

## MEMORANDUM

January 22, 2021

TO: Transportation and Environment (T&E) Committee

FROM: Glenn Orlin, Senior Analyst

SUBJECT: Facility planning review of Amherst Avenue Bikeway Study<sup>1</sup>

PURPOSE: To review the study and provide guidance to the Department of Transportation (DOT)

### Participants

Dan Sheridan, Chief, Planning and Design Section, Division of Transportation Engineering, DOT  
Corey Pitts, Planning Section Manager, Division of Transportation Engineering, DOT  
Angel Cheng, Senior Planner, Division of Transportation Engineering, DOT  
Casey Anderson, Chair, Montgomery County Planning Board  
David Anspacher, Supervisor, Countywide Planning, Planning staff  
Eli Glazier, Planner/Coordinator, Countywide Planning, Planning staff

DOT has completed the first (feasibility) phase of facility planning for a new bikeway along Amherst Avenue in Wheaton that would run for 1.1 miles between Arcola Avenue and Windham Lane. The study is funded as part of the Bicycle-Pedestrian Priority Areas (BPPA) Improvements – Wheaton CBD project in the Capital Improvements Program. The Planning Board reviewed the study date at a worksession on December 3, 2020.

The objective of this worksession is for the Committee to provide feedback and guidance to DOT regarding the next (preliminary engineering) phase of facility planning. DOT's briefing presentation is on ©1-23, the Planning Board's letter is on ©24-25, and the Planning staff's report is on ©26-43.

***Alternatives studied.*** The project is divided into four segments. Their limits and curb-to-curb distances are:

- Segment 1: Windham Lane to Pritchard Road, 48 ft
- Segment 2: Pritchard Road to Reddie Drive, 40 ft
- Segment 3: Reddie Drive to Blueridge Avenue, 48 ft
- Segment 4: Blueridge Avenue to Arcola Avenue, 36 ft

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<sup>1</sup> Key words: #Amherst Avenue, bikeway

DOT has developed five alternatives:

- *Alternative 1* (©7) includes: One-way 5' separated bike lanes on both sides of Amherst Avenue with 2' buffer in Segments 1 and 3, a one-way 5' separated bike lane with a 2' buffer in the southbound direction of Segment 2, conventional bike lanes provided in the northbound direction in Segment 2 and southbound direction in Segment 4 and a shared lane provided in the northbound direction in Segment 4. This alternative is within the existing curb-to-curb width of the roadway for all segments. This alternative includes floating bus stops in Segment 3 and shared bus-bike platforms in Segment 4. Construction cost: \$2.1 million.
- *Alternative 2* (©8) includes: One-way 5' separated bike lanes on both sides of Amherst Avenue with 2' buffer in Segments 1, 3 and 4 and southbound in Segment 2, with a conventional bike lane provided in the northbound direction in Segment 2. This alternative widens the roadway widening in Segment 4 to accommodate the bikeway. This alternative includes floating bus stops and shared bus-bike platforms in Segment 3 and floating bus stops in segment 4. Construction cost: \$3.0 million.
- *Alternative 3A* (©10) includes: Two-way 8' separated bike lanes with variable (1'-2' buffer) on the west side of Amherst Avenue for all segments. This alternative is within the existing curb-to-curb width of the roadway. This alternative includes floating bus stops in Segment 3 and shared bus-bike platforms in Segment 4. Construction cost: \$1.9 million.
- *Alternative 3B* (©11) includes: Two-way 8' separated bike lanes with 3' buffer on the west side of Amherst Avenue for all segments. This alternative has roadway widening in Segments 2 and 4. This alternative includes floating bus stops in Segments 3 and 4. Construction cost: \$3.3 million.
- *Alternative 3B Modified* (©12) is the same as Alternative 3B, but the side of the road where the widening occurs in Segment 2 differs (east side in Alternative 3B; west side in Alternative 3B Modified). This alternative includes floating bus stops in Segments 3 and 4. Construction cost: \$3.1 million.

A comparison of the alternatives is on ©17. The construction cost estimates of the alternatives range from \$1.9 million to \$3.3 million, and none are too far off from the \$2.3 million programmed in the Approved CIP. Alternatives 3B and 3B Modified would remove the fewest on-street parking spaces (12); however, these two alternatives would remove the most trees: 19 and 44, respectively.

The Planning Board and staff recommendations are:

- Advance Alternative 3B Modified as the preferred alternative if the Maryland State Highway Administration (SHA) approves a protected intersection at the intersection of University Boulevard and Amherst Avenue, to ensure a safe crossing for bicyclists using the two-way separated bike lanes. Additionally, between Pritchard Road and Reddie Drive, rather than widening the road, travel lanes should be narrowed to 10.5 feet and the parking lane should be moved to the west side of the street to provide a three-foot bikeway buffer with parking protection.
- If this protected intersection is not approved by SHA, advance Alternative 2 as the preferred alternative and consider design changes to improve bicyclist comfort between Pritchard Road and

Reedie Drive, potentially including roadway widening, removal of both lanes of parking, or removal of one travel lane. After additional public engagement on these issues, DOT should consider resubmitting this project to the T&E Committee and the Planning Board for deliberations on the appropriate bikeway treatment between Pritchard Road and Reedie Drive in advance of mandatory referral.

**Council staff concurs with the Planning Board's and staff's recommendations.**

It is possible that DOT could complete the second (preliminary engineering) phase of facility planning this year, in which case final design and construction funding for the Amherst Avenue Bikeway would be eligible for inclusion in the FY23-28 CIP. The \$2.3 million currently programmed is in FYs25-26, so the Council may wish to consider accelerating the schedule when it takes up the full CIP next year.

Furthermore, this is the type of project that would likely be included in a Wheaton CBD Urban Mobility Program, should it be developed over the course of 2021, in which case the cost could be at least partially borne by development exactions paid in lieu of meeting the Growth and Infrastructural Policy (GIP) Local Area Transportation Review's Bicycle Mobility Test.

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# Project Overview

## Amherst Avenue Cycle Track

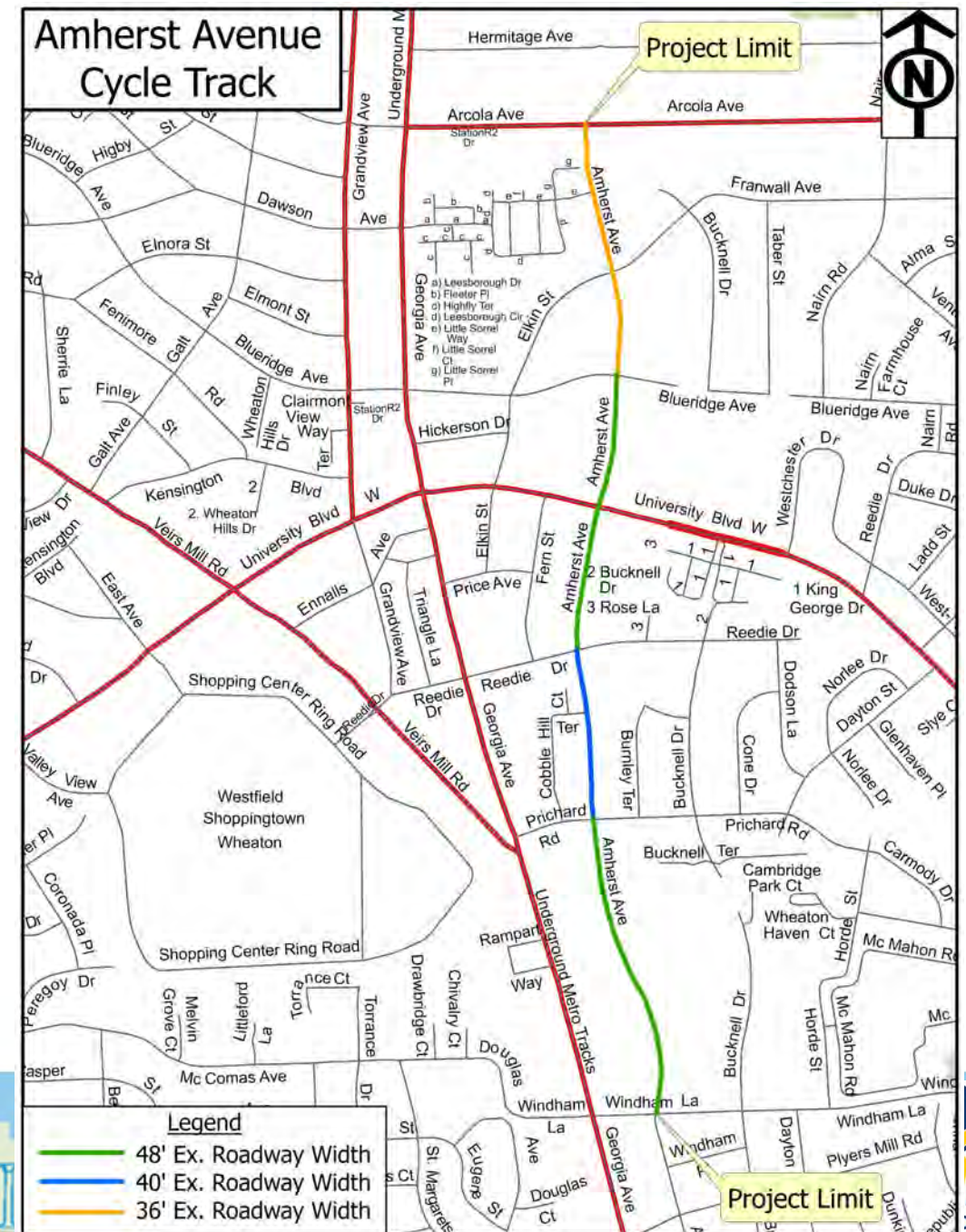
- From Windham Lane to Arcola Avenue
- Provide key connection to Sligo Creek Trail from the Wheaton Central Business District (CBD)
- Accommodate a long-distance bicycle connection from the terminus of the CBD
- Bicycle Master Plan: Separated bike lanes in both directions
- DRAFT CSDG Road Classifications:
  - Neighborhood Connector – Windham to Prichard; Blueridge to Arcola
  - Downtown Street – Prichard to Blueridge





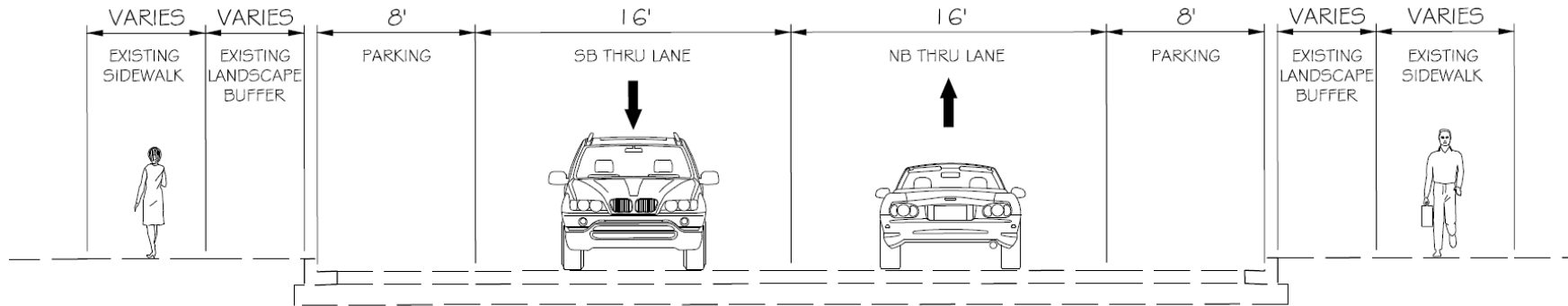
# Existing Conditions

- Typical roadway width – 48'
- Prichard Road to Reddie Drive – 40'
- Blueridge Avenue to Arcola Avenue – 36'
- ROW available beyond the existing sidewalk throughout corridor, varies between 60' – 90'

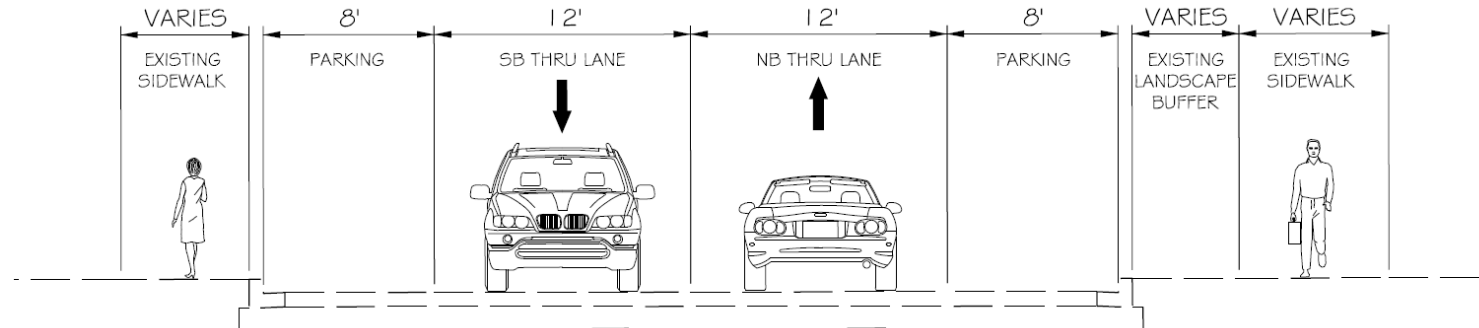


# Existing Conditions

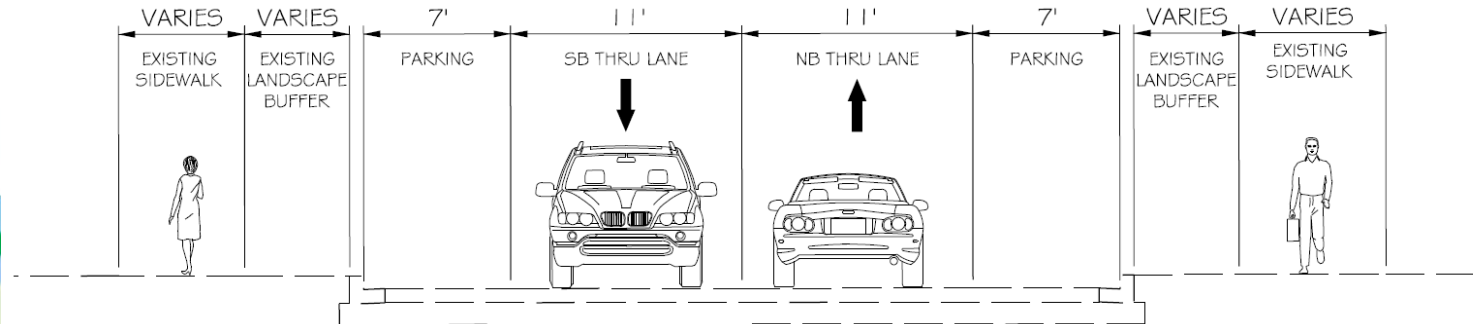
## 48' EXISTING ROADWAY SECTIONS



## 40' EXISTING ROADWAY SECTIONS



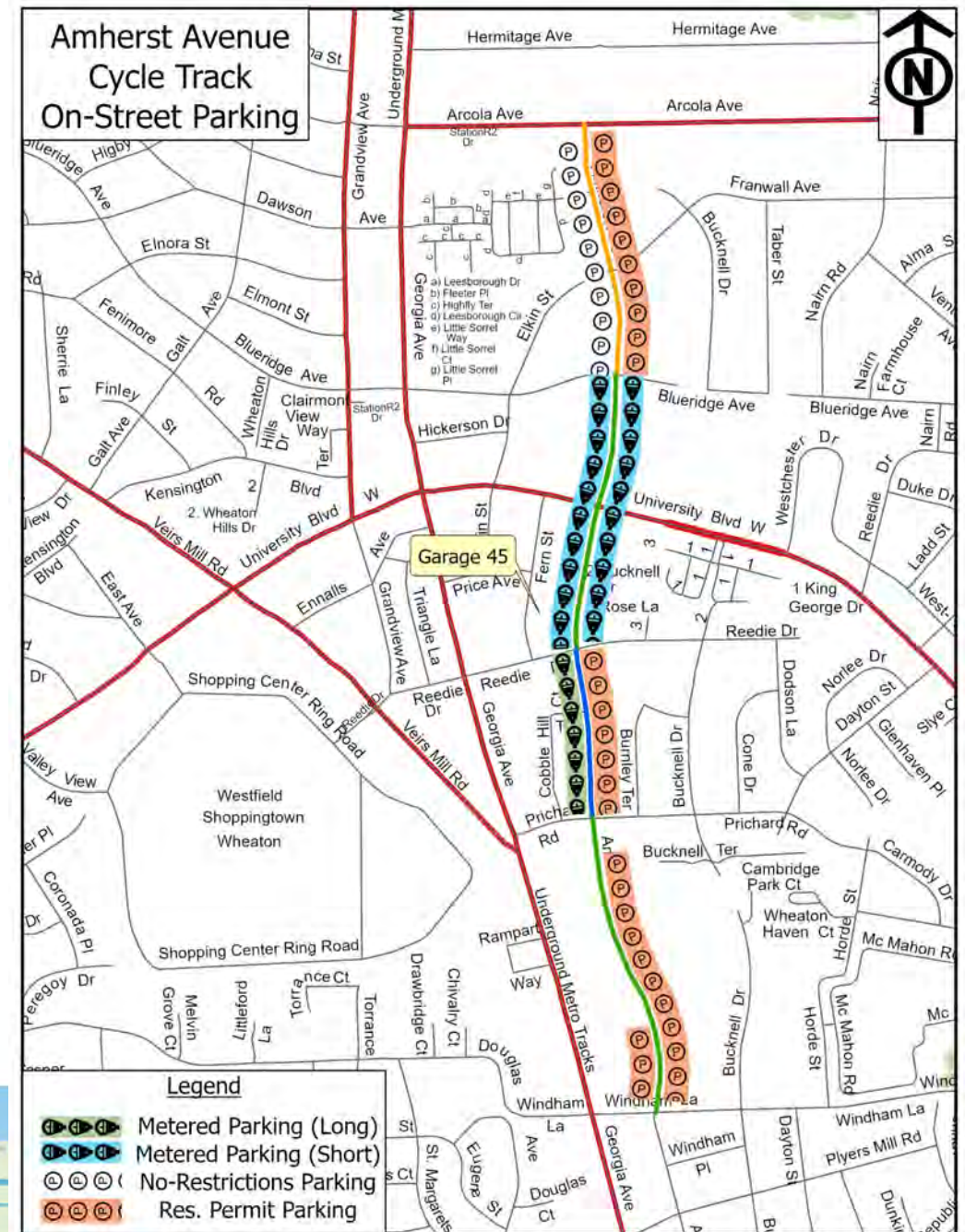
## 36' EXISTING ROADWAY SECTIONS





# Existing Conditions

- Parking on both sides for most of the corridor
  - Metered parking
    - Short-term – Reddie to Blueridge
    - Long-term/Reduced Residential Rate – SB Prichard to Reddie
  - Residential Permit parking
    - NB Windham to Prichard
    - NB Prichard to Reddie
    - NB Blueridge Ave to Arcola Ave
  - No-restrictions on-street parking
    - SB Blueridge to Arcola



# Alternatives Analysis





# Alternative Analysis Overview

## Bicycle Facility Types

### ➤ Separated Bike Lanes

- Alt. 1
- Alt. 2



### ➤ 2-Way Cycle Track

- Alt. 3A
- Alt. 3B & 3B Mod.



## Construction Complexity & Parking

### ➤ Within Existing Roadway Footprint (Utilize existing parking spaces)

- Alt. 1
- Alt. 3A

### ➤ Roadway Widening Needed (Maintain existing parking capacity)

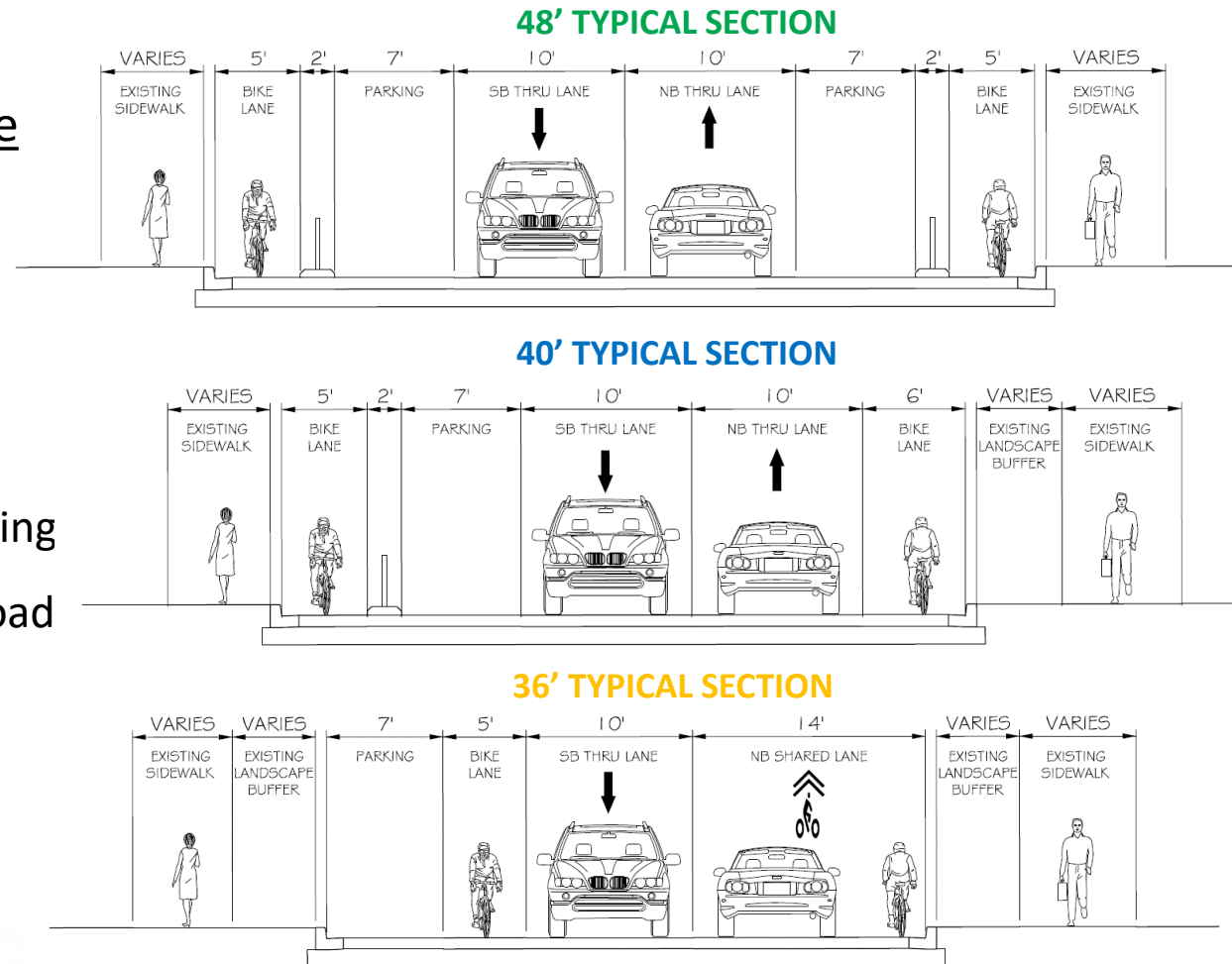
- Alt. 2
- Alt. 3B & 3B Mod.



# Proposed Corridor Alternative 1

## Separated Bike Lanes – Both Side

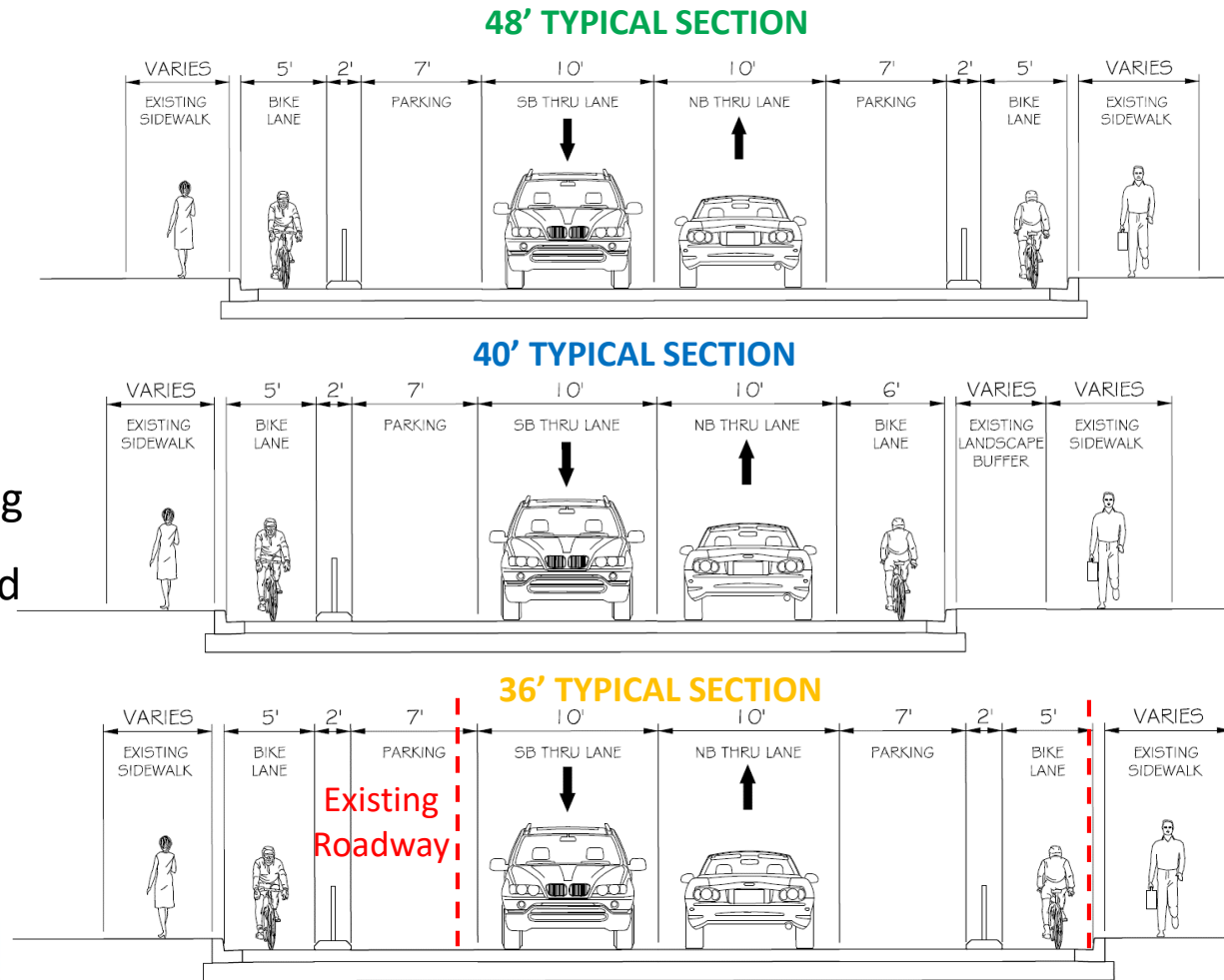
- 5' bike lane with 2' buffer
- Maintain 7' parking spaces to match existing conditions
  - Remove NB residential parking spaces between Prichard Road & Reddie Drive
- NB from Blueridge Avenue to Arcola Avenue – Shared Lane



# Proposed Corridor Alternative 2

## Separated Bike Lanes – Both Side

- 5' bike lane with 2' buffer
- Maintain 7' parking spaces to match existing conditions
  - Remove NB residential parking spaces between Prichard Road & Reedie Drive
- Roadway widening from Blueridge Avenue to Arcola Avenue





## Proposed Corridor Alternative 2 - Amherst Avenue looking South from Arcola Avenue

Existing



Proposed



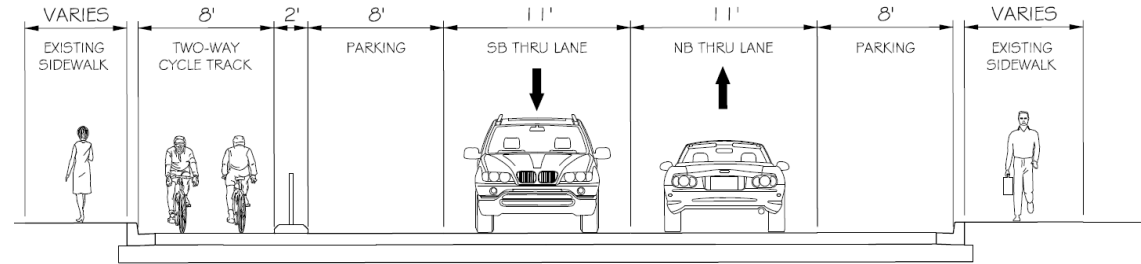


# Proposed Corridor Alternative 3A

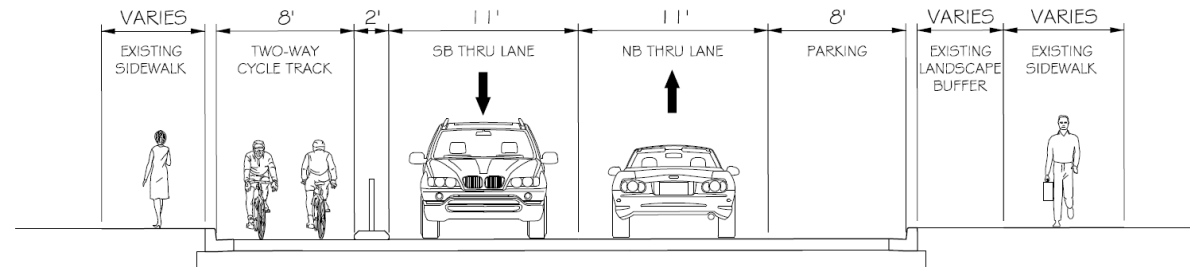
## Two-Way Cycle Track – SB Side

- 8' two-way cycle track with 2' buffer
- 11' travel lanes with 8' parking lanes
  - Remove SB long-term metered parking spaces between Prichard Road & Reedie Drive
- 10' travel lanes with 7' parking lane on NB Amherst Avenue from Blueridge Avenue to Arcola Avenue

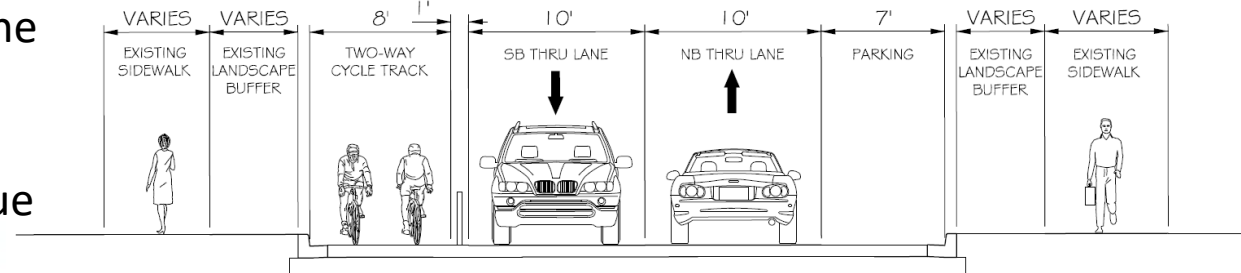
48' TYPICAL SECTION



40' TYPICAL SECTION



36' TYPICAL SECTION

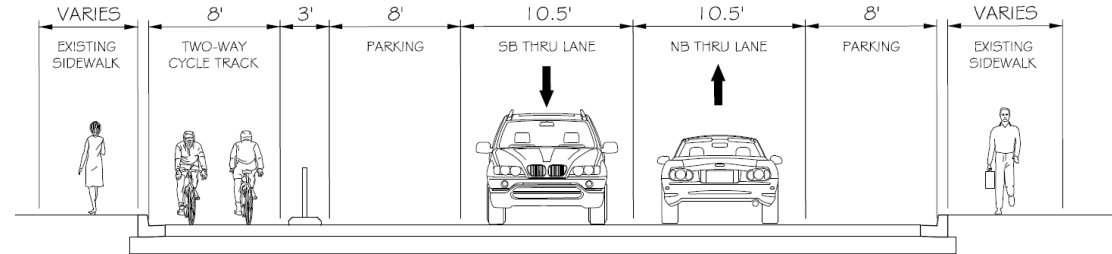


# Proposed Corridor Alternative 3B

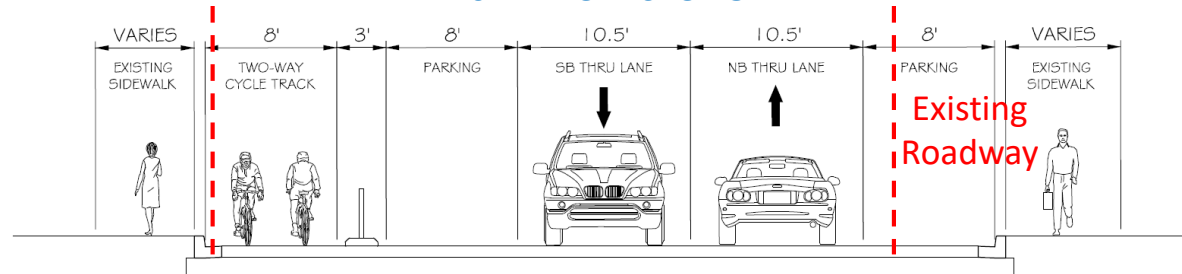
## Two-Way Cycle Track – SB Side

- 8' two-way cycle track with 3' buffer
- 10.5' travel lanes with 8' parking lanes
- Roadway widening from Prichard Road to Reddie Drive to the east side & Blueridge Avenue to Arcola Avenue

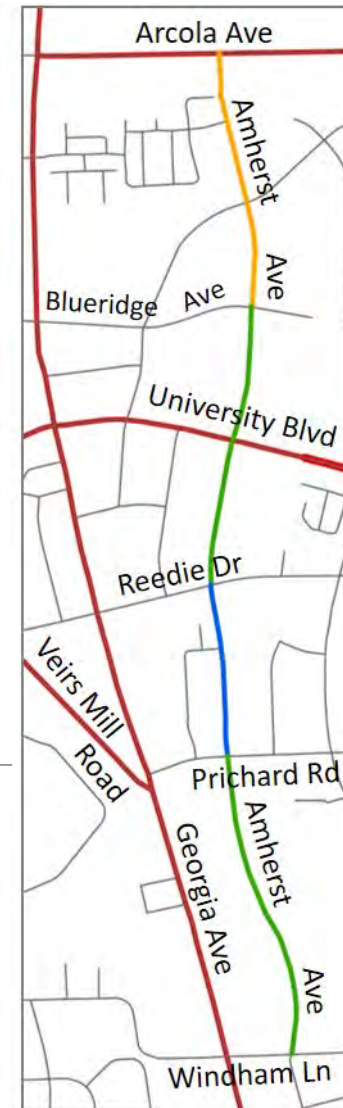
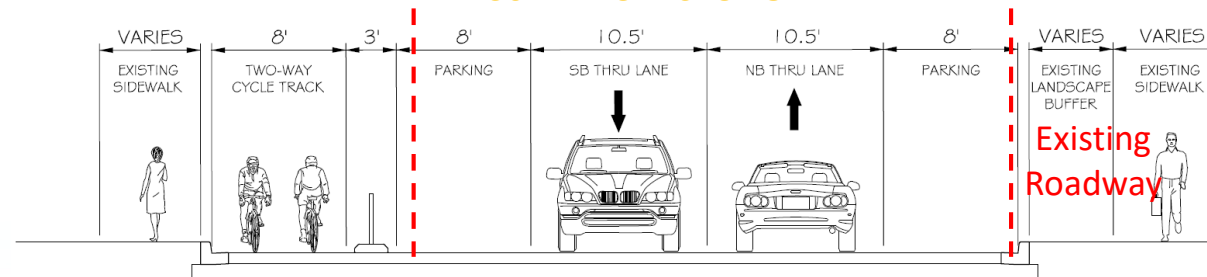
48' TYPICAL SECTION



40' TYPICAL SECTION



36' TYPICAL SECTION

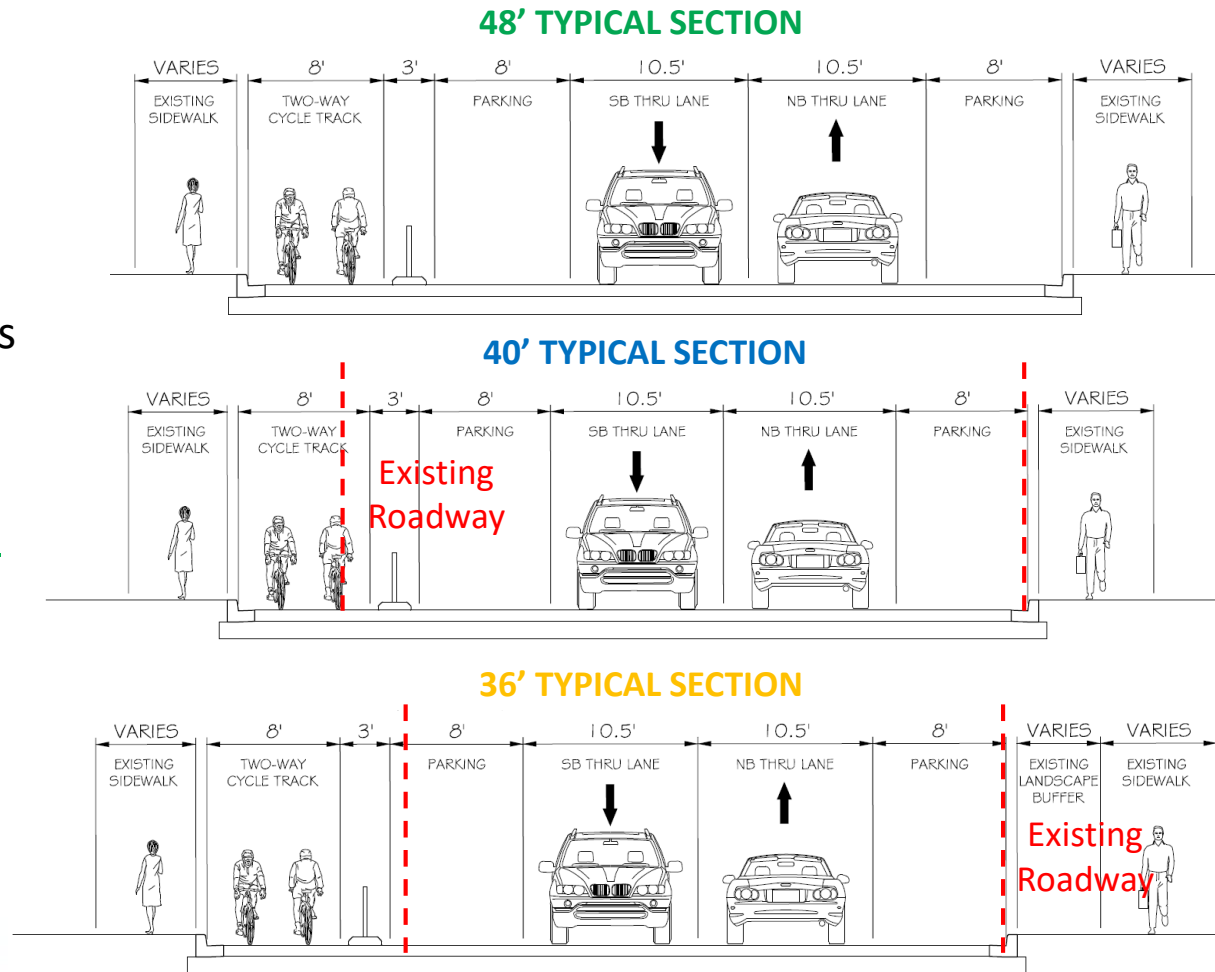




# Proposed Corridor Alternative 3B Modified

## Two-Way Cycle Track – SB Side

- 8' two-way cycle track with 3' buffer
- 10.5' travel lanes with 8' parking lanes
- Roadway widening from Prichard Road to Reddie Drive to the west side & Blueridge Avenue to Arcola Avenue





## Proposed Corridor Alternative 3B - Amherst Avenue looking North towards Elkin Street

Existing



Proposed

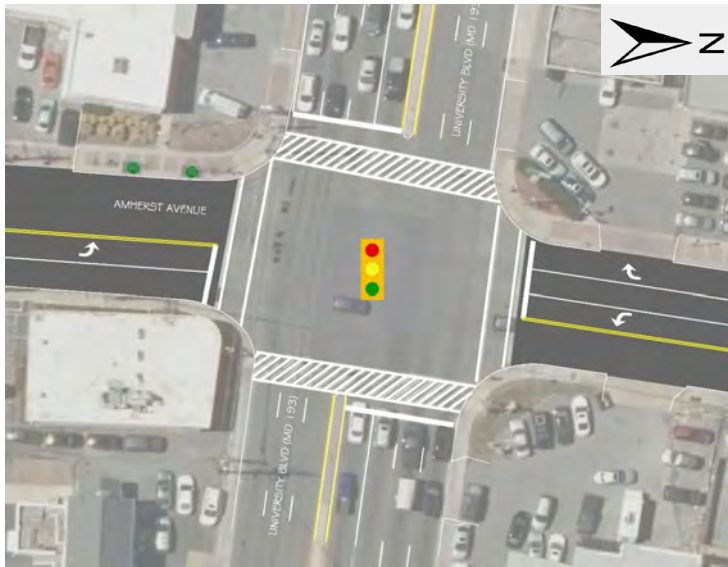




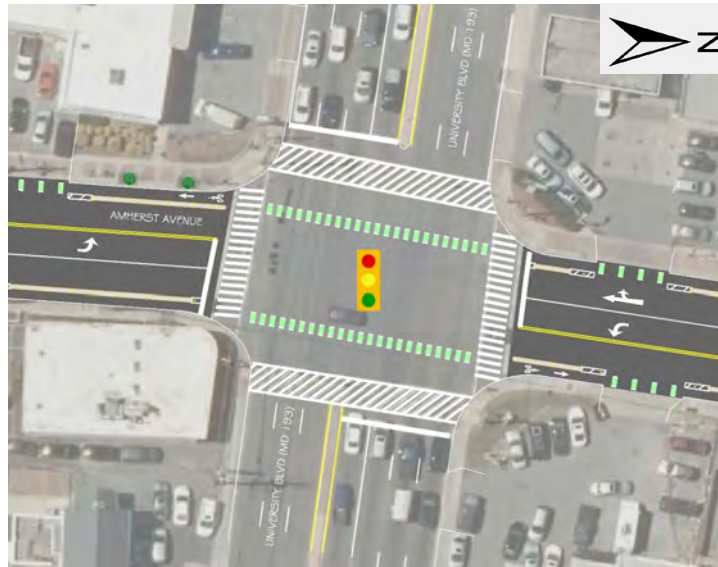
# Other Considerations

## University Boulevard Reconfiguration

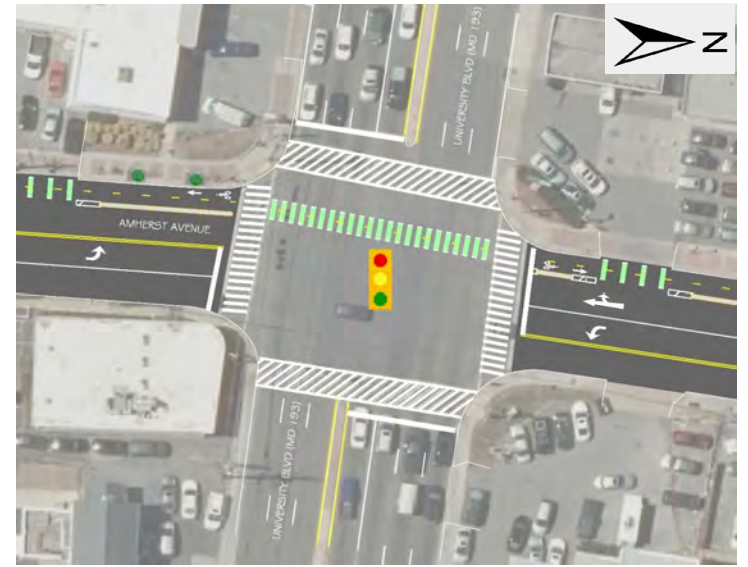
### ➤ Existing Configurations



### ➤ Alternative 1 & 2



### ➤ Alternative 3's – with protected intersection features

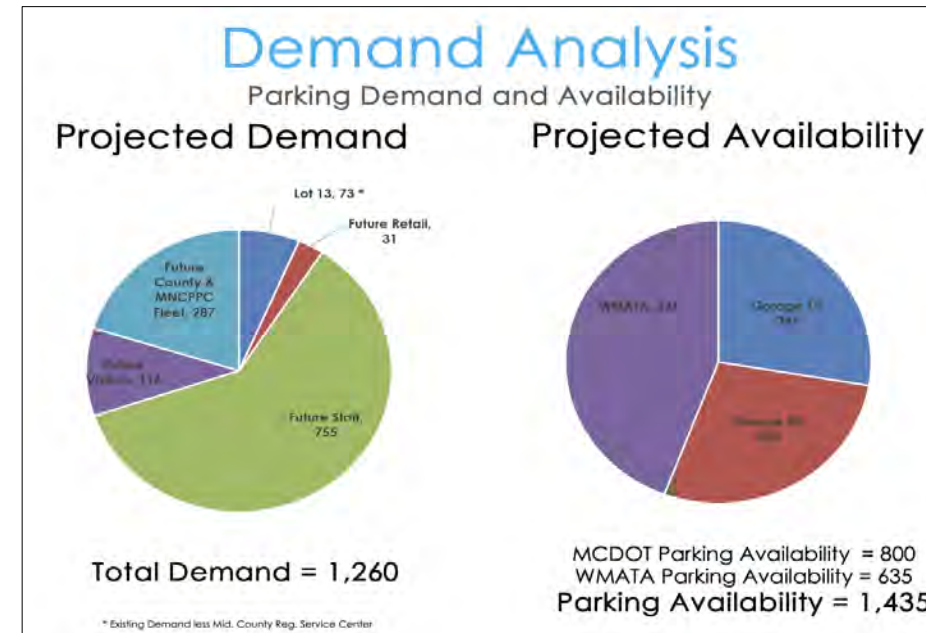




# Other Considerations

## On-Street Parking Utilization

- Metered and residential permit parking along the corridor within project limits
  - Being used as loading area by delivery trucks
  - Metered parking (long-term) spaces between Prichard and Reddie for residential parking at Cobble Hill
- Future increase in parking demand expected at Amherst Garage (Garage 45) and adjacent streets from new County facilities

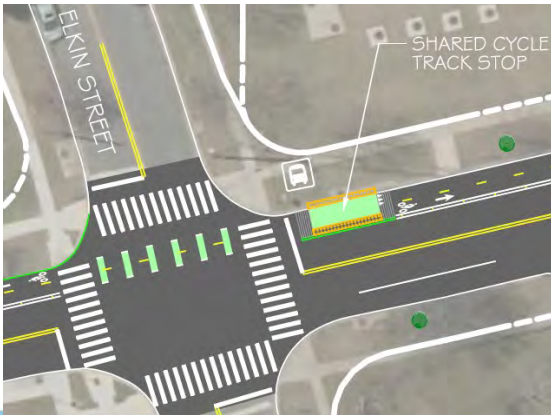


# Other Considerations

## Ride-On bus routes operate on Amherst Avenue from Reddie Drive to Arcola Avenue

### Shared Cycle Track Stop

- Avoid buses having to pull into the bike lane to discharge passengers
- Space within a bike lane is utilized to satisfy accessible boarding zone requirements
- Roadway widening not required



### Floating Bus Stop

- Separates the waiting area (buses) from the bicycle facility
- Avoid buses having to pull into the bike lane to discharge passengers
- Roadway widening needed





# Alternative Analysis Summary

	Alternative 1	Alternative 2	Alternative 3A	Alternative 3B	Alternative 3B Mod.
Facility Type	Separated Bike Lane w/Shared Lane	Separated Bike Lane	Two-Way Cycle Track	Two-Way Cycle Track	Two-Way Cycle Track
Roadway Widening		✓		✓	✓
Bus Stop Treatment	Shared Stops	Floating Bus Stops	Shared Stop & Floating Bus Stops	Floating Bus Stops	Floating Bus Stops
Utilities Impacts	None	1 Utility Pole	None	14 Utility Poles	7 Utility Poles 13 Light Poles 18 Parking Meters
On-Street Parking Impacts <sup>1</sup>	71 (41%) Spaces Loss: 59 Permit (100%) 12 Metered (14%)	39 (22%) Spaces Loss: 27 Permit <sup>2</sup> (46%) 12 Metered (14%)	76 (43%) Spaces Loss: 0 Permit 44 Metered (91%) 32 No-Restrictions <sup>3</sup> (100%)	12 (7%) Spaces Loss: 0 Permit 12 Metered (14%)	12 (7%) Spaces Loss: 0 Permit 12 Metered (14%)
Tree Impacts	None	12 Street Trees	None	19 Street Trees	12 Street Trees 32 Residential Trees
Property Impacts	None	None	None	4458 Sq. Ft. (14 Properties)	641 Sq. Ft. (1 Property)
Estimated Construction Cost	\$2.1M	\$3.0M	\$1.9M	\$3.3M	\$3.1M

<sup>1</sup> Total number of parking spaces to be potentially impacted = 175 (59 permit parking + 84 metered parking + 32 on-street parking)

<sup>2</sup> 25 of the permit parking impacts located along NB Amherst Avenue between Prichard Road and Reddie Drive

<sup>3</sup> Potentially impacted spaces with no parking restrictions are located between SB Blueridge Avenue and Arcola Avenue (17)





# Public Engagement

- In-person public meeting with presentation – Oct 3, 2019
  - Option of streaming online
  - Collected 16 comments
- Feedback overall positive with concerns on potential impacts to:
  - House frontage
  - Street trees
  - Existing Parking Spaces





# Planning Board Briefing – December 2020

## Recommendations

1. *Alternative 3B Modified* as preferred alternative if:
  - **MDOT SHA approves** a protected intersection at University Blvd and Amherst Avenue
  - No widening between Prichard Road and Reddie Drive
    - Travel lanes to be narrowed to 10.5 feet
    - Provide a 3-foot bikeway buffer with parking protection
    - Parking lane to be moved to west side of street

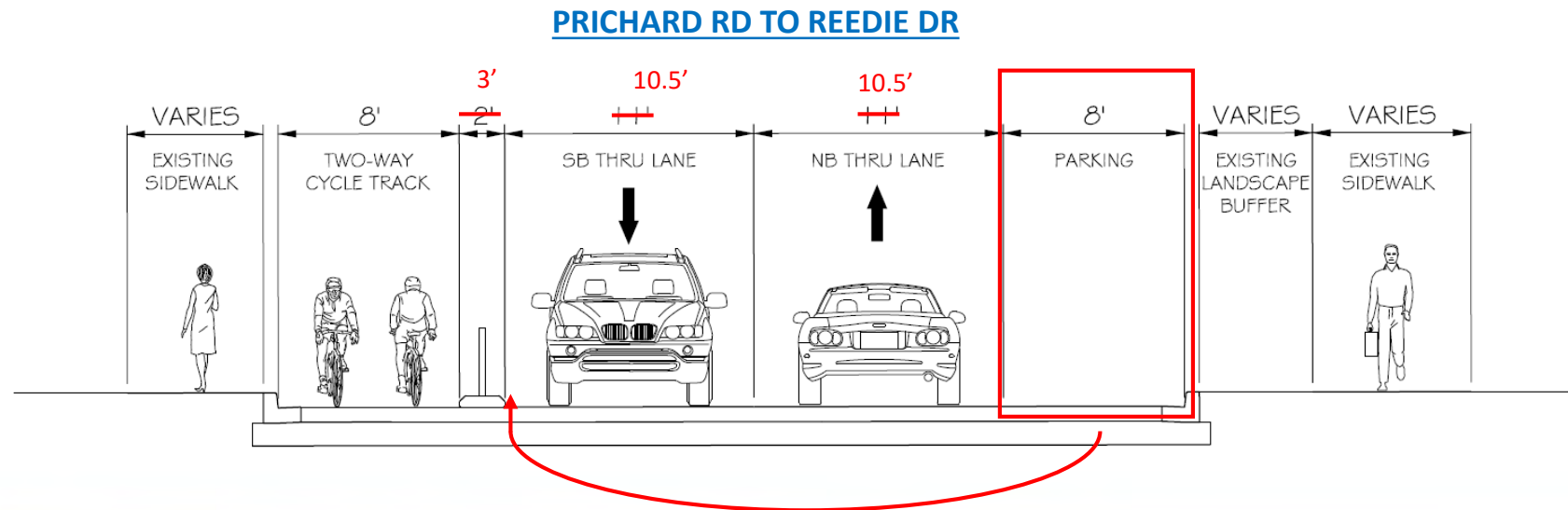




# Planning Board Briefing – December 2020

## Alt. 3B Mod. – Two-Way Cycle Track on SB Amherst Ave with Additional Modifications

- 8' two-way cycle track with 3' buffer
- 10.5' travel lanes with 8' parking lanes





# Planning Board Briefing – December 2020

## Recommendations

1. *Alternative 3B Modified* as preferred alternative if:
  - **MDOT SHA approves** a protected intersection at University Blvd and Amherst Avenue
  - No widening between Prichard Road and Reddie Drive
    - Travel lanes to be narrowed to 10.5 feet
    - Provide a 3-foot bikeway buffer with parking protection
    - Parking lane to be moved to west side of street
2. If MDOT **does not approve** a protected intersection at University Blvd then *Alternative 2* is preferred:
  - Improvements to bicyclist comfort by widening roadway, remove parking lanes, or remove one travel lane (one-way street) between Prichard Road and Reddie Drive





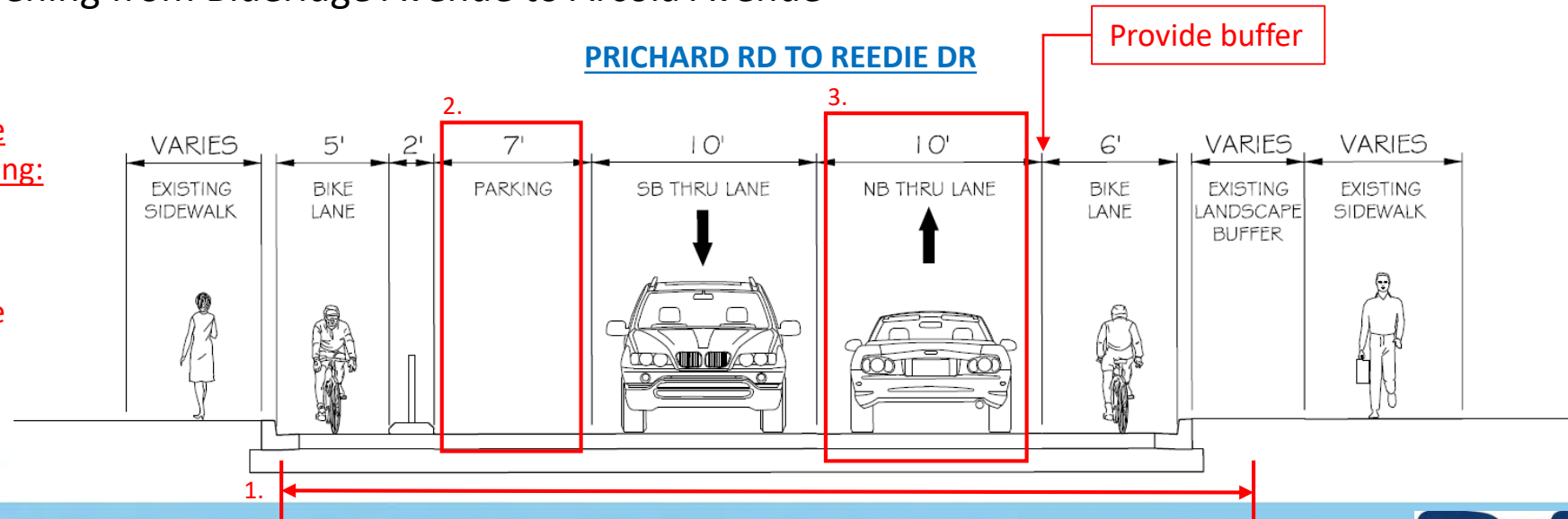
# Planning Board Briefing – December 2020

## Alt. 2 – Separated Bike Lanes in Both Direction with Additional Modifications

- 5' bike lane with 2' buffer
- Maintain 7' parking spaces to match existing conditions
- Roadway widening from Blueridge Avenue to Arcola Avenue

Provide buffer for NB bike lane by one of the following:

1. Roadway widening
2. Remove parking lane
3. Remove NB travel lane





# Next Steps

## Early 2021

- Select a preferred alternative to move toward 35% design

## Spring/Summer 2021

- Develop 35% design plan and cost estimate
  - SWM concept development and submission
- Continuation of public engagement throughout design
- Mandatory Referral







**MONTGOMERY COUNTY PLANNING BOARD**  
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION  
**OFFICE OF THE CHAIR**

December 7, 2020

The Honorable Tom Hucker, President  
Montgomery County Council  
Stella B. Werner Council Office Building  
100 Maryland Avenue  
Rockville, Maryland 20850

Re: Amherst Avenue Separated Bike Lane Alternatives

Dear Council President Hucker:

At its regularly scheduled meeting on December 3, 2020, the Montgomery County Planning Board reviewed the Amherst Avenue Separated Bike Lanes project and voted 4-0 to forward the following comments (I was temporarily absent for the vote, but I am in full support of the comments):

- 1) Advance Alternative 3B Modified as the preferred alternative if the Maryland State Highway Administration (SHA) approves a protected intersection at the intersection of University Boulevard and Amherst Avenue, to ensure a safe crossing for bicyclists using the two-way separated bike lanes. Additionally, between Pritchard Road and Reedie Drive, rather than widening the road, travel lanes should be narrowed to 10.5 feet and the parking lane should be moved to the west side of the street to provide a three-foot bikeway buffer with parking protection.
- 2) If this protected intersection is not approved by SHA, advance Alternative 2 as the preferred alternative and consider design changes to improve bicyclist comfort between Pritchard Road and Reedie Drive, potentially including roadway widening, removal of both lanes of parking, or removal of one travel lane. After additional public engagement on these issues, MCDOT should consider resubmitting this project to the T&E Committee and the Planning Board for deliberations on the appropriate bikeway treatment between Pritchard Road and Reedie Drive in advance of mandatory referral.

The Honorable Tom Hucker  
December 7, 2020  
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Thank you for your attention to this matter. If you have any questions or comments concerning our review, please contact Eli Glazier at 301-495-4548 or [Eli.Glazier@montgomeryplanning.org](mailto:Eli.Glazier@montgomeryplanning.org).

Sincerely,



Casey Anderson  
Chair

CA:EG:aj

cc: Angel Cheng, MCDOT  
Corey Pitts, MCDOT  
Daniel Sheridan, MCDOT  
Christopher Conklin, MCDOT  
Gwen Wright  
Jason Sartori  
Stephen Aldrich  
David Anspacher  
Eli Glazier  
Dr. Glenn Orlin



## Amherst Avenue Separated Bike Lanes Project – Alternatives Selection

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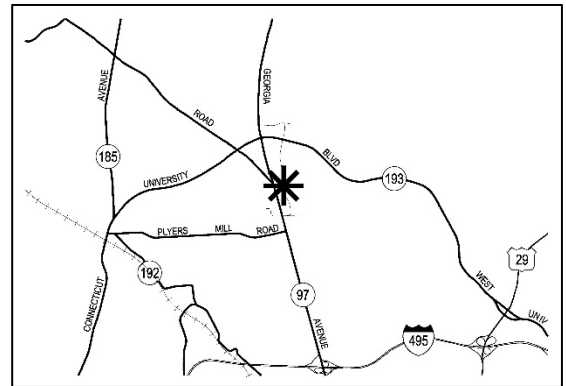
-  Eli Glazier, Planner/Coordinator, [eli.glazier@montgomeryplanning.org](mailto:eli.glazier@montgomeryplanning.org), 301-495-4548
-  David Anspacher, Supervisor, [david.anspacher@montgomeryplanning.org](mailto:david.anspacher@montgomeryplanning.org), 301-495-2191
-  Jason Sartori, Chief, [jason.sartori@montgomeryplanning.org](mailto:jason.sartori@montgomeryplanning.org), 301-495-2172

Completed: 11/25/2020

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### EXECUTIVE SUMMARY

The Amherst Avenue Separated Bike Lane project is identified in the Bicycle Master Plan as one of the highest priority bikeways in Montgomery County. It would substantially improve the safety and comfort of the bicycle experience for people travelling to and through the Wheaton Central Business District by installing a bikeway from Windham Lane to Arcola Avenue that would be comfortable for people of all ages and bicycling abilities. The Montgomery County Department of Transportation (MCDOT) has developed five bikeway alternatives. This agenda item provides the Planning Board the opportunity to recommend a preferred alternative to the County Council and transmit comments to MCDOT for further project refinement.



Applicant: Montgomery County Department of Transportation

### RECOMMENDATION

Transmit the following comments to the Montgomery County Council's Transportation, Infrastructure, Energy and Environment Committee (T&E) Committee:

- 1. Advance Alternative 3B Modified as the preferred alternative if the Maryland State Highway Administration (SHA) approves a protected intersection at the intersection of University Boulevard and Amherst Avenue, to ensure a safe crossing for bicyclists using the two-way separated bike lanes. Additionally, between Pritchard Road and Reedie Drive, rather than widening the road, travel lanes should be narrowed to 10.5 feet and the parking lane should be moved to the west side of the street to provide a three-foot bikeway buffer with parking protection.**
- 2. If this protected intersection is not approved by SHA, advance Alternative 2 as the preferred alternative and consider design changes to improve bicyclist comfort between Pritchard Road**

and Reddie Drive, potentially including roadway widening, removal of both lanes of parking, or removal of one travel lane. After additional public engagement on these issues, MCDOT should resubmit this project to the Planning Board for deliberations on the appropriate bikeway treatment between Pritchard Road and Reddie Drive.

## SITE DESCRIPTION

Amherst Avenue is a two-way, two-lane roadway that runs in the north-south direction between Dennis Avenue and Arcola Avenue. It is classified as a Primary Residential street at its northern and southern ends, and as a Business District street between Reddie Drive and Blueridge Avenue. The project extents are from Windham Lane at the south to Arcola Avenue at the north along the east side of the Wheaton CBD, a distance of 1.1 miles (*Figure 1*). Through the study area, the posted speed limit is 25 miles per hour. In addition to the two through lanes, turn lanes are currently present at the intersection of Amherst Avenue and University Boulevard and the intersection of Amherst Avenue and Arcola Avenue. On-street parking is present on many roadway segments, both designated metered spaces and residential permit parking. Parking counts were conducted as part of this project, and the results are provided in *Attachment 1*.

*Figure 1: Project Study Area*



The average annual daily traffic (AADT) on Amherst Avenue varies from approximately 4,000 vehicles per day between Windham Lane and Reddie Drive to approximately 9,000 vehicles per day between University Boulevard and Blueridge Avenue. The curb-to-curb width of the corridor varies, from 36 feet to 48 feet (*Figure 2*). The right-of-way extends beyond the existing sidewalks and varies between 60 feet and 90 feet. The roadway is currently signed as a bicycle route in both directions, where bicyclists typically share the roadway with motor vehicles. There are currently no bicycle pavement markings on the roadway along the corridor. At the eastern end of the corridor's intersection with Blueridge Avenue is a connection



to the Sligo Creek Trail. There are also three Capital Bikeshare stations: one at the intersection with Elkin Street, another just south of Pritchard Road, and a third at the Windham Lane intersection. There are sidewalks along both sides of Amherst Avenue.

Transit service is provided along a portion of the corridor, with Ride On buses (7, 8, 9, 31) operating along Amherst Avenue between Reedie Drive and Arcola Avenue and WMATA buses (C2, C4) between Reedie Drive and University Boulevard. There are four existing southbound bus stops and three in the northbound direction.

The existing corridor includes traffic signals at one intersection (University Boulevard), with all other intersections stop-controlled. There are curb extensions with stormwater bioretention at the intersection of Blueridge Avenue and Amherst Avenue.

The project corridor abuts a mixture of land uses, both commercial and residential. Along the corridor, there are apartment buildings, townhouses and single-family detached houses. Small-scale retail, restaurant and civic uses are also present, as is the MCDOT Wheaton Garage, Wheaton Veterans Park, a car dealership, big-box retail and self-storage.

The map displays Amherst Avenue from its northern end near Hermitage Avenue to its southern end near Windham Avenue. A red line indicates the 'Project Limit' at both ends. A yellow callout box labeled 'Project Limit' points to the northern limit. A green line indicates a 48-foot proposed roadway width, a blue line indicates a 40-foot proposed roadway width, and an orange line indicates a 36-foot proposed roadway width. The map includes various local streets, landmarks like the Shopping Center Ring Road, and a legend in the bottom left corner.

**Amherst Avenue Cycle Track**

**Legend**

- 48' Ex. Roadway Width
- 40' Ex. Roadway Width
- 36' Ex. Roadway Width

The Montgomery County Department of Transportation (MCDOT) is proposing to construct a bikeway along a 1.1-mile section of Amherst Avenue between Windham Lane and Arcola Avenue. This bikeway will connect communities to the Wheaton CBD from the north and south. Future efforts (*Figure 3*) will extend this bikeway south to Forest Glen Road as a master-planned Neighborhood Greenway. At the northern limit of this project, collaboration between MCDOT, the Planning Department, and the Department of Parks is also underway to pursue a master-planned trail along a paper street that extends from Arcola Avenue to Henderson Avenue, providing future connectivity into Wheaton Regional Park,



the Wheaton Public Library and other community resources. Every street that intersects with the project corridor has master-planned bikeway improvements. Amherst Avenue is the spine that supports the entire Wheaton-area bicycling network.

MCDOT has developed five alternatives that all provide improved bicycle connectivity along this corridor.

As the curb-to-curb width of the corridor varies, typical existing and proposed roadway cross-sections are identified for four segments (*Figure 2*). The four segments and their curb-to-curb widths are:

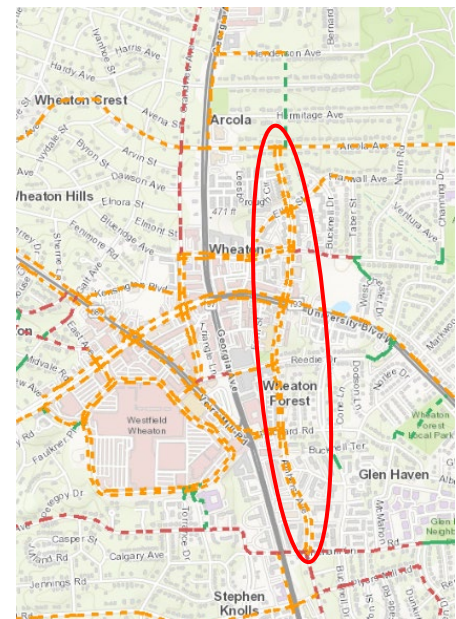
- Segment 1: Windham Lane to Pritchard Road, 48 ft
- Segment 2: Pritchard Road to Reddie Drive, 40 ft
- Segment 3: Reddie Drive to Blueridge Avenue, 48 ft
- Segment 4: Blueridge Avenue to Arcola Avenue, 36 ft

While in wider segments (Segments 1 and 3) it is possible to introduce separated bike lanes with minimal impacts to existing elements of the roadway, introducing separated bike lanes in the narrower segments (Segments 2 and 4) requires tradeoffs. Therefore, the width and presence of different roadway elements like parking and bikeway separation changes from segment to segment.

A general description of each alternative is provided below, and a more detailed description is included in *Table 1*. Concept drawings of each alternative are shown in *Attachment 2*.

- Alternative 1 includes: One-way 5' separated bike lanes on both sides of Amherst Avenue with 2' buffer in Segments 1 and 3, a one-way 5' separated bike lane with a 2' buffer in the southbound direction of Segment 2, conventional bike lanes provided in the northbound direction in Segment 2 and southbound direction in Segment 4 and a shared lane provided in the northbound direction in Segment 4. This alternative is within the existing curb-to-curb width of the roadway for all segments. This alternative includes floating bus stops in Segment 3 and shared bus-bike platforms in Segment 4.
- Alternative 2 includes: One-way 5' separated bike lanes on both sides of Amherst Avenue with 2' buffer in Segments 1, 3 and 4 and southbound in Segment 2, with a conventional bike lane provided in the northbound direction in Segment 2. This alternative widens the roadway roadway widening in Segment 4 to accommodate the bikeway. This alternative includes floating bus stops and shared bus-bike platforms in Segment 3 and floating bus stops in segment 4.
- Alternative 3A includes: Two-way 8' separated bike lanes with variable (1'-2' buffer) on the west side of Amherst Avenue for all segments. This alternative is within the existing curb-to-curb width of the roadway. This alternative includes floating bus stops in Segment 3 and shared bus-bike platforms in Segment 4.

*Figure 3: Master-Planned Bikeways along the Project Corridor*



- Alternative 3B includes: Two-way 8' separated bike lanes with 3' buffer on the west side of Amherst Avenue for all segments. This alternative has roadway widening in Segments 2 and 4. This alternative includes floating bus stops in Segments 3 and 4.
- Alternative 3B Modified is the same as Alternative 3B, but the side of the road where the widening occurs in Segment 2 differs (east side in Alternative 3B; west side in Alternative 3B Modified). This alternative includes floating bus stops in Segments 3 and 4.

The only proposed roadway widening that narrows an existing sidewalk is part of Alternative 3B Modified. Between Pritchard Road and Reddie Drive, an existing ten-foot sidewalk that narrows to seven feet at light poles would become an eight-foot sidewalk that narrows to five feet at light poles. These changes, coupled with the two-way separated bike lanes included in that Alternative, would actually improve pedestrian comfort, as measured by the Planning Department's Pedestrian Level of Comfort (PLOC) score by providing a wider buffer from traffic (in the form of the separated bike lanes).

*Table 1* includes a summary of the typical section elements that are included in each alternative.



*Table 1: Summary of Bicycle Improvements by Alternative and Segment*

Element	Existing	Alternative 1	Alternative 2	Alternative 3A	Alternative 3B	Alternative 3B Mod.
<b>Segment 1: Windham Lane to Pritchard Road</b>						
Traffic Lane	16' thru lane	10' thru lane	10' thru lane	11' thru lane	10.5' thru lane	10.5' thru lane
Parking Lane	8' (both sides)	7' (both sides)	7' (both sides)	8' (both sides)	8' (both sides)	8' (both sides)
Bike Lane Buffer	---	2'	2'	2'	3'	3'
Bike Lane	---	5'	5'	8' (two-way)	8' (two-way)	8' (two-way)
Bus Stop/Bikeway Configuration	---	N/A	N/A	N/A	N/A	N/A
Roadway Widening	---	N/A	N/A	N/A	N/A	N/A
<b>Segment 2: Pritchard Road to Reedie Drive</b>						
Traffic Lane	12' thru lane	10' thru lane	10' thru lane	11' thru lane	10' thru lane	10' thru lane
Parking Lane	8' (both sides)	7' (west side) / --- (east side)	7' (west side) / --- (east side)	--- (west side) / 8' (east side)	8' (both sides)	8' (both sides)
Bike Lane Buffer	---	2' (west side) / --- (east side)	2' (west side) / --- (east side)	2'	2'	2'
Bike Lane	---	5' (west side) / 6' (east side)	5' (west side) / 6' (east side)	8' (two-way)	8' (two-way)	8' (two-way)
Bus Stop/Bikeway Configuration	---	N/A	N/A	N/A	N/A	N/A
Roadway Widening	---	N/A	N/A	N/A	~6'	~6'
<b>Segment 3: Reedie Drive to Blueridge Avenue</b>						
Traffic Lane	16' thru lane	10' thru	10' thru	11' thru	10.5' thru	10.5' thru
Parking Lane	8' (both sides)	7' (both sides)	7' (both sides)	8' (both sides)	8' (both sides)	8' (both sides)
Bike Lane Buffer	---	2'	2'	2'	3'	3'
Bike Lane	---	5'	5'	8' (two-way)	8' (two-way)	8' (two-way)
Bus Stop/Bikeway Configuration	---	Floating	Floating, Shared	Floating	Floating	Floating
Roadway Widening	---	N/A	N/A	N/A	N/A	N/A
<b>Segment 4: Blueridge Avenue to Arcola Avenue</b>						
Traffic Lane	11' thru lane	10' (west side) / 14' (east side)	10' thru lane	10' thru lane	10.5' thru lane	10.5' thru lane
Parking Lane	7' (both sides)	7' (west side) / --- (east side)	7' (both sides)	--- (west side) / 7' (east side)	8' (both sides)	8' (both sides)
Bike Lane Buffer	---	---	2'	1'	3'	3'
Bike Lane	---	5' (west side)	5'	8' (two-way)	8' (two-way)	8' (two-way)
Bus Stop/Bikeway Configuration	---	Shared	Floating	Shared	Floating	Floating
Roadway Widening	---	N/A	~12'	N/A	~12'	~12'

Typical cross-sections for each alternative by segment can be reviewed in *Attachment 3*.

Table 2 summarizes the cost estimates and trade-offs involved in the pursuit of the respective alternatives. Those alternatives that remain within the curb-to-curb width of Amherst Avenue (Alternative 1, Alternative 3A) have lower cost estimates, but there are other trade-offs to consider.

*Table 2: Cost Estimates and Trade-offs*

Element	Alternative 1	Alternative 2	Alternative 3A	Alternative 3B	Alternative 3B Mod.
Utilities	No Impact	1 Utility Pole Relocation	No Impact	14 Utility Pole Relocations	- 7 Utility Pole Relocations - 13 Light Pole Relocations - 18 Parking Meter Post Relocations
Parking	71 Spaces Removed	36 Spaces Removed	76 Spaces Removed	12 Spaces Removed	12 Spaces Removed
	59 Permitted	27 Permitted	0 Permitted	0 Permitted	0 Permitted
	12 Metered/ Unrestricted	12 Metered/ Unrestricted	76 Metered/ Unrestricted	12 Metered/ Unrestricted	12 Metered/ Unrestricted
Trees	No Impact	12 Street Trees Removed	No Impact	19 Street Trees Removed	- 12 Street Trees - 32 Residential Trees Removed
Infrastructure	- Blueridge Ave Curb Reconstruction - Bioretention at Elkins St Removed	- Blueridge Ave Curb Reconstruction - Bioretention at Elkins St Removed - Road Widening from Blueridge Ave to Arcola Ave	- Blueridge Ave Curb Reconstruction - One of two bioretention at Elkins St Removed	- Blueridge Ave Curb Reconstruction - One of two bioretention at Elkins St Removed - Road widening from Pritchard Rd to Reddie Dr and Blueridge Ave to Arcola Ave	- Blueridge Ave Curb Reconstruction - One of two bioretention at Elkins St Removed - Road widening from Pritchard Rd to Reddie Dr and Blueridge Ave to Arcola Ave
Cost Estimate	<b>\$2,079,336</b>	<b>\$2,973,105</b>	<b>\$1,862,504</b>	<b>\$3,284,806</b>	<b>\$3,137,132</b>

## MASTER PLAN CONSISTENCY

The following master plan recommendations are relevant for this project:

- The 2018 Master Plan of Highways and Transitways has the following recommendations:
  - A two-lane Primary Residential street with an 84-foot right-of-way between Windham Lane and Pritchard Road.
  - A two-lane Business District street with an 80-foot right-of-way between Pritchard Road and Blueridge Avenue.
  - A two-lane Primary Residential street with an 84-foot right-of-way between Blueridge Avenue and Elkin Street.
  - A two-lane Primary Residential street with a 70-foot right-of-way between Elkin Street and Arcola Avenue.
- The 2018 Bicycle Master Plan recommends one-way separated bike lanes on both sides of Amherst Avenue from Arcola Avenue to Windham Lane. Amherst Avenue in Downtown Wheaton is identified as one of the highest priority bikeways in the county. It is also identified as part of the proposed Breezeway Network, a designation for bikeways that are to provide a high level of comfort and that prioritize higher speed bicycle travel between major activity centers – these are the arterials of the bicycle network.



Additionally, the draft Complete Streets Design Guide reviewed by the Planning Board calls for two-way separated bike lanes to have 11' default widths with 8' minimums and one-way separated bike lanes to have 6.5' default widths with 5' minimums along streets like Amherst Avenue.

While no alternative proposes to implement the long-term vision of the bikeway on Amherst Avenue, each makes important advancements toward that vision. Among the alternatives prepared by MCDOT, Alternative 2 comes closest by providing one-way separated bike lanes along most block faces, with the exception of the east side of Segment 2 (Pritchard Road to Reddie Drive). None of the bikeway widths proposed in the alternatives achieve the Breezeway standard (11' for a two-way separated bike lane and 8' for a one-way separated bike lane outside the gutter pan), though all widths meet the minimums outlined in the Complete Streets Design Guide. Some of the widths proposed, particularly for the bikeway buffers, are substandard, especially given the adjacent parking lane and travel lane widths and may cause safety issues.

## STAFF ANALYSIS

A discussion of the process that led to staff's recommendation follows.

### Alternatives Analysis

In addition to consideration of the Costs and Trade-offs in *Table 2*, staff identified the following priority issues on which the proposed alternatives should be ranked, shown in order of importance.

1. University Boulevard crossing
2. Separation from parked cars in commercial areas
3. Separation from parked cars in residential areas
4. Separation from traffic
5. Bikeway width
6. Minor intersection crossings

Each are discussed in more detail below.

#### University Boulevard crossing

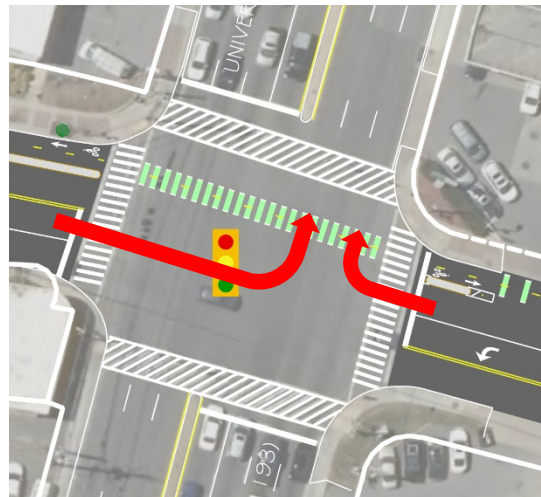
The success or failure of this project is directly tied to how safely bicyclists can cross the intersection of University Boulevard and Amherst Avenue.

As staff has discussed several times with the Planning Board, separated bike lanes do not end at the intersection. **In many ways, ensuring safe intersection crossings is more important from a safety and connectivity perspective than providing separation from traffic along a street segment.** Without spatial and temporal separation between bicyclists and motor vehicles at intersections, conflicts between bicyclists traveling through the intersection and turning motor vehicles cannot be substantially mitigated.

This is even more of a problem with two-way separated bike lanes because these bikeways facilitate bicyclist travel against the direction of motor vehicle traffic, which can be confusing for all road users. For example, a right-turning motorist crossing a bikeway may look over their right shoulder to see a bicyclist travelling in the same direction, but the motorist is less likely to consider that an oncoming bicyclist may be approaching (*Figure 4*). This conflict can be mitigated by separating turning vehicle movements from through bicyclists movements through signalization and roadway changes. **It is essential that this conflict be mitigated to create a safe bicycling environment.**

As a protected intersection is not currently included in the project alternatives at this location, a one-way bikeway (Alternatives 1 and 2) is safer than a two-way bikeway (Alternatives 3A, 3B, and 3B Modified) given the increased predictability and visibility of bicyclist travel in this configuration.

*Figure 4: University Boulevard Intersection with Two-Way Separated Bicycle Lane Conflicts Shown*



#### *Separation from parked cars in commercial areas*

Parked cars are a common tool to buffer separated bike lanes (*Figure 5*). While staff would prefer a bikeway be separated from travel lanes by five feet or more, an adjacent parking lane narrows the necessary buffer width to three feet, as the parked cars themselves provide substantial protection from moving vehicles. A buffer adjacent to parked cars narrower than three feet is problematic because vehicle doors may extend into the bikeway when they swing open, risking serious injury both to bicyclists and those getting into or out of parked cars.

*Figure 5: Example of Parking Buffer with Door*



Every time people exit a parked car is an opportunity for this conflict between the vehicle and a bicyclist or the bicyclist and the vehicle's driver or passengers to occur.

On-street parking in commercial areas has higher turnover than on-street parking in residential areas, so maintaining a three-foot buffer between the parking lane and bicycle lanes is essential in commercial areas. Alternatives 1, 2 and 3A do not provide a three-foot buffer in commercial areas – between Reddie Drive and Blueridge Avenue (Segment 3) , while Alternative 3B and 3B Modified both do. In locations with narrow travel lanes (10 feet wide) and narrow parking lanes (7 feet wide), like those contemplated



by Alternatives 1 and 2, the likelihood of this conflict is even more pronounced because parked cars are more likely to encroach on the bikeway buffer to limit the potential for side-swipe crashes from the narrow travel lanes, extending an open passenger-side door further into the bicycle lane.

#### *Separation from parked cars in residential areas*

While the conflict between parked cars and bicyclists in residential areas is less frequent than in commercial ones, it still exists. Alternatives 1, 2 and 3A do not provide a three-foot buffer in any residential areas (Segments 1,2 and 4), while Alternatives 3B and 3B Modified provide a three-foot buffer in some residential areas.

#### *Separation from traffic*

Without the protection on-street parking provides, a minimum five-foot-wide buffer is preferable between a bikeway and travel lanes. A buffer between three feet and five feet is acceptable, and a buffer narrower than three feet is substandard. Alternatives 1 and 2 both have segments with conventional bike lanes or shared lanes – effectively a zero-foot buffer – and score poorly by this metric. Alternative 3A has a segment with a one-foot buffer and another with a two-foot buffer – both substandard. Alternative 3B and 3B Modified do not have any segments where bikeways are separated from traffic without parking.

#### *Bikeway width*

An important consideration after separation from traffic is the width of the bikeway itself. Ideally, the bikeway will be wide enough for bicyclists to safely travel and for faster-moving bicyclists to pass slower ones. For one-way bikeways, in keeping with the Complete Streets Design Guide and the Breezeway standard:

- a preferred width is eight feet,
- a standard width is between five and seven feet, and
- a substandard width is less than five feet.

For two-way bikeways:

- a preferred width is eleven feet or more,
- a standard width is between eight and eleven feet, and
- a substandard width is less than eight feet.

For conventional bike lanes:

- a preferred width is six feet,
- a standard width is five feet, and
- a substandard width is less than five feet.

Alternatives 1 and 2 both provide standard widths for bikeways along most segments, with the exception in the northbound direction between Pritchard Road and Reddie Drive where a preferred

width conventional bike lane is provided in both alternatives. Alternatives 3A, 3B and 3B Modified all provide a standard width two-way separated bike lane of eight feet.

#### *Minor intersection crossings*

In addition to the crossing at University Boulevard, the proposed bikeway intersects six other streets. Other than the Arcola Avenue intersection, which is signalized, these intersections are managed with stop signs. These intersections, with their universally understood alternating right-of-way, are often safer for bicyclists to navigate than signalized intersections. Care must still be taken in design to ensure bicyclists can see and be seen by other road users as they approach the intersection. At this stage in design, the alternatives cannot be differentiated on their approach to these crossings.

Table 3 compares the proposed alternatives on the six priority issues, where green is preferred, yellow is standard, and red is substandard.

*Table 3: Alternative Comparison on Priority Bikeway Issues*

Priority Issues	Alternative 1	Alternative 2		Alternative 3A	Alternative 3B	Alternative 3B Mod.
Segment 1: Windham Lane to Pritchard Road						
Separation from Residential Parking						
Bikeway Width						
Minor Intersection Crossings						
Segment 2: Pritchard Road to Reedie Drive						
Separation from Residential Parking				N/A		
Separation from Traffic					N/A	N/A
Bikeway Width						
Minor Intersection Crossings						
Segment 3: Reedie Drive to Blueridge Avenue						
University Blvd Crossing						
Separation from Commercial Parking						
Bikeway Width						
Minor Intersection Crossings						
Segment 4: Blueridge Avenue to Arcola Avenue						
Separation from Residential Parking				N/A		
Separation from Traffic		N/A			N/A	N/A
Bikeway Width						
Minor Intersection Crossings						

One-way

Two-way

## Selecting a Recommended Alternative

Staff first reduced the number of alternatives by eliminating those that performed worse in the alternatives comparison among the one-way separated bike lane options and the two-way separated bike lane options and then identified a preferred alternative overall.

### One-Way Separated Bike Lane Alternatives

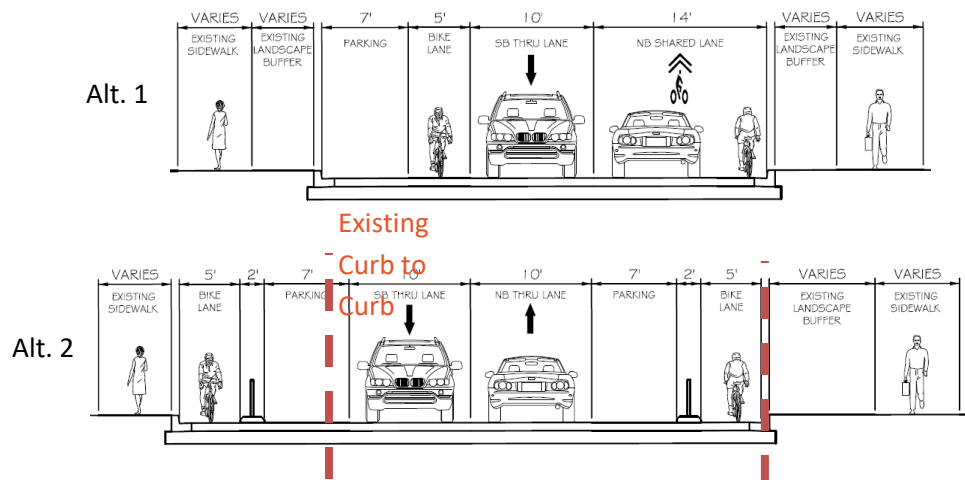
As discussed, MCDOT evaluated two one-way separated bike lane alternatives: Alternative 1 and Alternative 2. The two alternatives are identical in cross-section and in evaluation in Table 3, except in Segment 4 (*Figure 6*). Alternative 1 maintains the existing curb-to-curb width of the roadway to reduce project costs and street tree impacts. As a result, there would be no bikeway in the northbound direction (bicyclists would ride in traffic). In the southbound direction, a five-foot bike lane would be squeezed between a narrow seven-foot parking lane and a ten-foot travel lane. Conversely, Alternative 2 widens the road in this segment, which costs more and requires removing street trees, but adds space for two five-foot bicycle lanes with two-foot buffers from parking.

A shared lane as proposed in Alternative 1 will not be comfortable for the majority of bicyclists, due to the estimated AADT in this segment (approximately 6,700 vehicles per day) and a 25-mph posted speed limit. The Bikeway Selection Chart from the *Montgomery County Bicycle Master Plan Framework Report* (page 33) (*Attachment 4*) provides more information on the breakpoints between AADT and vehicle speed where different types of bikeways are appropriate.

Both alternatives include a northbound conventional bike lane between Pritchard Road and Reedie Drive. In this block with traffic volumes around 4,500 vehicles per day, a conventional bike lane is more acceptable, though not preferable (*Attachment 4*).

Of the two alternatives, Alternative 2 (*Figure 7*) is better because it provides a bikeway that will encourage more people to bicycle in this corridor. Neither of these one-way alternatives achieve the full vision of the Bicycle Master Plan. If this alternative is selected, staff believes that MCDOT should evaluate additional changes to the segment between Pritchard Road and Reedie Drive to provide a

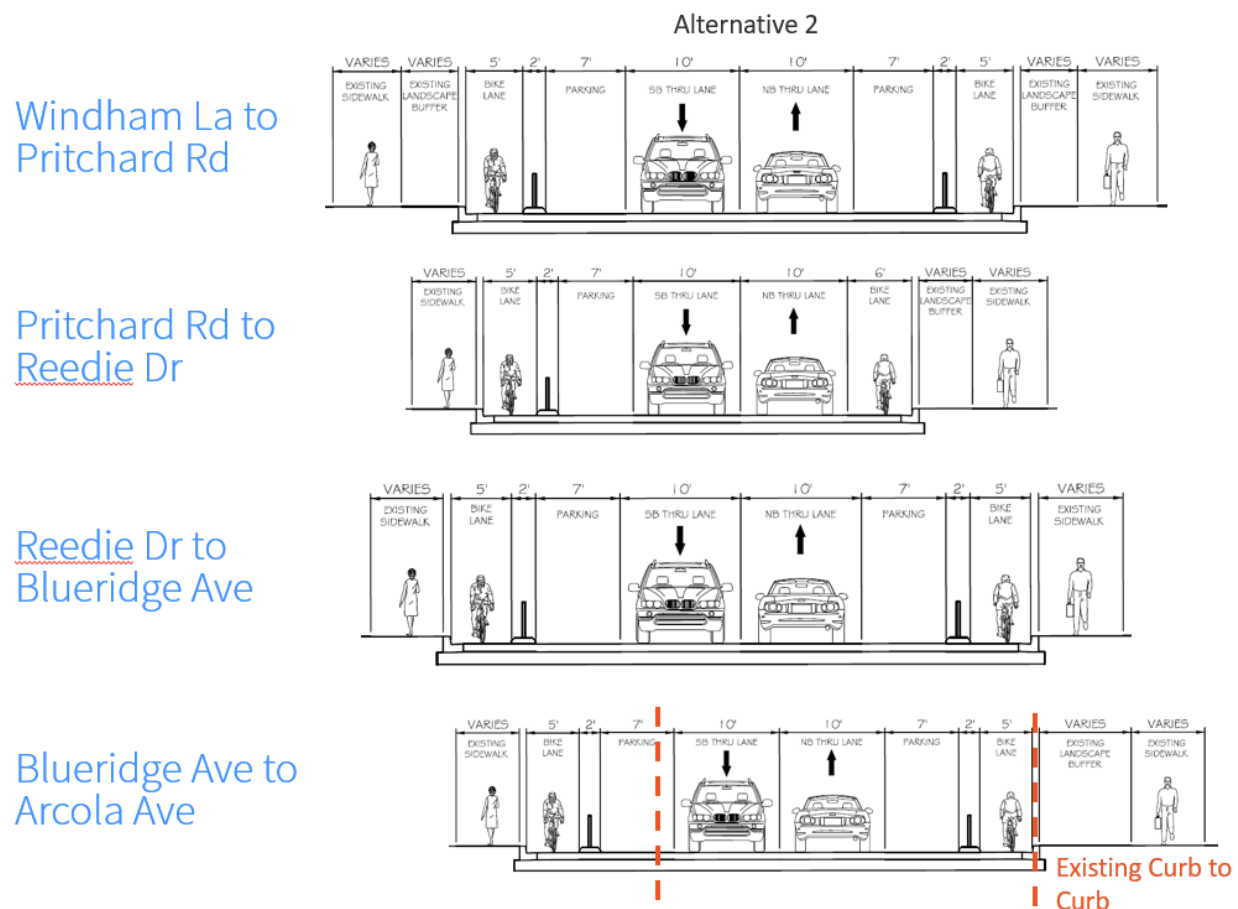
*Figure 6: Alternatives 1 and 2 between Blueridge Avenue and Arcola Avenue*





separated bike lane in the northbound direction and to widen the buffers to 3 feet. Options include widening the roadway further, removing a parking lane or making this block a one-way road. If this alternative is pursued, staff would recommend that the options be resubmitted to the Planning Board for their review.

Figure 7: Alternative 2 by Segment



### Two-Way Separated Bike Lane Alternatives

MCDOT evaluated three two-way separated bike lane alternatives: Alternative 3A, Alternative 3B and Alternative 3B Modified. Alternative 3A fits entirely within the existing curb-to-curb width of Amherst Avenue. This is beneficial from a cost and trade-off perspective. It is the lowest-cost alternative overall and requires no utility relocations or impacts to street trees, though the most on-street parking is removed. However, fitting a bikeway within the curb-to-curb space has its limitations. Between Blueridge Avenue and Arcola Avenue, a one-foot flex-post buffer is imagined between the two-way separated bike lane and a ten-foot oncoming travel lane. This is not meaningful protection for people bicycling in the northbound direction, and with the rest of the cross-section in that segment already at

minimum widths (ten foot travel lanes and seven foot parking lanes), there is no additional space to reallocate without removing a travel lane or the remaining parking lane.

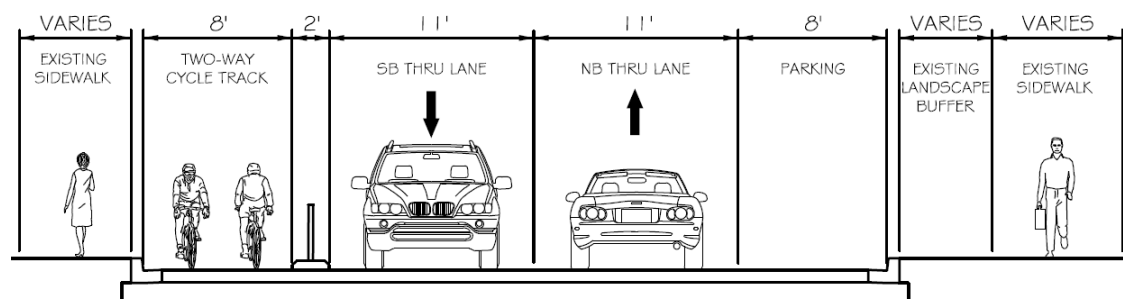
Alternative 3B and 3B Modified address the constrained conditions in this segment by moving curbs. In both alternatives, the west curb between Blueridge Avenue and Arcola Avenue is moved to maintain existing parking lanes and travel lanes while providing an adequate three-foot buffer and eight-foot two-way separated bike lane. In this segment, Alternatives 3B and 3B Modified address the priority bikeway issues better than Alternative 3A in a way that costs more but minimizes repurposing on-street parking.

For the segments between Windham Lane and Pritchard Road and between Reedie Drive and Blueridge Avenue, all three alternatives fit within the existing curb-to-curb width, and while there are differences in lane width between the two – eleven feet and ten and a half feet respectively – that result in a two-foot buffer in Alternative 3A and a three-foot buffer in Alternatives 3B and 3B Modified, if the travel lanes were narrowed to ten and a half feet in Alternative 3A, as recommended in the draft Complete Streets Design Guide, these segments would be identical. *Attachment 3* provides a visual comparison.

The remaining segment between Pritchard Road and Reedie Drive is different across the three two-way separated bike lane alternatives. This is a block that has long-term metered parking on the west side that residents of the adjacent townhomes can use at preferential rates. The parking utilization study for this project found that 88% of the west side's 32 parking spaces were occupied at any given time. The parking on the east side of the street is residential permit parking for the Wheaton Forest neighborhood. Alternative 3A removes the parking on the west side of this block to provide the two-way separated bike lane. The same parking study found that 50% of the east side's 25 parking spaces were occupied at any one time.

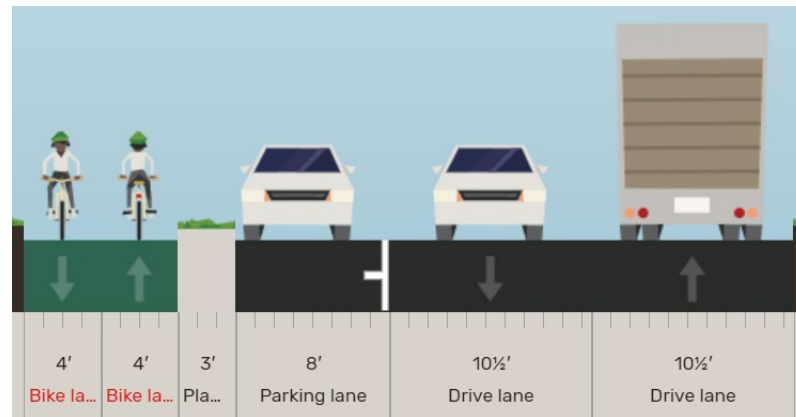
Alternatives 3B and 3B Modified keep both parking lanes by widening the road. Alternative 3B maintains the western curb line and widens the road on the east side, removing the existing landscape buffer, but keeping the existing sidewalk intact. Alternative 3B Modified does the opposite, holding the eastern curb line while expanding the road into the street furniture zone and sidewalk on the west side of the street. As described earlier, this reduces the sidewalk width on the west side from ten feet (seven feet at light poles) to eight feet (five feet at light poles). The road widening contemplated by Alternatives 3B and 3B Modified in this segment increases the cost of the project and its impacts on utilities, lighting, and the pedestrian environment. Staff believes that over the entire corridor, Alternative 3B Modified is the best two-way alternative, but between Pritchard Road and Reedie Drive, there are opportunities to save additional cost and limit impacts by modifying the Alternative 3A cross-section (Figure 8).

*Figure 8: Alternative 3A Cross-Section from Pritchard Road to Reedie Drive*



This modification, shown in Figure 9, narrows lanes to ten and a half feet and moves the on-street parking from the east side to the west side of Amherst Avenue. This option provides a three-foot buffer and uses the on-street parking to provide additional separation from traffic for the bikeway, while not requiring any costly curb changes.

*Figure 9: Flipped Parking Option*



Of the two-way bikeway alternatives, staff therefore recommends the Board support Alternative 3B Modified, but with a cross-section between Reddie Drive and Pritchard Road as shown in *Figure 9*.

*Figure 10* shows the proposed cross-section for each segment.

### Recommended Alternative

Staff recommends that the Planning Board transmit the following comments to the Montgomery County Council's Transportation, Infrastructure, Energy and Environment Committee (T&E) Committee:

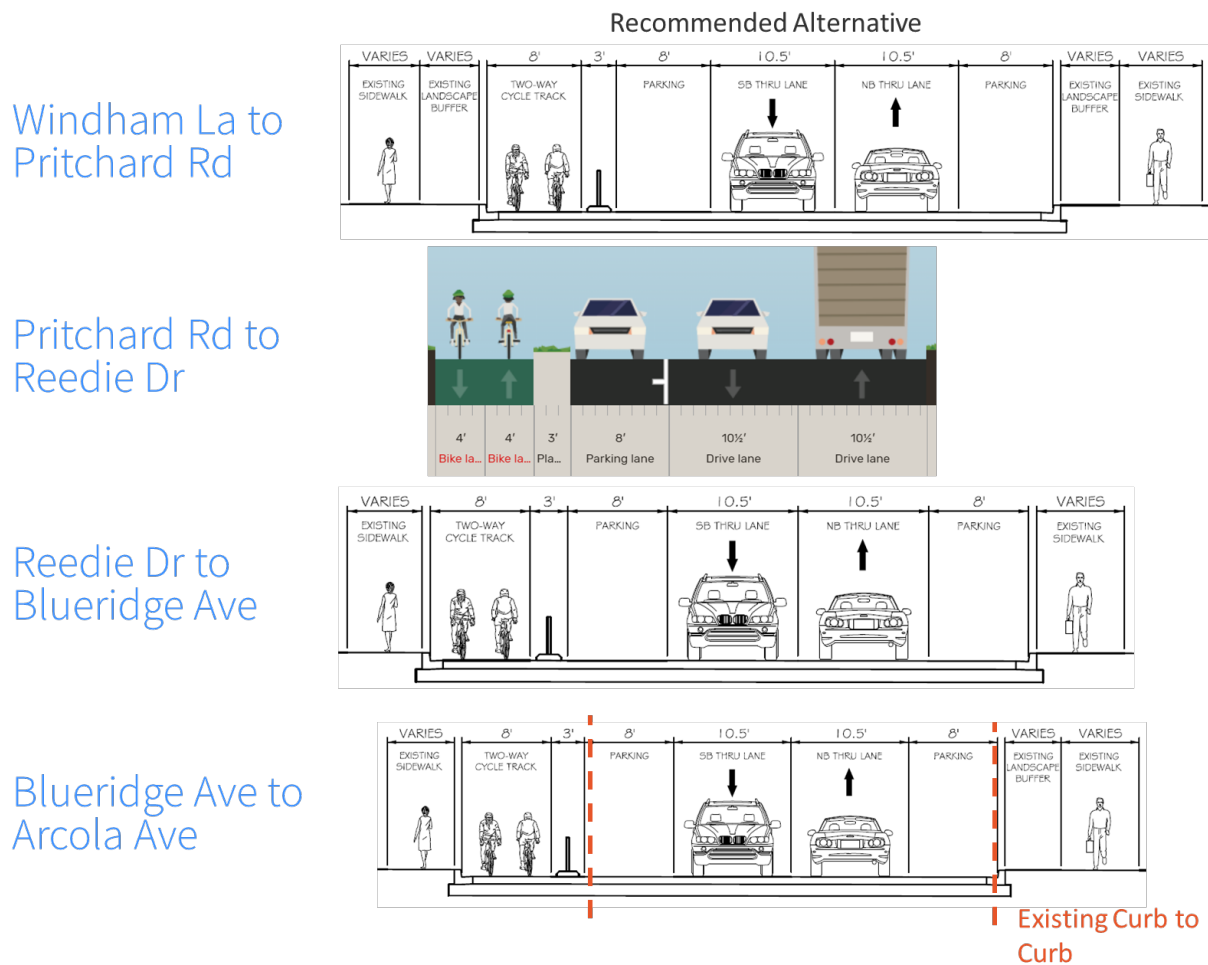
1. **Advance Alternative 3B Modified as the preferred alternative if the Maryland State Highway Administration (SHA) approves a protected intersection at the intersection of University Boulevard and Amherst Avenue, to ensure a safe crossing for bicyclists using the two-way separated bike lanes. Additionally, between Pritchard Road and Reddie Drive, rather than widening the road, travel lanes should be narrowed to 10.5 feet and the parking lane should be moved to the west side of the street to provide a three-foot bikeway buffer with parking protection.**
2. **If this protected intersection is not approved by SHA, advance Alternative 2 as the preferred alternative and consider design changes to improve bicyclist comfort between Pritchard Road and Reddie Drive, potentially including roadway widening, removal of both lanes of parking, or removal of one travel lane. After additional public engagement on these issues, MCDOT should resubmit this project to the Planning Board for deliberations on the appropriate bikeway treatment between Pritchard Road and Reddie Drive.**

Given the limitations of this corridor, the change recommended to Segment 2 in Alternative 3B Modified will be lower-cost with fewer impacts than Alternative 2 while providing a comparable low-stress



experience to people bicycling along this corridor. The only hesitation staff has about recommending this alternative whole-heartedly is the uncertainty surrounding the University Boulevard intersection. Without appropriate bicycle signalization and roadway improvements, it may not be possible to address the safety issues inherent in a signalized two-way bikeway crossing.

Figure 10: Recommended Alternative



## PUBLIC OUTREACH

MCDOT engaged the community using a newsletter mailing which provided an overview of the project and invitation to a public meeting. A public meeting presenting the proposed improvements was held on October 3, 2019 at Arcola Elementary School, and an option of streaming the meeting online was also provided. The overall feedback from the community was generally positive, with some concerns of potential impacts to house frontage and impacts to street trees, as well as existing parking spaces.

**NEXT STEPS**

The Transportation and Environment Committee will review the project and select a preferred alternative. MCDOT will continue design work to advance that alternative.

**ATTACHMENTS**

Attachment 1: Traffic Study and Parking Utilization excerpts from the Traffic Impact Study

Attachment 2: Roll Map with Sections

Attachment 3: Typical Sections by Alignment by Segment

Attachment 4: Bikeway Selection Chart