

# US 29 South Corridor Advisory Committee Meeting #3

## Montgomery County **RAPID TRANSIT**

US 29

White Oak Community Recreation Center  
Silver Spring, Maryland  
June 2, 2015



# Welcome

## Topics to be discussed (times approximate):

- Project Update – 15 min
- Transit Ridership – 35 min
- Traffic Operations – 35 min
- Draft Purpose and Need Language – 10 min
- BRT Running Way Options – 35 min
- Future Meetings & Questions – 5 min

**Note: Each topic will be followed by a question and answer session. Please hold questions and comments until the section presentation is complete.**

# Project Update: Corridor Planning Study

- Conducting a preliminary assessment of a range of conceptual improvements
- Developing recommendations to be used in subsequent phases (i.e., NEPA or MEPA)
- Utilizing the Planning and Environment Linkages (PEL) approach
  - Consider environmental, community, and economic goals early in the transportation planning process
  - Use products developed during PEL to guide the subsequent environmental review process (i.e., NEPA or MEPA)
  - For more on PEL, go to:  
<http://environment.fhwa.dot.gov/integ/index.asp>

# Project Update:

## Informational Open House Meetings

The Informational Open House meetings postponed, to:

- Allow time to better understand and address new project-related developments (e.g., New Hampshire Avenue BRT Study)
- Gain more input from the public as the US 29 study progresses
- Allow for greater coordination and input from the CAC Members
- Once new dates are identified, the public will be informed through a series of outreach efforts: “Save The Date” postcard, informational brochure, newspaper ads, project website, and coordination with local civic organizations.

# Project Update:

## New Hampshire Avenue (MD 650) Study

- On May 21, 2015 the County Council approved amendments to the Capital Improvements Program (CIP) that included funding for a study of the MD 650 BRT corridor.
- The BRT Team, SHA, MTA, and MCDOT is working on a scope of work, schedule, and budget to commence BRT corridor planning on MD 650.
- The scope will outline how the MD 650 study would interface with the US 29 corridor planning study.
- The team will share additional information on the status of the MD 650 study as it becomes available.

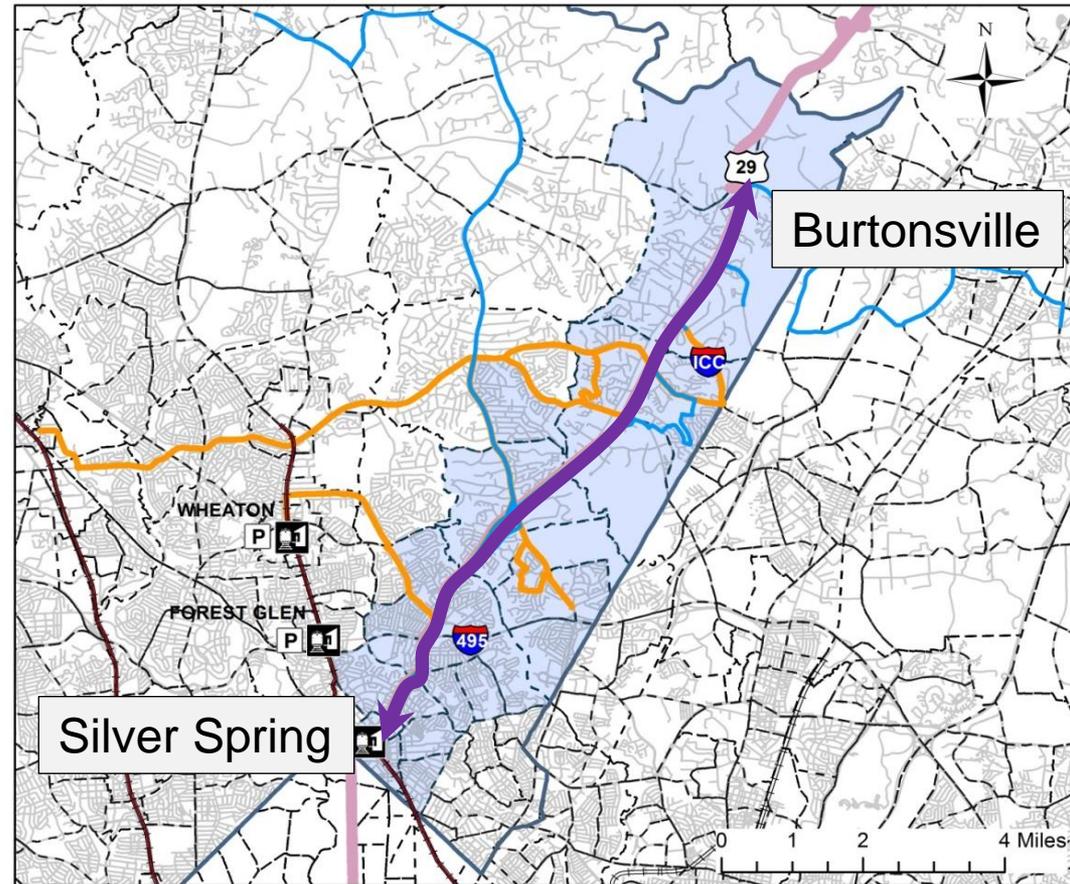
# CAC Meeting #3 Agenda

## Topics to be discussed:

- Project Update
- **Transit Ridership**
  - **Corridor Context**
  - **Travel and Transit Markets**
  - **Questions**
- Traffic Operations
- Draft Purpose and Need Language
- BRT Running Way Options
- Future Meetings & Questions

# Existing and Future (2040) No-Build Regional Travel Demand

- Study Area Overview
- Traffic Analysis Zones
- TPB Traffic Analysis Zones
- Existing Transit Routes



**US 29 BRT Corridor Planning Study**

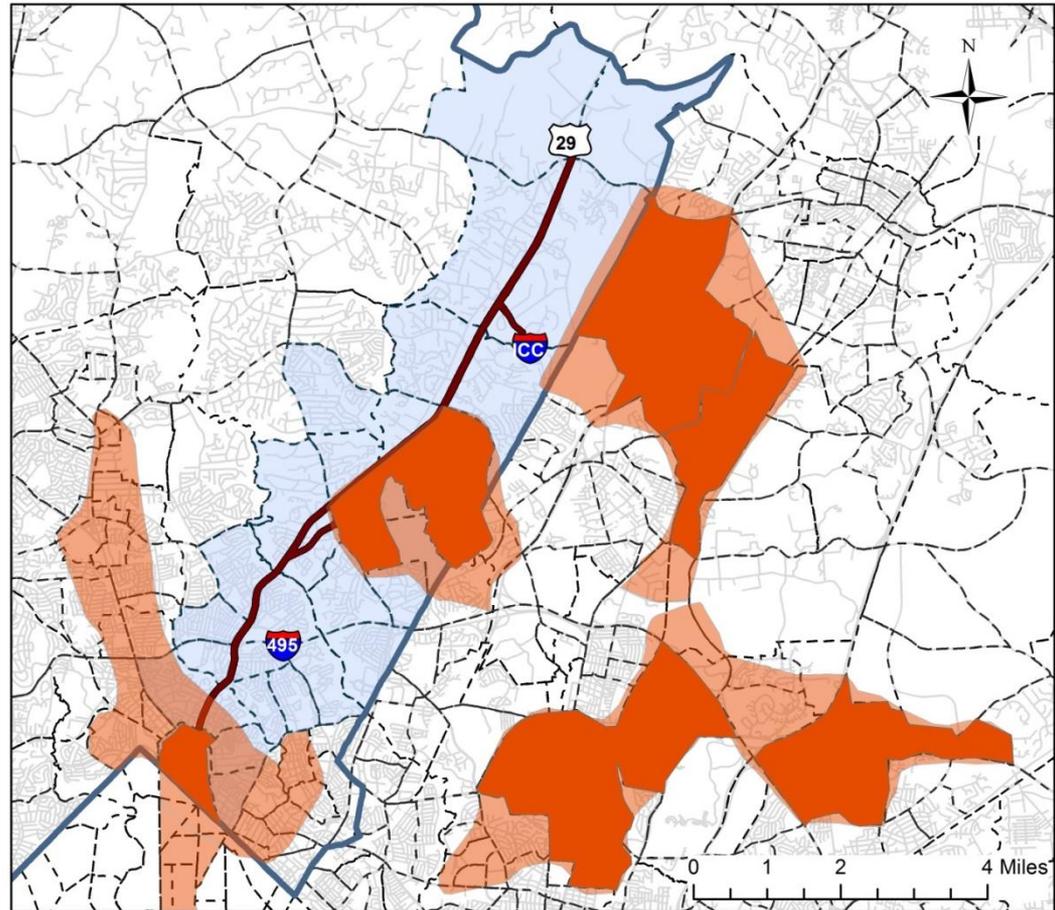
**Features**

- |                                      |                            |
|--------------------------------------|----------------------------|
| Traffic Analysis Zones in Study Area | Metrorail Station          |
| TPB Traffic Analysis Zones           | Metrorail Park & Ride Lots |
| Montgomery County                    | Metrorail Line             |
| All Roadways                         | Metro Bus Routes           |
|                                      | Ride On Bus Routes         |
|                                      | MTA Bus Routes             |

# Corridor Context

- **Regional Activity Centers and Clusters**
  - Silver Spring
  - White Oak
- **County Growth Visions**
- **Regional Priority Corridor**

Source: MWCOG, regional MPO travel demand model



**Features**

- Traffic Analysis Zones in Study Area
- TPB Traffic Analysis Zones
- Montgomery County
- Study Corridor
- All Roadways

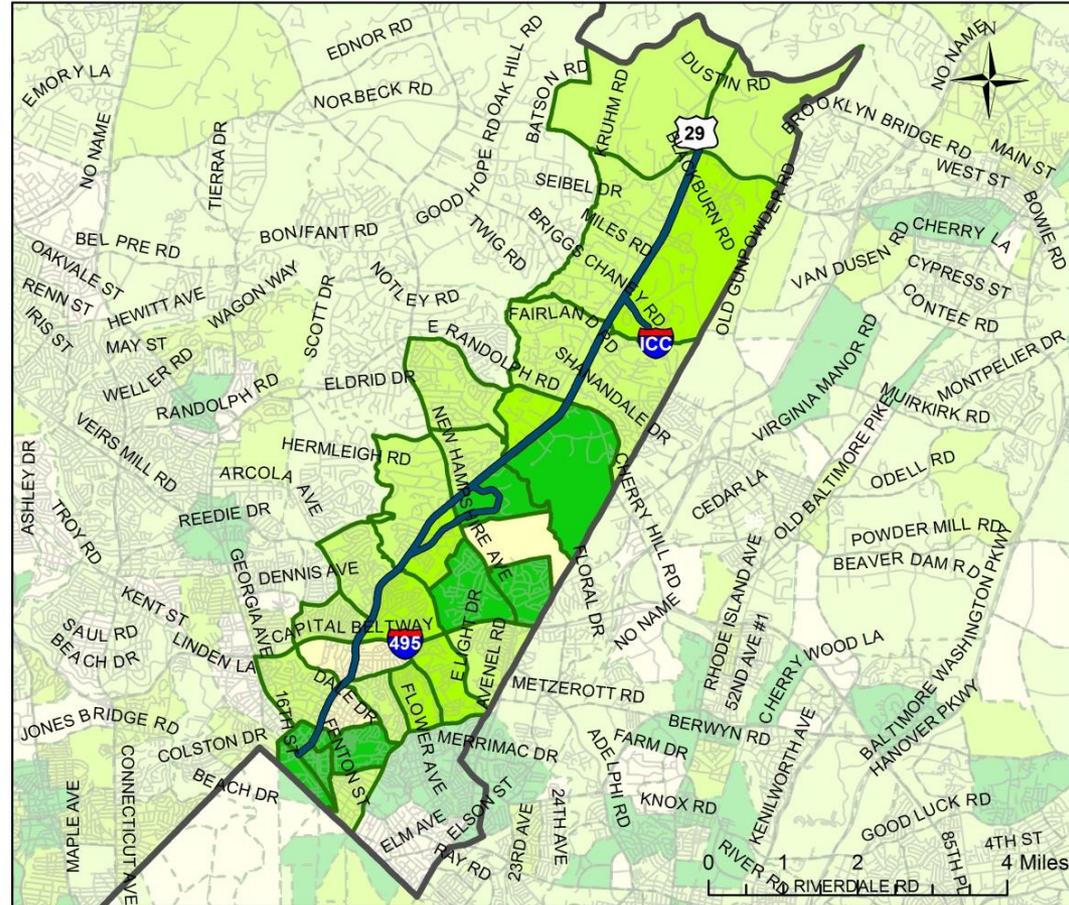
**US 29 BRT Corridor Planning Study**

- Activity Clusters
- Activity Centers

# Corridor Context

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

Source: 2040 forecasts developed using MWCOG, regional MPO travel demand model



### Features

Increase in Household Density (households/sq. mi.)

- No Change
- 1 - 100
- 101 - 500
- 501+

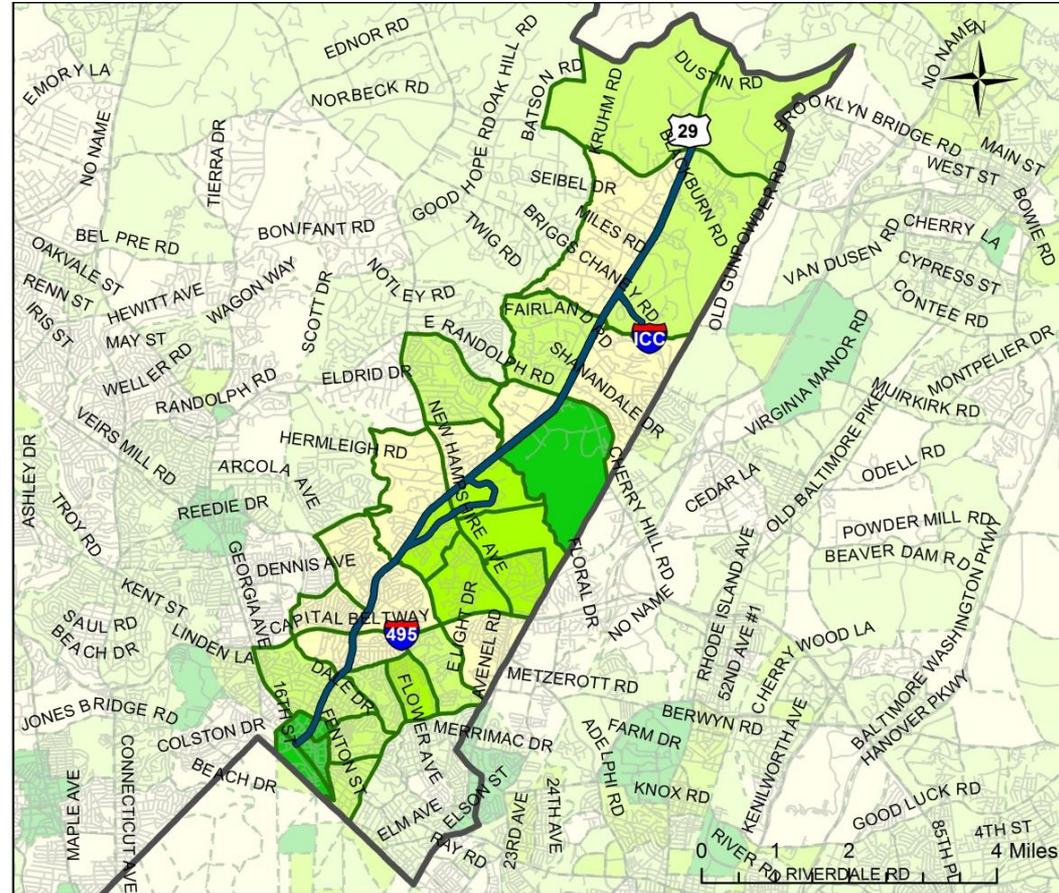
### US 29 BRT Corridor Planning Study

- Montgomery County
- TPB Traffic Analysis Zones
- All Roadways
- Study Corridor

# Corridor Context

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

Source: 2040 forecasts developed using MWCOG, regional MPO travel demand model



**Features**

Increase in Employment Density (jobs/sq. mi.)

- No Change
- 1 - 1000
- 1001 - 5000
- 5001+

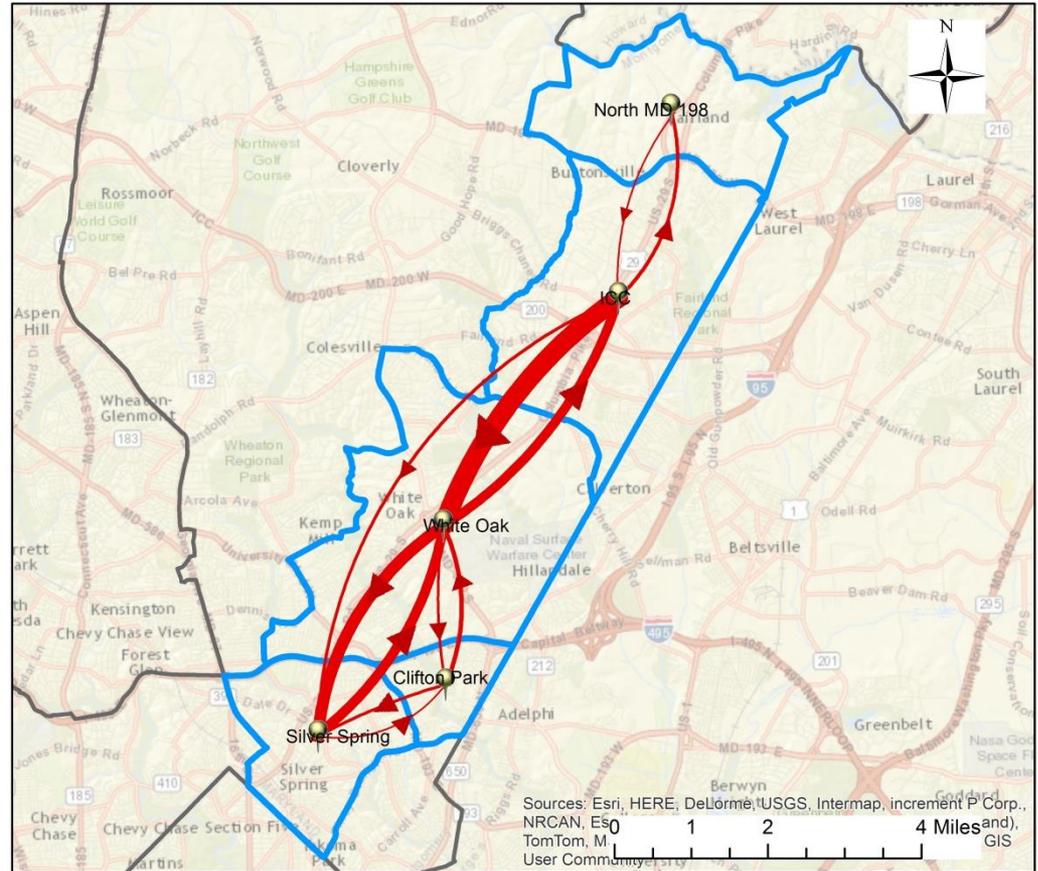
- Montgomery County
- TPB Traffic Analysis Zones
- All Roadways
- Study Corridor

**US 29 BRT Corridor Planning Study**

# Travel Markets: Patterns and Growth

- 176,000 Intra-study-area trips (2040), which represents 40% of total trips
- 29% increase from 2014

Source: 2040 forecasts developed using MWCOG, regional MPO travel demand model



Features

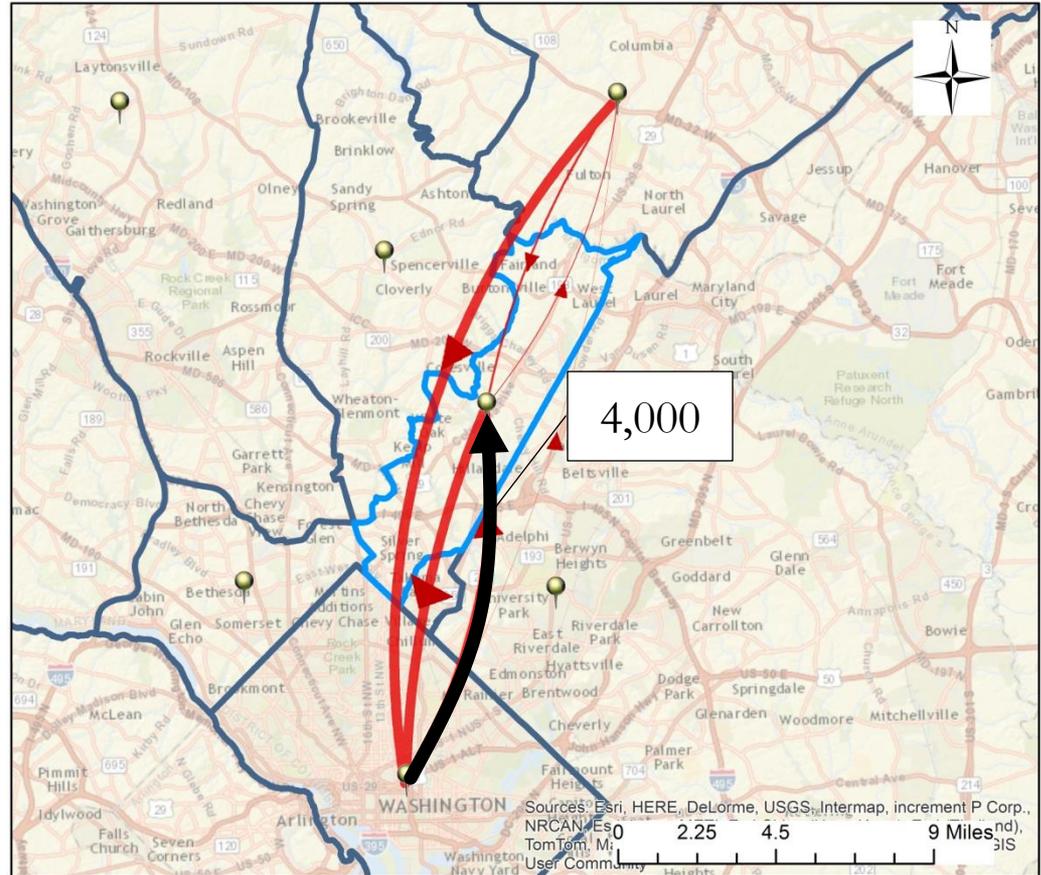
US 29 BRT Corridor Planning Study

- Study Area District
- TPB Region Districts

- District
- Daily Person Trip

# Travel Markets: Patterns and Growth

- From DC to Study Area:  
4,000 Trips in 2010



Source: 2006-2010 CTPP

Features

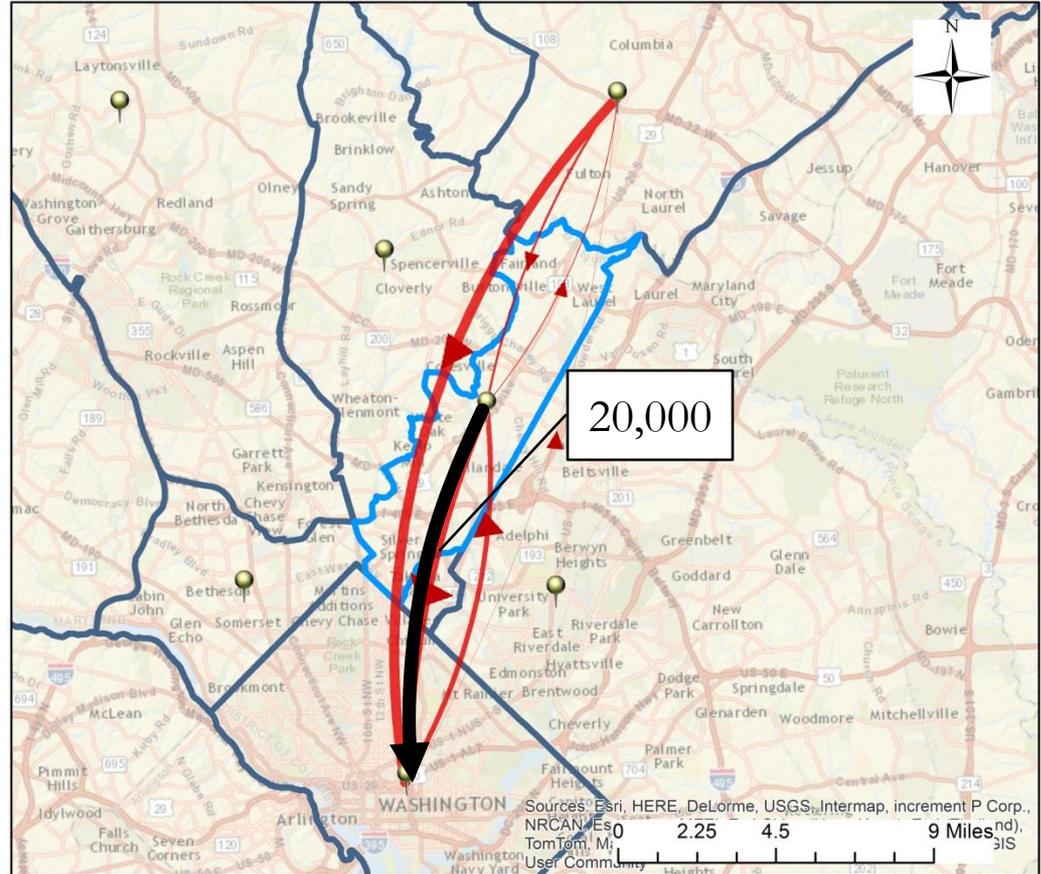
US 29 BRT Corridor Planning Study

- Study Area
- TPB Region District

- District
- Daily Person Trip

# Travel Markets: Patterns and Growth

- From Study Area to DC: 20,000 commuter trips in 2010



Source: 2006-2010 CTPP

Features

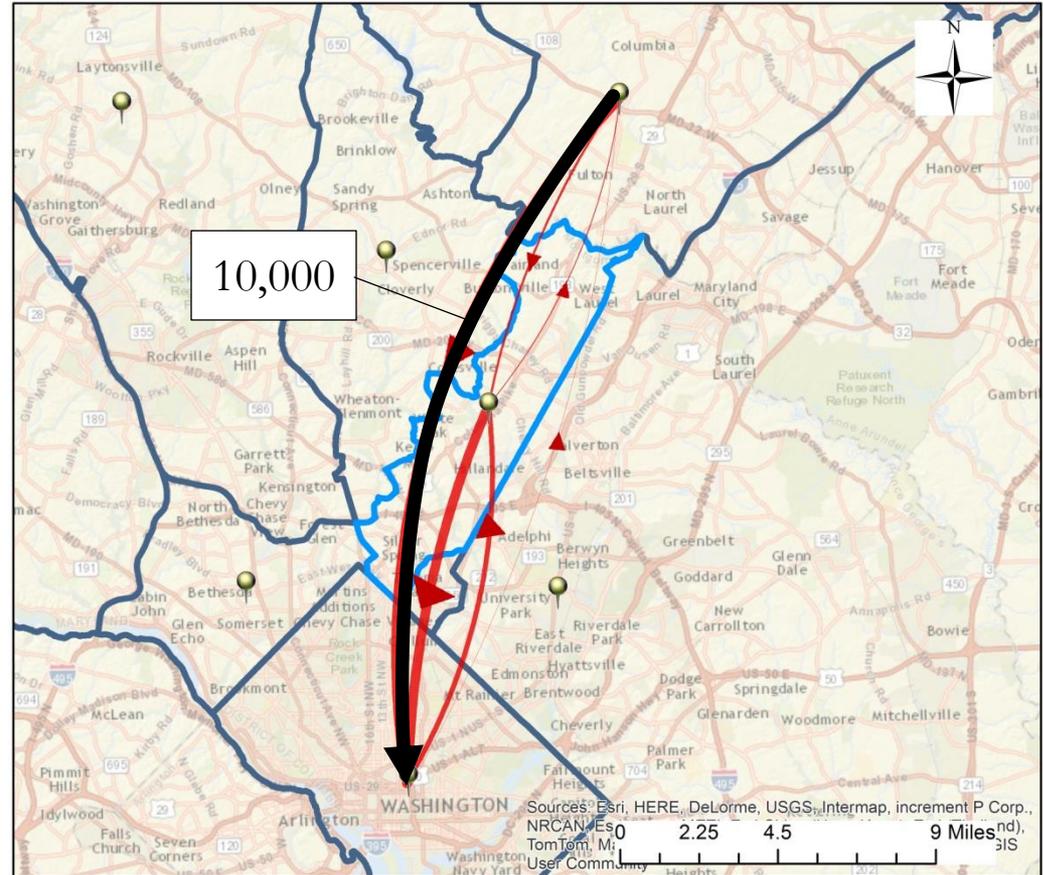
US 29 BRT Corridor Planning Study

- Study Area
- TPB Region District

- District
- Daily Person Trip

# Travel Markets: Patterns and Growth

- Through trips between the North US 29 corridor and DC: 10,000 Trips



Source: 2006-2010 CTPP

Features

US 29 BRT Corridor Planning Study

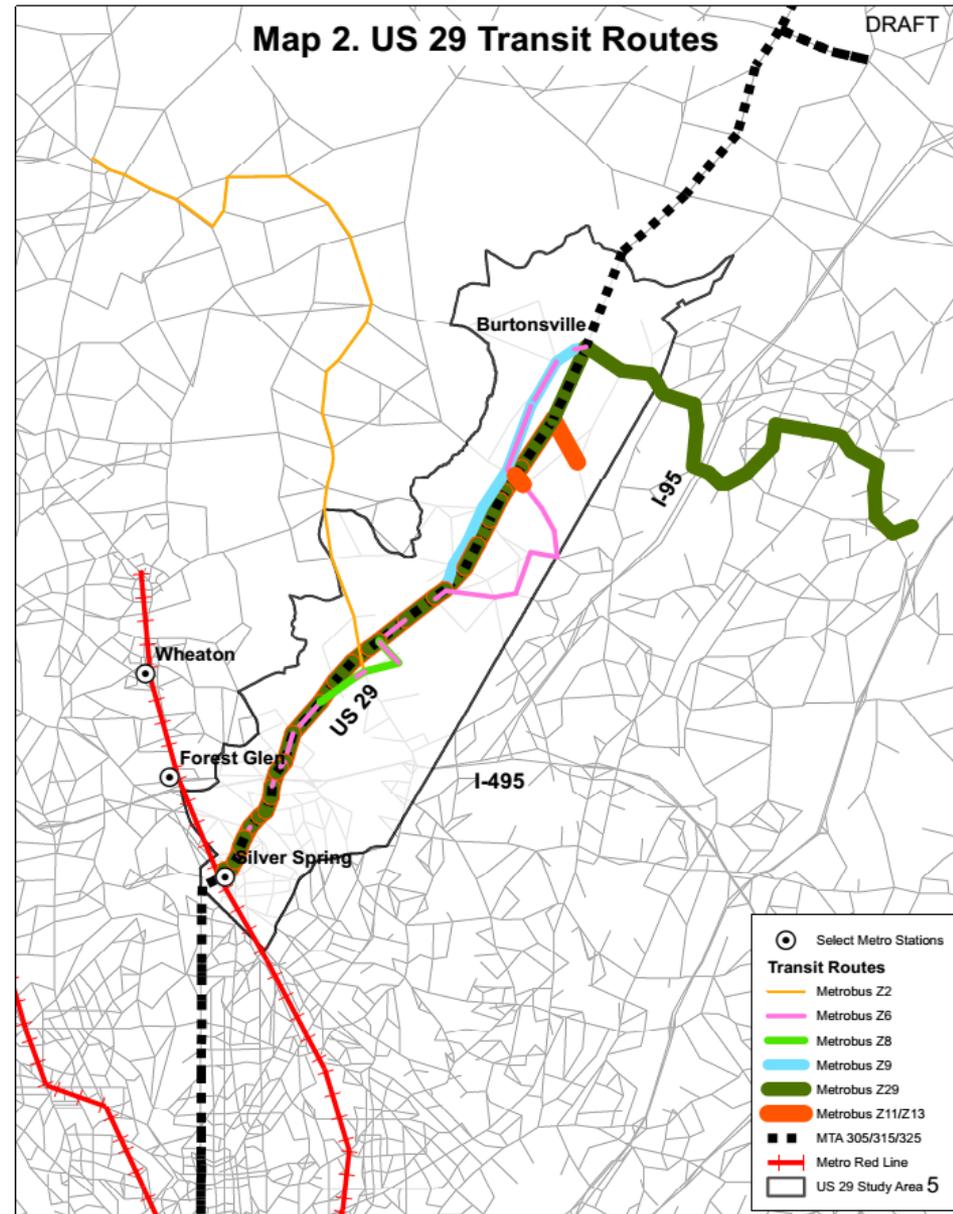
- Study Area
- TPB Region District

- District
- Daily Person Trip

# Corridor Transit Market

- **Existing (2014) Metrorail Red Line Ridership: 19,900**
  - Silver Spring: 13,200
  - Forest Glen: 2,500
  - Wheaton: 4,200
- **Future (2040) Metrorail Ridership increases by 40%**
- **Existing (2014) Bus Ridership: 11,000**
  - Metrobus: 9,925
  - Ride On: 975
  - MTA: 350
- **Future (2040) Bus Ridership increases by 40%**

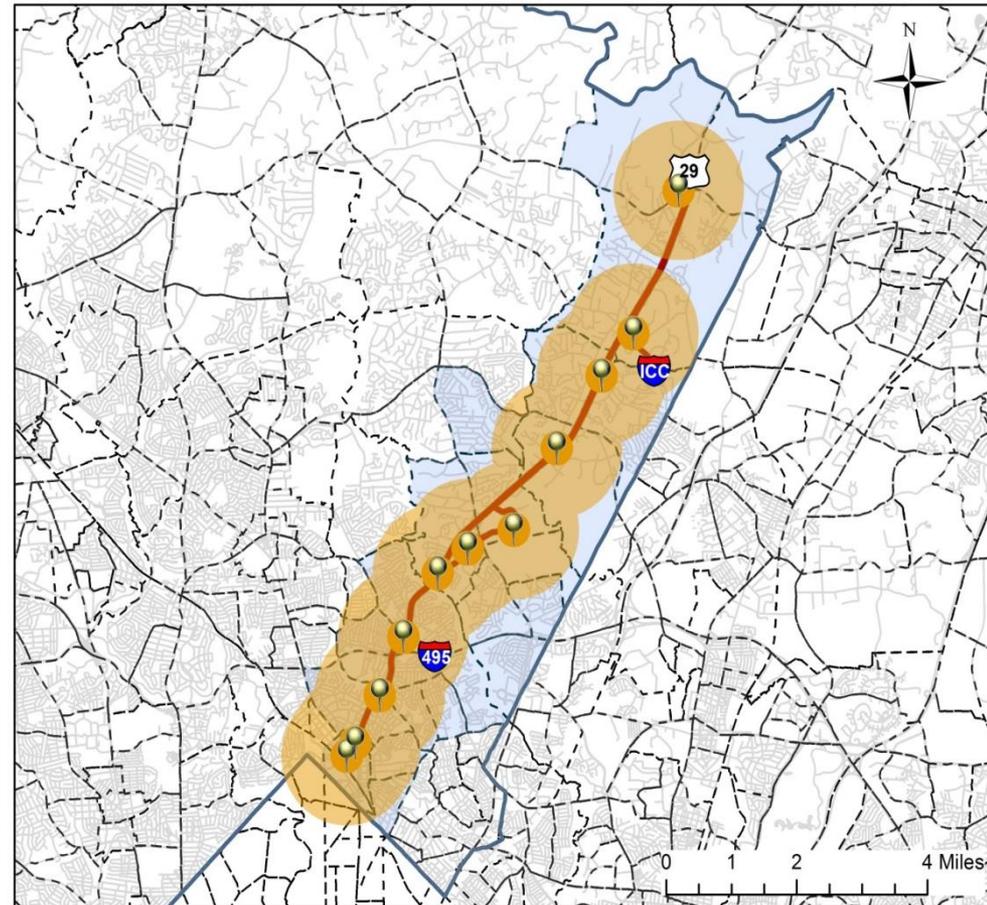
Source: 2040 forecasts developed using MWCOCG, regional MPO travel demand model



# Proposed BRT Transit Market

- **Proposed BRT**
  - Burtonsville to Silver Spring
  - Approx. 12 miles
  - 11 stations
  - 3 Park & Ride Locations
- **Connectivity to Metrorail and Purple Line**
- **Accessibility to Proposed BRT Stations**

Source: 2040 forecasts developed using MWCOG, regional MPO travel demand model



**Features**

- Traffic Analysis Zones in Study Area
- TPB Traffic Analysis Zones
- Montgomery County
- Study Corridor
- All Roadways

**US 29 BRT Corridor Planning Study**

- BRT Stations
- 1/4 Mile Buffer
- 1 Mile Buffer

# US 29 Regional Demand

## Summary:

- Strong employment growth in regional activity centers
- Travel markets for intra-corridor, corridor to DC, and external to DC
- Strong existing transit market in the corridor
- Support for the County's growth visions and the regional transit priority

# Questions: Travel & Transit Markets

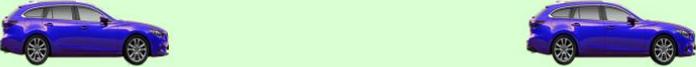


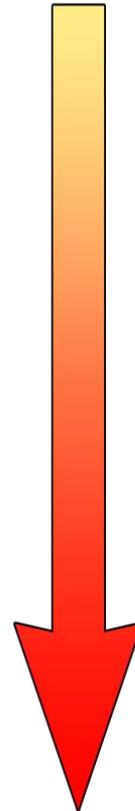
# CAC Meeting #3 Agenda

## Topics to be discussed:

- Project Update
- Transit Ridership
- **Traffic Operations**
  - **Existing and Future No-Build Levels of Service**
  - **Vehicle Travel Time Changes**
  - **Crash History**
  - **Questions/Comments**
- Draft Purpose and Need Language
- BRT Running Way Options
- Future Meetings & Questions

# Level of Service (LOS) Overview

<b>A</b>	
<b>B</b>	
<b>C</b>	
<b>D</b>	
<b>E</b>	
<b>F</b>	



**EXCELLENT**

**GOOD**

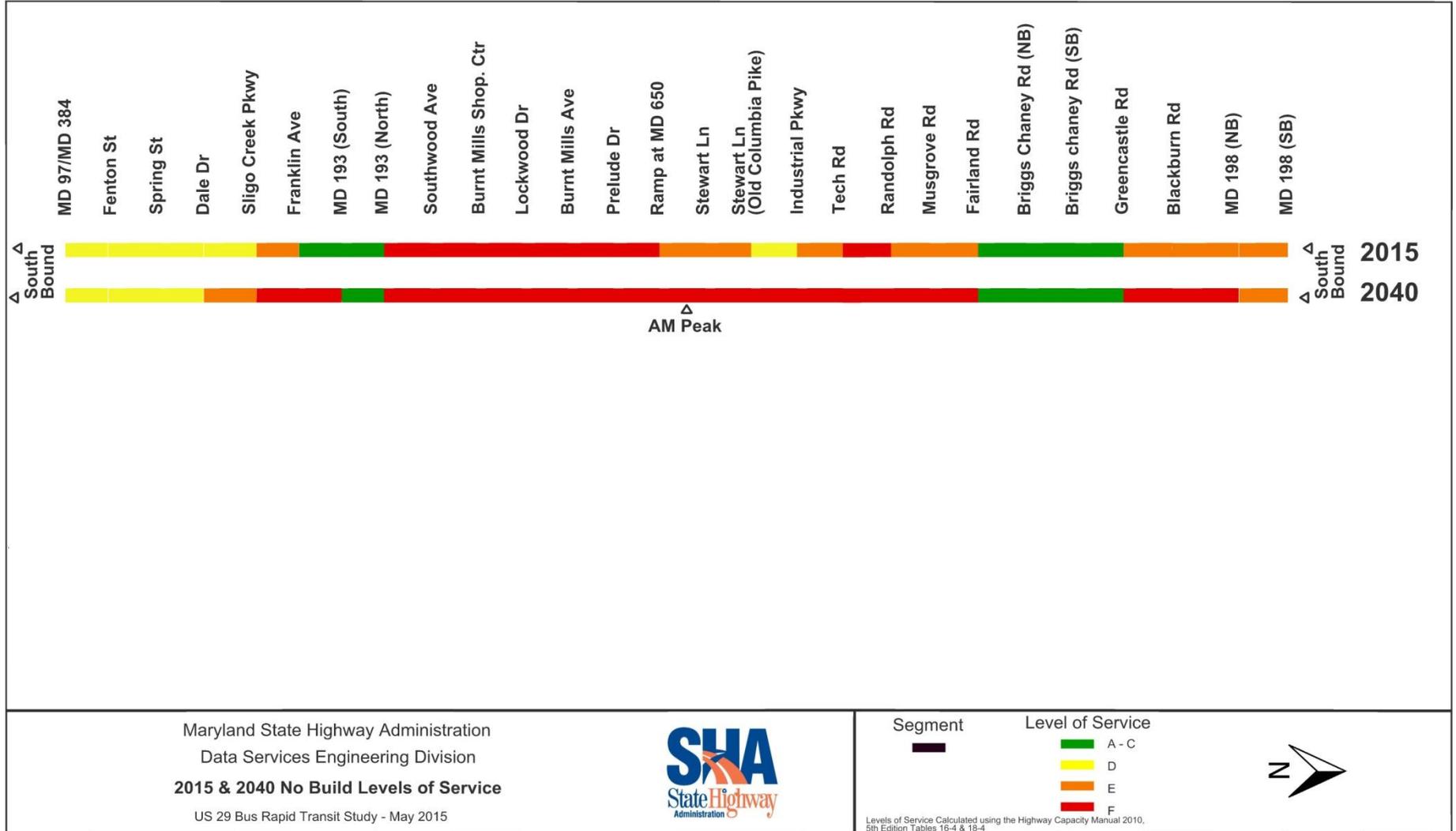
**AVERAGE**

**ACCEPTABLE**

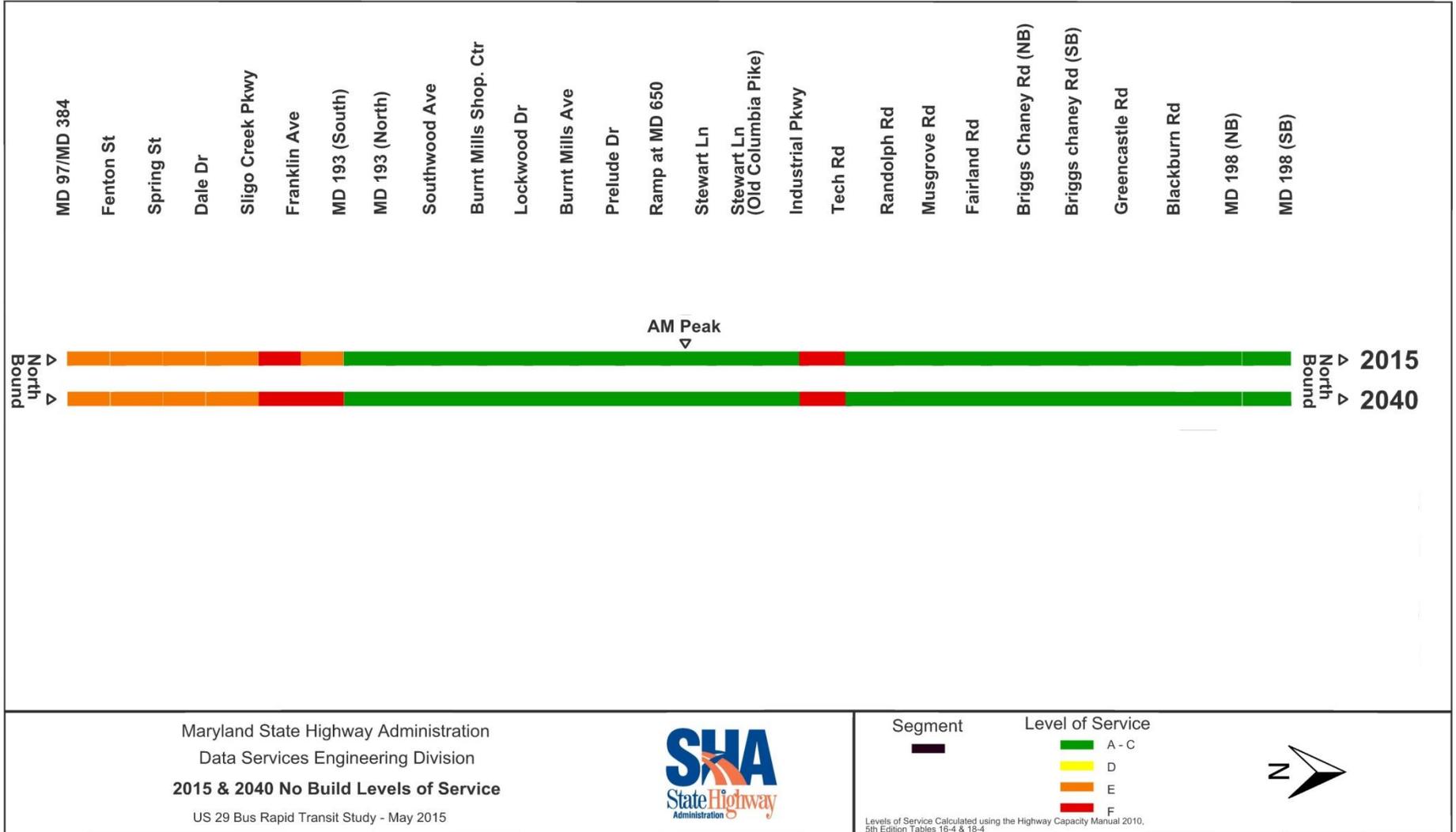
**CONGESTED**

**SEVERELY CONGESTED**

# 2015 & 2040 No-Build Levels of Service



# 2015 & 2040 No-Build Levels of Service



# 2015 & 2040 No-Build Levels of Service



Maryland State Highway Administration  
Data Services Engineering Division

**2015 & 2040 No Build Levels of Service**

US 29 Bus Rapid Transit Study - May 2015



Segment

Level of Service



A - C

D

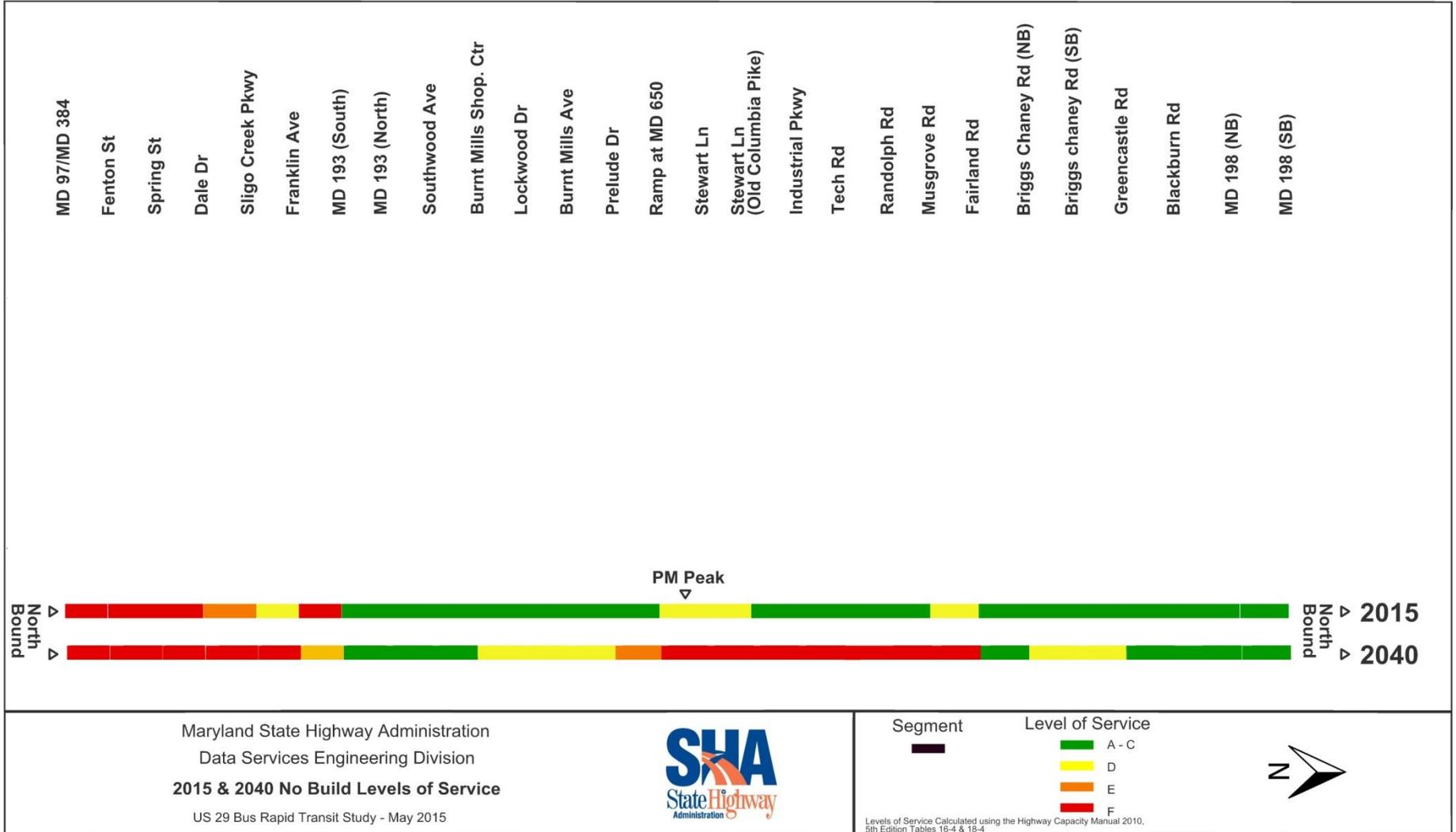
E

F

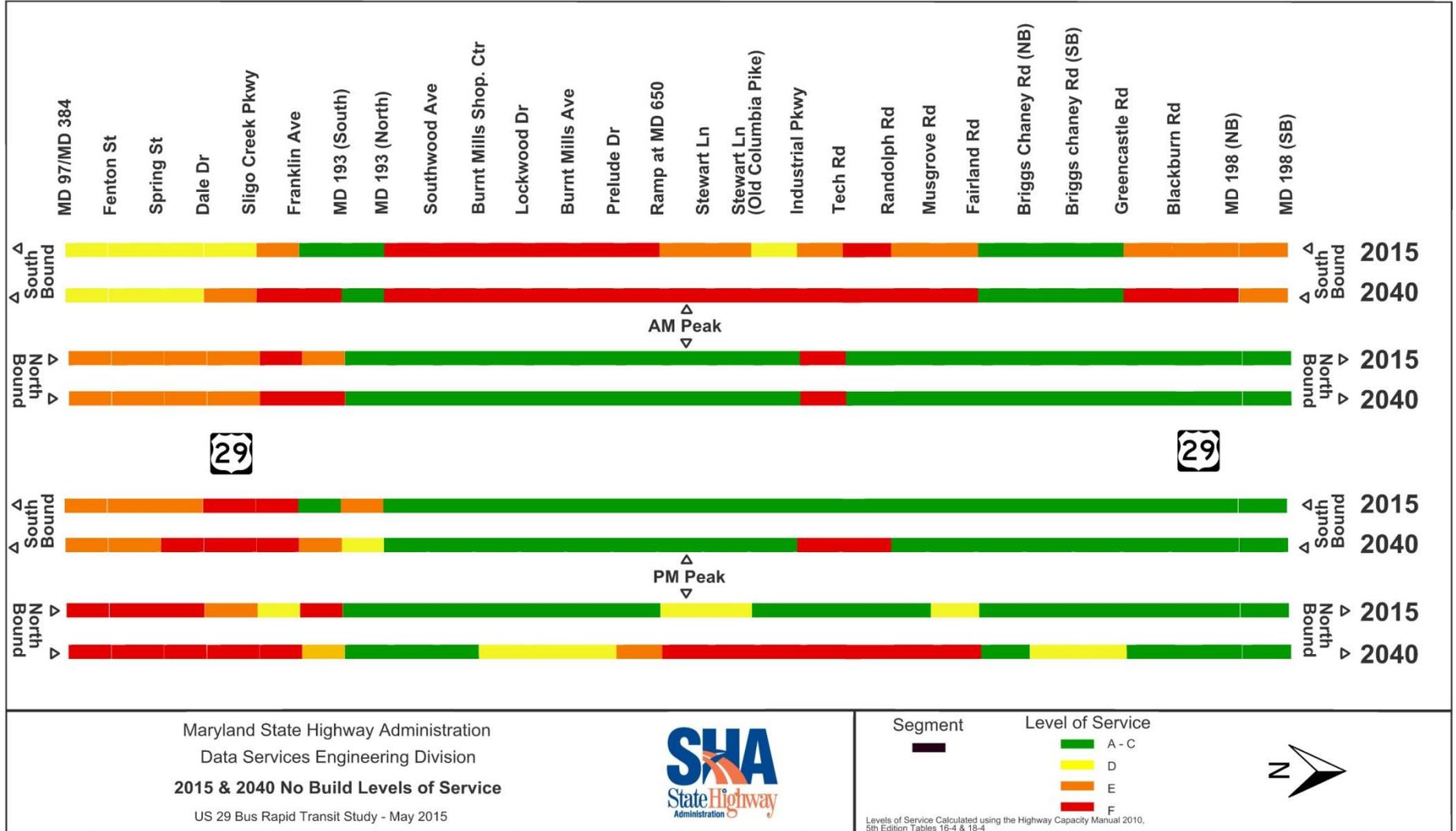


Levels of Service Calculated using the Highway Capacity Manual 2010, 5th Edition Tables 16-4 & 18-4

# 2015 & 2040 No-Build Levels of Service



# 2015 & 2040 No-Build Levels of Service



# Vehicle Travel Time Changes

Total Network Wide Travel Times from MD 198 to MD 97						
	Southbound			Northbound		
	2015 Existing	2040 No Build	% change	2015 Existing	2040 No Build	% change
<b>AM Cars &amp; Trucks</b>	34 min	44 min	<b>-29%</b>	21 min	21 min	<b>0%</b>
<b>AM Buses*</b>	34 min	44 min	<b>-29%</b>	25 min	25 min	<b>0%</b>
<b>PM Cars &amp; Trucks</b>	23 min	25 min	<b>-8%</b>	25 min	37 min	<b>-47%</b>
<b>PM Buses*</b>	27 min	30 min	<b>-11%</b>	30 min	45 min	<b>-51%</b>

\* This % change does not affect buses individually – it is a network wide bus miles traveled comparison

**Red** indicates delay increase

# US 29 Crash History

Roadway Sections (North to South)	3-year Crash Rate per Mile	High Crash Types
MD 97 to Spring Street Includes portions of US 29 south of MD 97	200 High crash segment	Sideswipe, pedestrian, property damage, & parked vehicles
Spring Street to MD 193 (University Boulevard)	182	Rear end & Sideswipe
MD 193 (University Boulevard) to Lockwood Drive	117	Opposite Direction
Lockwood Drive to Stewart Lane	103	Injury, Left Turn & Night time
Stewart Lane to Musgrove Road	95	Injury, Left Turn, Angle, & Night Time
Musgrove Road to MD 198 (Sandy Spring Road)	64	Night Time

# US 29 Existing and Future No-Build Traffic Operations

## Summary:

- **53** intersections along US 29 and associated side streets modeled and analyzed
- Increase in regional growth leads to increased congestion throughout corridor
- Average speeds in the corridor are forecasted to reduce between **3%** and **50%** from 2015 to 2040, with some segments experiencing increased average speeds fluctuating between **2%** to **16%**
- Crash data for 2011 to 2013 show approximately **1,088** crashes occurred (this includes **3** fatal crashes and **24** pedestrian crashes) along US 29 in study limits
- Most Prevalent – Injury (41%), Property Damage (59%), Rear ends (42%), and Side Swipe (19%).

# Questions: Traffic Operations



# CAC Meeting #3 Agenda

## Topics to be discussed:

- Project Update
- Transit Ridership
- Traffic Operations
- **Draft Purpose and Need Language**
  - **Purpose**
  - **Need**
- BRT Running Way Options
- Future Meetings & Questions

# Draft Project Purpose Language

The purpose of this project is to provide a higher speed, higher frequency, all day transit service along the US 29 corridor between the Silver Spring Transit Center and the Burtonsville Park & Ride that will:

- Enhance transit connectivity along the corridor and within the regional system;
- Improve the ability for buses to move along the corridor (bus mobility) with improved operational efficiency and travel times;
- Address current and future bus ridership demands;
- Integrate service with rail and other transit services;
- Attract new riders who do not use existing services and provide improved service options for current transit riders;
- Look for opportunities to provide safe multi-modal access to transit;
- Build on previous Montgomery County studies which recommend Bus Rapid Transit along US 29;
- Improve transit access to major employment and activity centers;
- Support approved Master Planned growth (e.g., White Oak) generated from development within the study limits and the County; and
- Improve person throughput on the US 29 corridor.

# Draft Project Need Language

Four specific needs for the project have been identified by the study team:

- ***System connectivity*** – A high-quality, continuous transit connection is needed from Silver Spring to Burtonsville that can support the surrounding mixed used development along the corridor.
- ***Mobility*** – 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.
- ***Transit demand/attractiveness*** – Transit demand and ridership in the US 29 corridor continues to grow. A high-quality transit service is needed to maintain current transit riders and attract new riders.
- ***Livability*** – 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.

# CAC Meeting #3 Agenda

## Topics to be discussed:

- Project Update
- Transit Ridership
- Traffic Operations
- Draft Purpose and Need Language
- **BRT Running Way Options**
  - **Introduction**
  - **Overview of BRT Running Way Options**
  - **Questions**
- Future Meetings & Questions

# BRT Running Way Options

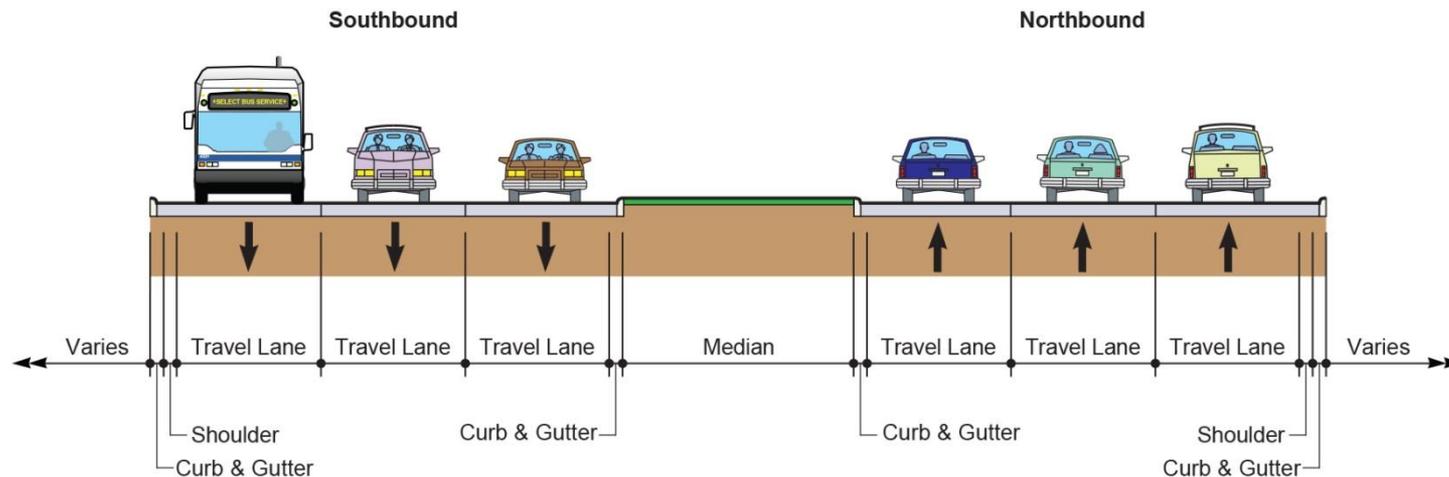
## Introduction:

- Six BRT Running Way options have been identified for consideration
- The proposed six options can be mixed and matched along different segments of the corridor to best fit within the surrounding area
- Location and dimensions of proposed roadway elements will vary throughout the corridor
- The following typical sections represent the six options, illustrating the interaction between vehicles and the BRT, as they could generally be applied throughout the corridor
- **NOT EVERY OPTION IS APPROPRIATE FOR EVERY SEGMENT OF THE US 29 CORRIDOR**

# BRT Running Way Options

## Option 1 – BRT in Mixed Traffic

- Could include enhancements to existing WMATA, MTA, and Ride-On bus services via system operational improvements, and minor facility improvements such as transit signal priority.
- Could include considerations for enhanced transit service with limited stops.



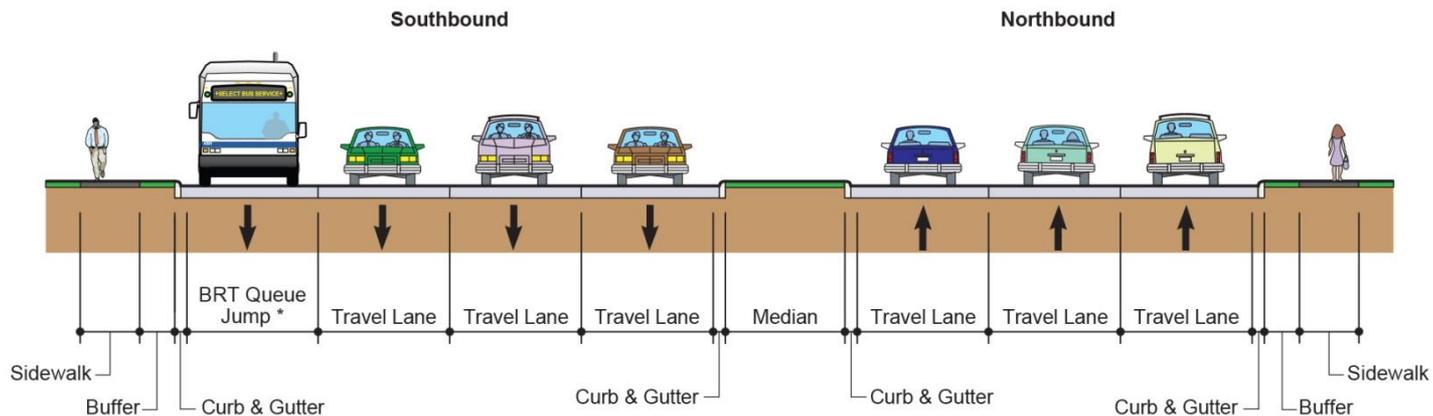
# BRT in Mixed Traffic, City of Brampton, Canada



# BRT Running Way Options

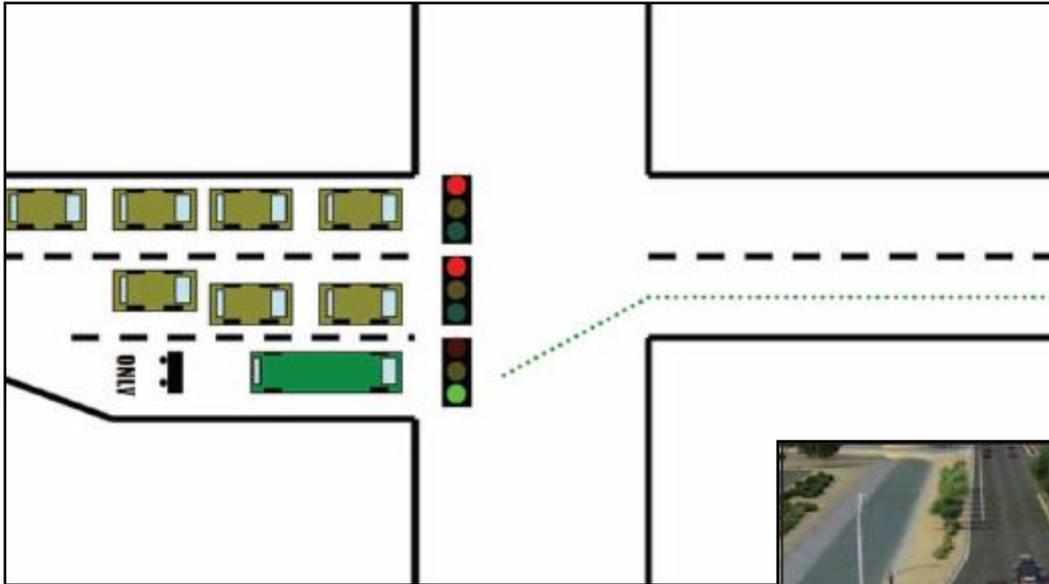
## Option 2 – BRT Queue Jump Lanes

- Would include enhancements to existing WMATA, MTA, and Ride-On bus services via system operational improvements, and minor facility improvements such as transit signal priority and BRT queue jump lanes.
- Would include considerations for enhanced transit service with limited stops.

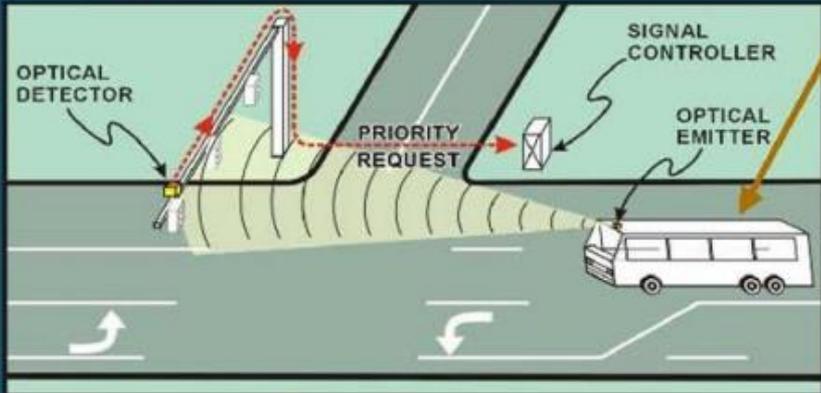


\* Queue Jumps could be applied to both northbound and southbound directions.

# BRT Queue Jump



# BRT Running Way Options



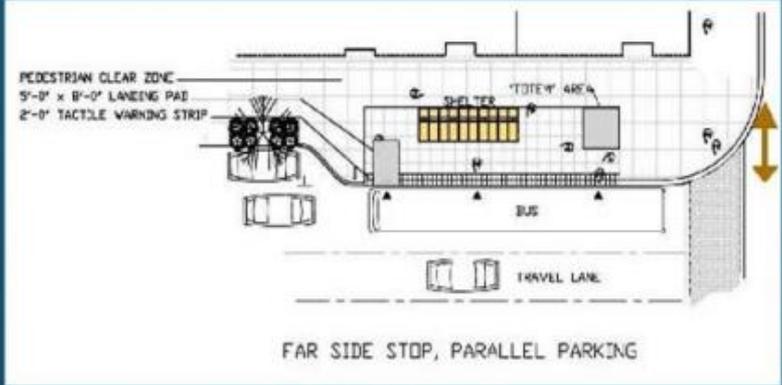
**Transit signal priority**

Approaching BRT vehicle may get a green light if it is behind schedule.

BRT uses special lane to bypass stopped cars.



**Queue jump**



**Curb extension**

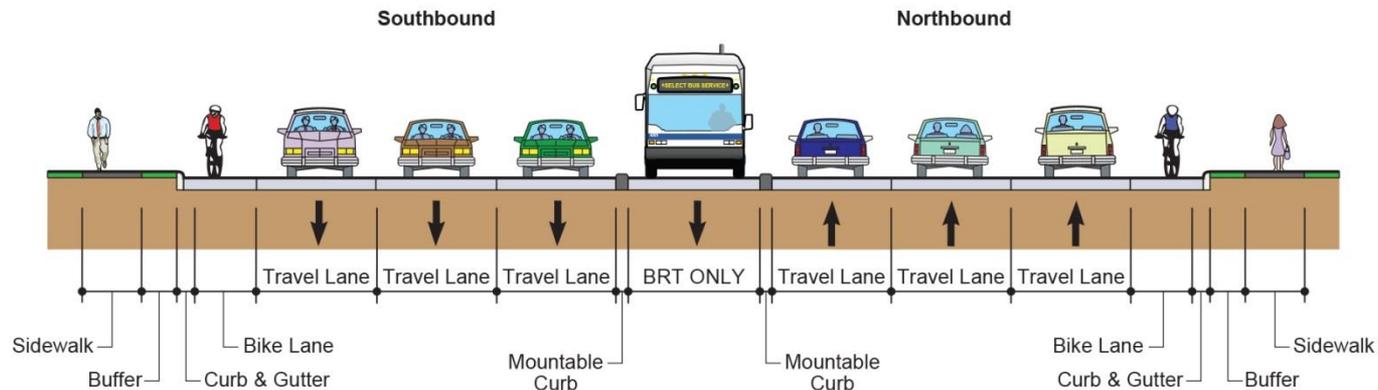
Widened sidewalk at BRT station means bus does not have to wait to merge back into travel lane to leave station.

# BRT Running Way Options

## Option 3 – One-Way, Reversible, Dedicated BRT Lane

- Would provide BRT service in addition to the existing local bus service.
- Peak direction BRT buses in the one-way reversible lane would stop at new BRT stations, while off-peak direction BRT buses will operate in mixed traffic and could use existing bus stops retrofitted for BRT.
- Directionality of the dedicated BRT lane would be determined by peak-hour demand.
- Reversible lanes could be implemented in median or curb lane via an additional lane.
- An existing general use travel lane could be repurposed to a lane exclusively dedicated for the use of buses.

**Type A:** Additional lane is included to accommodate the dedicated BRT lane

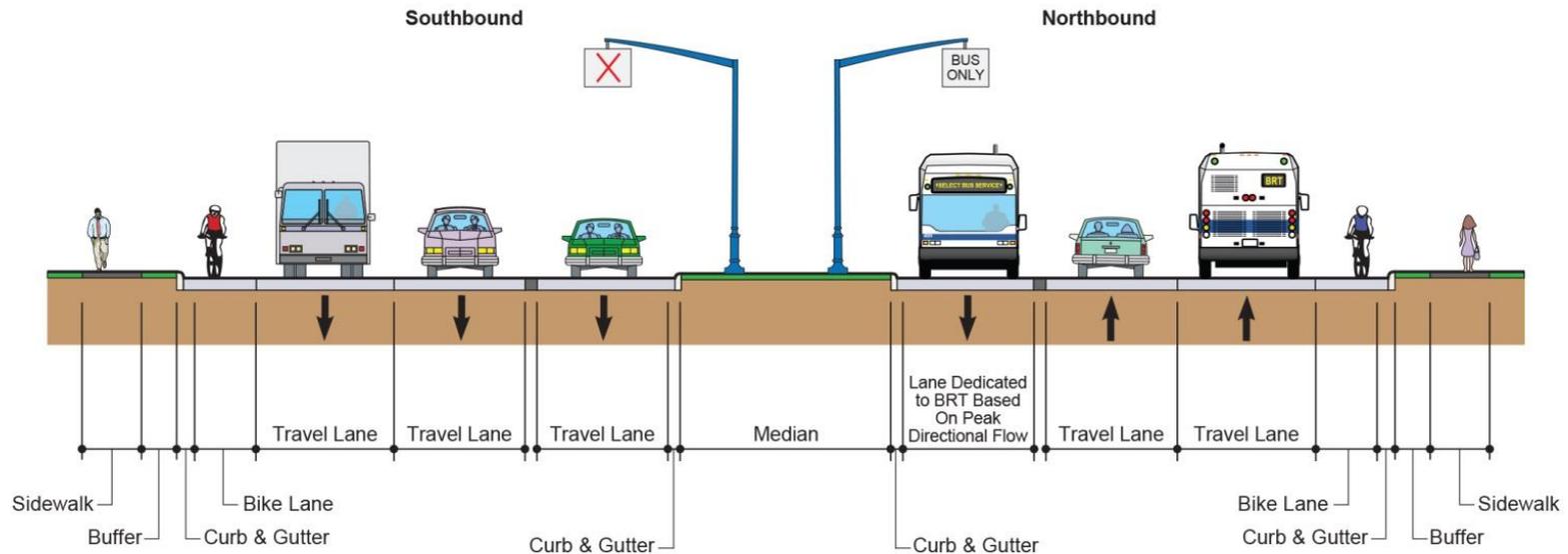


A.M. Peak Configuration Shown

# BRT Running Way Options

## Option 3 – One-Way, Reversible, Dedicated BRT Lane

**Type B:** Existing travel lane is repurposed to accommodate the dedicated BRT lane.



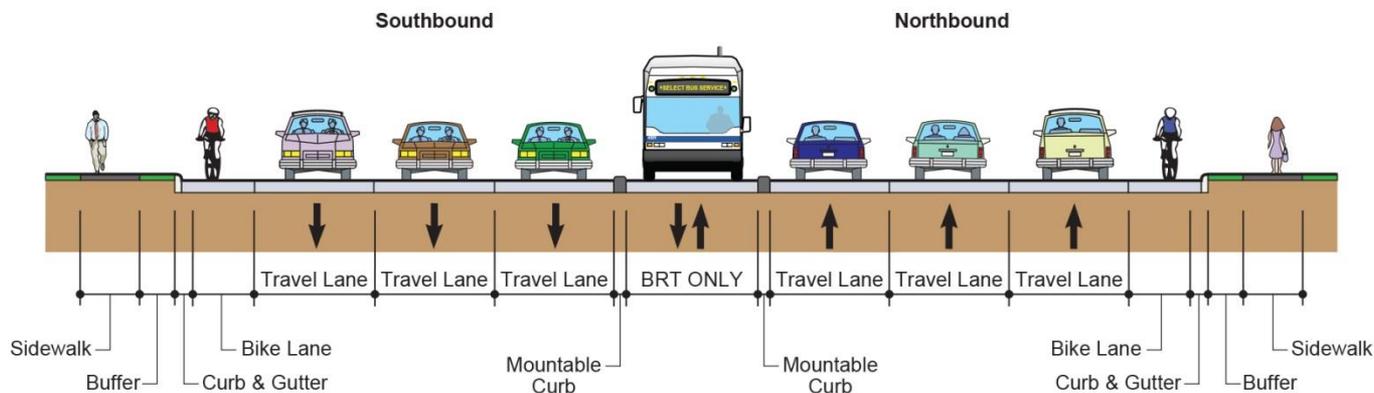
A.M. Peak Configuration Shown

# BRT Running Way Options

## Option 4 – Bi-Directional, Dedicated BRT Lane

- Would provide BRT service in addition to the existing local bus service.
- Buses in bi-directional lanes would stop at new BRT stations.
- In a bi-directional system BRT buses share a single lane that will have passing zones to maintain operation.
- Bi-directional lanes could be implemented in the median or curb lane via an additional lane or repurposing of an existing travel lane.

**Type A:** Additional lane is included to accommodate the dedicated BRT lane



# Bi-Directional Lane – Eugene, Oregon



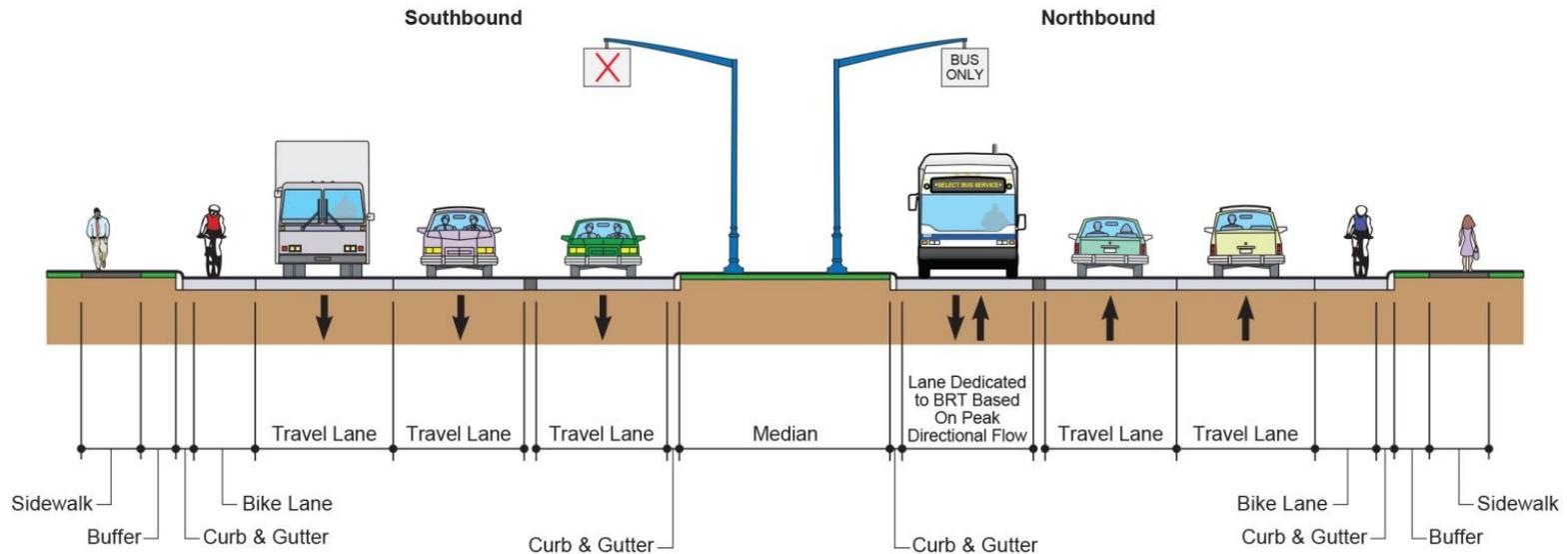
# Bi-Directional Lane – Eugene, Oregon



# BRT Running Way Options

## Option 4 – Bi-Directional, Dedicated BRT Lane

**Type B:** Existing travel lane is repurposed to accommodate the dedicated BRT lane



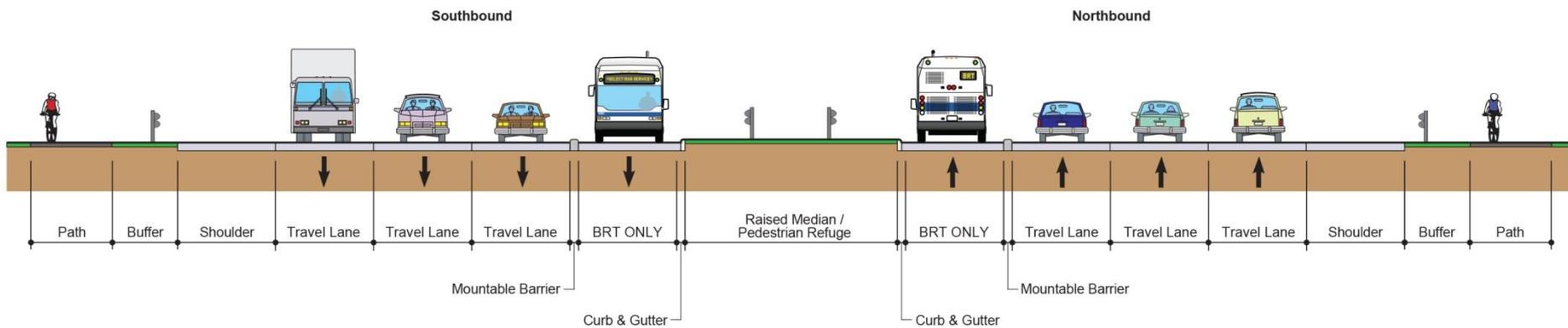
A.M. Peak Configuration Shown

# BRT Running Way Options

## Option 5 – Dedicated BRT Median Lanes

- Would provide BRT service in addition to the existing bus services.
- BRT would operate in dedicated lanes located in the median with new stations and implemented via additional lanes or repurposing of existing travel lane(s).

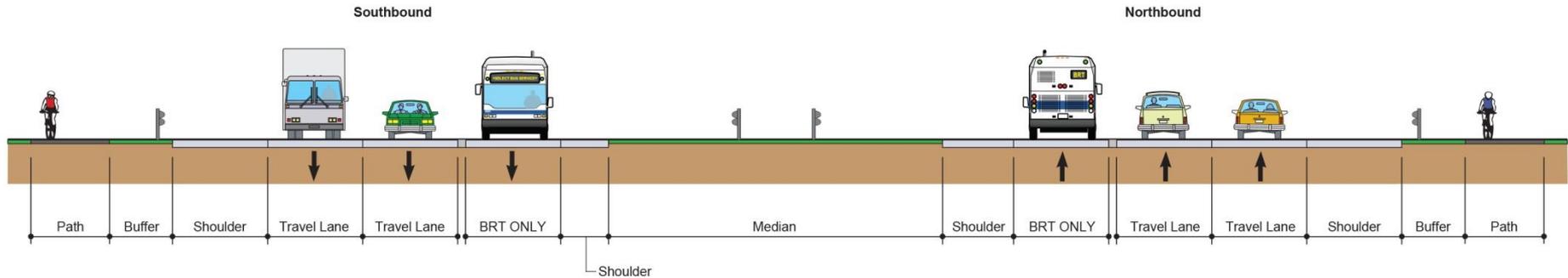
**Type A:** Additional lanes are included to accommodate the dedicated BRT lanes



# BRT Running Way Options

## Option 5 – Dedicated BRT Median Lanes

**Type B:** Existing travel lanes are repurposed to accommodate the dedicated BRT lanes



# Dedicated Median BRT Lanes

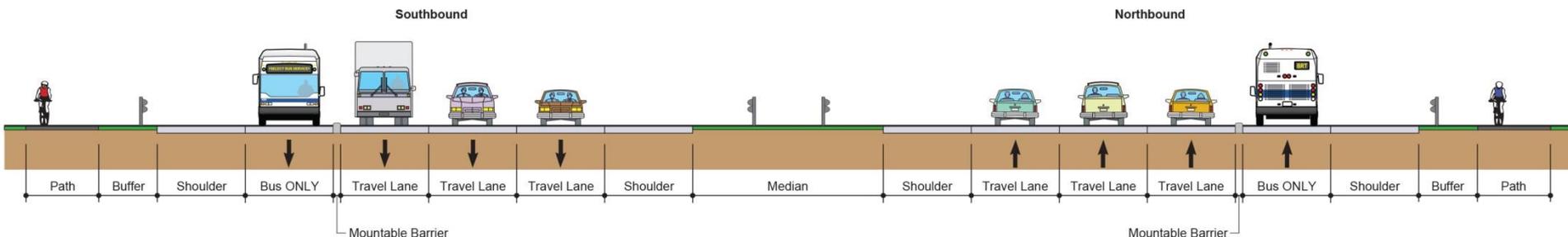


# BRT Running Way Options

## Option 6 – Dedicated BRT Curb Lanes

- Would provide BRT service in addition to the existing bus services.
- BRT would operate in dedicated lanes located curbside with new stations and implemented via additional lanes or repurposing of existing travel lane(s).
- The curbside lane could be shared with existing bus services, vehicles making right turns, and those merging to and from US 29.

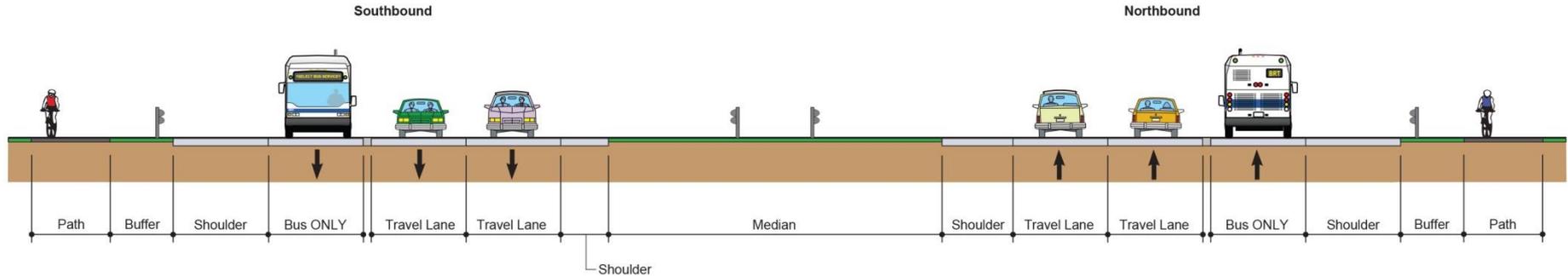
**Type A:** Additional lanes are included to accommodate the dedicated BRT lanes



# BRT Running Way Options

## Option 6 – Dedicated BRT Curb Lanes

**Type B:** Existing travel lanes are repurposed to accommodate the dedicated BRT lanes



# Dedicated Curb BRT Lanes



# BRT Running Way Options

## Summary of Options

- Option 1: BRT in Mixed Traffic
- Option 2: BRT Queue Jump Lanes
- Option 3\*: One-Way, Reversible, Dedicated BRT Lane
- Option 4\*: Bi-Directional, Dedicated BRT Lane
- Option 5\*: Dedicated BRT Median Lanes
- Option 6\*: Dedicated BRT Curb Lanes

\*Types Vary – Could be achieved through additional lanes or lane repurposing.

# Questions: BRT Running Way Options



# CAC Meeting #3 Agenda

## Topics to be discussed:

- Project Update
- Transit Ridership
- Traffic Operations
- Draft Purpose and Need Language
- BRT Running Way Options
- **Future Meetings & Questions**

# CAC Meeting Topics

## Topics Covered:

- ✓ Existing Conditions
- ✓ Purpose and Need
- ✓ Regional Travel Demand
- ✓ Traffic & Ridership
  - Existing
  - Future No-Build
- ✓ Crash History
- ✓ Environmental Inventory
- ✓ BRT Running Ways

## Upcoming Topics:

- Land Use & Development
- Environmental Review
- Review of Technical Data
- Build Traffic & Ridership Analyses
- Preliminary Concepts
  - Range of improvements
  - Station locations
  - Anticipated impacts
  - Costs

**Other topics/issues you would like to discuss at future meetings?**

# Future Meetings

- Next CAC Meeting Dates: To Be Determined
- Informational Open House Meetings: Fall 2015

# Questions & Comments



# Adjournment