITS:

The US 29 BRT project will provide many quantifiable benefits to one of the busiest transit corridors in the State, including:



ATTRACTING "CHOICE" RIDERS AND PROVIDING BETTER SERVICE FOR EXISTING RIDERS:

US 29 BRT is projected to have 13,000 daily boardings in 2020 and 20,000 daily boardings in 2040. This number of daily boardings exceeds the ridership for most BRT lines in the United States.

IMPROVED TRANSIT RELIABILITY:

Current on time performance for local corridor transit services averages 45-77%. US 29 BRT will improve reliability through use of dedicated Bus on Shoulder lanes, Transit Signal Priority (TSP), and more efficient operations (level multiple-door vehicle boarding, limited stops, off-board fare collection).

TRAVEL TIME SAVINGS:

The more efficient operation of BRT on US 29 is expected to result in a 22-35% corridor travel time savings over current local bus service.

ECONOMIC BENEFITS:

The US 29 BRT project is estimated to result in $269-520 million of economic net benefit. Development of the White Oak Science Gateway will benefit substantially from the presence of high quality transit service such as the US 29 BRT.

EFFICIENCY:

An element of the US 29 BRT project will be to examine local service along and around the corridor for operational efficiency improvements, potentially increasing the level of transit service to surrounding communities.

ACCESSIBILITY:

US 29 BRT will increase regional connections and access to a fast-growing jobs corridor, and will improve transit access and provide upward mobility to transit-dependent populations along the corridor.

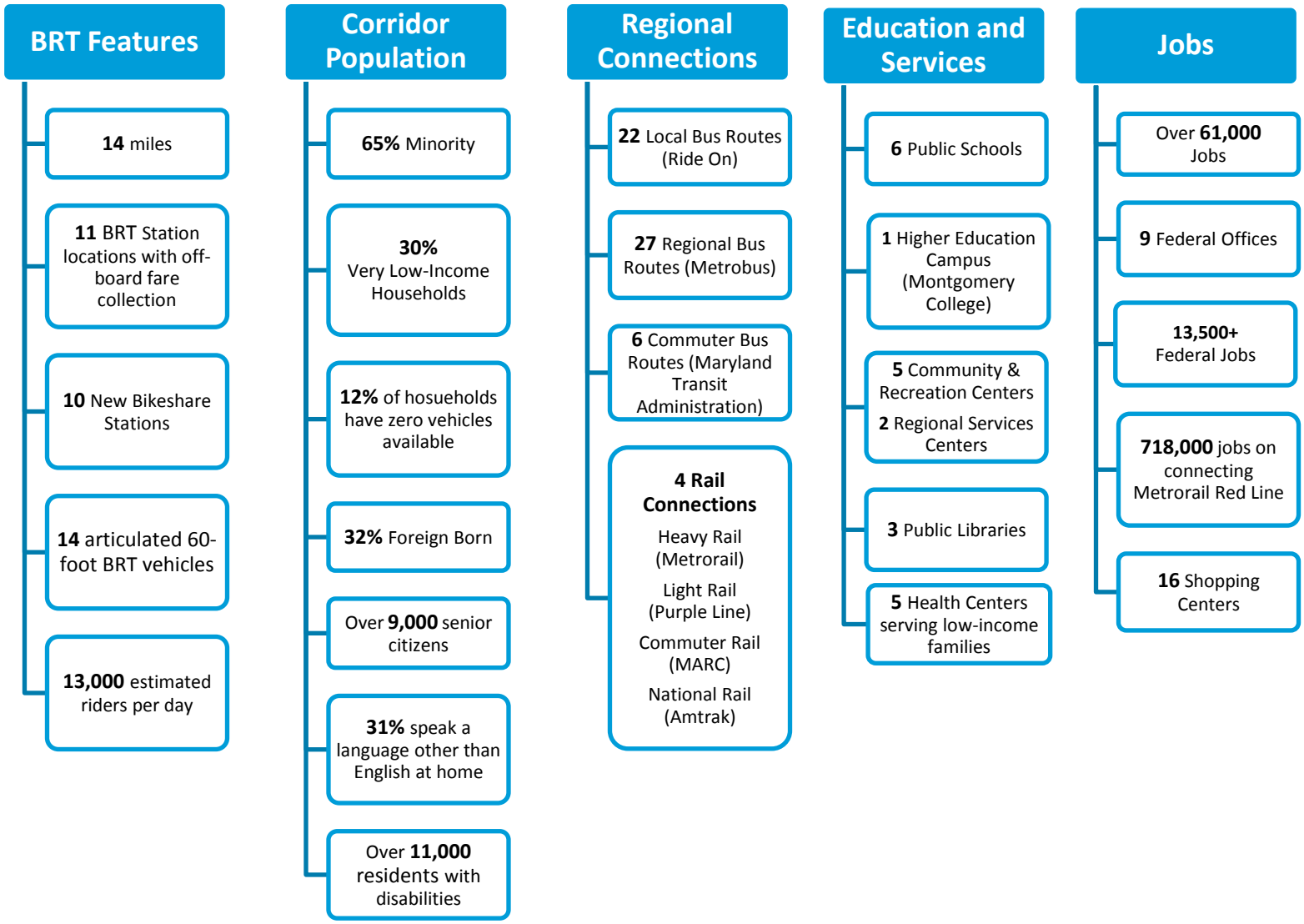
LASTING BENEFITS:

The project has a benefit cost ratio of 4 to 1. This means the monetized user time savings, user cost savings, greenhouse gas & emissions reductions, and accident reductions outweigh the project costs.

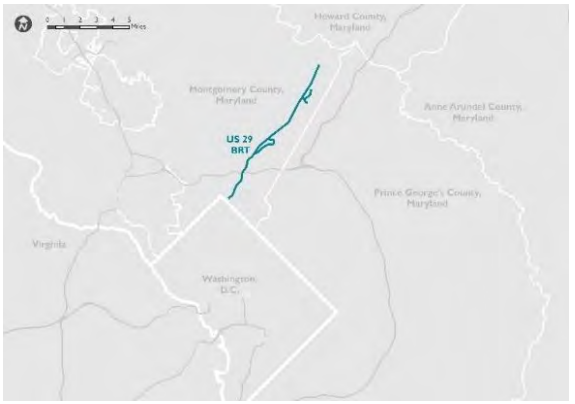
TIGER

MONTGOMERY COUNTY MARYLAND

MCDOT Montgomery County Department of Transportation


BRT Features
14 miles
11 BRT Station locations with off-board fare collection
10 New Bikeshare Stations
14 articulated 60-foot BRT vehicles
13,000 estimated riders per day
Corridor Population
65% Minority
30% Very Low-Income Households
12% of hosueholds have zero vehicles available
32% Foreign Born
Over 9,000 senior citizens
31% speak a language other than English at home
Over 11,000 residents with disabilities
Regional Connections
22 Local Bus Routes (Ride On)
27 Regional Bus Routes (Metrobus)
6 Commuter Bus Routes (Maryland Transit Administration)
4 Rail Connections
Heavy Rail (Metrorail)
Light Rail (Purple Line)
Commuter Rail (MARC)
National Rail (Amtrak)
Education and Services
6 Public Schools
1 Higher Education Campus (Montgomery College)
5 Community & Recreation Centers
2 Regional Services Centers
3 Public Libraries
5 Health Centers serving low-income families
Jobs
Over 61,000 Jobs
9 Federal Offices
13,500+ Federal Jobs
718,000 jobs on connecting Metrorail Red Line
16 Shopping Centers

PROJECT LOCATION[22]



The proposed 14-mile US 29 Bus Rapid Transit (US29 BRT) runs along US Route 29 in eastern Montgomery County, Maryland. Montgomery County is located just north of Washington, D.C., and is an integral part of the economic, social, and political fabric of the Washington DC Metropolitan Area. The county is part of the Metropolitan Planning Organization's National Capital Region Transportation Planning Board and the Washington-Baltimore-Northern Virginia Combined Statistical Area, which has a population of more than 9 million people. Montgomery County is the most populous county in the state of Maryland with over 1 million residents, and it is the second most populous county in the metropolitan region.

Montgomery County's high median income masks the social and economic factors at play in eastern Montgomery County. While the western section of the county has flourished, the eastern section has suffered from a legacy of disconnection, as well as the effects of the recent economic recession. The US 29 corridor is the prime example, as cited by a 2014 Washington Post article, "In 2000, none of the county's census tracts had more than an 18 percent poverty rate. Now, even as $3 million condos sprout in Bethesda, there are 12 tracts exceeding that benchmark, including the Briggs Chaney neighborhood east of Route 29, near the Prince George's County line."[23] The US 29 BRT will travel through a diverse set of neighborhoods ranging from rural Burtonsville to suburban White Oak to urban Silver Spring. The demographics of the corridor range from very low income to above the median income level. The US 29 BRT will connect these diverse populations and landscapes to provide the most in need populations with access to the more than 3.8 million jobs in the greater Washington, D.C. region.

The US 29 BRT will directly serve Silver Spring and White Oak, major regional activity centers, which are home to three of the county's largest employers: the U.S. Food and Drug Administration (FDA), with over 13,000 employees; the National Oceanic and Atmospheric Administration (NOAA), with over 4,600 employees; and Discovery Communications, a Fortune 500 company, with over 1,500 employees. The corridor will only continue to grow, with job growth in Silver Spring and White Oak estimated to be over 80 percent by 2040. Montgomery County supports economic development and growth with transit infrastructure, such as that envisioned in the Countywide Transit Corridors Functional Master Plan, and by offering many competitive business resources including "Fast Track" permitting. These policies ensure the US 29 BRT project generates sustainable growth by attracting businesses that are accessible to all populations regardless of income level or background.

Along the corridor, US 29 changes from an urban road in Silver Spring to a six-lane divided expressway with existing Bus on Shoulder lanes north of MD 200. The US 29 BRT project will transform US 29, the only US Route in the County, from auto-centric to a transit oriented roadway that provides transit connections to the corridor, the County, and the region. The US 29 BRT will provide vital transit connections to 22 local bus routes, six Commuter Routes, Metrorail, MARC Commuter Rail, and Amtrak on one of the most congested and failing road corridors in the region. The US 29 BRT will also provide future connections to the Purple Line Light Rail Line, which is scheduled for construction, providing inter- and cross-county connections, and the US 29 BRT will provide a link between Howard County's and Washington, D.C.'s US 29 BRT systems. These numerous transit connections provide the corridor and the region's diverse, low-income transit dependent populations with affordable, safe, and reliable access to one of the country's fastest growing job and housing markets.

US 29 BRT Corridor
14 Neighborhoods
2 Major Activity Centers
3 of the County's Largest Employeers
122,560 People
47,257 Households
65% Minority
30% of Households are "Very Low Income"
15,000 Daily Bus Riders
46% of daily trips are SOV
10% of daily trips are Transit

PROJECT PARTIES

The US 29 BRT project will be implemented and operated by **Montgomery County Department of Transportation (MCDOT)**. MCDOT will oversee all aspects of the project and will coordinate closely with all project parties.

Montgomery County Department of Transportation (MCDOT)

MCDOT will oversee all aspects of the project and will coordinate closely with all project parties. MCDOT has 1,345 Employees and an annual operating budget of $205 million.

Maryland State Highway Administration (SHA)

SHA, part of the Maryland Department of Transportation, maintains, improves and develops state highways and roads and ensures safe driving conditions for Maryland citizens. SHA will be a coordinating partner in planning, engineering, signal design and Bikeshare.

Maryland Transit Administration (MTA)

MTA, part of the Maryland Department of Transportation, provides commuter rail, commuter bus, and mobility services to Maryland citizens. MTA will coordinate implementation of the BRT with its existing commuter bus routes and the Purple Line. MTA will also assist with grant administration.

Washington Metropolitan Area Transportation Authority (WMATA)

WMATA operates Metrobus, Metrorail, and MetroAccess. WMATA will participate in coordinating bus operations, real time transit information (RTTI), and fare collection to ensure system integrations.

Howard County

Montgomery County, Howard County, and the State of Maryland are working closely to provide future BRT service through US 29 to Columbia in Howard County. Howard County will

be initiating a planning study of BRT along US 29 in their county in 2017. The study will be conducted by Howard County with funds provided by the Maryland Department of Transportation.

Corridor Advisory Committees

The County's Corridor Advisory Committee (CAC) of US29 Corridor residents and businesses will continue to meet to provide feedback and input on the US29 BRT project. The County created a robust application process and the CAC members reflect the corridors diversity. Throughout all phases of the US 29 project, Montgomery County will take numerous steps to inform and involve the public and community groups, including holding public meetings, open houses and presentations. See Section VIII. Public Engagement for information about the CACs and the Public Involvement Plan.

The project has numerous letters of support from local, regional, state, federal, and non-profit representatives and other public and private stakeholders who support the project and the application to USDOT for grant funding, all of which are included in **Appendix A.**

The list below itemizes the support letters that can be found in Appendix A:

Barbara Mikulski, United States Senator, MD
Benjamin Cardin, United States Senator, MD
U.S. Rep. John Sarbanes, 3rd Congressional District, MD
U.S. Rep. John Delaney, 6th Congressional District, MD
U.S. Rep. Chris Van Hollen, 8th Congressional District, MD
Pete Rahn, Secretary, Maryland Department of Transportation
Isiah Leggett, Montgomery County Executive
Allan H. Kittleman, Howard County Executive
Sen. Nancy J. King, Chair, Montgomery Co. Senate Delegation
Del. Shane Robinson, Chair, Montgomery Co. House Delegation
Nancy Floreen, President, Montgomery County Council
Casey Anderson, M-NCPPC - Montgomery County Planning Board
National Capital Region Transportation Planning Board (MPO)
Paul J. Wiedefeld, General Manager and Chief Executive Officer, Washington Metropolitan Area Transit Authority (WMATA)
East County Citizens Advisory Board
Good Hope Estates Citizens Association
Greater Colesville Citizens Association
LABQUEST Partnership, Montgomery County, MD
Saul Centers, Inc., Bethesda, MD
Soltesz Inc., Lanham, MD
The Duffie Companies, Silver Spring, MD
Washington Adventist Hospital, Takoma Park, MD

2011: MCDOT completes a Countywide Bus Rapid Transit Study, which studies how to address increased travel demand in the county's corridors, including BRT on US 29.

2013: County Council approves the Countywide Transit Corridors Functional Master Plan, which proposes a BRT network throughout the County (including US29) to support the County's mobility, land use, and economic development goals.

2014: Montgomery County begins working with the Maryland State Highway and the Maryland Transit Administrations to study four corridors for possible BRT implementation. Three corridors included in the process, including US29.

2014: Citizen Corridor Advisory Committees are formed for each study corridor, giving community stakeholders a critical voice in the BRT system planning process. Committees advise on BRT design, study assumptions, transit access, coordination with other modes, public involvement planning, and community needs.

2015-2017: Two Corridor Advisory Committees for US 29 have meet **19** times so far and will continue to meet as the process goes forward

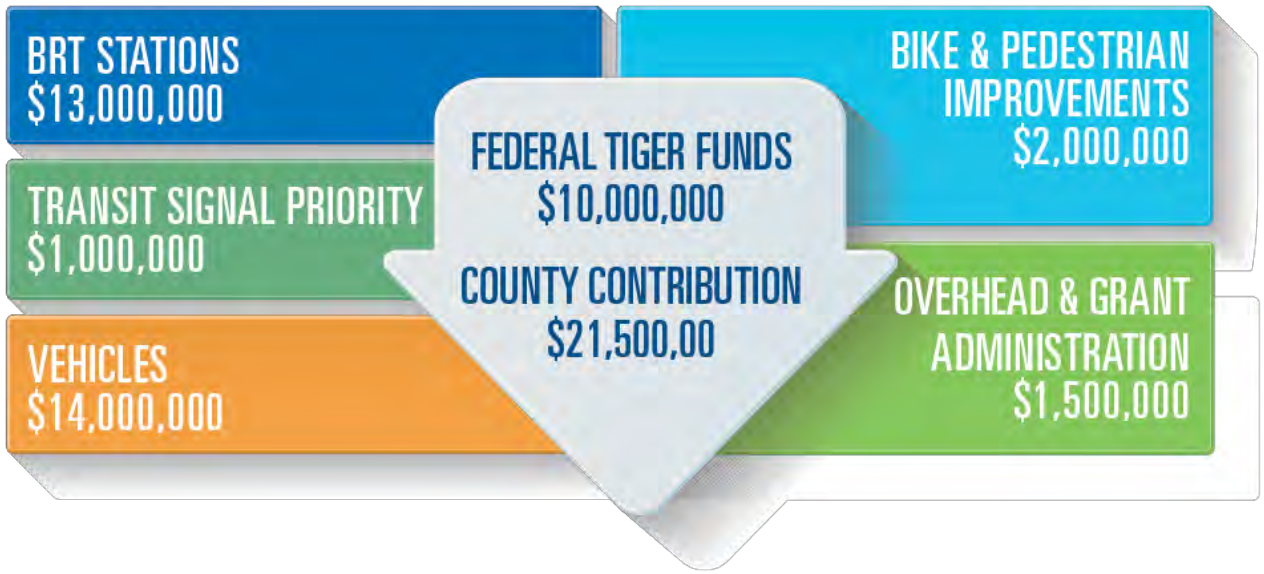
2015: The project team, in consultation with the two Corridor Advisory Committees for US29, develops a preliminary purpose and needs document for the US 29 Bus Rapid Transit Corridor

2016: Montgomery County Executive Ike Leggett announces recommendations for better transit on the the County's corridors, including $6.5 million in the County's Capital Budget for the planning, design, outreach and marketing of a US 29 BRT on existing pavement, with the intent of "Getting this route up and running less than four years."

2016: U.S. Department of Transportation selects Montgomery County to recieve a $10 million TIGER grant (Transportation Investment Generating Economic Recovery) to help fund the 14-mile Bus Rapid Transit (BRT) system along US 29. The TIGER program is merit-based and highly competitive.

PROJECT BUDGET AND SOURCE OF FUNDS

The implementation cost for the US 29 BRT project is estimated to be $31.5 million, $10 million of which will be supported by the Federal government as part of a Transportation Infrastructure Generating Economic Recovery (TIGER) grant.



TIGER GRANT SELECTION CRITERIA

The highly competitive TIGER grant program supports innovative capital projects that generate economic development and improve access to reliable, safe and affordable transportation for communities. The US 29 BRT project was selected to receive $10 million in TIGER funds because it is well-aligned with the TIGER Discretionary Grant program selection

criteria and provides both long-term and short-term benefits to Montgomery County and the surrounding region. This project will provide a new link to the multimodal transportation network, thus reducing operating costs, travel times, vehicle exhaust emissions and other environmental benefits compared with the current conditions. At the same time, the BRT will increase job opportunities, economic competitiveness, and improve livability in the County and National Capital Region by stimulating development of this key corridor into a vibrant, mixed-use, and inclusive community.

The corridor's suburban landscape currently encourages automobile usage which further degrades the corridor's vitality. The US 29 BRT will redefine the suburbs by creating a sustainable, inclusive, and accessible landscape. By improving transit service on the corridor, the disadvantaged populations who do not have access to automobiles will finally have reliable, fast, and safe access to the corridor and region's opportunity.

State of Good Repair

The US 29 BRT project reflects Montgomery County's dedication to improving and maintaining its existing transportation facilities. A transportation system in a state of good repair creates a built environment that inherently promotes the success of all people. The bus purchase component of the US29 BRT project will enable the County to purchase 14 articulated buses. Smaller bus shelters will be replaced at stops with larger, newer stations with enhanced amenities including real-time transit information screens, off-board fare collection, and level-boarding platforms to accommodate increased ridership. Ride On's state-of-the-art maintenance and operation facility (which opened in October 2013) has capacity to service and maintain the proposed fleet expansion. **County's Ride On bus system** consists of 337 County owned and operated buses on 78 routes. Ride On has an annual ridership of approximately 27 million and a daily average of 88,000 riders.

Economic Competitiveness

This project meets the USDOT's goals for the provision of "ladders of opportunity" by creating and improving connections between people and centers of employment, education, and

***"BRT is crucial to Montgomery County's future if we are to** reduce traffic congestion, spur business growth and attract a talented workforce to build on our innovative economy, **provide affordable transportation options for people of all incomes,** create a reliable intra-county bus trapid transit system and fight climate change through reduced greenhouse gas emissions. Many of our current plans for walkable, livable new mixed use communities hinge on providing a robust and efficient transit system."*

-Ike Leggett, County Executive

services while removing barriers to connected systems of transportation. Specifically, the US 29 BRT project will spur sustainable and equitable development and redevelopment of non-transit-oriented suburban spaces.

Increase Movement of People

The US 29 BRT system will facilitate the efficient movement of people and provide viable alternatives to the automobile. In 2020, the US 29 BRT is expected to have 13,000 daily weekday riders, 3,950 of which will be new transit riders shifting from autos. In 2040, this grows to 5,700 new riders and 20,000 boardings.[24]

Increase Transit Oriented Development in Suburban Areas

The US 29 BRT will connect suburban White Oak and rural Burtonsville to Silver Spring, which serves as a model for the county's successful ability to transform suburban landscapes into sustainable and equitable transit oriented developments. The White Oak Sector Plan envisions a walkable and livable community with the US 29 BRT, which is expected to become operational on a time frame concurrent with the Sector Plan, serving as the backbone of the area's revitalization. The Burtonsville Crossroads Neighborhood Plan also envisions a complete community with small businesses, retail, local services, offices, residential, and open spaces, and sees the US 29 BRT station as a foundation for improving the area's economy and regional connectivity.

Attract Tenants to Transit-Accessible Office Space

Montgomery County and the Washington D.C. region are experiencing an unprecedented increase in office vacancies, which negatively impacts the real estate market and more seriously degrades the region's tax base. The office market vacancy rate in the region is 15 percent, and a Montgomery County Planning Department report found that "single use office developments without convenient transit or highway access are having difficulty in attracting tenants."[25] The same report also noted that technology has changed traditional location factors based on knowledge economy workers who prefer "[a]ccess to transit and walkable mixed-use environments where workers can live, eat and play." In 2014, the office vacancy rate in Silver Spring – which is a more densely developed area – was 11.4 percent, while the vacancy rate

The most successful office clusters in Montgomery County are part of mixed-use developments with strong sense of place and a quality enviroment. Transit connectivity is increasingly important to office tenants. This trend is consistent with recommended land use strategies in recent County plans for White Flint, Bethesda, White Oak and other communities.

- Office Market Assesment, Montgomery County

This Plan relies on an efficient and attractive transit network to achieve the vision of transforming this area into a vibrant mixed-use center. The type and level of growth needed to achieve this vision cannot be supported by road improvements alone; there must be a robust transit network that connects the area to the rest of the eastern County and the region's transit and highways.

-White Oak Master Plan

along the remainder of the US 29 corridor was 12.5 percent. With anticipated job growth on the corridor at 32 percent, the US 29 BRT project prioritizes transit oriented development, which the report recommends is the key to reducing vacancy levels.

Create New Jobs[26]

This project will stimulate the region's economy through the creation of short-term and permanent jobs.

Once operational, the project will support 85 permanent jobs within Montgomery County, for a total of 130 full-time jobs statewide. These jobs will be associated with annual labor income of roughly $6.5 million statewide. Annual business sales will be bolstered by $13.4 million statewide.

In the long-term, the project will directly contribute to the creation of an even greater number of permanent new jobs in Montgomery County by enhancing the communities near new development in the Silver Spring and White Oak business districts. The corridor is estimated to have job growth of 32 percent by 2040, with estimates as high as 80 percent for Silver Spring and White Oak. In White Oak, BRT on US 29 could lead to the construction of 7 million square feet of commercial space – space that could accommodate more than 20,000 jobs.

Quality of Life

Montgomery County is nationally recognized as one the nation's top places for upward mobility.[27] The US 29 BRT reflects the county's dedication to ensuring the top quality of life for all residents, employees, and visitors by increasing access to high-quality transit to benefit a diverse population, increasing access to jobs centers and access to areas north of the beltway with more affordable housing stock.

"I know that providing a BRT system will give County residents more time to spend with their family and enjoy leisure activities, and will improve each of our lives."

- Ike Leggett, County Executive

For children of parents at the 25th percentile of the national income distribution

Montgomery County ranks **#9 for creating economic opportunity**

- Harvard University: The Impacts of Neighborhoods on Intergeneration al Mobility

Each additional year a child spends growing up in Montgomery County **raises their houshold income in adulthood by 0.52%.**

Equitable Transit

Single Occupancy Vehicles (SOVs) are the primary travel mode along the US29 corridor and account for 46 percent of all trips. Under current roadway conditions, Maryland State Highway Administration found transit to be noncompetitive compared to automobile travel on US 29 due to inefficiency and unreliability. However, twelve percent, or nearly 15,000 households, on the corridor do not have access to a vehicle, which is twice as high as the county's average.[28]

Transit trips account for 10 percent of daily US 29 trips, but almost 35 percent of the corridor's daily home based work trips. While the US 29 corridor is home to 65 percent minority populations, minority populations account for a higher proportion of the 15,000 daily transit riders, between 72 and 82 percent.

The US 29 BRT project also enhances the walkability and bikability along the corridor, in turn providing additional affordable, efficient, and safe transportation modes to all users. In addition to providing support programs such as Kids Ride Free and Seniors Ride Free, Montgomery County offers free Capital Bikeshare memberships, bike safety training, helmets and route assistance to low-income residents through its MCLiberty Program.

Equitable Housing

The suburbanization of poverty is a national trend, and through the US 29 BRT project, Montgomery County is working to ensure the built environment does not hinder the area's affordability. Based on the Center for Neighborhood Technology's Housing and Transportation Index, the US 29 corridor becomes unaffordable as you travel north where the landscape is more auto-centric. For example, in rural Burtonsville, census data shows households on average spend 71 percent of their income on Housing and Transportation Costs.[29] With driving costs as high as $14,000 a year in these areas, transforming these areas into walkable neighborhood centers will increase the affordability of the corridor.

Montgomery County is the nationwide leader in providing affordable housing and has policies in place to ensure the US 29's corridor redevelopment is inclusive of low income populations. The White Oak Science Gateway Master Plan prioritizes retaining and creating

Montgomery County's Moderatley Priced Dwelling Units Program	Nation's Longest Running Inclusionary Housing Program
	The most number of affordable units of any communinty in the county
	More than 14,000 affordable units since 1976
	Serves households at a lower percentage of area median income than served in most other counties

new affordable units to ensure redevelopment does not displace disadvantaged communities. In addition to establishing a 12.5% Moderately Priced Dwelling Unit (MPDU) requirement for new residential development, the plan also calls for a comprehensive countywide housing study to ensure redevelopment does not result in rent increases or reduce/eliminate the number of units that are currently market affordable.

ENVIRONMENTAL SUSTAINABILITY

More than 45 percent of all daily trips on the corridor are in Single Occupancy Vehicles (SOVs). This creates myriad environmental hazards for residents, workers, and visitors to the corridor. In Montgomery County, environmental hazards have a disproportionate impact on minority communities.[30] With 65 percent of the US 29 corridor's population qualifying as minority, the environmental burden of projected increase of 15 percent more Vehicle Miles Traveled (VMT) in the absence of BRT will be more heavily felt among already disadvantaged populations.

The project will promote environmental sustainability by providing the following benefits:

- Reduced travel time and congestion will reduce vehicle emissions of particulate matter, nitrogen oxide, carbon monoxide, Volatile Organic Compounds and carbon dioxide. The value of the air quality savings is approximately $670,864 (at a 7 percent discount rate for the 21-year benefit-cost analysis term).
- Convert vehicle trips from single occupant vehicle to transit,, bicycling and walking. The BRT will result in an average weekday savings of 33,353 VMT and an average annual savings of 9,672,382VMT.
- The project includes solar Bikeshare stations and energy efficient signals.

SAFETY

The corridor's current suburban landscape limits alternative forms of transportation due to a lack of convenient, safe access. Creating a safer roadway by integrating multiple transportation

options ensures populations with limited transportation choices have alternative, affordable, and safe travel options. The US 29 BRT will improve the safety of travel for all modes and users along the corridor, while increasing the accessibility of the regional transportation network by providing:

Safer and More Inclusive Transportation Options

BRT will incorporate appropriate safety elements into the adaptive transit signal priority (TSP) system design. Specific TSP design safety elements include use of a signal control algorithm that adjust signals to maintain safe and adequate pedestrian crossing intervals where applicable; emergency vehicle pre-emption; and basic timing plans that maintain safe operations requirements.

The BRT project will improve pedestrian access, ADA accessibility, and safety at BRT facilities, and to ensure safe connections can be made between the BRT facilities and existing rail stations, bus stops, and bikeshare stations.

The US29 BRT project includes implementing **10 more Capital Bikeshare stations** and **bike parking shelters** at BRT stops. The Capital Bikeshare system provides users access to 350 stations throughout Montgomery County, Maryland, Washington D.C., Arlington, Virginia, and Alexandria, Virginia, with 66 stations in Montgomery County. Montgomery County is the first jurisdiction in the Bikeshare system to offer low-income residents free Bikeshare memberships, safety training, helmets, and route planning through the MCLiberty program.[31]

Between 2011 and 2013 the US-29 Corridor had	1,088 Crashes
	25 incidents involving Peds and/or Bicyclists
	447 Crashes resulting in injuries
	3 Fatalities
	649 Vehicle Occupants Injured

Reduce Corridor Crash Rate

The current 14-mile corridor has a significantly higher crash rate than the statewide average for similar state-owned roadways. By implementing necessary pedestrian safety measures, the BRT project will improve safety on the corridor. The value of **safety benefits from reduced crashes will be $19.9 million per year** (2015 dollars), equivalent to $141 million when discounted at 7 percent over 21 years.

INNOVATION AND TECHNOLOGY

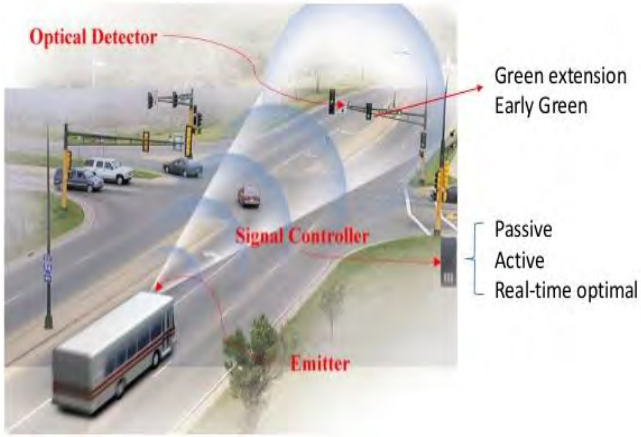
The US 29 BRT is pursuing innovation by advancing the region's real-time transit information screens and transit signal priority efforts.

Real Time Transit Information (RTTI) Screens

As part of USDOT's TIGER One award, the Washington, DC metropolitan region tested and installed real time arrival displays on priority corridor Metrobus routes around the region including in Montgomery County. The US29 Bus Rapid Transit project will to build on this success and install up to 18 new real time travel information screens at stops along the route. The new screens will show information about Metrorail and Metrobus; commuter rail arrivals; Bikeshare availability; and car sharing proximity. This live technology will increase ridership by improving rider confidence in the bus services, enable transit riders to quickly choose and adjust their preferred mode of travel, and promote the short bus headways available from the US 29 Bus Rapid Transit service.

Adaptive Transit Signal Priority

The TIGER US 29 BRT project will expand the County's TSP implemention at up to 15 intersections on US 29. A successful pilot on MD 355 showed that TSP can be implemented smoothly in the County and will help accelerate this key project element.



PARTNERSHIPS

Collaboration between Montgomery County, the Maryland State Highway Administration (SHA) and the Maryland Transit Administration (MTA) has been critical in the planning process for this project. MCDOT will continue to coordinate with SHA and MTA during implementation for permits and grant administration. Howard County and WMATA will also play important participating and coordinating roles.

The County's Corridor Advisory Committees (CACs) of US 29 Corridor residents and businesses will continue to meet and provide feedback and input on the US 29 BRT. The project team has already seen the benefit of their input in the development of the **US29 Purpose and Need Document**, service plans and station locations. Throughout all phases of the US 29 project, Montgomery County will take numerous steps to inform and involve the public and community groups, including holding public meetings, open houses and presentations.

Benefit-Cost Analysis

A formal benefit-cost analysis (BCA) was conducted for the project in accordance with USDOT's recommended methodology for a period of 21 years, starting when operations begin in 2020 and ending in 2040. The project benefits and costs were discounted to current dollars using the USDOT's recommended 7.0% discount rate and the alternative 3.0% discount rate. The BCA ratios, comparing the discounted benefits and costs are summarized in **Appendix C**. All monetized benefits and costs discussed below are in 2015 dollars and reflect net present values (NPV).

Benefit-Cost Analysis Summary (2015$)		Discount Rate		
		No Discount	7%	3%
Benefits				
Good Repair	Qualatative at the time			
Economic	User Time Savings	$605,396,242	$218,163,568	$379,785,330
Competitveness	User Cost Savings	$111,141,990	$41,157,061	$70,565,878
Sustainability	Greenhouse Gas & Emissions	$1,642,439	$670,864	$1,089,589
Safety	Accident Reduction	$368,635,273	$141,231,927	$237,808,961
	Total Benefits	$1,086,815,944	$401,223,419	$689,249,758
Costs				
	Capital Costs	$111,609,505	$44,607,834	$63,454,217
	O&M Costs	$122,293,395	$87,193,500	$105,491,357
	Total Costs	$233,902,900	$131,801,335	$168,945,574
Benefits - Costs		$852,913,043	$269,422,085	$520,304,184
Benefits Cost Ratio			**3.04**	**4.08**

The US 29 Bus Rapid Transit project costs include design and construction as well as annual operating and maintenance costs. In all, the monetized project cost over 21 years is $132 million (7.0% discount rate) or $168 million (3.0% discount rate). While the project requires notable investment, the project's BCA indicates that the benefits greatly outweigh the costs.

The project is expected to provide substantial benefits in the form of travel time savings for users, reduced vehicle operating costs for motorists who switch to BRT, and crash reductions along key segments of the corridor. When monetized, these benefits amount to nearly $401 million (7.0% discount rate) or $689 million (3.0% discount rate) – yielding a benefit-cost ratio of 3.04 to 4.08. Understanding the inherent risks of double-counting benefits, the assumptions used to quantify these benefits were conservative and pragmatic.

The BCA Summary is available **Appendix C**.

PROJECT TIMELINE

The US 29 Bus Rapid Transit project is a result of cooperative regional and local planning and as such, fits the local land use plans in the surrounding corridor. US 29 BRT is pursuing an timeline and implementation schedule with operations to begin in late 2019 to early 2020. The remaining work for the project is primarily engineering, station construction, and vehicle procurement.

Environmental Approval

The project qualifies for a Categorical Exclusion (CE) due to the limited impacts of this project and per FTA guidance on NEPA based on 23 C.F.R. §771.118.

Right of Way & Technical Feasibility

US 29 BRT will be will be implemented primarily within the existing right-of-way. In select locations, stations may be built outside of the existing curbs and may require additional

property. These minor acquisitions have been included in the station cost and will not impede the project schedule.

Project Schedule

The figure below shows the planned schedule for the completion of preliminary engineering, final design and construction of US 29 BRT. Vehicle procurement will begin in late 2017 and occur throughout the project timeline. Construction will commence in mid-2018, with expected completion by late 2019 and the opening of US29 BRT as soon as possible thereafter. **Public outreach will continue to be an essential part of the project.**

PUBLIC ENGAGEMENT

Plans for BRT on US 29 have been in development for nearly 10 years and public engagement for the proposed project has built upon earlier planning efforts that offered substantial opportunities for public involvement. These opportunities included the development of the Countywide Transit Corridors Functional Master Plan (CTCFMP) through the Montgomery County Planning Board's and County Council's public participation processes.

Once the CTCFMP was adopted, work began on specifically advancing study of BRT on US 29. In the last two years, the US 29 BRT project has been the subject of a Maryland Department of Transportation (MDOT) study and the opportunities for input on the project have gone well beyond the typical State or County public process. Before the outset of the US 29 BRT corridor study, the County Council established a requirement for a higher level of community engagement than is customary for transportation projects. The Council specified formation of

Corridor Advisory Committees (CACs) to ensure engagement of the most directly-affected stakeholders in the BRT projects. MDOT, in coordination with MCDOT, diligently embraced the required CAC process for public engagement throughout the study. The result is that public input has directly guided the project now proposed for implementation.

Over the last two years, the State and County have held ***19 public meetings with Corridor Advisory Committees on US 29***, a group of approximately 60 community members who represent the neighborhoods along the corridor. Meetings were held on the following dates:

- February 28, 2015 (*two meetings*)
- March 26, 2015
- March 31, 2015
- May 28, 2015
- June 2, 2015
- September 8, 2015
- September 10, 2015
- December 1, 2015
- December 2, 2015
- February 1, 2016
- May 18, 2016
- May 24, 2016
- July 14, 2016
- July 20, 2016
- September 22, 2016
- September 26, 2016
- January 31, 2017
- February 2, 2017

The CAC members were selected by their respective communities. One of their primary responsibilities is to share information from the meetings with their neighbors and those who selected them, obtain their input and convey this information to other CAC members, MDOT, and MCDOT.

To more widely share information, the CAC meetings are open to the public and all meeting materials, including video recordings of the meetings, are posted on the County's BRT website for public review. Consistently throughout this process, MCDOT has offered to meet with any interested individuals and community groups about their concerns, and many residents and groups have availed themselves of these opportunities.

The project that **MCDOT is advancing includes the station locations and transit service plans studied through the State's US 29 analysis** that included substantial public input from community members**.** The decision not to include the managed lane portion of the project at this time is based, in part, on concerns we have heard from the community about potential traffic impacts. There is no roadway construction included in the County's planned implementation of BRT on US 29, and other elements that would have small right-of-way impacts, such as station locations, are being adopted from the State's documented corridor study. All elements of the County's BRT implementation, which includes new bus service, stations, transit signal priority, and bike/pedestrian improvements, have all been included in the study that has been conducted and vetted with the community over the last two years. The CAC members' input has shaped the project that is being advanced as an outcome of the planning process.

As the project transitions from planning into design with MCDOT as the lead agency, MCDOT is stepping up our engagement activities. MCDOT will continue to meet with the CACs every one to two months to ensure community members have ample opportunity to provide input on the details of the project design. In addition, three Open Houses have been held as an opportunity for additional conversation with people interested in the County's plans to improve transit service on the corridor. A second set of Open Houses will be held in the Fall of 2017 as the

project nears completion of preliminary design. In an effort to reach as broad a constituency as possible during the design phase of the project, MCDOT also plans to develop a "virtual" open house with the materials from the March meetings so that community members who are not able to attend in person can learn about the project and provide their input.

The project team recognizes that there are community members who may have little knowledge of the County's plans for BRT, so in November 2016 MCDOT launched the GetOnBoardBRT education and outreach campaign to engage with County residents more broadly in the plans for BRT. The community outreach team has developed an easy-to-use website and informational videos; engaged on social media; held or attended 20 outreach events; and met with several major employers. All future outreach activities for the US 29 and other BRT projects in the County will be coordinated with the GetOnBoardBRT education efforts.

As part of the US 29 BRT project's design phase, MCDOT is developing a comprehensive Public Involvement Plan (PIP) that will include outreach events, coordination with civic associations, employer focus groups, newsletters and other strategies for soliciting even more public feedback. A draft of the PIP will be provided to the CAC members so they can suggest other strategies we may want to consider. MCDOT's goal is to reach out as broadly as possible to community members who may use and benefit from the BRT, as well as those who could be more directly impacted along the corridor itself.

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[1] US Census 2000, US Census 2010, ACS 2015
[2] Metropolitan Washington Council of Governments, Household, Population and Employment Projection, Round 8.2.
[3] Unless otherwise specified, "the corridor" refers to a half-mile radius around planned BRT stations.
[4] HUD FMR Income Limits for Montgomery County, MD 2015.
[5] **"Affluent Montgomery County has pockets of poverty, mostly in the east."** Bill Turque, Washington Post. September 6, 2014.
[6] **US 29 Bus Rapid Transit Corridor Planning Study Preliminary Purpose and Need Document**. Maryland Department of Transportation. December 2015.
[7] US 29 Bus Rapid Transit Corridor Planning Study Preliminary Purpose and Need Document.
[8] **White Oak Sciences Gateway Master Plan, Montgomery County Planning Department**. Approved and Adopted, July 2014.
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[11] **Burtonsville Crossroads Neighborhood Plan, Montgomery County Planning Department**. Approved and Adopted 2012.
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[13] US 29 Travel Time and On-Time Performance Memo. Sabra, Wang & Associates, March 2017.
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[20] US 29 Bus Rapid Transit Corridor Planning Study Preliminary Purpose and Need Document.
[21] The Prospective and Likely Economic Implications of the US 29 BRT System. Sage Policy Group, Inc., April 2016.
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[26] The Prospective and Likely Economic Implications of the US 29 BRT System. Sage Policy Group, Inc., April 2016.
[27] **The Impacts of Neighborhoods on Intergenerational Mobility: Childhood Exposure Effects and County-Level Estimates.** Harvard University, 2015.
[28] Montgomery County 7.5%, US-29 Corridor: 12.1% (Silver Spring Station 20%, White Oak/Four Corners Station 7.6%, Burtonsville/Fairland Stations 9.5%) Table B08201 Household Size by Vehicles Available (by Census Tract), ACS 2010-2015, 5-year sample.
[29] **Center for Neighborhood Technology**. The Housing and Transportation Index. See "Montgomery County, Maryland."
[30] **Scorecard: The Pollution Information Site**. Montgomery County, Maryland Summary Report.
[31] **Montgomery County Bikeshare.** Montgomery County Government.

US 29 BUS RAPID TRANSIT (BRT)
IMPROVEMENTS PROJECT DESCRIPTION

APPENDICES

MCDOT
Montgomery County Department of Transportation

APPENDIX A

LETTERS OF SUPPORT

MCDOT
Montgomery County Department of Transportation

OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

Isiah Leggett
County Executive

March 25, 2016

Mr. Anthony Foxx, Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Dear Secretary Foxx:

I am writing to express our support for the application from the Montgomery County Department of Transportation (MCDOT) to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. We appreciate your leadership on the USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve safety and reduce travel times for motorists, cyclists, pedestrians; and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

The future economic vitality of Montgomery County depends on increased transportation investment to accommodate more residents and to encourage job growth. One of my highest priorities is to provide world-class transportation options for those who live and work throughout the County. These options are critical to providing congestion relief and unlocking the region's economic potential. I strongly believe that developing an efficient and effective Bus Rapid Transit (BRT) system is critical to our county's continued economic growth, mobility, and vitality.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, MCDOT at (240) 777-7170.

Sincerely,

Isiah Leggett
County Executive

IL:db:kcf

cc: Al Roshdieh, Director, MCDOT

MONTGOMERY COUNTY COUNCIL
ROCKVILLE, MARYLAND

NANCY FLOREEN
COUNCIL PRESIDENT

March 21, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave., SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

I am writing on behalf of the Montgomery County Council to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. The USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens is something that we appreciate your leadership on. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve safety and reduce travel times for motorists, cyclists, pedestrians; and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at 240-777-7170.

Sincerely,

Nancy Floreen

Nancy Floreen
President, Montgomery County Council

100 MARYLAND AVENUE, 6TH FLOOR • ROCKVILLE, MARYLAND 20850
240/777-7959 • FAX 240/777-7989 • COUNCILMEMBER.FLOREEN@MONTGOMERYCOUNTYMD.GOV

April 18, 2016

The Honorable Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

I am writing on behalf of the Washington Metropolitan Area Transit Authority to support the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. I appreciate USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens. Montgomery County's application is another example of a high quality transit project and is supported with a commitment from the County to provide the required local funding and operating match. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. Additionally, the project will improve safety and reduce travel times for motorists, cyclists, pedestrians, and transit users and will allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration and we ask for your support in funding these important projects. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,

Paul J. Wiedefeld
General Manager and
Chief Executive Officer

Washington Metropolitan Area Transit Authority

600 Fifth Street, NW
Washington, DC 20001
202/962-1234

www.metroopensdoors.com

A District of Columbia, Maryland and Virginia Transit Partnership

Adventist HealthCare
Washington Adventist Hospital
7600 Carroll Avenue
Takoma Park, MD 20912
www.AdventistHealthCare.com

April 18, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

Washington Adventist Hospital is excited that it will continue its 109 year legacy of caring for the community on its new and relocated campus in the White Oak section of Montgomery County just off US 29 and Cherry Hill Road. Construction for the relocation is underway with occupancy expected in 2019. Further, the hospital is excited to be a key asset in the economic redevelopment of the east county and is currently solidifying its relationship with the other existing and future developments in the region.

I am writing to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. The USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens is something that we appreciate your leadership on. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve travel times for motorists, cyclists, pedestrians; and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT, Montgomery County and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,

Geoff Morgan
Vice President, Expanded Access
Washington Adventist Hospital

cc: Peter Fosselman

National Capital Region
Transportation Planning Board

March 28, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Dear Secretary Foxx:

I am writing to express the support of the National Capital Region Transportation Planning Board (TPB), the metropolitan planning organization (MPO) for the national capital region, for Montgomery County's application under the FY 2016 Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant Program.

The TPB understands that the County's US 29 Bus Rapid Transit (BRT) project will enable the County to improve current transit travel times and frequencies while also addressing current and future bus ridership demands through this new higher speed, high frequency, premium transit service in the corridor. The project is anticipated to reduce single occupant vehicular travel, improve safety and reduce travel times for motorists, cyclists, and pedestrians; and will improve transit mobility and accessibility to high density housing and employment centers, including major private and government job centers, and education centers in the County.

The TPB supports these goals and appreciates your strong consideration of this application as it directly responds to regional transportation goals and priorities adopted by the Transportation Planning Board and identified in the Washington region's long-range transportation plan. I understand that upon successful grant award, Montgomery County will provide the required local funding and operating match for this project and the region's transportation improvement program (TIP) will be amended to include the grant funding.

Sincerely,

Timothy Lovain

Timothy Lovain
Chair, National Capital Region
Transportation Planning Board

C: Mr. Al Roshdieh, Montgomery County Department of Transportation, Director

THE DUFFIE COMPANIES

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

April 14, 2016

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

I am writing to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. The USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens is something that we appreciate your leadership on. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve travel times for motorists, cyclists, pedestrians; and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT, Montgomery County and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,

By: _____

Shane Pollin
Director of Development
The Duffie Companies

April 4, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

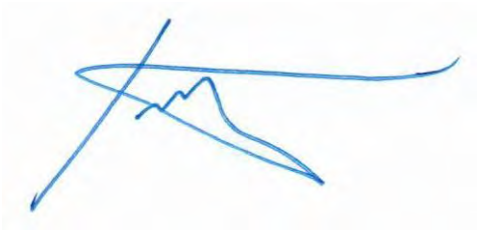
RE: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

I am writing to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. The USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens is something that we appreciate your leadership on. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve travel times for motorists, cyclists, pedestrians; and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT, Montgomery County and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,



James A. Soltesz, P.E.
President & CEO

BENJAMIN L. CARDIN
MARYLAND

www.cardin.senate.gov

509 HART BUILDING
WASHINGTON, DC 20510-2004
(202) 224-4524

TOWER 1, SUITE 1710
100 S. CHARLES STREET
BALTIMORE, MD 21201
(410) 962-4436

United States Senate

COMMITTEES:
ENVIRONMENT AND PUBLIC WORKS
FINANCE
FOREIGN RELATIONS
SMALL BUSINESS

COMMISSION ON SECURITY
AND COOPERATION IN EUROPE

April 18, 2016

The Honorable Anthony R. Foxx
Secretary
Department of Transportation
1200 New Jersey Avenue SE
Washington, D.C. 20590

Dear Secretary Foxx:

It has come to our attention that Montgomery County, Maryland has recently submitted a proposal for funding under the TIGER VIII grant program for its US 29 Bus Rapid Transit project.

More than 166,000 people moved to Montgomery County between 2000 and 2015 and another 162,000 are expected by 2040. This rapid growth has spurred new investment and planning along the US 29 corridor which struggles daily with crippling traffic congestion for both County residents and regional commuters. Montgomery County's US 29 Bus Rapid Transit (BRT) line with managed High Occupancy Vehicle lanes and expanded bike share will improve transit reliability between high-density neighborhoods in Montgomery County and provide immediate and positive benefits to residents in adjacent suburban counties and the District of Columbia. The project is part of the County's continuing investment to enhance quality of life for over 120,000 residents who live on or near the US 29 corridor, an increasingly diverse populations which is 65 percent minority, 32 percent foreign born, and 30 percent classified as "very low income."

Creating strong transportation connections that include improving opportunities for disadvantaged communities to access employment and education centers is a prime objective in Montgomery County's TIGER grant request. We respectfully request that you give all due consideration to this application, in accordance with established policies and procedures. Thank you very much.

Sincerely,

Benjamin L. Cardin
United States Senator

Barbara A. Mikulski
United States Senator

SAUL CENTERS, INC.

7501 Wisconsin Avenue, Suite 1500E, Bethesda, Maryland 20814
(301) 986-6200

April 20, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

Saul Centers, Inc. is invested in commercial properties throughout Montgomery County and elsewhere in the Metropolitan DC area. We are writing to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. The USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens is something that we appreciate your leadership on. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve travel times for motorists, cyclists, pedestrians; and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT, Montgomery County and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,

Brian T. Downie
Senior Vice President, Development

Cc: Al Roshdieh, Director, MCDOT

CHRIS VAN HOLLEN
8TH DISTRICT, MARYLAND

COMMITTEE ON THE BUDGET

Congress of the United States
House of Representatives
Washington, DC 20515

1707 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-5341

DISTRICT OFFICES:
51 MONROE STREET, #507
ROCKVILLE, MD 20850
(301) 424-3501

205 CENTER STREET
SUITE 206
MOUNT AIRY, MD 21771
(301) 829-2171

www.vanhollen.house.gov

April 19, 2016

The Honorable Anthony Foxx
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Foxx:

I am pleased to offer my strong support for Montgomery County, Maryland's application for funding in the eighth round of USDOT's Transportation Investment Generating Economic Recovery (TIGER) competitive grant program.

Currently, US Route 29 in Maryland lacks a high-quality, convenient and reliable transit connection from Burtonsville to Silver Spring. Montgomery County's US 29 Bus Rapid Transit (BRT) project proposal will increase transit access and reliability, advance connections in the fast-growing jobs corridor shared by Montgomery, Howard and Prince George's Counties and the District of Columbia, and support planned and existing mixed-use development on or near the congested roadway.

One of the foremost barriers to upward economic mobility is the lack of actual mobility. The US 29 BRT project features 11 BRT stations in three sectors of the corridor and will serve more than 120,000 people who live within one-half mile of the planned stations. Sixty-five percent of those residents are minorities, 32% are foreign-born, 30% are low-income, and 12% have no access to an automobile. Montgomery County plans to provide a 50% match for the project's cost.

Linking disadvantaged communities to job centers through improved transportation options makes this TIGER grant request an ideal candidate for funding. I urge the most serious consideration of this grant application.

Sincerely,

Chris Van Hollen
Member of Congress

JOHN P. SARBANES
3RD DISTRICT, MARYLAND

COMMITTEE ON
ENERGY AND COMMERCE

2444 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225–4016
FAX: (202) 225–9219

Congress of the United States

House of Representatives

Washington, DC 20515–2003

www.sarbanes.house.gov

April 20, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590-0001

Dear Secretary Foxx:

I am writing to express my strong support for Montgomery County's application to the US Department of Transportation's FY 16 TIGER VIII grant program for funding to establish Bus Rapid Transit and High Occupancy Vehicle lanes along the Route 29 corridor. With this funding, Montgomery County will build upon the existing transportation choices and improve the public transit infrastructure serving major suburban neighborhoods near the nation's capital.

Montgomery County's application will feature High Occupancy Vehicle lanes and a US 29 Bus Rapid Transit (BRT) line, including eleven BRT stations and an interconnected bike share network. With over 120,000 residents living on or near this congested corridor, a number expected to grow, the BRT and expanded bike share will improve the quality of life for communities that live along and depend upon this important transit corridor. The project will connect these high-density population centers with some of the major employers in the region, including the Food and Drug Administration, the National Oceanic and Atmospheric Administration and Discovery Communications. Residents will not only see improved reliability and usefulness in public transit, but they will have more options in how they choose to travel about the region.

I ask that you provide all appropriate consideration for the application of Montgomery County to the US Department of Transportation's FY 16 TIGER VIII program.

Sincerely,

John P. Sarbanes
Member of Congress

JPS/jl

600 BALTIMORE AVENUE
SUITE 303
TOWSON, MD 21204
(410) 832–8890
FAX: (410) 832–8898

44 CALVERT STREET
SUITE 349
ANNAPOLIS, MD 21401
(410) 295–1679
FAX: (410) 295–1682

HOUSE COMMITTEE ON FINANCIAL SERVICES

SUBCOMMITTEE ON FINANCIAL INSTITUTIONS AND CONSUMER CREDIT

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

JOINT ECONOMIC COMMITTEE

WASHINGTON OFFICE:
1632 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
PHONE: (202) 225-2721
FAX: (202) 225-2193

JOHN K. DELANEY
CONGRESS OF THE UNITED STATES
6TH DISTRICT, MARYLAND

DISTRICT OFFICES:

GAITHERSBURG
9801 WASHINGTONIAN BOULEVARD
SUITE 330
GAITHERSBURG, MARYLAND 20878
PHONE: (301) 926-0300
FAX: (301) 926-0324

HAGERSTOWN
38 SOUTH POTOMAC STREET
SUITE 205
HAGERSTOWN, MARYLAND 21740
PHONE: (301) 733-2900
FAX: (301) 926-0324

WEBSITE: HTTP://WWW.DELANEY.HOUSE.GOV

April 20, 2016

The Honorable Anthony Foxx
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Mr. Secretary:

I am writing to express my support for Montgomery County, Maryland's, application for funding for the US 29 Bus Rapid Transit Improvements (BRT) through USDOT's TIGER competitive grant program.

The US 29 BRT project proposed by the County will improve transit and non-motorized local and regional transportation connections in a heavily congested corridor that includes Howard and Prince George's Counties as well as the District of Columbia. New higher speed and high frequency bus service will be provided as well as accessible pedestrian and bike sharing improvements that will connect riders to high density housing, and employment and education centers. Montgomery County's commitment to environmental sustainability and livable communities makes this project a good candidate for TIGER funding. The total project cost is estimated at $65 million of which Montgomery County expects to provide a 50 percent match.

Locally and nationally, I believe smart investment in transportation infrastructure equals jobs, a stronger private sector and a better quality of life which will benefit my constituents.

I sincerely appreciate all due consideration and attention be given to this application.

Sincerely,

John K. Delaney
Member of Congress

MONTGOMERY COUNTY PLANNING BOARD
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

March 22, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, D.C. 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

I am writing on behalf of the Montgomery County Planning Board to express support for the application from the Montgomery County Department of Transportation to the U.S. Department of Transportation's (USDOT) Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. The US 29 corridor is one of ten BRT corridors (along with the Corridor Cities Transitway) identified in our Countywide Transit Corridors Functional Master Plan that was adopted in December 2013. Upon successful grant award, it is my understanding that Montgomery County will provide the required local funding and operating match for this project.

The USDOT's leadership and dedication to funding high quality projects that have clear and visible benefits for our residents is appreciated. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve safety and reduce travel times for motorists, cyclists, pedestrians, and transit users and allow increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration as we ask for your support in funding this important project. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT and both the Maryland and Montgomery County Departments of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,

Casey Anderson
Chair

CA:TA:aj
Attachment: USDOT TIGER FY 2016 Draft Grant Application Summary Sheet

8787 Georgia Avenue, Silver Spring, Maryland 20910 Phone: 301.495.4605 Fax: 301.495.1320
www.montgomeryplanningboard.org E-Mail: mcp-chair@mncppc-mc.org

Maryland Department of Transportation
The Secretary's Office

Larry Hogan
Governor

Boyd K. Rutherford
Lt. Governor

Pete K. Rahn
Secretary

April 21, 2016

The Honorable Anthony Foxx
Secretary
United States Department of Transportation
1200 New Jersey Avenue SE
Washington DC 20590

Dear Secretary Foxx:

The Maryland Department of Transportation (MDOT) supports the Montgomery County Department of Transportation's application for United States Department of Transportation's (USDOT) Transportation Investment Generating Economic Recovery (TIGER) VIII Discretionary Grant Program for their US 29 Bus Rapid Transit (BRT) project.

We appreciate USDOT's leadership and dedication to funding high quality projects that have clear and visible benefits for Marylanders. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. The project will improve safety and reduce travel times for motorists, cyclists, pedestrians, and transit users and will provide for increased opportunity for economic development in Montgomery County and the State of Maryland.

Thank you for your consideration. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT. If you have questions or need additional information, please contact Mr. Al Roshdieh, Montgomery County Department of Transportation Director, at 240-777-7170.

Sincerely,

Pete K. Rahn
Secretary

cc: Mr. Al Roshdieh, Director, Montgomery County Department of Transportation

bcc: Ms. Deborah Haynie, Federal Legislative Officer, Office of Government Affairs, MDOT
Mr. Curtis Johnson, Policy Analyst, Office of Planning and Capital Programming, MDOT
Mr. John G. Trueschler, Director, Officer, Office of Government Affairs, MDOT

LABQUEST Partnership

10733 Kinloch Road Silver Spring, MD 20903 301-980-3050

April 13, 2016

The Honorable Anthony Foxx
Secretary
U.S. Department of Transportation
1200 New Jersey Ave. SE
Washington, DC 20590

Re: USDOT TIGER Grant Application

Dear Secretary Foxx,

I am writing on behalf of the LABQUEST Partnership, a community organization in Montgomery Country, MD. Formed more than 20 years ago, LABQUEST played a key support role in the consolidation of Food and Drug Administration (FDA) headquarters in the county. We are now supporting two area economic development projects that will leverage their close proximity to the FDA.

LABQUEST strongly supports the application from the Montgomery County Department of Transportation to the TIGER VIII grant program for its Route 29 Bus Rapid Transit (BRT) project. This project will significantly improve mobility and transit times in the vital Route 29 corridor while connecting riders to major private and government employment centers. Major federal employment hubs include FDA, with 8,500 jobs and thousands of visitors annually, and the National Oceanic and Atmospheric Administration.

In addition, the project will represent an extremely important factor for increased economic development in the county, including a new Washington Adventist Hospital being constructed near FDA headquarters with 1,300 projected jobs and a planned mixed-use development with a biomedical research component adjacent to the FDA.

The time is right for this project; the TIGER grant will give it a huge push forward. Thank you for your consideration.

Sincerely,

Betsy Bretz
Chair

Executive Directors Rob Richardson, Marc Bloom, Dan Marren

cc: Peter Fosselman
Montgomery County

SENATOR NANCY J. KING
SENATE DELEGATION CHAIR

SENATOR ROGER MANNO
SENATE DELEGATION VICE CHAIR

301-858-3686 · 410-841-3686
800-492-7122 *Ext.* 3686

DELEGATE SHANE ROBINSON
HOUSE DELEGATION CHAIR

DELEGATE KIRILL REZNIK
HOUSE DELEGATION VICE CHAIR

301-858-3010 · 410-841-3010
800-492-7122 *Ext.* 3010

THE MARYLAND GENERAL ASSEMBLY
ANNAPOLIS, MARYLAND 21401
MONTGOMERY COUNTY DELEGATION

April 28, 2016

The Honorable Anthony Foxx
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590

Dear Secretary Foxx:

Montgomery County, Maryland, has submitted an application for federal funding through USDOT's TIGER competitive grant program. The project cost is estimated at $65 million of which the County plans to commit 50 percent in matching funds. As the Montgomery County delegation chairs for Maryland's Senate and House of Delegates, we are writing to express our delegation's strong support for this proposal.

With just over one million residents, Montgomery County has the largest population of any Maryland County. The US 29 Bus Rapid Transit (BRT) line and High Occupancy Vehicle managed lanes project proposed by the County will create needed connections between high-density neighborhoods adjacent to the nation's capital and education and employment centers in the County including the Food and Drug Administration, the National Oceanic and Atmospheric Administration, and Discovery Communications headquarters. The planned BRT with an expanded interconnected regional bike share network will feature eleven BRT stations, improve transit reliability for low-income and minority residents, spur walkable mixed-use suburban redevelopment, and improve the quality of life for over 120,000 residents living on or near the highly congested suburban corridor.

Montgomery County's TIGER proposal will not only result in providing more transportation choices for both commuter and non-work travel on existing payment, but it will also link disadvantaged communities to job centers through an improved transportation network. We respectfully urge your most serious consideration of this application.

Sincerely,

Nancy J. King

Senator Nancy J. King
Chair, Montgomery County Senate Delegation

Delegate Shane Robinson
Chair, Montgomery County House Delegation

BARBARA A. MIKULSKI
MARYLAND

COMMITTEES:

APPROPRIATIONS

HEALTH, EDUCATION, LABOR, AND PENSIONS

United States Senate

WASHINGTON, DC 20510–2003

April 26, 2016

IN REPLY PLEASE REFER TO OFFICE INDICATED:

☑ 901 SOUTH BOND STREET, SUITE 310
BALTIMORE, MD 21231
(410) 962-4510
VOICE/TDD: (410) 962-4512

☐ 60 WEST STREET, SUITE 202
ANNAPOLIS, MD 21401-2448
(410) 263-1805
BALTIMORE: (410) 269-1650

☐ 6404 IVY LANE, SUITE 406
GREENBELT, MD 20770-1407
(301) 345-5517

☐ 32 WEST WASHINGTON STREET
ROOM 203
HAGERSTOWN, MD 21740-4804
(301) 797-2826

☐ THE PLAZA GALLERY BUILDING
212 MAIN STREET, SUITE 200
SALISBURY, MD 21801-2403
(410) 546-7711

The Honorable Anthony Foxx
Secretary of Transportation
United States Department of Transportation
1200 New Jersey Avenue, SE
Washington, DC 20590-0001

Dear Secretary Foxx:

Your agency will soon be receiving a grant application from Montgomery County for funding consideration of their US 29 Bus Rapid Transit (BRT) proposal for funding consideration under the TIGER VIII competitive grant program. I am writing to draw your attention to the merits of this application and to urge you to give it every appropriate consideration.

The US 29 Bus Rapid Transit (BRT) line with managed High Occupancy Vehicle lanes and expanded bike share will improve transit reliability between high-density neighborhoods in Montgomery County and provide immediate and positive benefits to residents in adjacent suburban counties and the District of Columbia. Howard County and the District of Columbia, which border Montgomery County to the north and south, respectively, are in the process of planning and implementing BRT infrastructure along their portions of US 29. The number of daily commuter trips between the jurisdictions meets the demand for a cohesive transit service.

With just over one million residents, Montgomery County has the largest population of any Maryland county. More than 166,000 people moved to the County between 2000 and 2015 and another 162,000 are expected by 2040. This rapid growth has spurred new investment and planning along the US 29 corridor which struggles daily with crippling traffic congestion for both County residents and regional commuters. The proposed US 29 BRT project, located on the eastern side of Montgomery County, is a critical part of that investment that will enhance the quality of life for over 120,000 residents who live on or near the corridor representing a snapshot of America's increasingly diverse suburbs.

Creating strong transportation connections that include improving opportunities for disadvantaged communities to access employment and education centers is a prime objective in Montgomery County's TIGER grant request. I very much appreciate your attention and your consideration of this matter. Please keep me posted as these grant awards are made.

Sincerely,

Barbara A. Mikulski
United States Senator

BAM:wbk

GOOD HOPE ESTATES CIVIC ASSOCIATION

DEDICATED TO MANTAINING AND IMPROVING THE QUALITY OF LIFE WITHIN OUR COMMUNITY

April 21, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

On behalf of the residents of Good Hope Estates, I am writing to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the **US 29 Bus Rapid Transit (BRT) project**.

Our community of over 600 homes would benefit greatly from this transit investment. Not only would this project provide a shorter and more attractive commute for residents that currently use transit, but it would also encourage more transit use and alleviate congestion along US 29.

The proposed BRT system is the only high-capacity transit option available to East Montgomery County, as there are no plans for light or heavy rail. The distance from our community to Metrorail or commuter rail hubs is unattractive for most of our residents, and existing bus service is limited and infrequent. This project is essential to the future livelihood and quality of life for our region, especially as Howard County continues to develop and generate more traffic.

Thank you for your consideration and we ask for your support in funding these important projects. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT, Montgomery County and the Maryland Department of Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County DOT at (240) 777-7170.

Sincerely,

Sebastian Smoot

President, Good Hope Estates Civic Association
Mobile: 240-308-1006 | Email: gheca@gheca.org
1200 Rainbow Drive, Silver Spring MD 20905

Greater Colesville Citizens Association
PO Box 4087
Colesville, MD 20914
March 25, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

We are writing to express our support for the application from the Montgomery County Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. Upon successful grant award, Montgomery County will provide the required local funding and operating match for this project. These funds will be used to help fund the implementation of BRT on US29, which would be the first BRT corridor envisioned for Montgomery County. The vision calls for many of the corridors to eventually be extended to neighboring jurisdictions.

The Greater Colesville Citizens Association (GCCA) represents 3500 single family households centered at the intersection of New Hampshire Ave and Randolph Rd. We have been strong supporters of BRT for many years as a way of moving people, supporting economic development and starting to address global warming. As part of moving people, it will reduce road congestion, which is a major problem for our region.

There are four major components to achieving the above goals within Eastern Montgomery County, with BRT on US29 being one component. The other three are the relocation of FDA to White Oak which has been underway for several decades, the move of Adventist Hospital to White Oak (ground was broken on March 7, 2016), and partnership between Percontee and Montgomery County to build Viva White Oak, a life science center in a new town setting. Philanthropist John Gudelsky (Percontee) and County Executive Ike Leggett on March 24, 2016 reached a final agreement in principle concerning remaining issues related to the General Development Agreement.

These four efforts together will not only benefit the citizens in Eastern Montgomery County via jobs and mobility, but also benefit the entire county, state and nation by improving health products approved by FDA. A large number of companies from around the world that produce products that FDA regulates want to have a close presence to improve their collaboration. FDA and Adventist Hospital collaboration is already resulting in improved medical devices.

Sincerely,

Daniel L Wilhelm

Daniel L. Wilhelm
GCCA President

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration
Silver Spring MD 20993

May 2, 2016

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx,

The United States Food and Drug Administration (FDA) is a major employer in Montgomery County, Maryland's, U.S. 29 corridor. FDA supports Montgomery County's application for the Department of Transportation's (USDOT) Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit project because of its potential to improve mobility for our White Oak Campus in Silver Spring, Maryland. We appreciate the USDOT's dedication to funding high quality projects that have clear and visible benefits for citizens. The project proposal includes important benefits for both local residents and our FDA employees who work in this area by providing reliable transit and regional transportation connections. The project will improve travel times for commuters, cyclists, pedestrians; and transit users.

Please consider FDA's support when evaluating the important application for funding this initiative. If you have questions or need additional information, please have your staff contact Mr. Andrew Dempster, Director, Logistics and Transportation Management Branch, Office of Facilities Engineering and Mission Support Services, FDA at (301) 796-0446.

Sincerely,

Walter Harris, MBA, PMP
Deputy Commissioner for Operations/COO
Office of Operations
U.S. Food and Drug Administration

EAST COUNTY CITIZENS ADVISORY BOARD

Mr. Anthony Foxx
Secretary of Transportation
U.S. Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

April 20, 2016

Re: USDOT Tiger VIII – FY16 Discretionary Program Applications

Dear Secretary Foxx:

The East County Citizens Advisory Board supports the application from the Montgomery County, Maryland Department of Transportation to USDOT's Tiger VIII Discretionary Funding Program for the US 29 Bus Rapid Transit (BRT) project. The East County Citizens Advisory Board is an all-volunteer board of residents that advises the Montgomery County Executive and the County Council on issues and needs for the East County area and advocates for regional priorities. The Board appreciates your leadership of USDOT's dedication to funding high quality projects that have clear and visible benefits for our citizens. The project proposal includes transformative benefits for both local residents and businesses by providing reliable transit and non-motorized local and regional transportation connections. This project, we sincerely believe, will improve travel times for multi-modal transportation such as for motorists, cyclists, pedestrians, as well as transit users and allow increased opportunity for economic development in the eastern portion of Montgomery County and the State of Maryland, and it does this by way of laying the foundational infrastructure for transit improvement in the future between Montgomery County and its surrounding jurisdictions.

Thank you for your consideration and we ask for your support in funding this important project. While we understand that transportation funds are limited, we look forward to continuing a productive partnership with USDOT, Montgomery County and the Maryland Department of

Transportation. If you have questions or need additional information, please contact Mr. Al Roshdieh, Director, Montgomery County Department of Transportation at (240) 777-7170.

Sincerely,

Anthony Ramirez, Chair
East County Citizens Advisory Board

cc: Montgomery County Executive, Ike Leggett
County Council President, Nancy Floreen
Al Roshdieh, MCDOT Director
Jewru Bandeh, Director, East County Regional Office

APPENDIX B

PRESENTATION TO MONTGOMERY COUNTY PLANNING BOARD – FEBRUARY 17, 2017

MCDOT
Montgomery County Department of Transportation

GetOnBoardBRT

BUS RAPID TRANSIT IN MONTGOMERY COUNTY

US 29 Bus Rapid Transit
Planning Board Briefing

February 16, 2017

MCDOT
Montgomery County
Department of Transportation

Project Goals

- Improve the quality of transit service
- Improve mobility opportunities and choices
- Enhance quality of life
- Support master planned development
- Provide sustainable and cost-effective transit alternatives

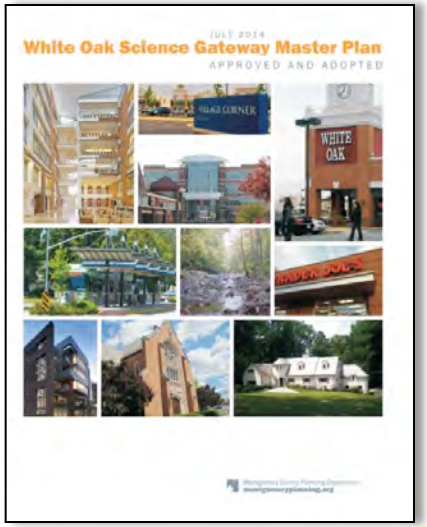
GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

A Snapshot of the US 29 Corridor

- One of busiest transit corridor in Maryland with over **11,000 daily bus trips**
- Bus trips on the corridor average **20 percent** longer than auto trips; up to **60 percent** longer during peak periods
- Highly diverse
    - 65% of residents minority; 32% foreign born
    - 31% of population speaks a language other than English at home
    - 30% of households earn less than half of the area median income
    - 12% have no access to a car; 38% have access to only one vehicle
    - Home to over 9,000 senior citizens and 11,000 people with disabilities

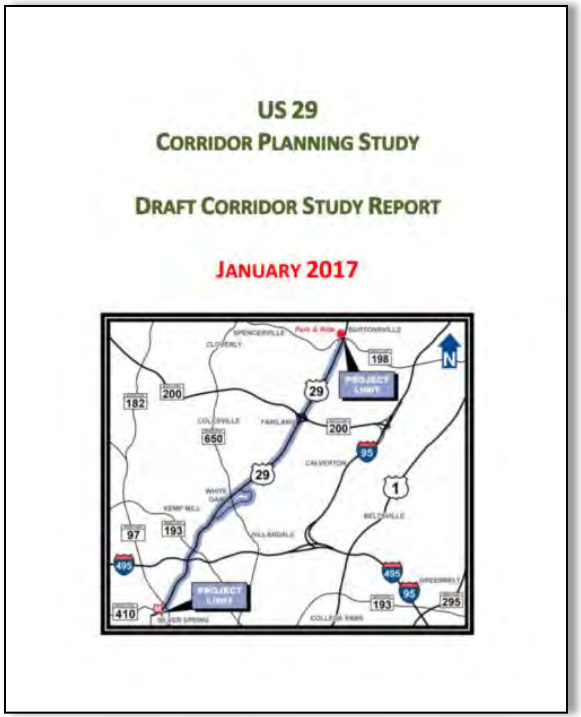
A Snapshot of the US 29 Corridor

- Major job and education centers
  - Food and Drug Administration (FDA)
  - National Oceanic and Atmospheric Administration (NOAA)
  - Discovery Communications Headquarters
- 61,000 jobs along corridor in 2010; projected to over 80,000 in 2040
- Major Planned Development
  - White Oak Science Gateway
  - Downtown Silver Spring
  - Burtonsville



MDOT Study Process Findings (2040 Analysis)

- Station Locations
- Service Plans
- HOV mode share
- Impacts of new pavement in north
- Traffic Analysis
- Total capital cost : $80-140 million



GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

MCDOT US 29 Project

Approximately 40% of the alignment along US 29 is in dedicated Bus on Shoulder lanes

GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

Elements of MCDOT US 29 Project

- Frequent all-day service
  - 7 days/week
  - Same hours as Metrorail
  - 7.5 minutes peak; 15 minutes off-peak
- Uniquely branded vehicles and stations
- Transit Signal Priority (TSP)
- Bike/pedestrian improvements to facilitate station access, including 10 new bikeshare stations
- Ongoing coordination with Howard County

Elements of BRT

BRT Element	US 29 BRT Details
Runningway ✓	40% in dedicated Bus on Shoulder
Stations ✓	11 level-boarding BRT stations with improved amenities such as real-time info and off-board fare collection
Vehicles ✓	Sleek, articulated BRT vehicles with multiple-door level boarding and interior bike accommodation
Fare Collection ✓	Off-board fare collection
ITS (Technology) ✓	Transit Signal Priority at 15 intersections; real-time arrival info
Service and Operations ✓	Frequent, headway-based service with longer span; integration with local services
Branding ✓	Uniquely branded service, stations, vehicles

Source: National BRT Institute

"Most BRT projects operate in mixed traffic – primarily arterials streets – for 50 percent or more of their routes."

- GAO Report, 2012

US 29 BRT Project Benefits – Ridership and Transit Reliability

- Projected BRT Ridership
  - 2020: 13,000 daily boardings (*3,950 new*)
  - 2040: 20,000 daily boardings (*5,700 new*)

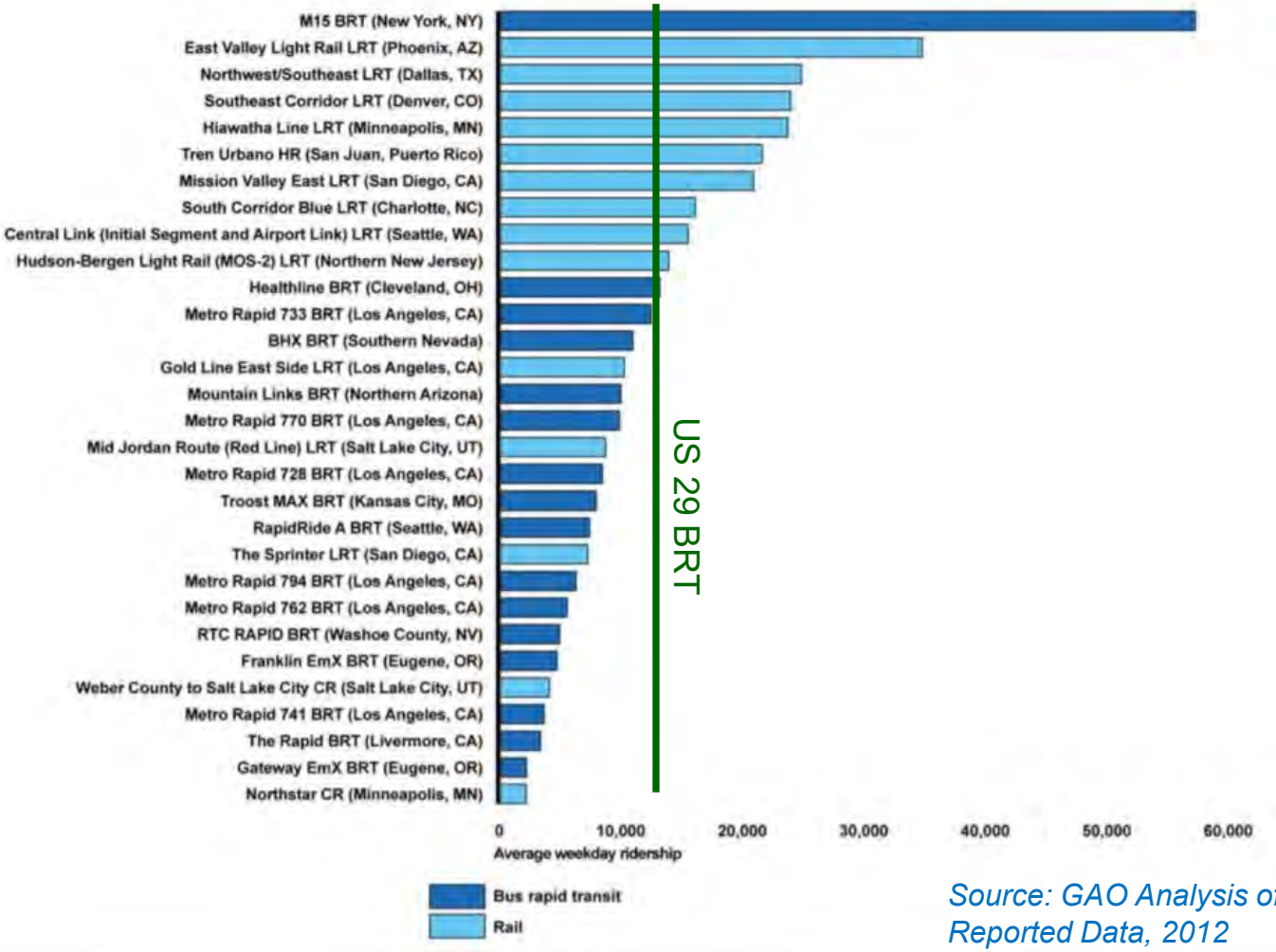
The Benefit-Cost Analysis for the US 29 BRT project shows that benefits outweigh costs by a factor of ***four***.

- Improved **transit reliability**
  - Current on time performance for local corridor transit services averages **45-77%***
  - US 29 BRT will improve reliability through:
    - Bus on Shoulder
    - Transit Signal Priority
    - More efficient operations (level multiple-door vehicle boarding, limited stops, off-board fare collection)

*RideOn goal is 90%

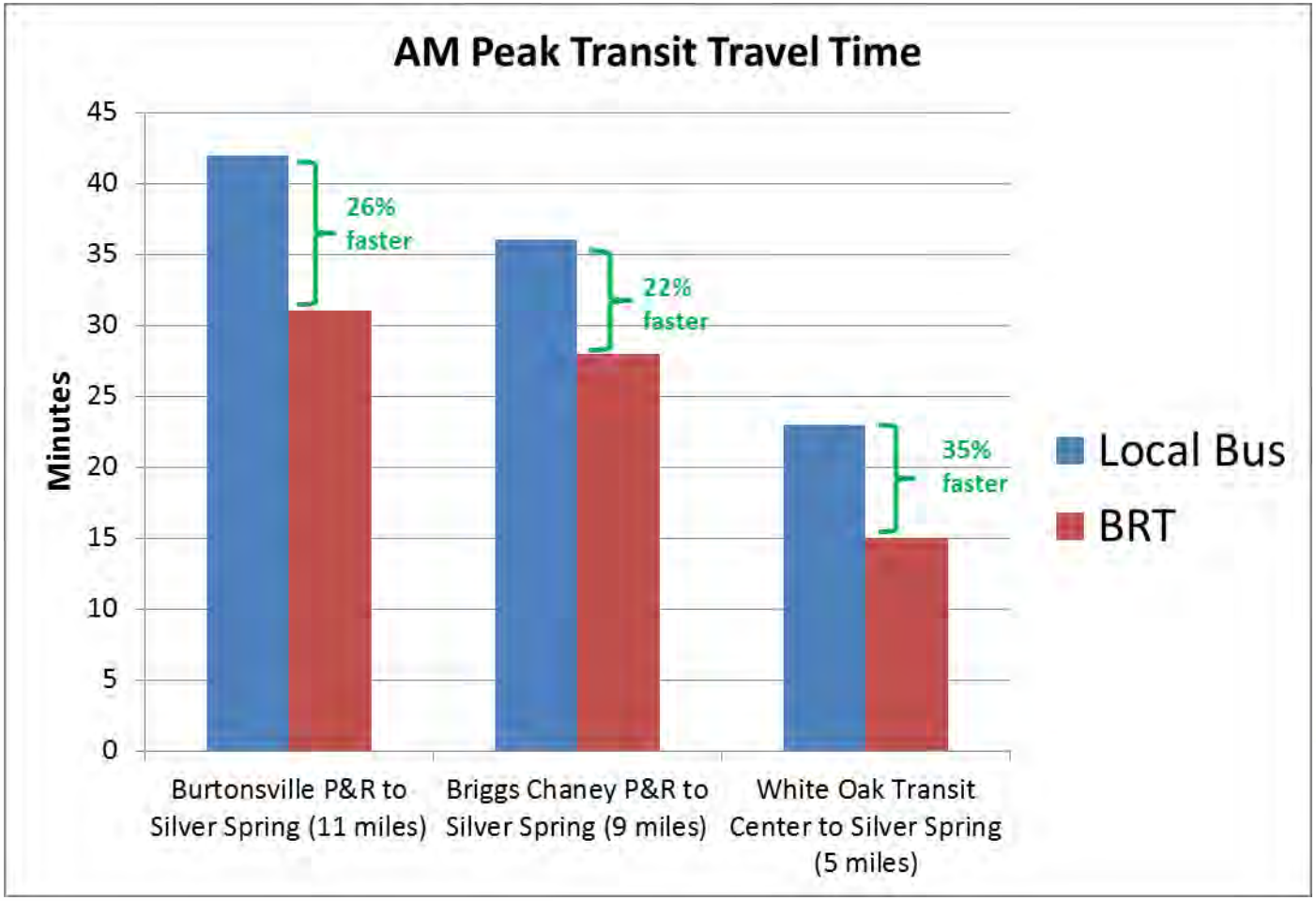
US 29 BRT Compared to Other BRTs – *Ridership*

Average Daily Ridership One Year After Opening



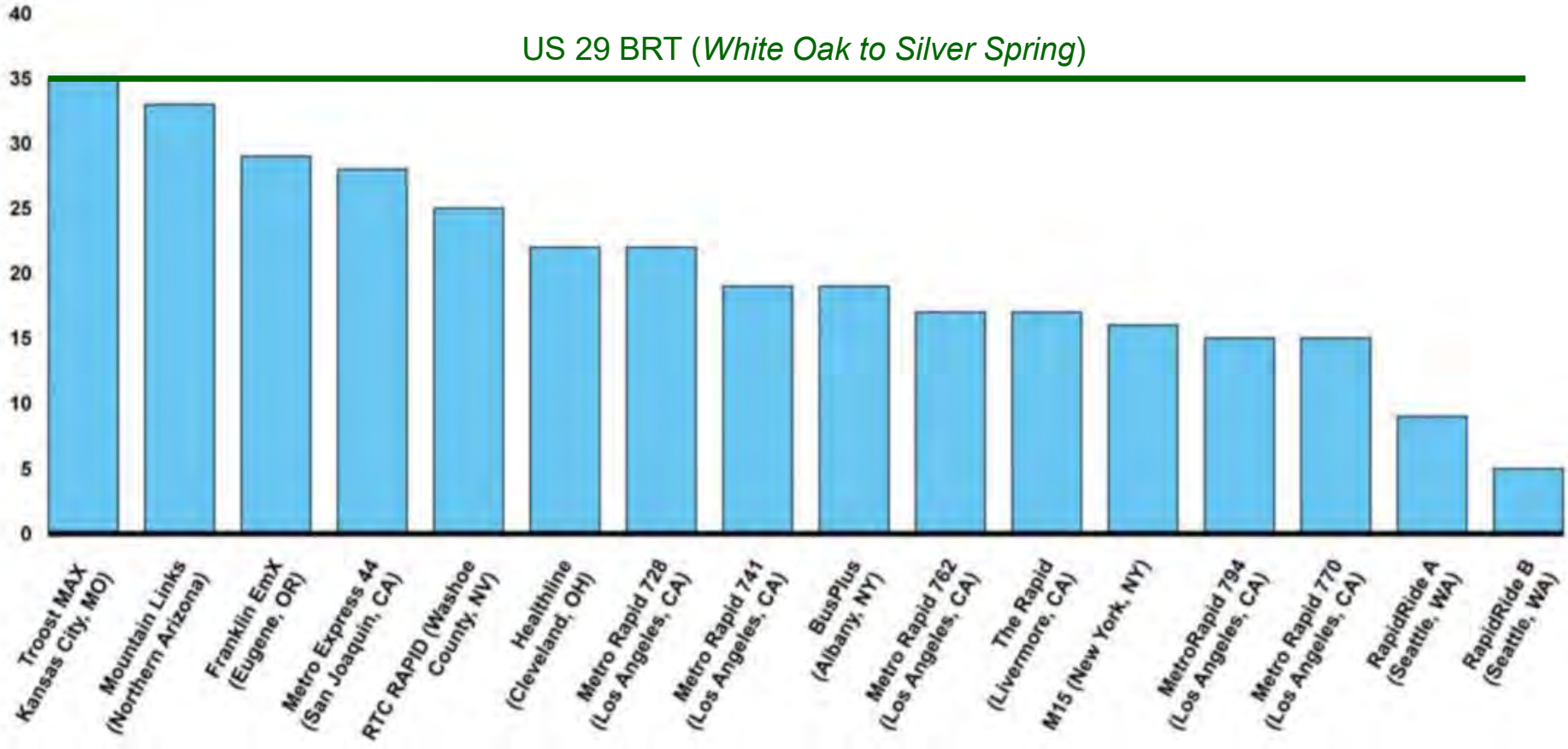
Source: GAO Analysis of Transit Agency Reported Data, 2012

US 29 BRT Project Benefits – Improved Transit Travel Time



US 29 BRT Compared to Other BRTs – *Travel Time Savings*

Change in travel time (as a percentage) over previous bus service



Source: GAO Analysis of Transit Agency Reported Data, 2012

US 29 BRT Project Benefits – Economic Impact

- Development of the White Oak Science Gateway depends heavily upon the presence of US 29 BRT and its capacity to enhance mobility.
  - 7 million square feet of commercial space
  - > 20,000 jobs
  - 5,300 additional dwelling units
- Project estimated to result in ***$269-520 million net benefit***
- Estimated Operational Phase Impacts
  - 85 permanent jobs in Montgomery County
  - $6.5 million annual labor income
  - $13.4 million additional annual business sales

Source: MCDOT TIGER grant application, Economic Impact Analysis, Sage Policy Group

US 29 BRT Project Benefits – Accessibility

- Increases regional connections and access to a fast-growing jobs corridor
- US 29 BRT will improve transit access and provide upward mobility for transit-dependent populations
  - Currently minimal off-peak transit service on the corridor
  - BRT will significantly increase span and frequency of service
  - Local routes will be integrated and improved

US 29 BRT Project Benefits – Route Efficiency and Coverage

- Existing local service will be evaluated to interface with BRT and potentially provide **improved frequency and/or coverage into neighborhoods**
- Potential strategies:
  - Adjust frequency
  - Adjust span of service
  - Relocate stops
  - Change alignments
  - Extend routes
  - Limited stop overlay
  - Neighborhood circulators

US 29 BRT Estimated Infrastructure Cost

Project Element	Estimated Cost
BRT Stations and Stops	$13,000,000
Transit Signal Priority	$1,000,000
Vehicles	$14,000,000
Bicycle & Pedestrian Improvements	$2,000,000
Overhead & Grant Administration	$1,500,000
TOTAL	**$31,500,000**
Federal TIGER Funds	**$10,000,000**
County Contribution	**$21,500,000**

MCDOT anticipates that the majority of TIGER funding will be used towards station and pedestrian improvement construction

Note: County's FY17-22 budget already included $6.5 million for US 29 BRT planning and design

TIGER Grant

- USDOT Program – **T**ransportation **I**nvestment **G**enerating **E**conomic **R**ecovery
- $500 million made available nationwide in FY16
- **Highly** competitive (3-5% of grant requests awarded)
- $10 million Federal grant awarded for US 29 BRT
  - Award based on demonstrated benefits of project with respect to grant criteria (*economic competitiveness, quality of life, environmental sustainability*)
  - Tremendous opportunity for federal investment in East County
  - Provides national visibility to Montgomery County's BRT program

Status of TIGER grant

- Developing positive relationship with FTA
- Grant agreement by June 2017
- Elements required to secure grant
  - Final scope of work (*in progress*)
  - Inclusion of project in STIP/CLRP (*March 2017*)
  - All local funding approved in CIP (*May 2017*)
  - NEPA complete (*June 2017*)

US 29 Project Schedule

GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

Public Engagement

- **Developing robust public engagement plan**
- **Corridor Advisory Committees**

  CACs will continue to meet to provide input on the project throughout project phases

- **Public Open Houses**

Tuesday, March 7

6:30-8:30pm

Silver Spring Civic Center

Monday, March 13

7:00-9:00pm

Montgomery Blair High School

Wednesday, March 15

6:30-8:30pm

White Oak Community Center

APPENDIX C

BENEFIT COST ANALYSIS

MCDOT
Montgomery County Department of Transportation

Sabra, Wang & Associates, Inc.
Engineers • Planners • Analysts

MEMORANDUM

To:	Joana Conklin, Darcey Buckley, Montgomery County DOT
From:	James A. Bunch, Senior Transportation Planner, SWAI
Subject:	US 29 Bus Rapid Transit Improvements, Montgomery County MD, TIGER VIII Grant Benefit Cost Analysis (Revised)
Date:	February 3, 2017
CC:	Gary Erenrich, MCDOT, Paul Silberman: SWAI

1 Executive Summary

A benefit-cost analysis (BCA) was conducted for the US29 Bus Rapid Transit Improvements project for submission to the US DOT as a requirement of a discretionary grant application for the TIGER VIII program. The analysis was conducted in accordance with the benefit-cost methodology as recommended by the US DOT in the Federal Register (81 FR 9935)(18), and the 2016 Benefit-Cost Analysis Guidance for TIGER and Grant Applications (16) and the 2016 Tiger Benefit-Cost Analysis (BCA) 2016 TIGER and Fast Lane BCA Resource Guide (17). As recommended the BCA was conducted for a period of over 20 years starting when operations begin in 2020 and ending in 2040 (21 years). The BCA provides conservative estimates of both benefits and costs. Full life-cycle costs including replacement of assets at the end of their economic life, operations and maintenance of the system, and recovery of remaining useful life at the end of the analysis period were incorporated into the analysis. Sensitivity analyses using discount rates of 7% and 3% along with various assumptions on the methods and inputs for estimating the benefits measures (travel time savings, user cost savings, air quality, etc.) were also performed.

The BCA analysis was originally carried out in April 2016 assuming Managed/HOV Lanes along portions of the Right of Way (ROW), and 12 minute headways for each BRT service pattern (6 minute combined headway on the trunk portions of the ROW). Since the original submittal, the Grant Proposal has been revised to:

- Convert the Managed/HOV lane portions of the ROW back to mixed use
- Provide 15 minute headways for each BRT service pattern (7.5 minute combined headways) in the opening year (2020).
- Restore the Ride On route 21 and 22 to their current service patterns (previously they were terminated at the White Oak Transit Center).

These changes change the transit travel times and reduce the capital costs for roadway improvements, signage, and traffic operations. Consequently the BCA analysis was revised to account for these changes, as documented in the remainder of this memorandum.

This memorandum provides additional detail on the assumptions, methods, and results discussed in the revised grant submittal. Printouts of all calculations and assumptions can also be found the accompanying PDF file: MoCo_MD_2016_US29BRT_BCA_Calculations_r4.pdf. Table 1 provides the Project Benefit Summary Matrix summarizing the existing conditions, changes, impacts, affected populations, results, and location in the Excel Workbook.

1.1 Summary of Results

Table 2 provides a summary of the Benefit Analysis results. As shown, the project enhances the mobility and travel options within the US 29 corridor resulting in net benefits over the 21 year analysis period of $852.91 Million in undiscounted 2015$, and Net Present Value (NPV) of $269.42 Million when a 7% discount rate is applied to future costs and benefits, or $520.30 Million when a 3% discount rate is applied.

The $39.25 Million initial capital costs funded by the TIGER Grant increase to $111.61 Million in undiscounted 2015$ ($44.61 Million NPV at 7% discount and $63.45 Million NPV at a 3% discount rate) over the 21 year life of the project primarily due to the replacement of the different components at the end of their economic life (Vehicles at 12 years, TSP equipment at 10 years, Passenger information displays at 5 years, and other assets at 20 years). Note that the assets replaced at 20 years such as the concrete shoulder pads are in service for only 1 year, before the end of the analysis, All remaining value for these and other assets that have not reached the end of their economic value is subtracted in the Residual Capital Recovery calculations.

Table 1 Project Benefit Summary Matrix

Change to Baseline/Alternative	Type of Impact	Population Affected By Impacts	Economic Benefit	Summary of Results (7% Discount, 20 years)	Page Reference in BCA (Spreadsheet)
* US 29 BRT service from Burtonsville to Silver Spring * 13.5 miles with 11 stations * Bus on Shoulder, and mixed flow ROW * Frequent (7.5 min. peak, 10 min. offpeak headways along the trunk) * All Day service in both directions * Related bicycle and pedestrian improvements such as Bikeshare stations where feasible * Improved station amenities (canopies, seating, passenger information, bike parking, etc.) * Branding and Marketing * Transit Signal Priority * Specialty BRT Vehicles * Service revisions to the WMATA Express Lines that run dupliate service. * Implementation of feeder and circulator service to BRT stations.	Change in system use (transit riders, road volumes, etc.)	Nobuild Transit Users that change route Nobuild Auto Users that change mode	Input into other impacts (below)	Travellers changing to transit from autos increases from 3,950 in 2020 to 5,700 in 2040 (62%). US 29 BRT Dailiy Boardings increase from 13,300 to 20,000 in 2040. Savings in Regional VMT is 26,400 in 2020 and 34,600 in 2040.	Demand Analysis & Travel time NVP
	Travel Time Savings	Existing transit users will divert to the new US 29 BRT service New transit users will divert to the US 29 BRT service	Monetized value of travel time savings	$218,163,568	Travel Time NVP
	User Cost Savings	New transit riders that divert from using autos	Monetized value of User Cost Savings	$41,157,061	User Cost NPV
	Air Quality reduction in emissions	New transit riders that divert from using autos All auto users	Monetized value of emission reductions	$670,864	Air Quality NPV
	Reduced accidents on roadways due to lower VMT	Auto users on roadway after US 29 BRT implementation	Monetized value of accident costs	$141,231,927	Safety NPV
	Good Repair savings	Reduction in parallel service provided by WMATA Metrobus Z Express Lines, and Ride On Service to White Oak	Savings in Ride On Operations and Maintenance Costs	Qualitative at this time	In main narrative
	Quality of Life due to lower congestion, increased bike use, healthier users	US 29 BRT Riders, and all residents, workers within corridor.		Qualitative at this time	In main narrative

Table 2 Benefit-Cost Analysis Summary (2015$)

		Discount Rate		
		No Discount	7%	3%
Benefits				
Good Repair	**Qualitative at this time**			
Economic Competitveness	**User Time Savings**	$605,396,242	$218,163,568	$379,785,330
	User Cost Savings	$111,141,990	$41,157,061	$70,565,878
Quality of Life	**Qualitative at this time**			
Sustainability	**Greenhouse Gas & Emissions Cost Reductions**	$1,642,439	$670,864	$1,089,589
Safety	**Accident Reduction**	$368,635,273	$141,231,927	$237,808,961
	Total Benefits	$ 1,086,815,944	$ 401,223,419	$ 689,249,758
Costs				
	Capital Costs	$111,609,505	$44,607,834	$63,454,217
	O&M Costs	$122,293,395	$87,193,500	$105,491,357
	Total Costs	$233,902,900	$131,801,335	$168,945,574
Benefits - Costs		$852,913,043	$269,422,085	$520,304,184

The operation and maintenance (O&M) costs of $122.29 Million in undiscounted 2015$ ($87.19 Million NPV at 7% discount and $105.49 Million NPV at a 3% discount rate) is significant and driven by the additional $5.1 million annual cost to operate the US 29 BRT service. Other significant annual expenses include the maintenance of way at $546.69 Thousand per year, fare equipment at $127.8 and TSP systems (vehicles, roadside and central) at $23 Thousand per year. The additional costs for the service operations are likely to be higher than they actually would be, since the concomitant savings from the service reductions of parallel service on the Express Z line routes in the corridor were not included (they are operated by the Washington Area Metropolitan Transit Authority and could not be used to offset Montgomery County costs). While the specific reduction in parallel service has not been calculated at this time, benefits can be realized by assuming reductions in parallel route service of up to 10% per route since the ridership estimation and forecasts predicted a noticeable shift in existing riders to the new US 29 service.

After the remaining life at the end of the 21 year analysis period of all capital cost items is valued and subtracted this results in a total cost over the 21 years of $233.91 Million in undiscounted 2015$ ($121.80 Million NPV at 7% discount and $168.94 Million NPV at a 3% discount rate).

The benefits that were quantified and valued for the cost-benefit analysis include those for Economic Competiveness (travel time savings and user cost savings), Sustainability (reduction in emissions), and Safety (reduction in accidents). The benefits are the result of the improved transit travel times along the corridor, the institution of service in both directions throughout the day, and a reduction in wait times due to the more frequent service. On an average weekday, these led to 3,950 new riders shifting from autos in 2020 and approximately 13,000 boardings (the difference is due to existing riders changing to the new service throughout the day), In 2040 this grows to 5,700 new riders and 20,000 boardings.

Consequently, the most significant benefits are shown to be from user travel time savings of of $605.40 Million in undiscounted 2015$ ($218.16 Million NPV at 7% and $379.85 Million NPV at 3%). These benefits are conservative based upon the average time on the US 29 service and actual travel times. They would be higher if the travel forecast door to door times accounting for the full trip, or the perceived times accounting for the additional inconvenience that travelers attribute to waiting or transferring were used.

Travelers that switch from automobile to transit also can receive benefits due to reduced out of pocket costs of driving a car and parking versus the transit fare that they pay for their new transit trip. These changes in user costs result in $111.14 Million in undiscounted 2015$ ($41.16 Million NPV at 7% and $70.56 Million NPV at 3%).

The air quality and safety benefits from reduced auto travel on the roads within the region and primarily along the corridor are also quantified for the cost-benefit analysis. The value of the air quality savings is $1,642 Thousand in undiscounted 2015$ ($670 Thousand NPV at 7% and $1,089 Thousand at 3%). This will be higher increase due to service reductions in the parallel Z line service. Last are the safety benefits due to the reduction in auto travel. These are mostly due to injury only accidents and sum to $368.63 Thousand in undiscounted 2015$ ($141.23 Thousand NPV at 7% and $237.81 Thousand at 3%).

Overall this results in a positive net benefit – costs over the 21 year life of the project: $852.91 Million in undiscounted 2015$ ($269.42 Million NPV at 7% and $520.30 Million NPV at 3%).

2 Methodologies and Assumptions

This section describes the basic methodologies and assumptions that were used to develop the inputs and carry out Benefit-Cost Analysis. Throughout, general best practices in conducting economic assessments were used (see, 1, 13, 16, 17) and will not be discussed here.

2.1 Travel Demand Analysis Model

This section summarizes the methods used to forecast the change is system usage due to the US 29 BRT Build alternative (transit ridership, transit boardings, auto vehicles miles traveled, etc. between the Nobuild and the Build US 29 BRT Alternative, and how these change over time). The travel demand analysis model that was developed and calibrated for the Montgomery County US 29 BRT Corridor System Planning Study (see reference 6 for a full description) was chosen as a base model for the TIGER Grant analysis. It was based on the adopted regional travel forecasting model, MWCOG V 2.3.57 Regional Travel Demand Model with the 2014 CLRP networks and Round 8.3 Cooperative Land Use Forecasts (8, 10, 12). The regional model was last updated and adopted with the constrained long ranged plan networks and demographics in October 2014. It is a traditional A trip-based, "four-step" travel model utilizing 4 feedback iterations with additional features including estimation of motorized and non-motorized trips, time-of-day modeling, and incorporation of detailed transit schedules from General Transit Feed Specification (GTFS) data. It was calibrated to the most recent transit ridership and other data in 2012 (9), and validated to the 2010 U.S. Census data in 2013 (11). (see http://www.mwcog.org/transportation/activities/models/current.asp for more). For the US 29 BRT Corridor System Planning Study (ongoing) carried out in coordination with Montgomery County, and the Maryland State Highway and Maryland Transit Administrations, additional Land Use reflecting the recently adopted White Oak Science Gateway Master Plan was incorporated in the land use forecasts along with additional network detail. This model was validated to 2014/2015 conditions and a Nobuild 2040 land use and travel forecast scenario developed.

The US 29 BRT Corridor, study area, and Traffic Analysis Zones (TAZs) used is shown in Figure 1 (6). The 2014/2015 to 2040 Household and Employment Growth input into the models is shown in Figure 2 and Figure 3 (6).

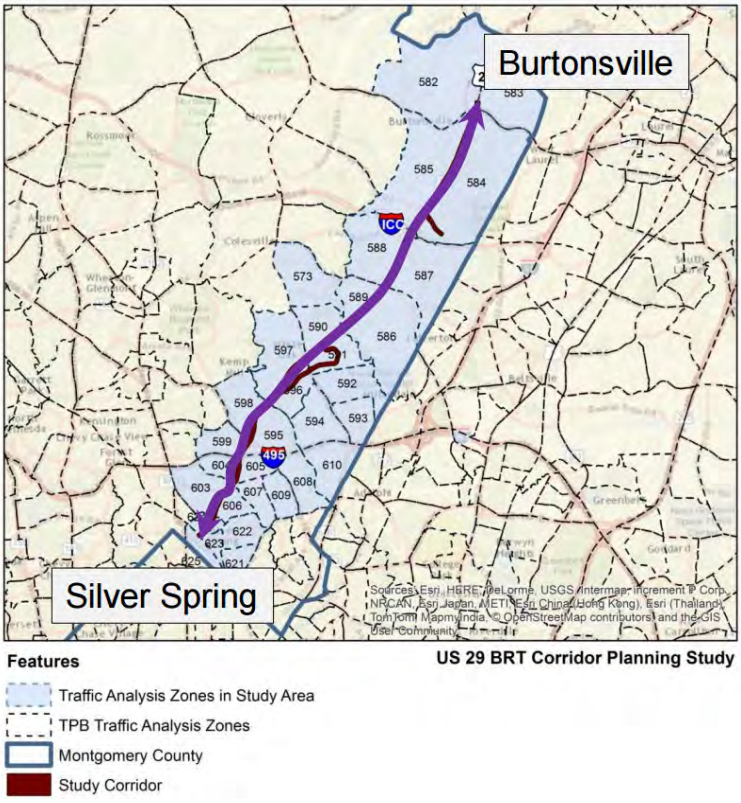


Figure 1 US 29 BRT Corridor and Traffic Analysis Zones (TAZs)

Household Growth 2014/2015 to 2040

- 52,100 Households in 2014
- 61,000 Households in 2040
  (17% increase)

Where do these numbers come from?

MWCOG Round 8.3, with update from Montgomery County, which provides the future forecasts of both households and employment through the Parks & Planning office.
(http://www.montgomeryplanning.org/)

Source: Cambridge Systematics, based on MWCOG Round 8.3 and Montgomery County

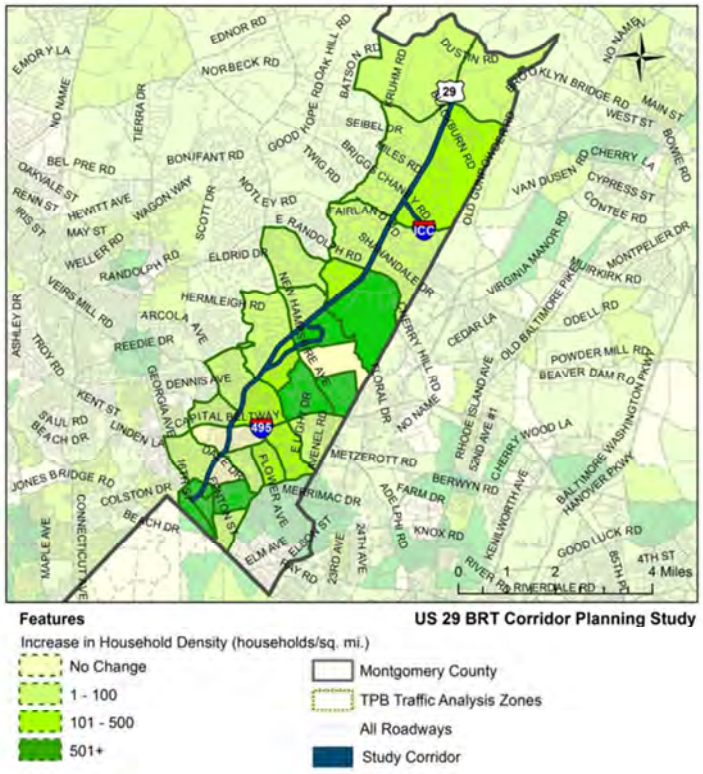


Figure 2 Household Growth 2014/2015 to 2040

Employment Growth 2014/2015 to 2040

- 2014 Employment 67,400
- 2040 Employment 120,000
  (78% increase)

Where do these numbers come from?

MWCOG Round 8.3, with update from Montgomery County, which provides the future forecasts of both households and employment through the Parks & Planning office.
(http://www.montgomeryplanning.org/)

Source: Cambridge Systematics, based on MWCOG Round 8.3 and Montgomery County

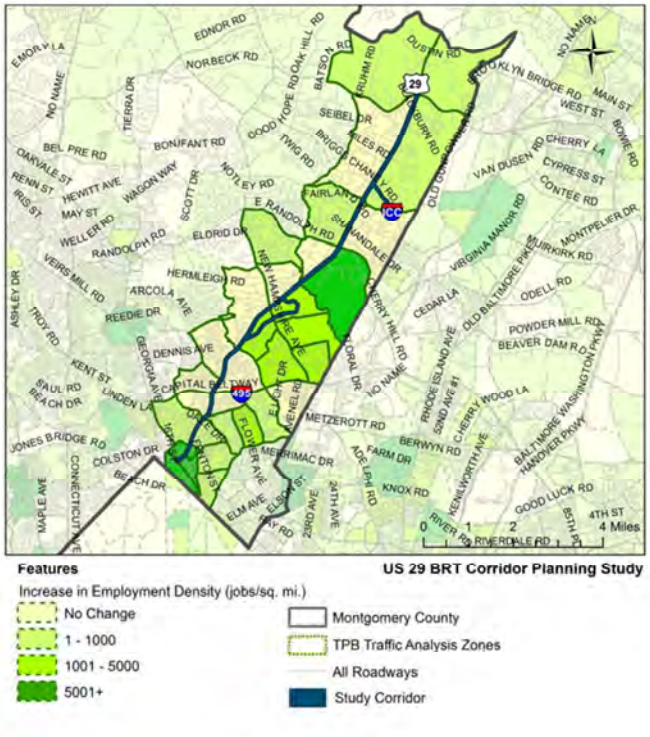


Figure 3 2014/2015 Employment Growth

For this analysis a pivot point approach was chosen for carrying out the forecasts. In this approach, the trip generation and trip distribution (person trips) from the baseline regional model runs remain fixed and the last iteration skims (highway and transit), mode choice, and assignments (highway and transit) are rerun with the new transit inputs. This approach was warranted because it is unlikely that a single new transit line should impact regional trip productions and overall travel patterns, and using the person trip distribution from a Nobuild alternative is recommended by the FTA for transit alternative analyses. The results of the travel demand analysis are shown in Table 3 (see the Travel Demand" tab in the accompanying pdf file). The change was distributed by year from 2015 to 2040 using a straight line allocation (see the Travel NVP TAB rows 56-83)

Table 3 Summary of Travel Demand Results

			Regional Linked Transit Trips	US 29 BRT Boardings	Veh Trips	VMT	VMT/Trip	Ave Spd	Auto		
	Year								VHT	Occ	APHT
Model	2015	No Build	1159626		16681291	165465035	9.92	32.28	5126358	1.41	7228165
		US 29	1163147	11612	16,678,451	165440731	9.92	32.28	5124491	1.41	7225532
		Change	3521		-2840	-24304			-1867		-2632
Model	2040	No Build	1583928		20452069	207777313	10.16	27.59	7531933	1.43	10770664
		US 29	1589604	19942	20447914	207742726	10.16	27.59	7528724	1.43	10766075
		Change	5676		-4155	-34587			-3209		-4589
% change	2015-2040	Nobuild	36.59%		22.60%	25.57%	0.02	-0.15	0.47		0.49
% change	2015-2040	BRT	36.66%	71.74%	22.60%	25.57%	0.02	-0.15	0.47		0.49

Source: US 29 BRT Study Model (MWCOG V 2.3.57 Regional Travel Demand Model 2014 CLRP and Round 8.3 Cooperative Forecasts with White Oak Science Gateway Land Use) pivot analyses.
Trip Generation and Trip Distribution Fixed
Final iteration

2.2 Alternatives (Nobuild and US 29 BRT)

Key to any economic analysis is the careful definition of the Nobuild and US 29 BRT Build service to capture all of the potential impacts and costs that may be caused by a project's implementation. If too narrow a corridor or system is defined then impacts or costs may be overlooked. Consequently, the following was assumed for the NoBuild and Build (US 29 BRT) service:

- Nobuild Alternatives (2014/2015 and 2040):
  - MWCOG 2014 CLRP system plus US 29 BRT Corridor current and 2040 Nobuild network changes
  - Regional Round 8.3 cooperative land use forecasts with White Oak Science Gateway Master Plan growth in the White Oak Area.
  - Current transit service for 2014/2015 and 2040. All inputs and outputs prorated for the analysis of the years of operation (2020-2040).
  - Current Transit Service schedule run times (degraded in model for future years by forecast congestion factor) (10).
- Build US 29 BRT Alternative.
  - The 2014/2015 and 2040 Nobuild transit service as background service with the following changes (see reference 1 for service configuration details).
  - 7.5 minute peak and 10 minute off peak headways on the trunk portions of the ROW
  - Station Dwell at BRT Stops of 30 seconds (reflects off board fare payment, multi-door boarding, etc.)
  - Transit Signal Priority on all Vehicles with TSP at 15 signals along corridor. Travel time savings due to TSP in the peak are assumed to be 7.5% and for the off peak 5 seconds per intersection) (5).

- The following US 29 BRT Stations/Stops as shown in Figure 4:

Pattern 1	Pattern 2
Burtonsville PNR	--
--	Castle Terrace
--	Castle Ridge
--	Briggs Chaney PNR
Tech Rd	Tech Rd
Stewart Lane	--
White Oak TC	--
OakLeaf Dr.	--
Burnt Mills Ave	Burnt Mills Ave
University Blvd	University Blvd
Fenton St	Fenton St
Silver Spring TC	Silver Spring TC

- Modifications to current service as follows:
  - Remove WMATA Z11 and Z13 Express service to Briggs Chaney Park and Ride
  - Remove WMATA Z9/29 Express service to Burtonsville Park and Ride
  - Extend WMATA Z8 local service to cover area previously served by the Z11
  - Extend the WMATA Z6 local peak service to cover area previously served by the Z9/Z229
  - Create new feeder service from South Laurel to Burtonsville (previously Z9/Z29)
  - Extend the WMATA Express Service from FDA to the White Oak Transit Center
  - Add a White Oak Science Center circulator/Shuttle to and from the Tech Road BRT Station.
- Reflect recommended priority treatments shown in Figure 5 US 29 BRT ROW Treatments:
  - Bus on Shoulder = 20 mph above parallel Roadway. In 2015 ~ 45 mph
  - Mixed Use = Congested speeds. In 2015 varies from 15 to 25 mph
  - Reverse direction in mixed use

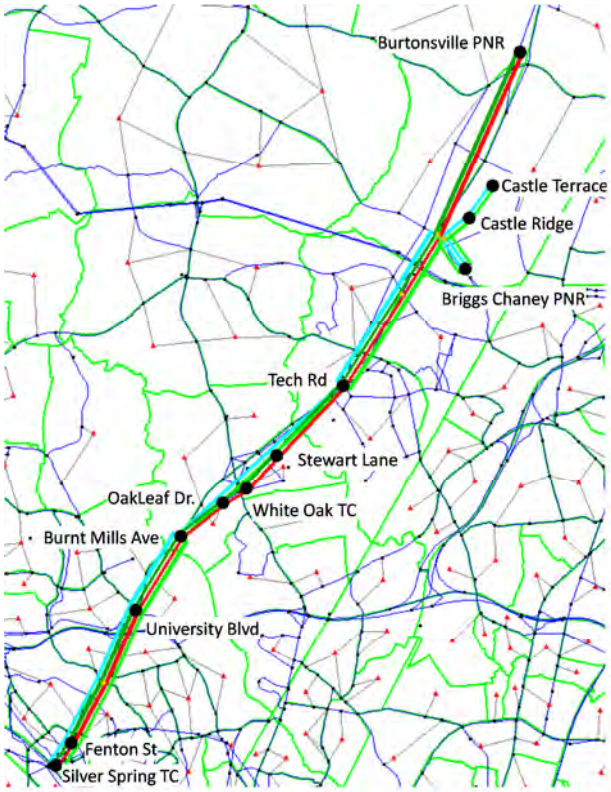


Figure 4 US 29 BRT Build Coded Routes

Figure 5 US 29 BRT ROW Treatments

2.3 General Assumptions

The general assumptions used throughout the Benefit-Cost Analysis are as follows:

- All input dollar values are expressed in 2015$ constant dollars

- The analysis period begins in 2017 with a 3 year start up (2017, 2018, 2019), and 21 years of operation (2020 – 2040).
- No construction or start up costs or significant user impacts are anticipated
- A constant 7 percent real discount rate is used throughout the analysis. Sensitivity analyses are also provided for both 3 and 0 percent real discount rates
- Standard formulas for discounting and converting life cycles of costs and benefits to Net Present Value are used throughout (17, 13)
  - Average Weekday Annualization factor of 290. This is in between the current ratio of average weekday to annual boardings for Montgomery Count Ride On of 302, and a focused peak period service provided only on weekdays (~290). New Starts Projects for the FTA often use values ranging from 280 to 300, with special justification requested for values approaching 300.

3 Benefits (Impacts)

The analyses and their major assumptions that were used to estimate the quantifiable benefits(impacts) from the US 29 BRT Service are described in this section. This includes User Time Savings, User Cost Savings, Greenhouse Gas and Emissions Cost Reductions, and Accident Cost Savings. All are documented in the accompanying Excel Workbook.

3.1 User Time Savings

The User Time Savings benefits are due to the improved transit travel times along the corridor (from mixed flow service along US 29 to a mixture of Bus on Shoulder at 20 mph above the parallel general traffic lanes, and segments of mixed flow), institution of 2 way service throughout the day, and a reduction in wait times caused by BRT headways of 7.5 minutes in the peak and 15 minutes in the offpeak periods initially improving to 6 minutes in the peak and 10 minutes in the off peak in 2040. On an average weekday, these lead to 3,950 new riders shifting from autos in 2020 and approximately 13,000 boardings (the difference is due to existing riders changing to the new service throughout the day), In 2040 this grows to 5,700 new riders and 20,000 boardings.

Time savings are calculated first by estimating difference in Auto Passenger Hours Traveled from the Vehicle Hours Traveled from the highway assignments between the Nobuild and US 29 BRT Build alternatives. Second, hours saved by those using the US 29 BRT Service are estimated from the change in wait time plus the time saved due to the faster speeds for those boarding the system (see the Demand Analysis and Travel Time NVP Tabs). These time savings are then multiplied by the average $13.45 /hour value of time in 2015 grown by 1.2 % a year for urban areas as recommended in the 2016 TIGER CBA Resource Guide (17).

The User Time Saving Calculations are calculated in the Travel Time NVP tab and shown in Table 4. The Net Present Value (NPV) of the savings across the 21 year analysis period is of $605.40 Million in undiscounted 2015$ ($218.16 Million NPV at 7% and $379.85 Million NPV at 3%). These benefits are conservative based upon the average time on the US 29 service and actual travel times. They would be higher if the travel forecast door to door times accounting for the full trip, or the perceived times accounting for the additional inconvenience that travelers attribute to waiting or transferring were used. The time savings from these alternative methods are also sown in the Travel Time NVP tab.

Table 4 User Value of Time NPV

	Year	Transit Time Savings (Hours)	Auto Time Savings (Hours)	Ave. Wk. day Time Savings (Hrs)	Annualization Factor	Annual Time Savings (Hrs)	VOT (All Trips) (2015$)/hr	Total 2015 $	NPV 7%	NPV 3%
	2015						$13.45			
	2016						$13.61			
Startup	**2017**						$13.77			
	2018						$13.94			
	2019						$14.11			
1	**2020**	1615	3024	4639	290	1345316	$14.28	$ 19,206,545	$ 13,694,001	$ 16,567,735
2	**2021**	1683	3102	4785	290	1387688	$14.45	$ 20,049,211	$ 13,359,636	$ 16,790,899
3	**2022**	1751	3180	4931	290	1430060	$14.62	$ 20,909,335	$ 13,021,283	$ 17,001,203
4	**2023**	1819	3259	5077	290	1472432	$14.80	$ 21,787,216	$ 12,680,358	$ 17,199,029
5	**2024**	1887	3337	5223	290	1514804	$14.97	$ 22,683,154	$ 12,338,133	$ 17,384,749
6	**2025**	1955	3415	5370	290	1557176	$15.15	$ 23,597,457	$ 11,995,751	$ 17,558,724
7	**2026**	2022	3493	5516	290	1599548	$15.34	$ 24,530,437	$ 11,654,234	$ 17,721,310
8	**2027**	2090	3572	5662	290	1641920	$15.52	$ 25,482,411	$ 11,314,495	$ 17,872,851
9	**2028**	2158	3650	5808	290	1684292	$15.71	$ 26,453,700	$ 10,977,345	$ 18,013,682
10	**2029**	2226	3728	5954	290	1726664	$15.89	$ 27,444,630	$ 10,643,501	$ 18,144,134
11	**2030**	2294	3806	6100	290	1769036	$16.09	$ 28,455,533	$ 10,313,595	$ 18,264,524
12	**2031**	2362	3885	6246	290	1811408	$16.28	$ 29,486,746	$ 9,988,181	$ 18,375,165
13	**2032**	2430	3963	6392	290	1853780	$16.47	$ 30,538,611	$ 9,667,742	$ 18,476,362
14	**2033**	2497	4041	6538	290	1896152	$16.67	$ 31,611,474	$ 9,352,694	$ 18,568,409
15	**2034**	2565	4119	6685	290	1938524	$16.87	$ 32,705,688	$ 9,043,395	$ 18,651,597
16	**2035**	2633	4198	6831	290	1980896	$17.07	$ 33,821,611	$ 8,740,147	$ 18,726,206
17	**2036**	2701	4276	6977	290	2023268	$17.28	$ 34,959,607	$ 8,443,203	$ 18,792,511
18	**2037**	2769	4354	7123	290	2065640	$17.49	$ 36,120,044	$ 8,152,770	$ 18,850,780
19	**2038**	2837	4432	7269	290	2108012	$17.70	$ 37,303,298	$ 7,869,014	$ 18,901,273
20	**2039**	2905	4511	7415	290	2150384	$17.91	$ 38,509,749	$ 7,592,067	$ 18,944,245
21	**2040**	2972	4589	7561	290	2192756	$18.12	$ 39,739,782	$ 7,322,022	$ 18,979,941
							Total	$ 605,396,242	$218,163,568	$ 379,785,330

3.2 User Cost Savings

Travelers that switch from automobile to transit also can receive benefits due to reduced out of pocket costs of driving a car and parking versus the transit fare that they pay for their new transit trip. These benefits are estimated from the new transit trips that use the US 29 BRT Service. This is provided from the change in Vehicle Miles Travelled from the travel demand model. The change in VMT is multiplied by the 2015 total cost of driving a car of $0.54 provided by the Internal Revenue Service (14). The potential cost of parking is also added assuming an average $5.00 in 2015$ and 25% pay for parking currently and 50% pay for parking in 2040. The increased percentage is due to the additional development and densification in the activity centers along the corridor (Silver Spring, White Oak) and the implementation of travel demand management strategies to meet reduction in drive alone vehicle trips. An average US 29 BRT fare is also incorporated.

The User Cost Savings are calculated in the User Cost NPV tab and also shown in Table 5. These changes in user costs result in $111.14 Million in undiscounted 2015$ ($41.16 Million NPV at 7% and $70.56 Million NPV at 3%).

Table 5 User Cost Savings NPV

	Year	Change in Transit Person Trips	Avg weekday change in Auto VMT	Avg weekday change in mile costs	Avg Weekday change in Parking Costs	Avg Weekday Fares Paid ($1.75/Trip)	Avg Weekday Cost Savings	Annual Auto Cost Savings	Total 2015 $	NPV 7%	NPV 3%
	2015										
	2016										
Startup	**2017**										
	2018										
	2019										
1	**2020**	3952	26361	$14,235	$6,359	$6,916	$13,678	$3,966,540	$ 3,966,540	$ 2,828,088	$ 3,421,572
2	**2021**	4038	26772	$14,457	$6,751	$7,067	$14,141	$4,100,756	$ 4,100,756	$ 2,732,507	$ 3,434,318
3	**2022**	4124	27183	$14,679	$7,142	$7,218	$14,603	$4,234,971	$ 4,234,971	$ 2,637,327	$ 3,443,419
4	**2023**	4211	27595	$14,901	$7,534	$7,369	$15,066	$4,369,187	$ 4,369,187	$ 2,542,907	$ 3,449,077
5	**2024**	4297	28006	$15,123	$7,925	$7,519	$15,529	$4,503,403	$ 4,503,403	$ 2,449,553	$ 3,451,483
6	**2025**	4383	28417	$15,345	$8,317	$7,670	$15,992	$4,637,619	$ 4,637,619	$ 2,357,530	$ 3,450,824
7	**2026**	4469	28829	$15,567	$8,708	$7,821	$16,455	$4,771,834	$ 4,771,834	$ 2,267,064	$ 3,447,275
8	**2027**	4555	29240	$15,790	$9,100	$7,972	$16,917	$4,906,050	$ 4,906,050	$ 2,178,345	$ 3,441,005
9	**2028**	4642	29651	$16,012	$9,491	$8,123	$17,380	$5,040,266	$ 5,040,266	$ 2,091,531	$ 3,432,176
10	**2029**	4728	30062	$16,234	$9,883	$8,274	$17,843	$5,174,481	$ 5,174,481	$ 2,006,753	$ 3,420,942
11	**2030**	4814	30474	$16,456	$10,275	$8,424	$18,306	$5,308,697	$ 5,308,697	$ 1,924,116	$ 3,407,451
12	**2031**	4900	30885	$16,678	$10,666	$8,575	$18,769	$5,442,913	$ 5,442,913	$ 1,843,703	$ 3,391,843
13	**2032**	4986	31296	$16,900	$11,058	$8,726	$19,231	$5,577,129	$ 5,577,129	$ 1,765,576	$ 3,374,254
14	**2033**	5073	31708	$17,122	$11,449	$8,877	$19,694	$5,711,344	$ 5,711,344	$ 1,689,781	$ 3,354,813
15	**2034**	5159	32119	$17,344	$11,841	$9,028	$20,157	$5,845,560	$ 5,845,560	$ 1,616,346	$ 3,333,641
16	**2035**	5245	32530	$17,566	$12,232	$9,179	$20,620	$5,979,776	$ 5,979,776	$ 1,545,288	$ 3,310,857
17	**2036**	5331	32942	$17,789	$12,624	$9,330	$21,083	$6,113,991	$ 6,113,991	$ 1,476,609	$ 3,286,572
18	**2037**	5417	33353	$18,011	$13,015	$9,480	$21,546	$6,248,207	$ 6,248,207	$ 1,410,303	$ 3,260,892
19	**2038**	5504	33764	$18,233	$13,407	$9,631	$22,008	$6,382,423	$ 6,382,423	$ 1,346,352	$ 3,233,921
20	**2039**	5590	34176	$18,455	$13,798	$9,782	$22,471	$6,516,638	$ 6,516,638	$ 1,284,733	$ 3,205,754
21	**2040**	5676	34587	$18,677	$13,015	$9,933	$21,759	$6,310,206	$ 6,310,206	$ 1,162,650	$ 3,013,789
				Total Auto Cost Per mile =		$0.540		**Total**	$ 111,141,990	$ 41,157,061	$ 70,565,878
				Annualization Factor =		290					
					Avg Fare =	$1.75					

3.3 Greenhouse Gas & Emissions Cost Reductions

The Greenhouse Gas & Emissions Cost Reductions are estimated from the change in auto vehicle miles traveled from the Nobuild and US 29 BRT Build alternative highway assignments, multiplied by the emissions rates recommended by the Federal Transit Administration for New Starts Analyses (3) and the valuation of emissions savings from the 2016 TIGER CBA Resource Guide (17).

The Greenhouse Gas & Emissions Cost Reductions are calculated in the Air Quality NPV tab and also shown in Table 6 Air Quality NPV. The value of the air quality savings is $1,642 Thousand in undiscounted 2015$ ($670 Thousand NPV at 7% and $1,089 Thousand at 3%).

Table 6 Air Quality NPV

	Year	Avg Weekday Savings in Auto VMT	Annual Savings in Auto VMT	Change in CO (Metric Tons)	Change in Nox (Metric Tons)	Change in VOC (Metric Tons)	Change in PM2.5 (Metric Tons)	Value of CO 2015$	Value of Nox 2015$	Value of VOC 2015$	Value of PM2.5 2015$	Total Value Emissions (2015$)	Total 2015 $	NPV 7%	NPV 3%
	2015														
	2016														
Startup	**2017**														
	2018														
	2019														
1	**2020**	26361	7644574	118.24627	5.87103	3.99047	0.07645	$ 5,439	$ 47,027	8108.63022	$ 28,011	$ 88,586	$ 88,586	$ 63,160	$ 76,415
2	**2021**	26772	7763857	118.06963	5.74215	3.93162	0.07764	$ 5,549	$ 45,995	7989.04591	$ 28,448	$ 87,981	$ 87,981	$ 58,625	$ 73,683
3	**2022**	27183	7883140	117.83086	5.60649	3.86904	0.07883	$ 5,538	$ 44,908	7861.89927	$ 28,885	$ 87,193	$ 87,193	$ 54,299	$ 70,896
4	**2023**	27595	8002422	117.52998	5.46405	3.80275	0.08002	$ 5,641	$ 43,767	7727.19028	$ 29,322	$ 86,458	$ 86,458	$ 50,319	$ 68,251
5	**2024**	28006	8121705	117.16697	5.31484	3.73274	0.08122	$ 5,858	$ 42,572	7584.91896	$ 29,759	$ 85,774	$ 85,774	$ 46,656	$ 65,739
6	**2025**	28417	8240988	116.74184	5.15886	3.65900	0.08241	$ 5,954	$ 41,322	7435.08530	$ 30,196	$ 84,908	$ 84,908	$ 43,163	$ 63,179
7	**2026**	28829	8360271	116.25458	4.99610	3.58154	0.08360	$ 6,045	$ 40,019	7277.68930	$ 30,633	$ 83,975	$ 83,975	$ 39,896	$ 60,665
8	**2027**	29240	8479554	115.70520	4.82656	3.50036	0.08480	$ 6,132	$ 38,661	7112.73096	$ 31,070	$ 82,976	$ 82,976	$ 36,842	$ 58,198
9	**2028**	29651	8598836	115.09371	4.65025	3.41546	0.08599	$ 6,215	$ 37,249	6940.21029	$ 31,507	$ 81,911	$ 81,911	$ 33,990	$ 55,778
10	**2029**	30062	8718119	114.42008	4.46716	3.32683	0.08718	$ 6,293	$ 35,782	6760.12727	$ 31,944	$ 80,780	$ 80,780	$ 31,328	$ 53,405
11	**2030**	30474	8837402	113.68434	4.27730	3.23449	0.08837	$ 6,253	$ 34,261	6572.48192	$ 32,381	$ 79,468	$ 79,468	$ 28,803	$ 51,007
12	**2031**	30885	8956685	112.88647	4.08067	3.13842	0.08957	$ 6,322	$ 32,686	6377.27422	$ 32,819	$ 78,204	$ 78,204	$ 26,490	$ 48,734
13	**2032**	31296	9075968	112.02648	3.87725	3.03863	0.09076	$ 6,498	$ 31,057	6174.50419	$ 33,256	$ 76,985	$ 76,985	$ 24,371	$ 46,577
14	**2033**	31708	9195250	111.10437	3.66707	2.93512	0.09195	$ 6,555	$ 29,373	5964.17182	$ 33,693	$ 75,585	$ 75,585	$ 22,363	$ 44,398
15	**2034**	32119	9314533	110.12014	3.45010	2.82789	0.09315	$ 6,607	$ 27,635	5746.27711	$ 34,130	$ 74,119	$ 74,119	$ 20,494	$ 42,269
16	**2035**	32530	9433816	109.07378	3.22637	2.71694	0.09434	$ 6,654	$ 25,843	5520.82006	$ 34,567	$ 72,584	$ 72,584	$ 18,757	$ 40,188
17	**2036**	32942	9553099	107.96530	2.99585	2.60226	0.09553	$ 6,694	$ 23,997	5287.80068	$ 35,004	$ 70,982	$ 70,982	$ 17,143	$ 38,157
18	**2037**	33353	9672382	106.79470	2.75856	2.48387	0.09672	$ 6,728	$ 22,096	5047.21895	$ 35,441	$ 69,312	$ 69,312	$ 15,645	$ 36,174
19	**2038**	33764	9791664	105.56198	2.51450	2.36175	0.09792	$ 6,756	$ 20,141	4799.07489	$ 35,878	$ 67,574	$ 67,574	$ 14,255	$ 34,239
20	**2039**	34176	9910947	104.26713	2.26366	2.23591	0.09911	$ 6,777	$ 18,132	4543.36849	$ 36,315	$ 65,768	$ 65,768	$ 12,966	$ 32,353
21	**2040**	33353	9672382	99.23864	1.93448	2.03120	0.09672	$ 6,252	$ 15,495	4127.39868	$ 35,441	$ 61,316	$ 61,316	$ 11,297	$ 29,285
												Total	$ 1,642,439	$ 670,864	$ 1,089,589

Note, that the air quality benefits assume that the US29 BRT service will use Clean Diesel or CNG vehicles with a zero net impact in emissions when the current service that is being reduced is taken into account.

3.4 Accident Reductions

The savings due to accident reductions are estimated based on the savings in auto vehicle mile traveled from Nobuild and US 29 BRT Build alternative highway assignments multiplied by the Montgomery County accident rates obtained from the Maryland State Highway Administration (**Error! Reference source not found.**). These produce estimated changes in Property Damage Only (PDO), Injury, and Fatal crashes which are then multiplied by the recommended values described in the 2016 TIGER BCA Resource Guide (17).

The Accident Reduction cost savings are calculated in the Safety NPV tab and shown in Table 7. These are mostly due to injury only accidents and sum to $368.63 Thousand in undiscounted 2015$ ($141.23 Thousand NPV at 7% and $237.81 Thousand at 3%).

Table 7 Accident Reduction NPV

	Year	Avg Weekday Savings in VMT	Annual Savings in VMT	Annual Change PDO Crashes	Annual Change Inj Crashes	Annual Change Fatal Crashes	Value PDO Crashes (2015$)	Value Inj Crashes (2014$)	Value Fatal Crashes (2015$)	Total Value Crashes (2015$)	**Total 2015 $**	**NPV 7%**	**NPV 3%**
	2015												
	2016												
Startup	**2017**												
	2018												
	2019												
1	**2020**	26361	7644574	6.06252	3.55442	0.03061	$ 25,450	$ 14,865,364	$ 293,888	$ 15,184,702	$ 15,184,702	$ 10,826,483	$ 13,098,457
2	**2021**	26772	7763857	6.15712	3.60988	0.03109	$ 25,848	$ 15,097,317	$ 298,473	$ 15,421,638	$ 15,421,638	$ 10,276,088	$ 12,915,379
3	**2022**	27183	7883140	6.25172	3.66534	0.03157	$ 26,245	$ 15,329,270	$ 303,059	$ 15,658,574	$ 15,658,574	$ 9,751,373	$ 12,731,853
4	**2023**	27595	8002422	6.34631	3.72081	0.03205	$ 26,642	$ 15,561,223	$ 307,645	$ 15,895,510	$ 15,895,510	$ 9,251,331	$ 12,548,062
5	**2024**	28006	8121705	6.44091	3.77627	0.03252	$ 27,039	$ 15,793,176	$ 312,230	$ 16,132,445	$ 16,132,445	$ 8,774,981	$ 12,364,176
6	**2025**	28417	8240988	6.53551	3.83173	0.03300	$ 27,436	$ 16,025,129	$ 316,816	$ 16,369,381	$ 16,369,381	$ 8,321,363	$ 12,180,357
7	**2026**	28829	8360271	6.63011	3.88719	0.03348	$ 27,833	$ 16,257,082	$ 321,402	$ 16,606,317	$ 16,606,317	$ 7,889,542	$ 11,996,757
8	**2027**	29240	8479554	6.72470	3.94265	0.03396	$ 28,230	$ 16,489,035	$ 325,987	$ 16,843,253	$ 16,843,253	$ 7,478,606	$ 11,813,519
9	**2028**	29651	8598836	6.81930	3.99811	0.03443	$ 28,627	$ 16,720,988	$ 330,573	$ 17,080,189	$ 17,080,189	$ 7,087,671	$ 11,630,778
10	**2029**	30062	8718119	6.91390	4.05358	0.03491	$ 29,025	$ 16,952,941	$ 335,159	$ 17,317,125	$ 17,317,125	$ 6,715,880	$ 11,448,660
11	**2030**	30474	8837402	7.00849	4.10904	0.03539	$ 29,422	$ 17,184,894	$ 339,745	$ 17,554,061	$ 17,554,061	$ 6,362,399	$ 11,267,284
12	**2031**	30885	8956685	7.10309	4.16450	0.03587	$ 29,819	$ 17,416,848	$ 344,330	$ 17,790,996	$ 17,790,996	$ 6,026,426	$ 11,086,761
13	**2032**	31296	9075968	7.19769	4.21996	0.03635	$ 30,216	$ 17,648,801	$ 348,916	$ 18,027,932	$ 18,027,932	$ 5,707,182	$ 10,907,196
14	**2033**	31708	9195250	7.29229	4.27542	0.03682	$ 30,613	$ 17,880,754	$ 353,502	$ 18,264,868	$ 18,264,868	$ 5,403,915	$ 10,728,685
15	**2034**	32119	9314533	7.38688	4.33088	0.03730	$ 31,010	$ 18,112,707	$ 358,087	$ 18,501,804	$ 18,501,804	$ 5,115,903	$ 10,551,320
16	**2035**	32530	9433816	7.48148	4.38635	0.03778	$ 31,407	$ 18,344,660	$ 362,673	$ 18,738,740	$ 18,738,740	$ 4,842,446	$ 10,375,186
17	**2036**	32942	9553099	7.57608	4.44181	0.03826	$ 31,804	$ 18,576,613	$ 367,259	$ 18,975,676	$ 18,975,676	$ 4,582,874	$ 10,200,361
18	**2037**	33353	9672382	7.67067	4.49727	0.03873	$ 32,201	$ 18,808,566	$ 371,844	$ 19,212,612	$ 19,212,612	$ 4,336,539	$ 10,026,918
19	**2038**	33764	9791664	7.76527	4.55273	0.03921	$ 32,599	$ 19,040,519	$ 376,430	$ 19,449,548	$ 19,449,548	$ 4,102,821	$ 9,854,925
20	**2039**	34176	9910947	7.85987	4.60819	0.03969	$ 32,996	$ 19,272,472	$ 381,016	$ 19,686,483	$ 19,686,483	$ 3,881,124	$ 9,684,445
21	**2037**	34587	10030230	7.95447	4.66366	0.04017	$ 33,393	$ 19,504,425	$ 385,602	$ 19,923,419	$ 19,923,419	$ 4,496,978	$ 10,397,883
			Annualization Factor =		290					**Total**	$ 368,635,273	$ 141,231,927	$ 237,808,961

4 Costs

The cost items used for the Benefit-Cost Analysis are provided in the Cost Items tab and shown in Table 8. All items were provided based upon current experience by the Montgomery County Department of Transportation and Ride On. Note, that the costs assume that the US 29 BRT service will be implemented with reductions in the Z 29 express current transit service routes that provide parallel service and some Ride On service into White Oak. Since these services are provided by WMATA and it would be difficult to offset the savings to Montgomery County the savings were not included in the analysis. This leads to a conservative overall benefits-costs assessment.

The economic life of each capital asset is also an important input for carrying out full life cycle costing in a BCA. The values shown in Table 8 are those recommended by the Federal Transit Administration for transit assets (1) and for technology components from the USDOT ITS Cost database (4).

Table 8 Cost Items

Element	Starting Year	Economic Life [a]	Units	Unit Cost (2015$) Capital	Unit Cost (2015$) Annual O&M	Total Cost (2015$) Capital	Total Cost (2015$) Annual O&M
Planning/Design							
Planning, Engineering, Design	2017	-	1	$ 6,500,000		$ 6,500,000	
Vehicles							
Bus - BRT Articulated (including CAD/AVL and Fare Colle	2020	12	14	$ 1,000,000	See US29 BRT Service	$ 14,000,000	See US29 BRT Service
TSP OnBoard Purchase & Install (w Engineering)	2020	10	14	$ 20,000	$ 357	$ 280,000	$ 5,000
Stops/Stations							
Stations and amenities (10 + SSTC)	2020	25	10			$ 10,933,900	$ 546,695
RTPI Signs	2020	5	17	$ 21,300	$ 1,000	$ 362,100	$ 17,000
Off Board Fare Collection Equipment	2020	25	16	$ 106,500	$ 7,988	$ 1,704,000	$ 127,800
Bike and Pedestrian Improvements	2020	25	Throughout			$ 2,000,000	$ 7,000
Roadside/Right of Way							
TSP Field Hardware & Install (w Engineering)	2020	10	15	$ 43,000	$ 1,200	$ 645,000	$ 18,000
Signing and Marking of BAT and HOV Lanes (lane miles)	2020	20	0	$ 250,000	$ 12,500	$ -	$ -
Signal changes for BAT Lane	2020	20	0	$ 500,000	$ 250	$ -	$ -
Bus on Shoulder Burtonsville to Tech Road (lane miles)	2020	20	0	$ 2,000,000	$ 100,000	$ -	$ -
Central Facilities & Systems							
TSP Traffic System Software	2020	20	1	$ 75,000	$ 2,000	$ 75,000	$ 2,000
Grant Overhead and Administration (3% of Total)	2017 to 2020	-	1	$ 1,500,000	-	$ 1,500,000	
US 29 BRT Service							
Marketing & Startup	2019	-	1	$ 1,250,000	-	$ 1,250,000	
Operations	2020	-	1		$ 5,100,000	$ -	$ 5,100,000
Subtotal						$ 39,250,000	
Other							
Contingency							
Total						$ 39,250,000	

a Economic Life:
ITS from the ITS Joint Program Office Cost Database(5/12/2015): http://www.itscosts.its.dot.gov/its/benecost.nsf/AdjustedUnitCosts
Transit Structures, Sidewalks, vehicles, from FTA New Starts/Small Starts Evaluation of Alternatives (5/12/2015): http://www.fta.dot.gov/12304_9718.html

4.1 Capital Costs

The life cycle capital costs are shown in the Capital Cost NPV tab and also shown in

Table 9. As shown each asset is replaced at the end of its economic life. For those that extend beyond the 21 year analysis period a residual capital value is estimated for the remaining years of useful life. Note, that this leads to a higher overall life cycle cost than the initial $39.25 million. The life cycle capital costs increase to $111.61 Million in undiscounted 2015$ ($44.61 Million NPV at 7% discount and $63.45 Million NPV at a 3% discount rate) over the 21 year life of the project. This is primarily due to the replacement of the different components at the end of their economic life (Vehicles at 12 years, TSP equipment at 10 years, Passenger information displays at 5 years, and other assets at 20 years). Note that the assets replaced at 20 years such as concrete bus pads are in service for only 1 year, before the end of the analysis, All remaining value for these and other assets that have not reached the end of their economic value is subtracted in the Residual Capital Recovery calculations.

Table 9 Capital Cost NPV

	Vehicles			Stops/Stations				Roadside ROW	Central	US 29 BRT Service					
Plan, Eng, Design	Vehicles	TSP	Concreate Pad	Stations	RTPI Signs	Off Board Fare Equip.	Bike & Pedestrian	TSP Field Equip	TSP Software	Grant Admin	Marketing & Startup	US 29 BRT O&M		Current Year =	2015
--	12	10	20	25	5	25	25	10	20	-	-	-	Total 2015 $	NPV 7%	NPV 3%
													$ -	$ -	$ -
$ 2,166,667										$ 375,000			$ 375,000	$ 327,540	$ 353,473
$ 2,166,667										$ 375,000			$ 375,000	$ 306,112	$ 343,178
$ 2,166,667	$ 14,000,000	$ 280,000	$10,933,900	$ 10,933,900	$ 362,100	$ 1,704,000	$ 2,000,000	$ 645,000	$ 75,000	$ 375,000	$ 625,000		$ 41,933,900	$ 31,991,172	$ 37,257,727
										$ 375,000	$ 625,000		$ 1,000,000	$ 712,986	$ 862,609
													$ -	$ -	$ -
													$ -	$ -	$ -
													$ -	$ -	$ -
													$ -	$ -	$ -
					$ 362,100								$ 362,100	$ 184,073	$ 269,436
													$ -	$ -	$ -
													$ -	$ -	$ -
													$ -	$ -	$ -
													$ -	$ -	$ -
		$ 280,000			$ 362,100			$ 645,000					$ 1,287,100	$ 466,504	$ 826,141
													$ -	$ -	$ -
	$ 14,000,000												$ 14,000,000	$ 4,432,041	$ 8,470,230
													$ -	$ -	$ -
													$ -	$ -	$ -
					$ 362,100								$ 362,100	$ 93,574	$ 200,486
													$ -	$ -	$ -
		$ 280,000	$10,933,900		$ 362,100			$ 645,000	$ 75,000				$ 12,296,000	$ 2,265,528	$ 5,872,638
	$ 4,625,693	$ 259,734	$10,667,190	$ 3,178,029	$ 299,134	$ 495,282	$ 581,317	$ 598,317	$ 73,171				$ 20,777,866	$ 3,828,305	
	$ 3,978,355	$ 255,575	$10,526,987	$ 2,334,005	$ 293,897	$ 363,744	$ 426,930	$ 588,736	$ 72,209				$ 18,840,439		$ 8,998,299
												Total	$ 111,609,505	$ 44,607,834	$ 63,454,217

4.2 Operations and Maintenance Costs

The life cycle operations and maintenance costs are provided in the O&M NPV tab and also in Table 10. The operation and maintenance (O&M) costs of $122.29 Million in undiscounted 2015$ ($87.19 Million NPV at 7% discount and $105.49 Million NPV at a 3% discount rate) is significant and driven by the additional $5.1 million annual cost to operate the US 29 BRT service. Other significant annual expenses include the maintenance of way at $546.69 Thousand per year, fare equipment at $127.8 and TSP systems (vehicles, roadside and central) at $23 Thousand per year. The additional costs for the service operations are likely to be high since the concomitant savings from the service reductions of parallel service on the Express Z line routes in the corridor were not included (they are operated by the Washington Area Metropolitan Transit Authority and could not be used to offset Montgomery County costs). While the specific reduction in parallel service has not been calculated at this time, benefits can be realized by assuming reductions in parallel route service of up to 10% per route since the ridership estimation and forecasts predicted a noticeable shift in existing riders to the new US 29 service.

Table 10 O&M Cost NPV

		Vehicles		Stops/Stations				Roadside ROW	Central			Current Year =	2015
	Year	Vehicles[a]	TSP	Stations	RTPI Signs	Off Board Fare Equip	Station Amenities	TSP Field Equip	TSP Software	US 29 BRT O&M	Total 2015 $	NPV 7%	NPV 3%
	2015												
	2016												
Startup	2017												
	2018												
	2019												
1	2020		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
2	2021		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
3	2022		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
4	2023		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
5	2024		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
6	2025		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
7	2026		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
8	2027		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
9	2028		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
10	2029		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
11	2030		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
12	2031		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
13	2032		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
14	2033		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
15	2034		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
16	2035		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
17	2036		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
18	2037		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
19	2038		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
20	2039		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
21	2040		$ 5,000	$ 546,695	$ 17,000	$ 127,800	$ 7,000	$ 18,000	$ 2,000	$ 5,100,000	$ 5,823,495	$ 4,152,071	$ 5,023,398
		a Vehicle maintenance included in the US 29 BRT Service O&M								Total	$122,293,395	$ 87,193,500	$105,491,357

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APPENDIX D

TECHNICAL MEMO ON TRAVEL TIME SAVINGS AND RELIABILITY

MCDOT
Montgomery County Department of Transportation

Sabra, Wang & Associates, Inc.
Engineers • Planners • Analysts

MEMORANDUM: US 29 Travel Time & OTP

To:	Joana Conklin, Montgomery County DOT
From:	James A. Bunch, SWAI
Subject:	US 29 Travel Time and On Time Performance Analysis
Date:	March 15, 2017

This memorandum documents the US 29 corridor travel time and on time performance (OTP) analysis carried out using Automatic Vehicle Location(AVL)/Automatic Passenger Counter (APC) data for October 3rd – October 7th 2016 provided by WMATA and Ride On. The AVL/APC provides data for every trip made during this first week in October, the trip start time, time stamps of the vehicles along the route, when the doors open and close, dwell times, and event types. The Ride On data also provides the boardings, alightings, and passengers on board each vehicle as they traverse their routes. This information is invaluable in understanding the reliability of travel times and how they vary by time of day, direction, etc. The analysis shows that the actual travel times of trips though sometimes shorter are often much longer than the scheduled times, and get longer during the peak periods as well as more unreliable (see the appendix for plots). BRT provides end to end (Burtonsville to Silver Spring) travel time savings of around 26% but this varies between specific Origin Destination pairs depending on the directness of current service, location, and other factors (as high as 60% between Burtonsville and White Oak to 0 to 2% from Four Corners to the Silver Spring Transit Center. BRT may also improve reliability.

1 On Time Performance

Montgomery County Ride On defines On Time Performance (OTP) as the percentage of vehicles arriving at a time point within 1 minute early and 4 minutes late of their scheduled arrival time (and departure time for the start of each trip). This captures not only whether the trip is on time based on its final destination, but also if it maintains its schedule as it travels along its route. WMATA uses for its performance measurement a different definition of OTP as the % of vehicles arriving with 2 minutes early and 7 minutes late. As described below the OTP was estimated for both the Ride On and WMATA Routes along the US 29 corridor using the Ride On definition of OTP. Daily OTP for Ride On routes varied between 54% and 75%, and Daily OTP for WMATA routes varied between 40% and 54%.

Table 1 WMATA US 29 Route On Time Performance

WMATA US 29 On Time* Performance	
Route	Weekday Oct 3-7, 2016
Z2	48%
Z6	47%
Z7	40%
Z8	48%
Z11	54%

* On time = time at timepoint is within 1 minute early and 4 minutes late

1.1 WMATA OTP

Weekday OTP for WMATA service within the US 29 Corridor was estimated using the Automated Vehicle Location (AVL) data for October 3rd – October 7th provided by WMATA on their PlanITMetro website: https://planitmetro.com/2016/11/16/data-download-metrobus-vehicle-location-data/

The data sets provide the AVL data for every bus trip that took place during the 5 day time period. Snapshots are recorded for "events" along each run which include the event type, time, location, direction

etc. One of the variables included in the data is Delta_Time defined as "The time difference, in seconds, between the actual and scheduled stop times". The formal definition of % On-Time Performance is the % of stops at Time Points that are "On Time" versus all stops at Time points. To be consistent with the thresholds used by Ride On a bus was considered to be on time if it was within 1 minute early and 4 minutes late when it departed the stop location. This translates to Delta Time being greater than -60 seconds and less than 240 seconds.

The results of the analysis are shown in Table 2. As shown the OTP varies from a low of 40% for the Z7 and a high of 54% for the Z11. This compares to the overall WMATA Bus OTP for 2015 (using the less stringent 2 minutes early to 7 minutes late criteria) of 77.7%. Upon further investigation we believe that one reason for the lower OTP is WMATA may set constant schedules within the peak periods that some specific trips will be behind and some ahead of schedule. For example using the WMATA trip planner a person leaving the Tech Road P&R lot at 8:00 am using the z7 route is scheduled to take 20 minutes (in-vehicle time) to reach the Silver Spring Transit Center. However, Google maps and our independent field measurement using GPS probe analysis show that the 6.4 mile trip typically take 22 – 50 minutes in a private car when leaving at 8 AM in the morning. Figure 1 illustrates the variance in actual bus travel times from Tech Road to the Silver Spring Transit Center and the fact that the southbound Z7 trips (green dots) actually have shorter travel times than 20 minutes earlier than 6:00 am but quickly increase from 7 to 9 am. Likewise, their travel times are longer than 20 minutes in the evening peak from 4 to 6 pm.

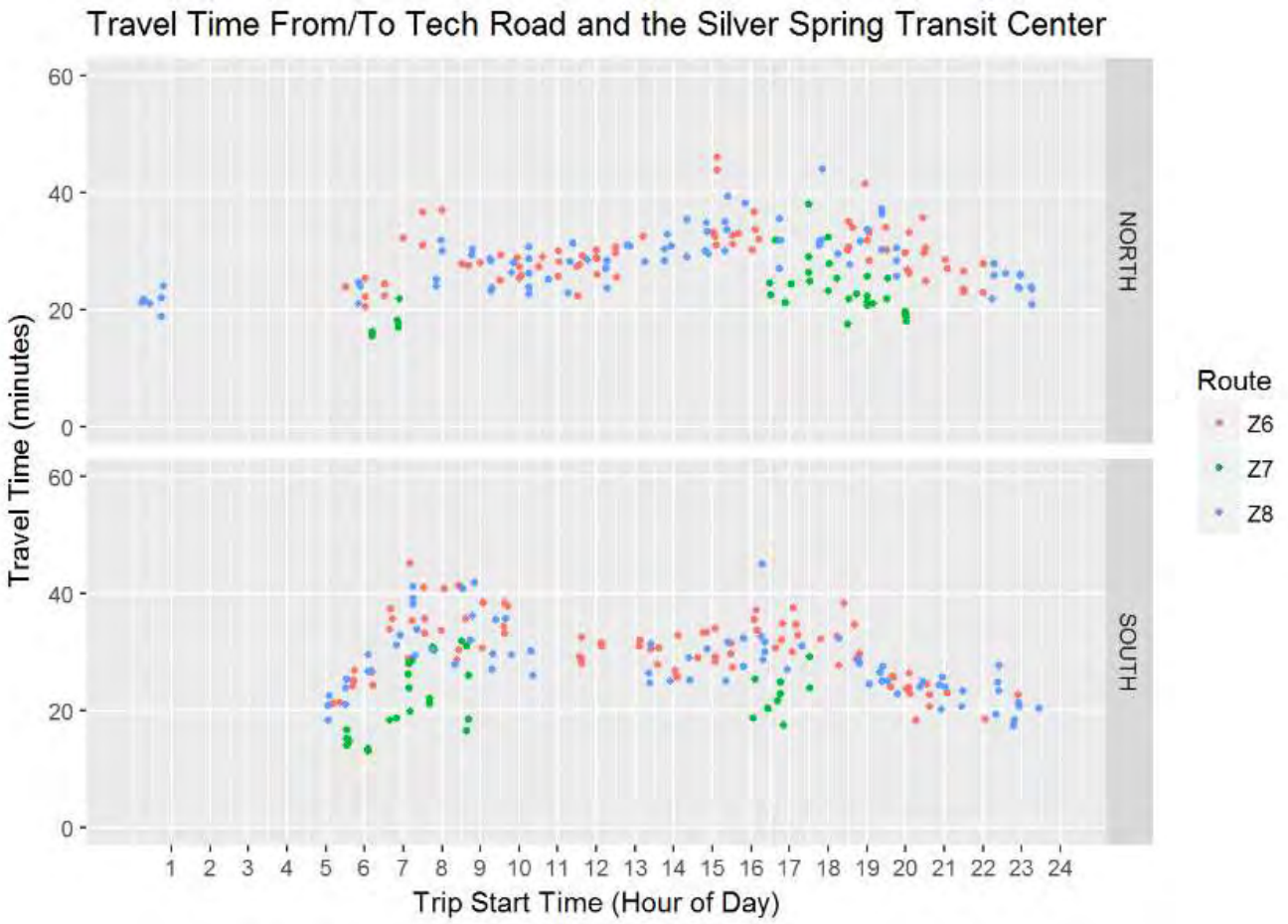


Figure 1 WMATA travel times from Tech Road to Silver Spring Transit Center

1.2 Ride On OTP

Ride On OTP was provided by the Ride On Automatic Vehicle Location (AVL) / Automatic Passenger Counter (APC) system reports run by Ride On staff in February 2017. Data was pulled from the AVL/APC databases for two time periods: October 3 – October 7th 2016 for consistency with the WMATA data, and January 30 – February 3 2017 to capture any recent performance trends and changes in service. The results are shown in Table 2. Ride On OTP for US 29 routes varies from 54% to 75% in October 2016 and 63% to 79% in February 2017. Ride On adjusts its schedules within each time period to reflect observed differences in congestion within the peak of the peak and this results in higher OTP percentages than observed for the WMATA routes. As can be seen the OTP for the February 2017 also improves, which may be due to a recent adjustment to how initial departure times for Ride On trips are monitored. However, even after tailoring to conditions, Ride On service within the US 29 corridor still does not meet the overall Ride On performance goal of 90% OTP due to the delays caused by auto congestion and the day to day variability that results.

Table 2 RIde On US 29 Route On Time Performance

RideOn US 29 On Time* Performance		
Route	Weekday Oct 3-7, 2016	Weekday Jan 30-Feb 3, 2017
8	57%	63%
9	58%	64%
12	69%	77%
13	64%	66%
14	56%	73%
16	56%	69%
17	61%	79%
20	54%	70%
21	67%	72%
22	75%	68%

* On time = time at timepoint is within 1 minute early and 4 minutes late

2 Travel Times and Travel Time Variability

The AVL/APC data from October 2017 was also used to analyze the AM Peak Travel Times and Travel Time Variability from key origins to key destinations within the US 29 Corridor. These were then compared with the BRT opening year travel times estimated as part of the US 29 TIGER Grant application.

The travel times for all trips that travel between each origin and destination pair were extracted from the October 3 to October 7 2016 Ride On and WMATA AVL/APC databases . For each Origin Destination pair the median, 10% and 90% percentile values were calculated. In order to capture the variance in travel times (this removes from the analysis the outliers that are either very slow or very slow and very fast trips). Table 3 and Figure 2 show the results of this analysis. They illustrate that the actual travel times that 80% of all trips are made within can vary by as much as 25 minutes (for Briggs Chaney to Silver Spring). Of course the shorter trips such as Four Corners to Silver Spring have much less variation. However, they may have very long trips as well (that were removed as outliers). The Appendix provides detailed plots of the travel times for each origin destination pair by time of day and route.

Table 3 US 29 Corridor Travel times (Observed Current Service versus BRT in minutes)

Current Service Travel Times from AVL/APC Data (Oct, 2016)				BRT	
Origin-Destination	Q10	Median	Q90	Time	Savings
Burtonsville to Silver Spring	34	42	48	31	11
Burtonsville to White Oak	34	40	46	16	24
Briggs Chaney to Silver Spring (Wmata)	27	34	52	28	6
Tech Road to Silver Spring	29	35	42	18	17
White Oak to Silver Spring (WMATA)	19	22	25	15	7
White Oak to Silver Spring (Ride On)	20	23	27	15	8
Four Corners to Silver Spring (WMATA)	7	9	12	9	0
Four Corners To Silver Spring (Ride On)	9	12	15	9	3

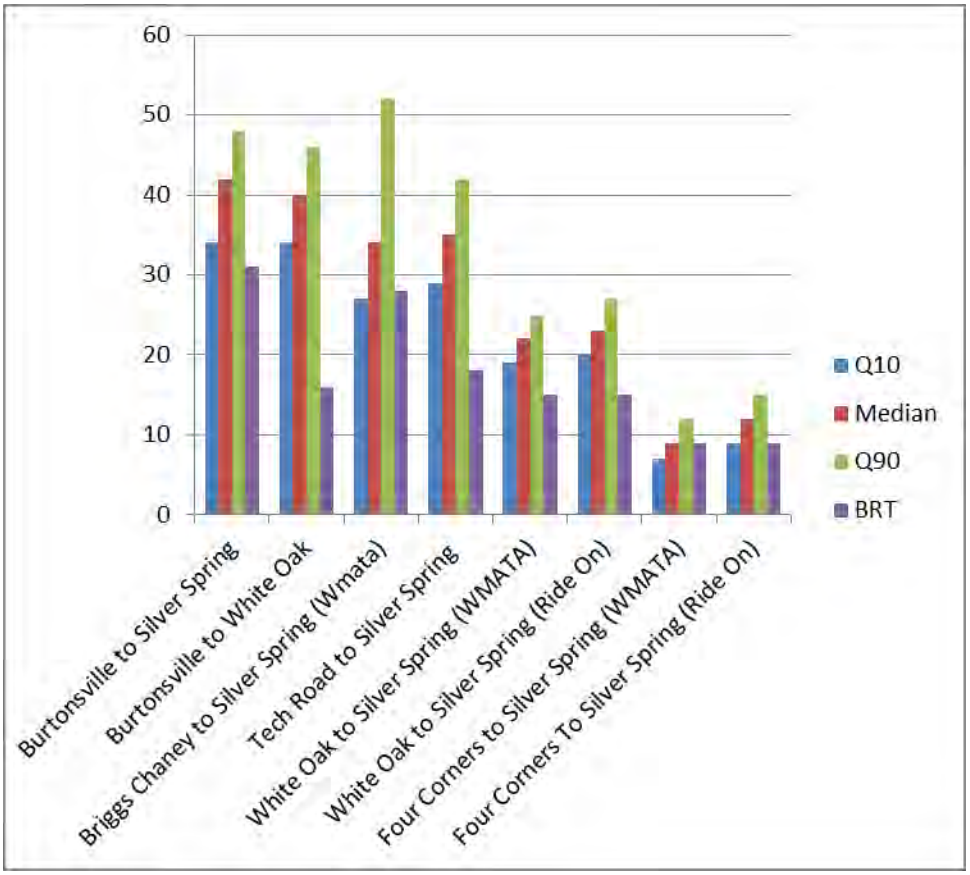


Figure 2 US 29 Corridor Travel times (Observed Current Service versus BRT)

Table 3 and Figure 2 also provide the BRT travel times for the opening year service estimated as part of the revised US 29 TIGER Grant Application (in December 2016 Montgomery County revised the US 29 TIGER Grant to change the managed lane service to mixed use, reduce the initial BRT headways to 15 minutes for each BRT service pattern or 7.5 minutes in the trunk portions, and maintain current service for the Ride On 21 and 22 routes). The BRT origin destination travel times were therefore based on the following assumptions[1]:

- Running way Assumptions
  - Shoulder Use North of 650
  - Mixed Traffic South of 650
  - Median Stations South of 650
  - Tech Road Station on East Side
- Performance Assumptions
  - Level Platforms
  - Off Board Fare Payment
  - Multiple Door Access
  - Transit Signal Priority (5 secs /intersection)
  - Dwell Time = 20 seconds
  - Speeds

[1] Used for analysis and modeling purposes. Station locations and other details will be finalized during project design

> Bus on Shoulder = 20 mph above parallel Roadway. In 2015 ~ 45 mph
> Mixed Use = Congested speeds. In 2015 varies from 15 to 25 mph
> Reverse direction in mixed use

As can be seen the BRT provides significant reductions in travel time when compared to the median values for current service ranging from 0 to 2 minutes for Four Corners to the Silver Spring Transit Center to over 10 minutes from Burtonsville to Silver Spring, and even more time savings to intermediate destinations such as Burtonsville to White Oak Transit Center. Note that this does not account for the anticipated improvement in reliability that BRT will offer and is an added benefit.

As an additional check, origin destination travel times were also calculated based upon schedules using the WMATA trip planner for trips starting at 8 am in the morning on typical weekdays. These are shown in Table 4. Note that the travel times from the schedule are typically shorter than the observed travel times from the AVL/APC data discussed above (particularly for the WMATA service). Also, this analysis could include transfers. As shown, some of the largest benefits may occur because the BRT is providing more direct service between intermediate points than is currently available. An example is the improved connectivity from Burtonsville to the White Oak Science Gateway (both Tech Road and the White Oak Transit Center). This is also true for the service BRT offers in the reverse peak direction and midday.

Table 4 US 29 Scheduled Current Service and BRT AM Peak Travel Times

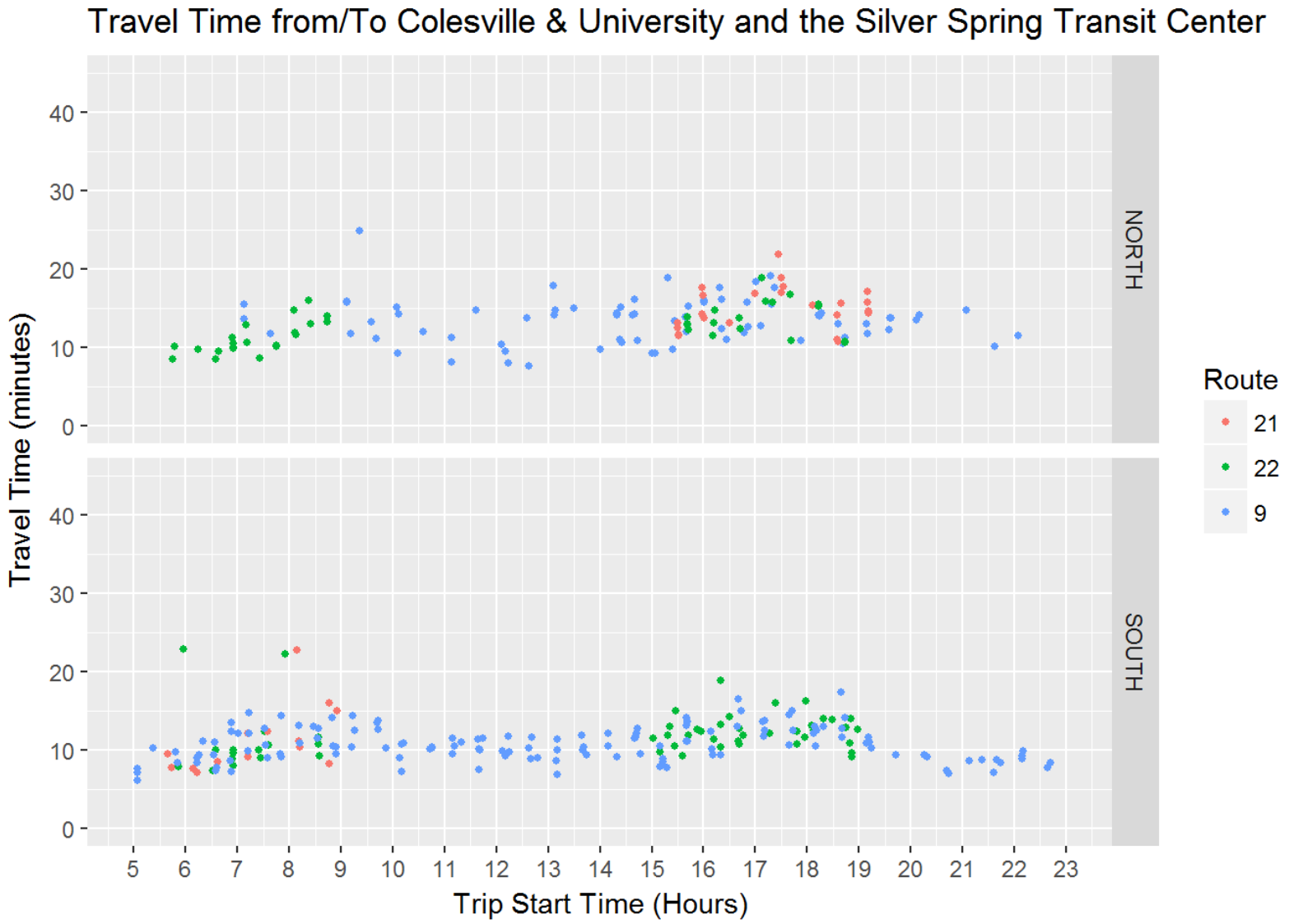
		Current Service*		US 29 BRT
From	**To**	Service	Time (min)	Time (min)
Burtonsville P&R	Stewart Lane & US 29	WMATA z7 then transfer to RO 10 or Z8 No Direct Ride On	32 to 40	13
	Four Corners	WMATA z11 No Direct Ride On	42	22
	SSTC	WMATA Z7 No Direct Ride On	36	31
Briggs Chaney P&R	Stewart Lane & US 29	WMATA z6	19	10
	Four Corners	WMATA z11 No Direct Ride On	21	24
	SSTC	WMATA z11	31	28
Tech Road Current Travel Times from existing P&R lot	Stewart Lane & US 29	Ride On 10	8	6
	Four Corners	WMATA z8	23	16
	SSTC	WMATA z7	20	18
Stewart Lane & US 29	Stewart Lane & US 29			
	Four Corners	WMATA z6 or z8	18	9
	SSTC	WMATA z6 or z8	28	18
White Oak Transit Center	Stewart Lane & US 29			
	Four Corners	WMATA z2,z6	9	7
	SSTC	Ride On 22 or WMATA z6,z8	18 to 20	15
University Boulevard & US 29	Stewart Lane & US 29			
	Four Corners			
	SSTC	Ride On 9, or WMATA z2,z6	9	9

* Current service may not be direct via US 29

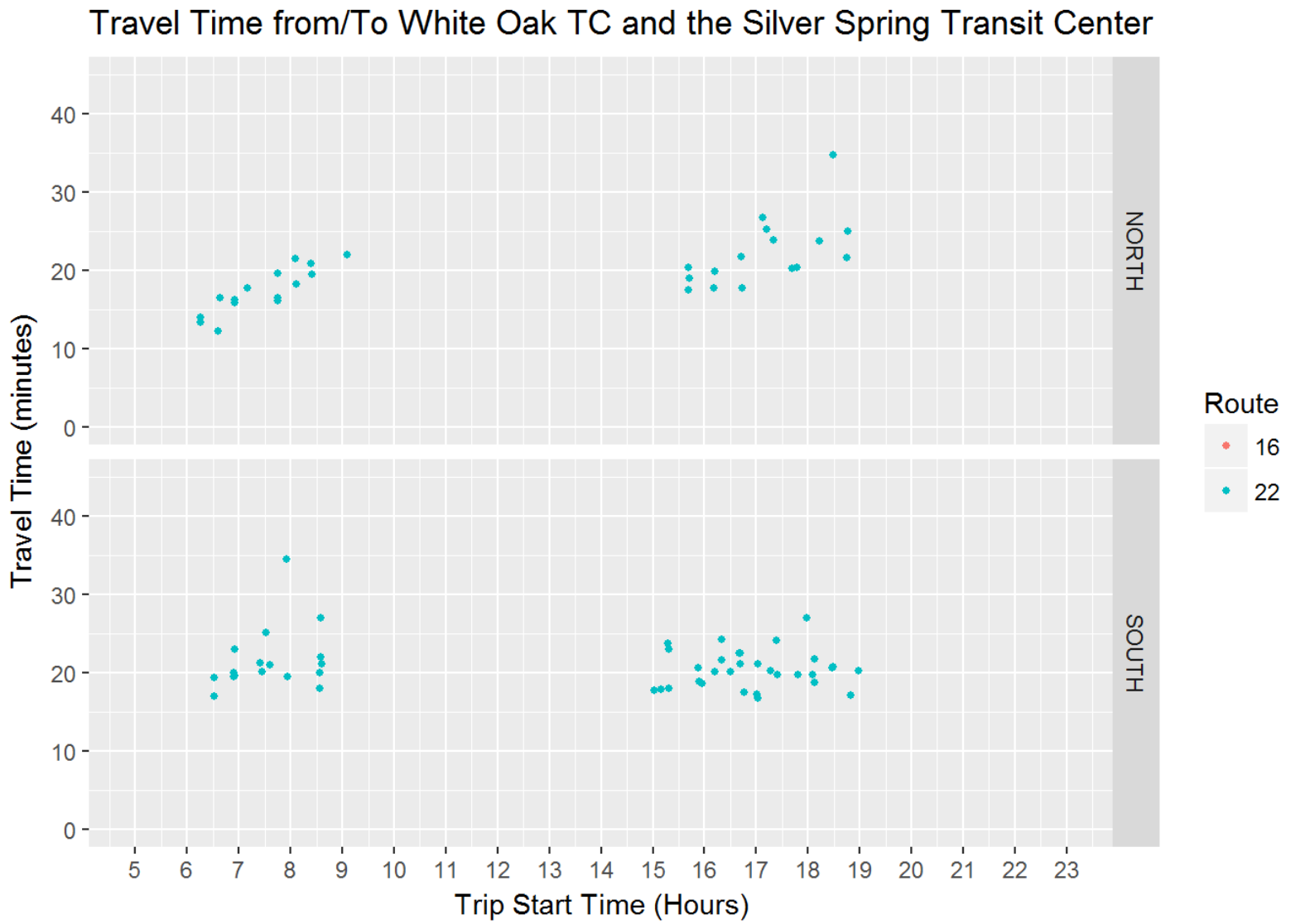
Travel times for the 2020 opening year BRT service are also being refined using a separate operations simulation analysis using VISSIM. Results of this analysis when it is complete will be documented in a separate technical memorandum.

Appendix
Origin To Destination Travel Time Scatter Plots

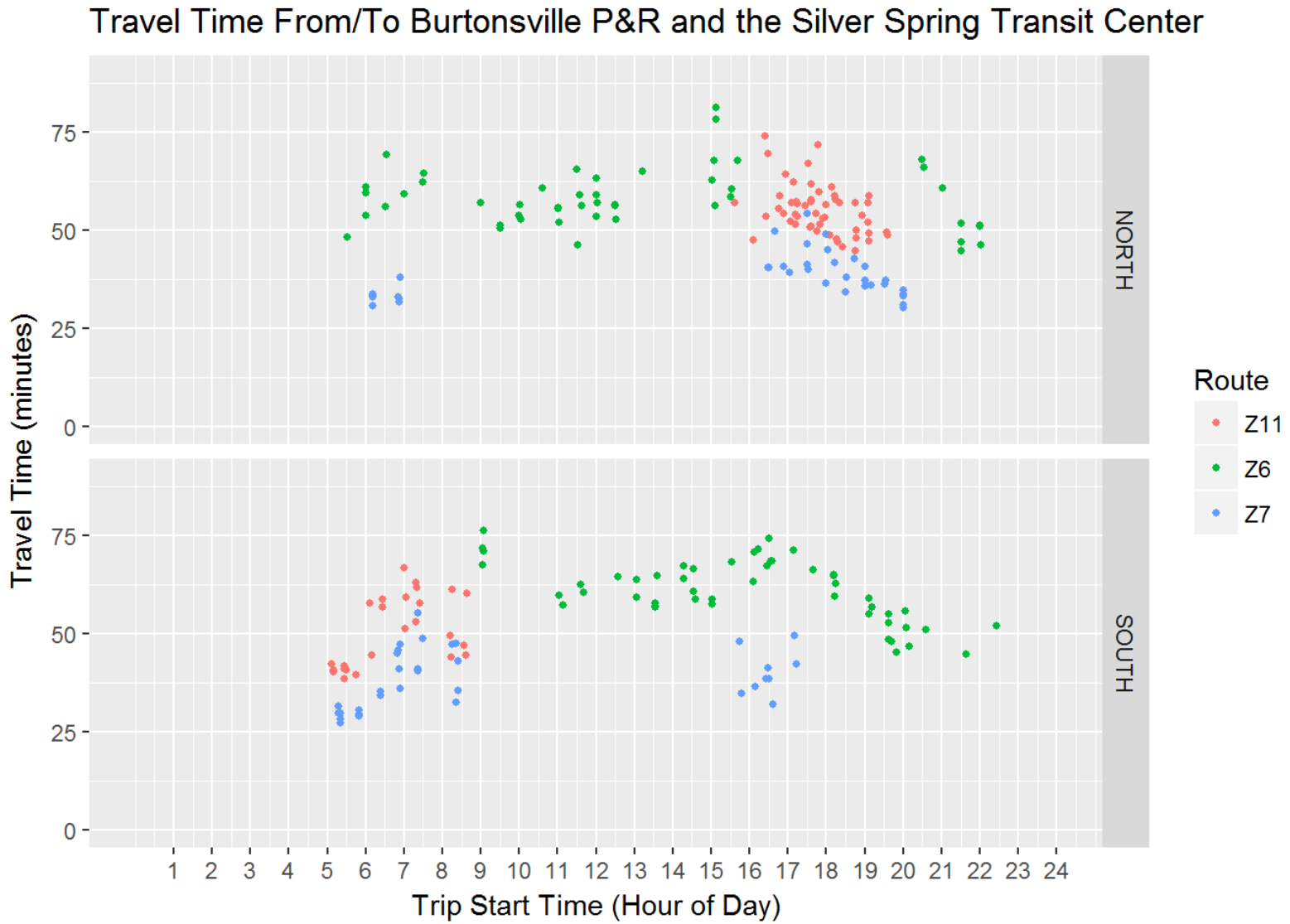
RIDE ON


Travel Time from/To Colesville & University and the Silver Spring Transit Center
Travel Time (minutes)
0
10
20
30
40
NORTH
SOUTH
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
Trip Start Time (Hours)
Route
21
22
9

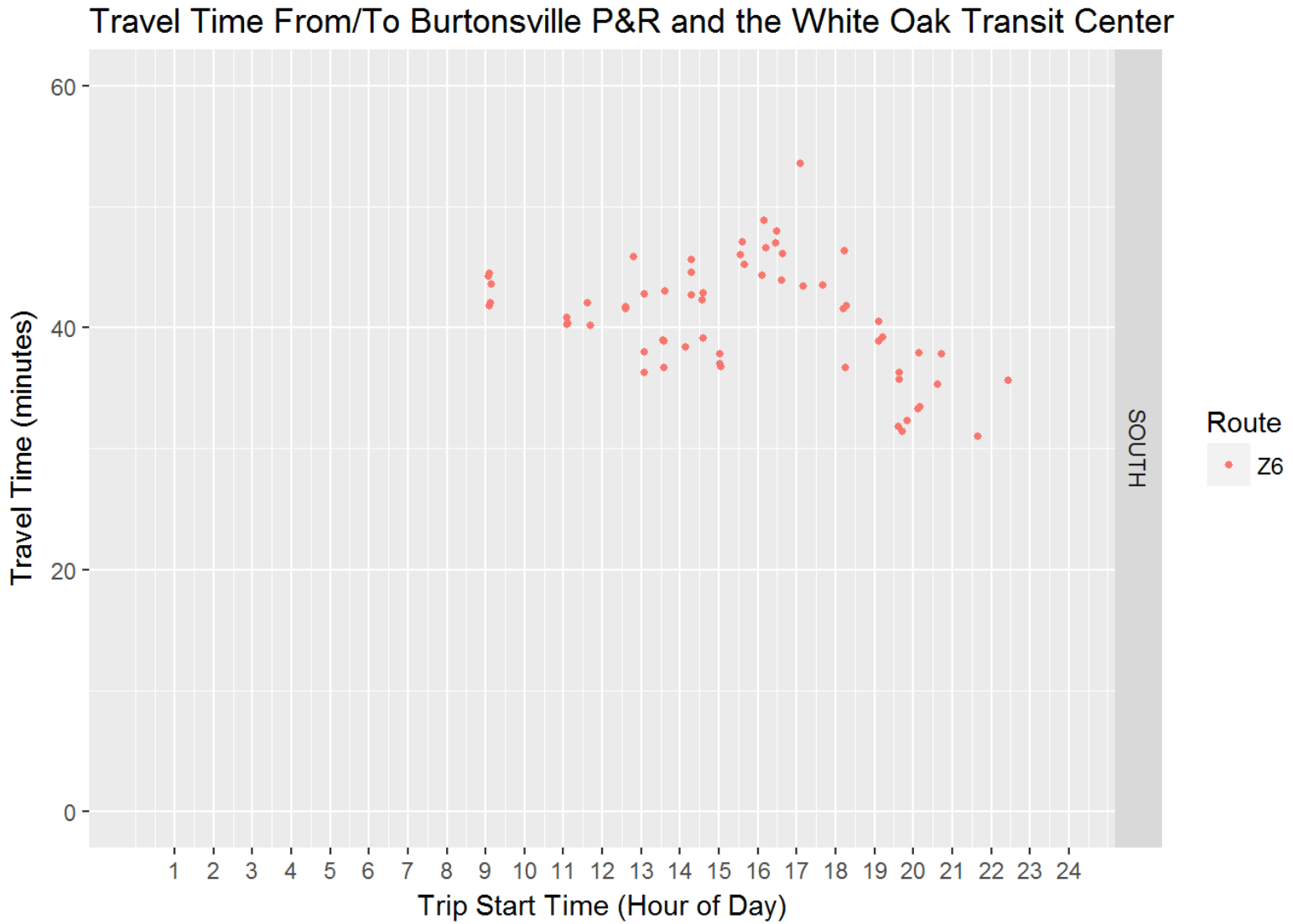
RIDE ON


Travel Time from/To White Oak TC and the Silver Spring Transit Center
Travel Time (minutes)
Trip Start Time (Hours)
NORTH
SOUTH
Route
16
22
0
10
20
30
40
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

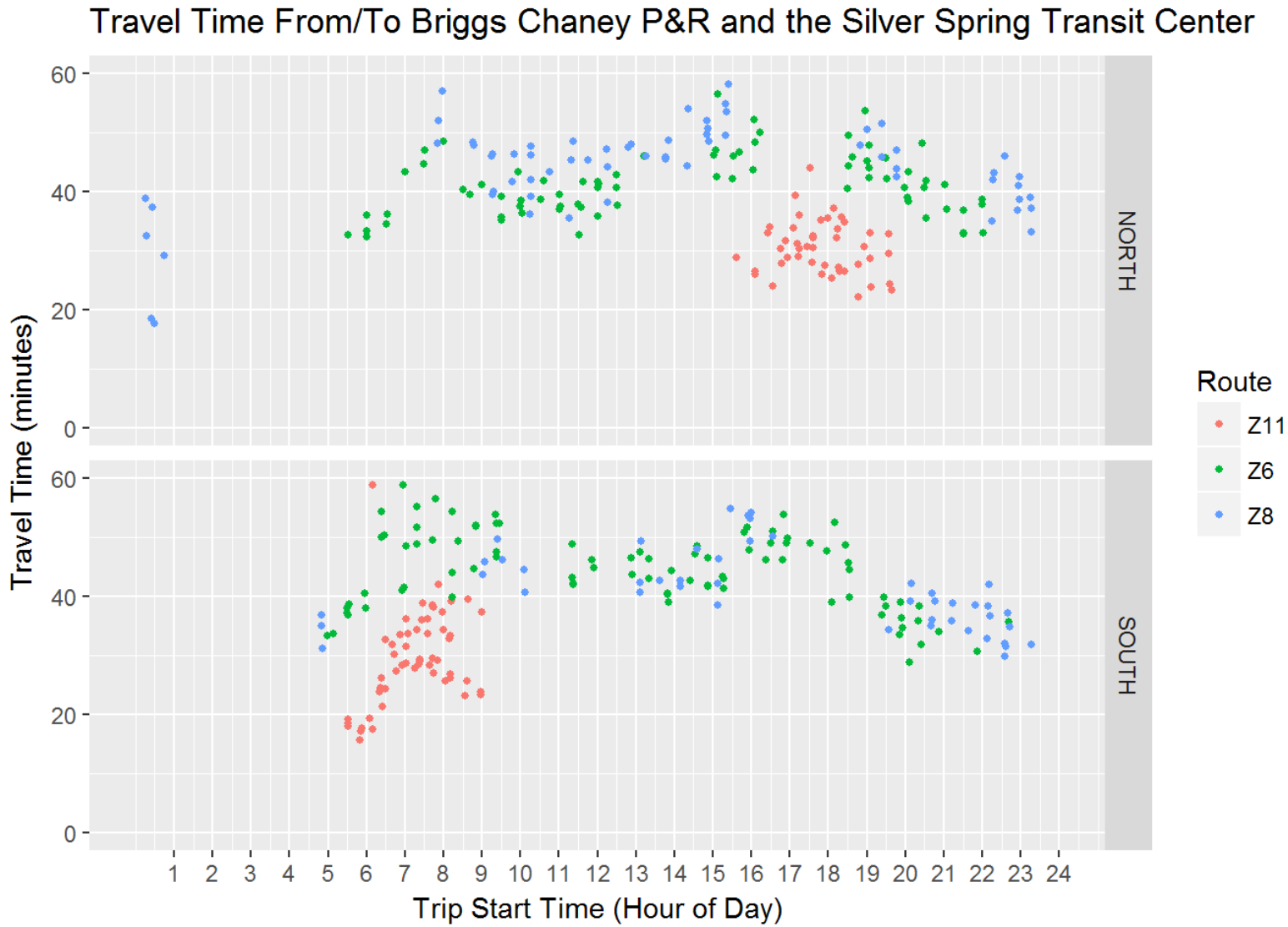
WMATA


Travel Time From/To Burtonsville P&R and the Silver Spring Transit Center
Travel Time (minutes)
0
25
50
75
NORTH
SOUTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Trip Start Time (Hour of Day)
Route
Z11
Z6
Z7

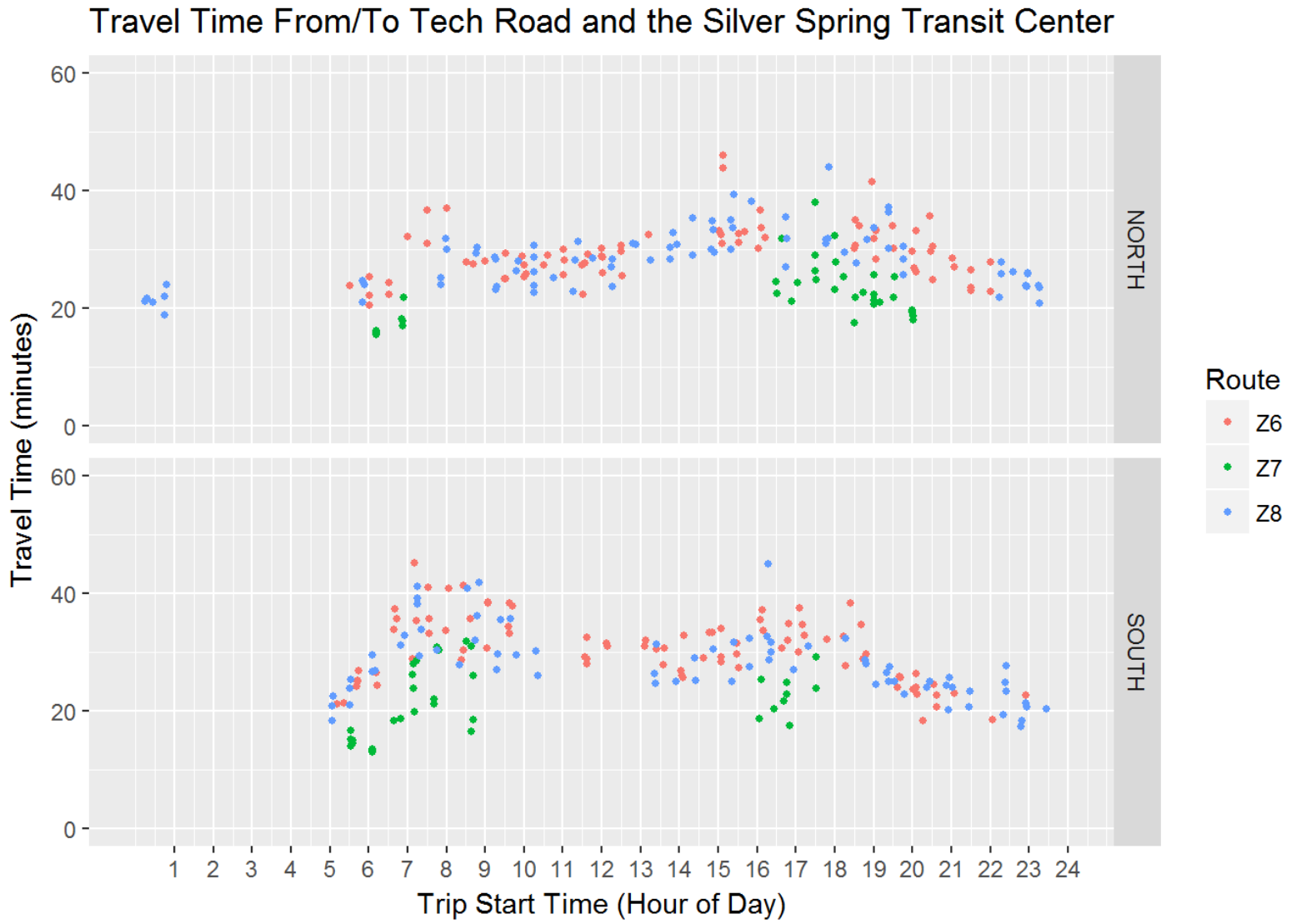
WMATA


Travel Time From/To Burtonsville P&R and the White Oak Transit Center
Travel Time (minutes)
60
40
20
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Trip Start Time (Hour of Day)
SOUTH
Route
Z6

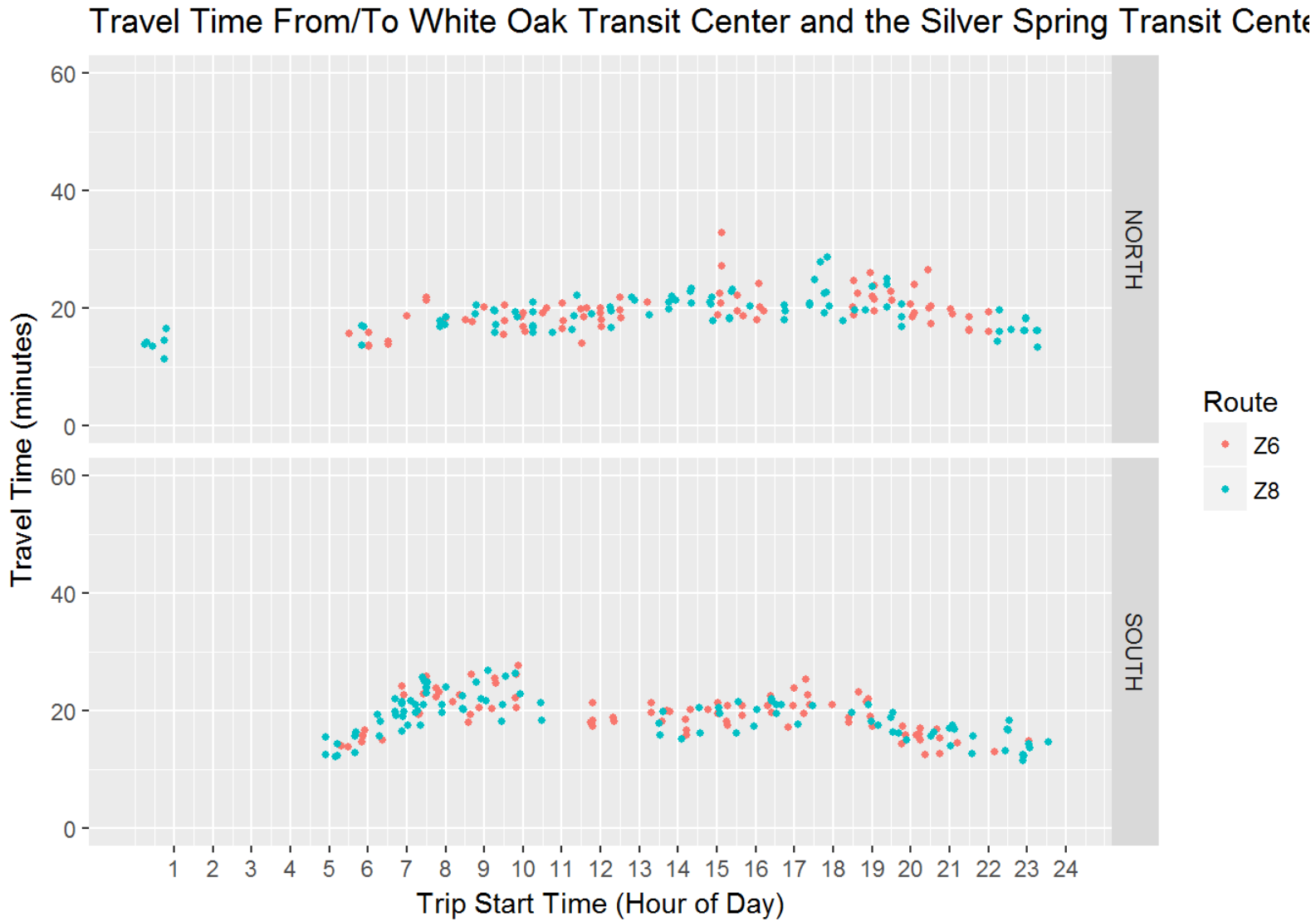
WMATA


Travel Time From/To Briggs Chaney P&R and the Silver Spring Transit Center
Travel Time (minutes)
60
40
20
0
NORTH
SOUTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Trip Start Time (Hour of Day)
Route
Z11
Z6
Z8

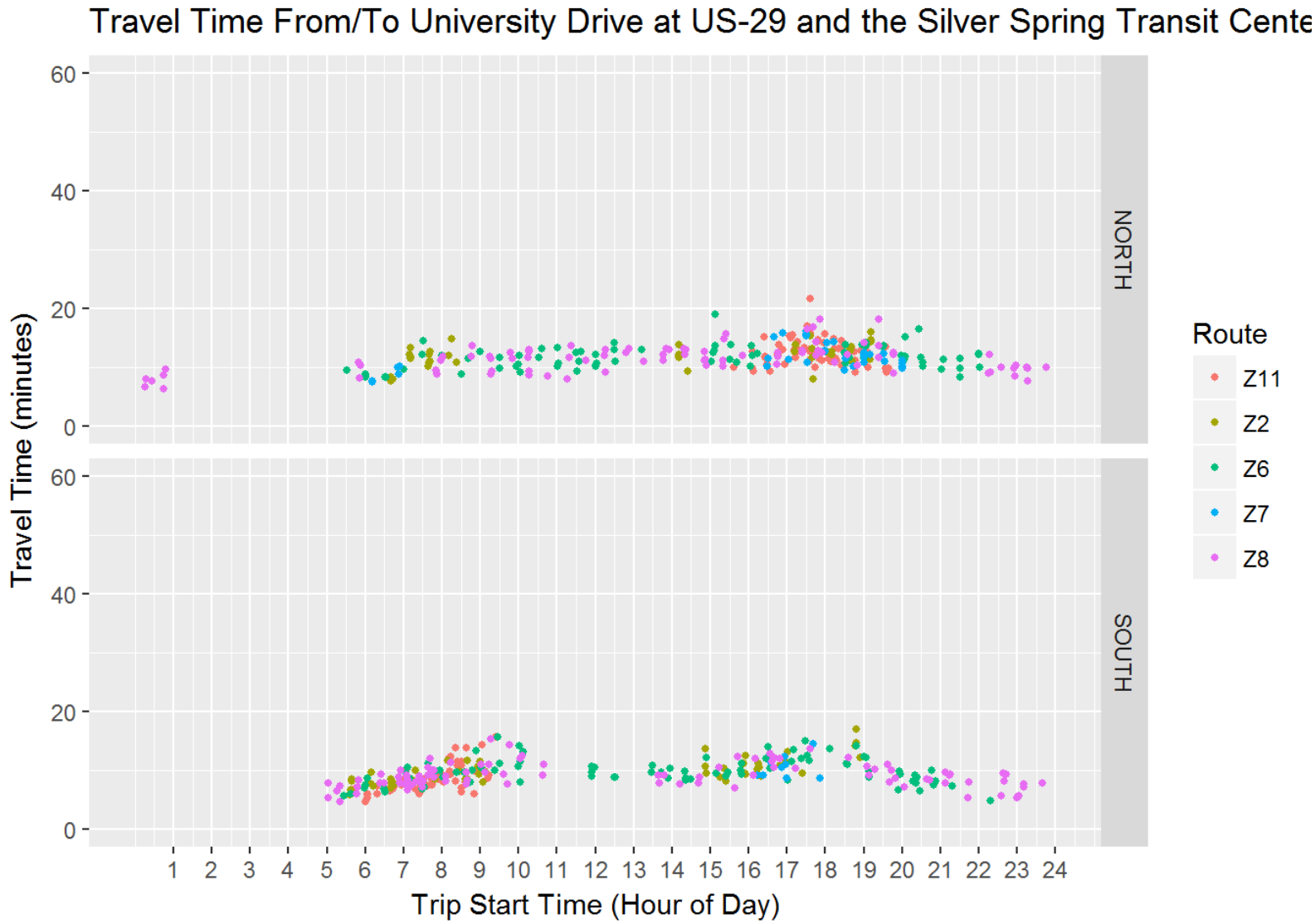
WMATA


Travel Time From/To Tech Road and the Silver Spring Transit Center
Travel Time (minutes)
60
40
20
0
NORTH
SOUTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Trip Start Time (Hour of Day)
Route
Z6
Z7
Z8

WMATA


Travel Time From/To White Oak Transit Center and the Silver Spring Transit Cente
Travel Time (minutes)
60
40
20
0
NORTH
SOUTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Trip Start Time (Hour of Day)
Route
Z6
Z8

WMATA


Travel Time From/To University Drive at US-29 and the Silver Spring Transit Cente
Travel Time (minutes)
60
40
20
0
NORTH
SOUTH
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Trip Start Time (Hour of Day)
Route
Z11
Z2
Z6
Z7
Z8

APPENDIX E

ECONOMIC IMPACT ANALYSIS

MCDOT
Montgomery County Department of Transportation

Sage Policy Group, Inc.

The Prospective and Likely Economic Implications of the US 29 BRT System

Submitted by:

Sage Policy Group, Inc.

Submitted to:

The Montgomery County Department of Transportation

April 2016

The Prospective and Likely Economic Implications of the US 29 BRT System

Table of Contents

List of Exhibits

Projected Economic Impacts of the US 29 BRT SYSTEM

Executive Summary

This Sage Policy Group, Inc. report estimates the economic impacts associated with the prospective development and operation of Montgomery County's US 29 Corridor Bus Rapid Transit System (BRT-29). Impact estimates are supplied at both county and state levels. The study team used IMPLAN economic modeling software, which embodies multipliers specific to the local economy, to generate all estimates of economic impact. Certain parameters are subject to alteration in the context of the ongoing development of the proposed endeavor.

Principal Analytical Findings

Development Phase

- Total costs for developing (planning and construction) the BRT-29 will be in excess of $65 million;
- The development phase will support 447 jobs within Montgomery County and 531 jobs statewide, measured in job-years (statewide economic impacts encompass county level impacts – these impacts are not additive);
- These jobs will be associated with more than $32 million in labor income in Montgomery County and $37 million statewide;
- Business sales during the project's development phase will total $83 million countywide and $94 million statewide.

Operational Phase

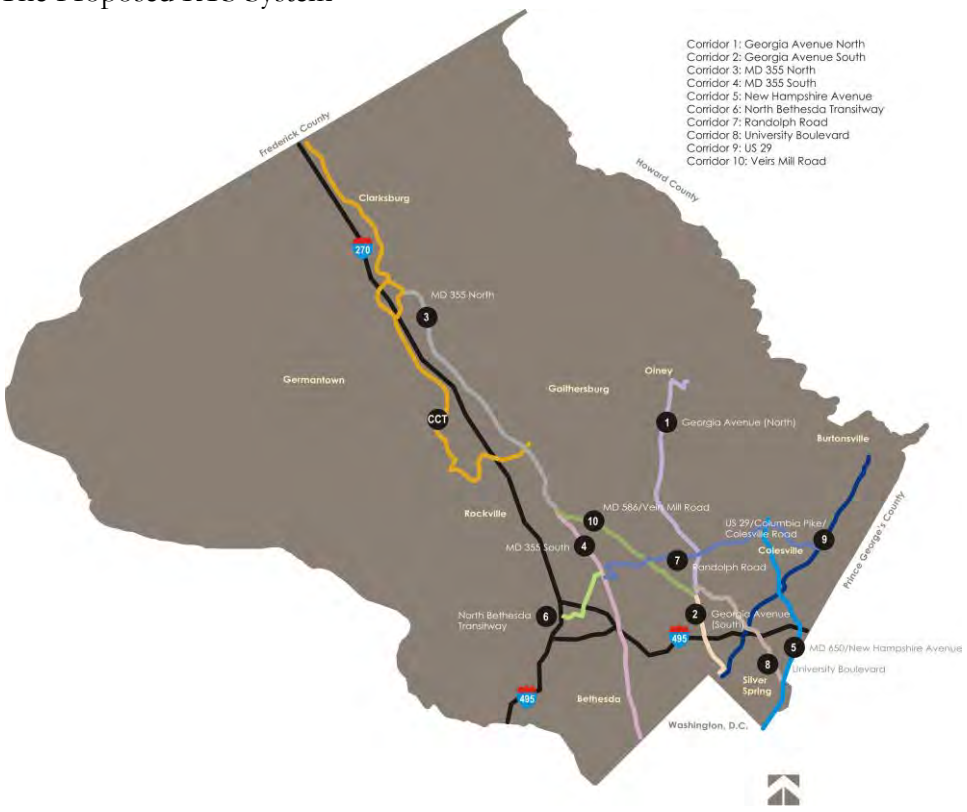
- Annual operating costs will be in the range of $5.2 million measured in 2016 dollars;
- The operational phase will support 85 permanent jobs within Montgomery County and 130 jobs within Maryland;
- These jobs will be associated with annual labor income of roughly $4.1 million countywide and $6.5 million statewide;
- Annual business sales will be bolstered by $9.4 million in Montgomery County and by $13.4 million statewide;
- Development of the White Oaks Science Gateway depends heavily upon the presence of BRT-29 and its capacity to enhance mobility. BRT-29 could unleash the development of more than 5,300 additional dwelling units in a highly active part of the county and lead to the construction of 7 million square feet of commercial space – space that could accommodate more than 20,000 jobs.

Introduction

This Sage Policy Group (Sage) report examines the economic impacts associated with the implementation and operation of Montgomery County's US 29 Corridor Bus Rapid Transit (BRT) System. Sage, an economic and policy consultancy located in Baltimore, Maryland, conducted this assessment of the economic impacts of this potential project. To generate estimates of impact, the study team used IMPLAN economic modeling software. The appendix to this report provides insight into the IMPLAN model and key definitions.

The line of interest can be seen in dark blue below (Corridor 9), stretching from Silver Spring in the southwest to Burtonsville in the northeast. In 2015, Sage quantified the impacts associated with the full build-out of the proposed complete rapid transit system (RTS), as pictured in Exhibit 1. This report analyzes the implications of a single corridor – US 29.

Exhibit 1: The Proposed RTS System



RTS stations will function like Metrorail stations, providing pre-boarding ticketing and platforms allowing direct access to RTS vehicles. Exhibit 2 provides a preliminary mapping of stations along the corridor examined for this analysis.

Exhibit 2: US29 BRT (planned)

Phase I: Impacts of Developing BRT-29

- Employment, Income, and Business Sales

Total costs for BRT-29 development (planning and construction) are estimated at $65.2 million, of which a bit more than half is represented by roadway improvements ($33 million). This cost estimate encompasses a variety of other development components, including buses ($13 million), bus stop improvements ($8.2 million), design and installation of transit signals ($860,000), bicycle and pedestrian improvements ($2.355 million), marketing and outreach ($1.25 million), system planning and design ($6.5 million). Capital cost estimates have been refined over time, with significant cost savings already identified. The Montgomery County Department of Transportation (MCDOT) supplied Sage with key input data, and notes that certain cost estimates remain subject to change.

Local companies and the local labor force will contribute significantly to supplying goods and services. However, the study team presumes that the buses will be manufactured elsewhere since the local economy does not include bus manufacturing capacity. Local companies may be able to supply other key technologies, however, including fare collection and automatic vehicle location technology as well as computer assisted design. In order to generate conservative estimates of impact, the study team has presumed that these technology-driven services will also be sourced elsewhere. To the extent that these services are sourced from Montgomery County enterprises, this study will have supplied estimates of impact that are too small.

In total, project implementation will support approximately 447 full- and part-time jobs[1] in Montgomery County with associated income of roughly $32.2 million per annum. These tallies encompass both direct and secondary jobs supported during development. The study team estimates that approximately 258 jobs will be directly associated with project development while the remaining jobs will take the form of indirect (business-to-business transactions) and induced (household spending) impacts. The implementation phase will also support approximately $83.6 million in augmented sales of goods and services by county businesses during the development period. Note that these impacts are expected to transpire over the course of the development phases. For instance, should development require four years, each of those years would be associated with an average of 112 positions supported per year.

Statewide economic impacts, which embody countywide impacts, are larger by definition. Approximately 531 jobs generating more than $37 million in income would be supported statewide during the development phase. Business sales statewide will be boosted by roughly $95 million. Exhibit 3 supplies relevant summary detail.

Exhibit 3: Economic Impacts: Implementation Phase (one-time impacts)

	Jobs	Labor Income (millions of 2015 dollars)	Business sales (millions of 2015 dollars)
Montgomery County			
Direct effects	258	$20,375,086	$53,716,132
Indirect effects	83	$5,973,049	$13,919,785
Induced effects	106	$5,865,437	$16,026,199
Total	**447**	**$32,213,572**	**$83,662,116**
Maryland			
Direct effects	275	$22,315,890	$53,573,725
Indirect effects	116	$7,387,804	$21,152,997
Induced effects	140	$7,462,823	$20,235,437
Total	**531**	**$37,166,517**	**$94,962,159**
Note: Figures may not add due to rounding.			

Source: Sage

[1] Annual job equivalents or job years. For instance, were one individual to work on the project for two years, this would count as two jobs.

Phase II: Impacts of Operating BRT-29

- Economic Impacts

Once the US 29 BRT system becomes operational, a set of ongoing, permanent economic and fiscal impacts occurs. As reflected in Exhibit 4, the ongoing operation of the bus line will support roughly 85 full-time equivalent positions (FTEs) per year within Montgomery County. These positions will be associated with more than $4 million in labor income. BRT operations will augment local business sales by approximately $9.4 million per annum. Statewide employment would be bolstered by 130 FTEs. Those jobs would be associated with labor income approaching $6.5 million. Statewide business sales would be augmented by more than $13.4 million. Unlike development phase impacts, these impacts are annual and for purposes of this discussion last into economic perpetuity.

Exhibit 4: Economic Impacts: Operational Phase (ongoing impacts)

	Jobs (FTEs)	Labor Income (millions of 2015 dollars)	Business sales (millions of 2015 dollars)
Montgomery County			
Direct effects	60	$2,350,226	$5,163,134
Indirect effects	13	$1,088,347	$2,294,473
Induced effects	13	$716,069	$1,953,851
Total	**85**	**$4,154,642**	**$9,411,458**
Maryland			
Direct effects	81	$3,574,867	$5,163,134
Indirect effects	22	$1,608,569	$4,425,139
Induced effects	27	$1,306,208	$3,821,640
Total	**130**	**$6,489,644**	**$13,409,913**
Note: Figures may not add due to rounding.			

Source: Sage

Evaluating Implications for Accelerated Development in Montgomery County

- Accelerating Development Represents the Primary Source of Economic Impact

A 2015 Sage report entitled "Montgomery County's RTS: Leveraging Mobility for Economic Growth" evaluated the broader impacts of a prospective rapid transit system on Montgomery County's economy. That study identified planning areas within Montgomery County and estimated the development potential linked to each rapid transit corridor. BRT-29 is associated with and would serve four such planning areas: the Silver Spring CBD Sector Plan, Four corners, the White Oak Science Gateway, and Burtonsville Commercial Crossroads Neighborhood Plan.

Two of these plans (White Oak Science Gateway and the Burtonsville Commercial Crossroads Neighborhood Plan) are associated with highly detailed quantification of development potential. As reflected in Exhibit 5, these two planning areas are associated with more than 9,000 residences and more than 43,000 net new commercial space-using jobs. This latter estimate is based on a ratio of 3,000 jobs per million square feet of commercial space.

Of the four planning areas reflected in Exhibit 5 and the two master-planned areas for which data are available, only the White Oak Science Gateway depends directly upon the existence of BRT-29. These economies to be unleashed by rapid transit in Montgomery County are highlighted in our 2015 report.

Exhibit 5: Direct Economic Impacts associated with Development of BRT-29 Planning Areas

Master Plans	Dwelling Units	Commercial Space (millions of SF)	Commercial Space Using Jobs
White Oak Science Gateway	8,570	13.4	39,144
Burtonsville Commercial Crossroads Neighborhood Plan	600	1.4	4,200
Silver Spring CBD Sector Plan	Not quantified		
Four Corners	Not quantified		

Source: Montgomery County Planning Department

Development of the White Oak Science Gateway depends heavily upon the presence of the BRT-29 component of the broader planned rapid transit system. Exhibit 6 below supplies an indication of the level of economic activity dependent upon BRT-29.

Exhibit 6. Development Potential Clearly or Reasonably Linked to the RTS System

Master Plan	*Clearly linked to RTS*		*Reasonably linked to RTS*	
	Dwelling Units	*Commercial Space (millions of SF)*	*Dwelling Units*	*Commercial Space (millions of SF)*
White Oak Science Gateway – BRT – 29	5,360	7.0	2,353	5.1

Sources. Montgomery County Planning Department, City of Gaithersburg, City of Rockville

Conclusion

This study provides some additional statistical detail for Montgomery County and State of Maryland policymakers as well as for an array of other stakeholders. Total costs for developing the BRT-29 (planning and construction) will be in excess of $65 million. The development phase will support 447 full- and part-time jobs in Montgomery County associated with $32 million in labor income. Local business sales will be bolstered by more than $83 million despite the presumption that the buses and key technology services will be sourced from other communities.

Annual operating costs will be in the range of $5.2 million measured in 2016 dollars. Maintaining and operating BRT-29 will support 85 permanent jobs within Montgomery County associated with $4.1 million in annual worker income. Local business sales will be bolstered by $9.4 million. However, the major impact comes in the form of accelerated development. Development of the White Oaks Science Gateway depends heavily upon the presence of BRT-29 and its capacity to enhance mobility. BRT-29 could unleash the development of more than 5,300 additional dwelling units in a highly active part of the county and lead to the construction of 7 million square feet of commercial space – space that could accommodate more than 20,000 jobs.

Appendix

IMPLAN is an economic impact assessment software system. The system was originally developed and is now maintained by the Minnesota IMPLAN Group (MIG). It combines a set of extensive databases concerning economic factors, multipliers and demographic statistics with a highly refined and detailed system of modeling software. IMPLAN allows the user to develop local-level input-output models that can estimate the economic impact of new firms moving into an area as well as the impacts of professional sports teams, recreation and tourism, and residential development. The model accomplishes this by identifying direct impacts by sector, then developing a set of indirect and induced impacts by sector through the use of industry-specific multipliers, local purchase coefficients, income-to-output ratios, and other factors and relationships.

There are two major components to IMPLAN: data files and software. An impact analysis using IMPLAN starts by identifying expenditures in terms of the sectoring scheme for the model. Each spending category becomes a "group" of "events" in IMPLAN, where each event specifies the portion of activity allocated to a specific IMPLAN sector. Groups of events can then be used to run impact analysis individually or can be combined into a project consisting of several groups. Once the direct economic impacts have been identified, IMPLAN can calculate the indirect and induced impacts based on a set of multipliers and additional factors.

Secondary benefits can be segmented into two types of impacts, indirect and induced. Indirect benefits are related to the business-to-business transactions that take place due to increased demand for goods and services that accompanies augmented investment and business operations. Impacted businesses sell everything from office furniture and copiers to computer and graphic design services. Induced benefits are created when workers directly or indirectly supported by increased economic activity spend their earnings in the local economy. Indirect and induced benefits together comprise total multiplier effects.

The hallmark of IMPLAN is the specificity of its economic datasets. The database includes information for five-hundred-and-twenty-eight different industries (generally at the three or four digit Standard Industrial Classification level), and twenty-one different economic variables. Along with these data files, national input-output structural matrices detail the interrelationships between and among these sectors. The database also contains a full schedule of Social Accounting Matrix (SAM) data. All of these data are available at national, state, and county levels.

Another strength of the IMPLAN system is its flexibility. It allows the user to augment any of the data or algorithmic relationships within each model in order to more precisely account for regional relationships. This includes inputting different output-to-income ratios for a given industry, different wage rates, and different multipliers where appropriate. IMPLAN also provides the user with a choice of trade-flow assumptions, including the modification of regional purchase coefficients, which determine the mix of goods and services purchased locally with each dollar in

each sector. Moreover, the system also allows the user to create custom impact analyses by entering changes in final demand.

A final advantage of IMPLAN is its credibility and acceptance within the profession. There are more than five hundred active users of IMPLAN databases and software within federal and state governments, universities, and among private sector consultants. The following list provides a sampling of IMPLAN users.

Sample of IMPLAN Users:

Academic Institutions

Alabama A&M University
Auburn University
Cornell University
Duke University
Iowa State University
Michigan Tech University
Ohio State
Penn State University
Portland State University
Purdue University
Stanford University
Texas A&M University
University of California – Berkeley
University of Wisconsin
University of Minnesota
Virginia Tech
West Virginia University
Marshall University/College of Business

Federal Government Agencies

Fed. Emergency Man. Agency (FEMA)
US Dep't of Agriculture, Forest Service
US Dep't of Ag., Econ Research Service
US Dep't of Int., Bureau of Land Mgmt.
US Dep't of Int., Fish and Wildlife Serv.
US Dep't of Int., National Parks Service
US Army Corps of Engineers

State Government Agencies

MD Dep't of Natural Resources
California Energy Commission
Florida Division of Forestry
Illinois Dep't of Natural Resources
New Mexico Department of Tourism
South Carolina Employment Security
Utah Department of Natural Resources
Wisconsin Department of Transportation

Private Consulting Firms

Coopers & Lybrand
Batelle Pacific NW Laboratories
Boise Cascade Corporation
Charles River Associates
CIC Research
BTG/Delta Research Division
Deloitte & Touche
Ernst & Young
Jack Faucett Associates
KPMG Peat Marwick
Price Waterhouse LLP
Sage Policy Group, Inc.
SMS Research
Economic Research Associates
American Economics Group, Inc.
L.E. Peabody Associates, Inc.
The Kalorama Consulting Group
West Virginia Research League

APPENDIX F

BOARDS FROM MARCH 2017 US 29 BRT OPEN HOUSES

MCDOT
Montgomery County Department of Transportation

WELCOME TO GET ON BOARD BRT

WHAT IS BRT?

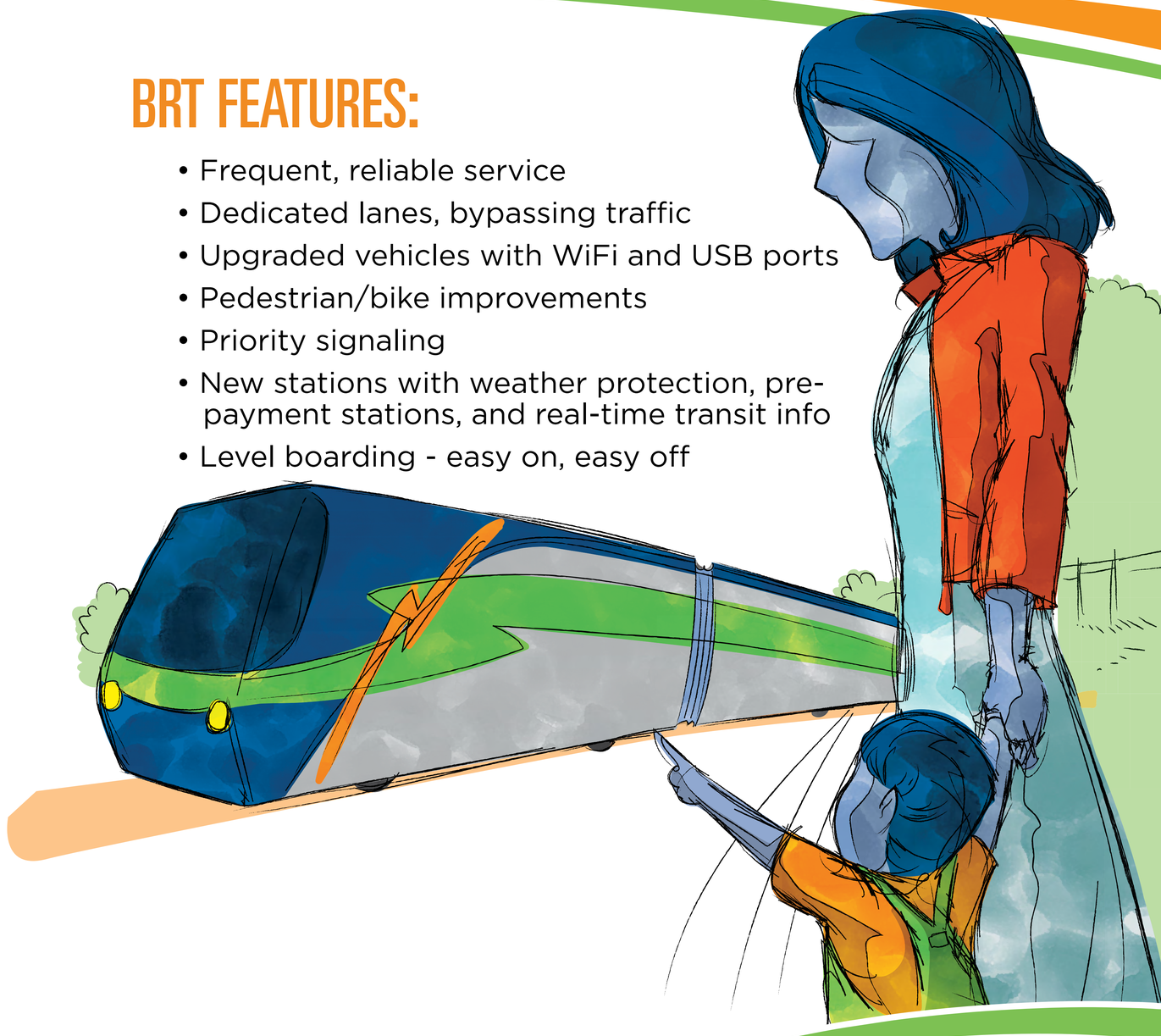
A **comfortable, reliable, new** transit option for Montgomery County.

Bus Rapid Transit, or BRT, drives on the street, often in its own lane on busy roads. It makes fewer stops than a traditional bus so you can get where you need to go quickly.

- **Gets you out of traffic**
- **Saves you money**
- **Better for the environment**
- **Gets you where you want to go quickly**

BRT FEATURES:

- Frequent, reliable service
- Dedicated lanes, bypassing traffic
- Upgraded vehicles with WiFi and USB ports
- Pedestrian/bike improvements
- Priority signaling
- New stations with weather protection, pre-payment stations, and real-time transit info
- Level boarding - easy on, easy off



GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

BRT FEATURES AND AMENITIES

ENHANCED VEHICLES

Accommodates bicycles onboard

Frequent, reliable service

New, enhanced vehicles

WiFi and USB ports

Level boarding allows for easy on, easy off

Often travel in dedicated lanes, bypassing traffic

COMMUNITY-FRIENDLY DESIGN

New, comfortable stations

Pre-payment stations

Weather protection

4min Real-time transit info

Enhanced pedestrian walkways

Bike facilities and bikeshare stations

GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

US 29 BRT PROJECT

The Montgomery County Department of Transportation (MCDOT) is designing and constructing a Bus Rapid Transit (BRT) line along US 29 to meet the needs of residents and businesses along this busy route.

PROJECT SCHEDULE:

Route 29 will be the first BRT line to open, with service expected to begin in the year 2020.

2017 to mid **2018** — PROJECT DESIGN
NEPA COMPLETION

mid **2018** to late **2019** — PROJECT CONSTRUCTION

late **2019** to early **2020** — BEGIN OPERATIONS

BRT WILL:

- Use existing bus-on-shoulder lanes on US 29 in the northern section of the corridor.
- Operate in mixed traffic in the southern section of US 29 and along Lockwood Drive, Stewart Lane, Briggs Chaney Road, and Castle Boulevard.

SERVICE PLANS CURRENTLY BEING CONSIDERED INCLUDE:

- Running every **7.5 minutes** during the peak period and every **15 minutes** during the off-peak.
- A proposed span of service from **5am to midnight, 7 days/week**.
- **Transit Signal Priority (TSP)** will be installed at up to 15 intersections along the corridor to provide traffic signal benefits to BRT vehicles where appropriate, reducing travel time and increasing reliability.

Note: The service plan is preliminary and may be modified.

GetOnBoardBRT
BUS RAPID TRANSIT IN MONTGOMERY COUNTY

EXPLORE THE US 29 BRT CORRIDOR

US 29 ALIGNMENT

1 HIGHER EDUCATION CAMPUS

3 3 RAIL CONNECTIONS: Heavy Rail (Metrorail) Commuter Rail (MARC) National Rail (Amtrak)

9 FEDERAL OFFICES

6 PUBLIC SCHOOLS

5 COMMUNITY & RECREATION CENTERS

2 REGIONAL SERVICES CENTERS

16 SHOPPING CENTERS

3 PUBLIC LIBRARIES

5 HEALTH CENTERS serving low-income families

Silver Spring Transit Center

Fenton St

University Blvd

Burnt Mills

Oak Leaf Dr

White Oak Transit Center

Stewart Lane

Tech Rd

Castle Ridge

Briggs Chaney Park and Ridge

Burtonsville Park and Ride

DOWNTOWN SILVER SPRING: Densely built urban community near Washington, D.C. that serves as a regional activity center with private and government jobs, social services, healthcare, a large community college campus, and access to local and regional transit. With 15,000 daily boardings, the Silver Spring Metrorail Station is the busiest station in the County, and serves as a major transfer hub for bus service, making it an ideal connection to the future MTA Purple Line and MCDOT BRT service.

WHITE OAK: Transitioning from an auto-centric 3,000-acre regional activity center north of Silver Spring to an urban focused development, this community is a growing job center with over 27,000 jobs at major employers including the Food and Drug Administration (FDA) and the White Oak Federal Research Center.

BURTONSVILLE/FAIRLAND: The Burtonsville Crossroads Neighborhood Plan is helping to shape the rural/suburban area into a neighborhood center with community services. The Inter County Connector (ICC) provides east-west access and additional transit connections to the BRT.

65% of residents minority; **32%** foreign born

31% of population speaks a language other than English at home

30% of households earn less than half of the area median income

12% have no access to a car; **38%** have access to only one vehicle

Home to over **9,000** senior citizens and **11,000** people with disabilities

Legend

- US 29 BRT Alignment
- US 29 BRT Stop

Points of Interest

- College or University
- Public School
- Federal Facility
- HHS Facilty
- Hospital
- Library
- Recreation Centers
- Shopping Centers

0 0.5 1

Miles

US 29 BRT BENEFITS AND BUDGET

BENEFITS: The US 29 BRT project will provide many quantifiable benefits to one of the busiest transit corridors in the State, including:

ATTRACTING "CHOICE" RIDERS AND PROVIDING BETTER SERVICE FOR EXISTING RIDERS:

US 29 BRT is projected to have 13,000 daily boardings in 2020 and 20,000 daily boardings in 2040. This number of daily boardings exceeds the ridership for most BRT lines in the United States.

IMPROVED TRANSIT RELIABILITY:

Current on time performance for local corridor transit services averages 45-77%. US 29 BRT will improve reliability through use of dedicated Bus on Shoulder lanes, Transit Signal Priority (TSP), and more efficient operations (level multiple-door vehicle boarding, limited stops, off-board fare collection).

TRAVEL TIME SAVINGS:

The more efficient operation of BRT on US 29 is expected to result in a 22-35% corridor travel time savings over current local bus service.

ECONOMIC BENEFITS:

The US 29 BRT project is estimated to result in $269-520 million of economic net benefit. Development of the White Oak Science Gateway will benefit substantially from the presence of high quality transit service such as the US 29 BRT.

EFFICIENCY:

An element of the US 29 BRT project will be to examine local service along and around the corridor for operational efficiency improvements, potentially increasing the level of transit service to surrounding communities.

ACCESSIBILITY:

US 29 BRT will increase regional connections and access to a fast-growing jobs corridor, and will improve transit access and provide upward mobility to transit-dependent populations along the corridor.

LASTING BENEFITS:

The project has a benefit cost ratio of 4 to 1 . This means the monetized user time savings, user cost savings, greenhouse gas & emissions reductions, and accident reductions outweigh the project costs.

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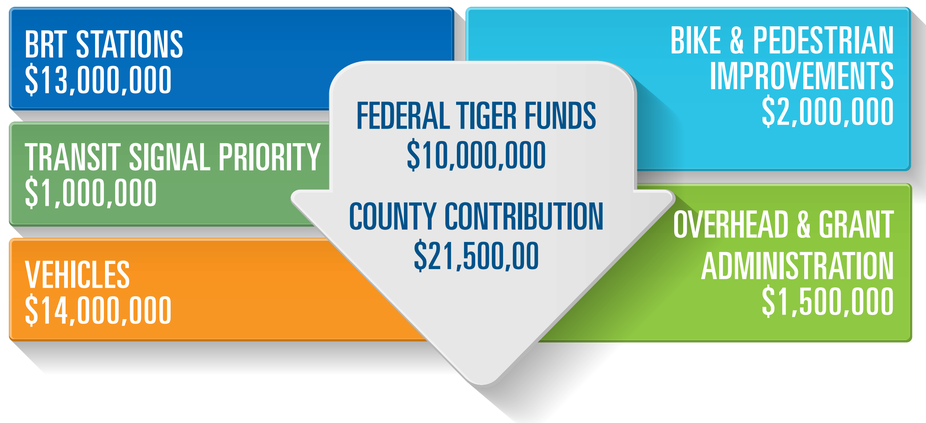
PROJECT BUDGET: The implementation cost for the US 29 BRT project is estimated to be $31.5 million, $10 million of which will be paid by the Federal government as part of a Transportation Infrastructure Generating Economic Recovery (TIGER) grant.



TOTAL $31,500,000

Costs are estimated

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STRATEGIES TO IMPROVE LOCAL BUS

LOCAL BUS

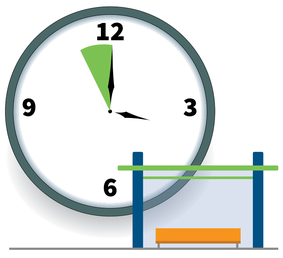
The bus network includes local bus services that supplement and connect to the high frequency BRT network. The service concepts below will be used to evaluate modifications to the existing local bus routes to create a more efficient transit network.

LEVEL OF SERVICE ENHANCEMENTS

ADJUST FREQUENCY

Frequency refers to how often a bus arrives at any given stop and is determined based on the level of demand for transit.

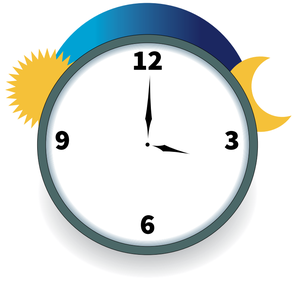
Adjustments may be made to frequency of local service to enhance connections with BRT service, minimize waiting time, or meet increased demand.



ADJUST HOURS

Hours of Service refers to the hours the bus route provides service during the day and the days on which it operates.

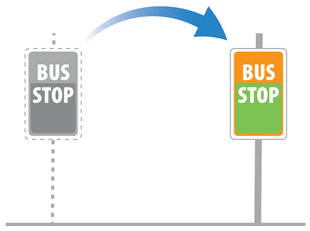
Adjustments may be made to the hours of operation for local services to match the BRT service, or to meet increased demand.



ROUTE ADJUSTMENTS

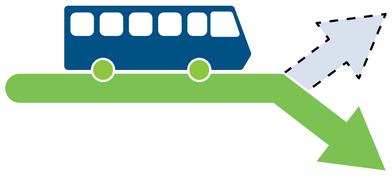
STOP RELOCATION

Relocate bus stops to improve access to the BRT service, or consolidate bus stops to improve travel time.



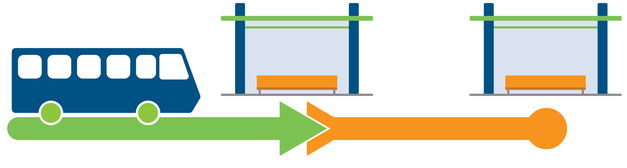
ROUTE REALIGNMENT

Realign local services to better serve localized demand, improve connections to the BRT service, and avoid congestion.



EXTEND ROUTE

Extend local service to provide connections to activity centers, transfer hubs, or BRT stations.



NEW SERVICE TYPES

EXPRESS SERVICE

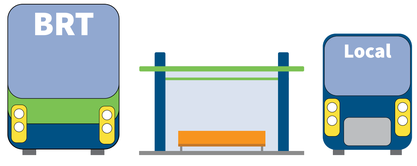
Provide express service that connects neighborhoods directly with major activity centers.

NEIGHBORHOOD CIRCULATOR

Create neighborhood circulators connecting communities to the BRT service.

LIMITED STOP OVERLAY

Provide local service to supplement limited-stop BRT service and improve service coverage.



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BRT Station Prototype Design

PROJECT INTRODUCTION

MCDOT, in partnership with the Metropolitan Washington Council of Governments' Transportation/Land-Use Connections Program, is designing stations for the County's future BRT network.

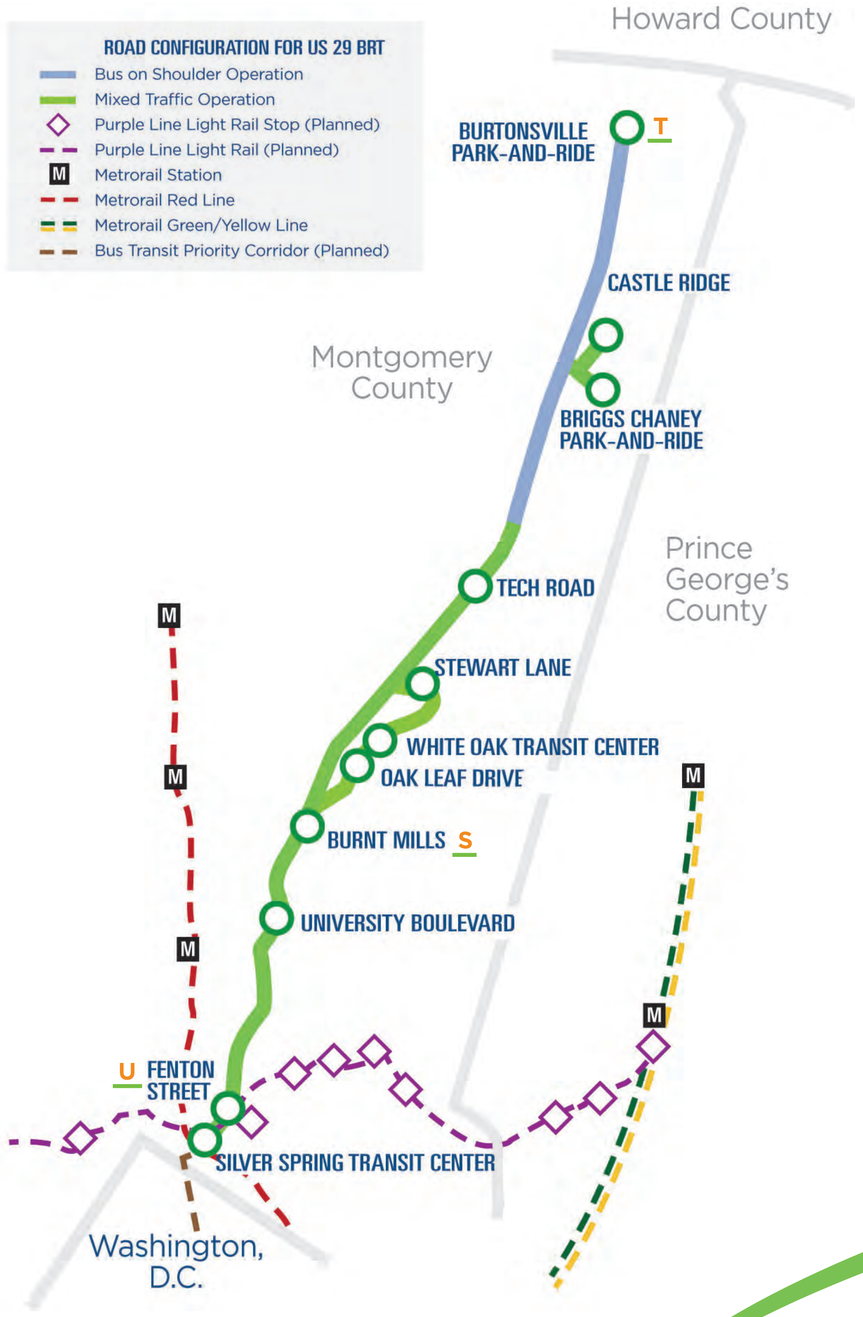
These stations will not only be the prototype for BRT stations in the County, but the resulting design will be the first BRT station design implemented as part of the US 29 BRT corridor project. These stations will have interchangeable, flexible components, that can be adapted for all corridors.

We need your input as part of the Get On Board BRT program to ensure the station design reflects your ideas of what truly reflects that County's character and aesthetic. Please review the boards in this station area, and participate in our interactive activity!

STATION DESIGN GOALS

- Easy to find and use
- Accessible
- Safe and comfortable
- Context sensitive and adaptable
- Supports efficient operations
- Maintainable
- Good life-cycle investment

US 29 BRT CORRIDOR



US 29 STATION AREAS

T TRANSIT - PARK & RIDE — **BURTONSVILLE PARK & RIDE**

S SUBURBAN — **BURNT MILLS**

U URBAN MIXED USE — **FENTON ST.**

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Station Design Criteria

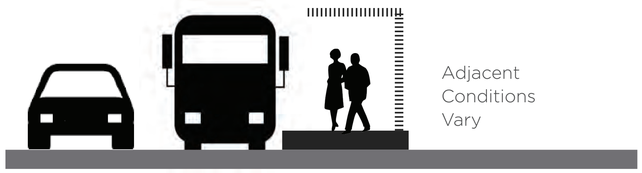
STATION PLATFORM TYPES

There are two station platform types:

- Side-loading - which may be accessed directly from a sidewalk
- Center-loading - which may be located in a roadway median

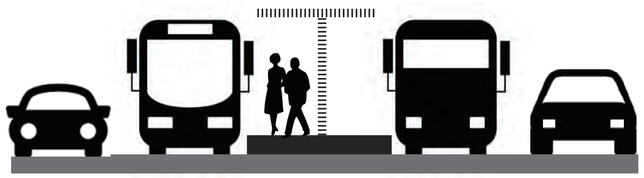
SIDE-LOADING PLATFORMS

SECTION DIAGRAM

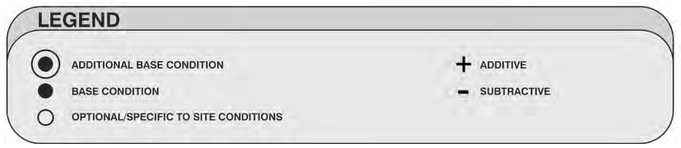


CENTER-LOADING PLATFORMS

SECTION DIAGRAM



AMENITIES



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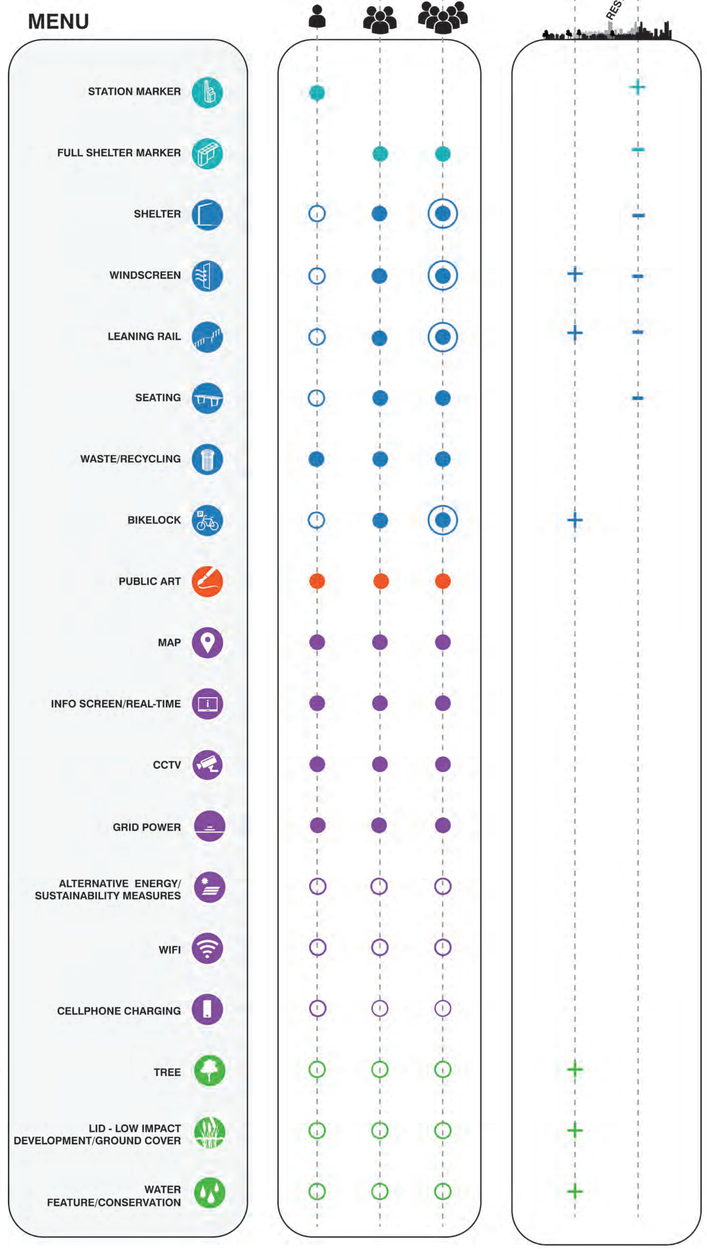
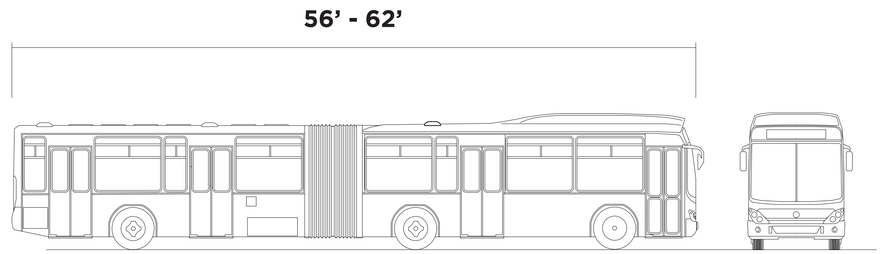
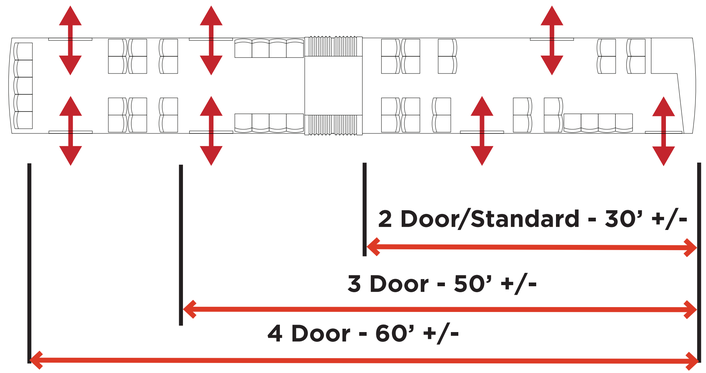


POTENTIAL BUS

Articulated buses, with doors on both each side of the bus, will be used for premium transit service. The multiple doors will allow for more efficient passenger loading and unloading, flexibility for both side and center loding platforms and will support faster, overall travel times.





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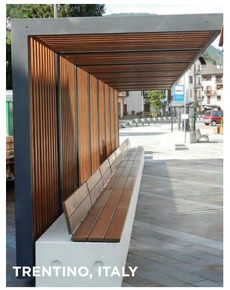
Station Shelter Examples

SCALE, FORM, IMAGE & ENCLOSURE



MATERIAL

TRANSPARENCY

LIGHTING

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STAY INVOLVED IN PLANNING FOR THE US 29 BRT!

GET ON BOARD!

ATTEND A CORRIDOR ADVISORY COMMITTEE (CAC) MEETING

The CACs provide community stakeholders (area residents, businesses, community organizations and others) the opportunity to participate in the BRT system planning process.

PARTICIPATE IN AN EMPLOYEE FOCUS GROUPS

If you are an employer or employee along the US 29 corridor, please visit our website (**GetOnBoardBRT.com/get-on-board**) to sign up for a focus group or event at your location.

REQUEST A COMMUNITY MEETING

We want to meet you where you are!

If you belong to a civic group such as a homeowners association, chamber of commerce, community advocacy organization, or are simply a member of the community that wants to engage in the **Get on Board BRT** outreach efforts, please visit our website (**GetOnBoardBRT.com/get-on-board**) to sign up for a community meeting.

ATTEND AND COLLABORATE AT US 29 OPEN HOUSES

Engage face to face with the staff that work directly on the final design process of the BRT route and passenger amenity stations. Your questions, comments, and ideas from today's Open House will be integrated into the design process, and this Fall 2017 you will see how they impacted the project at our next open house.

FIND US AT PUBLIC EVENTS

Find us at County events and festivals, such as the Bethesda Arts Festival, Taste of Wheaton, and at Metro Stations near you!

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