

Duke Street in Motion Advisory Group #4 Advance Materials

- 2012 High Capacity Transit Corridor Working Group Recommendation
- Conceptual design phase process graphic
- Conceptual design alternative summaries for Segments 1 and 3
- Design alternatives screening evaluation

2012 High Capacity Transit Corridor Working Group (CWG) Recommendation

The 2012 recommendation by the CWG is the type of recommendation the Duke Street in Motion Advisory Group is expected to make in terms of level of detail, including consideration of phasing, where appropriate.

Corridor B (Duke Street) Recommendation by High Capacity Transit Corridor Work Group, March 15, 2012

The following motion was passed by the High Capacity Transit Corridor Work Group at its March 15, 2012, meeting, regarding transit in Corridor B:

"The combination of Duke Street Alternatives 1a and 3c, are the preferred approach for phased implementation of a dedicated transitway in Corridor B. Alternative 1a would be the first phase of transitway implementation on Duke Street. It would create dedicated transit lanes in existing six-lane sections of Duke Street between Landmark Mall and Jordan Street and between Roth Street and Diagonal Road. In the remaining section of Duke Street between Jordan Street and Roth Street, transit would operate in mixed flow.

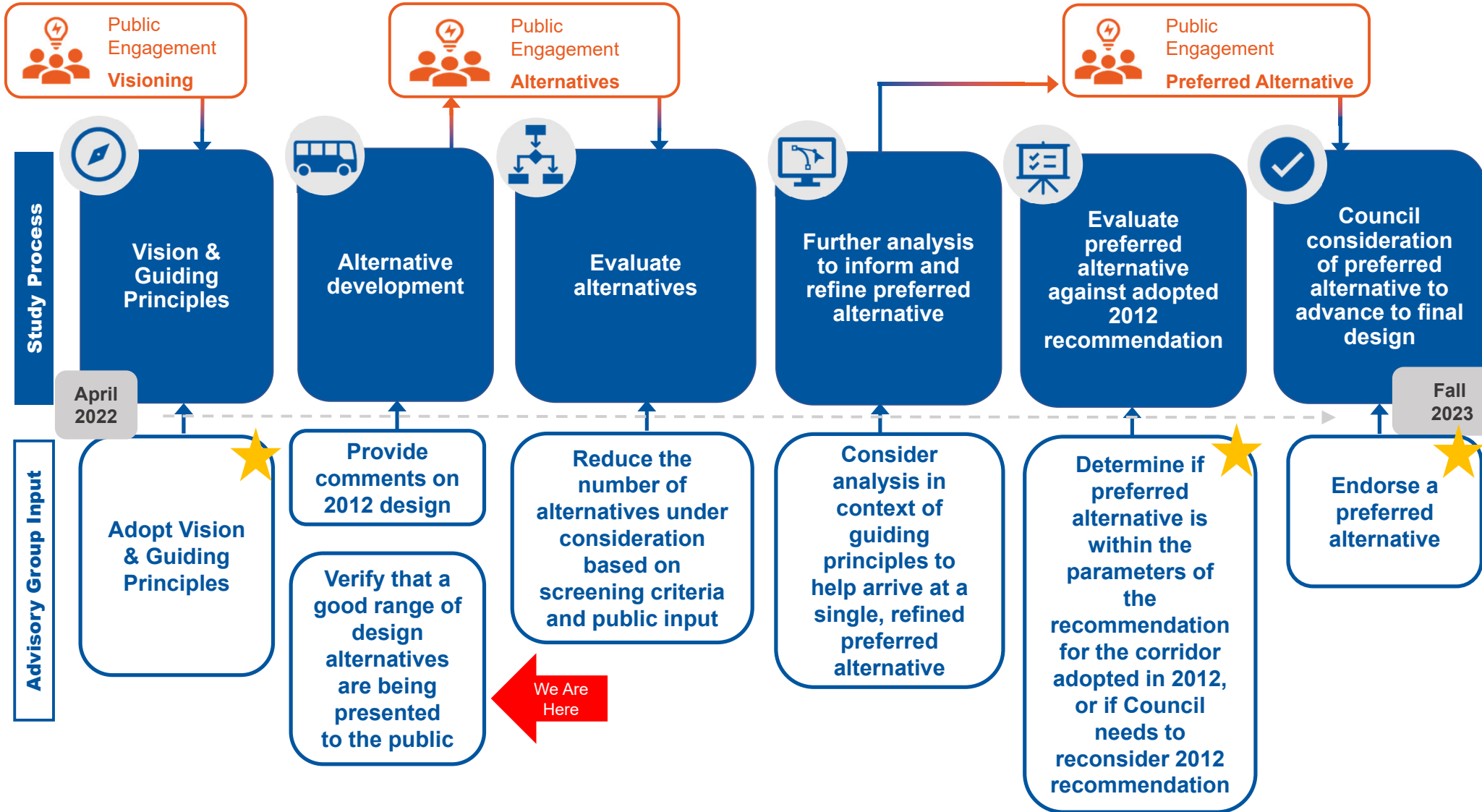
A parallel off-corridor bicycle facility should be examined to accommodate bicyclists along Duke Street and improved pedestrian facilities would be provided at intersections and near transit stations. Preliminary implementation should prioritize enhanced pedestrian safety and improvements at Taylor Run Parkway.

Alternative 3c would be the subsequent phase of transitway implementation on Duke Street. It would build on Alternative 1a by widening Duke Street to provide a reversible lane between Jordan Street and Roth Street. The reversible lane would be configured to allow Duke Street to accommodate a dedicated transit lane in the peak hour and peak direction of traffic flow during the a.m. and p.m. peak periods along Duke Street. Alternative 3c should continue to examine a bicycle facility along Duke Street along with corridor-wide pedestrian improvements. However, the Work Group believes that bicycles should be accommodated in this corridor if studies demonstrate that the streetscape can still be enhanced."

Duke Street in Motion Conceptual Design Phase Process Graphic

This graphic shows the general process for the conceptual design phase of Duke Street in Motion. The *Advisory Group Input* section is based on the Advisory Group [mission and charge](#) that Council adopted in March 2022.

★ Advisory Group Action



Design Alternatives for Segments 1 and 3

This section includes one-page summaries of the major design elements, benefits, and tradeoffs for each of the three proposed alternatives for Segments 1 and 3.

A notes section is included if you want to capture any questions or comments prior or during the meeting.

The questions on the next page will help address meeting goals outlined in the agenda.

Preliminary Questions to consider

Do you understand the design alternatives?

Are these a good range of options to bring to the community?

Are we missing any benefits/tradeoffs?

Segment 1: Center Running BRT (1A)

West End Alexandria to Jordan Street



EXISTING CORRIDOR

- » Three travel lanes in each direction
- » Median with trees
- » Sidewalk on both sides of the street
- » Some areas with commercial frontage roads
- » Some curbside bus pull off areas

PROPOSED DESIGN

- » Two travel lanes with turn lanes in each direction
- » A dedicated bus lane in each direction
- » Median buffers
- » Sidewalk on both sides of the street buffered from vehicles
- » Two-way cycle track with buffer
- » Opportunities for additional landscaping on the buffered cycle track side
- » Opportunity to relocate utilities underground

KEY TRADE OFFS

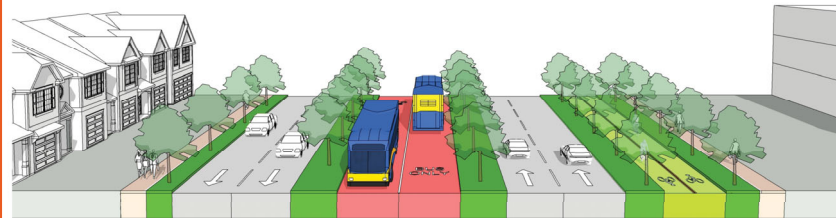
- » Number of general travel lanes reduced
- » Changes to commercial frontage road and related access

EXISTING TYPICAL SECTION



Sidewalk Travel Lanes Median Travel Lanes Frontage Road Sidewalk

CENTER RUNNING BRT (ALTERNATIVE 1A)



Sidewalk Travel Lanes BRT Lanes Travel Lanes Buffered Cycle Track Sidewalk

BENEFITS



Convenient

- » Dedicated transit lane improves **transit reliability** and bus rider experience



Efficient

- » Dedicated center transit lane provide maximum **travel time savings** for bus riders



Safe

- » Improved **pedestrian access and safety** with buffered sidewalks and shorter crossings
- » Increased **bicyclist safety**, comfort, and convenience
- » Improved **vehicle safety** from separating car and transit traffic and reducing conflict areas



Vibrant and Sustainable

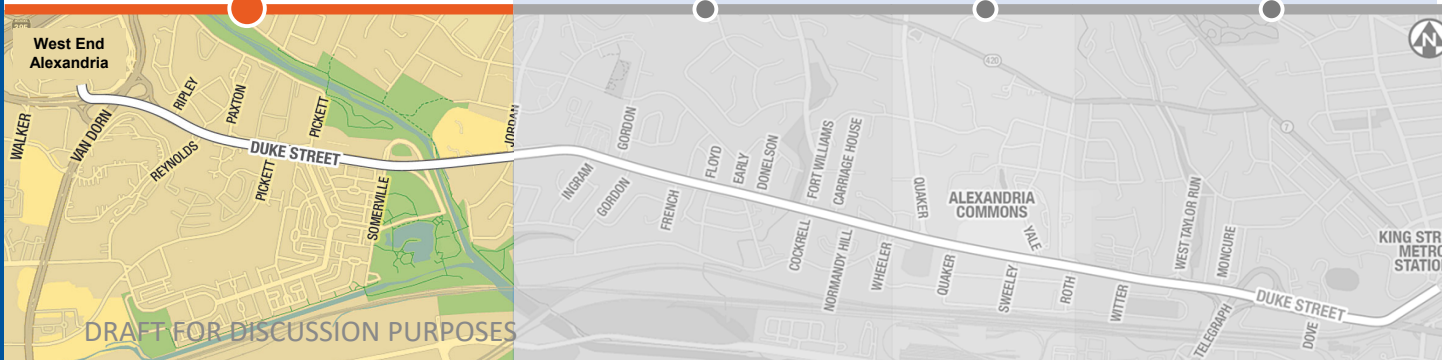
- » Increased area for **trees**, **streetscaping**, **stormwater management**



Equitable

- » Enhanced stations located near **high ridership/high need communities**

Notes



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Segment 1: Curb Running BRT (1B)

West End Alexandria to Jordan Street



EXISTING CORRIDOR

- » Three travel lanes in each direction
- » Median with trees
- » Sidewalk on both sides of the street
- » Some areas with commercial frontage roads
- » Some curbside bus pull off areas

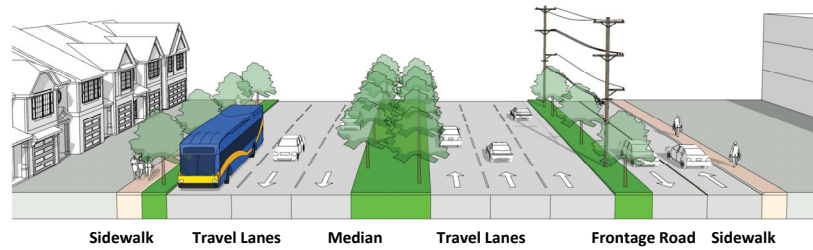
PROPOSED DESIGN

- » Two travel lanes with turn lanes in each direction
- » A dedicated bus lane in each direction with vehicles sharing the bus lane to make right turns
- » No change to median
- » Sidewalk will be buffered from vehicles on the south side of the street
- » Two-way shared use path with buffer from vehicle traffic on the north side of the street
- » Opportunities for additional landscaping on the shared use path side
- » Opportunity to relocate utilities underground

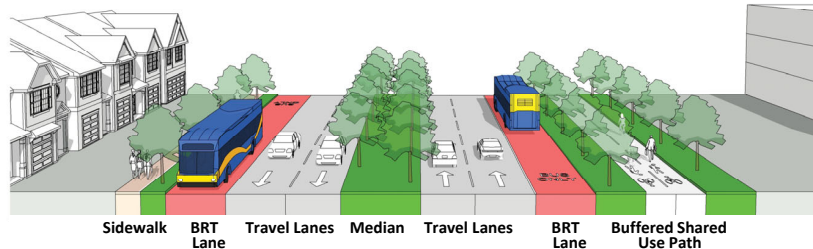
KEY TRADE OFFS

- » Number of general travel lanes reduced
- » Right turning vehicles use bus lanes, which reduces bus reliability
- » Changes to commercial frontage roads and related access

EXISTING TYPICAL SECTION



CURB RUNNING BRT (ALTERNATIVE 1B)



BENEFITS



Convenient

- » Dedicated transit lane improves **transit reliability** and bus rider experience



Efficient

- » Dedicated bus lane in each direction with vehicles sharing the bus lane to make right turns provides **travel time savings** for bus riders



Safe

- » Improved **pedestrian access and safety** with buffered sidewalk, and a buffered shared use path
- » Increased **bicyclist safety**, comfort, and convenience



Vibrant and Sustainable

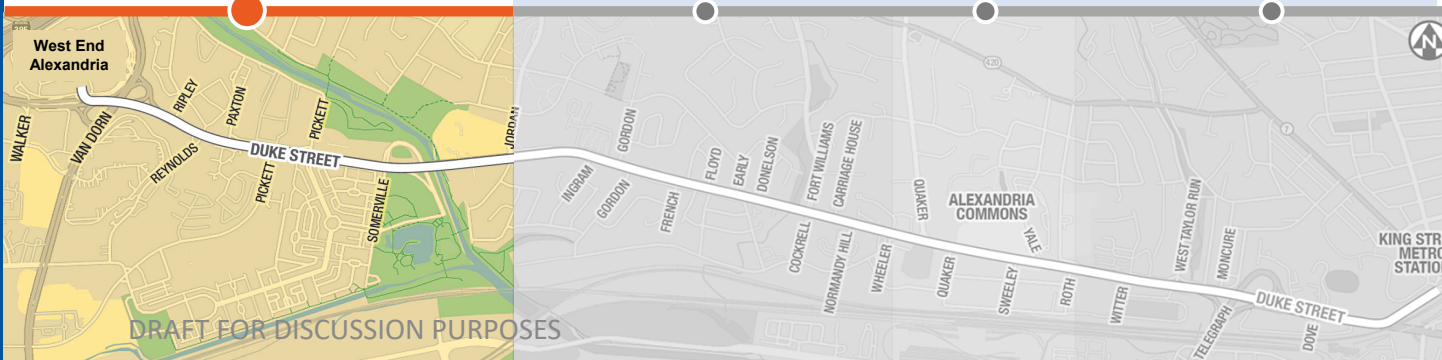
- » Center median and **tree canopy** remain as is with an increased area for **trees** to buffer the shared use path



Equitable

- » Enhanced stations located near **high ridership/high need communities**

NOTES



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Segment 1: Mixed Traffic BRT (1C)

West End Alexandria to Jordan Street



EXISTING CORRIDOR

- » Three travel lanes in each direction
- » Median with trees
- » Sidewalk on both sides of the street
- » Some areas with commercial frontage roads
- » Some curbside bus pull off areas

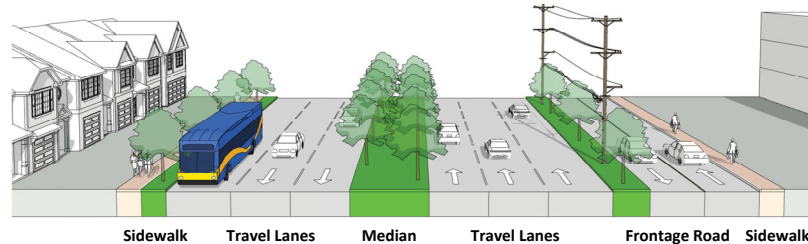
PROPOSED DESIGN

- » Three travel lanes in each direction
- » No dedicated bus lane in either direction
- » No change to median
- » Sidewalk will be buffered from vehicles
- » Two-way shared use path with buffer from vehicle traffic
- » Opportunities for additional landscaping on the shared use path side
- » Opportunity to relocate utilities underground

KEY TRADE OFFS

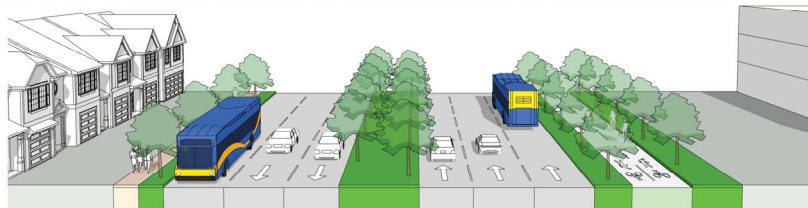
- » Limited/reduced improvement to bus operation and reliability
- » No changes to vehicle safety in the corridor
- » Changes to commercial frontage road and related access

EXISTING TYPICAL SECTION



Sidewalk Travel Lanes Median Travel Lanes Frontage Road Sidewalk

MIXED TRAFFIC BRT (ALTERNATIVE 1C)



Sidewalk Travel Lanes Median Travel Lanes Buffered Shared Use Path

BENEFITS



Convenient

- » Transit signal priority and queue jump at intersections improve **transit reliability** and bus rider experience



Safe

- » Improved **pedestrian access and safety** with buffered sidewalk, and a buffered shared use path
- » Increased **bicyclist safety**, comfort, and convenience



Vibrant and Sustainable

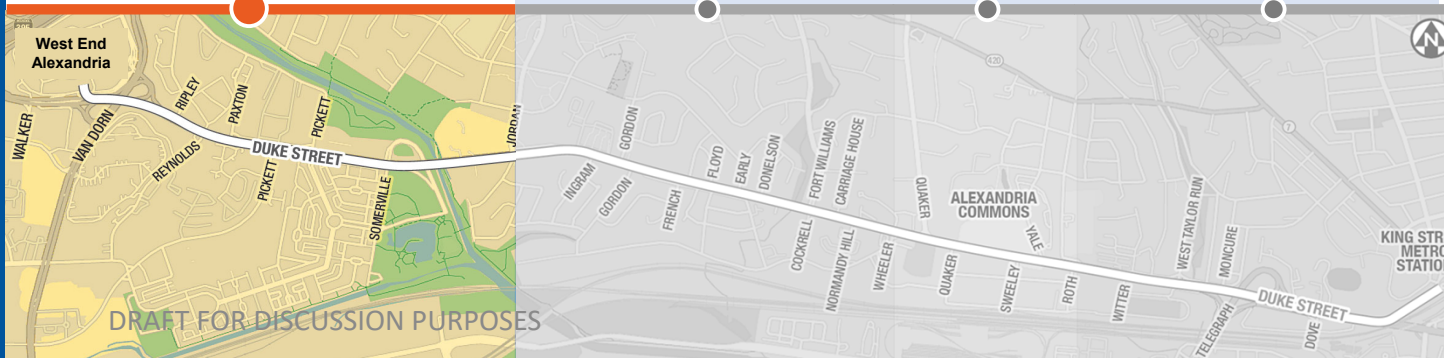
- » Minimal changes required for only a **small change to project footprint**
- » Center median and **tree canopy** remain as is with an increased area for **trees** to buffer the shared use path



Equitable

- » **Enhanced stations** located near **high ridership/high need communities**

NOTES



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Segment 3: Center Running (3A)

Roth Street to King Street Metro Station



EXISTING CORRIDOR

- » Three travel lanes in each direction
- » Median with trees
- » Sidewalk on both sides of the street (northern sidewalk along elevated frontage road)
- » Some areas with frontage roads
- » Existing bicycle sharrows on frontage road

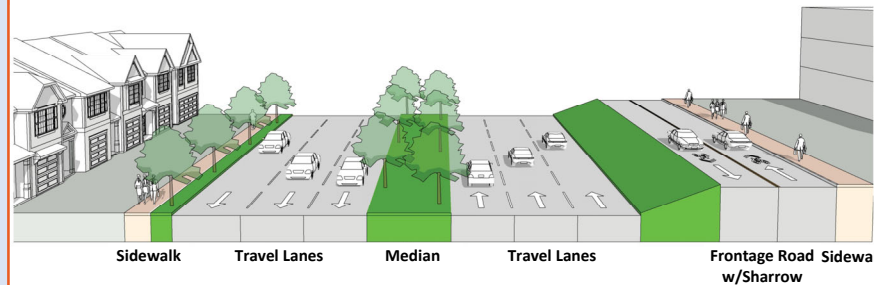
PROPOSED DESIGN

- » Two travel lanes in westbound (WB) direction
- » Three travel lanes in eastbound (EB) direction
- » One dedicated transit lane in each direction
- » Median buffer with space for landscaping and stormwater features
- » Sidewalk with buffer on both sides of the street
- » Two-way cycle track with buffer
- » At-grade pedestrian/bicycle facilities on the north side at grade with Duke Street
- » Additional landscaping/greenspace along the buffered cycle track

KEY TRADE OFFS

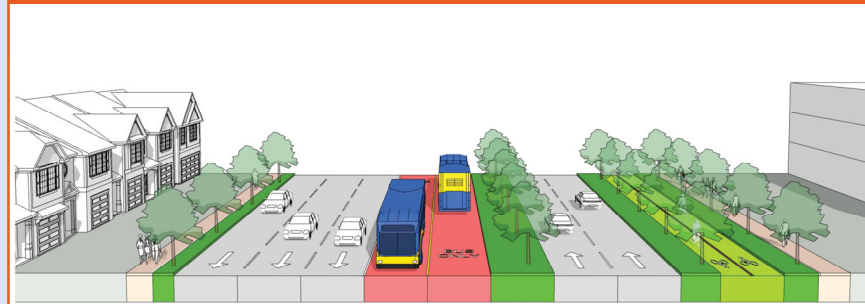
- » Number of general travel lanes WB reduced
- » Changes to frontage road and related access

EXISTING TYPICAL SECTION



Sidewalk Travel Lanes Median Travel Lanes Frontage Road Sidewalk w/Sharrows

CENTER RUNNING (ALTERNATIVE 3A)



Sidewalk EB Travel Lanes BRT Lanes Median WB Travel Lanes Buffered Cycle Track Sidewalk

BENEFITS



Convenient

- » Dedicated transit lane improves **transit reliability** and bus rider experience



Efficient

- » Dedicated center transit lane provide maximum **travel time savings** for bus riders



Safe

- » Improved **pedestrian access and safety** with buffered sidewalks and shorter crossings
- » Increased **bicyclist safety**, comfort, and convenience
- » Improved **vehicle safety** from separating car and transit traffic and reducing conflict areas



Vibrant and Sustainable

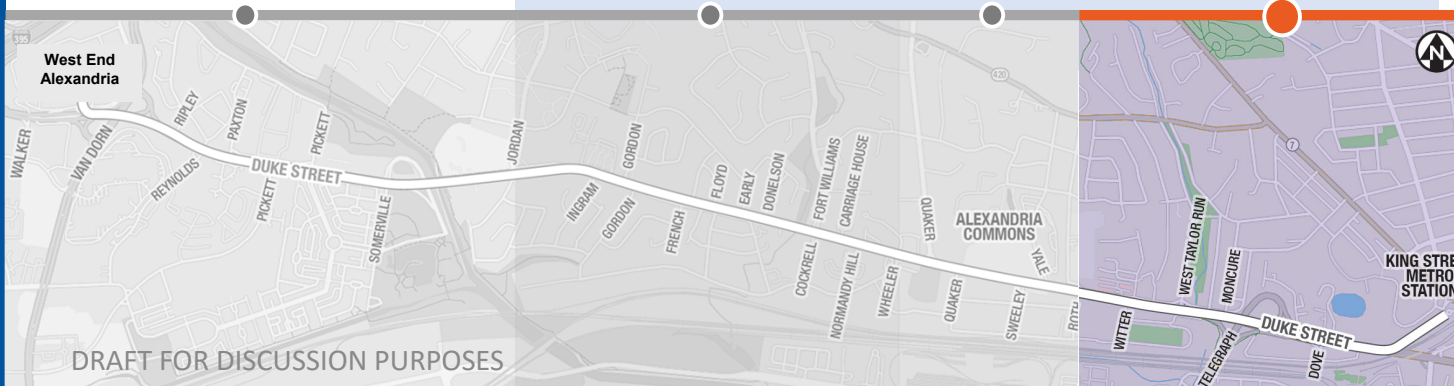
- » Increased area for **trees, street-scaping, stormwater management**



Equitable

- » Enhanced stations located near **high ridership/high need communities**

NOTES



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Segment 3: Curb Running (3B)

Roth Street to King Street Metro Station



EXISTING CORRIDOR

- » Three travel lanes in each direction
- » Median with trees
- » Sidewalk on both sides of the street (northern sidewalk along elevated frontage road)
- » Some areas with frontage roads
- » Bicycle sharrows on frontage road

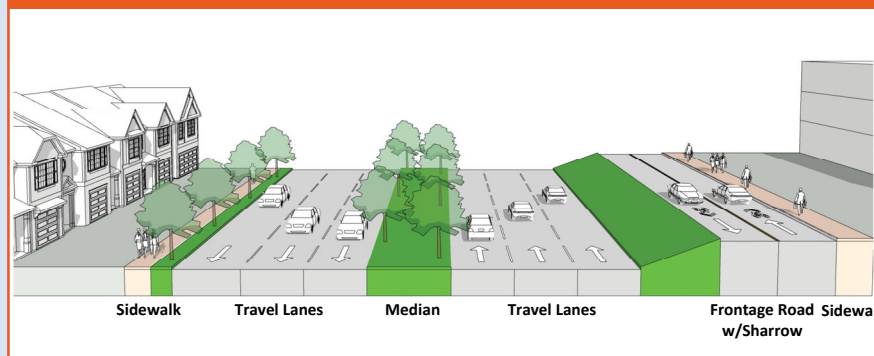
PROPOSED DESIGN

- » Two travel lanes in the westbound (WB) direction
- » Three travel lanes in eastbound direction (EB)
- » Dedicated transit lane in the westbound direction
- » Enhanced median buffers
- » Two-way cycle track on the elevated frontage road

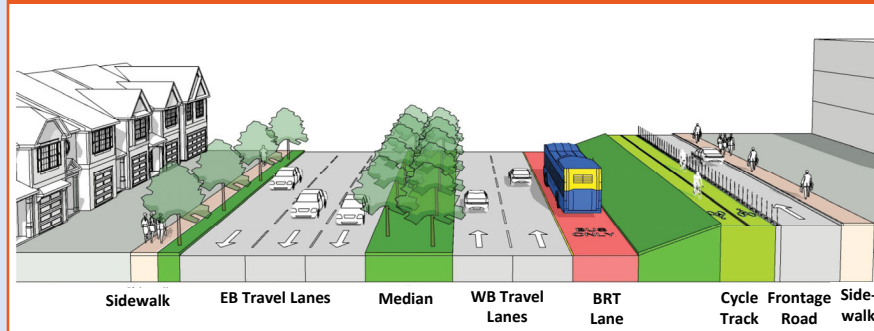
KEY TRADE OFFS

- » Number of general travel lanes WB reduced
- » Changes frontage road and related access
- » Cycle track provides less direct connectivity to Duke Street, but at less cost using existing frontage road
- » Number of travel lanes EB maintained

EXISTING TYPICAL SECTION



CURB RUNNING (PROPOSED DESIGN 3B)



BENEFITS



Convenient

- » Dedicated transit lane improves **transit reliability** and bus rider experience



Efficient

- » Dedicated curbside transit lane provide maximum **travel time savings** for bus riders in the westbound direction.



Safe

- » Improved **pedestrian access and safety** with buffered sidewalks and shorter crossings
- » Increased **bicyclist safety**, comfort, and convenience
- » Improved **vehicle safety** from separating car and transit traffic and reducing conflict areas



Vibrant and Sustainable

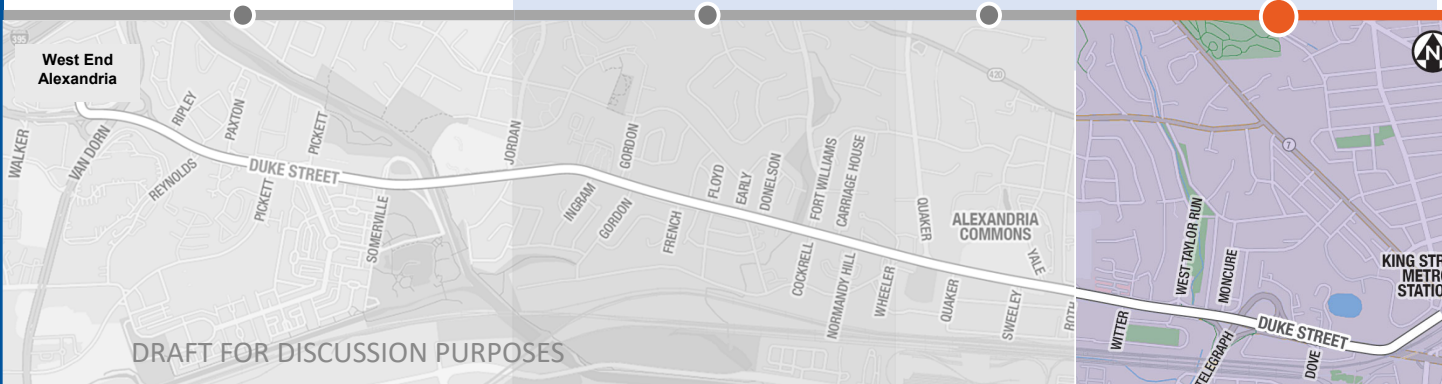
- » Increased area for **trees, street-scaping, stormwater management**



Equitable

- » **Enhanced stations** located near **high ridership/high need communities**

NOTES



DRAFT FOR DISCUSSION PURPOSES

Segment 3: Mixed Traffic (3C)

Roth Street to King Street Metro Station



EXISTING CORRIDOR

- » Three travel lanes in each direction
- » Median with trees
- » Sidewalk on both sides of the street (northern sidewalk along elevated frontage road)
- » Some areas with frontage roads
- » Bicycle sharrows on frontage road

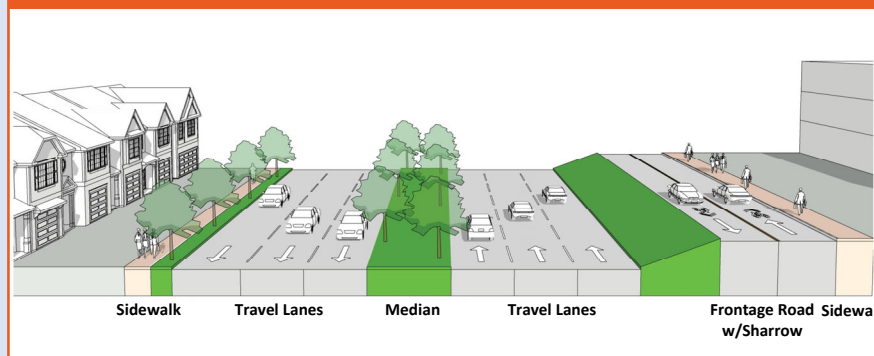
PROPOSED DESIGN

- » Three travel lanes in each direction
- » No dedicated transit lane in either direction
- » Median remains unchanged
- » Existing bicycle sharrows on frontage road remains as is
- » Queue jump areas at spot locations along the corridor to help provide transit reliability and reduction in transit travel time

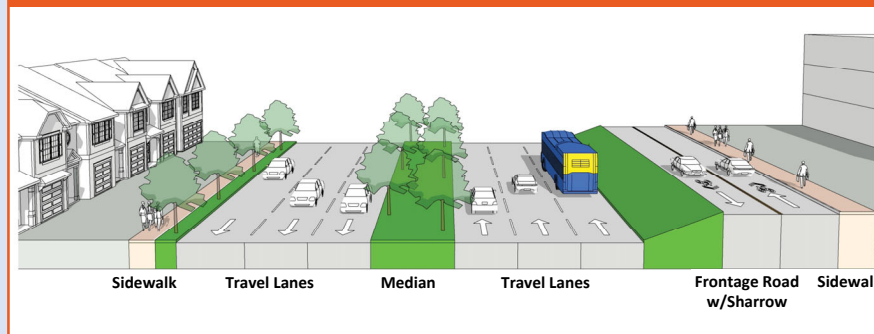
KEY TRADE OFFS

- » Limited/reduced improvement to transit operation and reliability
- » No changes to corridor safety
- » No changes to frontage road and related access
- » General traffic capacity and travel time remains unchanged

EXISTING TYPICAL SECTION



MIXED TRAFFIC (ALTERNATIVE 3C)



BENEFITS



Convenient

- » Transit signal priority and queue jump at intersections improve **transit reliability** and bus rider experience



Safe

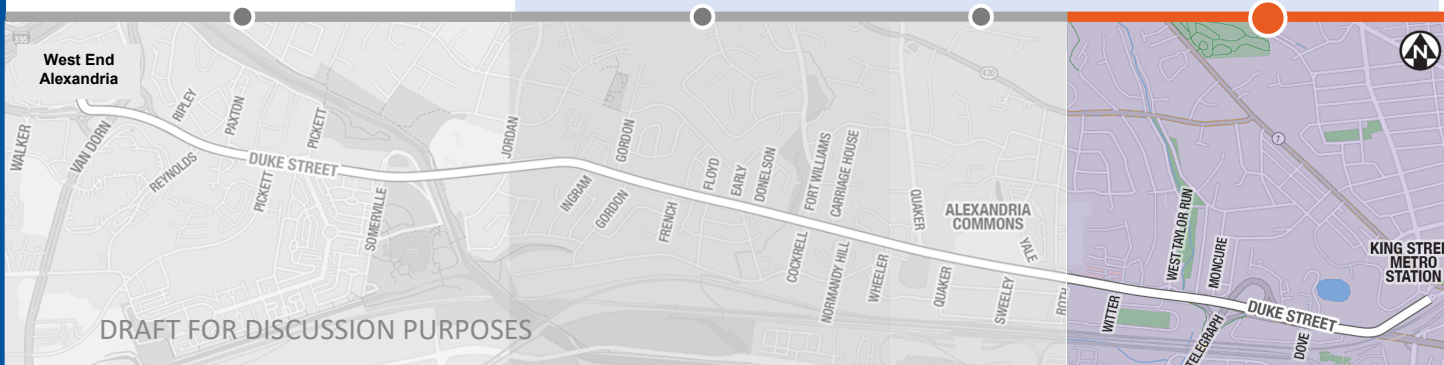
- » Some improvements to crosswalks and **pedestrian safety and access** to station areas



Equitable

- » Enhanced stations located near **high ridership/high need communities**

NOTES



Design Alternatives Screening Evaluation

This section includes a screening of the design alternatives based on the guiding principles. This level of screening presents the relative benefits/impacts between the alternatives. Future work will make this exercise more quantitative.

Key					
	No Benefit	Minor Benefit	Moderate Benefit	Large Benefit	
	No Impact	Minor Impact	Moderate Impact	Large Impact	
					<p>Center Running BRT Alternative 1A</p>
					<p>Curb Running BRT Alternative 1B</p>
					<p>Mixed Traffic BRT Alternative 1C</p>
Benefits	Convenient	Bus schedule reliability and user experience	●●●	●●	●
		Pedestrian improvements and accessibility features	●●●	●●	●●
	Safe	Bicycle facilities and connectivity	●●●	●●●	●●●
		Corridor and intersection safety features	●●●	●	○
	Vibrant	Areas for green space and streetscaping	●●●	●●	●●
	Sustainable	Areas for tree canopy and stormwater management features	●●●	●●	●●
Impacts	Efficient	Bus travel time*	●●●	●●	●
		Non-transit vehicle travel time*	●	●	●
		Property acquisition	●	●	●
	Vibrant	Service/frontage road	●●●	●●●	●●●
		Business/residential access or parking	●	●	●

*High level estimate based on bus running way configuration, signal delay. More detailed corridor end-to-end travel time will be provided during refinement of preferred alternative(s).

Key		Benefit				Impact				
		No Benefit	Minor Benefit	Moderate Benefit	Large Benefit	No Impact	Minor Impact	Moderate Impact	Large Impact	
		Center Running BRT Alternative 3A			Curb Running BRT Alternative 3B			Mixed Traffic BRT Alternative 3C		
Benefits	Convenient	Bus schedule reliability and user experience		●●●	●			●		
		Pedestrian improvements and accessibility features		●●●	●			●		
	Safe	Bicycle facilities and connectivity		●●●	●●			●		
		Corridor and intersection safety features		●●●	●			●		
	Vibrant	Areas for green space and streetscaping		●●●	●			●		
	Sustainable	Areas for tree canopy and stormwater management features		●●●	●			●		
Impacts	Efficient	Bus travel time*		●●●	●●			●		
		Non-transit vehicle travel time*		●●	●			●		
		Property acquisition		●				●		
	Vibrant	Service/frontage road		●●●	●●			●		
		Business/residential access or parking		●●●	●●			●		

*High level estimate based on bus running way configuration, signal delay. More detailed corridor end-to-end travel time will be provided during refinement of preferred alternative(s).