



MARYLAND DEPARTMENT
OF TRANSPORTATION

STATE HIGHWAY
ADMINISTRATION

MD 185 NEEDS ANALYSIS

JANUARY 2022

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Acknowledgements

This report is the result of a needs evaluation performed by the Maryland Department of Transportation State Highway Administration (MDOT SHA) Office of Planning and Preliminary Engineering and the MDOT SHA District Three Office. The MDOT SHA project team gathered valuable insights about the corridor through participating in meetings conducted by the District 18 Delegation, Montgomery County DOT, the Town of Kensington, and local residents.

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Introduction

Project Background and Process

The Maryland Department of Transportation State Highway Administration (MDOT SHA) Office of Planning and Preliminary Engineering (OPPE), in consultation with MDOT SHA District 3 completed a comprehensive Needs Analysis for MD 185 (Connecticut Avenue) between Chevy Chase Circle/Western Avenue at the state boundary with Washington DC, and MD 193 (University Boulevard) in the Town of Kensington. This document outlines a long-term vision for the corridor by identifying strategies to address pedestrian and bicycle network deficiencies, enhance multi-modal safety and improve travel conditions along the corridor.

This Needs Analysis provides a road-map to deliver improvements based on MDOT SHA's Context Driven - Access & Mobility for All Users 1.0, a planning and design resource centered on establishing safe and effective multi-modal transportation systems. Weighing the needs of pedestrians, bicyclists and drivers in the context of the surrounding environment and targeted strategies that overcome deficiencies and improve safety and mobility to be provided in the network.

Purpose

Balancing the needs of all MD 185 users is a complex proposal. A critical link between Washington DC, the I-495 Capital Beltway and inner suburbs of Montgomery County, MD 185 carries significant volumes of commercial and commuter traffic, leading to greater demand than there is capacity within the existing road. The surrounding communities include

a mix of well established residential neighborhoods, so widening the road to add vehicular capacity, or to significantly improve existing pedestrian or bicycle facilities is not feasible within the existing public right of way. New development is generally concentrated around the Purple Line station that is slated to open around 2022-2023, and in the Town of Kensington. In both growth areas, there are higher concentrations of pedestrian and bicycle activity, leading to greater demand for supporting sidewalk and bicycle facilities, coupled with demand for more frequent opportunities to cross the street. These expectations further limit opportunities to improve vehicular travel along the corridor.

Approach

This Needs Analysis was completed to identify context driven transportation improvements that will improve mobility, accessibility, safety and experience for users of the MD 185 corridor. Acknowledging differences in how pedestrians, bicyclists, transit users, and drivers experience travel, their sensitivity to barriers, stress and vulnerability to conflicts are central to this holistic approach. The resulting recommendations are based on two key variables, CONTEXT, which is identified by roadside use and intensity, and TOOLS that are appropriate to address user demand along the corridor.

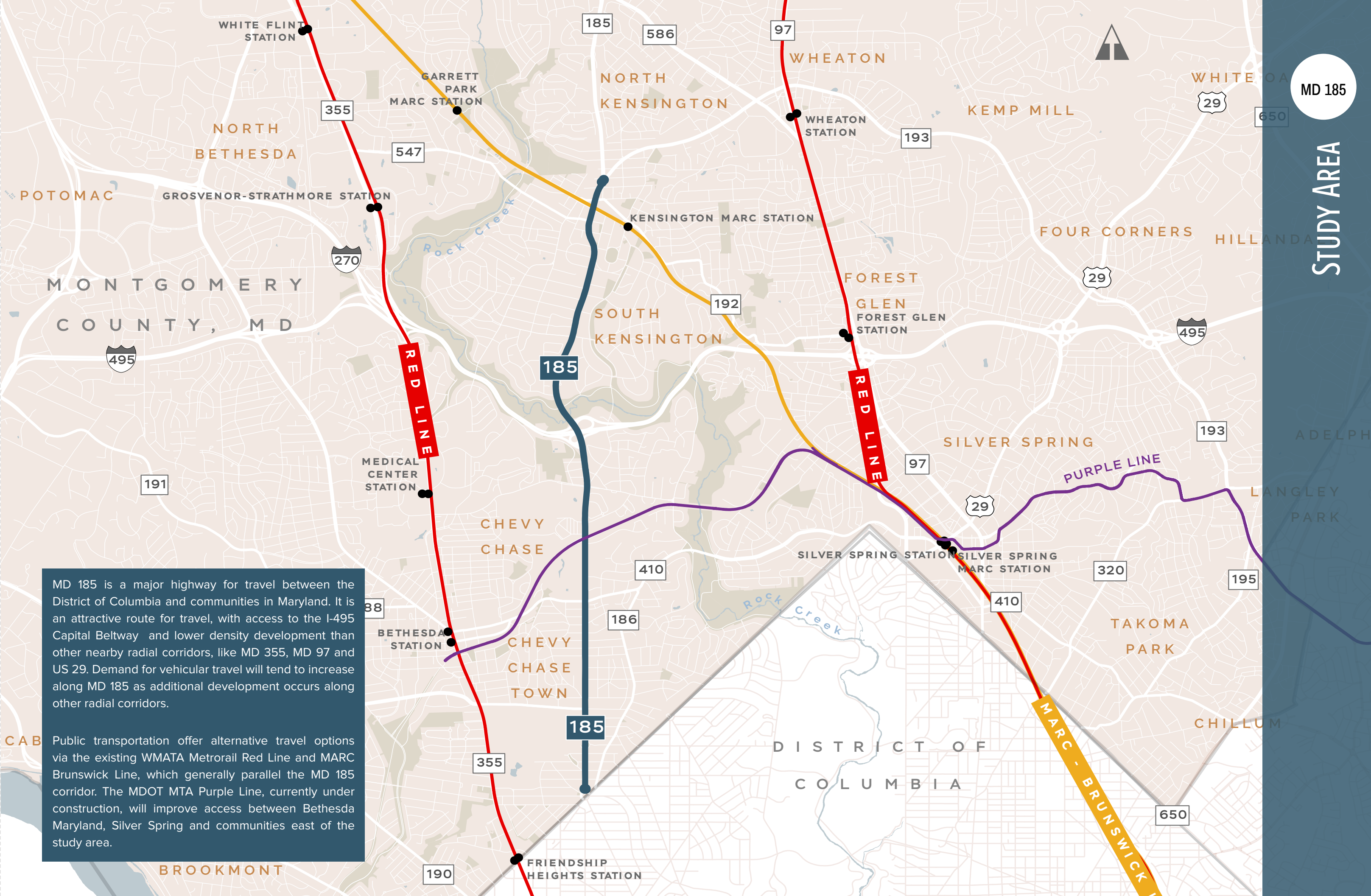
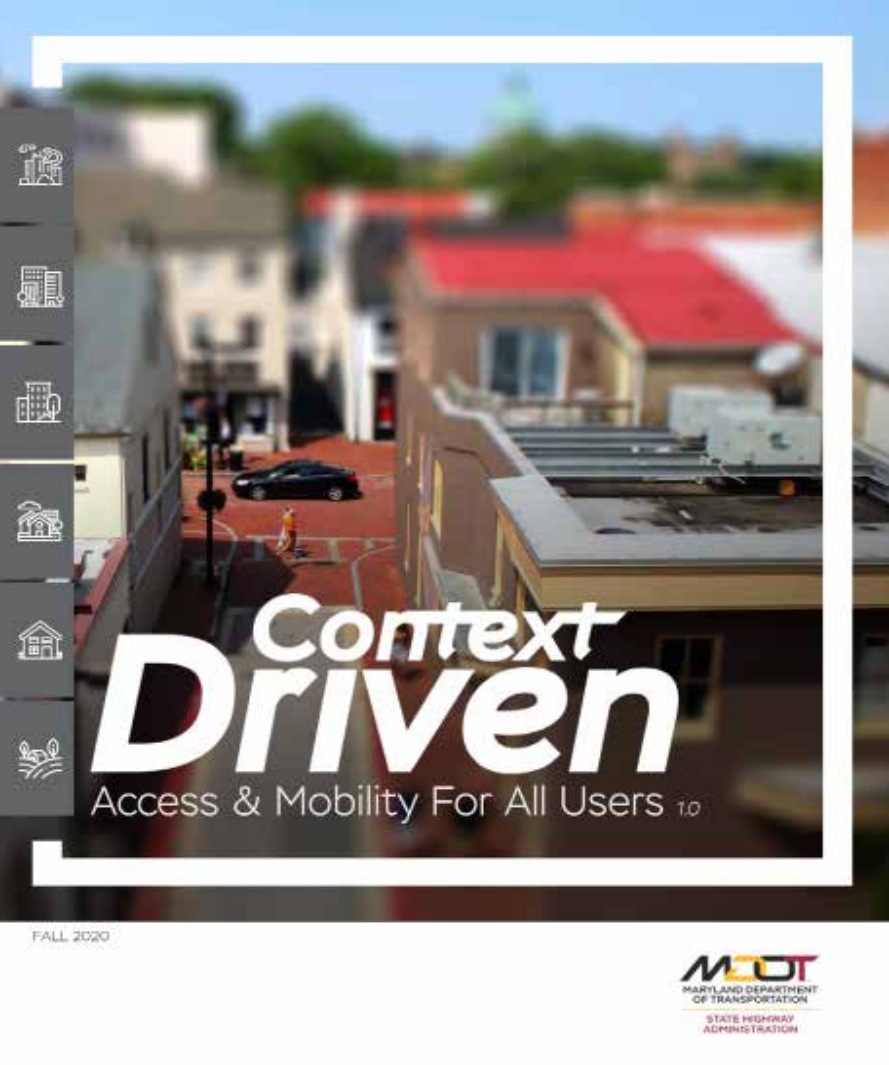
Context varies within any corridor. This is in part due to the existing conditions along the roadside, which influence the level of activity and demand to travel along or to cross a road. Over time, demand may also increase, as growth occurs or new transportation facilities are provided. This requires a review of the existing conditions in the field, to experience the character and travel conditions along a corridor, and a scan of long-range plans to reveal potential future conditions. Additional historical data, like traffic volumes, and crash locations are layered, to provide a complete picture of how the road functions, supporting observations that are made in the field.

With a more complete understanding of conditions on MD 185, the corridor was segmented into Context Zone segments based on MDOT SHA's Context Driven 1.0 Guide. With these segments defined, needs can be paired with tools to address the challenges that users encountering the corridor, and improve the user experience along MD 185.

COVID-19 Pandemic

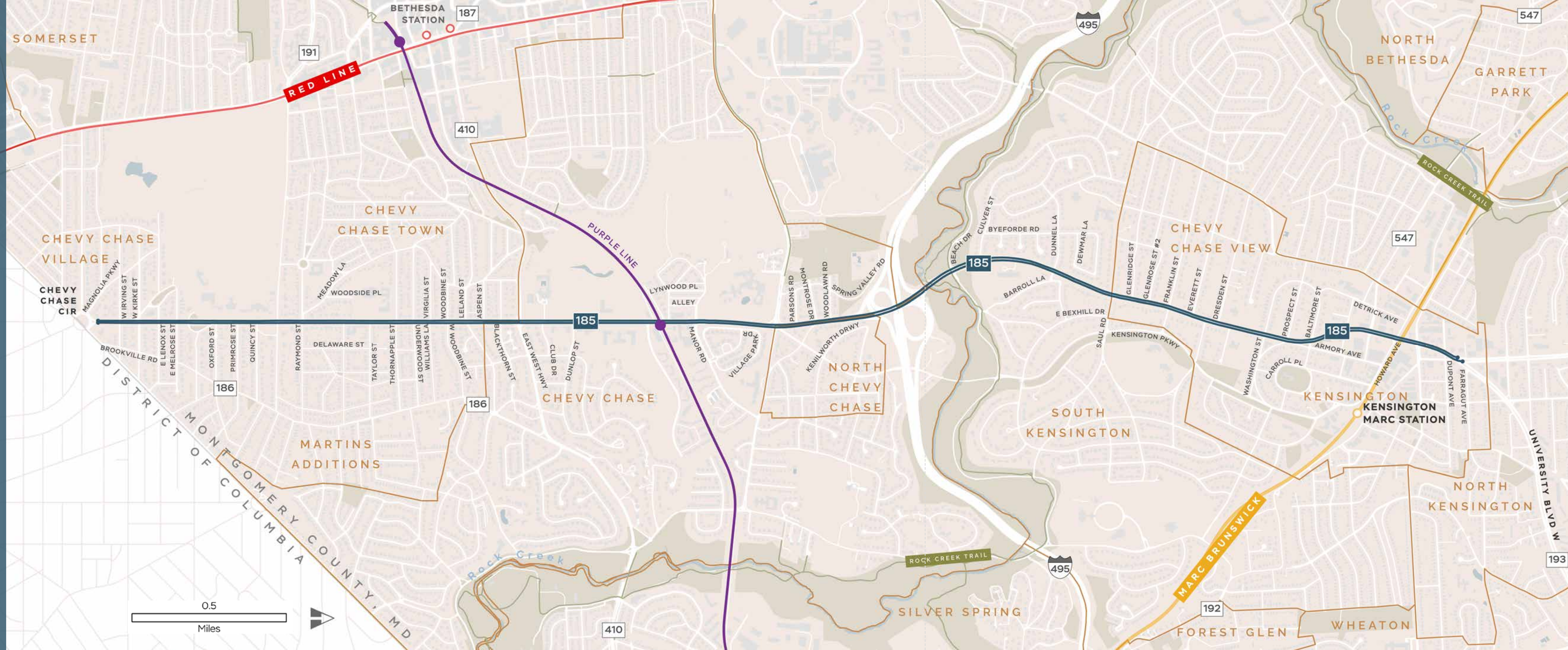
This study was conducted between the summer of 2020 and spring of 2021. During a significant portion of this time, emergency orders were in place that required businesses to operate at limited capacities, requiring school and non-essential work to be conducted remotely from residents' homes. As a result, vehicular travel patterns were significantly influenced, either by reduced demand or changed travel patterns, during the periods when field observations were made over the course of this study. In addition, demand for outdoor recreation increased, highlighting the need for highways to serve the broad multi-modal needs of all roadway users.

MDOT SHA Administrator Tim Smith, PE, in his November 13, 2020 introduction of Context Driven 1.0, stated "The Context Driven Guide has and is changing the way MDOT SHA delivers projects by identifying proactive treatments that support safe access and mobility for pedestrians, bicyclists, and motorists. This approach places the focus on people, ensuring that the system prioritizes all road users, regardless of mode, a philosophy that is central to the Needs Analysis approach."



MD 185

STUDY AREA



MD 185 Corridor Overview

MD 185 (Connecticut Avenue) is an urban principal arterial spanning from the D.C. line to Aspen Hill. The study limits are from the D.C. line (Chevy Chase Circle) to MD 193. This corridor consists of a six-lane divided roadway with signalized and unsignalized intersections, turn lanes, and ramps to/from I-495. MD 185 consists of several marked pedestrian crossings, signalized and unsignalized, with WMATA Metrobus and Montgomery County Ride On bus stops. The posted speed limit changes from 30 mph to 35 mph at MD 410 traveling northbound, with speed cameras throughout the segment.

Starting at the southern end of the corridor, the land uses adjacent to MD 185 from the D.C. line to MD 410 consist mostly of driveways to residential areas, such as neighborhoods or to single family homes. From MD 410 to Jones Bridge Road, driveways are generally to commercial locations, such as a library, country club, restaurants, and offices. The area transitions back to residential land use from Jones Bridge Road to MD 547. The land use between MD 547 to MD 193 provides access to a heavy commercial area.



EXISTING CONDITIONS & SAFETY

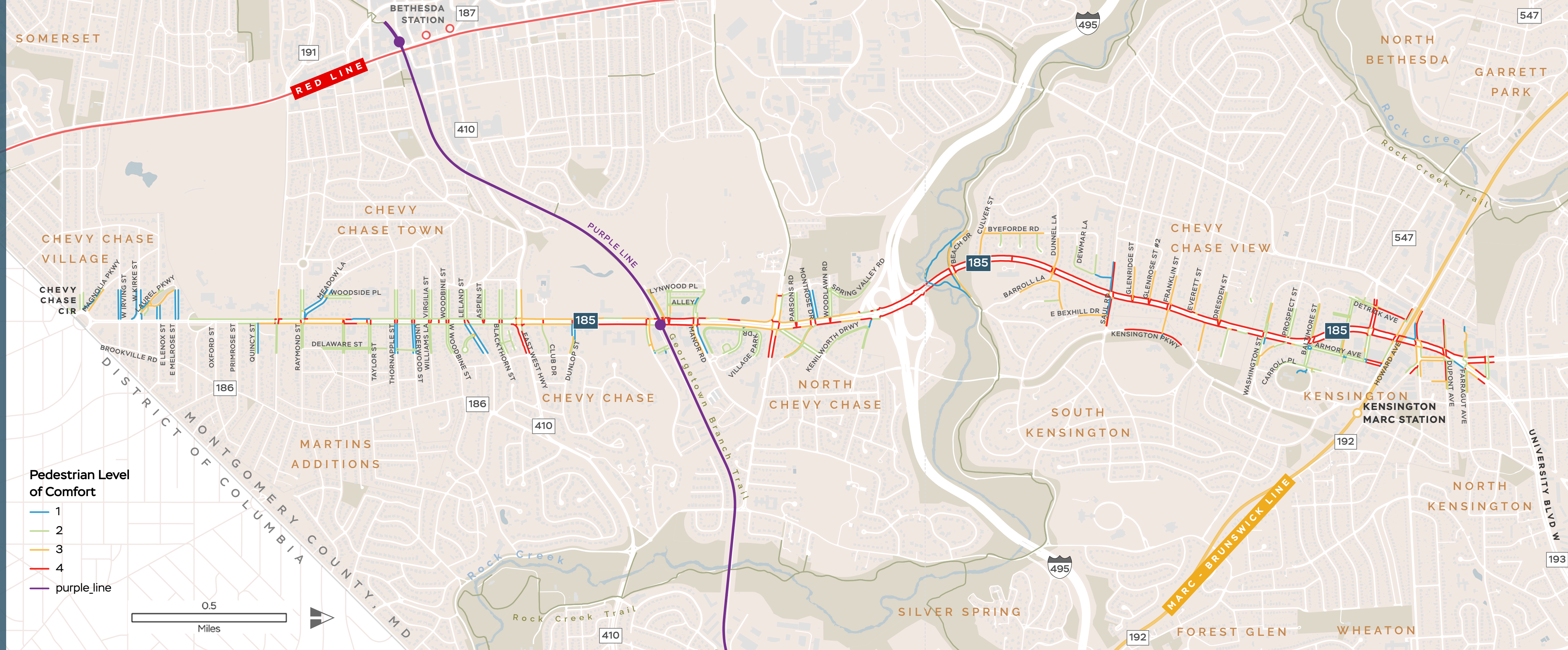
Overview

The experience of travel along the MD 185 corridor varies greatly, depending on factors like the road users method of travel, time of day, purpose for their trip, and locations where they enter and exit the corridor. Providing context for these variations in travel at a corridor level begins with a scan of existing traffic conditions, which are explained through metrics that describe traffic or the user experience.

To establish a baseline for this needs analysis, a variety of public data sources from Montgomery County and MDOT SHA were assembled and visualized to help explain existing travel conditions along the corridor. These measures are presented in order of vulnerability to traffic stress and safety, in part an acknowledgment that pedestrians represent the most vulnerable user group, followed by bicyclists and transit users.

These data sources shed initial light on the challenges that road users may encounter at specific areas along the corridor, including higher volume segments of the street, areas of concentrated activity where greater transit service is provided.

Safety is represented in the crash experience that occurs along the road. Along corridors where little change has occurred, or is anticipated, crashes offer valuable insights into challenges that users are experiencing, and potential needs to reduce the potential for similar collisions to occur in the future.



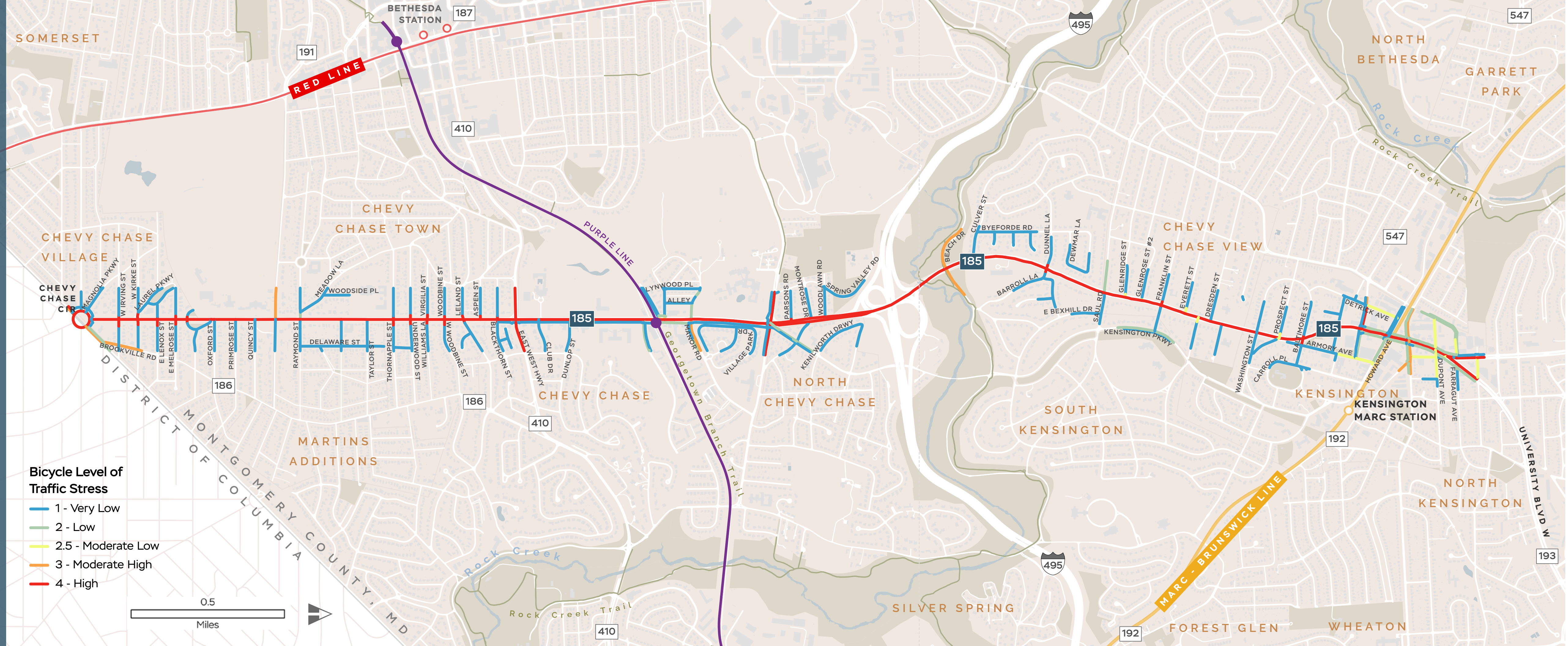
Pedestrian Level of Comfort

Pedestrian Level of Comfort (PLOC) was created by the Montgomery County Planning Department to identify locations in the existing walking network that are uncomfortable due to insufficient or incomplete sidewalks and crossings, and to quantify how different investments will increase connectivity. As part of the 2018 Montgomery County Bicycle Master Plan, this approach was inspired by the Bicycle Level of Traffic Stress (BLTS).

Factors such as pathway width, buffer from traffic, number of lanes to cross, traffic speed, presence of crosswalk markings, and availability of median islands affect comfort levels. The four main scores are undesirable (level 4), uncomfortable (level 3), somewhat comfortable (level 2) and very comfortable (level 1). Several factors are considered when scoring the thresholds, such as land use, roadway functional classification, pathway condition, and right-turn on red. Based on lack of available data at the time that M-NCCPC was conducting this analysis, there are some factors that are not considered, such as pedestrian and street lighting, or the presence of a Leading Pedestrian Interval (LPI) at crossings. These factors are to be scored separately.

It is important to note that “comfort” differs from “safety.” Safety is the basis for the transportation system, while comfort relates to a path that is enjoyable and comfortable for people of all ages. When a street receives a relatively poor score, it is a sign that change is needed to make people more comfortable and potentially attract more pedestrians.

The PLOC along MD 185 to the south of MD 410 is graded primarily at level 2 and level 3, somewhat comfortable to uncomfortable, primarily based on increased separation from the travel lanes. The segment of MD 185 from MD 410 to I-495 is graded primarily at level 3 and level 4, uncomfortable to undesirable, with many sidewalks provided immediately behind the curb. The segment of MD 185 north of I-495 to MD 193 is primarily graded at level 4, undesirable, with all sidewalks immediately behind the curb.



Bicycle Level of Traffic Stress

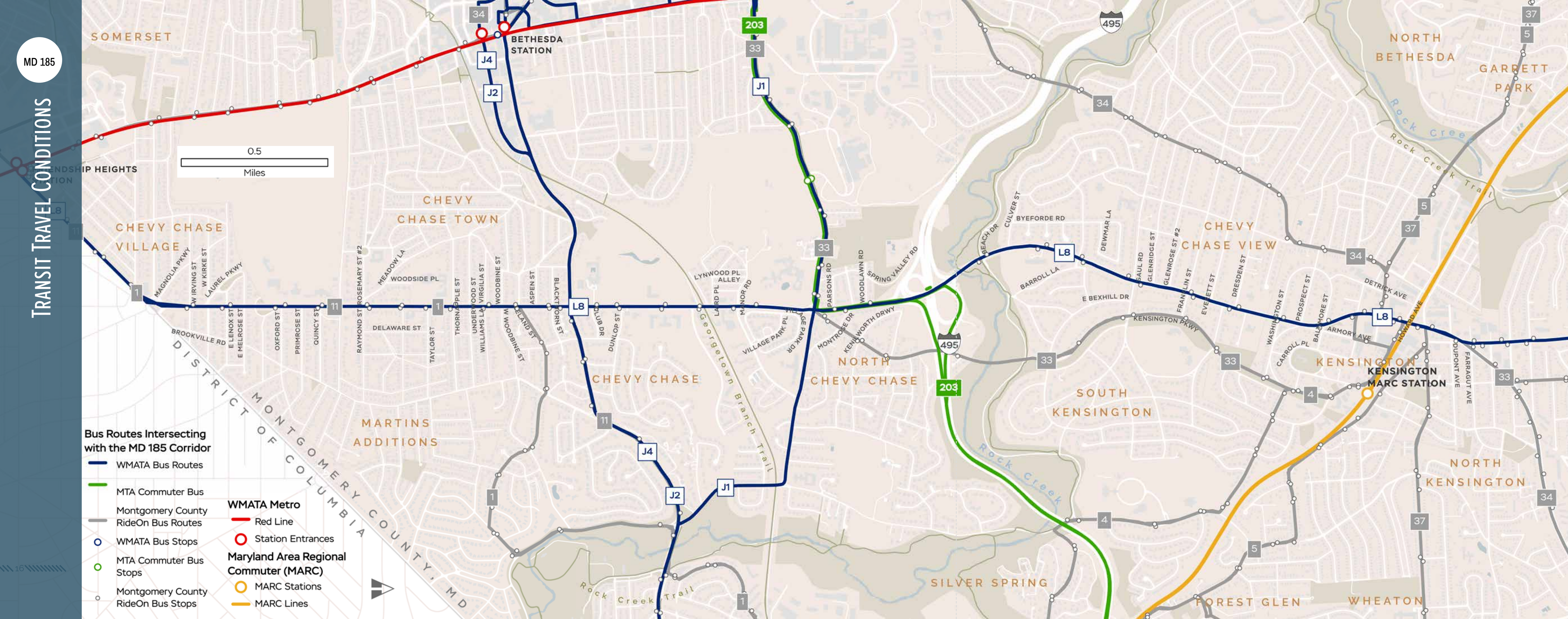
Bicycle Level of Traffic Stress (BLTS) is a methodology that was developed by the Mineta Transportation Institute as a tool to quantify the amount of discomfort that people feel when they travel closely to vehicular and pedestrian traffic. The Montgomery County Planning Department revised this methodology to fully capture the stress levels on some of the roads in the county. The goal of this methodology was to address which roads needed improvements as part of the 2018 Montgomery County Bicycle Master Plan to recommend ways of creating a connected bikeway system that will appeal to a wider range of riders. The revised level of stress is categorized by the following categories:

LTS	Stress Level	Rider Type
0	None	Most
1	Very Low Stress	Most
2	Low Stress	Strong
2.5	Moderately Low Stress	Strong
3	Moderately High Stress	Confident
4	High Stress	Confident

An existing high stress level is a sign that improved bicycle infrastructure is necessary to make people feel more comfortable riding.

Factors that contribute to the grading of stress includes number of traffic lanes, vehicular speeds and volume, frequency of on-street parking turnover, presence of a bike facility, presence and length of right-turn lanes, turn lane configurations, width and speed limit of the cross street at unsignalized crossings, and presence of median refuge.

Along MD 185, the BLTS is graded at a Stress Level 4, due to the number of lanes, high travel speeds and traffic volumes, lack of dedicated bicycle facilities, and several high-volume turning movements and intersections.



Transit Access

The MD 185 corridor is served by several transit agencies including the Washington Metropolitan Area Transportation Authority (WMATA), the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA), and Montgomery County Transit Ride On.

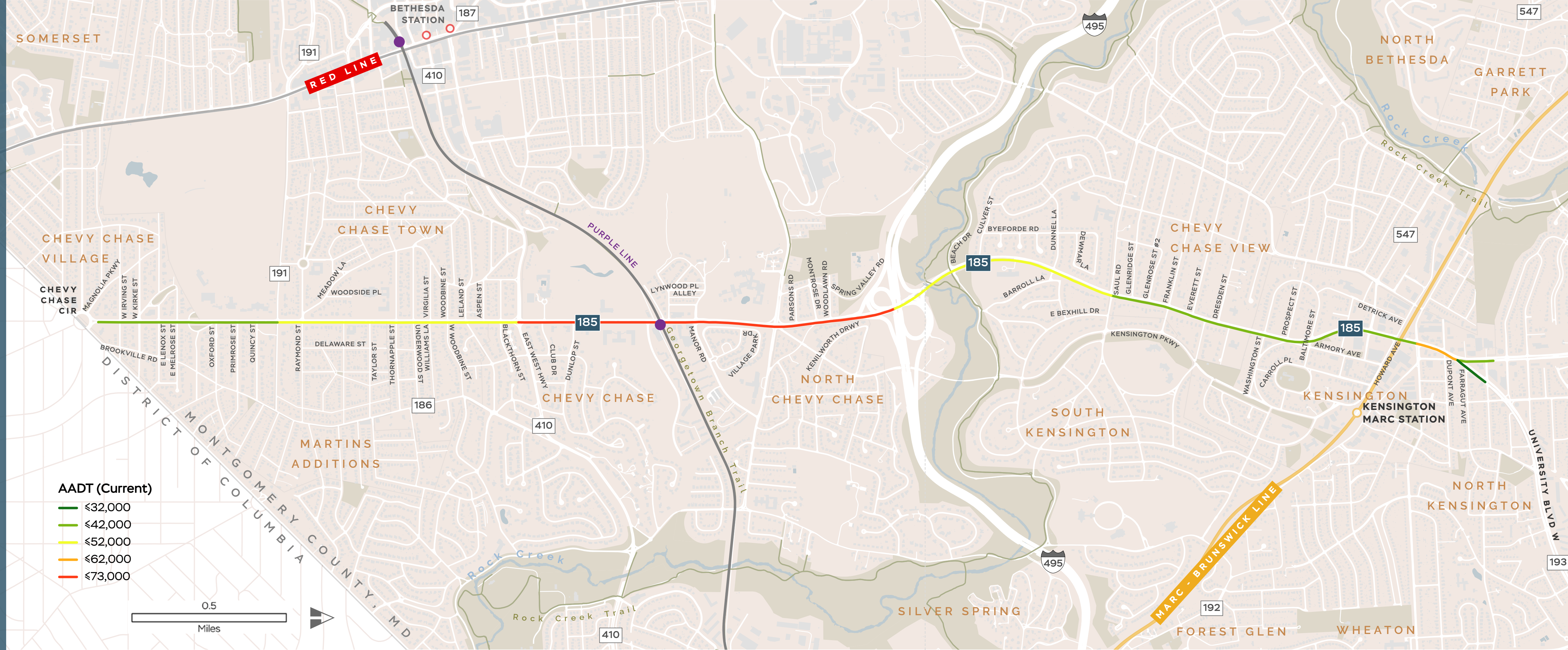
The WMATA L8 bus runs along MD 185 from the Friendship Heights Station to Grand Pre Road/Bel Pre Road, making about 30 stops along the corridor with six (6) scheduled timepoints. The bus runs along the entirety of the segment, from the D.C. line to MD 193. The L8 bus provides all-day weekday service with headways of approximately 30 minutes.

The WMATA J1 and J2 run across MD 185, connecting the Montgomery Mall to the Silver Spring Station. The J1 bus crosses MD 185 along Jones Bridge Road, with weekday peak period service in the peak direction only (westbound in the AM and eastbound in the PM) with headways of approximately 20 minutes. The J1 bus crosses MD 185 along MD 410 with all-day every day service with headways of approximately 10 to 30 minutes.

The Montgomery County Local RideOn Bus routes that travel along MD 185 include Bus 1 and Bus 11, with Bus 4, 5, 33, 34, and 37 crossing MD 185 at one location.

RideOn Bus Route 1 runs between the Friendship Heights Metro Station and the Silver Spring Metro Station, with two (2) schedule timepoints along the segment. The bus runs along the segment from the D.C. line to MD 410. Route 1 provides weekday service with headways of approximately 20-35 minutes, Saturday service with headways of approximately 35 minutes, and Sunday service with headways approximately once per hour.

RideOn Bus Route 11 runs between the Friendship Heights Metro Station and the Silver Spring Station, stopping at six (6) locations along MD 185 between the D.C. line and MD 410. Route 11 provides weekday peak period service in the peak direction only (southbound in the AM, northbound in the PM) with headways of approximately 20 to 40 minutes.



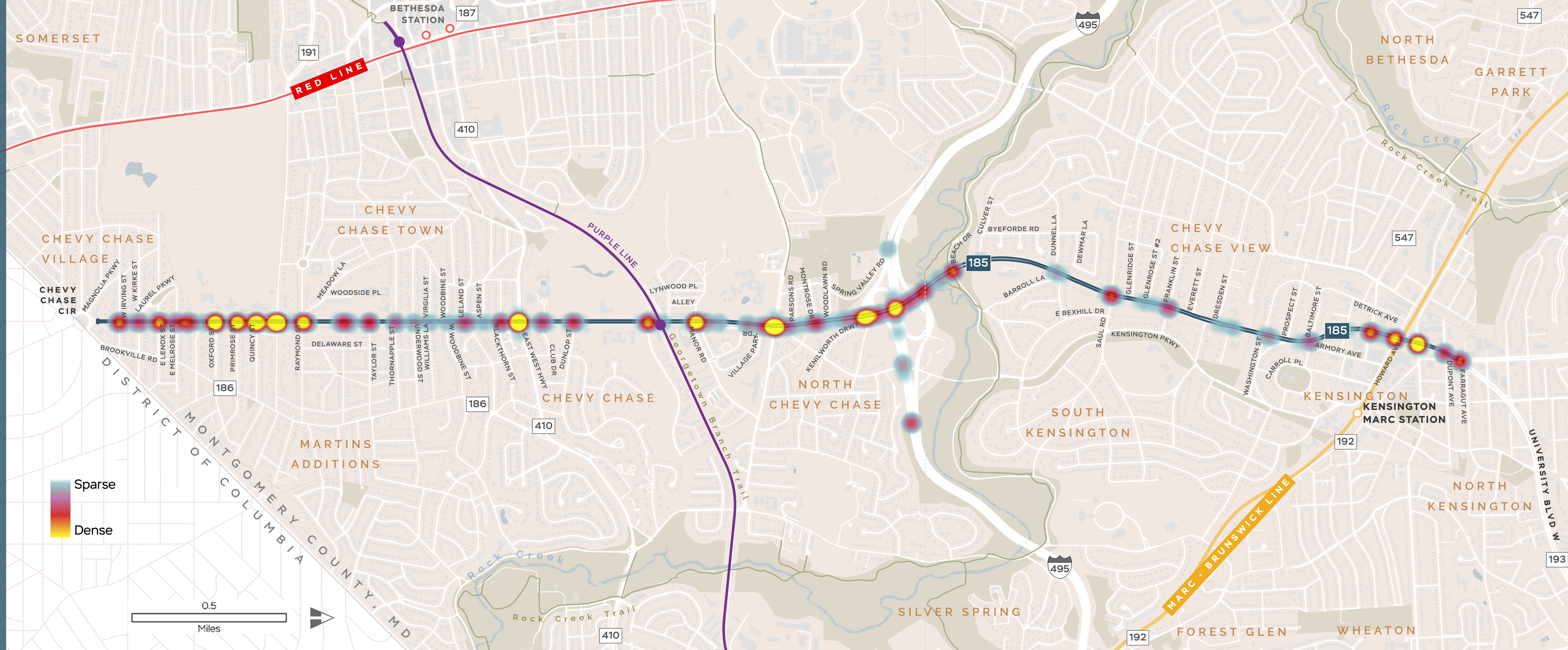
Vehicular Travel Conditions

Annual Average Daily Traffic (AADT) is an estimate of the mean traffic volume across all days for a year for a given location along a roadway. AADT does not reflect traffic volumes during peak morning and evening periods, which may be higher during those times.

Estimated AADT was obtained from MDOT SHA for the year 2018. Along the segment of MD 185 from the D.C. line to MD 193, the AADT ranges from 35,000-75,000. The peak direction of traffic along the corridor is southbound in the AM and northbound in the PM.

Starting at the southern end of the corridor, from the D.C. line to MD 191 (Bradley Lane), the estimated AADT is nearly 38,000 vehicles. Further north, between MD 191 and MD 410 (East-West Highway), the AADT increases to approximately 44,000 vehicles. Between MD 410 and I-495, the AADT increases significantly to approximately 73,000 vehicles. Between I-495 and MD 192 (Plyers Mill Road), the AADT ranges from 38,000 to 45,000 vehicles. At the northern end of the corridor, between MD 192 and MD 193 (University Boulevard) in Kensington, the AADT increases to nearly 54,000 vehicles.

Throughout the study corridor, MD 185 is a six-lane roadway with three through lanes in each direction. From a general planning perspective according to the Highway Capacity Manual (HCM), a four-lane roadway with exclusive left-turn lanes may operate at LOS E with daily service volumes of 27,000 to 36,000. While a full operational analysis is required for specific improvements, the MD 185 AADTs suggest that the southern end of the corridor may be a candidate for further study of lane reduction concepts.



Crash History

Crash data was reviewed for a five year period (2014 - 2018). Crash rates and trends were reviewed and assessed by the following subcategories: all crashes, injury crashes, bicycle and pedestrian crashes, and injury bicycle and pedestrian crashes.

A total of 566 crashes were reported during this period. Of these crashes, 90 were severe, disabling, or fatal; 11 of these crashes involved a person walking or biking, of which 7 individuals walking or biking were injured or disabled.

In total 2% of crashes along the study area involved a person walking or biking (11 crashes), and 64% of those crashes resulted in an injury for the pedestrian or bicyclist. Within the study area the highest bicycle and pedestrian crash rates occurred near high-density destinations like Kensington, and the Purple Line station area.

Along the southern segment of the corridor, high concentrations of rear end and sideswipe crashes occurred, which represented the highest rate of crashes and resulting injuries.

Collision rates were also higher in proximity of the I-495 interchange, though records indicated less severity than the southern segment of the corridor.

Although the analysis was specific to 2014-2018 crash data, a 2019 severe crash that occurred at the Saul Road intersection was also noted. This crash involved an individual walking their bicycle who was struck following a vehicular collision in the intersection. There was also a fatal crash in 2021 involving a pickup truck and an SUV at the same intersection with Saul Road. The 2019 and 2021 crashes were not included in the crash statistics for this study, but they are noted due to the outcomes of the collisions.



SEGMENTATION & TOOLKIT DEVELOPMENT

Overview

Identifying needs in the MD 185 corridor first requires an assessment of context, which informs which tools will be appropriate to balance safety, accessibility and mobility needs of all road users. Context is revealed by layering existing conditions data and field observation. Roadside land use is often a primary indicator of context, with varying density and mixes of use that tend to generate activity, or demand for local access. To a lesser degree, design of the road may be an indicator of context, though existing facilities may be misaligned toward auto mobility rather than local access. Operational character may also influence context, including prevailing vehicle speeds, frequency of controlled intersections or prevalence of certain crash types that may indicate an imbalance in how the road functions.

By considering and weighing these factors, the MD 185 corridor can be segmented into distinct contexts. This process builds on guidance from MDOT SHA's Context Driven, which outlines a variety of contexts, and associated priorities of local access or mobility. In reviewing context at the corridor level, finer detail of variation in travel needs are revealed than those observed at a regional level, responding to more discrete variations in land use, density, significant regional transportation facilities, or other factors. Change tends to occur gradually, so recognizing areas

of transition helps to identify the context, and then define the limits of each zone.

The final step before establishing specific corridor recommendations is to establish the toolkit of improvements that are appropriate in each context identified within a corridor. This process leverages local and industry best practices to prioritize access in contexts with higher pedestrian, transit and bicycle activity, and to balance mobility with safety in areas of lower activity. The toolkit primarily includes design and operational tools that may be introduced at MDOT SHA's discretion, and policy recommendations like automated enforcement that may require coordination with the agencies with oversight of those programs.

Field Review

Field reviews were conducted in the late summer and early fall of 2020 to review existing conditions in the MD 185 corridor. Observations were collected using GIS equipped tablets, allowing opportunities, challenges and photographs of existing conditions to be recorded spatially along the corridor for review and mapping. Initial assessments of possible context

segments were developed from observed conditions as investigators traveled along the corridor. Key themes that were observed included:

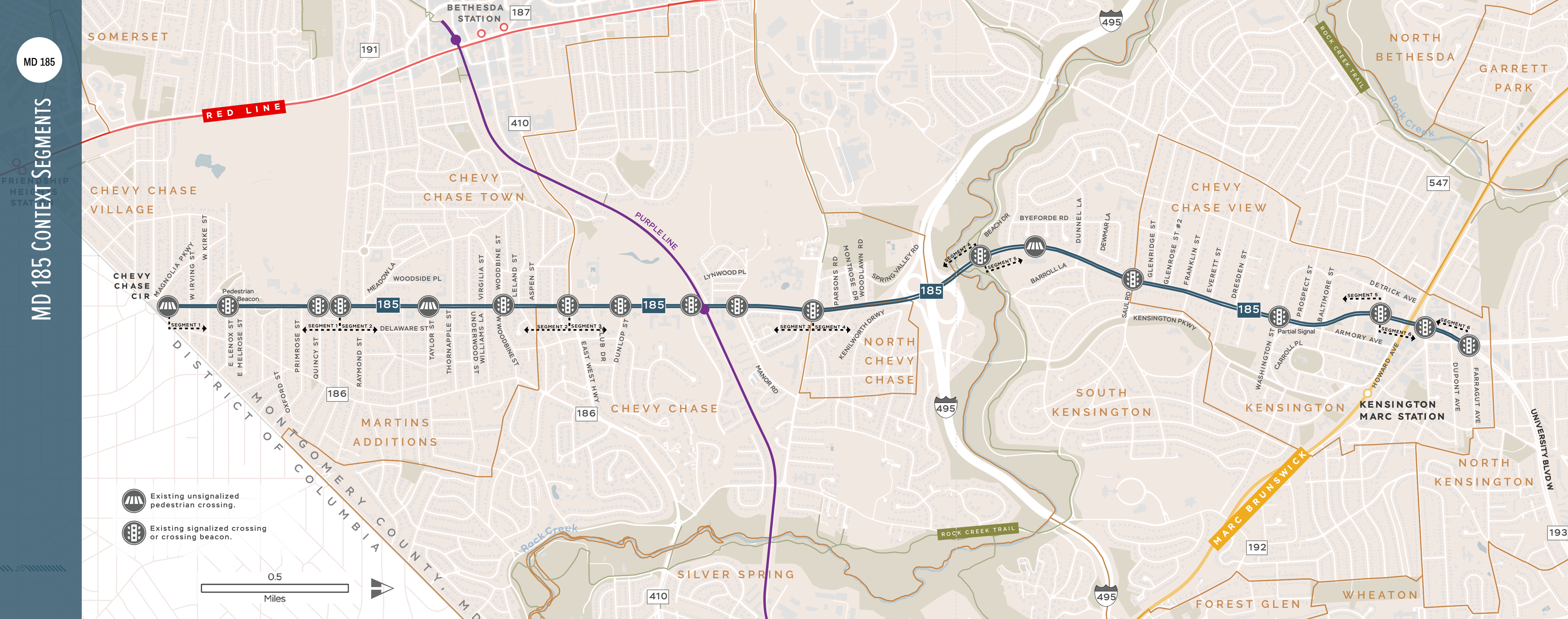
- » Sidewalks directly abutting high speed or heavily trafficked segments of MD 185.
- » Few designated or controlled crosswalk locations.
- » Intersections with yield controlled turning movements across crosswalks, some with poor visibility approaching the crosswalk.
- » Angled side streets that do not promote stopping, or low turning speeds that improve recognition of pedestrian or bicycle users.
- » High speed freeway ramps with poor visibility approaching the crosswalk.
- » Lack of bicycle facilities, resulting in sharing the sidewalk or riding in high speed and volume traffic.
- » Narrow vehicular lanes approaching the Washington DC border
- » Turn restrictions, or lack of left turn lanes to accommodate local neighborhood access .
- » Perceived speeding behavior.

Context Evaluation and Segmentation

To refine and validate initial context segmentation identified in the field, additional data sources were reviewed to provide additional context. This initially included a scan of the field observations to assess local conditions, highlight unique findings, and attribute data around the themes identified previously. Corridor plans and information were scanned and recorded for each of the segments, including Montgomery County’s highway and transitways plan, bicycle master plan, M-NCPPC sector plans, Vision Zero plan, zoning, and MDOT SHA’s Context Zones. Roadway data such as Annual Average Daily Traffic (AADT), Level of Traffic Stress (LTS), and functional classifications were also reviewed and recorded. Crashes that occurred along the corridor were also evaluated and summarized, as shown in the tables on page 28 (Injury Crashes and Bicycle & Pedestrian Crashes). A table was developed to summarize the data and characteristics for each of the context segments, which is provided on page 25 (MD 185 Context Segments).



MD 185 Context Segments					
Segment	Length	From	To	Context	Description
1	0.66	Chevy Chase Circle	MD 191 (Bradley Lane)	Suburban Activity Center	Suburban residential
2	0.67	MD 191 (Bradley Lane)	MD 410 (East-West Hwy)	Suburban Activity Center	Suburban activity area
3	0.84	MD 410 (East-West Hwy)	Jones Bridge Road	Suburban Activity Center	Purple Line station area
4	0.47	Jones Bridge Road	Beach Drive	Suburban & Suburban Activity Cente	I-495 Interchanges
5	1.51	Beach Drive	Knowles Ave	Suburban & Suburban Activity Center	Suburban residential
6	0.31	Knowles Ave	MD 193 (University Blvd)	Suburban Activity Center	Kensington commercial area



This map presents the context segments identified for the MD 185 Needs Analysis study corridor. The locations of existing signal or beacon controlled intersections and marked crosswalks are included to contextualize frequency of opportunities to cross the corridor.

Street sections for each of the context segments and toolkit recommendations are presented in the following section. These sections represent a vision for the corridor that will address the needs of broader users upon implementation. In recognition that change will occur incrementally, near- and mid-term improvements that may advance this vision are presented in Chapter 4.

Crash Evaluation

A detailed review of crash trends in the context segments was completed for comparison of overall crash trends within each of the context segments, and to identify where bicycle and pedestrian safety trends are observed in the collision data. The highest rates of injury crashes occurred in Segments 1 and 2, which have the lowest and third lowest traffic volumes, but the highest and third highest injury crashes, and segment 4, which includes the I-495 interchange ramps and has the highest traffic volumes within the study area. Crash types in these southern segments were primarily rear end and sideswipe crash types.

The highest bicycle and pedestrian crash rates occurred near high-density destinations like Kensington in Segment 6, and the future Purple Line station area in Segment 3. In total only 2% of crashes along the study area involved a person walking or biking, but 64% of those crashes resulted in an injury or worse for the pedestrian or bicyclist, indicating a disproportional negative impact on pedestrians or bicyclists who do experience a crash within the MD 185 corridor.

INJURY CRASHES (2014 - 2018)				
Segment	Length	Injury Crashes (per Mile)	AADT	Per Mile Per 1 Million Vehicles
1	0.66	26	37,500	690
2	0.67	22	44,900	490
3	0.84	25	69,500	360
4	0.47	38	57,700	660
5	1.51	8	42,100	190
6	0.31	23	45,600	500

BICYCLE & PEDESTRIAN CRASHES (2014 - 2018)				
Segment	Length	Bicycle & Pedestrian Crashes (per Mile)	AADT	Per Mile Per 1 Million Vehicles
1	0.66	3	37,500	80
2	0.67	1	44,900	20
3	0.84	6	69,500	90
4	0.47	0	57,700	0
5	1.51	0	42,100	0
6	0.31	10	45,600	220

Toolkit Development

Best practice resources provide guidance on enhancing safety, particularly for non-motorized road users, and enhancing multi-modal accessibility. To establish a toolkit appropriate to address needs in the MD 185 corridor, the following best practices from national and local guidebooks were consulted:

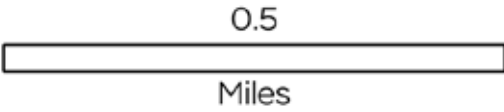
- » Montgomery County Complete Streets Guide
- » Montgomery County Bicycle Facility Design Toolkit
- » MDOT SHA Context Driven: Access & Mobility for All Users
- » Global Street Design Guide from the Global Designing Cities Initiative
- » ITE’s Implementing Context Sensitive Design on Multi-modal Thoroughfares
- » Fehr & Peer’s LA Bike/Bus Interaction Study
- » Oregon Metro’s Designing Livable Streets and Trails Guide
- » FHWA Intersection Safety Case Study
- » Signalized Intersections: An Informational Guide (link)
- » NCHRP 812: Signal Timing Manual

Context appropriate recommendations were drafted and revised for each context, with consideration of the unique demands in each segment along the corridor and each attribute within that segment. This included a detailed review of the various roadway elements, including travel lanes and widths, turn lanes and treatments, medians, sidewalks, buffers, driveways and adjacent land uses.

Context Segment Recommendations

In each of the context segments, the preferred master plan or “complete street” elements were compiled to develop an unconstrained roadway section to document the preferred corridor design under ideal conditions. In all cases, implementing such a design would be infeasible due to impacts to the surrounding community, so a context appropriate approach was used to identify a constrained street section that prioritizes pedestrian and bicyclist safety, access and a balanced approach to address all needs in the MD 187 corridor. This constrained roadway section and key recommendations for each context segment are summarized in the following pages. The recommended improvements are not intended to limit other potential future actions.

The full buildout of these street sections would be achieved by implementing all of the Long-Term Improvements shown in Chapter 4.





MULTIMODAL NEEDS ON THE CORRIDOR

SEGMENT 1 connects DC to the Chevy Chase neighborhood. According to Pedestrian Level of Comfort and Bicycle Level of Stress rating maps by Montgomery County, this transition segment is “somewhat comfortable” for pedestrians and “high stress” for people on bicycles due to the Chevy Chase Circle roundabout, three lanes of traffic per direction, narrow travel lanes, no turn pockets, and no bicycle facilities. These factors also make vehicular travel stressful. The AADT for this segment was 37,612 at the time of this report.

Vehicular turn movements are restricted during AM and PM commute periods to prioritize automobile through movements. Despite four pairs of bus stops, pedestrians have limited crossing opportunities within the area, with a traditional traffic signal at Bradley Lane, and a pedestrian signal at Lennox Street.

Segment 1 has the highest rate of injury crashes along the entire corridor, and the third highest segment for bicycle and pedestrian crashes within the study area. Injury crashes within Segment 1 are primarily sideswipes and rear ends.

WHAT TOOLS ARE APPLICABLE TO ADDRESS THE NEEDS?

MDOT SHA should consider performing an operational evaluation to determine if a road reconfiguration is suitable for Segment 1. Converting one travel lane per direction provides space for buffered bike lanes, widening of existing travel lanes, and left turn pockets. Providing space for people biking, additional buffer for people walking, and adding turn pockets can create a lower stress walking and biking environment as well as potentially reduce vehicular rear end and sideswipe crashes.

The buffered bike lanes could include safety features such as removable flex posts, kwik kurbs, rubber bumps, and green paint. MDOT SHA should coordinate with MCDOT’s traffic operations to consider a turn

pocket at Bradley Lane to improve operations. Safe pedestrian crossings every 800’-1600’ should include elements such as continental striping, Pedestrian Hybrid Beacons (PHB), pedestrian refuge island, Rapid Rectangular Flashing Beacon (RRFB), and curb extensions where possible.

SHA should work with DDOT to determine the appropriate posted speed, potentially 25 MPH, in this transition zone between DC and Chevy Chase. Where non-landscape buffered sidewalks exist, convert to landscape buffered sidewalk as development opportunities arise. Consider converting one of the duplicative brick sidewalk sections to concrete for improved accessibility.



TOOLKIT ELEMENTS IN THE CROSS-SECTION

TURN

- Protected/permitted left-turns
- Right-turn on red allowed except areas with high sidepath volumes

CURB RADII

- 15' Maximum curb radius
- Tighten curb radii
- Remove slip lanes

SPEED

POSTED SPEED
30

TARGET SPEED
25

ENFORCEMENT

- Encourage automated red enforcement
- Encourage automated speed enforcement

PEDESTRIAN & BIKE

- High-visibility crosswalks at all approaches
- Push-buttons
- LPI at signalized intersections in core area

West
5' Sidewalk
5' Bike lane

East
5' Sidewalk
5' Bike lane

800'
1,600'

Protected crossing spacing

OTHER

- Minimize, narrow, and consolidate driveways
- Pedestrian-scale lighting in town center areas
- High tree canopy coverage



MULTIMODAL NEEDS ON THE CORRIDOR

SEGMENT 2 travels through the Chevy Chase neighborhood north to East-West Highway. This segment of MD 185 is “uncomfortable” for pedestrians, “high stress” for people on bicycles, and listed on Montgomery County’s Vision Zero High Injury Network. Compared with Segment 1, auto lanes are wider and less stressful for drivers. Vehicular turn movements are restricted during AM and PM commute periods to prioritize automobile through movements. At the time of this report, the AADT was 43,702 for this segment.

Despite seven pairs of bus stops, pedestrians have limited crossing opportunities within the area, with a traditional traffic signal at Raymond Street and MD 410 (East-West Highway), a crosswalk and signage at Taylor Street, and a pedestrian signal between Williams Lane and Woodbine Street.

Segment 2 has the third highest rate of injury crashes along the entire corridor, and the fourth highest segment for bicycle and pedestrian crashes within the study area. Injury crashes within Segment 2 are primarily rear ends and sideswipes.

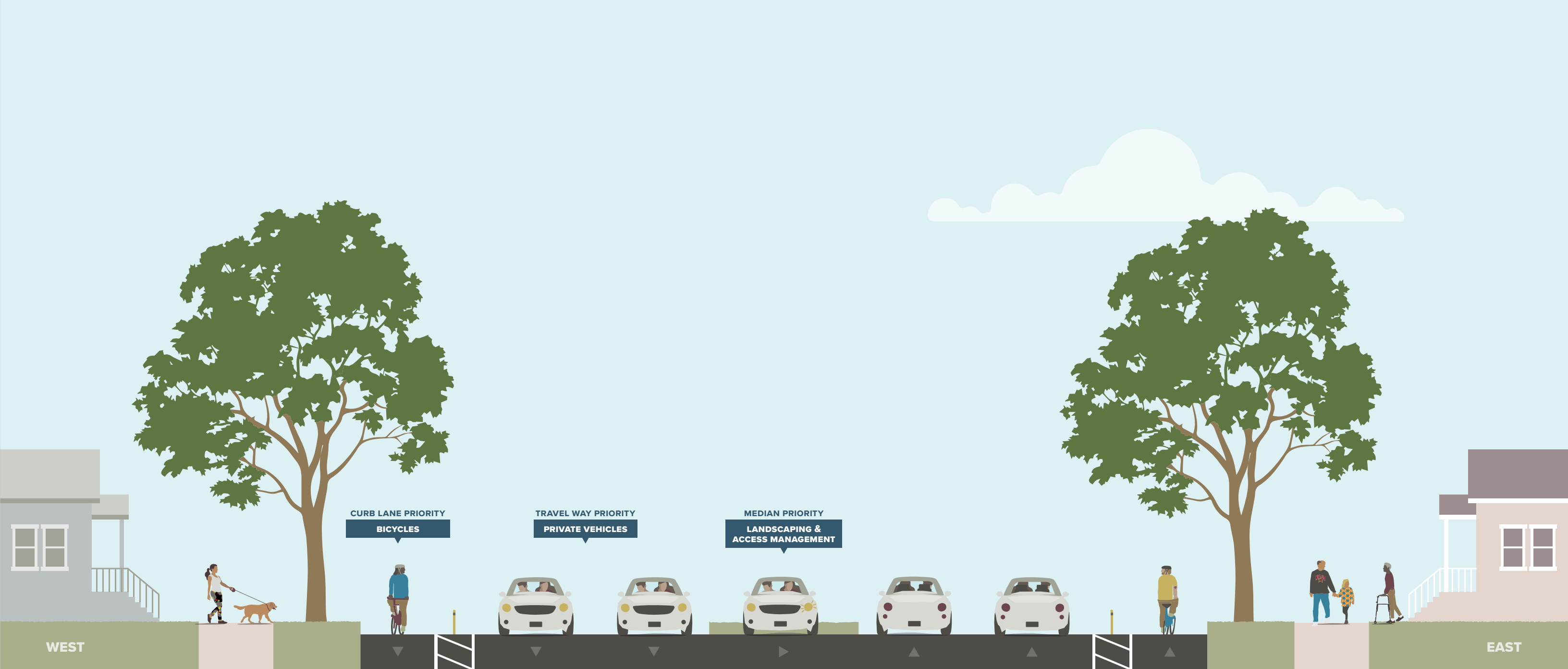
WHAT TOOLS ARE APPLICABLE TO ADDRESS THE NEEDS?

MDOT SHA should consider performing an operational evaluation to determine if a road reconfiguration is suitable for Segment 2. Converting one travel lane per direction provides space for buffered bike lanes and left turn pockets. Providing space for people biking, additional buffer for people walking, and adding turn pockets can create a lower stress walking and biking environment as well as potentially reduce vehicular rear end and sideswipe crashes.

The buffered bike lanes could include safety features such as removable flex posts, kwik kurbs, rubber bumps, and green paint. A signal at Bradly Lane that includes “No Right Turn On Red” should be designed to allow bicyclists to transition from directional travel

along the curb in Segment 2 to Segment 3’s eastside sidepath.

Safe pedestrian crossings every 800’-1600’ should include elements such as continental striping, Pedestrian Hybrid Beacon (PHB), pedestrian refuge island, Rapid Rectangular Flashing Beacon (RRFB), and curb extensions where possible. Recommend enhancing the protected crossing at Taylor Street. The East-West Highway intersection curb radii should be tightened to 10’-15’, and channelization islands removed to slow vehicles to safe turning speeds. Target speed should consider the determined speed limit in Segment 1, potentially 25 MPH, and the reduced speed north in Segment 3.



TOOLKIT ELEMENTS IN THE CROSS-SECTION

TURN

- ☒ Protected/permitted left-turns
- ☐ Right-turn on red allowed except areas with high sidepath volumes

CURB RADII

- ☐ 15' Maximum curb radius
- ☒ Tighten curb radii
- ☐ Remove slip lanes

SPEED

POSTED SPEED

30

TARGET SPEED

25

ENFORCEMENT

- ☐ Encourage automated red enforcement
- ☐ Encourage automated red light enforcement

PEDESTRIAN & BIKE

- ☒ High-visibility crosswalks at all approaches
- ☒ Push-buttons
- ☒ LPI at signalized intersections in core area

West

6' Sidewalk

6' Bike lane

East

6' Sidewalk

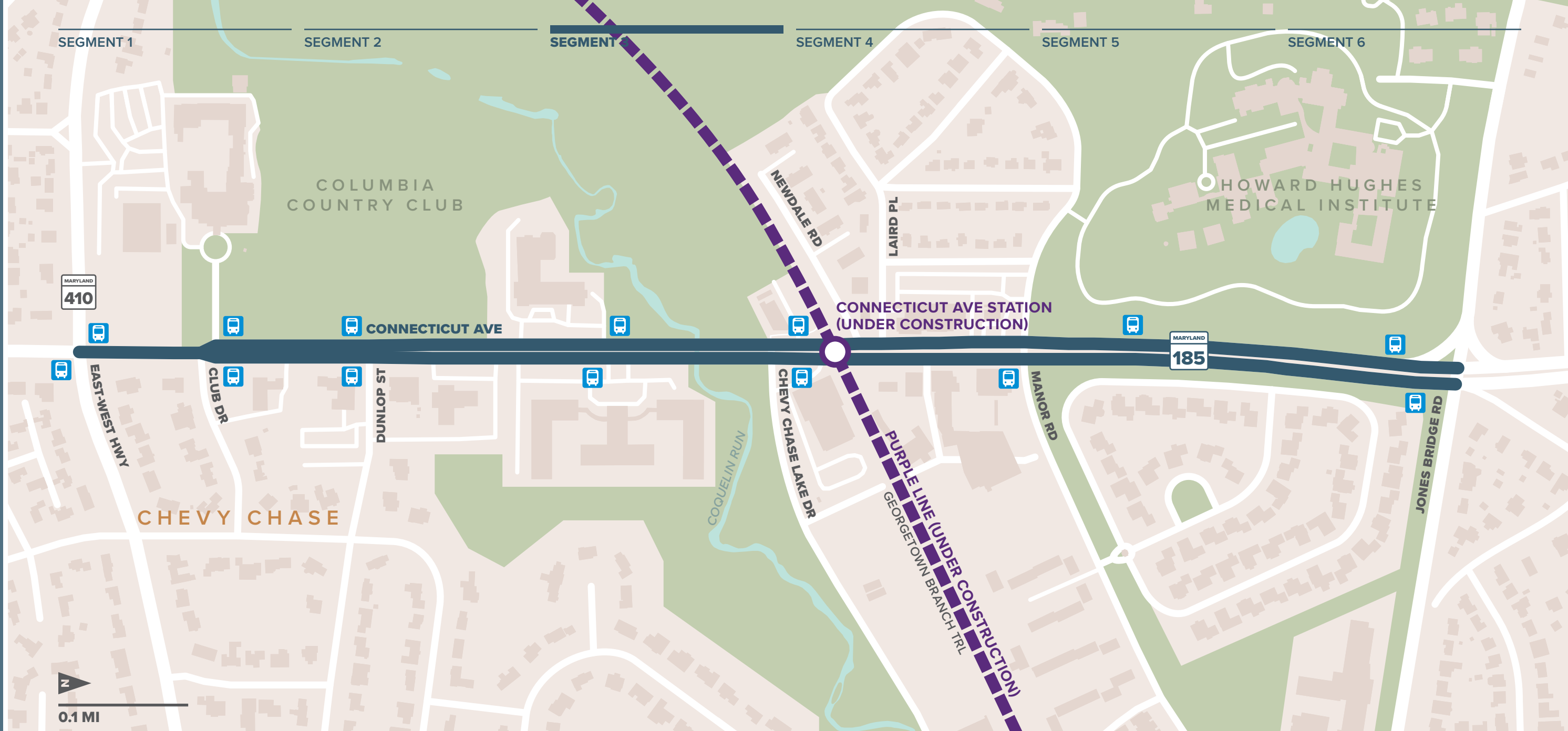
6' Bike lane

800' 1,600'

Protected crossing spacing

OTHER

- ☐ Minimize, narrow, and consolidate driveways
- ☐ Pedestrian-scale lighting in town center areas
- ☒ High tree canopy coverage



EXISTING	6' SIDEWALK	4' BUFFER	10' DRIVE	10' DRIVE	10' DRIVE	6' MEDIAN	10' DRIVE	10' DRIVE	10' DRIVE	8' BUFFER	6' SIDEWALK
RECOMMENDED	6' SIDEWALK	10' DRIVE	10' DRIVE	10' DRIVE	6' MEDIAN	10' DRIVE	10' DRIVE	10' DRIVE	7' BUFFER	11' SHARED SIDEWALK	
66' CURB-TO-CURB											
90' RIGHT-OF-WAY											

TOOLKIT ELEMENTS IN THE CROSS-SECTION

TURN

- Protected/permitted left-turns at major intersections
- Right-turn on red allowed except areas with high sidepath volumes

CURB RADII

- 15' Maximum curb radius
- Tighten curb radii
- Remove slip lanes

SPEED

POSTED SPEED 35

TARGET SPEED 25

ENFORCEMENT

- Encourage automated speed enforcement
- Encourage automated red light enforcement

PEDESTRIAN & BIKE

- High-visibility crosswalks at all approaches
- Automatic pedestrian recall where warranted
- LPI at signalized intersections in core area

West 6' Sidewalk

East 11' Shared sidepath

ADD NEAR PURPLE LINE

Protected crossing spacing

OTHER

- Minimize, narrow, and consolidate driveways near Purple Line
- Pedestrian-scale lighting near Purple Line
- High tree canopy coverage

MULTIMODAL NEEDS ON THE CORRIDOR

SEGMENT 3 connects neighborhoods north and south to the future Purple Line stop. This segment of MD 185 is “uncomfortable” for pedestrians, “high stress” for people on bicycles, and listed on Montgomery County’s Vision Zero High Injury Network. The future Purple Line station along with surrounding transit-oriented-development will further increase walking and biking destinations and volumes within this segment. The AADT for this segment was 72,692 at the time of this report.

Currently seven pairs of bus stops exist, but pedestrian crossings are somewhat limited within the area, with a traditional traffic signal at Dunlop Street, Chevy Chase Lake Drive, Manor Road, and Jones Bridge Road.

Segment 3 has the fifth highest rate of injury crashes along the entire corridor, and the second highest segment for bicycle and pedestrian crashes within the study area.

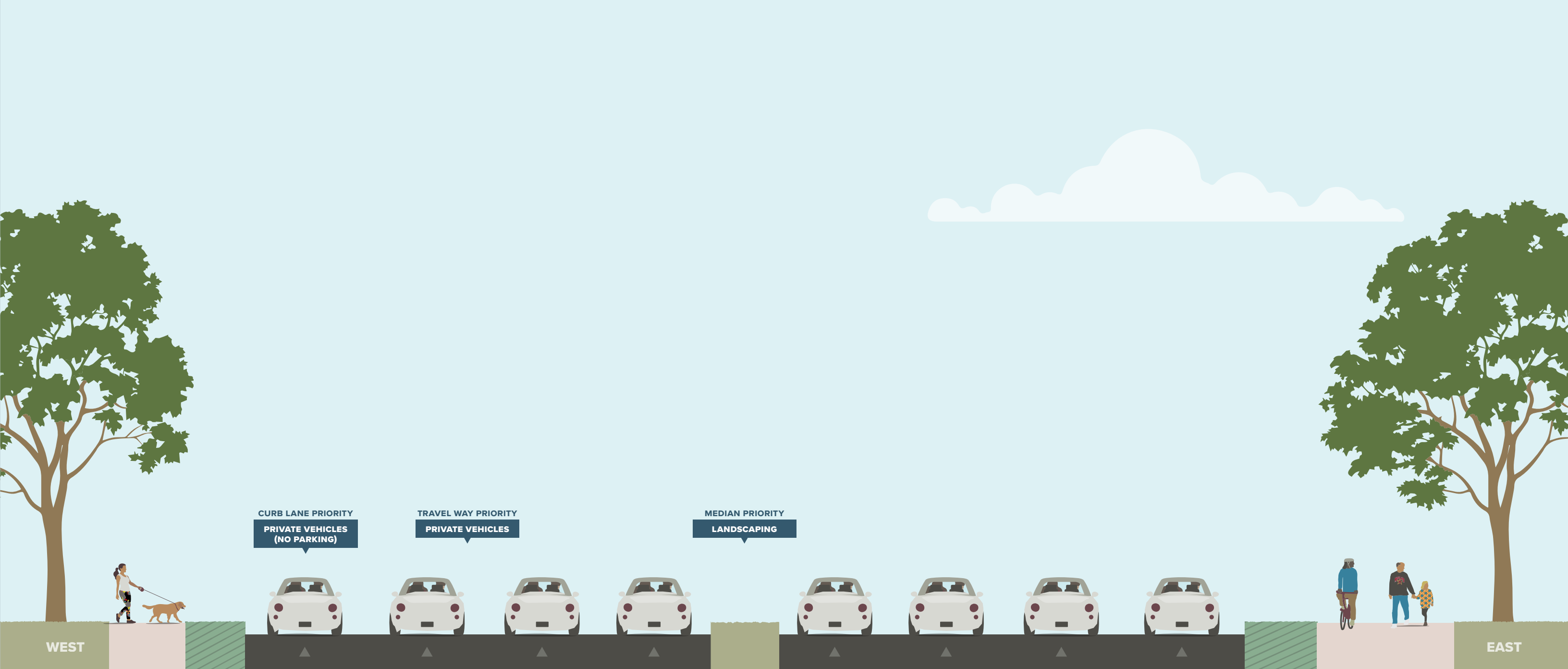
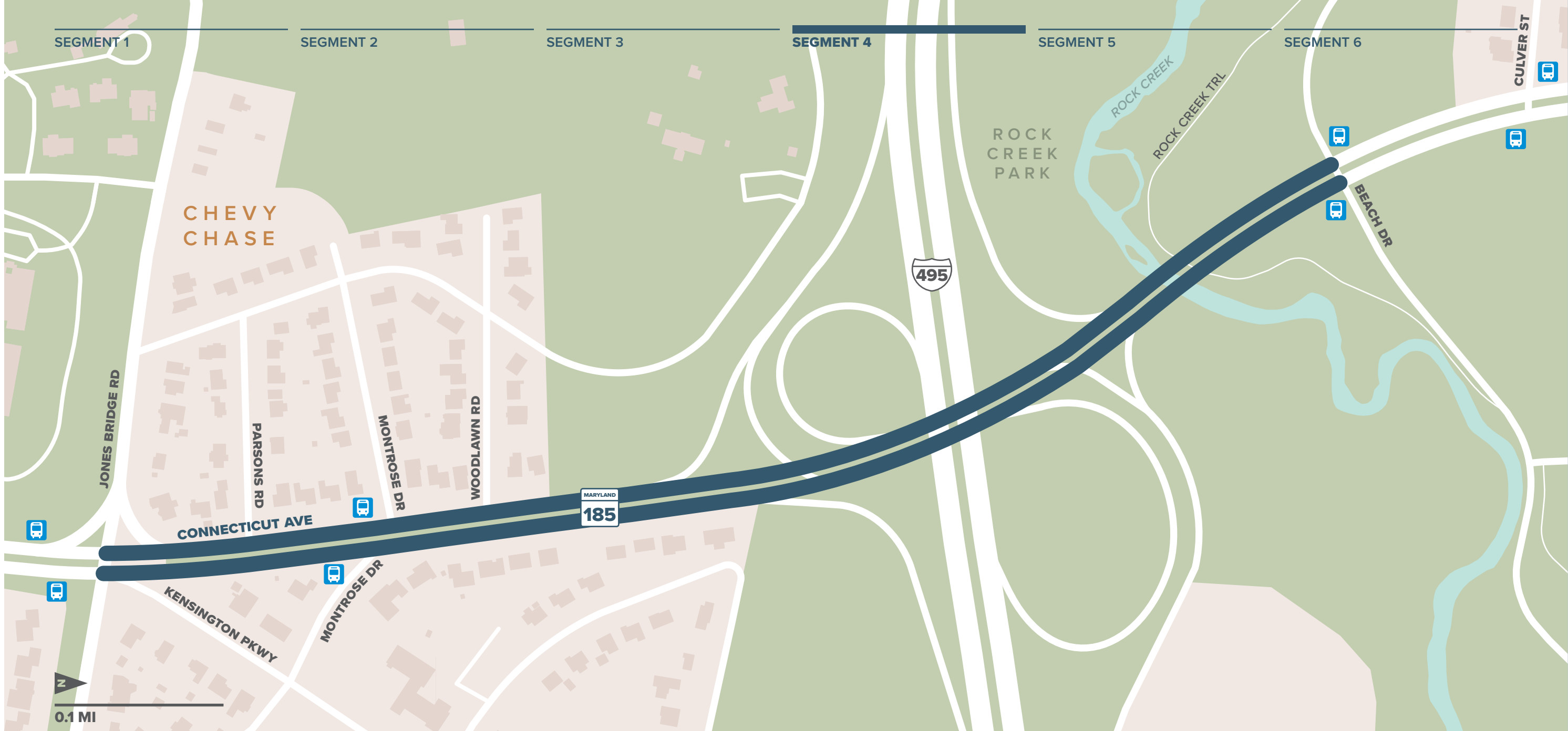
WHAT TOOLS ARE APPLICABLE TO ADDRESS THE NEEDS?

Due to the future Purple Line station, the area between Chevy Chase Lake Drive and Manor Road is designated as an Urban Road Code and Bicycle and Pedestrian Priority Area (BiPPA) by Montgomery County. Within this area the speed limit should be posted at 25 MPH and a curb radii should be a maximum of 15’.

A two-way cycle track is proposed along the eastside between Chevy Chase Lake Drive and Manor Road. An 11’ eastside side path north and south of the cycle track would provide continuous bicycle and pedestrian connectivity. The cycle track could include safety features such as removable flex posts, kwik kurbs, rubber bumps, green paint, and on-street parking buffer.

A new pedestrian signal at Laird Place should be evaluated. Consider consolidating driveways between Manor and Newdale Roads. A westside sidepath is recommended between Newdale Road and Laird Place. Automated red-light and speed cameras are encouraged in the area to maintain safe speeds and travel behaviors by drivers.

The Jones Bridge Road intersection curb radii should be tightened to 25’, and channelization islands removed to slow vehicles to safe turning speeds.



EXISTING	5' SIDEWALK	5.5' BUFFER	11' DRIVE	10.5' DRIVE	10' DRIVE	9.5' DRIVE	9' MEDIAN	9' DRIVE	9.5' DRIVE	10.5' DRIVE	10' DRIVE	7.5' SIDEWALK	
RECOMMENDED	6' SIDEWALK	VARIABLE BUFFER	10' DRIVE	9.5' DRIVE	9' DRIVE	9' DRIVE	5.5' MEDIAN	9' DRIVE	9' DRIVE	9.5' DRIVE	10' DRIVE	VARIABLE BUFFER	11' SHARED SIDEPATH
80.5' CURB-TO-CURB													
100'													

TOOLKIT
ELEMENTS
IN THE
CROSS-
SECTION

TURNSTurns

- Protected/ permitted left-turns
- Right-turn on red allowed except areas with high sidepath volumes

CURB RADII

- 25' Maximum curb radius
- Tighten curb radii
- Remove slip lanes

SPEED

POSTED SPEED35

TARGET SPEED35

ENFORCEMENT

- Encourage automated speed enforcement
- Encourage automated red light enforcement

PEDESTRIAN & BIKE

West 5' Sidewalk

East 11' Shared sidepath

1,200' Protected crossing spacing

One high-visibility crosswalk per intersection

Push-buttons at intersections and HIBs at ramp crossings

LPI at signalized intersections in core area

OTHER

- Discourage new driveways
- Pedestrian-scale lighting in town center areas
- High tree canopy coverage

MULTIMODAL NEEDS ON THE CORRIDOR

SEGMENT 4 connects areas north and south to I-495. The current layout is difficult for people walking and biking to safely navigate interstate entrance and exit ramps. This segment of MD 185 is “uncomfortable” for pedestrians, “high stress” for people on bicycles, and partially on Montgomery County’s Vision Zero High Injury Network. Non-landscape buffered sidewalks, no bicycle facilities, wide vehicular lanes, three travel lanes per direction, and a fourth lane designated for entering and exiting the interstate add to the stressful environment.

At the time of this report, AADT for this segment was 72,692 south of I-495, decreasing to 44,782 north of I-495.

A pair of bus stops are north of I-495 and south of I-495, but pedestrian crossing is limited, and interstate ramp crossing is challenging due to fast slip lanes and limited visibility. Segment 4 has the second highest rate of injury crashes along the entire corridor, but the lowest segment for bicycle and pedestrian crashes within the study area.

WHAT TOOLS ARE APPLICABLE TO ADDRESS THE NEEDS?

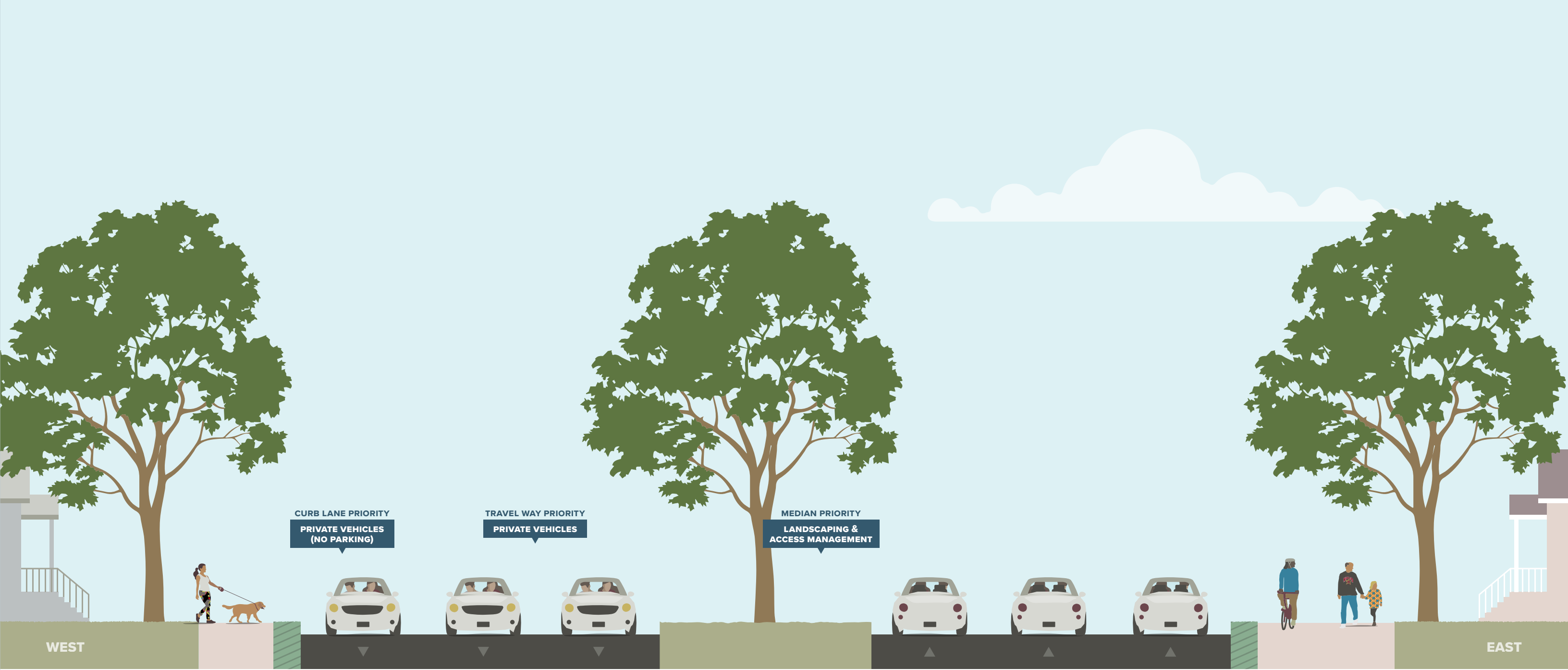
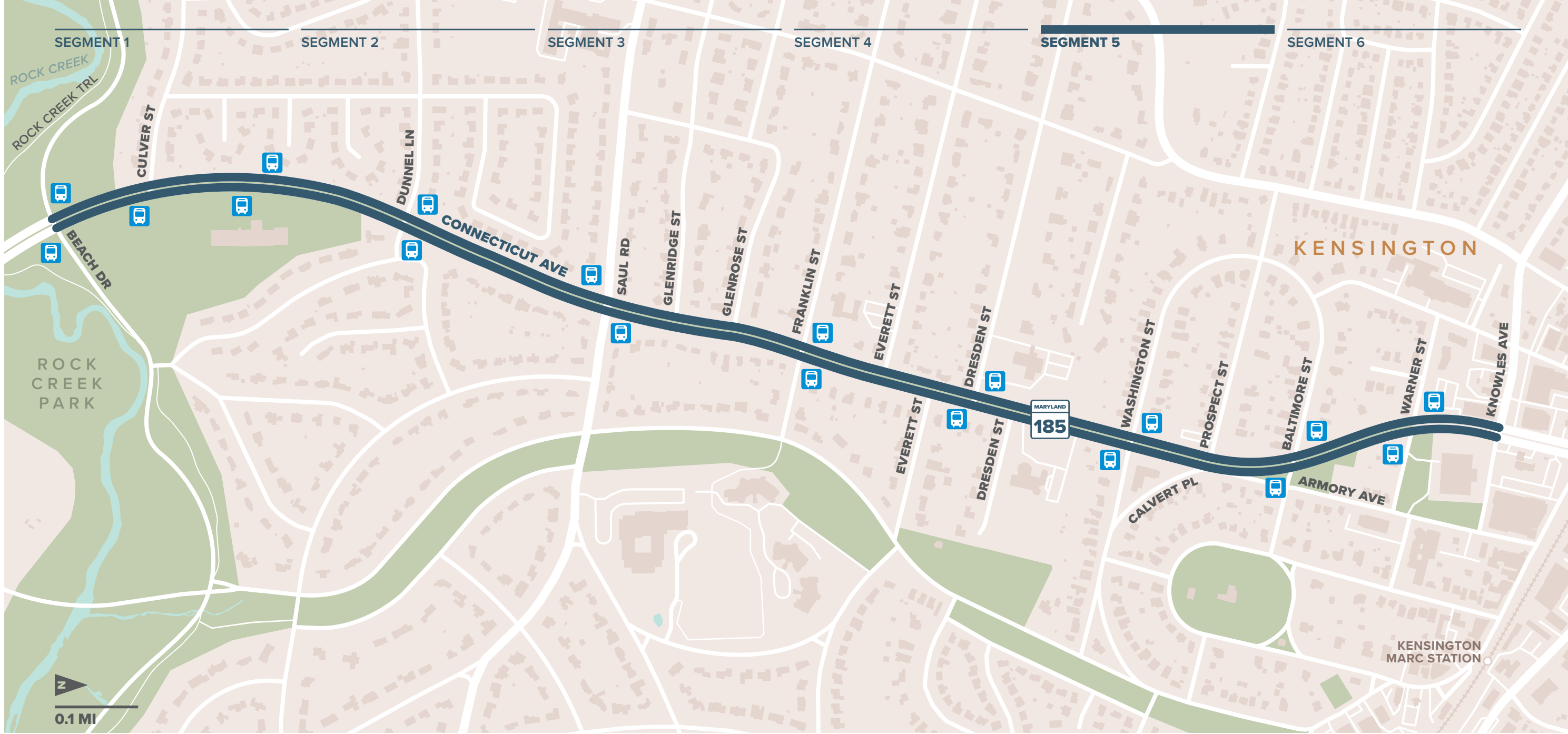
An 11’ eastside side path is recommended to support people walking and biking. The 5’ westside sidewalk should be retained. Realignment of junction intersections to right angles will slow vehicles to safe turning speeds. Hazard Identification Beacons (HIBs) could be added at ramp crossing to increase driver awareness of individuals walking and biking crossing the interchange ramps. Curb radii should be tightened to 25’ within Segment 4.

Safe pedestrian crossings every 1,200’ should include elements such as continental striping of crosswalks at all legs of an intersection, pedestrian refuge island, Rapid Rectangular Flashing Beacon (RRFB), and curb extensions if possible.

Recommend new pedestrian crossing at Montrose Drive. As redevelopment occurs, non-landscape buffered sidewalks should be converted to detached sidewalks with a landscaped buffer, and new curb cuts are discouraged. Automated red-light cameras are encouraged in this area to reduce unsafe speeds and maneuvers at intersections.

36

37



EXISTING	6' SIDEWALK	13' DRIVE	10' DRIVE	10' DRIVE	18' MEDIAN	10' DRIVE	10' DRIVE	13' DRIVE	6' SIDEWALK
RECOMMENDED	6' SIDEWALK	10' DRIVE	9.5' DRIVE	9.5' DRIVE	17' MEDIAN	9.5' DRIVE	9.5' DRIVE	10' DRIVE	11' SHARED SIDEPATH
					75' CURB-TO-CURB				
					96' RIGHT-OF-WAY				

TOOLKIT ELEMENTS IN THE CROSS-SECTION

URNS

- Protected/permitted left-turns
- Right-turn on red allowed except areas with high sidepath volumes

CURB RADII

- 15'-25' Maximum curb radius
- Tighten curb radii
- Remove slip lanes

SPEED

POSTED SPEED

30

TARGET SPEED

30

ENFORCEMENT

- Encourage automated speed enforcement
- Encourage automated red light enforcement

PEDESTRIAN & BIKE

- High-visibility crosswalks at all approaches
- Automatic recalls at Saul Rd and Knowles Ave
- LPI at Saul Rd and Knowles Ave

West 6' Sidewalk

East 11' Shared sidepath

1,200'

Protected crossing spacing

OTHER

- Discourage new curb cuts
- Pedestrian-scale lighting in town center areas
- High tree canopy coverage

MULTIMODAL NEEDS ON THE CORRIDOR

SEGMENT 5 connects the Chevy Chase View neighborhood to I-495 south and Kensington north. This segment of MD 185 is “uncomfortable” for pedestrians, “high stress” for people on bicycles, and is on Montgomery County’s Vision Zero High Injury Network from Saul Road to Knowles Avenue. Non-landscape buffered sidewalks, wide vehicular lanes, no bicycle facilities, and three travel lanes per direction add to the stressful environment.

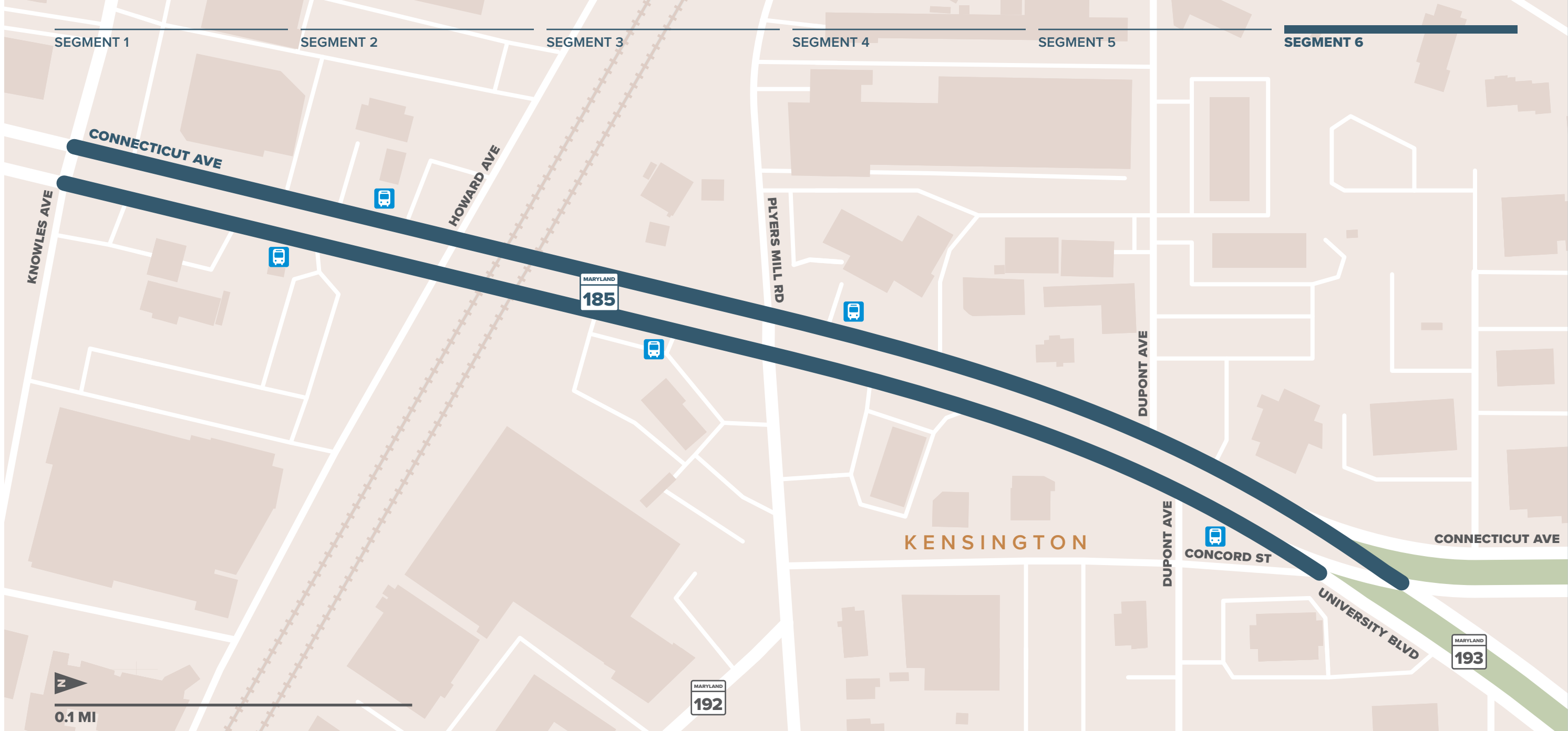
For this segment at the time of this report, AADT was 44,782 south of Saul Road and 37,892 north of Saul Road.

Despite nine pairs of bus stops, pedestrians have limited crossing opportunities within the area, with traditional traffic signals at Beach Drive, Saul Road, Washington Street, and Knowles Avenue. One pedestrian crosswalk and signage is located at Grace Episcopal Day School. Segment 5 has the lowest rate of injury crashes along the entire corridor, and the lowest segment for bicycle and pedestrian crashes within the study area.

WHAT TOOLS ARE APPLICABLE TO ADDRESS THE NEEDS?

An 11’ eastside side path is recommended to support people walking and biking. In the future, a separate bicycle signal phase could be considered at traffic signals, and current sharrows should be removed. The 6’ westside sidewalk should be retained. The northern portion of Segment 5, from Warner Drive to Knowles Avenue, is designated as an Urban Road Code (URC) and Bicycle and Pedestrian Priority Area (BiPPA) by Montgomery County. The southern portion should tighten curb radii to 25’ while corners within the URC and BiPPA should be a maximum of 15’. Speeds within the URC and BiPPA should be 25 MPH, and the southern section of Segment 5 is recommended to continue at 30 MPH.

Safe pedestrian crossings every 1,200’ should include elements such as continental striping, Pedestrian Hybrid Beacon (PHB), pedestrian refuge islands, Rapid Rectangular Flashing Beacon (RRFB), and curb extensions where possible. Recommend enhancing the crossings at Grace Episcopal Day School and Washington Street, and evaluate crossings at Dunnel Lane, Franklin Street, and Baltimore Street. As redevelopment occurs, non-landscape buffered sidewalks should be converted to detached sidewalks with a landscaped buffer, and new curb cuts are discouraged. Automated speed cameras already exist within this segment.



MULTIMODAL NEEDS ON THE CORRIDOR

SEGMENT 6 is within the Kensington urban activity area and connects with MD 193. This segment of MD 185 is “uncomfortable” for pedestrians and “high stress” for people on bicycles. Non-landscape buffered sidewalks, three lanes of travel per direction, and no bicycle facilities add to the stressful environment. Traffic is regularly congested during the peak hours within this segment, and Montgomery County has planned an extension of Summit Avenue to offer some traffic relief. In addition to through lanes, a turn lane adds to the curb-to-curb width, furthering the crossing distance for pedestrians.

For this segment at the time of this report, AADT was 37,892 south of Payers Mill Road and 53,622 north of Payers Mill Road.

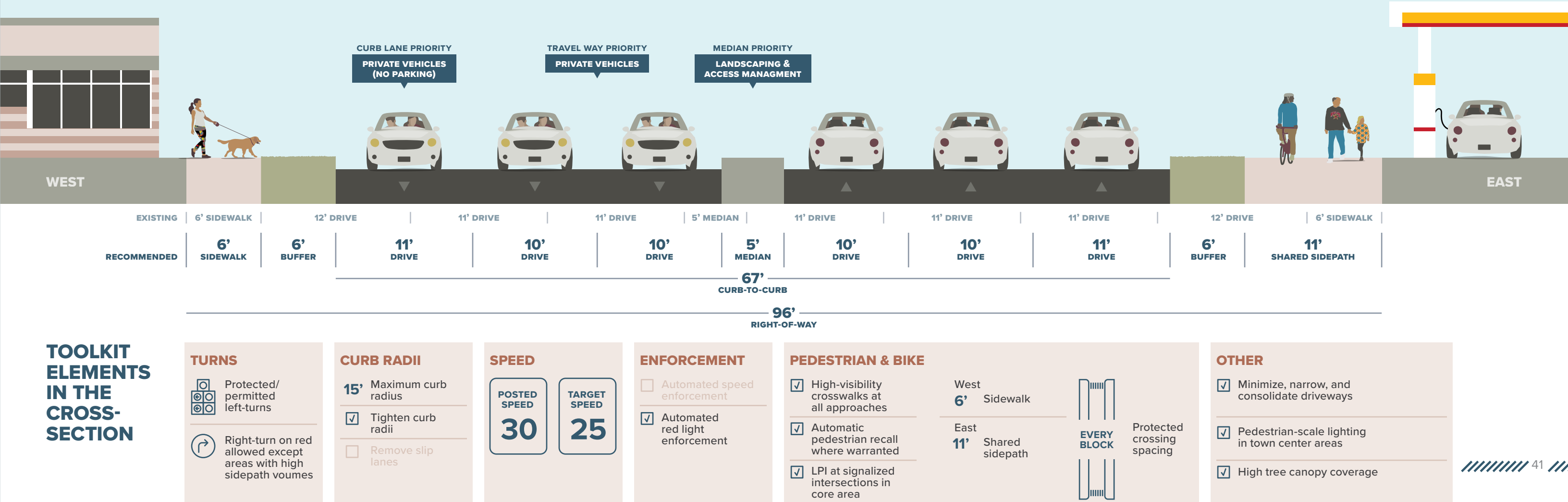
Despite five bus stops, pedestrians have limited crossing opportunities within the area, with a traditional traffic signal at Payers Mill Road and at the merge with MD-193. Both traffic signals include difficult angles further adding to the pedestrian crossing distance. Segment 6 has the fourth highest rate of injury crashes along the entire corridor, but the highest segment for bicycle and pedestrian crashes within the study area.

WHAT TOOLS ARE APPLICABLE TO ADDRESS THE NEEDS?

As the activity destinations within Kensington continue to grow, Montgomery County has designated the area as an Urban Road Code (URC) area and a County Bicycle and Pedestrian Priority Area (BiPPA). In addition, MDOT SHA defines the area as within a Suburban Activity Center context and as a State Bicycle and Pedestrian Priority Area (BPPA).. Within this area the speed limit should be posted at 25 MPH and a curb radii should be a maximum of 15'. An 11' eastside side path is recommended to support people walking and biking. Leading Pedestrian Interval (LPI)s should be considered at intersections to be used by both people walking and biking. No Right Turn on Red should be considered where sidepath volumes are expected to be high.

Request safe pedestrian crossings should include elements such as continental striping at all crosswalks, Pedestrian Hybrid Beacon (PHB), pedestrian refuge island, Rapid Rectangular Flashing Beacon (RRFB), and curb extensions if possible. Recommend new crossings at Howard Avenue and Dupont Avenue. As redevelopment occurs, non-landscape buffered sidewalks should be converted to detached sidewalks with a landscaped buffer, and new curb cuts are discouraged. Automated red-light cameras are encouraged in this area to reduce unsafe speeds and maneuvers at intersections.

TOOLKIT ELEMENTS IN THE CROSS-SECTION



4

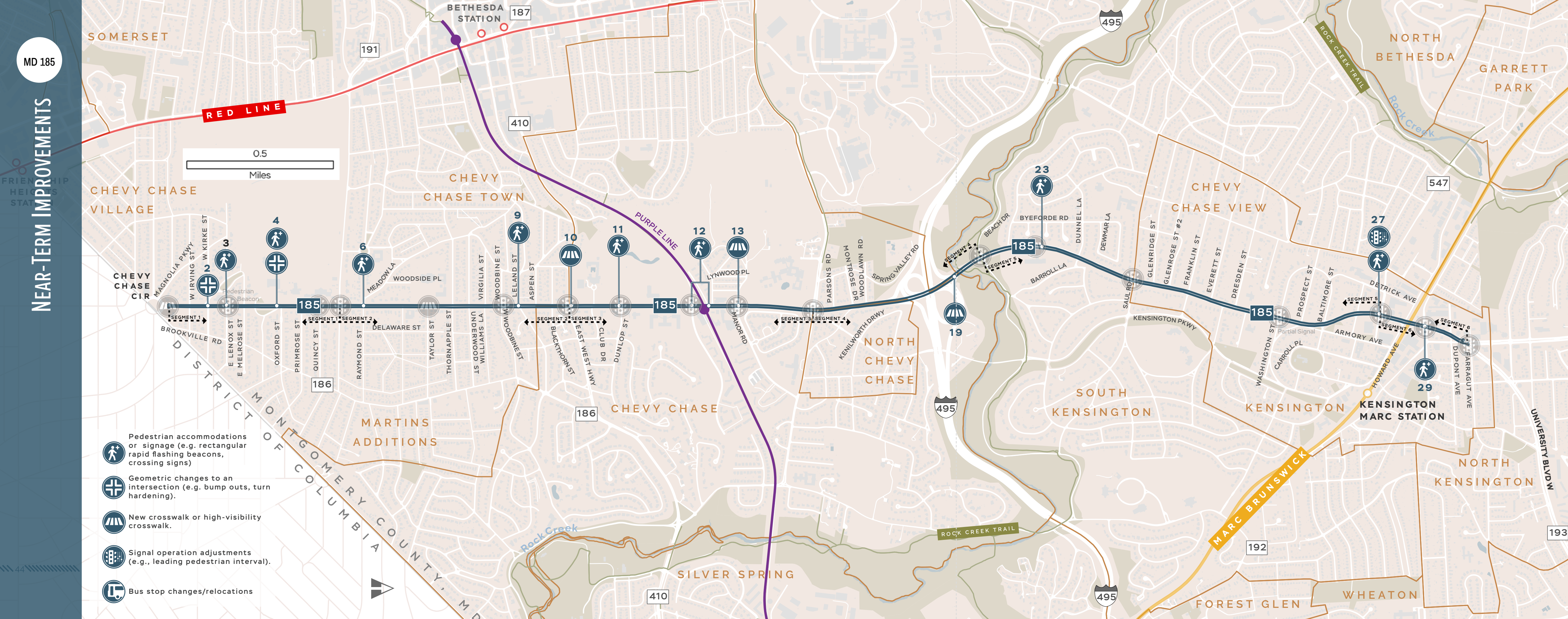


PRIORITIZATION & IMPLEMENTATION

Overview

Meeting the broad needs of MD 185 users will require thoughtful and intentional investments over time. Change in established highway corridors rarely occurs rapidly, often taking place incrementally to leverage opportunities for long-term improvements in safety or mobility. Strategic approaches are required to outline manageable projects, identify funding and achieve meaningful change.

MDOT SHA has a variety of near- and mid-term opportunities to address needs in the MD 185 corridor, which plans are developed for a broader reorientation of the corridor to achieve the grander vision outlined in this study. Drawing from the observations of this process, the following section outlines locations where improvements can be implemented, some of which can be championed by partners and the local community.



The MD 185 corridor includes multiple opportunities for short term improvements that will improve safety, access, and mobility for travelers in the corridor.

More immediate improvements can be made using tactical measures, such as marking and use of flexible materials with high visibility warning signs to reduce crosswalk lengths, and improve visibility of pedestrians or bicyclists in areas where vehicles and these users may experience conflicts. Operational enhancements like implementing leading pedestrian intervals at high-volume pedestrian intersections will also improve visibility of pedestrian traffic, and will prioritize safety. In addition, ADA compliance should be ensured during the installation of any of these near-term improvements.

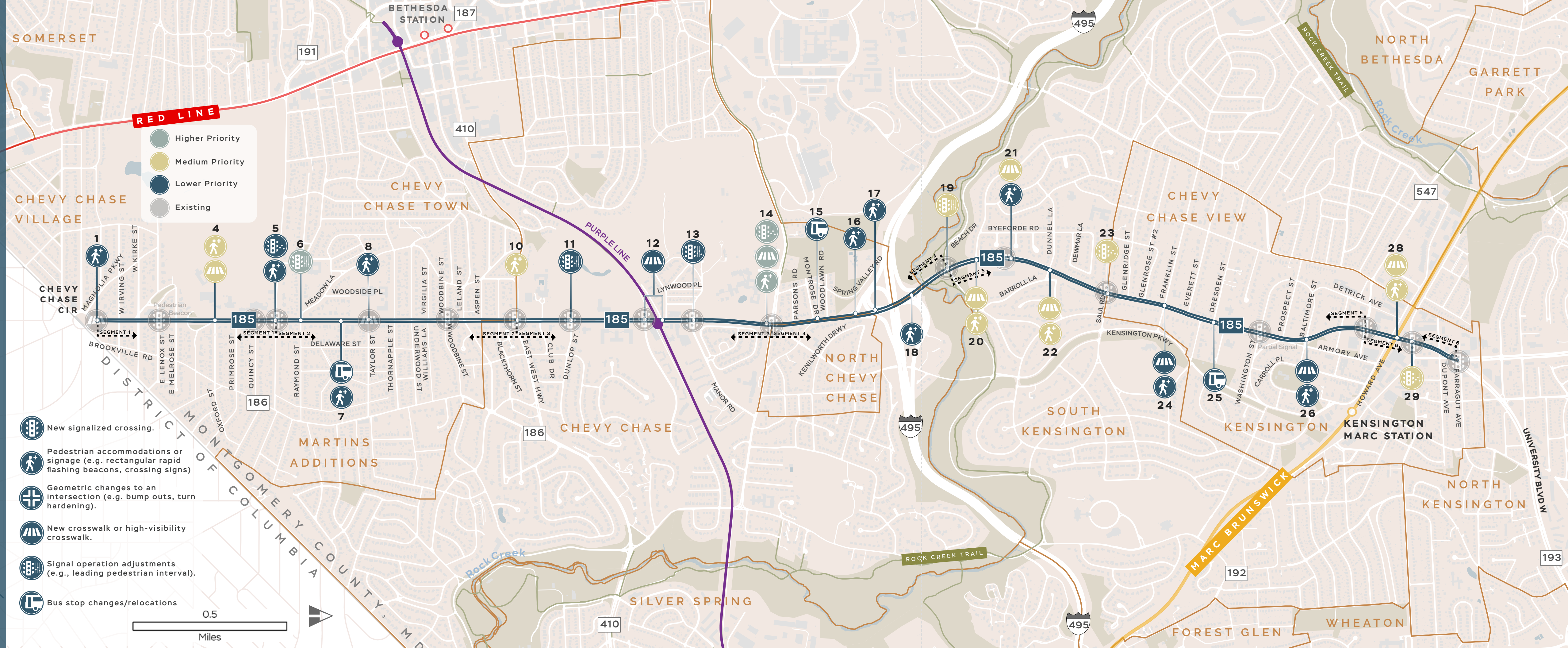
More complex improvements are also recommended in the near term. Implementing rectangular rapid flashing beacons (RRFB) at marked crosswalks of MD 185 that do not have traffic signal to manage conflicts will improve driver recognition of pedestrian activity, until more robust traffic signals or pedestrian hybrid beacon traffic controls can be implemented. Bus stops at intersections that are not served by a signal or unmarked crosswalk are good candidates for installation of safe crossings, relocation to nearby intersections where safe crossings are already provided, or consolidation, in coordination with transit operators. Operational enhancements may also be evaluated in the near-term, including potential speed limit reductions or implementation of additional automated speed enforcement.

Recommended near-term improvements, including those already in development by MDOT SHA, are listed in the table on page 46 (Near-Term Improvements). The ID numbers listed in the table can be used to identify where these recommended improvements are located on the map at left. The “Cost Range” column provides an estimated cost magnitude from lowest (\$) to highest (\$\$\$\$). All of the recommended near-term improvements are estimated to be within the lowest cost range.

Near-Term Improvements						
ID	Segment	Intersection	Improvement Type	Description	Potential Treatment	Cost Range
2	1	Kirke Street	Geometric Improvement	Reduce crosswalk length with compact intersection geometry	Painted Curb Extension, High Visibility Crosswalks	\$
3*	1	Lenox Street	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in crosswalk	HAWK signal for existing marked crosswalk	\$\$
4	1	Oxford Street	Pedestrian Accommodation or Signing	Improve driver awareness of pedestrians when turning	High visibility signs	\$
			Geometric Improvement	Reduce crosswalk length with compact intersection geometry	Painted Curb Extension, High Visibility Crosswalks	\$
6	2	Raymond Street	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Turning Traffic Yield to Peds signing	\$
9	2	Leland Street	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Turning Traffic Yield to Peds signing	\$
10	2 & 3	MD 410	New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk (east leg)	\$
11	3	Dunlop Street	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Turning Traffic Yield to Peds signing	\$
12	3	Newdale Road / Laird Place	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Advance Warning Signs (pedestrian emphasis area)	\$
13	3	Manor Road	New or High Visibility Crosswalk	Emphasize pedestrian priority	High visibility Crosswalk	\$
19	4 & 5	Beach Drive	New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$
23*	5	Saul Road	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	High visibility Crosswalk	\$
27	5 & 6	Knowles Avenue	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$
			Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Turning Traffic Yield to Peds signing, High Visibility Crosswalk	\$

*Project is in implementation phase





Mid-Term Strategies

Projects that would take longer to design and implement are ideal opportunities for implementation in the mid-term. These tools include installation of countermeasures such as new traffic signals, crosswalks, signage, or pedestrian hybrid beacons to increase the frequency of safe crossing opportunities along the corridor. Some bus stop relocations could also be considered in this timeframe.

Public involvement will be key to determining which mid-term projects and strategies to move forward with. To aid in this determination, the intersections with proposed mid-term projects have been scored on a scale of 0 to 2 to gauge which areas are most in need of improvements (2 representing a higher need, and 0 a lower need).

As described below the tables on pages 50 and 51, the scoring considered proximity to schools, proximity to bus stops, and whether or not the intersection was within a high crash area as determined from the Crash History map in Chapter 2.

Recommended mid-term improvements are listed in the table on page 46 (Mid-Term Improvements). The ID numbers listed in the table can be used to identify where these recommended improvements are located on the map on the map at left. The "Cost Range" column provides an estimated cost magnitude from lowest (\$) to highest (\$\$\$\$). All of the recommended near-term improvements are estimated to be within the lowest cost range.

For ease of interpretation, each of the recommended mid-term improvements is also shaded with a color that indicates a priority level that corresponds to its score in the "Priority Score" column. The color shading is described in a legend below the table, and the scoring methodology is detailed in the legend as well.

Mid-Term Improvements							
ID	Segment	Intersection	Improvement Type	Description	Potential Treatment	Cost Range	Priority Score
1	1	Chevy Chase Circle	Pedestrian Accommodation or Signing	Enhance multi-lane crosswalk with high visibility treatments	RRFB	\$\$	1
4	1	Oxford Street	Pedestrian Accommodation or Signing	Improve driver awareness of pedestrians when turning	High visibility crosswalk (east leg)	\$	2
			New or High Visibility Crosswalk	Improve access to bus stop	Install RRFB or HAWK	\$\$ / \$\$\$	2
5	1 & 2	MD 191	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	1
			Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Turning Traffic Yield to Peds signing	\$	1
6	2	Raymond Street	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	3
7	2	Shepherd Street	Bus Stop Changes	Consider consolidating Bus Stop	Sign Removal	\$	1
			New or High Visibility Crosswalk	Improve access to bus stop	High visibility crosswalk	\$	1
8	2	Taylor Street	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in crosswalk	Install RRFB or HAWK	\$\$ / \$\$\$	1
10	2 & 3	MD 410	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	Advance Warning Signs (right turns)	\$	2
11	3	Dunlop Street	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	1
12	3	Newdale Road / Laird Place	New or High Visibility Crosswalk	Improve access to Purple Line Station	High visibility marking, signs & RRFB	\$\$	0
13	3	Manor Road	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	1
14	3 & 4	Jones Bridge Road	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	3
			Pedestrian Accommodation or Signing	Emphasize pedestrian priority	High visibility markings, Advance Warning Signs (right turns)	\$	3
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	3
15	4	Montrose Drive / Woodlawn Road	Bus Stop Changes	Consider consolidating Bus Stop	Sign Removal	\$	1
16	4	I-495 EB exit Ramp	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	RRFB	\$\$	1

= Higher Priority (3 points)

= Medium Priority (2 points)

= Lower Priority (<2 points)

Priority was determined by adding up points as follows:

- » Within 1,000 feet of a school (1 point).
- » Within 100 feet of a bus stop (1 point).
- » Within a high crash area, using the Crash History map from Chapter 2 (1 point).

Mid-Term Improvements							
ID	Segment	Intersection	Improvement Type	Description	Potential Treatment	Cost Range	Priority Score
17	4	I-495 EB entrance Ramps (2)	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	RRFB	\$\$	0
18	4	I-495 WB entrance Ramps (2)	Pedestrian Accommodation or Signing	Emphasize pedestrian priority	RRFB	\$\$	1
19	4 & 5	Beach Drive	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	Protected Phasing (southbound left)	\$\$	2
20	5	Culver Street	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in crosswalk at Bus Stop	Install RRFB or HAWK	\$\$ / \$\$\$	2
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	2
21	5	Grace Episcopal Day School	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in school crosswalk	Install RRFB, HAWK, or traffic signal	\$\$ / \$\$\$	2
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	2
22	5	Dunnel Lane	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in crosswalk at Bus Stop	Install RRFB or HAWK	\$\$ / \$\$\$	2
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	2
23	5	Saul Road	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	2
24	5	Franklin Street	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in crosswalk at Bus Stop	Install RRFB or HAWK	\$\$ / \$\$\$	1
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	1
25	5	Dresden Street	Bus Stop Changes	Consider consolidating Bus Stop	Sign Removal	\$	1
26	5	Baltimore Street	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in crosswalk at Bus Stop	Install RRFB or HAWK	\$\$ / \$\$\$	1
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	1
28	6	Howard Avenue	Pedestrian Accommodation or Signing	Improve driver yielding to pedestrians in school crosswalk	Install RRFB or HAWK	\$\$ / \$\$\$	2
			New or High Visibility Crosswalk	Improve visibility of conflicting crosswalk	High Visibility Crosswalk	\$	2
29	6	Plyers Mill Road	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	LPI	\$	2

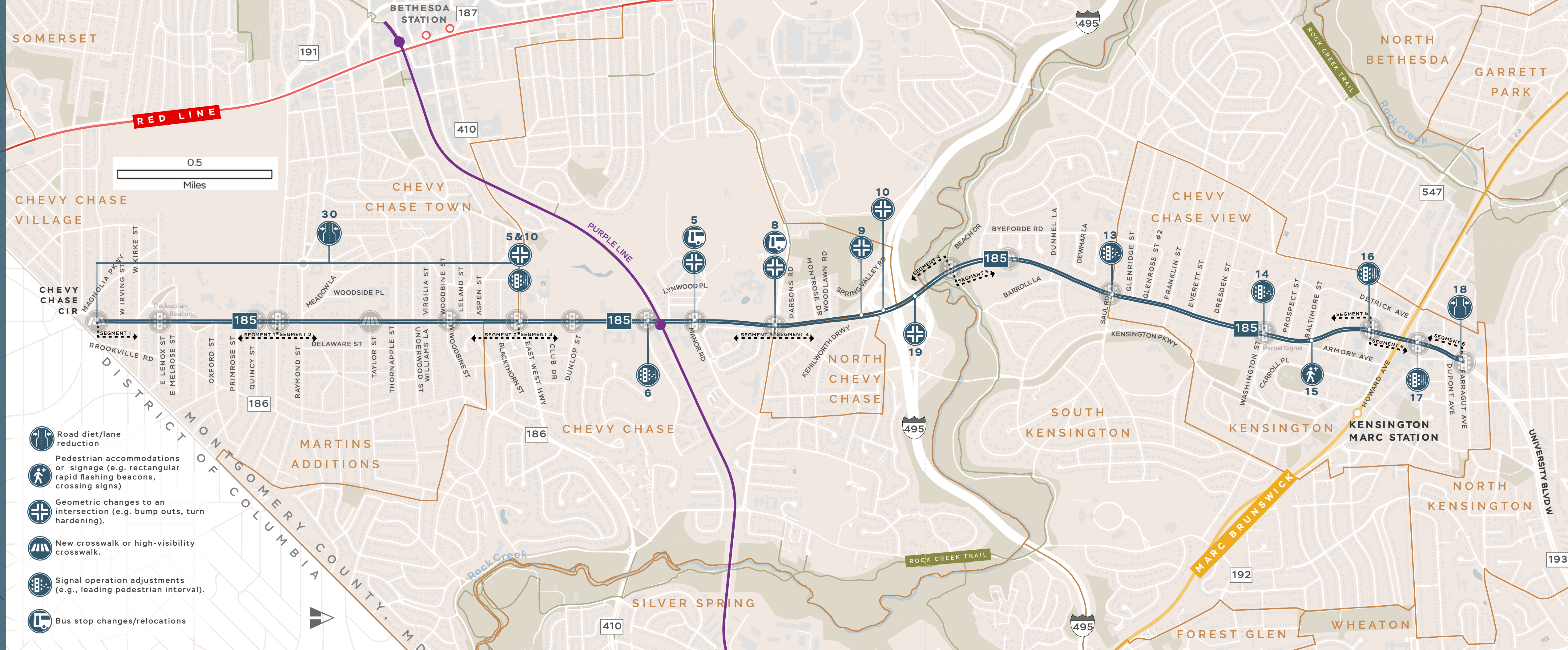
= Higher Priority (3 points)

= Medium Priority (2 points)

= Lower Priority (<2 points)

Priority was determined by adding up points as follows:

- » Within 1,000 feet of a school (1 point).
- » Within 100 feet of a bus stop (1 point).
- » Within a high crash area, using the Crash History map from Chapter 2 (1 point).



Long-term projects are typically high-cost projects that take more time to plan, coordinate, and successfully implement. Such projects include major changes to traffic signals, changes to curb space, adding bike lanes or pedestrian pathways, or road diets/lane reductions.

While improvements of this scale involve the most expensive and time-consuming projects recommended in this report, they also have the potential to yield the greatest safety benefits. The full build-out of these long-term improvements would result in the cross-sections shown in Chapter 3 of this report.

As with the list of proposed mid-term improvements, input from the community and stakeholders will be important in determining the long-term improvements that should be implemented along the MD 185 corridor. The tables on pages 54 through 56 detail these recommended long-term improvements. The first table on page 54 lists individual long-term improvement projects, while the subsequent tables on pages 55 and 56 describe the more extensive long-term changes to the corridor that would be required to match the cross-sections shown in Chapter 3.

Long-Term Improvements (Individual Projects)						
ID	Segment	Intersection	Improvement Type	Description	Potential Treatment	Cost Range
5	2&3	MD 410	Geometric Improvement	Control all approaches to the intersection to manage pedestrian conflicts	Remove right turn channelization islands	\$\$\$\$
6	3	Chevy Chase Lake Drive	Signal Operations Improvement	Phase separate left turning conflicts	Protected Left Turn Phasing and/or Flashing Red Arrow Phasing	\$
7	3	Manor Road	Geometric Improvement	Reduce turning speeds across crosswalk	Remove southbound right turn lane	\$\$\$
			Bus Stop Changes	Locate bus stop closer to controlled intersection	Relocate Bus Stop	\$\$\$
8	3&4	Jones Bridge Road	Geometric Improvement	Control all approaches to the intersection to manage pedestrian conflicts	Remove right turn channelization islands	\$\$\$\$
			Bus Stop Changes	Locate bus stop closer to controlled intersection	Relocate Bus Stop	\$\$\$
9	4	I-495 EB Exit Ramp	Geometric Improvement	Reduce turning speeds across crosswalk	Compact intersection geometry, truck aprons	\$
10	4	I-495 EB Entrance Ramp (2)	Geometric Improvement	Reduce turning speeds across crosswalk	Compact intersection geometry, truck aprons	\$
10	2&3	MD 410	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	Protected Left Turn Phasing and/or Flashing Red Arrow Phasing (southbound left)	\$
11	4	I-495 WB Entrance Ramps (2)	Geometric Improvement	Reduce turning speeds across crosswalk	Compact intersection geometry, truck aprons	\$
13	5	Saul Road	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	Protected Left Turn Phasing and/or Flashing Red Arrow Phasing	\$
14	5	Washington Street	Signal Operations Improvement	Reduce turning conflicts with pedestrians in crosswalk	Upgrade Beacon to HAWK or Traffic Signal	\$\$\$
15	5	Baltimore Street	Pedestrian Accomodations or Signing	Phase separate left turning conflicts	Protected Left Turn Phasing and/or Flashing Red Arrow Phasing	\$
16	5&6	Knowles Avenue	Signal Operations Improvement	Phase separate left turning conflicts	Protected Left Turn Phasing and/or Flashing Red Arrow Phasing	\$
17	6	Plyers Mill Road	Signal Operations Improvement	Phase separate left turning conflicts	Protected Left Turn Phasing and/or Flashing Red Arrow Phasing	\$
18	6	University Boulevard	Road Diet	Reduce pedestrians exposure and crossing time by narrowing crosswalks	Lane reduction on MD 193	\$
30	1	Chevy Chase Circle to MD 410	Road Diet	Reduce 6-to-4 travel lanes	Repurpose travel lanes with temporary materials, traffic signal modification	\$\$\$\$

Long-Term Improvements (Cross-Section Improvements by Segment)				
Segment	Improvement Type	Description	Potential Treatment	Cost Range
1	Modify Cross-Section	Reconstruct street with new cross-section	Convert outer drive lane to 5' bike lane with 1.5' buffer per side	\$\$\$
1	Modify Cross-Section	Reconstruct street with new cross-section	Increase median 9' to allow left turn pockets	\$\$\$
1	Modify Cross-Section	Reconstruct street with new cross-section	Reduce eastern buffer from 5' to 3'	\$\$\$
1	Modify Cross-Section	Reconstruct street with new cross-section	Resize drive lanes to 10' per lane	\$\$\$
2	Modify Cross-Section	Reconstruct street with new cross-section	Increase sidewalk from 5' to 6' per side	\$\$\$
2	Modify Cross-Section	Reconstruct street with new cross-section	Reduce buffers from 8' to 7' per side	\$\$\$
2	Modify Cross-Section	Reconstruct street with new cross-section	Convert outer drive lane to 6' bike lane with 2' buffer per side	\$\$\$
2	Modify Cross-Section	Reconstruct street with new cross-section	Increase median from 6' to 12' to allow left turn pockets	\$\$\$
2	Modify Cross-Section	Reconstruct street with new cross-section	Resize drive lanes as appropriate with outer lanes widest	\$\$\$
3	Modify Cross-Section	Reconstruct street with new cross-section	Remove western buffer and reduce eastern buffer by 1' to expand eastern sidewalk to 11' shared sidepath	\$\$\$
3	Buffer Zone Improvement	Enhance visibility and safety with pedestrian-scale lighting	Pedestrian-scale lighting near Purple Line	\$
3	Pedestrian Accomodations or Signing	Emphasize pedestrian priority	No Right-Turn on Red signs at intersections with high sidepath volumes	\$
3	Modify Corners	Modify corners concurrent with street reconstruction	Tighten curb radii along segment (Maximum curb radius of 15')	\$\$\$
4	Modify Cross-Section	Reconstruct street with new cross-section	Reduce median to 5.5' to provide ROW for 11' eastern sidepath	\$\$\$
4	Modify Corners	Modify corners concurrent with street reconstruction	Tighten curb radii along segment (Maximum curb radius of 25')	\$\$\$
4	Buffer Zone Improvement	Enhance sustainability and comfort with landscaping	Encourage high tree canopy coverage	\$
4	Modify Cross-Section	Reconstruct street with new cross-section	Resize drive lanes as appropriate with outer lanes widest	\$\$\$
5	Modify Cross-Section	Reconstruct street with new cross-section	Reduce outer drive lanes to 11'	\$\$\$
5	Modify Cross-Section	Reconstruct street with new cross-section	Reduce median to 17'	\$\$\$
5	Modify Cross-Section	Reconstruct street with new cross-section	Use new ROW footage to expand eastern sidewalk to 11' shared sidepath	\$\$\$

Long-Term Improvements (Cross-Section Improvements by Segment)				
Segment	Improvement Type	Description	Potential Treatment	Cost Range
5	Modify Corners	Modify corners concurrent with street reconstruction	Tighten curb radii along segment (Maximum curb radius between 15' - 25')	\$\$\$
5	Modify Cross-Section	Reconstruct street with new cross-section	Resize drive lanes as appropriate with outer lanes widest	\$\$\$
6	Modify Cross-Section	Reconstruct street with new cross-section	Reduce outer drive lanes to 11'	\$\$\$
6	Modify Cross-Section	Reconstruct street with new cross-section	Reduce inner lanes to 10'	\$\$\$
6	Modify Cross-Section	Reconstruct street with new cross-section	Add 6' buffers per side	\$\$\$
6	Modify Cross-Section	Reconstruct street with new cross-section	Expand eastern sidewalk to 11' shared sidepath	\$\$\$
6	Pedestrian Accomodations or Signing	Emphasize pedestrian priority	No Right-Turn on Red signs at intersections with high sidepath volumes	\$
6	Modify Corners	Modify corners concurrent with street reconstruction	Tighten curb radii along segment (Maximum curb radius of 15')	\$\$\$
6	Buffer Zone Improvement	Enhance visibility and safety with pedestrian-scale lighting	Pedestrian-scale lighting near town center areas	\$\$
6	Modify Cross-Section	Reconstruct street with new cross-section	Resize drive lanes as appropriate with outer lanes widest	\$\$\$
1	Speed Management	Reduce posted speed limit	Aim for target speed of 25 mph	\$
2	Speed Management	Reduce posted speed limit	Aim for target speed of 25 mph	\$
3	Speed Management	Reduce posted speed limit	Aim for target speed of 25 mph	\$
3	Speed Management	Seek opportunities to install red light and speed cameras	Encourage automated speed and red light enforcement	\$
4	Speed Management	Seek opportunities to install red light cameras	Encourage automated red light enforcement	\$
5	Speed Management	Seek opportunities to install red light cameras	Encourage automated red light enforcement	\$
6	Speed Management	Seek opportunities to install red light cameras	Encourage automated red light enforcement	\$
3	Access Management	Modify driveways as fronting properties develop/redevelop	Minimize, narrow, and consolidate driveways near Purple Line	NA
4	Access Management	Modify driveways as fronting properties develop/redevelop	Discourage new driveways	NA
5	Access Management	Modify driveways as fronting properties develop/redevelop	Discourage new curb cuts	NA
6	Access Management	Modify driveways as fronting properties develop/redevelop	Minimize, narrow, and consolidate driveways	NA

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STATE HIGHWAY
ADMINISTRATION

MD 185 NEEDS ANALYSIS

JANUARY 2022