



December 19, 2023

Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study



Submitted to: Frederick County Division of Planning and Permitting





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Executive Summary

Frederick County enlisted Johnson, Mirmiran, and Thompspon Inc. (JMT) to conduct a feasibility study evaluating options to improve and/or include pedestrian and bicycle facilities along a north-south alignment between the City of Frederick and Urbana District Park. The study considered a number of facility types, both on-road and off-road, and ultimately moved forward with analysis of a separated shared use path facility. This determination was largely influenced by feedback that was received from the public during engagement and outreach events, which emphasized an overwhelming desire for any proposed facility to be separated from traffic, safe, and comfortable.

JMT compared two final alignment alternatives for the proposed shared use path facility. Each of these alternatives included several preliminary options that were considered and ultimately dropped in favor of more feasible routes. Information and analysis of each of the dropped options are included as part of this report, along with analysis and comparison of the two final alignments.

Option A runs along MD 355 and Araby Church Road for approximately 4.8 miles, providing a more direct route and increased opportunities for connections to major points of interest including the Monocacy National Battlefield, Monocacy MARC station, and Francis Scott Key Mall. **Option B** traverses a more scenic route along Reichs Ford Road and Tabler Run for approximately 4.7 miles, which connects to Pinecliff Park and directly to Urbana District Park. Both options provide connections to an existing shared use path that continues south along MD 355 from the Stone Barn Community Garden into Urbana. This existing shared use path currently has access to the Urbana District Park entrance at an unsignalized intersection. Signalization of this intersection will be completed in the near future as part of a separate project.

JMT developed feasibility level construction cost estimates for both alignment options, based on a cost per mile estimate with major items including bridge structures, retaining walls, and environmental impacts within a conservative limit of disturbance. Additional consideration was given to potential design minimization alternatives that could be considered as part of future design efforts to reduce the cost of construction.

TABLE 1: COST COMPARISON

OPTION	CONSTRUCTION COST	ROW COST
Option A: MD 355 and Araby Church Road	\$25 - 27 Million	\$ 7.7 Million
Option B: Reichs Ford Road and Tabler Run	\$22 - 24 Million	\$ 2.0 Million

The project team recommends **Option A** as the most feasible and impactful solution for Frederick County. Option A is the most direct route providing efficiency, utility, and connectivity to major destinations in the study area. This option also has opportunities to be constructed in phases to provide additional flexibility for funding opportunities and construction challenges.

Recommendations are also included for Frederick County to consider in order to increase the economic benefits of trail tourism throughout Frederick County. These include developing a Regional Trail Tourism Advisory Group to implement marketing and communication strategies that promote increased trail usage and considering regional destinations such as the Monocacy National Battlefield and other parks when evaluating proposed alignments.



Introduction

Frederick County enlisted Johnson, Mirmiran, and Thompson, Inc. (JMT) to conduct a feasibility study evaluating options to improve and/or include pedestrian and bicycle facilities along a north-south alignment between the City of Frederick and Urbana District Park. The project team evaluated multiple options for a proposed facility alignment, primarily following existing linear features such as roadways, railways, stream valleys, and utility corridors to create a long and continuous connection without significant land use impacts. Route recommendations are in line with those that are identified as part of the 2018 Bikeways and Trails Plan.

The proposed study corridor is approximately five to seven miles long and encompasses alternatives that vary from natural scenic routes to direct transportation alternatives along existing arterial roadways. Each alternative seeks to maximize access to Frederick County's main attractions, with a focus on providing opportunities for safe and convenient non-motorized transportation alternatives. This effort is executing the Frederick County Division of Planning & Permitting's community vision and plan of creating a more Livable Frederick County.

Additionally, this feasibility report includes an evaluation of existing conditions, impacts analyses for each of the alternative alignments, a constructability review, feasibility level cost estimates, and a summary of anticipated funding sources for the project.

Existing Conditions

JMT performed a desktop analysis of existing conditions within the project area. Information regarding the existing transportation network, environmental resources, and points of interest are described in the following sections, and displayed on the Existing Conditions Map in **Appendix A**.

Transportation Network

According to the June 2022 Frederick County Complete and Green Streets Plan, Frederick County is roughly 80% rural, and its transportation network is comprised of a variety of modal types to accommodate the varied needs of its citizens. The existing roadways within the project study area provide mobility through the area on arterial and collector roads including MD 355, MD 144, and Reichs Ford Road. These roads are connected by a network of local roads and neighborhood streets that provide access to rural residential areas, including Reels Mill Road, Ball Road, and Araby Church Road.

Frederick County has developed an extensive network of bicycle facilities to serve both recreational and commuter cyclists. The County's existing bicycle infrastructure includes bike lanes, shared use paths, and dedicated bicycle routes that traverse its diverse landscape. The proposed Frederick to Urbana Bicycle Facility will expand this network by providing connections to the existing trail network within Urbana District Park, as well as the existing shared use path that continues south along MD 355 from the Stone Barn Community Garden to Urbana.

The existing public transportation system in Frederick County offers connectivity across various locales, with the hub in the City of Frederick and spanning outwards throughout the County. This network of bus services is centered on serving densely populated urban centers and towns within the County, and is predominantly concentrated along US Routes and



interstate highways, with limited extension into residential neighborhoods. Within the project study area, bus service is provided on MD 355 from the City of Frederick south to the Monocacy MARC Station, and on MD 144 to Spring Ridge.

Rail transportation also augments the transit network within the project study area. The Monocacy MARC train station, part of the Brunswick Line, connects commuters to Union Station in Washington, D.C.

Environmental Resources

JMT reviewed several background data sources including topographic maps; Maryland Department of Natural Resources (DNR) mapped wetlands; Maryland Department of the Environment (MDE) mapped streams; Federal Emergency Management Agency (FEMA) floodplain mapping; Frederick County mapped forest resources and agricultural preservation; and Maryland's Environmental Resources and Land Information Network (MERLIN).

According to these sources, the project area contains DNR mapped wetlands, MDE mapped streams, 100-year floodplains, forest resources, and protected lands. Major waterways within the project area include the Monocacy River, Bush Creek, and their tributaries, all of which are classified as Use I-P waterways. Forest resources within the project area include forested areas, forested agricultural streams and wetlands, and forest conservation easements. Protected lands within the project area include the Monocacy National Battlefield, parkland, and Maryland Environmental Trust Easements.

Environmental resource mapping can be seen on the Existing Conditions Map in **Appendix A**.

Points of Interest

There are multiple points of interest and major destinations within the project study area that could be served by a Frederick to Urbana Pedestrian and Bicycle facility. One major retail attraction is the Francis Scott Key Mall, located on MD 355 south of the City of Frederick. The Monocacy MARC station located near the mall is another major destination for those commuting to and from the capital metropolitan area. The Frederick Fairgrounds and Frederick Municipal Airport are both located just north of the project study area on MD 144.

The Monocacy National Battlefield, operated by the National Park Service, spans both sides of MD 355 and the Monocacy River within the project study area, and has a number of walking trails within the battlefield. Other parks in the area include Urbana District Park at the southern project limits on MD 355, and Pinecliff Park near Reichs Ford Road, directly adjacent to the Monocacy River. These parks both have sports fields and a network of paths for walking and biking.



Concept Development

The project team compiled design criteria from published design guidance documents that were used to develop typical sections and alignment alternatives for the proposed pedestrian and bicycle facility.

Design Criteria

The project team compiled design criteria for the Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study. The purpose of these criteria is to identify design elements for the project such as trail widths, offsets, and other constraining factors. These criteria are developed based on guidance provided by international, national, state, and city literature. When conflicting information is present in these guidance documents, the strictest criteria will be used for design.

The Design Criteria for the proposed facilities was created using the guidance provided in the 2022 Frederick County Complete and Green Streets Plan, and references other published design guidance including the 2012 AASHTO Guide for the Development of Bicycle Facilities, 4th Edition (AASHTO Bike Book), the 2018 AASHTO Policy on Geometric Design of Highways and Streets the Maryland State Highway Administrations (2018 Green Book), the 2015 Bicycle Policy and Design Guidelines (MSHA Bike Policy) and the NACTO Urban Bikeway Design Guide (NACTO UBDG). While a fifth edition of the AASHTO Bike Book is currently under review it has not yet been released for use.

In the event that this project utilizes federal funding, these criteria follow the Public Rights-of-Way Accessibility Guidelines (PROWAG) to ensure accessibility for all users.

Facility Type: Existing Roads

Criteria	Existing Design	Reference
Urbana Pike (MD 355)		
Context Zone	Suburban – Frederick to Monocacy River Rural – Monocacy River to Urbana	MDOT SHA Context Zones
Roadway Classification	Minor Arterial – Frederick to Monocacy River Major Collector – Monocacy River to Urbana	MDOT SHA Roadway Functional Classification
Posted Speed Limit	40 mph – Frederick to Lowes Lane 45 mph – Lowes Lane to Technology Way 50 mph – Technology Way to Urbana District Park	
Typical Section	Frederick to Technology Way: 50' – 100' pavement width, two lanes in each direction with left and right turn lanes as needed, intermittent 4'-5' sidewalk on each side of the road, at times separated by a grass buffer.	
	Technology Way to Urbana District Park: 22'-35' pavement width, one 11' lane in each direction Wide shoulders terminate at Monocacy River	
Ownership	MDOT SHA	



Criteria	Existing Design	Reference
Old National Pike (MD 144)		
Context Zone	Suburban	MDOT SHA Context Zones
Roadway Classification	Minor Arterial	MDOT SHA Roadway Functional Classification
Posted Speed Limit	40 mph	
Typical Section	48' pavement width, one 12 ft lane in each direction, 12 ft shoulders. Additional width for left and right turn lanes at intersections, narrow shoulders.	
Ownership	MDOT SHA	
Reichs Ford Road		
Context Zone	Suburban – Frederick to Monocacy River Rural – Monocacy River to Ijamsville	MDOT SHA Context Zones
Roadway Classification	Major Collector – Frederick to Reels Mill Road Minor Collector – Reels Mill Road to Ijamsville Road	MDOT SHA Roadway Functional Classification
Posted Speed Limit	40 mph – Frederick to Reels Mill Road 35 mph – Reels Mill Road to Ijamsville Road	
Typical Section	Frederick to Bartonsville Road: 40' pavement width, one 11' lane in each direction, 9' wide shoulders, occasional turn lanes as needed	
	Bartonsville Road to Ijamsville Road: 20' pavement width, no shoulders	
Ownership	Frederick County	
Bartonsville Road		
Context Zone	Suburban	MDOT SHA Context Zones
Roadway Classification	Minor Collector	MDOT SHA Roadway Functional Classification
Posted Speed Limit	30 mph	
Typical Section	20' pavement width, two 10 ft travel lanes, no shoulders	
Ownership	Frederick County	
Araby Church Road		
Context Zone	Rural	MDOT SHA Context Zones
Roadway Classification	Local Road	MDOT SHA Roadway Functional Classification
Posted Speed Limit	35 mph	
Typical Section	20' pavement width, two 10 ft travel lanes, no shoulders	
Ownership	Frederick County	



Criteria	Existing Design	Reference
Ball Road		
Context Zone	Rural	MDOT SHA Context Zones
Roadway Classification	Local Road	MDOT SHA Roadway Functional Classification
Posted Speed Limit	35 mph	
Typical Section	20' pavement width, no shoulders	
Ownership	Frederick County	
Reels Mill Road		
Context Zone	Rural	MDOT SHA Context Zones
Roadway Classification	Local Road	MDOT SHA Roadway Functional Classification
Posted Speed Limit	30 mph	
Typical Section	20' pavement width, no shoulders	
Ownership	Frederick County	
Tobery Road		
Context Zone	Rural	MDOT SHA Context Zones
Roadway Classification	Local Road	MDOT SHA Roadway Functional Classification
Posted Speed Limit	N/A	
Typical Section	12' pavement width, no shoulders	
Ownership	Frederick County	



Facility Type: Sidewalk

Criteria	Guidance	Reference
Sidewalk Width	5 ft min, 6 ft desired	Frederick County Complete and Green Streets Plan
Buffer Width	5 ft min where possible	Frederick County Complete and Green Streets Plan

Facility Type: On-Road Shared Lane

Criteria	Guidance	Reference
Lane Width	13 ft < X < 15 ft	AASHTO Bike Book (pg. 4-3)
Road Speed Limit	35 mph	AASHTO Bike Book (pg. 4-5)
Roadway Surface Requirements	Must meet requirements for motor vehicle use	AASHTO Bike Book (pg. 4-28)
Shoulder Width	Not needed Can be absorbed in retrofit	AASHTO Bike Book (pg. 4-29)

Facility Type: On-Road Bike Lane

Criteria	Guidance	Reference
Bicycle Lane Width	5 ft min	AASHTO Bike Book (pg. 4-14, 4-28)
Road Speed Limit	50 mph Recommended that higher speeds have wider bike lanes	MSHA Bicycle Policy (pg. 3.1) AASHTO Bike Book (pg.4-7)
Roadway Surface Requirements	Must meet requirements for motor vehicle use	AASHTO Bike Book (pg. 4-28)
Shoulder Width	Not needed Can be absorbed in retrofit	AASHTO Bike Book (pg. 4-7, 4-29)



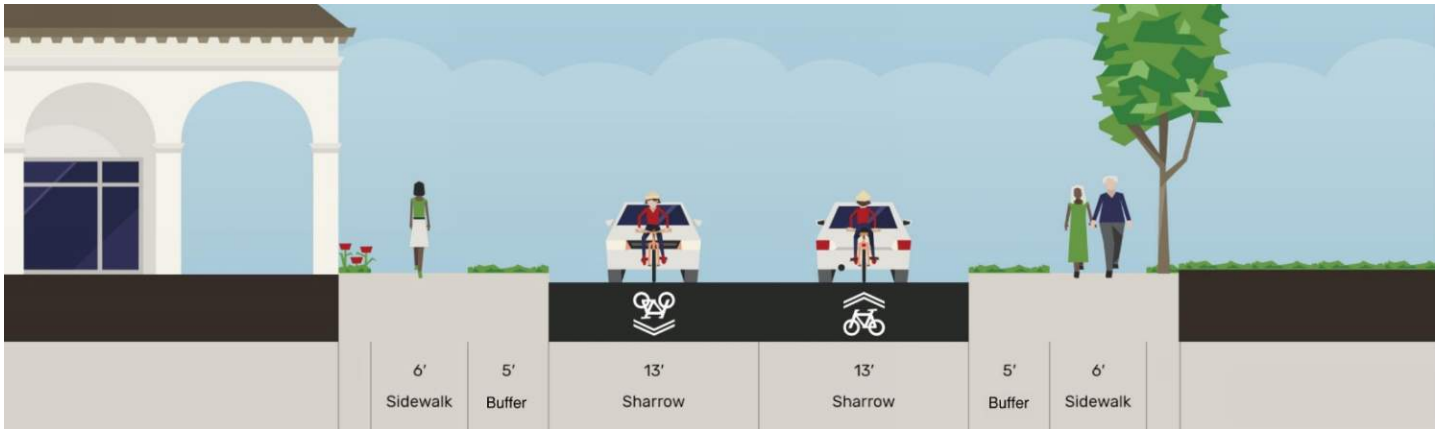
Facility Type: Off-Road Shared Use Path

Criteria	Guidance	Reference
Bicycle Design Speed	20 MPH max Recommended 12 MPH max for urban areas 8 MPH max speed at intersections	MSHA Bike Policy (pg. 7.3, 7.5)
Min. Curve Radius	74 ft	AASHTO Bike Book (pg. 5-14)
Stopping Sight Distance	200 ft	AASHTO Bike Book (pg. 5-17)
Maximum Grade (within Street or Highway ROW)	Not to exceed roadway grade	PROWAG Supplemental Notice R302.5.1
Maximum Grade (outside Street or Highway ROW)	5% max, with allowances for: 5% < X < 8.33% for 200' max 8.33% < X < 10% for 30' max 10% < X < 12% for 10' max	Forest Service Trail Accessibility Guidelines (FSTAG) (pg. 10)
Cross Slope	2% max.	PROWAG Supplemental Notice R302.6
Vertical Clearance above Path	8 ft min 10 ft preferred	MSHA Bicycle Policy (pg. 7.1) AASHTO Bike Book (pg. 5-26)
Vertical Clearance above Roadway	15 ft	2018 AASHTO Policy on Geometric Design of Highways and Streets (2018 Green Book) (pg. 6-20)
Horizontal Sightline Offset (HSO)	58 ft	AASHTO Bike Book (pg. 5-23)
Shared use Path (SUP) Width	12 ft to 14 ft preferred If under 10 ft, need design waiver from State; 8 ft min for short segments if constrained areas	MSHA Bicycle Policy (pg. 7.1)
Pedestrian Access Route (PAR)	Full Width of SUP	PROWAG Supplemental Notice R302.3.1
Shoulder Clearance Width (Clear area on either side of SUP)	2 ft min. (6:1 slope) Grass shoulders	AASHTO Bike Book (pg. 5-5) NPS Preferred Practice
Safety Grading	Barrier / Fence required if buffer < 5' or: 3:1 for 6' vertical drop 2:1 for 4' vertical drop 1:1 for 1' vertical drop	AASHTO Bike Book (pg. 5-6)
Buffer Width (With and without Curbs)	5' min, greater than 5' preferred for high-speed roadways from outside edge of shoulder If the buffer < 5', a vertical barrier should be installed for separation from vehicle lanes	AASHTO Bike Book (pg. 5-11)
Pavement Design	Pervious or impervious depending on soil characteristics. 3" Hot Mix Asphalt (HMA) for Surface, 4" Graded Aggregate Base (GABC)	

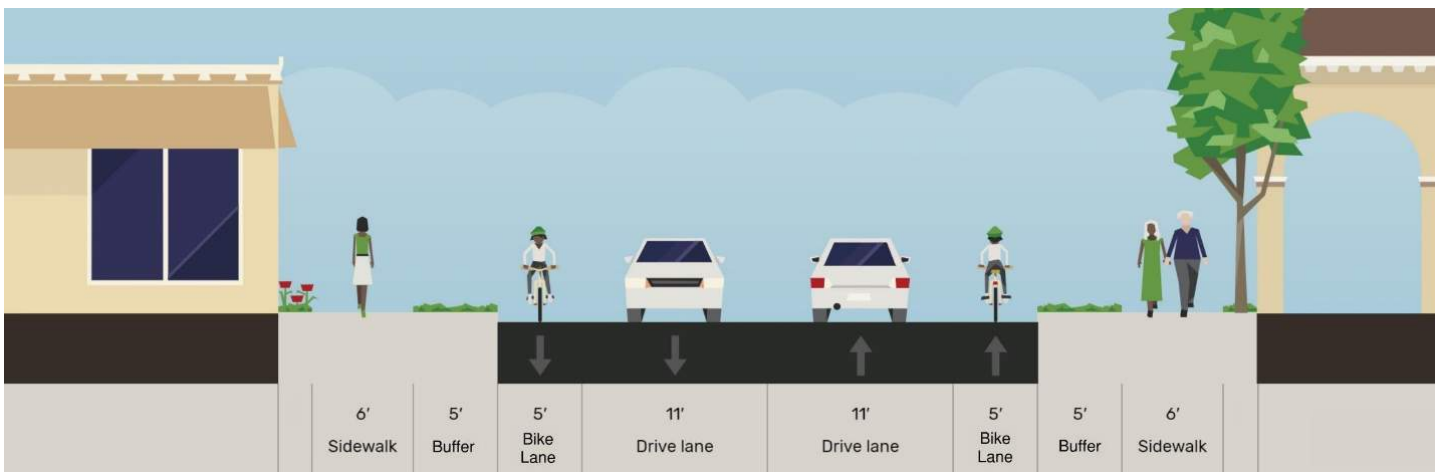


Typical Sections

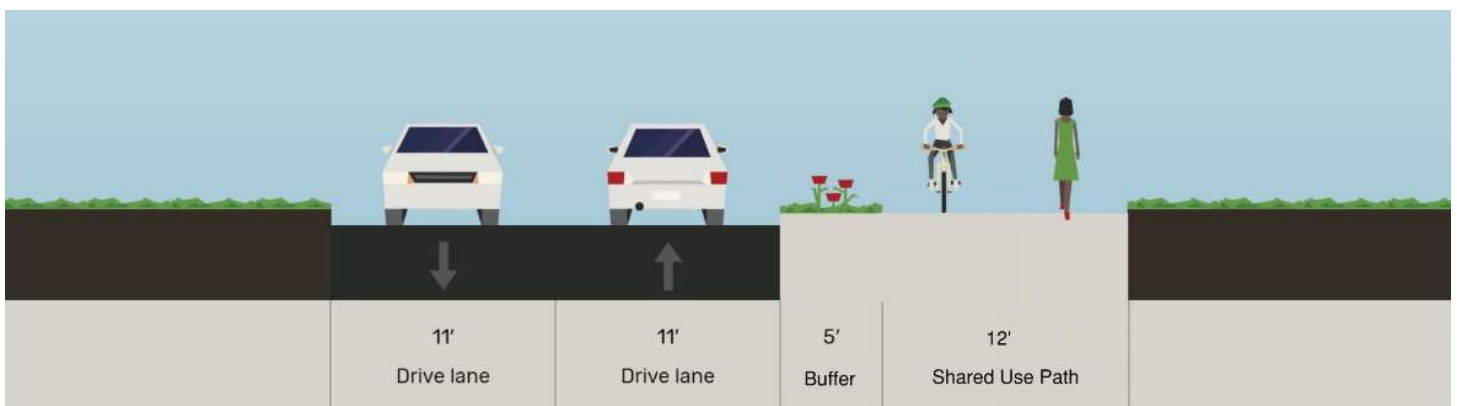
Facility Type: Sidewalk and On-Road Shared Lane



Facility Type: Sidewalk and On-Road Bike Lane



Facility Type: Off-Road Shared Use Path





Alternative Alignments

Based on the desktop review performed, the project team identified multiple potential alignments as part of this study. The two options described below include multiple sub-options that were included in the evaluation to assist in the development of final alignment recommendations. All alignments begin at the City of Frederick line and end at the Urbana District Park. The proposed facility typical section for all alignments is a 12-foot-wide shared use path with a 5-foot grass buffer. However, this typical section may not be feasible in some areas of the proposed alignments due to site constraints, and a reduced buffer or path width may need to be considered in short segments to minimize impacts.

A detailed map of the proposed alignment alternatives is included in **Appendix B**.

OPTION A

Option A: MD 355

The MD 355 option begins at the City of Frederick Line on Urbana Pike (MD 355) just north of I-70 and follows MD 355 southeast approximately 5.0 miles. The proposed facility typical section for Option A is a 12-foot-wide shared use path with a five-foot buffer along the east side of MD 355.

The north end of the alignment is a dense commercial area with multiple commercial driveway and signalized intersection crossings. In this area, the path passes the Francis Scott Key Mall and Monocacy MARC Station. Just south of the commercial area is the Monocacy National Battlefield. The path continues on the east side of MD 355, utilizing the wide sidewalk on the existing bridge that crosses the rail line. The existing roadway bridge crossing the Monocacy River does not have sufficient width to safely include a pedestrian or bicycle connection, so a new adjacent pedestrian bridge, approximately 300-feet-long, will be needed across the Monocacy River. In this area, the path moves past the Monocacy MARC Station and through the Monocacy National Battlefield. The path is preferred on the east side to facilitate access to points of interest including the MARC Station and Battlefield Visitors Center, existing trail access points, and to utilize existing wide sidewalks along the rail bridge.

South of the battlefield, at the northern intersection with Araby Church Road, the proposed alignment veers away from MD 355 into the adjacent wooded area, running along the east side of the stream. The alignment remains parallel to MD 355 with a 30-to-50-foot offset from the edge of the roadway. This increased offset from MD 355 minimizes impacts to steep slopes and streams adjacent to MD 355.

Just north of Reels Mill Road, the alignment returns to the typical five-foot buffer along the east side of MD 355 for approximately 0.65 miles to the entrance of Urbana District Park. Signalization of this intersection will be completed in the near future as part of a separate project which will also provide safe bicycle and pedestrian access across MD 355 to the existing shared use path on the west side of MD 355.

North of the park entrance, at the intersection with Park Mills Road, there is an additional connection made to the existing shared use path along the west side of MD 355 at the Stone Barn Community Garden. The proposed alignment crosses MD 355 on the south leg of the intersection to the Community Garden on the south side of Park Mills Road. Improvements will be required to provide safe pedestrian crossings at this uncontrolled crossing of MD 355, especially given the 50-mph speed limit. These improvements may include advanced signage, median refuge island, or a pedestrian activated signal.



The total length of Option A: MD 355, including existing sidewalks and paths, is 5.0 miles.

Option A: Araby Church Road Spur

The Araby Church Road Spur is an alignment alternative within Option A. At the northern intersection with Araby Church Road, the proposed spur alignment crosses MD 355 across the north leg of the intersection. Improvements will be required to provide safe pedestrian crossings at this 50-mph uncontrolled crossing of MD 355, especially with the location being situated near the bottom of a hill which could encourage faster vehicular speeds. These improvements may include advanced signage, median refuge island, or a pedestrian activated signal. There is ample sight distance provided at this location.

The path continues for 1.85 miles along the west side of Araby Church Road. At the southern intersection with Araby Church Road, the proposed alignment continues along the west side of MD 355 for 1,500 feet and crosses Park Mills Road to connect to the existing shared use path at the Stone Barn Community Garden. The existing shared use path continues southeast towards the entrance to Urbana District Park.

As part of a separate project, signalization and crosswalk improvements will be installed at the intersection of MD 355 and the Urbana District Park entrance to provide safer bike and pedestrian access to Urbana District Park from the existing shared use path.

The total length of Option A: Araby Church Road Spur, including existing sidewalks and paths, is 4.75 miles.

OPTION B

The Option B alignment alternative is divided into North and South sections, each of which consists of two alternatives. Either of the North alignments can be paired with either of the South alignments, and all four sections have been included for evaluation to comprise the most feasible alignment for Option B.

Option B North: MD 144

The northern limit for the Option B North: MD 144 alignment begins at the City of Frederick line, at the intersection of East Patrick Street and Old National Pike (MD 144) where the existing sidewalk terminates. The proposed facility typical section is a 12-foot-wide shared use path with a five-foot buffer along the north side of East Patrick Street. The path travels 500 feet east along East Patrick Street and crosses to the east side of MD 144. Existing rumble strips will caution motorists in addition to proposed new signage for bicycle and pedestrian crossings. The path continues on the east side of MD 144, bridging over I-70. The existing MD-144 bridge crossing I-70 does not have sufficient width to safely include a pedestrian or bicycle connection, so a new adjacent pedestrian bridge, approximately 300-feet-long, is proposed across I-70.

The path continues approximately 1,000 feet along the north side of MD 144 to the I-70 interchange ramps. The proposed path alignment crosses the I-70 exit ramp at a location where it is feasible to maintain five-foot buffers between the path, I-70 exit ramp, and MD 144. Additional signage will be required for this crossing, and potentially a HAWK signal. Approximately 500 feet east, the path crosses additional I-70 exit and entrance ramps at a signalized intersection.

At the MD 144 and I-70 intersection, the path shifts east to utilize Old MD 144. The path utilizes the existing pavement along the north side of Old MD 144 through the Frederick Old National Pike Park & Ride lot, which will be restriped to facilitate the new path. Continuing east, the proposed alignment utilizes historic Jug Bridge 2 to cross the Monocacy River. Repairs and safety improvements on Jug Bridge 2 and Old MD 144 will be required for the roadway surface and parapet walls.

East of the Monocacy River, the alignment continues east along the unpaved segment for approximately 1,500 feet, crossing the stop controlled Old Linganore Road and reaching the signalized intersection at Linganore Road.



Figure 1: Jug Bridge 2

At the Linganore Road and MD 144 intersection, the alignment crosses MD 144 to the west side of Bartonsville Road. Due to limited right-of-way, the recommended facility typical section along Bartonsville Road and Tobery Road is reduced to an 8-foot-wide shared use path with a five-foot buffer along the west side of the roadway. The path runs south 1,000 feet along Bartonsville Road and continues 1,200 feet to the end of Tobery Road. At the end of Tobery Road, the facility expands back to a 12-foot-wide path and turns west 3,000 feet through a wooded area to connect into Pinecliff Park. Consideration for pedestrian lighting through this wooded area as part of future design efforts should evaluate potential light pollution impacts to neighboring properties.

The proposed path uses existing trails and roadways through Pinecliff Park, then continues along the Monocacy River approximately 650 feet southwest and crosses under Reichs Ford Road. The vertical clearance to Reichs Ford Road is greater than ten feet and the proposed path includes a fence or railings near the edge of the Monocacy River. The path continues along the Monocacy River for 1.5 miles to the railroad tracks. Tree removals and coordination with property owners will be required in locations where the path cannot run directly along the bank of the Monocacy River.

The path turns east to run parallel with the railroad track for 1.2 miles to Reels Mill Road, maintaining a 30-foot clearance from the railway. There is a large slope in this segment that will require significant grading and retaining walls to maintain a safe distance between the path and the rail line. Fencing is recommended between the rail line and path to increase safety. Overall, even with the proposed fencing, this segment poses a safety challenge due to the close proximity of the proposed path to an active rail line.

At Reels Mill Road, the path alignment turns south along the west side of Reels Mill Road with a typical five-foot buffer to the railroad crossing. Improvements to the existing railroad crossing will be required to widen the crossing to accommodate a minimum 8-foot-wide shared use path. The facility typical section returns to a 12-foot-wide shared use-path with a five-foot buffer after crossing the railway.

South of the rail crossing, the alignment crosses Reels Mill Road to the east side of the roadway. New pedestrian and bicycle signage will be required at the crossing location. The path continues south adjacent to the railway, with fencing placed between the path and the rail line. A new pedestrian bridge, approximately 85 feet in length, will be required to cross Bush Creek adjacent to the existing one lane roadway bridge.



*Figure 2: Railroad crossing along Reels Mill Road
Source: Google Streetview*

The alignment continues south along Reels Mill Road for approximately 1,200 feet to the intersection with Ball Road. Due to a drainage facility in the northeast corner of the Reels Mill Road and Ball Road intersection, widening the east side of Reels Mill Road may not be feasible, but the intersection could be reconstructed to widen along the west side of the road to accommodate the path on the east side.

The total length of Option B North: MD 144, including existing trails within Pinecliff Park, is approximately 6.6 miles. This alignment is considered a scenic route.

Option B North: Reichs Ford Road

Option B North: Reichs Ford Road begins at the intersection of Reichs Ford Road & Ray Smith Road and continues southeast on the west side of Reichs Ford Road to Reels Mill Road. The proposed facility typical section is a 12-foot-wide shared use path with a five-foot buffer. To maintain a separate pedestrian and bicycle facility across the Monocacy River, a new pedestrian bridge is recommended adjacent to the existing 500-foot long Reichs Ford Road bridge.

At Reels Mill Road, the alignment turns right onto Reels Mill Road, staying along the west side of the roadway. The alignment follows Reels Mill Road 1.5 miles to the railroad crossing. A portion of this segment, beginning approximately 0.5 miles south of Reichs Ford Road, deviates from Reels Mill Road for about 1,300 linear feet through a wooded area to minimize impacts to steep slopes adjacent to the roadway. This portion of the trail requires some tree removal, and installation of lighting is preferred to enhance safety along the path alignment.

The path continues south from the railroad crossing to Ball Road, following the same alignment as Option A North: MD 144.

The total length of Option B North: Reichs Ford Road, is approximately 3.25 miles.



*Figure 3: Segment of the path will divert away from Reels Mill Road to minimize impacts.
Source: Google Streetview*

Option B South: Reels Mill Road

Option B South: Reels Mill Road begins at the intersection of Reels Mill Road and Ball Road. The proposed facility typical section is a 12-foot-wide shared use path with a five-foot buffer to the adjacent roadway. The path alignment crosses Ball Road on the east leg of the intersection and runs 500 feet west along the south side of Ball Road to Reels Mill Road. The shared use path continues south along the east side of Reels Mill Road for 1 mile to the intersection with Urbana Pike (MD 355).

The path alignment continues southeast along the east side of MD 355 approximately 1,900 feet to Park Mills Road. The alignment crosses MD 355 on the south leg of the intersection to connect to the existing shared use path at the Stone Barn Community Garden. Improvements such as advanced signage, median refuge island, or a pedestrian activated signal will be required to provide safe pedestrian crossings at this uncontrolled crossing of MD 355 at Park Mills Road. South of Park Mills Road, the existing shared use path continues 0.4 miles south to Stone Barn Drive, across from the Urbana District Park entrance. Improvements are in progress as part of a separate project to signalize this intersection which will provide safe bicycle and pedestrian access to Urbana District Park across MD 355.

The total length of Option B South: Reels Mill Road, excluding the existing Community Garden shared use path, is approximately 1.45 miles.



Figure 4: Option B South: Reels Mill Road

Option B South: Tabler Run

Option B South: Tabler Run begins at the intersection of Reels Mill Road and Ball Road. The proposed facility typical section is a 12-foot-wide shared use path. The path alignment crosses Ball Road on the east leg of the intersection and continues south through the wooded area on the west side of Tabler Run, making use of an existing sewer line easement that has been cleared parallel to the stream. The trail continues adjacent to Tabler Run for approximately 1.25 miles to Tabler Road. This segment intersects through two parcels of land and will require coordination with property owners.

The path alignment crosses Tabler Road at a mid-block crossing. Due to the limited sight distance on Tabler Road, advance warning signs are recommended for the bicycle and pedestrian crossing. After crossing Tabler Road, the path extends approximately 400 feet southeast to connect into the existing trail system within Urbana District Park.

The total length of Option B South: Tabler Run is approximately 1.34 miles.



Figure 5: Option B South: Tabler Run alignment south of Ball Road at Reels Mill Road Intersection
Source: Google Streetview



Corridor Analysis

JMT's project team analyzed the potential impact of the alternative alignments based on available GIS mapping and an assumed limit of disturbance (LOD) offset 30 feet on both sides of the alignment centerline. Within this LOD area, impacts were calculated for major elements, including existing topography, existing infrastructure, environmental resources, property ownership, and roadway crossings and intersections. These are conservative estimates, but detailed field investigations in future design phases would result in confirmation and more detailed quantification of these impacts.

Impact Evaluation

The following tables summarize the impacts of each alternative alignment and allow for comparison. The elements that have been evaluated are listed below:

Facility Design:

- **Alignment Length**
- **Roadway Conditions** – an assessment of the current roadway condition (Poor, Fair, Excellent).
- **Trail Access Points** – locations where the trail can be accessed with available parking.
- **Steep Slopes** – running grades of 15-25% along alignment.
- **Very Steep Slopes** – running grades of 25%+ along alignment.
- **Parcels Impacted** – number of individual parcels adjacent to the path alignment.
- **Available Right of Way** – average distance between edge of roadway and property line. Roadways marked with an (*) denotes that coordination with State owned right of way will be required.

Structures:

- **Existing Bridges and Structures** – the total number of existing bridges, and retaining walls along path alignment.
- **New / Reconstructed Structures** – newly constructed structures and repaired structures.

Environmental Resources:

- **Stream Impacts** – linear feet of direct stream impacts within path alignment.
- **Adjacent Streams** – linear feet of streams that run parallel to and within proximity of path alignment.
- **Wetlands**
- **Floodplains**
- **Forests**
- **Sensitive Species**
- **Historical Areas**

Transportation Improvements:

- **Driveways / Entrances** – property entrances or driveways crossed by the alignment.
- **Stop Controlled Crossings** – number of times the path crosses a road that has a stop sign.
- **Uncontrolled Crossings** – number of times the path crosses a roadway with no traffic control.
- **Signalized Intersections** – number of times the path crosses an intersection with a traffic light.
- **Railroad Crossings**



TABLE 2: OPTION A COMPARISON

ITEM	OPTION A: MD 355 FREDERICK TO ARABY CHURCH ROAD	OPTION A: MD 355 ARABY CHURCH ROAD TO URBANA DISTRICT PARK	OPTION A: ARABY CHURCH ROAD SPUR
Alignment Length	2.6 miles	2.4 miles	2.2 miles
Roadway Conditions	Fair	Fair	Fair
Trail Access Points	4	2	2
Steep Slopes (15-25%)	0	0	1
Very Steep Slopes (25%+)	0	0	0
Parcels Impacted	26	34	33
Available Right of Way	*MD 355 (east): 8-16 ft	*MD 355 (east): 16-18 ft	Araby Church Road: 8 ft *MD 355 (west): 34 ft
Existing Bridges and Structures	2 bridges	0	0
New / Reconstructed Structures	1 new retaining wall, 1 new bridge	0	0
Stream Impacts	125 LF	250 LF	60 LF
Adjacent Streams	0 LF	8,375 LF	1,275 LF
Wetlands	0 acres	0 acres	0 acres
Floodplains	0.75 – 1 acres	0.25 – 0.5 acres	0 acres
Forests	0.5 – 1 acres	10 – 10.5 acres	2 – 2.5 acres
Sensitive Species	2.25 – 2.75 acres	12 – 12.5 acres	9 – 9.5 acres
Historical Areas	6 – 6.5 acres	0.5 – 1 acres	3 – 3.5 acres
Driveways / Entrances	16	7	25
Stop Controlled Crossings	0	3	3
Uncontrolled Crossings	0	1	1
Signalized Intersections	4	0	0
Railroad Crossings	0	0	0

Note: Color of headings in comparison table correspond to the alternative alignments map included in **Appendix B**.



TABLE 3: OPTION B NORTH COMPARISON

ITEM	OPTION B NORTH: REICHS FORD ROAD	OPTION B NORTH: MD 144
Alignment Length	3.3 miles	6.6 miles
Roadway Conditions	Fair	Fair
Trail Access Points	2	3
Steep Slopes (15-25%)	1	4
Very Steep Slope (25%+)	0	1
Parcels Impacted	25	39
Available Right of Way	Reichs Ford Road: 26 ft Reels Mill Road: 4.5-5.5 ft	East Patrick St: 0.5 ft *MD 144: 50+ ft Bartonsville Road and Tobery Road: 19 ft Reels Mill Road: 5.5 ft
Existing Bridges and Structures	2 bridges	3 bridges
New / Reconstructed Structures	2 new bridges	2 new bridges, 1 repaired bridge, 1 new retaining wall
Stream Impacts	530 LF	445 LF
Adjacent Streams	1,725 LF	2,700 LF
Wetlands	0.5 – 0.75 acres	4 – 4.25 acres
Floodplains	4.5 – 5 acres	17 – 17.5 acres
Forests	4 – 4.5 acres	18.5 – 19 acres
Sensitive Species	1 – 1.25 acres	2.75 - 3 acres
Historical Areas	0 acres	11 – 11.5 acres
Driveways / Entrances	11	6
Stop Controlled Crossings	2	3
Uncontrolled Crossings	0	3
Signalized Intersections	0	2
Railroad Crossings	1	1

Note: Color of headings in comparison table correspond to the alternative alignments map included in **Appendix B**.



TABLE 4: OPTION B SOUTH COMPARISON

ITEM	OPTION B SOUTH: REELS MILL ROAD	OPTION B SOUTH: TABLER RUN
Alignment Length	1.5 miles	1.4 miles
Roadway Conditions	Fair	Fair
Trail Access Points	1	1
Steep Slopes (15-25%)	1	4
Very Steep Slopes (25%+)	0	0
Parcels Impacted	19	4
Available Right of Way	Ball Road: 3ft Reels Mill Road: 9.5 ft *MD 355: 16.5 ft	N/A
Existing Bridges and Structures	0	0
New / Reconstructed Structures	0	0
Stream Impacts	0 LF	250 LF
Adjacent Streams	0 LF	6,550 LF
Wetlands	0 acres	0 acres
Floodplains	0 acres	1.5 – 2 acres
Forests	1.5 - 2 acres	3 – 3.5 acres
Sensitive Species	3 – 3.5 acres	0 acres
Historical Areas	0 acres	0 acres
Driveways / Entrances	15	0
Stop Controlled Crossings	1	0
Uncontrolled Crossings	2	2
Signalized Intersections	0	0
Railroad Crossings	0	0

Note: Color of headings in comparison table correspond to the alternative alignments map included in **Appendix B**.



Safety

In addition to the infrastructure and environmental impacts of the proposed pedestrian and bicycle facility that are discussed in the previous section, the safety and level of comfort of the proposed facility is critical to consider in determining a preferred alignment that will encourage users of all ages and abilities. Major safety benefits and challenges have been identified for each of the alternative alignments.

OPTION A: MD 355

A major safety challenge of the MD 355 alignment is the dense commercial area at the northern end of the alignment, which has multiple conflict points between path users and vehicles turning on and off the road at commercial entrances. It may also be challenging to maintain the desired 5' buffer between the roadway and proposed facility within the available right of way.

Another safety concern is the speed of vehicles on MD 355 and the proximity of the proposed pedestrian and bicycle facility to vehicles travelling at these high speeds. The posted speed limit varies between 40 and 50 mph along the corridor, however actual speeds may tend to be even higher. Providing a pedestrian and bicycle facility that provides sufficient separation between the proposed facility and vehicles on the roadway will be key to providing a facility that is safe and comfortable for pedestrians and cyclists. South of the battlefield, the proposed alignment deviates away from MD 355 for 1.4 miles and follows an existing stream. This separation from the roadway will provide ample separation between vehicles and path users, but may introduce concerns related to facility lighting and visibility.

South of the battlefield, there is one proposed uncontrolled crossing across the south leg of MD 355 at the intersection with Park Mills Road to connect to the existing shared use path at the Stone Barn Community Garden. The location of this crossing at an intersection will increase visibility and safety of this crossing over a mid-block crossing location. Improvements are recommended at this location to increase visibility of this crossing to ensure safety for path users.

OPTION A: ARABY CHURCH ROAD SPUR

The Araby Church Road Spur provides an alternative to the MD 355 alignment south of the battlefield. This alignment follows a residential local road with lower posted and vehicular speeds, which will increase the level of comfort for path users. The tradeoff is that the number of potential conflict points with vehicles is greatly increased at the multiple driveway crossings through this residential neighborhood.

There is also one uncontrolled crossing across MD 355 across the north leg of the Araby Church Road intersection. The location of this crossing at an intersection will increase visibility and safety of this crossing over a mid-block crossing location. Improvements are recommended at this location to increase visibility of this crossing to ensure safety for path users. The location of this crossing is near the bottom of a hill, where motorists have ample sight and stopping distance.

OPTION B NORTH: MD-144

This proposed alignment has a number of safety challenges all along its length, which include the current condition of historic Jug Bridge 2, navigating through multiple uncontrolled vehicular conflict points at the I-70 interchange ramps, location within the Monocacy River floodplain, and proximity to an active rail line.

Near the northern limits, the alignment navigates through multiple vehicular conflict points at the I-70 interchange ramps. Some of these crossings are signalized, while others are uncontrolled. Improvements will be needed to force



motorists to slow down on the ramps, and to increase visibility of the path crossings, including advance warning signs, pavement markings, rumble strips, and potentially a HAWK signal.

To cross the Monocacy River, the historic jug bridge will require improvements to repair the surface of the bridge and approach roadway, and also to increase the height of the parapet walls to meet updated guidelines for it to be used for recreational activity.

South of Pinecliff Park, the proposed alignment follows the Monocacy River along a proposed alignment that is within the 100-year floodplain. Major rain events could result in flooding of the proposed facility and pose a danger to path users. Additionally, the remote location may also introduce safety concerns related to lighting and visibility.

Finally, there are two locations where the proposed alignment is in close proximity to an active rail line. The proposed alignment turns to run on the north side of the active railroad that parallels Bush Creek. Given the existing topography of this area, significant grading and retaining walls would be required to maintain a safe distance between the path and the rail line. Even with proposed fencing between the path and railroad, this segment poses a safety challenge due to the close proximity of the proposed path to an active rail line. Further south, there is also an at-grade crossing of this railroad on Reels Mill Road.

OPTION B NORTH: REICHS FORD ROAD

There is one short segment of this alignment (approx. 1,300 linear feet) where the proposed facility deviates away from the existing alignment of Reels Mill Road and runs through a wooded area. Safety challenges within this area include concerns related to lighting and visibility.

Additionally, similarly to the Option B North: MD 144 alignment, there is an at-grade crossing of the railroad on Reels Mill Road.

OPTION B SOUTH: REELS MILL ROAD

There is an uncontrolled crossing at the south end of the Reels Mill Road alignment where the proposed alignment crosses the south leg of MD 355 at the intersection with Park Mills Road to connect to the existing shared use path at the Stone Barn Community Garden. The location of this crossing at an intersection will increase visibility and safety of this crossing over a mid-block crossing location. Improvements are recommended at this location to increase visibility of this crossing to ensure safety for path users.

OPTION B SOUTH: TABLER RUN

The entirety of this proposed alignment runs through a wooded area along an existing sewer easement adjacent to Tabler Run. Safety challenges include concerns related to facility lighting and visibility.

There is one uncontrolled mid-block crossing at the southern end of this alignment, where the path crosses Tabler Road to connect into Urbana District Park. This is a smaller road than MD 355 with fewer vehicles and lower speeds, but improvements are still recommended at this location to increase visibility of this crossing to ensure safety for path users.



Final Alignments

Using all data available from the desktop review and impact evaluation, two final alignments have been recommended for further comparison and ultimate determination of a preferred alignment.

- **Option A: Araby Church Road Spur**

The Araby Church Road Spur route has fewer environmental impacts and will provide a safer, more comfortable experience for users along the lesser traveled and slower roadway.

- **Option B: Reichs Ford Road and Tabler Run**

This combination of trail alignments has fewer impacts along the alignment and avoids the need for large retaining walls along an alignment that is also in close proximity to an active railroad. It provides a more direct connection between Frederick and Urbana District Park, and does not require the rehabilitation of historic Jug Bridge 2. South of Ball Road, the alignment along Tabler Run provides a scenic route that is largely separated from narrow existing roads and connects directly into Urbana District Park. This combination of options also does not require an uncontrolled crossing of Urbana Pike to connect to the Stone Barn Community Garden.



TABLE 5: FINAL IMPACT ANALYSIS COMPARISON

ITEM	OPTION A	OPTION B
Alignment Length	4.8 miles	4.7 miles
Roadway Conditions	Fair	Fair
Trail Access Points	6	3
Steep Slopes (15-25%)	1	5
Very Steep Slopes (25%+)	0	0
Parcels Impacted	59	29
Available Right of Way	*MD 355 (east): 8-16 ft Araby Church Road: 8 ft *MD 355 (west): 34 ft	Reichs Ford Road: 26 ft Reels Mill Road: 4.5-5.5 ft
Existing Bridges and Structures	2 bridges	1 bridge, 1 railroad crossing
New / Reconstructed Structures	1 new retaining wall, 1 new bridge	2 new bridges
Stream Impacts	185 LF	780 LF
Adjacent Streams	1,275 LF	8,275 LF
Wetlands	0 acres	0.5 – 0.75 acres
Floodplains	0.75 – 1 acres	6 – 7 acres
Forests	2.5 – 3.5 acres	7 – 8 acres
Sensitive Species	11.25 – 12 acres	1 – 1.25 acres
Historical Areas	9 – 10 acres	0 acres
Driveways / Entrances	41	11
Stop Controlled Crossings	2	2
Uncontrolled Crossings	2	2
Signalized Intersections	4	0
Railroad Crossings	0	1

The following sections include additional analysis and comparison of these two options.

Constructability

PEDESTRIAN BRIDGES

The Option A alignment along MD 355 crosses the Monocacy River at the location of an existing 300-foot-long steel truss bridge for vehicular traffic. Due to the limited width of this bridge, a separate adjacent pedestrian bridge is



Figure 6: MD-355 bridge over Monocacy River

Source: Google

assumed to be required for pedestrian and bicycle traffic. An alternative consideration for this crossing is to coordinate with MDOT SHA about the expected timeline for the future replacement of this bridge to determine whether it would be feasible to wait and have pedestrian and bicycle accommodations crossing the Monocacy River be included as part of a future State-funded project.

Near the beginning of Option B, the alignment crosses over the Monocacy River along Reichs Ford Road. The existing roadway bridge carries two lanes of traffic with shoulders, however there is not enough available width to safely accommodate a separated pedestrian and bicycle connection within the existing width of the bridge. For this reason, it is assumed that this option would require the construction of an adjacent pedestrian bridge.

Further south on Option B, after the path crosses the railroad along Reels Mill Road, the road crosses Bush Creek on a one-lane bridge. It is assumed that an adjacent pedestrian bridge will be constructed to carry pedestrian and bicycle traffic on a separate structure from vehicular traffic.



Figure 7: Reichs Ford Road bridge over Monocacy River

Source: Google



Figure 8: Reels Mill Road bridge over small stream

Source: Google



RAILROAD CROSSING

For Option B, the proposed reconstruction of the railroad crossing requires careful examination and efforts to minimize impacts to the active railway. Improvements to the existing railroad crossing will be required to widen the crossing to accommodate a minimum 8-foot-wide shared use path. Fencing will also be required when the path is within proximity of the railway to maintain physical separation between the path and the railway.

COMMERCIAL AREA

Option A starts in a dense commercial area with numerous challenges to implementing a shared use facility.

The proposed alignment crosses several multi-lane roadways as well as driveways and entrances for vehicular traffic. One driveway of particular concern for Option A is between the parking lots for The Home Depot and T.J. Maxx. There is a steep slope directly adjacent to MD 355 that will likely require significant earthwork and construction of retaining walls to construct the shared use path directly adjacent to the roadway. Modifications will also be required for the traffic island to facilitate a safe pedestrian and bicycle crossing.



Figure 9: Driveway with steep grading

Source: Google Streetview

This alignment is also conservatively assumed to impact approximately 100 utility poles, most of which are located within the commercial area. It is likely that not all utility poles will need to be impacted, and future design of the shared use path should consider minimization and optimization to limit these impacts.

Opportunities exist for impacts within the commercial area to be minimized in future design stages. One would be consideration of a reduced width for both the buffer and shared use facility. Another option would be to investigate an alternative route for the path alignment through the parking lots. If a retaining wall is required, consideration for an F-Shape barrier style of structure could also be a more cost-effective solution. Further analysis will be required within the commercial area to identify the full extent of potential modifications to optimize the facility design and minimize impacts.

SOILS / GEOLOGY

JMT gathered information from the USDA, NRCS Web Soil Survey website to compare existing soil types that exist along both alternative alignments. This information is helpful to determine potential challenges for future design of stormwater management for the proposed pedestrian and bicycle facility. **Table 6** identifies the hydrologic soil groups that are present along each alignment, and the percentage of the alignment length that falls within each group.



Hydrologic Soil Groups encountered include Group A, B, C, and D along with Groups B/D and C/D. Group A is identified to be a soil with a high infiltration rate, low runoff potential, and a high rate of water transmission. Conversely, Group D soils have a very slow infiltration rate, high runoff potential, and a slow rate of water transmission. Soil Groups B/D and C/D indicate that the Soil Group in drained areas are B and C respectively while in undrained areas, the Soil Group is D.

TABLE 6: HYDROLOGIC SOIL GROUP SURVEY

Soil Group	OPTION A	OPTION B
A	1%	4%
B	37%	33%
C	46%	38%
D	11%	17%
B/D	0%	2%
C/D	1%	5%
TOTAL	96%	99%

Comparing Option A and Option B, moderately low runoff potential (Soil Groups A and B) areas are found to be 38% and 37% respectively. Moderately high runoff potential (Soil Groups C and D) areas within Option A and Option B are 57% and 55%. Option A has slightly preferable soil groups along the alignment but overall, both Options can be generalized as equivalent.

It should be noted that some areas along the alignment have not been surveyed preventing 100% identification, however this does not prevent the analysis from being useful in assessing potential impacts to runoff.

EXISTING DRAINAGE STRUCTURES

There is a large drainage culvert and outfall on the northeast corner of the intersection of Ball Road and Reels Mill Road that conflicts with the proposed path alignment for Option B. Construction of the proposed facility will require modification of this culvert and outfall, or reconfiguration of the intersection to shift towards the north to make space for the shared use path. Modification of the intersection layout will likely result in impacts to the existing catch basin that feeds into the drainage outfall on the opposite side of the road. Future design and construction of this intersection will require careful consideration to minimize drainage impacts and maintain safety and comfort for path users.



Figure 10: Drainage culvert on northeast corner of Ball Road and Reels Mill Road intersection
Source: Google Streetview



Figure 11: Drainage structures on northwest corner of Ball Road and Reels Mill Road intersection
Source: Google Streetview



Cost Estimates

Feasibility-level cost estimates were developed for the two shared use path alignment options on a Cost Per Mile (CPM) basis using the 2017 SHA Cost Estimating Manual and a 25% inflation factor to reflect 2023 unit costs. Estimates include major items such as bridge structures, retaining walls, traffic signal modifications, utility pole relocations, and mitigation for environmental impacts within a conservative assumed limit of disturbance. Additional cost categories are included as percentage contingencies for maintenance of traffic, drainage, landscaping, and utilities. A 40% contingency is included in the project cost to account for unknown costs through the design process. The construction cost estimates do not include the cost of acquiring additional right-of-way.

Table 7 shows a cost comparison for the two options, including consideration of potential design alternatives that exist within each option. Full feasibility level cost estimates can be found in **Appendix C**.

TABLE 7: CONSTRUCTION COST COMPARISON

OPTION	COST
Option A: MD 355 and Araby Church Road	\$25 - 27 Million
Option B: Reichs Ford Road and Tabler Run	\$22 - 24 Million

For Option A, one major cost includes the construction of a retaining wall near the commercial area on MD 355, as discussed on page 21. The cost of this retaining wall, approximately \$3 million, could potentially be avoided by realigning the shared use path through parking lots. This change would increase the length of the route and require additional coordination with commercial property owners.

For Option B, changing the location of the norther terminus of the alignment to end at Pinecliff Park could reduce the cost by approximately \$7.1 million. This change would shorten the alignment by almost 1.0 mile and eliminate the need for an additional pedestrian bridge across the Monocacy River. However, this would not provide a connection to the City of Frederick, as it would remain approximately 1.0 miles from the City of Frederick boundary.

RIGHT-OF-WAY COST COMPARISON

The project team also evaluated the cost of acquiring additional right-of-way along the alternative alignments, as shown in **Table 8**. The routes traverse commercial, industrial, residential, and agricultural properties that range from unimproved acreage to finished lots. Average unit costs for each of these land uses were calculated using available online resources to identify the price of comparable recent property sales within the project area.

TABLE 8: RIGHT OF WAY COST COMPARISON

OPTION	COST
Option A: MD 355 and Araby Church Road	\$7.7 Million
Option B: Reichs Ford Road and Tabler Run	\$2.0 Million

For the purposes of comparison, all property impacts outside of the existing right of way are assumed to be full fee simple acquisitions. Impacts were calculated based on the assumed LOD, which is offset 30 feet on both sides of the alignment centerline.



Recommendation

After careful consideration and review, **Option A** is recommended as the preferred route to implement a shared use path between the City of Frederick and Urbana District Park.

Option A takes a direct route which provides efficiency and greater utility for the community, as it provides connections to more points of interest including the Monocacy MARC Train Station, Francis Scott Key Mall, and a large shopping center. Option B: Reichs Ford Road and Tabler Run, which takes a less direct, more scenic route, connects to various neighborhoods and Pinecliff Park.

An evaluation of the safety of the two options shows that they are equally comparable. Both provide a separated, off-road facility for pedestrians and bicyclists, and both have two uncontrolled roadway crossings. Option A is adjacent to MD 355 through the commercial area north of the Monocacy Battlefield, but utilizes a residential local road south of the Monocacy River (Araby Church Road) which has lower volumes and speeds. Option B has several sections that traverse wooded areas with limited lighting and visibility, and also contains an at-grade railroad crossing.

Evaluation of the anticipated impacts shows that Option A has fewer environmental impacts to streams, wetlands, floodplains, and forests. Option B has fewer impacts to sensitive species, historical areas, and properties. However, design optimization through future design stages will likely work to minimize the impacts of both options.

Option B also carries more potential for complexities in design and construction, based on the alignment navigating through more rural areas and along existing streams. The alignment traverses properties that are not within or directly adjacent to County right of way, and will require additional coordination and property acquisition. The potential impacts to the large culvert and drainage outfall near the intersection of Reels Mill Road and Ball Road could also be a challenge.

Phasing Recommendations

The project team has provided recommendations for both Options to be constructed in multiple phases if the proposed alignment cannot be constructed at one time due to funding constraints or major constructability challenges.

OPTION A

Construction of the Option A alignment can be split into three phases:

1. Northern terminus to the Monocacy River.
2. Araby Church Road Spur to the Stone Barn Community Garden.
3. Monocacy River bridge crossing to northern Araby Church Road intersection.

For the construction sequence, the order of the first two phases can be interchanged, but the third phase is recommended to be completed last.

OPTION B

JMT does not recommend that the construction of the Option B alignment be split into phases. Based on the lack of destinations along the alignment, there are not any safe and logical endpoints for shorter phases that would not leave path users stranded on narrow roadways with limited sight distance or force them to turn around.

Public Engagement

Two public outreach events were held in August 2023 to present the Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study to the community. The format for this outreach was pop-up public information and input events. The project team set up a tent and information table at Urbana District Park to share information with park patrons about the project and solicit their feedback about the project. The two events were scheduled at different times of the day to capture a wider variety of park users.

- Saturday, August 19th at 10:00 am – 2:00 pm
- Wednesday, August 30th at 3:00 pm – 7:00 pm

Project information available during these events included a printed roll map of the project area, one-page project information sheet handouts, printed comment cards, and an online survey. The survey could be taken at the event using iPads, as a printed hard copy, or via a QR code on the one-page project information sheet.

During these events, project staff interacted with a total of 26 individuals, most of whom were young adults accompanied by children. Our team distributed 15 project information sheets and had 12 people complete the online survey during the events. Several others stated that they would complete the survey on their own time using the QR code on the project information sheet.

During the in-person events, a few recurring themes were raised by participants. Several people expressed concern about the overall safety of any proposed bicycle facility, and a desire for a proposed facility to be able to be comfortably used by people of all ages. Related to this, most people stated that they would prefer to use a facility that is separated from roadway traffic, as they feel this is the safest type of bicycle facility. Participants in the in-person events also expressed excitement for the possibility of increased connectivity to the MARC station and mall.



Figure 12: Public Outreach Event

In total, the online survey had 272 responses. Of the participants who completed the questionnaire, over 90% were from County residents whose primary form of transportation is their personal vehicle, but who walk or ride their bicycle for recreation and/or exercise. The survey also garnered 135 comments, which provide a more detailed understanding of the sentiments of the public. A review of these comments revealed recurring themes that were similar to those expressed by residents during the in-person events.

The most often repeated sentiment in the survey comments were related to safety of the proposed facility, and a desire for it to be separated from vehicular traffic. One specific area of concern that was mentioned multiple times is the existing bridge crossing MD 355 over the Monocacy River, since it has a narrow width. Other comments noted that the use of plastic bollards is not considered adequate separation for vehicles and bicycles, and that the project should also



consider placement of bike racks and increased enforcement and education to boost the use of bicycle facilities in the County.

Not all of the feedback received was positive. A number of responses expressed that the funds that are planned to be used for this facility could be better utilized elsewhere, and that bicycle infrastructure is unnecessary and underutilized. However, the project received more positive feedback than opposition overall.

The project information sheet and online survey results can be viewed in **Appendix D**.

Economic Benefits

The project team identified three (3) existing trail facilities in Maryland, Pennsylvania, North Carolina, and New York that provide a qualitative evaluation of economic benefits at each respective trail facility.

THE GREAT ALLEGHENY PASSAGE ECONOMIC IMPACT REPORT (2021)

The Great Allegheny Passage (GAP) is a 150-mile trail that runs through Allegany County, MD, Somerset County, PA, Fayette County, PA, Westmoreland County, PA and Allegheny County, PA. Economic impact analyses have been conducted on the GAP trail in 1999, 2009, 2019. The most recent economic impact analysis quantified specific tourism values through an economic impact model that measures the total economic effects of tourism spending from GAP users who leave their home county to use the trail in the Trail Impact Zone (shown below) and outlined impacts to property values.

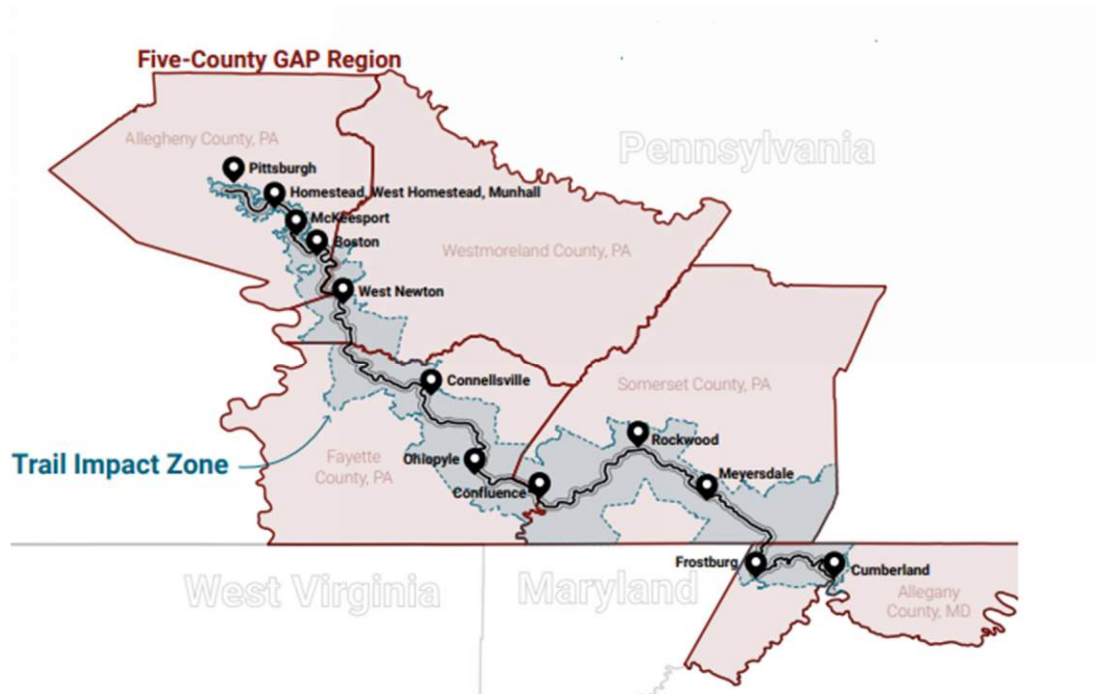


Figure 13: Great Allegheny Passage (GAP) Trail Impact Zone
Source: The Great Allegheny Passage Economic Impact Report – Executive Summary



The report estimates a \$121 million regional impact from GAP tourism, comprised direct spending (\$74 million), indirect spending (\$22 million), and induced impact spending (\$25 million) throughout the five-county region in 2019. Residential areas within the Trail Impact Zone saw a higher median change in home value than the State of Pennsylvania (13%) and Maryland (7%) at large.

The report identifies challenges among GAP communities, including identification of support for marketing the trail's assets. Despite having several regional organizations, a conservancy network dedicated to GAP, and other tourism groups, there is limited staff capacity given that communities along the GAP network are smaller municipal entities. Additionally, the report outlines the need for local trail networks and connections to GAP. Providing local trail networks and connections to GAP and local businesses would increase demand and use of the trail from residents in the Trail Impact Zone. Additional findings can be found at the following link: [The Great Allegheny Passage Economic Impact Report](#).

TRAIL BENEFITS: EVALUATING THE ECONOMIC, PHYSICAL HEALTH, AND ENVIRONMENTAL IMPACTS OF COMPLETING SIX KEY SEGMENTS OF THE CAROLINA THREAD TRAIL (2022)

The Carolina Thread Trail is a 350-mile network of trails and greenways in North and South Carolina's Piedmont region. The trail benefits report outlines the economic impact of six trail network extensions at the following locations (approximately 13 linear miles):

- Four Mile Creek Greenway (Matthews, NC)
- Piedmont Medical Center Trail (Rock Hill, SC)
- Hector H. Henry II Greenway (Concord NC)
- South Fork Trail (McAdenville, NC)
- Mount Holly River Hawk Greenway (Mount Holly, NC)
- The Goat Island Park and River Link Greenway (Cramerton, NC)

Each of the six trail network extensions supported upwards of \$3 million in annual business sales. Combined, the six trails generated \$3.3 million in tax revenue, \$25.8 million in economic output, \$9.7 million in labor income, and resulted in 190 jobs. Additional findings by each trail can be found at the following link: [Trail Benefits: Evaluating the Economic, Physical Health, and Environmental Impacts of Completing Six Key Segments of the North Carolina Thread Trail](#).

THE ECONOMIC IMPACT OF THE ERIE CANALWAY TRAIL (2014)

The Erie Canalway Trail (ECT) is a 360-mile trail that connects communities between Buffalo, NY, and Albany, NY and parallels historic and active sections of the Erie Canal. ECT is one of the longest multi-use trails in the nation. The ECT trail generates approximately \$253 million in sales, \$78 million in labor income, and \$28.5 million in tax revenue in the 14 counties where the ECT is located. Visitor spending supports an estimated 3,440 jobs.

The report identifies challenges in resources devoted to promotion of the trail. In the report's business owner survey, businesses suggested creating signs and brochures dedicated to the trail, regular advertising on radio stations and television stations, and working with local Chambers of Commerce and local governments to create promotional materials. Businesses also suggested creating local trail connections to the ECT. Additional findings can be found at the following link: [The Economic Impact of the Erie Canalway Trail](#).



ECONOMIC BENEFITS RECOMMENDATIONS

Based on review of economic benefits studies of existing trail facilities throughout the US, and review of the project location for points of interest along the proposed alignments, the project team provides the following recommendations to increase trail tourism throughout Frederick County:

1. Develop a Regional Trail Tourism Advisory Group with a dedicated staff member to implement marketing and communication strategies. The advisory group should consist of local businesses, economic development organizations, Chambers of Commerce, and municipalities throughout Frederick County. The advisory group should consider opportunities to develop trail-specific branding and develop a marketing and communication plan that will outline how to communicate with target markets for trail facilities. The advisory group should consider signs and brochures for the network of trails in the community, social media pages, and advertisements to increase trail usage.
2. Consider regional destinations when evaluating proposed alignments. Given the presence of Monocacy National Battlefield, Frederick County should consider alignments that connect to the National Park that create multi-modal options to tourism destinations.

Funding Sources

The project team has identified potential grant funding opportunities that could be pursued by Frederick County for this project. Information about these grants, including descriptions of eligibility requirements and application schedules, is included below.

TRANSPORTATION LAND-USE CONNECTIONS PROGRAM (TLC)

The Metropolitan Washington Council of Governments (MWCOG) operates as an autonomous and non-profit organization, facilitating a platform for leaders from the District of Columbia, Maryland, and Virginia. MWCOG serves a dual role as both a think tank, fostering thoughtful deliberation and strategic planning, and as a conduit for channeling federal funding opportunities to municipalities facing pressing needs. Financial resources for transportation projects are managed through the TLC program.

This program enables consultants to utilize funds to complete abridged planning or design projects that promote mixed-use, walkable communities or other transportation alternatives. The application period for FY 2025 will be from January to March of 2024. Confirmed grant recipients will be notified in April or May of 2024 and will need to complete the project within a designated period, typically six to eight months. Additional information concerning this program can be found at the following link: [MWCOG | Transportation Grant Applications](#).



TRANSPORTATION ALTERNATIVES PROGRAM (TAP)

Maryland Department of Transportation (MDOT) State Highway Administration (SHA) is responsible for the State's non-tolled roads and provides solutions to improving Maryland's roads and bridges. MDOT SHA administers TAP Grant Program which awards grant funding to projects that enhance mobility and emphasize sustainability and ADA compliance.

To be considered as an eligible recipient of this grant, the project's sponsor must be mission driven to improve the area's surface transportation and meet just one of the TAP categories. This project would most likely fall into the Design category. A 20% cash match is also required from the project sponsor. This project is located within the National Capital Region of the Transportation Planning Board (TPB), which increases the likelihood of funds being awarded for this project. The application cycle for the FY 2025 TAP grants will begin in mid-April to mid-May 2024, with grants awarded in the fall of 2024.

Additional information concerning the program requirements can be found at the following link: [TAP Grant Manual](#).

MDOT BIKEWAYS GRANT (KIM LAMPHIER BIKEWAYS NETWORK PROGRAM)

MDOT created the Kim Lamphier Bikeways Network program to provide funding for projects that prioritize enhancements to bicycle networks and facilities. The projects are to maximize access and connectivity, while simultaneously promoting a fun alternative mode of transportation, health, and wellness.

This project would likely be submitted as a Design project, rather than Construction or Minor Retrofit. This project is a strong candidate as it meets multiple eligibility criteria including access to transit, and access to points of interest. The application period is May 1 – June 1, 2024. If chosen as a grant recipient, Frederick County is required to provide a 20% cash match for the project and to provide maintenance for the duration of the asset's lifecycle.

Additional information concerning the program's requirements can be found at the following link: [Kim Lamphier Bikeways Network Program](#).

FHWA SAFE STREETS AND ROADS FOR ALL

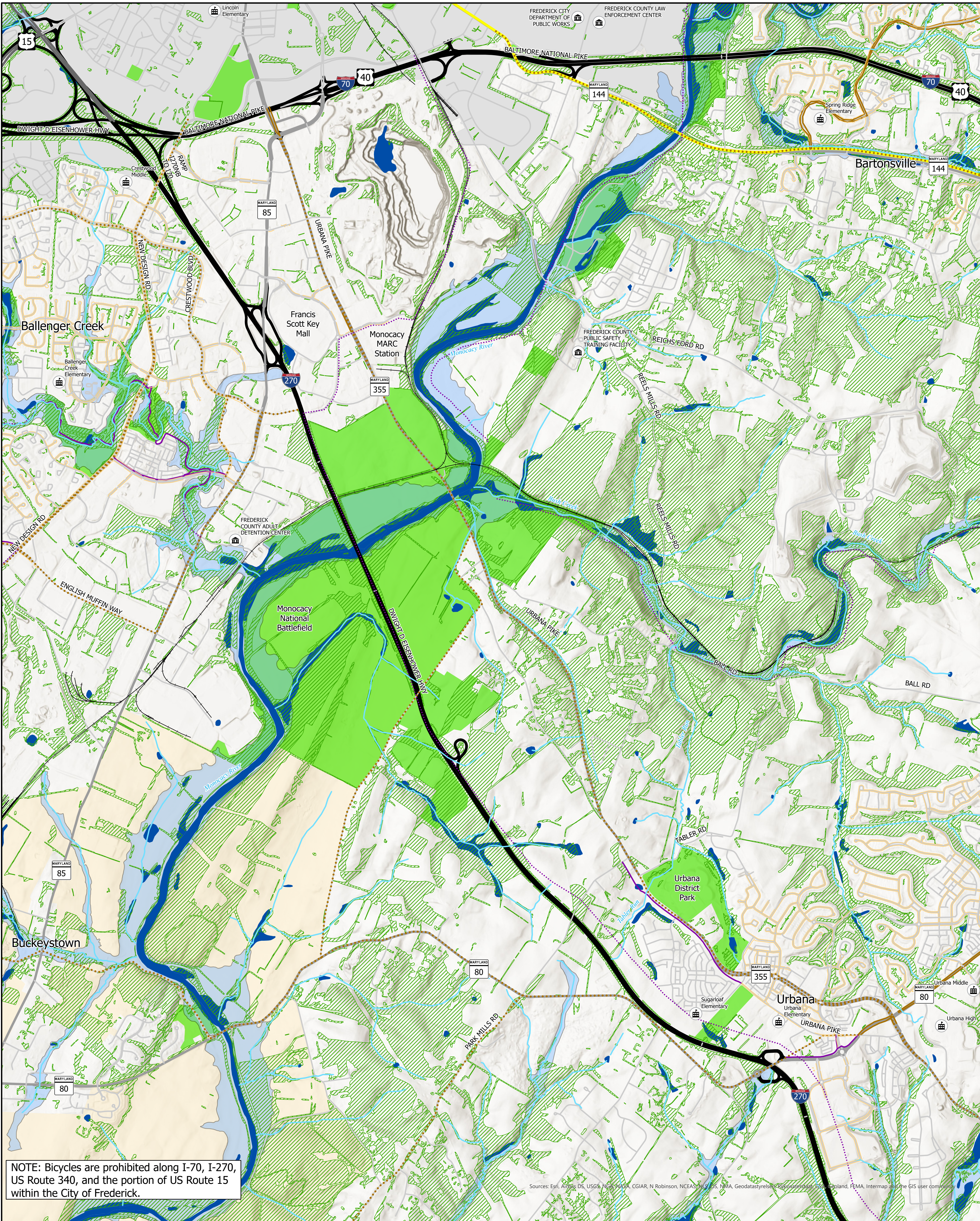
The Federal Highway Administration (FHWA) "Safe Streets and Roads for All" program was funded and established by the recently implemented Bipartisan Infrastructure Law and strives to eliminate roadway fatalities. The grants eligibility requirements state that the applicant must be county, city, town, or transit agency. This project would likely fall into the Implementation category. One eligibility requirement is that the applicant have an existing Action Plan or similar plan to reduce roadway fatalities and significant injuries by a specific date. The FY24 Notice of Funding Opportunity (NOFO) for this grant is expected to open in the spring of 2024. If awarded, NEPA documentation will be required for the project, since it would be utilizing federal funds.

Additional information concerning this program's requirements can be found at the following link: [Safe Streets and Roads for All \(SS4A\)](#).



Appendix A

Existing Conditions Map



Interstate

US Route

State Roadway

County/Local Roadway

Railroads

Existing Off-Road Trails

Proposed Off-Road Trails

Existing On-Street Bike Routes

Proposed On-Street Bike Routes

Existing Sidewalk

MDOT SHA Bike Routes

Rural Legacy Areas

Parks

Forests

DNR Wetlands

City of Frederick

Government Facilities

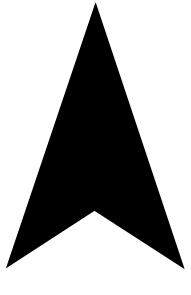
Schools

100 Year Floodplain

Streams

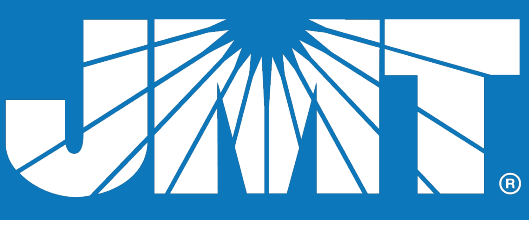
Legend

N



00.250.51 Miles

JUNE 2023





Appendix B

Alternative Alignments Map



A horizontal scale bar with a black background. It has white tick marks at 0, 0.5, and 1. The word "Miles" is written in white at the right end of the bar.



Appendix C

Cost Estimates

Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study
Feasibility Cost Estimate: Option A - MD 355 and Araby Church Road Spur

Roadway Costs							
	Item	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Shared-Use Path, 12' width	MI	4.8	\$ 1,253,000.00	\$ 6,014,400.00		p. F-4
	New Bridge Structure - Crossing Monocacy River	SF	4,650	\$ 325.78	\$ 1,514,877.00	Assumed 310 LF and 15 ft wide	p. F-15
	Retaining Wall	SF	3,760	\$ 375.90	\$ 1,413,384.00	Assumed 6 ft high for 260 LF, 4 ft high for 550 LF	p. F-16
	Traffic Signal Modification - Per Leg	EA	4	\$ 81,445.00	\$ 325,780.00		p. F-20
	Pedestrian Lighting Pole	EA	0	\$ 12,530.00	\$ -		p. F-21
	Utility Pole Impact	EA	100	\$ 6,000.00	\$ 600,000.00	20 Foot Breakaway Pole (Item# 818006)	July 2023 Price Index
	Cantilever Sign Structure & Signs	EA	1	\$ 125,300.00	\$ 125,300.00		p. F-23
	Wetland Mitigation	AC	0	\$ 952,280.00	\$ -		p. F-31
	Stream Mitigation	LS	1	\$ 877,100.00	\$ 877,100.00	Approx. 185 LF	p. F-31
	Tree Felling / Forest Impacts	AC	3	\$ 3,759.00	\$ 11,277.00		p. H-2
	Subtotal 1				\$ 10,882,118.00		
Contingent Categories							
	Category 1: Preliminary, MOT	30%			\$ 3,264,635.40	30% of Subtotal 1	p. F-12
	Category 3: Drainage	15%			\$ 1,632,317.70	15% of Subtotal 1	p. F-13
	Category 7: Landscaping	12%			\$ 1,305,854.16	12% of Subtotal 1	p. F-14
	Category 8: Utilities	15%			\$ 1,632,317.70	15% of Subtotal 1	p. F-26
	Subtotal 2				\$ 18,717,242.96		
	Contingency	40%			\$ 7,486,897.18	40% of Subtotal 2	p. A-3
	Feasibility Level Cost				\$ 26,204,140.14		
	Rounded Value				\$ 26,300,000.00		
	Right of Way	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Agricultural	AC	0.45	\$ 4,153.00	\$ 1,868.85		
	Commercial	SF	283,600	\$ 23.99	\$ 6,803,564.00		
	Commercial - Large	SF	97,732	\$ 3.71	\$ 362,585.72		
	Industrial	AC	0.10	\$ 286,155.00	\$ 28,615.50		
	Industrial - Large	AC	1.00	\$ 92,319.00	\$ 92,319.00		
	Residential	AC	3.25	\$ 76,359.97	\$ 248,244.64		
	Residential - Large	AC	2.35	\$ 61,649.00	\$ 144,875.15		
	Subtotal Right of Way				\$ 7,682,072.86		
	Rounded Value				\$ 7,700,000.00		

- Notes: 1. All unit costs are from the 2017 SHA Cost Estimating Guide, inflated by a factor of 1.253 to reflect 2023 costs, unless otherwise noted.
2. Land values for right of way impacts were evaluated in November 2023 based on recent property sales in the County.
3. Right of way costs are included for comparison purposes only.

Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study

Feasibility Cost Estimate: Option A - MD 355 and Araby Church Road Spur

Alternative without Retaining Walls

Roadway Costs							
	Item	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Shared-Use Path, 12' width	MI	4.8	\$ 1,253,000.00	\$ 6,014,400.00		p. F-4
	New Bridge Structure - Crossing Monocacy River	SF	4,650	\$ 325.78	\$ 1,514,877.00	Assumed 310 LF x 15 ft wide	p. F-15
	Retaining Wall	SF	0	\$ 375.90	\$ -		p. F-16
	Traffic Signal Modification - Per Leg	EA	4	\$ 81,445.00	\$ 325,780.00		p. F-20
	Pedestrian Lighting Pole	EA	0	\$ 12,530.00	\$ -		p. F-21
	Utility Pole Impact	EA	100	\$ 6,000.00	\$ 600,000.00	20 Foot Breakaway Pole (Item# 818006)	July 2023 Price Index
	Cantilever Sign Structure & Signs	EA	1	\$ 125,300.00	\$ 125,300.00		p. F-23
	Wetland Mitigation	AC	0	\$ 952,280.00	\$ -		p. F-31
	Stream Mitigation	LS	1	\$ 877,100.00	\$ 877,100.00	Approx. 185 LF	p. F-31
	Tree Felling / Forest Impacts	AC	3	\$ 3,759.00	\$ 11,277.00		p. H-2
	Subtotal 1				\$ 9,468,734.00		
Contingent Categories							
	Category 1: Preliminary, MOT	30%			\$ 2,840,620.20	30% of Subtotal 1	p. F-12
	Category 3: Drainage	15%			\$ 1,420,310.10	15% of Subtotal 1	p. F-13
	Category 7: Landscaping	12%			\$ 1,136,248.08	12% of Subtotal 1	p. F-14
	Category 8: Utilities	15%			\$ 1,420,310.10	15% of Subtotal 1	p. F-26
	Subtotal 2				\$ 16,286,222.48		
	Contingency	40%			\$ 6,514,488.99	40% of Subtotal 2	p. A-3
	Feasibility Level Cost				\$ 22,800,711.47		
	Rounded Value				\$ 22,900,000.00		
Right of Way							
	Right of Way	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Agricultural	AC	0.45	\$ 4,153.00	\$ 1,868.85		
	Commercial	SF	283,600	\$ 23.99	\$ 6,803,564.00		
	Commercial - Large	SF	97,732	\$ 3.71	\$ 362,585.72		
	Industrial	AC	0.10	\$ 286,155.00	\$ 28,615.50		
	Industrial - Large	AC	1.00	\$ 92,319.00	\$ 92,319.00		
	Residential	AC	3.25	\$ 76,359.97	\$ 248,244.64		
	Residential - Large	AC	2.35	\$ 61,649.00	\$ 144,875.15		
	Subtotal Right of Way				\$ 7,682,072.86		
	Rounded Value				\$ 7,700,000.00		

- Notes: 1. All unit costs are from the 2017 SHA Cost Estimating Guide, inflated by a factor of 1.253 to reflect 2023 costs, unless otherwise noted.
2. Land values for right of way impacts were evaluated in November 2023 based on recent property sales in the County.
3. Right of way costs are included for comparison purposes only.

Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study
Feasibility Cost Estimate: Option B - Reichs Ford Road and Tabler Run

Roadway Costs							
	Item	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Shared-Use Path, 12' width	MI	4.7	\$ 1,253,000.00	\$ 5,889,100.00		p. F-4
	New Bridge Structure - Crossing Monocacy River	SF	6,000	\$ 325.78	\$ 1,954,680.00	Assumed 400 LF x 15 ft wide	p. F-15
	New Bridge Structure - Crossing Tributary Stream	SF	1,350	\$ 325.78	\$ 439,803.00	Assumed 90 LF x 15 ft wide	p. F-15
	Retaining Wall	SF	0	\$ 375.90	\$ -		p. F-16
	Traffic Signal Modification - Per Leg	EA	0	\$ 81,445.00	\$ -		p. F-20
	Pedestrian Lighting Pole	EA	18	\$ 12,530.00	\$ 225,540.00	Assumed 75 foot linear spacing for 1,300 LF	p. F-21
	Utility Pole Impact	EA	10	\$ 6,000.00	\$ 60,000.00	20 Foot Breakaway Pole (Item# 818006)	July 2023 Price Index
	Cantilever Sign Structure & Signs	EA	0	\$ 125,300.00	\$ -		p. F-23
	Wetland Mitigation	AC	0.5	\$ 952,280.00	\$ 476,140.00		F-31
	Stream Mitigation	LS	1	\$ 877,100.00	\$ 877,100.00	Approx. 780 LF	p. F-31
	Tree Felling / Forest Impacts	AC	7.5	\$ 6,265.00	\$ 46,987.50		p. H-2
Subtotal 1					\$ 9,969,350.50		
Contingent Categories							
	Category 1: Preliminary, MOT	30%			\$ 2,990,805.15	30% of Subtotal 1	p. F-12
	Category 3: Drainage	15%			\$ 1,495,402.58	15% of Subtotal 1	p. F-13
	Category 7: Landscaping	12%			\$ 1,196,322.06	12% of Subtotal 1	p. F-14
	Category 8: Utilities	8%			\$ 797,548.04	8% of Subtotal 1	p. F-26
Subtotal 2					\$ 16,449,428.33		
	Contingency	40%			\$ 6,579,771.33	40% of Subtotal 2	p. A-3
Feasibility Level Cost					\$ 23,029,199.66		
Rounded Value					\$ 23,100,000.00		
	Right of Way	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Agricultural	AC	9.70	\$ 4,153.00	\$ 40,284.10		
	Commercial	SF	43,540	\$ 23.99	\$ 1,044,524.60		
	Commercial - Large	SF	66,350	\$ 3.71	\$ 246,158.50		
	Industrial	AC	0.50	\$ 286,155.00	\$ 143,077.50		
	Industrial - Large	AC	0.95	\$ 92,319.00	\$ 87,703.05		
	Residential	AC	1.10	\$ 76,359.97	\$ 83,995.97		
	Residential - Large	AC	4.55	\$ 61,649.00	\$ 280,502.95		
Subtotal Right of Way					\$ 1,926,246.67		
Rounded Value					\$ 2,000,000.00		

- Notes: 1. All unit costs are from the 2017 SHA Cost Estimating Guide, inflated by a factor of 1.253 to reflect 2023 costs, unless otherwise noted.
2. Land values for right of way impacts were evaluated in November 2023 based on recent property sales in the County.
3. Right of way costs are included for comparison purposes only.

Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study

Feasibility Cost Estimate: Option B - Reichs Ford Road and Tabler Run

Alternative terminating at Pinecliff Park

Roadway Costs							
	Item	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Shared-Use Path, 12' width	MI	3.7	\$ 1,253,000.00	\$ 4,636,100.00		p. F-4
	New Bridge Structure - Crossing Tributary Stream	SF	1,350	\$ 325.78	\$ 439,803.00	Assumed 90 LF x 15 ft wide	p. F-15
	Retaining Wall	SF	0	\$ 375.90	\$ -		p. F-16
	Traffic Signal Modification - Per Leg	EA	0	\$ 81,445.00	\$ -		p. F-20
	Pedestrian Lighting Pole	EA	18	\$ 12,530.00	\$ 225,540.00	Assumed 75 foot linear spacing for 1,300 LF	p. F-21
	Utility Pole Impact	EA	10	\$ 6,000.00	\$ 60,000.00	20 Foot Breakaway Pole (Item# 818006)	July 2023 Price Index
	Cantilever Sign Structure & Signs	EA	0	\$ 125,300.00	\$ -		p. F-23
	Wetland Mitigation	AC	0.5	\$ 952,280.00	\$ 476,140.00		p. F-31
	Stream Mitigation	LS	1	\$ 877,100.00	\$ 877,100.00	Approx. 780 LF	p. F-31
	Tree Felling / Forest Impacts	AC	7.5	\$ 6,265.00	\$ 46,987.50		p. H-2
Subtotal 1					\$ 6,761,670.50		
Contingent Categories							
	Category 1: Preliminary, MOT		30%		\$ 2,028,501.15	30% of Subtotal 1	p. F-12
	Category 3: Drainage		15%		\$ 1,014,250.58	15% of Subtotal 1	p. F-13
	Category 7: Landscaping		12%		\$ 811,400.46	12% of Subtotal 1	p. F-14
	Category 8: Utilities		8%		\$ 540,933.64	8% of Subtotal 1	p. F-26
Subtotal 2					\$ 11,156,756.33		
	Contingency		40%		\$ 4,462,702.53	40% of Subtotal 2	p. A-3
Feasibility Level Cost					\$ 15,619,458.86		
Rounded Value					\$ 15,700,000.00		
	Right of Way	Unit	Quantity	Unit Cost	Total Cost	Notes	Reference
	Agricultural	AC	9.70	\$ 4,153.00	\$ 40,284.10		
	Commercial	SF	43,540	\$ 23.99	\$ 1,044,524.60		
	Commercial - Large	SF	66,350	\$ 3.71	\$ 246,158.50		
	Industrial	AC	0.50	\$ 286,155.00	\$ 143,077.50		
	Industrial - Large	AC	0.95	\$ 92,319.00	\$ 87,703.05		
	Residential	AC	1.10	\$ 76,359.97	\$ 83,995.97		
	Residential - Large	AC	4.55	\$ 61,649.00	\$ 280,502.95		
Subtotal Right of Way					\$ 1,926,246.67		
Rounded Value					\$ 2,000,000.00		

- Notes: 1. All unit costs are from the 2017 SHA Cost Estimating Guide, inflated by a factor of 1.253 to reflect 2023 costs, unless otherwise noted.
2. Land values for right of way impacts were evaluated in November 2023 based on recent property sales in the County.
3. Right of way costs are included for comparison purposes only.



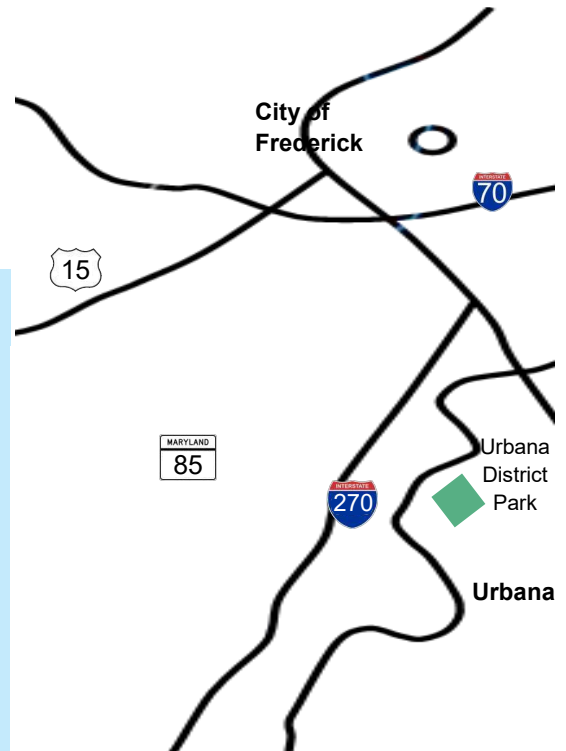
Appendix D

Public Outreach Materials



Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study

The Frederick County Division of Planning & Permitting is investigating potential routes for improved pedestrian and bicycle facilities between the City of Frederick and Urbana District Park. This facility will provide more opportunities to access healthy recreation and alternative transportation options, and move closer to the community's vision of a Livable Frederick County.



ABOUT THIS PROJECT

This feasibility study will develop multiple alternative routes that follow roads, stream corridors, rails to trails, and utility rights-of-way to create a long and continuous path without significant land use impacts. The study will also consider ADA accessibility, potential impacts to environmental features, and cost and feasibility of construction to identify a preferred alternative that maximizes connections to existing pedestrian and bicycle facilities, parks, schools, existing and planned development, and other points of interest.

Spring 2023

Project Kickoff
Alternative Analysis

Summer 2023

Public Engagement
End Feasibility Study

Fall 2023

Preferred Alternative
Conceptual Design

Winter 2023

Project End



WE WANT YOUR INPUT



In order to better serve the needs of the community, Frederick County seeks public input as part of the feasibility study process. Please share your thoughts by taking the survey and attending one of the meetings listed below so that the project team can make informed decisions with your input in mind.

ONLINE SURVEY



You can complete the project survey online by using the link or QR Code:

<https://forms.office.com/r/mk3mm2xKg6>

Please respond before
September 15, 2023

COME TALK TO US

Project team members from Frederick County and JMT, the design consultant, will be at **Urbana District Park** to provide information about the project and gather feedback from the community.

Saturday

August 19, 2023
10:00 am - 2:00 pm

Wednesday

August 30, 2023
3:00 pm - 7:00 pm



Project Team Contacts: MMishler@FrederickCountyMD.gov | AHavener@JMT.com
Website Link: <https://www.frederickcountymd.gov/8010/Transportation-Planning>



Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study

272

Responses

08:41

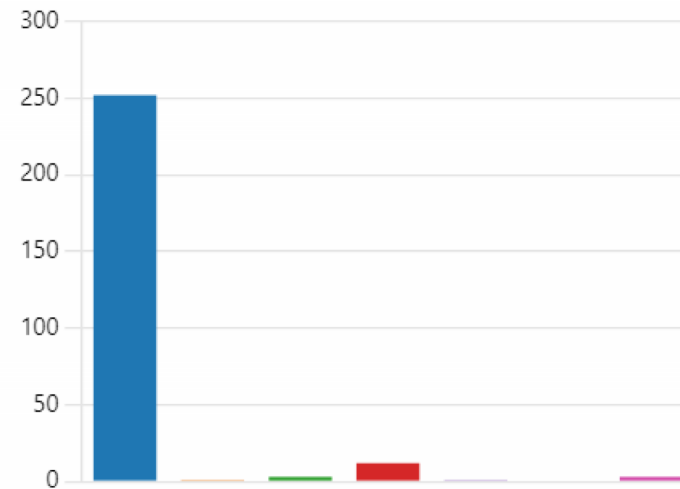
Average time to complete

Closed

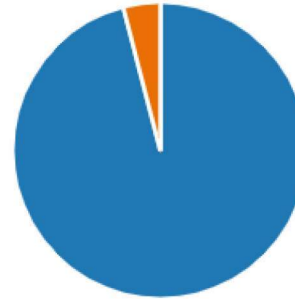
Status

1. Please select the option that most accurately represents you:

Resident	252
Business Owner	1
Commuter	3
Local / State Government Emplo...	12
Elected Official	1
News / Media	0
Other	3



2. Do you live in Frederick County?



3. If yes, what town or city do you live in?

263
Responses

Latest Responses

"Ijamsville"

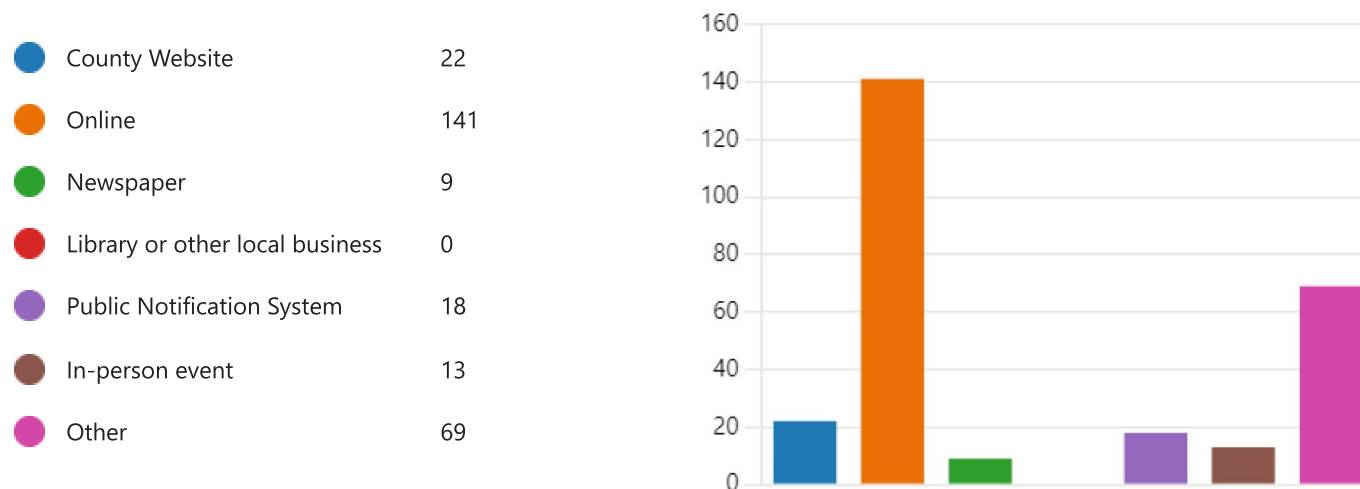
"Urbana"

"Point of Rocks"

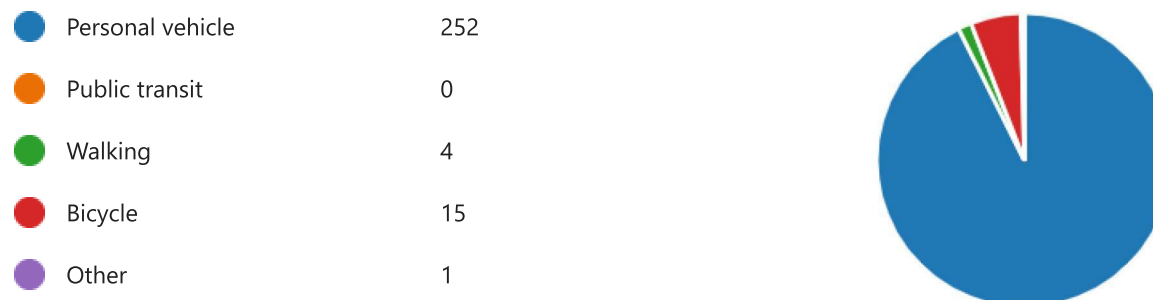
119 respondents (45%) answered **Urbana** for this question.



4. How did you hear about the Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study project?

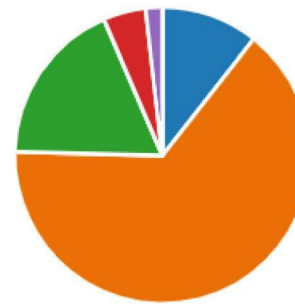


5. What is your primary mode of transportation?



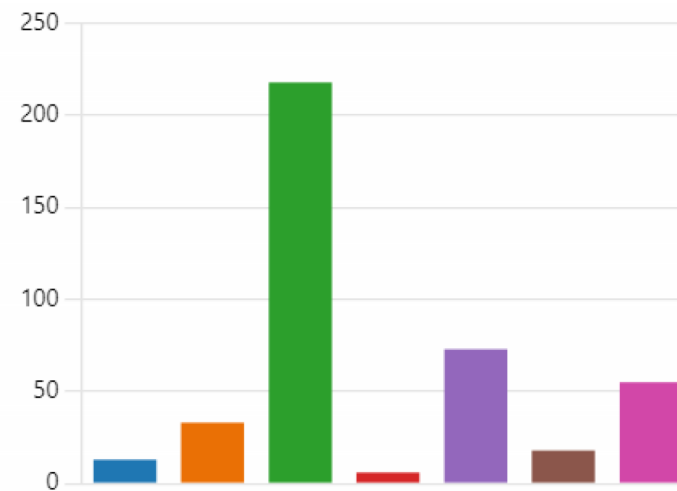
6. Why do you walk / ride your bicycle? (select all that apply)

Commute to work or school	41
Recreation / Exercise	250
Running errands	70
I never walk or ride a bicycle	18
Other	7



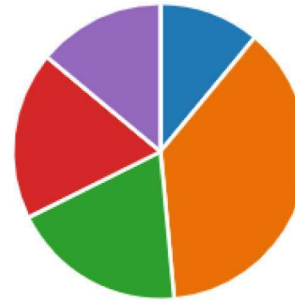
7. Where do you typically walk / bike to? (select all that apply)

School	13
Work	33
Trail / Park	218
Religious Places	6
Shopping	73
I never walk or ride a bicycle	18
Other	55



8. On average, how often do you walk / bike to a destination?

● Every day	30
● Several times a week	102
● Once a week	52
● Once a month	50
● Never	38



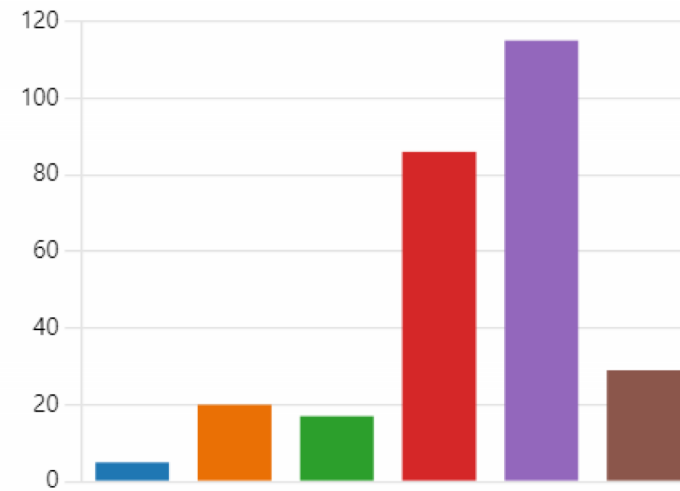
9. If there were improved pedestrian and bicycle facilities between City of Frederick and Urbana District Park, how often do you think you would walk / bike to a destination?

● Every day	22
● Several times a week	81
● Once a week	52
● Once a month	69
● Never	48



10. What type of bicycle facility would you be most likely to use?

Shared lanes	5
Wide bikeable shoulders	20
On-road bike lanes	17
Separated bike lanes	86
Shared use path	115
None	29



11. Please provide any additional thoughts, comments, suggestions, or ideas about the Frederick to Urbana Pedestrian and Bicycle Facility Feasibility Study.

Latest Responses

135

Responses

"As a cyclist and driver, I wish there were more bike lanes along the state-de..."

"This would really open up Urbana to downtown residents as well as the inv..."

"It would be nice to not only have bicycle lanes throughout Frederick county,..."

46 respondents (34%) answered **roads** for this question.

BIKE OR PEDESTRIAN **small bike**
Sharing the road **bike routes** **walking or biking** **bike racks**
Cars and bikes **Urbana roads** **bike lane** **bike-friendly**
roads to bike **use path** **Frederick County** **Bike path** **PUBLIC ROADS**
lanes from Frederick **bikes are off the road** **bike trails** **bikes don't**

12. First and Last Name

175

Responses

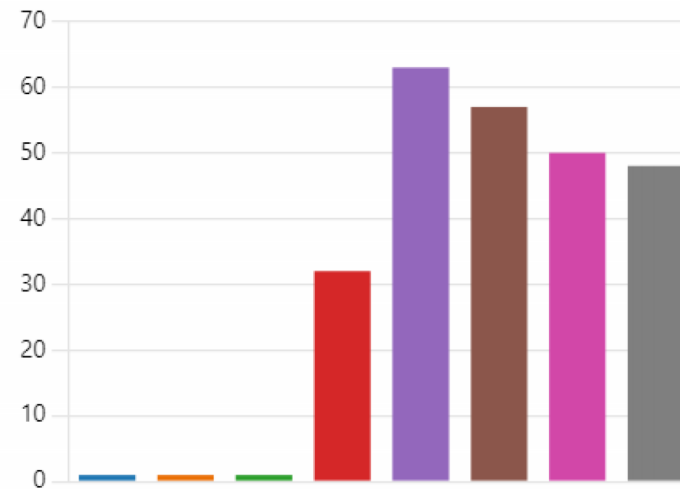
13. Provide your email address to be added to the project email list for future project updates:

167

Responses

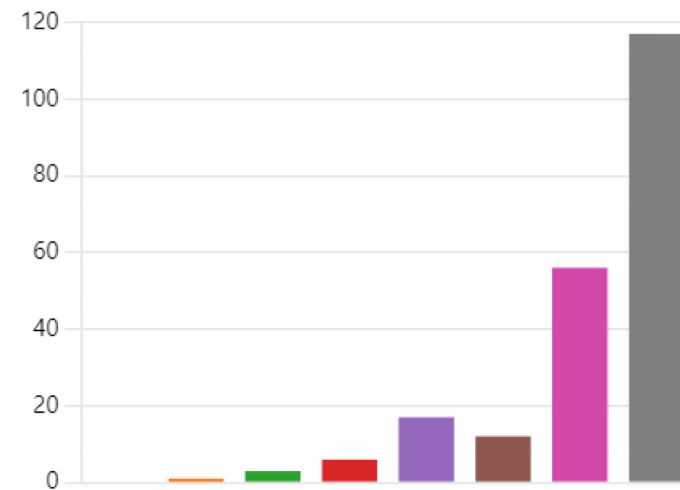
14. Please select your age range:

Under 18	1
18 - 20	1
21 - 24	1
25 - 34	32
35 - 44	63
45 - 54	57
55 - 64	50
65+	48



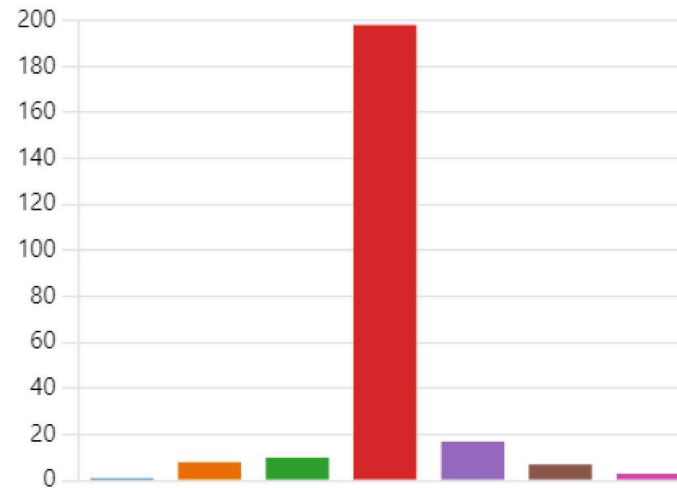
15. Please select your household income range:

\$0 - 14,999	0
\$15,000 - 24,999	1
\$25,000 - 34,999	3
\$35,000 - 49,999	6
\$50,000 - 74,999	17
\$75,000 - 99,999	12
\$100,000 - 149,999	56
\$150,000+	117



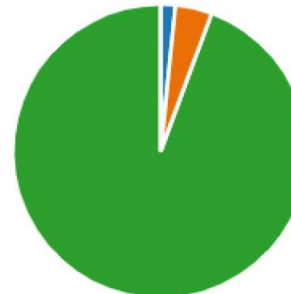
16. Please select your race and ethnicity: (select all that apply)

● American Indian or Alaska Native	1
● Asian or Pacific Islander	8
● Black or African American	10
● White	198
● Hispanic, Latino, or Spanish Ori...	17
● Not Hispanic, Latino, or Spanish...	7
● Other	3



17. Do you use a mobility device or have a disability? (select all that apply)

● Yes, I use a mobility device	4
● Yes, I have a disability	10
● No, I do not have a disability, no...	233





40 Wight Avenue
Hunt Valley, MD 21030
P. 410-329-3100
www.jmt.com

Submitted to:

