

Fehr & Peers

Twinbrook Metrorail Station Bicycle and Pedestrian Accessibility Improvements

Final Report

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City of Rockville

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1. Introduction

The Twinbrook Metrorail Station Bicycle and Pedestrian Accessibility Improvements project focuses on improving pedestrian and bicycle safety, comfort, accessibility, and connectivity along an approximately 1.3-mile corridor in the Twinbrook neighborhood near the Twinbrook Metro Station in Rockville, Maryland. The study area includes Lewis Avenue between Edmonston Drive and Halpine Road, Halpine Road between Lewis Avenue and Ardennes Avenue, and Ardennes Avenue between Halpine Road and Holland Road.

The project evaluates a combination of bicycle, pedestrian, traffic calming, and intersection improvements throughout the corridor. As shown in Figure 1, the study recommendations include:

- Shared roadway facilities on Lewis Avenue between Rockland Avenue and Edmonston Drive
- Separated bicycle lanes on Lewis Avenue between Rockland Avenue and Halpine Road
- Shared roadway facilities on Halpine Road between Lewis Avenue and Ardennes Avenue
- Shared roadway facilities on Ardennes Avenue between Halpine Road and Holland Road
- Intersection improvements at Lewis Avenue, Halpine Road, and the Twinbrook Metro Station entrance
- Intersection improvements at Halpine Road and Ardennes Avenue

Bicycle facilities along streets in the study area would make bicycling more visible throughout the community and extend the Bethesda Trolley Trail via an alternative to Rockville Pike (MD 355).

The project included a review of relevant plans, policies, projects, and available data; collection of multimodal traffic volume, speed, and near-miss data; crash analysis; and a physical inventory of roadway conditions. The findings from this work were documented in the Existing Conditions Memorandum and used to identify the primary challenges along the study corridor.

Based on these findings, the project team identified potential safety improvements, coordinated with the City of Rockville to refine the recommendations, developed preliminary concept plans, and prepared planning-level cost estimates for implementation.



Figure 1. Project Study Area and Alternatives Overview



2. Methodology

The study methodology combined a review of relevant plans and projects, data collection, safety analysis, field observations, community input, and coordination with the City of Rockville. These tasks informed documentation of existing conditions, identification of corridor challenges, and development of recommendations, concept plans, and planning-level cost estimates.

2.1 Review of Relevant Plans, Policies, Projects, and Best Practices

The project team reviewed relevant city plans, policies, and ongoing projects to understand existing bicycle and pedestrian goals and planned changes that could affect the study corridor. The two most relevant resources to this project were:

- **City of Rockville Vision Zero Action Plan:** establishes a goal of eliminating traffic fatalities and severe injuries by 2030. Relevant actions include evaluating crossings and unsignalized intersections to identify and improve high-risk locations and expanding bicycle facilities to create a safer and more connected network.
- **City of Rockville Bikeway Master Plan:** identifies sections of Lewis Avenue and Halpine Road within the study area as signed shared roadways and recommends extending the existing bike lane on Ardennes Avenue north from Halpine Road to Vandergrift Avenue. The study corridor is also identified as part of two north-south crosstown bicycle routes.

The project team also reviewed ongoing projects and studies that may influence future pedestrian and bicycle activity in the area. These included the Twinbrook Pedestrian and Bicycle Bridge Project, the Twinbrook Metrorail Station West Side Transit Facilities Reconfiguration, and the Rollins Avenue Complete Streets Study.

2.2 Data Collection

The project team collected several types of data to understand existing roadway conditions and multimodal activity, as described below:

- **Crash data:** collected for the five-year period from April 1, 2021, through March 31, 2026. Data was obtained from the Automated Crash Reporting System (ACRS) on the Maryland Crash Data Dashboard.



- **Near-miss data:** twenty-four hours of near-miss data were collected on April 21, 2026, at Lewis Avenue and Edmonston Drive and at Ardennes Avenue and Halpine Road. The data included vehicle-to-vehicle, vehicle-to-pedestrian, and vehicle-to-bicycle conflicts.
- **Multimodal turning movement counts:** collected at major intersections throughout the corridor during the weekday AM and PM peak periods. The counts included vehicles, pedestrians, and bicycles.
- **Segment speed and volume data:** bidirectional speed and traffic volume data were collected over two days on Lewis Avenue between Thornden Road and Matthews Drive.

2.3 Safety Analysis

The safety analysis considered both reported crashes and near-miss events. Key findings are summarized below.

Total Crashes by Severity

Thirty-two crashes were reported along the study corridor between April 1, 2021, and March 31, 2026. Two crashes resulted in injuries, and the remaining 30 resulted in property damage only. Both injury crashes occurred at Lewis Avenue and Edmonston Drive, including one pedestrian crash and one angle crash involving vehicles.

High Crash Frequency

The Lewis Avenue and Edmonston Drive intersection had the highest concentration of crashes along the corridor, with seven reported crashes. Five were angle crashes, one was a head-on left turn crash, and one involved a pedestrian. Four of the seven crashes, including both injury crashes, occurred in 2025.

Figure 2 displays crashes by segment and intersection along the study corridor to highlight locations with higher crash frequencies. Locations are arranged beginning at the northernmost intersection and progressing south along Lewis Avenue to Halpine Road, then east along Halpine Road, and finally north along Ardennes Avenue.

Collision Type

Rear-end crashes, same-direction sideswipes, and angle crashes were the most common collision types. 15 of the 32 crashes involved a motor vehicle striking a parked vehicle. Figure 3 shows crashes by mode and severity.

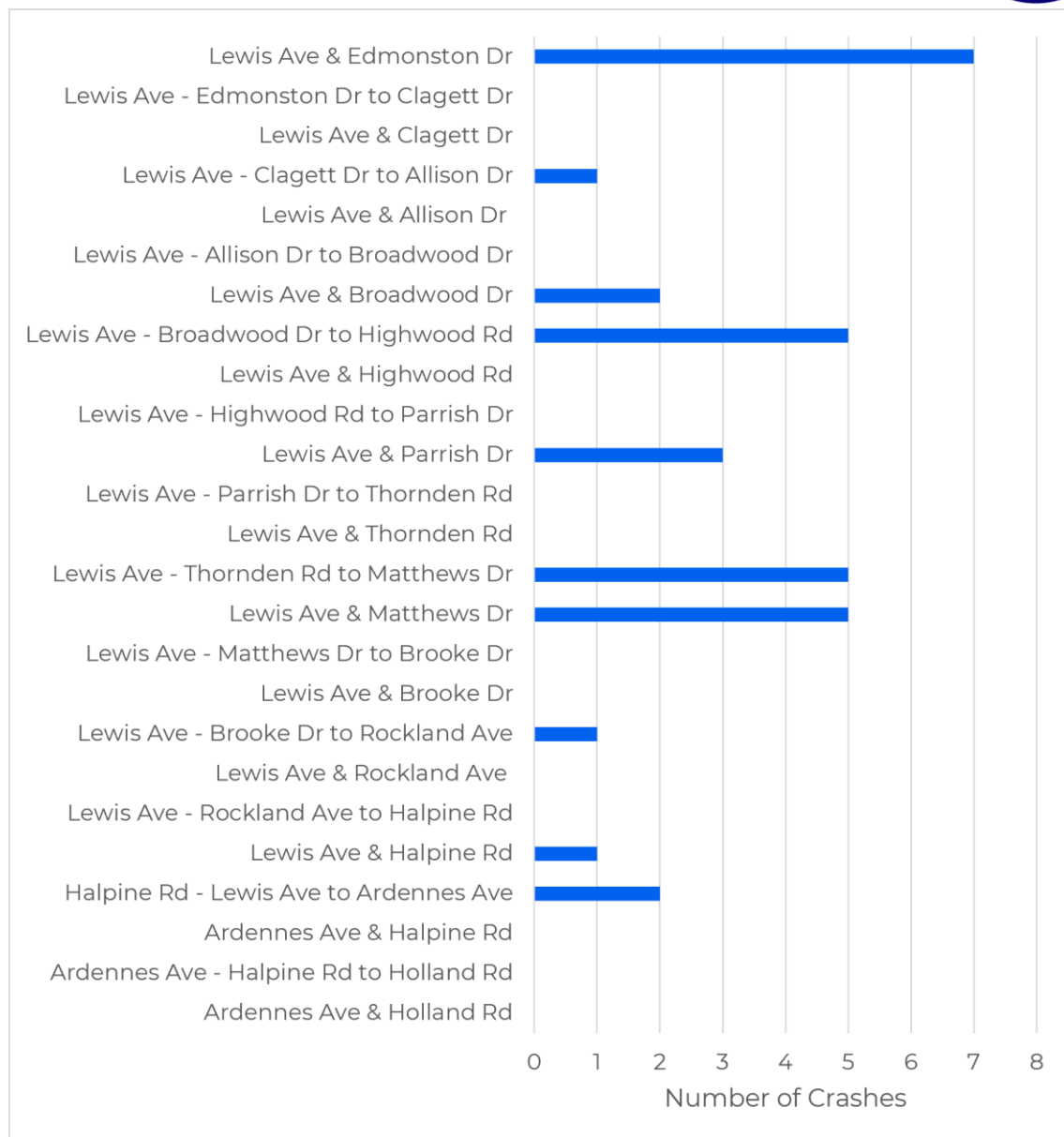
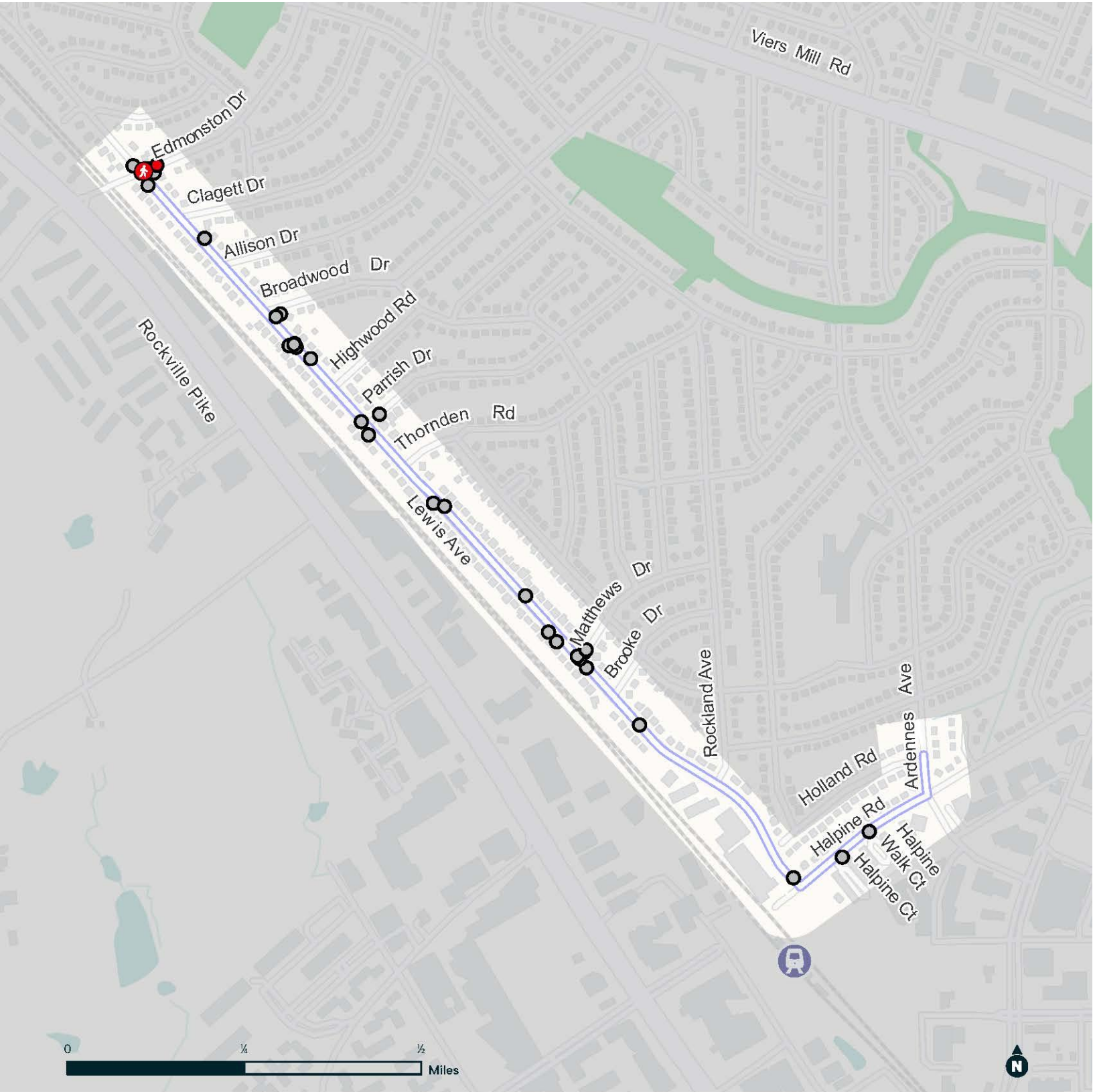


Figure 2. Corridor crashes by segment or intersection



Mode and Severity

- Vehicular; Property Damage Only
- Vehicular; Injury
- Pedestrian; Injury

■ Ponds

■ Parks

● Metro Station

— Study Corridor

FIGURE 3

Crashes by Mode and Severity

G:\GIS\DC\DC26-0166.00_Rockville\Rockville_BaseMap\Rockville_BaseMap.aprx

Intersection Conflicts

Near-miss analysis at the Lewis Avenue and Edmonston Drive intersection identified 63 total vehicle-vehicle conflicts. Of these, 53 were northbound left-turn versus eastbound through conflicts. The intersection also recorded 53 pedestrian conflicts and 18 bicycle conflicts. At the Ardennes Avenue and Halpine Road intersection, 9 pedestrian conflicts and 4 bicycle conflicts were observed. Figure 4 shows an example of a near-miss occurring at the east leg of the Edmonston Drive and Lewis Avenue intersection.

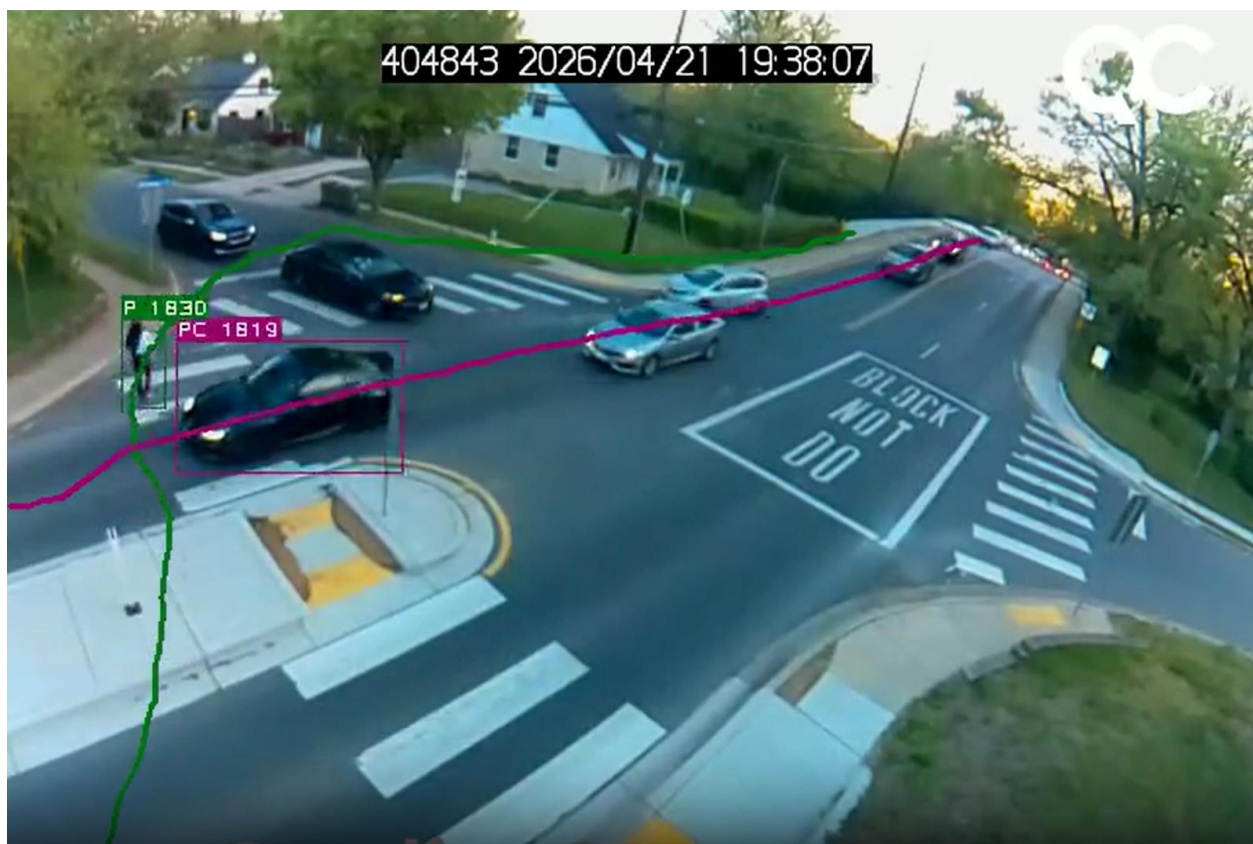


Figure 4. Image captured from video recording of a near-miss on the east leg of Lewis Avenue and Edmonston Drive

2.4 Field Visit and Roadway Facilities Inventory

A field visit was conducted on April 27, 2026, to document existing roadway conditions. The field review included speed observations, on-street parking utilization, pedestrian and bicycle facilities, utilities, landscaping, ADA accommodations, traffic control devices, and pavement markings.



Land use within the study area is primarily residential, with multifamily development near the Twinbrook Metro Station on Halpine Road and commercial, industrial, office, and service-oriented uses along Lewis Avenue near the station.

Lewis Avenue consists of one travel lane in each direction with curb and gutter, sidewalks, and on-street parking on both sides. Parking utilization varies along the corridor. Metered parking between Halpine Road and Rockland Avenue was observed to have occupancy below 50 percent. Field observations also identified speeding concerns on downhill segments, limited sight distance at select intersections, and frequent residential driveways.

The field visit also provided an opportunity to hear concerns from residents. Residents identified speeding concerns along Lewis Avenue between Parrish Drive and Thornden Road, particularly for southbound vehicles traveling downhill, and noted concerns regarding drivers failing to stop at Thornden Road.

2.5 Summary of Corridor Concerns

The existing conditions analysis identified several recurring concerns that were used to inform the recommendations:

- Crash and conflict frequency
- Vehicle speed
- Pavement marking conditions
- Sign inconsistencies
- Dedicated bicycle space, heavy vehicle presence, and frequent conflicts
- Visibility and sight distance

2.6 Coordination and Development of Concept Plans

The project team coordinated with the City of Rockville throughout the study to review findings and recommendations and refine the concept plans. The concept alternatives included shared roadway facilities, a separated bicycle facility, and intersection improvements.

The resulting concept plans and planning-level costs were based on the findings of the existing conditions analysis, applicable guidance, field observations, and coordination with the city.



3. Key Challenges and Recommendations

The existing conditions analysis identified several recurring challenges affecting pedestrian and bicycle safety, comfort, and connectivity throughout the study corridor. These challenges were informed by the crash and near-miss analyses, speed and traffic data, field observations, roadway characteristics, and input received during the field visit. The findings highlight both corridor-wide issues and location-specific concerns that informed the development of the study recommendations.

As summarized in Table 1, the primary challenges include crash and conflict frequency, vehicle speeds, pavement marking conditions, sign inconsistencies, limited dedicated bicycle space, heavy vehicle presence, frequent conflicts, and visibility and sight-distance constraints. Several of these concerns overlap. For example, parked vehicles affect both sight distance and crash patterns, while vehicle speeds and inconsistent traffic control can increase the potential severity and likelihood of conflicts. The concentration of crashes and near-miss events at Lewis Avenue and Edmonston Drive was important in identifying the need for targeted improvements.

The recommendations were developed to respond directly to the challenges identified through the existing conditions analysis. As summarized in Table 2, the recommendations are linked to one or more of the challenges identified in Table 1.

Planning-level cost estimates shown in Table 2 were developed to provide an approximate order of magnitude for implementation. Costs were developed using unit costs from Fehr & Peers guidance, recent MDOT SHA bid prices, and, where applicable, comparable City of Rockville project costs. The estimates are rounded for planning purposes and are intended to support comparison and future budgeting rather than represent detailed construction cost estimates.



Table 1. Corridor challenges and key observations

Challenges	Key Observations
Crash and Conflict Frequency	This concern is most notable at Lewis Avenue and Edmonston Drive, which had the highest number of crashes along the corridor, with 7 crashes, including 5 angle crashes, 1 head-on left-turn crash, and 1 pedestrian crash. Of the 7 crashes, 4 occurred in 2025, including both corridor injury crashes, following the November 2023 safety improvements at this location. Near-miss analysis also identified 53 observed northbound left turn versus eastbound through conflicts, compared with 30 expected conflicts.
Vehicle Speed	Field observations and conversations with residents identified speeding concerns, particularly in the downhill segments of Lewis Avenue. Speed data collected between Thornden Road and Matthews Drive recorded top speeds between 36 and 40 mph southbound and 41 and 45 mph northbound.
Pavement Marking Conditions	Field observations identified faded or worn pavement markings at 5 intersections along the study corridor. No marked crosswalks or STOP lines were present at Lewis Avenue and Allison Drive or Ardennes Avenue and Holland Road. Marked crosswalks were also missing from the entrances to Halpine Court and Halpine Walk Court from Halpine Road.
Sign Inconsistencies	Field observations identified several signage inconsistencies along the study corridor. BUMP (W8-1) signs were used incorrectly at 3 locations where SPEED HUMP (W17-1) signs are required.
Dedicated Bicycle Space, Heavy Vehicle Presence, and Frequent Conflicts	Shared roadway conditions and heavy vehicle activity may create less comfortable conditions for bicyclists, while frequent driveways may create conflicts for both bicyclists and pedestrians. Along Lewis Avenue between Rockland Avenue and Halpine Road, the wider roadway and transition to commercial and industrial land uses, combined with activity approaching the Twinbrook Metro Station, would support providing dedicated bicycle space to separate bicyclists from motor vehicle traffic, with conflict markings at driveway crossings. Parking utilization near the Metro station was generally low to moderate, providing flexibility for parking reconfiguration and multimodal space reallocation.
Visibility and Sight Distance	Vegetation, parked vehicles, and hidden traffic control devices may limit visibility at some intersections. The crash history also identified parked vehicles as a recurring concern, with 15 of the 32 crashes (47%) involving a moving vehicle striking a parked vehicle. The highest numbers of parked-vehicle crashes occurred at Lewis Avenue and Matthews Drive (4 crashes) and Lewis Avenue and Parrish Drive (2 crashes), as well as along the Lewis Avenue segments between Thornden Road and Matthews Drive (2 crashes) and Broadwood Drive and Highwood Road (3 crashes).



Table 2. Recommendations and planning-level cost estimates

Recommendation	Planning-Level Cost Estimates		Location	Challenges					
	Approximate Cost	Cost Basis		Crash and Conflict Frequency	Vehicle Speed	Pavement Marking Conditions	Sign Inconsistencies	Dedicated Bicycle Space, Heavy Vehicle Presence, and Frequent Conflicts	Visibility and Sight Distance
Use curb extensions to improve visibility and allow cars room to turn	< \$10,000	3 intersections with painted curb extensions. \$3/LF for 5-inch white thermoplastic pavement markings based on 2026 MDOT SHA bid prices.	Intersections of Lewis Ave and Broadwood Dr, Parrish Dr, Matthews Dr						x
Delineate parking area with white line to visually narrow roadway and increase visibility	< \$10,000	\$3/LF for 5-inch white thermoplastic pavement markings based on 2026 MDOT SHA bid prices.	Lewis Ave from Matthews Dr to Rockland Ave						x
Install speed humps, SPEED HUMP (W17-1) signs with Advisory Speed (W13-1P) plaque. Replace existing BUMP (W8-1) signage with SPEED HUMP (W17-1) per MUTCD.	\$40,000	3 speed humps × approximately \$7,000/speed hump, plus 12 sign/post assemblies (\$100/SF sheet aluminum sign + \$225 per sign post). Speed hump cost based on the City of Rockville <i>Congressional Lane Complete Streets Study</i> unit cost of \$25/SF, assuming a 12-ft-long speed hump across a 22- to 24-ft roadway (264–288 SF). 2026 MDOT SHA bid prices used for signs.	Lewis Ave between Parrish Dr and Broadwood Dr; Lewis Ave between Thornden Rd and Matthews Dr		x		x	x	
Install shared markings	\$15,000	Approximately 1 mile of shared lane markings (spaced 50 ft from intersections and then every 250 ft), \$20/SF. 2026 MDOT SHA bid prices used.	Lewis Ave from Edmonston Dr to Rockland Ave; Halpine Rd from Lewis Ave to Ardennes Ave; Ardennes Ave from Halpine Rd to Holland Rd					x	
Mark all stop bars and all missing crosswalks that meet PROWAG requirements. Upgrade all existing crosswalks to be continental.	\$40,000	16 continental crosswalks (2 of them are smaller and on private property). 24-inch white thermoplastic markings/crosswalk, \$19/LF. Each crosswalk is assumed to include approximately 12 longitudinal bars, each 2 ft wide × 10 ft long, resulting in approximately 120 LF of markings per crosswalk. 2026 MDOT SHA unit cost used for pavement markings.	Intersections of Lewis Ave and Brooke Dr, Matthews Dr, Thornden Rd, Parrish Dr, Highwood Rd, Broadwood Dr, Allison Dr, Clagett Dr; intersections of Halpine Rd and Halpine Ct, Halpine Walk Ct; intersections of Ardennes Ave and Halpine Rd, Holland Rd			x			



Table 2 (Continuation). Recommendations and planning-level cost estimates

Planning-Level Cost Estimates					Challenges				
Recommendation	Approximate Cost	Cost Basis	Location	Crash and Conflict Frequency	Vehicle Speed	Pavement Marking Conditions	Sign Inconsistencies	Dedicated Bicycle Space, Heavy Vehicle Presence, and Frequent Conflicts	Visibility and Sight Distance
Install a two-stage left turn by keeping WBT vehicles in the right lane (Do Not Block the Box markings may need to be revised). Expected to reduce angle crashes and turning speeds by eliminating the single-movement left turn.	< \$10,000	350 LF of 5-inch white thermoplastic pavement markings (\$3/LF); 350 LF of yellow marking (\$4/LF); 6 post-mounted delineators (\$75/delineator). 2026 MDOT SHA unit cost used. Estimates include allowance for pavement marking removal.	Lewis Ave & Edmonston Dr	x					
Install a one-way bike lane on each side of Lewis Ave, beginning just south of the southernmost residences on the street. Retain parking on the west side and use targeted parking removal to open sight lines at a minimum of one spot on each side of the driveways.	\$80,000	Approximately 700 ft. \$3/LF for 5-inch white thermoplastic pavement markings, bike lane thermoplastic pavement marking with arrow (\$20/SF), signs (\$100/SF sheet aluminum sign + \$225 per sign post), and post-mounted delineators (\$75/delineator). Add 4 green conflict zones (approximately \$8,000 each). 2026 MDOT SHA unit cost and F&P unit costs used.	Lewis Ave from Halpine Rd to Rockland Ave					x	



4. Concept Plans

Concept plans were developed to illustrate how the study recommendations could be implemented throughout the corridor. The plans build on the existing conditions analysis, identified challenges, and coordination with the City of Rockville and show preliminary roadway and intersection improvements.

The proposed improvements include:

- Shared roadway facilities on Lewis Avenue between Edmonston Drive and Rockland Avenue, supported by traffic calming
- Separated bicycle lanes on Lewis Avenue between Rockland Avenue and Halpine Road
- Shared roadway facilities on Halpine Road between Lewis Avenue and Ardennes Avenue
- Shared roadway facilities on Ardennes Avenue between Halpine Road and Holland Road
- Intersection improvements, primarily at locations with a history of crashes, including Lewis Avenue at Edmonston Drive, Broadwood Drive, Parrish Drive, and Matthews Drive
- Pedestrian facility improvements, including new and upgraded crossing infrastructure

The concept plans incorporate the supporting improvements identified in Table 2, including traffic calming, pavement marking and crossing improvements, quick-build curb extensions, bicycle markings and signage, and targeted intersection treatments. These improvements are intended to provide a more continuous route for bicyclists and pedestrians through the study area while addressing the location-specific safety and operational concerns identified through the study.

The plans are conceptual and are intended to illustrate the recommended configuration and approximate extent of the improvements. Additional detailed analysis and engineering design will be required prior to implementation to confirm final dimensions and design specifications.



5. Conclusion

The Twinbrook Metrorail Station Bicycle and Pedestrian Accessibility Improvements project identified opportunities to improve pedestrian and bicycle safety, comfort, accessibility, and connectivity along the study corridor while responding to the specific roadway and safety conditions observed throughout the study. The existing conditions analysis identified several key challenges, including crash and conflict patterns, vehicle speeds, pavement marking and signage conditions, limited dedicated bicycle space, and visibility and sight-distance constraints.

The recommended improvements respond directly to these findings through a combination of shared roadway facilities, separated bicycle lanes, traffic calming, crossing and pavement marking improvements, quick-build treatments, and targeted intersection improvements. The recommendations would provide a more continuous bicycle connection through the Twinbrook neighborhood and toward the Twinbrook Metro Station, while addressing location-specific safety concerns for people walking, bicycling, and driving. The improvements would also extend the Bethesda Trolley Trail along an alternative to Rockville Pike (MD 355), supporting the city's broader goal of a safer and more connected bicycle network.

The concept plans and planning-level cost estimates provide the City of Rockville with a framework for advancing the recommendations toward implementation. As individual improvements move forward, additional engineering analysis and design will be needed to confirm final dimensions, treatments, and site-specific conditions.

The City of Rockville Department of Public Works will review all proposed improvements. The city will share the study findings and proposed improvements with the community for additional feedback and implement improvements in consideration of their comments. City staff will implement these improvements as budget resources and staff capacity allow and as part of future roadway resurfacing projects.