



# Montgomery Road Multimodal Improvements Feasibility Study

---

*January 2026*



## Table of Contents

INTRODUCTION AND CONTEXT .....	1
STUDY AREA.....	2
EXISTING CONDITIONS .....	2
EXISTING ADJACENT PROJECTS .....	2
EXISTING ROADWAY CONDITIONS .....	3
EXISTING RIGHTS OF WAY.....	3
EXISTING ENVIRONMENTAL CONDITIONS .....	4
EXISTING DRAINAGE AND STORMWATER MANAGEMENT .....	6
EXISTING UTILITIES .....	6
EXISTING SIGHT DISTANCE .....	7
DESIGN CRITERIA.....	9
ALTERNATIVES DEVELOPED.....	10
ALTERNATIVES COMPARISON .....	11
ENVIRONMENTAL IMPACTS .....	13
RIGHT OF WAY IMPACTS.....	13
UTILITY IMPACTS .....	13
SIGHT DISTANCE AND CROSSWALKS .....	13
DRAINAGE AND SWM CONSIDERATIONS .....	14
ROCKBURN PARK TRAIL CONNECTIONS.....	19
ESTIMATED COSTS.....	20
PUBLIC ENGAGEMENT .....	20
SUMMARY OF FEEDBACK .....	20
NEXT STEPS .....	21
Appendix A .....	Sight Distance Evaluations
Appendix B .....	Design Criteria
Appendix C .....	Alternatives Plans
Appendix D .....	Alignment Shift Plan
Appendix E .....	Drainage and SWM Concepts
Appendix F .....	Major Quantities Cost Estimate
Appendix G .....	Public Outreach Questionnaire Responses
Appendix H .....	Speed Data

## INTRODUCTION AND CONTEXT

Montgomery Road is an east-west minor arterial street which connects central Elkridge east of US 1 to eastern Ellicott City via MD 103 and Landing Road. The street provides the only crossing of Interstate 95 between MD 100 and I-895 in Howard County.

The Howard County Office of Transportation recommended Montgomery Road, from Marshalee Drive to Rowanberry Drive, as a candidate for the study of potential Complete Streets improvements. It was selected for study because the corridor lacks contiguous, low-stress pedestrian and bicycle facilities on the street, and due to the lack of other potential multimodal crossings of I-95 in the area; MD 103 (2.3 miles to the south) and River Road (1.5 miles to the north) provide the closest alternate multimodal crossings of I-95. While [\*BikeHoward\*](#) (2016) recommended addition of shoulders within the study limits and [\*WalkHoward\*](#) (2020) recommended the addition of sidewalks along both sides of the street, this study was initiated to evaluate cost-effective, practical alternatives to provide low-stress bicycle and pedestrian facilities within the study limits in compliance with the Howard County General Plan 2000, the Howard County's Complete Streets policy (2019), and the [Howard County Design Manual, Volume III, 2022 Edition](#). Additional resources utilized include the 2018 American Association of State Highway and Transportation Officials' (AASHTO) [A Policy on Geometric Design of Highways and Streets](#) (The "Green Book"), and the AASHTO [Guide for the Development of Bicycle Facilities, 5th Edition](#).

Currently, pedestrian accommodation is absent from just east of Koffel Court to Bauman Drive and bicyclists must share the roadway pavement with motorists west of the Rowanberry Drive/Lawyers Hill Road intersection. Continuity of routes for users and connectivity with new bike/ped facilities to the east were considered for alternatives developed, along with constraints and impacts to right of way, utilities, and environmental features, to provide well defined facilities for bicyclists and pedestrians which are separated from vehicular traffic.

It should be noted that these concepts were based on GIS information and field reconnaissance; no field-run topographic surveys were conducted as a part of this study. The purpose of this phase of the study is to identify a preferred option. Topographic surveys will be required as the project moves forward into design.

## STUDY AREA



Figure 1: Map of Study Limits along Montgomery Road

## EXISTING CONDITIONS

### EXISTING ADJACENT PROJECTS

Several recent, or upcoming, projects were considered during the development of this study:

#### *Montgomery Road School Walk Zone Improvements*

Howard County recently completed extensive bicycle and pedestrian improvements from Rowanberry Dr./Lawyers Hill Rd. intersection, east to Elkridge Crossing Way and Lawyers Hill Court to improve and expand walking and biking to school for Elkridge Elementary School and Elkridge Landing Middle School. The improvements evaluated in this study connect to this recent project to provide continuity and connectivity from Deborah Jean Dr. to the Elkridge Corners business and retail center at US 1.

#### *BGE Fiber Optic Improvements*

BGE recently installed new fiber optic lines along the westbound shoulder of Montgomery Road from Landing Road to Hunt Club Road. WRA coordinated with BGE through Howard County regarding the proposed location and depths of the new line to reduce the potential for conflicts between the new lines and any proposed multi-modal facility; however, further coordination and utility investigation will be required during design.

*Redevelopment at 6908 Montgomery*

The property at 6908 Montgomery Road is currently being subdivided and redeveloped. The County is providing comments to the developer to provide possible accommodation for the alternatives developed during this study including frontage improvements or right-of-way dedications, as part of the redevelopment.

**EXISTING ROADWAY CONDITIONS**

Montgomery Road, within the Study Area, is a 2-lane, asphalt, minor arterial roadway with 12-foot lanes, minimal variable width shoulders (2 feet typically), and no access control. The posted speed is 40mph; however, a reduction in speed limit or installation of speed warning signs will be explored in final design. A cursory evaluation of the roadway surface shows that it is in generally good to fair condition, with minor signs of cracking and rutting, isolated areas of pavement repair, and some overlain sections. Currently, pedestrian accommodation is absent from just east of Koffel Court to Bauman Drive and bicyclists must share the roadway pavement with motorists west of the Rowenberry Drive/Lawyers Hill Road intersection. The surrounding area does not provide a network of connected streets parallel to Montgomery Road that can provide alternate low-stress bicycle and pedestrian facilities. The existing typical section is shown to the right:

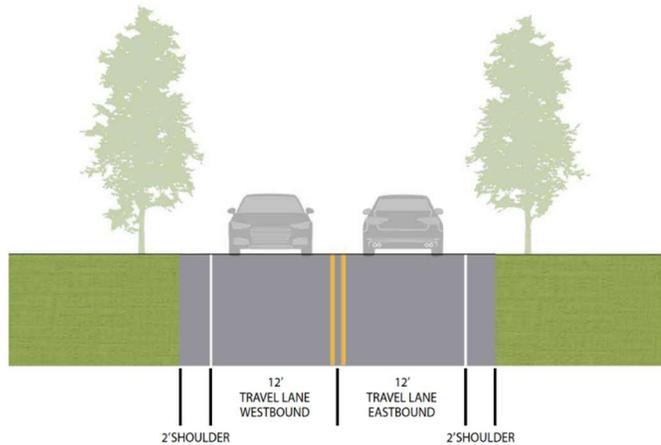


Figure 2: Montgomery Road Existing Typical Section

**EXISTING RIGHTS OF WAY**

The corridor’s right-of-way (ROW) is generally characterized by “prescriptive right-of-way”, where property boundaries adjacent to the roadway often extend into the road and the local agency operates and maintains the roadway by statute, which prescribes the right-of-way width to be at least 30 feet. Many properties date to the 1950’s or earlier, with a few of the more recent subdivisions having dedicated a strip of ROW. Properties west of Ruxton Road and those east of I-95 generally have sufficient ROW dedications to allow improvements within the right-of-way, as do several properties on the westbound side of Montgomery Road near Hunt Club Drive.

WRA obtained and reviewed GIS data, cataloged tax account record data, researched record documents, computed and annotated descriptions, and developed a property mosaic for the corridor as part of this study. The study area included approximately 90 parcels, 14 county roads, one interstate (I-95) and one BGE transmission right-of-way. Dedicated strips of land and side streets are shown via the best available information within the record documents that were reviewed.

More detailed right-of-way investigations beyond the scope of this study, including boundary surveys and title/deed research will be needed during the design phase of this project to properly set the corridor’s “through ROW”, ascertain precise impacts, and determine what difficulties may be involved with encroachment of various properties.

*Maryland Environmental Trust Easement*

WRA obtained the Deed of Conservation Easement, the Forest Conservation & Management Agreement, and the Deed for 6831 Montgomery Road Elkridge, MD (see **Appendix D**). According to the Deed of Conservation Easement, “Industrial or commercial activities other than farming, silviculture and horticulture are prohibited on the property, except or permitted structures without alteration of the external appearance and the sale of agriculture or forestry products produced on the Property,” and “No building facility or other structure shall be constructed on the Property after the date of the Conservation Easement.”

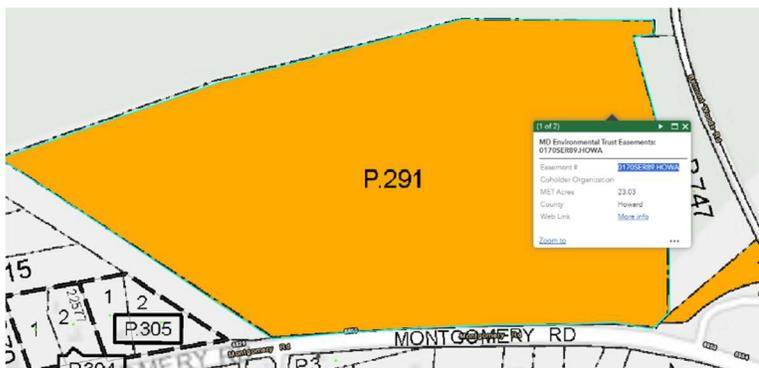


Figure 3: Maryland Environmental Trust Easement

**EXISTING ENVIRONMENTAL CONDITIONS**

WRA conducted a desktop analysis of existing environmental features within the study area using available published resources such as MERLIN, USDA NRCS, USFWS, MDNR, and Howard County GIS, and performed field visits to evaluate the absence/presence of waters of the U.S., including wetlands, within project study area. The U.S. Fish and Wildlife Service (USFWS) on-line portal Planning and Consultation (IPaC) was cross-referenced to identify federally listed species and critical habitat within the project area and coordination with the DNR Wildlife and Heritage Service occurred to identify the presence of protected species/critical habitats. A preliminary review of Maryland Historical Trust resources was conducted to identify potentially affected cultural resources within the project area.



Figure 4: Map of Waterways, Wetlands, and Floodplain within Study Limits along Montgomery Road

*Wetlands, Waterways, and Floodplains*

Online mapping resources (Merlin/NWI) display no known wetlands; however, they do display waterway and floodplain resources within the study area (Figure 3). One unnamed tributary to Rockburn Branch is located north of Montgomery Road generally flowing east from north of the intersection of Marshalee

Road and Montgomery Road, via a culvert under Koffel Court and north along the roadway to east of Ruxton Drive, where the stream turns to the northeast. There is a palustrine forested (PFO) wetland associated with this stream within the vicinity of Rockburn Branch Park and a second, potentially ephemeral stream is fed by roadside ditches along the eastbound side of Montgomery Road via a culvert and into the PFO wetland. The potential ephemeral stream and PFO wetland are located east of Ruxton Drive, along the north side of Montgomery Road. The Maryland Department of the Environment (MDE) has assigned a Use I designation to the unnamed tributary to Rockburn Branch. Use I streams are classified as water contact recreation, and protection of nontidal warmwater aquatic life with a time of year restriction for instream construction from March 1 to June 15. Rockburn Branch is associated with MD 8-digit code 02130906. The unnamed tributary to Rockburn Branch has an associated 100-year floodplain from east of Koffel Court along Montgomery Road (FIRM: 24027C0160D, effective 11/6/2013). Impacts to the 100-year floodplain are regulated by MDE and therefore require a Wetlands and Waterways Permit for associated impacts. The extent of the potential intermittent stream (unnamed tributary to Rockburn Branch) is well documented on online mapping; however, online mapping did not identify the potential wetland. An official wetland and waterway delineation will be necessary to identify and confirm the extent of the wetlands and streams within the project area.

### *Sensitive Species*

WRA received confirmation on May 2, 2025, from Maryland Department of Natural Resources Wildlife and Heritage Service that no official records for State or Federal listed, candidate, proposed, or rare plant or animal species occur within the project area. Review of U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) website noted that no federally listed species or their critical habitats are known to occur within the project area. The IPaC report identified two candidate species, the proposed endangered Tricolored bat (*Perimyotis subflavus*) and the proposed threatened Monarch Butterfly (*Danaus plexippus*); candidate species do not currently receive federal protection. However, the project proponent should review the USFWS IPaC database prior to project milestones to determine if species or status of protections have changed. No state or federally regulated resources were identified via desktop or during field review.

Online mapping from Merlin identifies Forest Interior Dwelling Species (FIDS) areas north of Montgomery Road from the intersection of Marshalee Road to I-95 within and adjacent to Rockburn Branch Park and Patapsco Valley State Park. Coordinating agencies request that projects within FIDS areas avoid and minimize impacts to forested areas. If impacts to forests are deemed unavoidable, then FIDS guidance requests that impacts take place on the outer edge of the forest stand. Proposed impacts which bisect a forest stand are highly discouraged.

### *Forested and Protected Lands*

This study area contains areas of significant tree cover and some protected lands (in addition to the Maryland Environmental Trust Easement, discussed above). As the design process progresses, a Natural Resource Inventory (NRI) identifying forest or individual trees may be necessary to assess resources. Coordination and approval from [Howard County Natural Resources Division](#) will be needed for individual tree and forest resource impacts to comply with local forest ordinance and the Maryland Forest Conservation Act requirements. Requirements will include a field delineation of adjacent or on-site existing trees and forest and preparation of a Roadside Tree Permit or preparation of a Forest Conservation Plan (FCP), depending on the severity of impacts, to comply with Maryland Forest

Conservation Law as design progresses. Forest or tree removal may require mitigation by on-site replacement of trees or a fee-in-lieu if on-site tree planting is not feasible.

The southern edge of Rockburn Branch Park is located along the north side of Montgomery Road near Ruxton Drive. Patapsco Valley State Park extends almost to the north side of Montgomery Road near Elibank Drive. There are forest conservation easements on either side of Koffel Court north of Montgomery Road, and along either side of Ruxton Drive, south of Montgomery Road.

### *Historic Properties*

The Maryland Historical Trust (MHT) provides online mapping information from both the Maryland Inventory of Historical Places and the National Register of Historic Places (NRHP). Four properties and one historical district are listed within 500-600 feet of the project and are listed below. A description from the MD inventory of historical places can be provided upon request. Correspondence with MHT for further coordination on these findings should be performed during preliminary design.

- 1) HO-892: Harman House (6441 Montgomery Road), (ca. 1860). This private residence property was identified but not included in the Maryland Inventory of Historic Properties as not enough information was obtained for decision. This property is not listed on the NRHP.
- 2) HO-1032: Albert and Isobel Wilford House (6754 Montgomery Road). Demolished in 2011. This property was not listed in the NRHP.
- 3) 93001000/HO-610: Lawyers Hill Historical District (north side of Montgomery Road from Old Hunt Club Road to Lawyers Hill Road). The district is centered around Lawyers Hill Road and Old Lawyers Hill Road and contains 48 contributing buildings of Colonial, Gothic, Victorian, Queen Anne/Colonia Revival, to Modern Era (1730 through 1941) architecture.
- 4) HO-885: Daniel M. Murry Jr. House (6831 Montgomery Road). Located inside the Lawyers Hill Historical District. This property is approximately 200 ft north of Montgomery Road, the Colonial Revival House is associated with events that made significant contribution to the broad patterns of Howard County history, according to MHT report. While on the Maryland Inventory of Historic Properties, this property was not evaluated for NRHP inclusion.
- 5) HO-759: Patapsco State Park. Located partially inside the Lawyers Hill Historical District. The Patapsco Valley State Park includes 14,250 acres in Anne Arundel, Baltimore, Howard, and Carroll Counties. The Park extends southwest to terminate at Montgomery Road, along the northern side of Montgomery Road. There are numerous sites, buildings, objects and districts within the greater park property. According to the HO-759 MHT records, no noted sites are located within the vicinity of the study area.

### **EXISTING DRAINAGE AND STORMWATER MANAGEMENT**

The existing drainage throughout the corridor is primarily open-channel or sheet flow off the public right-of-way. Roadside ditches, when present, are generally shallow and closed drainage systems are limited to the eastern-most and western-most ends of the project, with some isolated inlets present on the eastbound side of the roadway throughout the corridor to convey collected drainage from the south side of the road to the north side. No existing SWM facilities were identified within the project corridor.

### **EXISTING UTILITIES**

Utilities throughout the corridor consist of both overhead and underground facilities. WRA requested record drawings from utility companies and water and sewer records from Howard County to identify

potential surface and subsurface utilities within the corridor and conducted a field investigation to verify the findings. Both overhead and underground facilities are present within the study limits. Overhead facilities are owned by BGE (Gas and Electric), Lumen (communications), and Verizon and Verizon Business (communications). Underground facilities are owned by BGE (Gas and Electric) and Howard County (Fiber Optic, Water, and Sewer) services, including a new BGE-owned fiber optic line running along the westbound shoulder of Montgomery Road from Landing Road to Hunt Club Road. More detailed utility investigations, such as Type A/B utility designations, will be required during the design phase of this project to properly locate and avoid utilities to the maximum extent practical.

**EXISTING SIGHT DISTANCE**

WRA conducted Intersection Sight Distance (ISD) and Stopping Sight Distance (SSD) analyses at selected existing intersections with potential sight distance concerns and where proposed crosswalks were being considered. Sight distance evaluations were performed using a design speed of 40 mph, which is the 85% speed for the corridor based on data obtained by Howard County (see **Appendix H**). The evaluations were performed based on procedures outlined in the American Association of State and Highway Officials' (AASHTO's) [A Policy on Geometric Design of Highways and Streets](#), 6<sup>th</sup> Edition ("The Green Book") ISD analyses were performed for the Left Turn from Minor Road (Case B1) and the Right Turn from Minor Road (Case B2). SSD was evaluated using a 40-mph design speed and assuming a maximum 3% grade in some instances (measured from GIS information), which resulted in a required minimum SSD of 305 feet on level roadway sections and 315 feet at 3% downgrades. Results are provided in **Appendix A**.

Table 3-2. Stopping Sight Distance on Grades

Design Speed (mph)	U.S. Customary					
	Stopping Sight Distance (ft)					
	Downgrades			Upgrades		
	3%	6%	9%	3%	6%	9%
15	80	82	85	75	74	73
20	116	120	126	109	107	104
25	158	165	173	147	143	140
30	205	215	227	200	184	179
35	257	271	287	237	229	222
40	315	333	354	289	278	269
45	378	400	427	344	331	320
50	446	474	507	405	388	375
55	520	553	593	469	450	433
60	598	638	686	538	515	495
65	682	728	785	612	584	561
70	771	825	891	690	658	631
75	866	927	1003	772	736	704
80	965	1035	1121	859	817	782
85	1070	1149	1246	949	902	862

Table 1: AASHTO SSD Chart

*Deborah Jean Drive Intersection*

The Deborah Jean Drive / Marshalee Drive intersection is an existing minor-leg stop-controlled intersection with adequate sight distance for the 40-mph design speed. ISD to the west is approximately 421 feet± and to the east is approximately 397 feet±. SSD along Montgomery Road is greater than 400 feet. The ISD and SSD meet the 40-mph design speed requirements.

There are no marked crosswalks currently at this location.

*Ruxton Drive Intersection*

The Ruxton Drive intersection is an existing minor-leg stop-controlled intersection. ISD to the west is 150 feet± and ISD to the east is 200 feet±. The ISD in either direction does not meet the 40-mph requirements due to vegetation and topography blocking the view of a driver on Ruxton Dr. It should be noted that the stop bar is set back significantly on Ruxton Dr. and when drivers pull forward, sight-distance is increased to greater than the minimum calculated requirement for the Left Turn from Minor Road (Case B1) and the Right Turn from Minor Road (Case B2). SSD along Montgomery Road from the west is 378 feet± due to a crest vertical curve west of the intersection. SSD from the east is >378 feet. SSD meets the 40-mph design speed requirements in either direction.

No marked crosswalks currently exist at this location. The ISD and stop bar locations will be evaluated in final design as a comprehensive part of the geometric design.

*Deer Ridge Lane Intersection*

The Deer Ridge Lane intersection is an existing minor-leg stop-controlled intersection. ISD to the west is 120 feet± and to the east is >441 feet. The ISD for the Left Turn from Minor Road (Case B1) meets the calculated 40-mph requirement of 441 feet. ISD for the Right Turn from Minor Road (Case B2), does not meet the minimum calculated requirement of 421 feet for a 40-mph design speed due to the crest vertical curve west of the intersection. SSD along Montgomery Road from the west is 120 feet± due to a crest vertical curve west of the intersection. SSD from the east is >441 feet. SSD meets the 40-mph design speed from the east but is below minimum from the west due to the crest vertical curve.

No crosswalks currently exist at this location.

*Timberview Drive Intersection*

The Timberview Drive intersection is an existing minor-leg stop-controlled intersection. ISD for the Left Turn from Minor Road (Case B1) is greater than the calculated minimum requirement of 445 feet and ISD for the Right Turn from Minor Road (Case B2) is 290 feet± and does not meet the minimum calculated requirement of 385 feet for a 40-mph design speed due to the crest vertical curve west of the intersection. SSD from the west is 290 feet± and from the east is >445 feet. The SSD meets the 40-mph design speed requirements from the east but does not meet requirements from the west.

No crosswalks currently exist at this location. The ISD and stop bar locations will be evaluated in final design as a comprehensive part of the geometric design.

*Landing Road Intersection*

The Landing Road intersection is an existing minor-leg stop-controlled intersection. ISD to the west is 350 feet± and ISD to the east is 350 feet±. The ISD for the Left Turn from Minor Road (Case B1) does not meet the 40-mph requirement of 505 feet due to a crest vertical curve on Montgomery Road. It should be noted that the stop bar is set back on Landing Road, and when drivers pull forward, ISD for the Right Turn from Minor Road (Case B2), is unhindered and exceeds the requirement of 414 feet for a 40-mph design speed. The SSD along Montgomery Road is greater than 450 feet and meets the 40-mph design speed requirements in either direction.

No crosswalks currently exist at this location. The ISD and stop bar locations will be evaluated in final design as a comprehensive part of the geometric design.

*Elibank Drive Intersection*

The Elibank Drive intersection is an existing minor-leg stop-controlled intersection with adequate sight distance for the 40-mph design speed. ISD is greater than the minimum calculated requirement of 385 feet and 445 feet the Left Turn from Minor Road (Case B1) and the Right Turn from Minor Road (Case B2), respectively. SSD along Montgomery Road is >400 feet. The ISD and SSD meet the 40-mph design speed requirements in either direction.

No crosswalks currently exist at this location.

### Rowanberry Drive Intersection

The Rowanberry Drive / Lawyers Hill Road intersection is an existing signalized intersection with adequate sight distance for the 40-mph design speed. ISD is greater than the minimum requirement of 354 feet to both the east and the west. SSD along Montgomery Road is >400 feet. The ISD and SSD meet the 40-mph design speed requirements.

This intersection has existing crosswalks across Montgomery Road (west leg) and Rowanberry Drive (south leg) which are controlled with dedicated pedestrian signals.

## DESIGN CRITERIA

Design Criteria utilized in this study are provided in **Appendix B** and were based on Montgomery Road's functional classification per the Howard County General Plan 2000, the Howard County's Complete Streets policy, the [Howard County Design Manual, Volume III, 2022 Edition](#), the 2018 American Association of State Highway and Transportation Officials' (AASHTO) [A Policy on Geometric Design of Highways and Streets](#) (The "Green Book"), the AASHTO [Guide for the Development of Bicycle Facilities, 5th Edition](#), and recommendations from [BikeHoward](#) (2016) and [WalkHoward](#) (2020), including criteria for configuration of travel lanes, intersections, shared-use path geometry, bicycle lanes, pedestrian accommodations, and buffers.

Following street type selection guidance based on the Howard County Design Manual, the requirements for Montgomery Road most closely match **Neighborhood Street 2** street type (note that while the graphic below depicts parking, the street type does not require on-street parking, and none is proposed with this project). This street type is appropriate for a lower density suburban area, two lane street with a shared-use path on one side of the street, variable width shoulders, or buffered bicycle lanes in lieu of shoulders. Target speeds for this street type are typically 25 mph; however, given the nature of the roadway and Average Daily Traffic (ADT) provided by Howard County, the 85% speed for Montgomery Road is much higher. After discussion with County staff, this project does not propose revisions to the posted speed of 40 mph and thus evaluation of a 40-mph design speed was determined to be applicable for this roadway.

Additionally, the recommendation of [BikeHoward](#) (2016) to "reduce lane width to 11 feet" was incorporated into all alternatives. The recommendation of "add 2-4 feet of shoulder [for bike lanes]," was incorporated into Alternative 4. A target SUP width of 10 feet, sidewalk width of 5 feet, and/or 6-foot buffered bicycle lanes were utilized in Alternative 1 through 3 to provide bicycle and pedestrian accommodation, depending on the alternative.

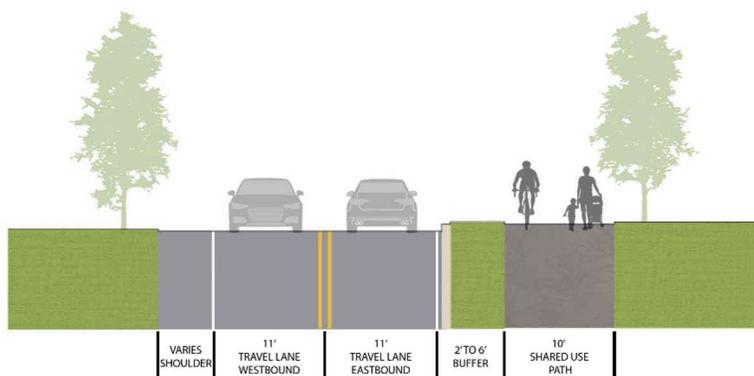


Figure 5: Street Type Selection for Montgomery Road: **Neighborhood Street 2**

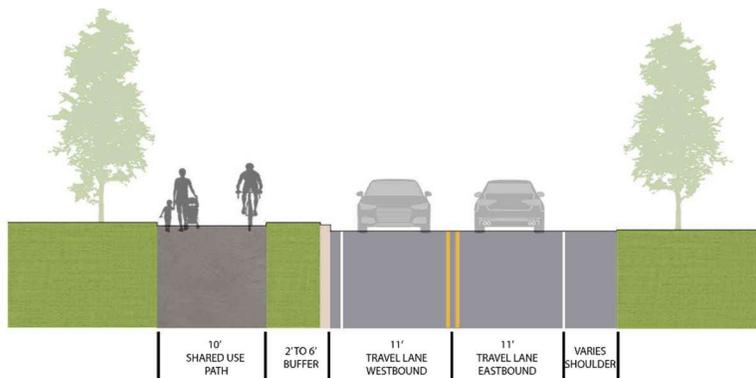
## ALTERNATIVES DEVELOPED

Four alternatives were investigated to evaluate strategies to provide pedestrian and bicyclist improvements from the Marshalee Drive intersection to the Rowenberry Drive/Lawyers Hill Road intersection. Plan views of each alternative are provided in **Appendix C**. The study evaluated four Alternatives. Alternative 1 provides a 10-foot Shared-Use Path (SUP) entirely along the south side of Montgomery Road. Alternative 2 provides a 10-foot SUP which alternates from the south side to the north side of Montgomery Road at strategic locations. Alternative 3 provides 6-foot buffered bicycle lanes along both eastbound and westbound Montgomery Road and a separated 5-foot pedestrian facility (sidewalk) along the south side of the street. Alternative 4 provides a separated 5-foot pedestrian facility along the south side of the street with bicycles and vehicles sharing the roadway, as they do under current conditions.

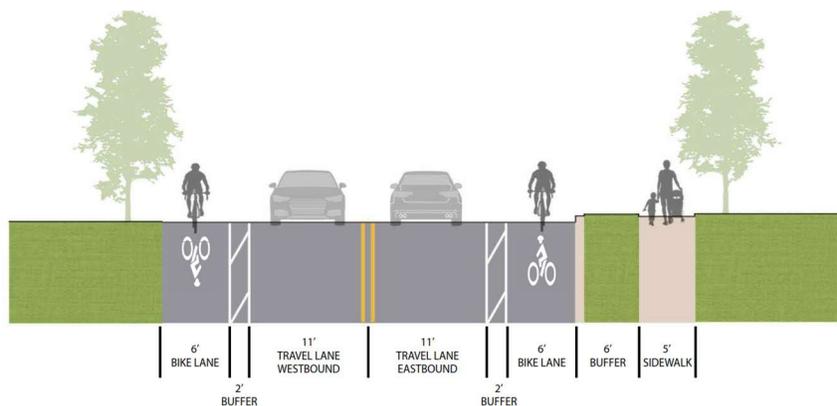
Typical sections for each alternative are illustrated below:



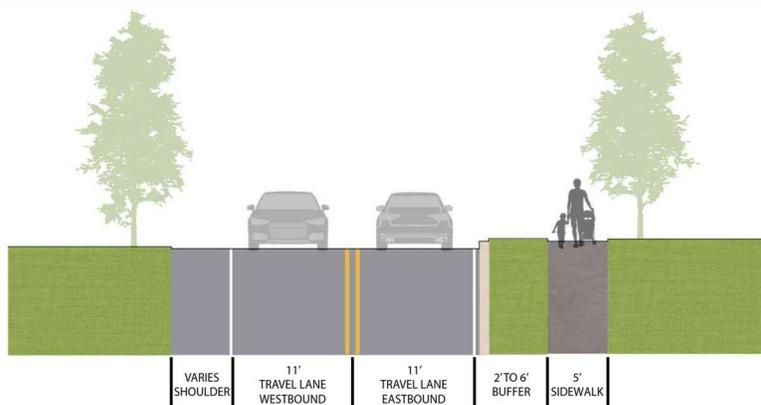
Typical Section: Alternative 1 - 10-foot shared-use path along south side of Montgomery Road



Typical Section: Alternative 2 - 10-foot shared-use path alternating from north side to south side of Montgomery Road



Typical Section: Alternative 3 - 6-foot buffered bicycle lanes with 5-foot sidewalk on south side



Typical Section: Alternative 4 - 5-foot sidewalk on south side and bicycles "Share the Road".

This alternative could include the addition of "Sharrows" markings and additional signing to indicate the roadway is a shared facility.

## ALTERNATIVES COMPARISON

Four alternatives were evaluated for this study. Plans of each alternative may be found in **Appendix C**. Figure 6, below, provides an impact summary of the alternatives:

- **Alternative 1:** 10-foot Shared-Use Path (SUP) along the eastbound side of the corridor
- **Alternative 2:** 10-foot SUP on alternating sides of the corridor
- **Alternative 3:** 6-foot buffered bike lanes (EB / WB) and a 5-foot sidewalk along the eastbound side
- **Alternative 4:** 5-foot sidewalk along the eastbound side; bicycles "Share the Road"

Each alternative presents its own unique challenges and provides a different level of accommodation. The SUP alternatives and the sidewalk-only alternative (Alternative 4), generally result in fewer property and utility impacts. Alternatives 1 and 2 would provide the lowest Level of Traffic Stress for bicyclists but would not provide separated cyclists and pedestrians facilities.

Both SUP alternatives require a reduced width path in certain locations due to unavoidable constraints, whereas the Bike Lane alternative provides a continuous width facility westbound and a near-continuous width facility eastbound, through the corridor (an approximately 500 foot long SUP section was required near Old Hunt Club Road to avoid the BGE tower and property impacts at 6860 Montgomery Road).

The on-road bicycle lanes provided by Alternative 3 may provide a preferred configuration for some cyclists who are not comfortable riding in mixed traffic but may prefer to avoid mixing with the slower speeds of pedestrian traffic, but result in the highest property impacts, SWM needs, and utility impacts.

	Existing	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Bicycle Accommodation Type (Level of Traffic Stress)	Mixed Traffic (LTS 4)	Shared-Use Path (LTS 1)	Shared-Use Path (LTS 1)	Buffered Bike Lanes (LTS 3)	Mixed Traffic (LTS 4)
Bicycle Improvement Location	N/A	South Side	Alternates	Both Sides	N/A
Pedestrian Accommodation Type	None	Shared-Use Path	Shared-Use Path	Sidewalk	Sidewalk
Pedestrian Improvement Location	N/A	South Side	Alternates	South Side	South Side
Main Path/Sidewalk Side Road Crossings	N/A	9	7	9	9
Main Path/Sidewalk Driveway Crossings	N/A	32	12	32	32
Property Impacts	N/A	Moderate Slightly > than Alt4	Lowest	Highest	Moderate Slightly < than Alt1
Utility Pole Relocations	N/A	0	1 minor	10 minor 26 med/major	0
Tree Impacts	N/A	Lowest	Highest	Moderate	Lowest
Stormwater Management Requirements	N/A	Moderate	Moderate	Highest	Lowest
Construction Cost	N/A	\$3.2M to \$5.1M	\$3.1M to \$5.0M	\$3.4M to \$5.4M	\$2.4M to \$3.7M
Anticipated Utility Relocation Cost	N/A	< \$100k	< \$150k	\$2.2M±	< \$100k

Table 2: Impact Summary for Proposed Multi-Modal Improvements

Alternative 4 provides only a sidewalk for pedestrians; cyclists are required to “share the road” with vehicles, as they do in the existing condition, which is not optimal. Some bicyclists may prefer to “share the road” in the Alternative 1 and 2 configurations rather than interact with pedestrians.

Environmental impacts, drainage needs, and SWM requirements also vary by Alternative. Environmental impacts are generally confined to tree impacts, although a formal Wetland and WUS investigation is needed to verify presence and exact location of resources.

Drainage and SWM needs are significant for all alternatives. A more detailed discussion of drainage and SWM concerns is below. All Alternatives introduce a curb to the street section in various locations and will require a closed drainage network. All Alternatives significantly increase the amount of impervious area, requiring SWM treatment with limited availability to introduce adequate facilities. Alternately, future design

investigations would include possible use of pervious pavement for pathways and sidewalks, which the County has successfully implemented in other multimodal improvements in the County. Alternatives that require pavement widening cannot use pervious pavement, and thus independent stormwater management quantity and quality facilities are required for those alternatives.

### ENVIRONMENTAL IMPACTS

Formal Wetland and Waters of the US delineations, roadside tree, and forest-stand delineations will be required during the design phase to provide a more accurate evaluation of environmental impacts. While it may be possible to avoid Wetland/WUS impacts, tree impacts will be unavoidable, including impacts to forest-stands. Generally, Alternatives 1 and 4 result in the fewest tree impacts, followed by Alternative 3, with Alternative 2 resulting in the greatest tree impacts.

### RIGHT OF WAY IMPACTS

All Alternatives require right-of-way acquisition and will entail negotiations with property owners. Montgomery Road is street with a “prescriptive” right-of-way, meaning that many of the properties adjacent to the road extend into the existing street with the County having a prescriptive easement for maintaining the street. Alternatives 1 and 4 result in the lowest property impacts, followed by Alternative 2, with Alternative 3 resulting in the largest property impacts.

#### *Alignment Shift near the Maryland Environmental Trust Easement*

The house at 6860 Montgomery Road sits approximately 14 feet± from the edge stripe on Montgomery Road, making construction of a 10-foot SUP challenging. WRA investigated the possibility of realigning Montgomery Road in this vicinity, which could be applicable to any of the alternatives developed. Utilizing a 2,400-foot± horizontal curve at this location allows for a 15-foot± centerline shift to the north and adequate space to avoid major impacts on this property and the BGE tower to the west of the house. The shift would allow a proposed path to be constructed within the existing roadway footprint and provide at least 8 feet± clear from the tower. A plan view of this shift, shown as a sub-alternative of Option 1, is provided in **Appendix D**.

Such a shift, however, would result in impacts to the property across the street which is currently encumbered by a [Maryland Environmental Trust Easement](#). It is expected that a revision to the existing easement would need to be requested by the property owner and approved by the Department of Natural Resources; and that mitigation for easement impacts would be required; however, further in-depth research into the specifics of this easement will be needed.

### UTILITY IMPACTS

Utility impacts are broken down in Figure 7 for each of the Alternatives. Generally, underground utilities should not be adversely impacted; however, drainage and SWM needs may result in additional conflicts with underground facilities within the corridor. Overhead impacts (e.g. pole mounted facilities) have been broken into three classifications: Major, Intermediate, and Minor pole impacts.

### SIGHT DISTANCE AND CROSSWALKS

SSD analyses were performed on intersections where new crossings are proposed and are provided in **Appendix A**. As with the existing analyses, a design speed of 40 mph was utilized, assuming a 3% downgrade, which resulted in a minimum SSD of 354 feet. Sight distance evaluation was performed based on procedures outlined in the American Association of State and Highway Officials’ (AASHTO’s)

[A Policy on Geometric Design of Highways and Streets](#), 6<sup>th</sup> Edition (“The Green Book”). Although SSD was of primary concern for the crosswalks, evaluations of the anticipated pedestrian sight distance was also performed.

#### *Deborah Jean Drive Intersection*

A new crosswalk across Montgomery Road, east of Deborah Jean, is proposed for the Deborah Jean Drive / Marshalee Drive intersection in all alternatives. ISD is approximately 421 feet± and 397 feet± to the west and east, respectively. SSD along Montgomery Road is greater than 400 feet. The ISD and SSD in the proposed condition meet the 40-mph design speed requirements.

#### *Ruxton Drive Intersection*

No crosswalks currently exist at the Ruxton Drive intersection, but a new crosswalk across Montgomery Road, east of Ruxton Road, is proposed for Alternative 2. ISD in the existing conditions are limited as discussed above under [Existing Conditions](#); however, the construction of a SUP or sidewalk will eliminate the obstructions due to vegetation and topography currently limiting sight distance. With these obstructions removed, ISD is increased to greater than the minimum requirement of 354 feet and SSD along Montgomery Road is greater than 378 feet. The ISD and SSD meet the 40-mph design speed requirements.

#### *Deer Ridge Lane Intersection*

No crosswalks currently exist at this location and none are proposed.

#### *Timberview Drive Intersection*

No crosswalks currently exist at this location and none are proposed.

#### *Landing Road Intersection*

No crosswalks currently exist at the Landing Road intersection, but a new crosswalk across Montgomery Road, east of Landing Road is proposed for all alternatives. The ISD and SSD at the location of the proposed crossing exceed 385 feet and meet the 40-mph design speed requirements.

#### *Elibank Drive Intersection*

No crosswalks currently exist at the Elibank Drive intersection, but a new crosswalk across Montgomery Road, west of Elibank Drive is proposed for all alternatives. The ISD and SSD at the location of the proposed crossing exceed 400 feet and meet the 40-mph design speed requirements.

#### *Rowanberry Drive Intersection*

The existing crosswalks across Montgomery Road (west leg) and Rowanberry Drive (south leg) which are controlled with dedicated pedestrian signals, are proposed to be maintained for all alternatives. ISD is greater than the minimum requirement of 354 feet to both the east and the west. SSD along Montgomery Road is >400 feet. The ISD and SSD meet the 40-mph design speed requirements.

### **DRAINAGE AND SWM CONSIDERATIONS**

The drainage designs for the alternatives have been developed to maintain the existing drainage patterns as closely as possible and can be found in **Appendix E**. There are existing low points located around the following STAs: 109+30, 117+90, and 128+15. In addition, there are existing high points located around the following STAs: 112+30, 123+50, and 134+00. The existing drainage along the project starts at a high point west of the Marshalee Drive intersection and drains down to the first project low point at STA

109+30. This first drainage area is curbed, and the water is collected via an existing drainage system. From this area to the high point at STA 134+00 the existing drainage follows the listed high and low points with sheet-flow out falling to the north side of the road. Beyond the high point at STA 134+00, the street follows a continuous downward grade to the end of the project. Through this area, the water outfalls to both sides of the road via sheet flow until the I-95 bridge and curbed section at the end of the project which collects via an existing drainage system.

The proposed drainage systems utilize inlets and pipes to direct the water to outfall locations matching the existing low points and outfall locations. Curb inlets are used for the proposed systems through the curbed areas of the street and grate inlets are used through the areas where walls are proposed along the street. The outfalls from the proposed drainage systems utilize a rip rap and turf reinforcement matting for erosion control.

Stormwater management for the proposed shared-use path/sidewalk will be accommodated by constructing the shared-use path/sidewalk using pervious pavement. The pavement widening for each alternative will be accommodated using stormwater management facilities. Several locations were identified as suitable sites for proposed stormwater management facilities along the project. The types of stormwater management facilities proposed include bioswales, grass swales, and micro-bioretenion ponds. Below is an outline of the proposed drainage and potential stormwater management facility (SWM) locations for each alternative.

*Alternative 1*

Alternative 1 involves development on the south side of the road and the addition of curb; therefore, most of the proposed drainage is placed on this side of the road to intercept the flows from the new pavement. This Alternative utilizes the existing drainage system from the high point west of the project to the high point at STA 112+30. This existing system outfalls to the north at the low point located at STA 109+30 and consists of a network of inlets and pipes. The flows ultimately drain to the unnamed tributary to Rockburn Branch.

From the high point at STA 112+30 to the high point at STA 123+50 a drainage system of inlets and pipes is proposed along the south side of the road to collect runoff and outfall to the north at the low point at STA 117+90. This system also contains a headwall at STA 115+00 to intercept a potential outfall from an existing system at the southeast corner of the Ruxton Drive intersection. The flows from this system ultimately drain to the unnamed tributary to Rockburn Branch. At the outfall location for the proposed system and running along the north side of the road from approximately STA 115+50 to 118+50 is a potential location (SWM 1A) that can be used for a bioswale or micro-bioretenion pond.

From the high point at STA 123+50 to the high point at STA 134+00 a drainage system of inlets and pipes is proposed along the south side of the road to collect runoff and outfall to the north adjacent to the low point at STA 128+15. The flows from the outfall follow the western roadside ditch along Landing Road and ultimately drain to the unnamed tributary to Rockburn Branch. This system has a potential location that can be used for a bioswale (SWM 1C) located on the north side of the road running from approximately STA 128+50 to 133+00. The system also has a potential location that can be used for a bioswale/grass swale (SWM 1B) running approximately 70 feet downstream of the system outfall at STA 127+00.

Beyond the high point at STA 134+00 there is an existing inlet and outfall to the north side of the road at STA 139+50. A drainage system of inlets and pipes is proposed along the south side of the road with

an outfall at this same location to the north. The flows from this system outfall pass through an existing driveway culvert and ultimately drain to Rockburn Branch. This system has a potential location that can be used for a bioswale (SWM 1D) between the existing driveway culvert and the proposed system outfall at STA 139+50.

Following this drainage system is a section of road with three drainage systems on the south side of the road and out falling to the south. These outfalls are located at STA 143+00, 145+50, and 147+00 and they ultimately outfall to a cross drain under I-95. This system has a potential location that can be used for a bioswale (SWM 1E) running approximately 60 feet downstream of the easternmost outfall at STA 147+00.

Flows from approximately STA 148+00 to the I-95 bridge flow into a roadside swale on the south side of the road in existing conditions. For the proposed condition, a drainage system consisting of inlets and pipes captures the runoff and outfalls to the roadside ditch at STA 153+00 that ultimately drains into an I-95 drainage system via a headwall. This system has a potential location that can be used for a bioswale (SWM 1F) within the existing roadside ditch that the proposed system outfalls into and runs from approximately STA 152+30 to 153+50.

From the I-95 bridge to the end of the project the flows are handled by existing drainage systems except for one inlet that was added at STA 159+50 to intercept flows from a section of curbed street that was flush shoulder in the existing condition. This inlet ties into the existing drainage system at the Rowanberry Drive intersection.

#### Alternative 2

Alternative 2 involves development on alternating sides of the road; therefore, the drainage systems differ from the Alternative 1 drainage systems in a few locations. The existing drainage system at the beginning of the project will be utilized in a similar manner to Alternative 1 up to the high point at STA 112+30. The next drainage system requires the addition of an inlet on the north side of the road at STA 114+00 to intercept the flow from the proposed curb on the north side of the road in Alternative 2. The layout is the same as Alternative 1 for the remainder of the system. This includes the potential location for a bioswale or micro-bioretenion pond (SWM 2A) along the north side of the road from approximately STA 115+50 to 118+50.

The drainage system following the high point at STA 123+50 is like Alternative 1 up to the outfall point at STA 127+00. Beyond this point, the system shifts to the north side of the road to intercept the flows from the proposed curb in this location. Alternative 2 does not contain any potential locations for stormwater management facilities for this drainage system.

Moving past the high point at STA 134+00, the drainage system that outfalls at STA 139+50 is moved to the north side of the road to intercept the flows from the curb on this side of the road. A proposed inlet is still included on the south side of the road at STA 139+50 to pick up the flows that go to the inlet at this location in the existing condition. This system includes the potential location from Alternative 1 that can be used for a bioswale/grass swale (SWM 2B) between the existing driveway culvert and the proposed system outfall at STA 139+50.

The next stretch of street from the outfall at STA 139+50 to STA 152+50 contains development on the north side of the road as opposed to the south side development in Alternative 1. The existing flows on the north side of the road up to STA 143+50 outfall to the north; therefore, an inlet and outfall point is

included in the proposed condition at STA 143+50. The flows from this outfall ultimately drain to Rockburn Branch.

Beyond STA 143+50, a ridge line and roadside ditch develop on the north side of the road in the existing condition that collects the flows and directs them into a roadside ditch along the northwest side of Elibank Drive that ultimately outfalls into Rockburn Branch. The proposed drainage system includes inlets to pick up the flows from the curb on the north side of the road and outfalls into the Elibank Drive ditch at STA 152+50. This system includes a potential location that can be used for a bioswale (SWM 2C) running along the north side of the road from approximate STA 151+00 to 153+00 at the system outfall.

Around STA 153+00, the proposed development shifts to the south side of the road, and a proposed drainage system is included to pick up the flows along the south curb line before the I-95 bridge. Like Alternative 1, this system outfalls at STA 153+00 and includes a potential location that can be used for a bioswale (SWM 2D) within the existing roadside ditch that the proposed system outfalls into and runs from approximately STA 152+30 to STA 153+50. From the I-95 bridge to the end of the project the proposed drainage is identical to Alternative 1.

### Alternative 3

Alternative 3 is the most challenging of the three Alternatives from a stormwater management perspective. Not only does this Alternative include the addition of a sidewalk adjacent to the road, but it also includes widening on both sides of the road for much of the project. This requires additional inlets and pipes as well as additional stormwater management facilities.

The existing system at the beginning of the project will require adjustment due to the development along the street. Proposed inlets are shown at similar locations to the existing inlets up through the outfall to the north at STA 108+50. Additional inlets are also required to intercept the flows along the top of the wall at STA 111+00. A potential location that can be used for a bioswale (SWM 3A) is located on the north side of the road from approximate STA 108+00 to 109+00 at the system outfall.

Following the high point at STA 112+30, the existing drainage system is like the other Alternatives with the addition of inlets on the north side of the road up to approximately STA 118+20 to intercept the flows on the top of the proposed wall. The system also includes the potential location for a bioswale or micro-bioretenion pond (SWM 3B) along the north side of the road from approximately STA 115+50 to 118+50 that was contained in the other two Alternatives.

The next drainage system, starting at the high point at STA 123+50, is like the layout in Alternative 1 with minor adjustments due to the differences in proposed street geometry. This system includes the potential location that can be used for a bioswale (SWM 3D) located on the north side of the road running from approximately STA 128+50 to 133+00 and the potential location that can be used for a bioswale/grass swale (SWM 3C) running approximately 70 feet downstream of the system outfall at STA 127+00.

Beyond the high point at STA 134+00, the system that outfalls to the existing culvert under a driveway is like Alternative 1 with the addition of grate inlets along the wall on the north side of the road. Like Alternative 1, the system includes the potential location that can be used for a bioswale (SWM 3E) between the existing driveway culvert and the proposed system outfall at STA 139+50.

The next three drainage systems are like Alternative 1 with outfalls at STA 143+00, 145+50, and 147+00. The systems also include grate inlets on the north side of the road to pick up flows adjacent to the wall through these locations. As in Alternative 1, the system has a potential location that can be used for a bioswale (SWM 3F) running approximately 60 feet downstream of the easternmost outfall at STA 147+00.

The drainage system from approximately STA 148+00 to the I-95 bridge is also like Alternative 1 with the addition of grate inlets on the north side of the road to intercept flows adjacent to the wall through this location. The system contains a location, like Alternative 1, that can be used for a bioswale (SWM 3G) within the existing roadside ditch that the proposed system outfalls into and runs from approximately STA 152+30 to 153+50. From the I-95 bridge to the end of the project the drainage system is like the other two Alternatives.

#### *Alternative 4*

Alternative 4 is like Alternative 1 from a stormwater management perspective; however, the resulting SWM requirements will be significantly less.

**ROCKBURN PARK TRAIL CONNECTIONS**

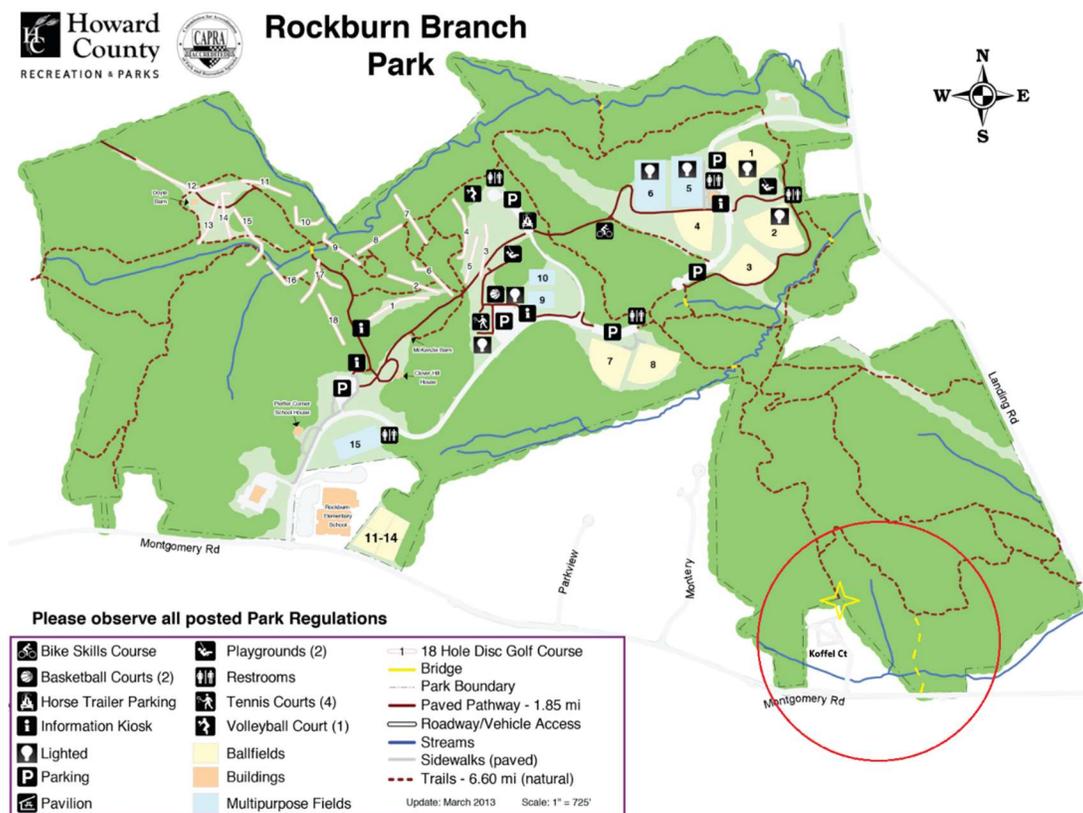


Figure 7: Map of Rockburn Branch Park

Provision of new pedestrian accommodations along Montgomery Road would provide an opportunity to create new access points to the existing trail network within Rockburn Park.

Potential connection options are highlighted in the red circle in Figure 7 above and could include:

- Provide a connection to the existing trail spur which currently terminates near Koffel Court (See Figure 8). This would require improvements along Koffel Court.
- Provide a new connection to the trail system opposite Ruxton Road, approximately 700' east of the intersection of Montgomery Road and Koffel Court. This would require development of a small trail section, possible tree clearing, and a crossing (e.g. bridge ) of Rockburn Branch.



Figure 8: Existing trailhead near Koffel Court

## ESTIMATED COSTS

Major Quantities estimates were developed for each Alternative which may be found in **Appendix F**. These estimates follow Maryland State Highway Administration (SHA) cost estimating guidance for projects at a concept level, using average unit prices for major roadway items and percentages for elements such as preliminary, drainage, landscaping, and traffic items. These estimates do not include costs for utility relocation or right-of-way acquisition. A 40% overall contingency was applied due to the uncertainties inherent in a study, and the costs were rounded to the nearest \$10,000.

## **PUBLIC ENGAGEMENT**

On May 22, 2025, a public information workshop was held at the Elkridge Volunteer Fire Department, located at 5700 Rowanberry Drive in Elkridge, MD, for the public and stakeholders to learn about the goals of the study, review the alternatives, and provide comments. Four stations were set up in the Fire Hall to highlight the features of each alternative and provide attendees with the opportunity to ask questions and express their thoughts on each alternative. The materials presented at the event included project boards providing an overview of each alternative in plan view, typical



*Figure 6: County and WRA employees engaged residents in an interactive public meeting on May 22, 2025*

sections of each alternative, and an impact comparison of the four alternatives. The public was encouraged to ask questions, provide feedback on concerns and ideas, and interact with the County and WRA staff. An online comment form was provided, and notes were taken at the meeting by County and WRA staff. Comments received from that outreach are available in **Appendix G**.

## SUMMARY OF FEEDBACK

Below is a summary of the feedback received at the public meeting and from the questionnaire provided. Attendees were generally in favor of providing bicycle and pedestrian accommodation within the corridor, with Alternatives 1 and 3 generally viewed as more favorable than either Alternatives 2 or 4.

### *Comments from Interaction at Roll Map Stations*

County and WRA employees engaged in discussions with residents at each station. Some recurring discussion themes included:

- An appreciation for improved multimodal access in the corridor.
- Concerns regarding sight distance at several intersections (see [Sight Distance](#) discussion above).
- Questions regarding the magnitude of environmental (wetland and forest) impacts (see [Environmental Impacts](#) section above).

- The potential for providing an alternative intersection at Landing Road to mitigate speed, volume, and sight distance concerns.
- Right-of-Way and property impact concerns, especially at the existing house at 6860 Montgomery Road and the existing preservation easement at 6831 Montgomery Road (see [Right-of-Way Impacts](#) discussion above).

#### Notes from Written Survey

A comment form, in both hardcopy handout form and an online form, was provided to attendees to provide feedback. Some of the comments from this include:

- Sight distance concerns.
- Implementation of alternative intersections (e.g. roundabouts).
- Concerns with pavement conditions on Montgomery Road.
- Interest in the overall project timeline.
- Inquiries about signing and methods to alert motorists and cyclists about Park access and ensuring adequate space for bikes and pedestrians, especially on the I-95 bridge.
- The intended path materials (e.g. porous pavement) that might be considered who would have responsibility for clearing the path of snow and debris.

The comments received from the surveys and the public meeting will be evaluated fully in final design in conjunction with design progression. Comments suggesting evaluation of additional traffic control devices in the corridor (including roundabouts) would require additional study to evaluate multimodal safety, operations geometry, costs, and impacts.

## NEXT STEPS

This study has identified several viable alternatives for the implementation of a low stress pedestrian and bicycle connection. Selection of an alternative will be based on a variety of considerations including funding availability, impacts, and community feedback. Next steps include selection of a preferred alternative; development of a preliminary design to include a viable stormwater management strategy; and coordination with adjacent property owners, utility owners, environmental permitting agencies, and approval authorities. If desired, the project could be constructed in phases, with a segment from Landing Road to the Rowenberry/Lawyers Hill intersection constructed first, followed by a later project to construct the segment from the Marshalee intersection to Landing Hill Road This approach would not provide a contiguous, low stress route through the entire corridor at the completion of the first phase for pedestrians or bicyclists, so the benefits of segmentation must be considered.