



**Columbia Connector Trail
Alternatives**

**Spring Hill Drive Extension
(PID 114496) and
Pocahontas Avenue Extension
(PID 114497)**

Feasibility Study

January 13, 2023

Prepared for:

Ohio Department of Transportation
District 8
505 South SR 741
Lebanon, Ohio 45036

Prepared by:

Stantec Consulting Services Inc.



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1.0 INTRODUCTION

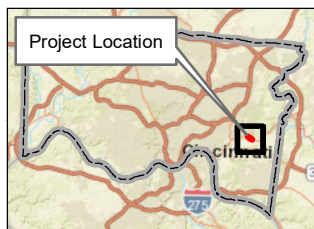
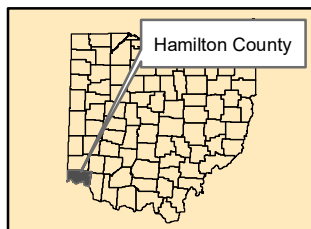
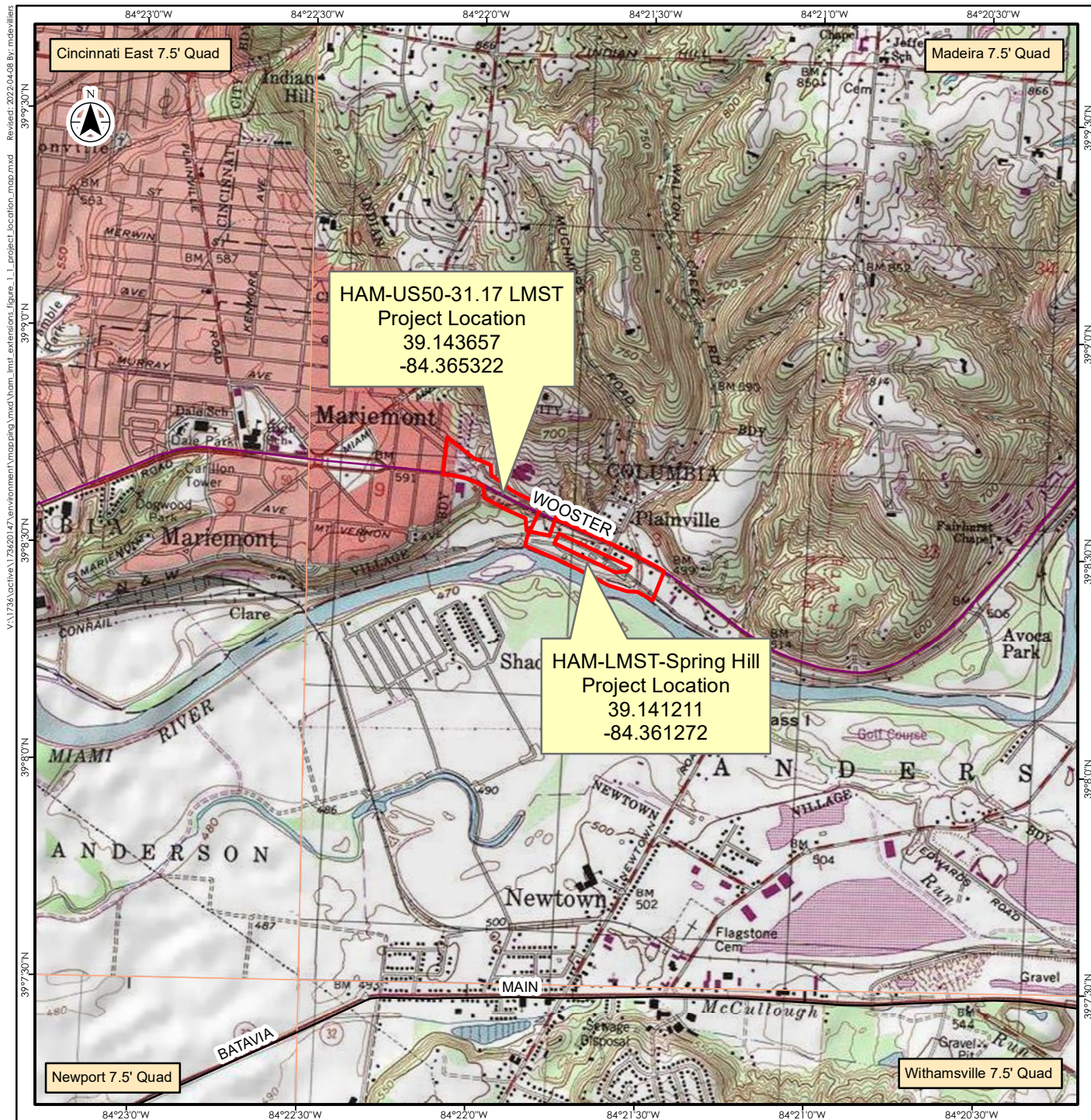
Great Parks of Hamilton County (Great Parks), Columbia Township, and the Village of Mariemont, in cooperation with the Ohio Department of Transportation (ODOT), are proposing a new shared-use path connection from the Columbia Connector Trail near US 50 (Wooster Pike) to the Mariemont Library at Pocahontas Avenue. The proposed project is located in Columbia Township and the Village of Mariemont in southeast Hamilton County (See **Figure 1**, Project Location Map). This project is divided into two separate contiguous sections for funding purposes; however, these sections will be evaluated as one project in engineering and environmental studies following ODOT's Project Development Process (PDP). The eastern section of the trail extends from the existing Columbia Connector Trail at Walton Creek to Spring Hill Drive. (The Columbia Connector Trail extends eastward for 0.3 miles to the Little Miami Scenic Trail). This section, which is sponsored by the Great Parks of Hamilton County, is identified as PID 114496 in ODOT's Project Management System and will be referred to as the Spring Hill Extension throughout this Feasibility Study. The western section of the trail extends from Spring Hill Drive to the Mariemont Library at Pocahontas Avenue, along US 50. This section, which is sponsored by Great Parks, Columbia Township, and the Village of Mariemont is identified as PID 114497 and will be referred to as the Pocahontas Extension throughout this report. This Feasibility Study was prepared as part of ODOT's PDP to document the process used to recommend a preferred alternative for the Little Miami Scenic Trail Extensions to Spring Hill (PID 114496) and Pocahontas (PID 114497). This report summarizes the results of the engineering and environmental studies conducted to date, as well as input received from project stakeholders and the public throughout the development of the project.

1.1 PROJECT HISTORY

Project Development

In 2017, ODOT prepared a *Transportation Needs Analysis* for Segments II and III (PID 86462) of the Eastern Corridor Program, a multi-modal transportation improvement program extending from downtown Cincinnati and communities through eastern Hamilton County and into western Clermont County, Ohio. The Eastern Corridor Program is a coordinated series of regional transportation improvement studies and projects in varying stages of planning, construction, and completion. The study area for Segments II and III extends between the Red Bank Corridor (Segment I) and the I-275/SR 32 interchange in the Eastgate Area of Clermont County (Segment IV), encompassing key routes through this area including US 50 in Columbia Township and the Village of Mariemont. Transportation needs in the Segments II and III study area were identified through technical studies and confirmed and refined through community and stakeholder input. The project team conducted extensive public and stakeholder outreach to learn how communities prioritized transportation needs with respect to community goals, objectives, and ongoing planning. The need for pedestrian and bicycle connectivity from Mariemont to the Little Miami Scenic Trail (LMST) and the need to address pedestrian connectivity to businesses on the south side of US 50 were identified as secondary





Notes

1. Coordinate System: NAD 1983 StatePlane Ohio South FIPS 3402 Feet
2. Base features produced from project design elements.
3. Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS

0 1,000 2,000
Feet
1:25,000 (at original document size of 8.5x11)



Project Location 173620147

Columbia Township,
Hamilton County, Ohio
Prepared by MDV on 2022-04-08

Client/Project
HAM-LMST-Spring Hill (PID114496)
HAM-US50-31.17 LMST (PID114497)
Technical Memorandum

Figure No.
1.1

Title

Project Location Map

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needs. Excerpts from the 2017 Transportation Needs Analysis relevant to this project can be found in **Attachment A**.

Based on the transportation needs identified in the 2017 Needs Analysis, ODOT began to develop project concepts which would address these needs. Concepts were developed through extensive input from five Advisory Committees comprised of stakeholders from six focus areas identified within the study area for Segments II and III. Advisory Committee members included elected officials, transportation planning professionals, and community and interest group representatives. Advisory Committee members assisted with identifying, evaluating, and prioritizing recommended solutions for transportation needs within their assigned focus area, as well as developing strategies for implementation. Each Advisory Committee convened for four work sessions throughout this process for a combined total of 20 meetings. Two public meetings were also held throughout the development and refinement of the transportation concepts. Through this process, 68 transportation concepts were recommended for the Segments II and III study area and are identified in the *Conceptual Alternatives Implementation Plan* dated June 21, 2019. Excerpts from the *Conceptual Implementation Plan* relevant to this project can be found in **Attachment B**. The Implementation Plan identified two concepts to improve pedestrian and bicycle connectivity along US 50. These concepts included:

- Adding a Shared-Use Path from Little Miami Scenic Trail (LMST) to Spring Hill (Concept F7)
- Adding a Shared-Use Path Along US 50 from Spring Hill to Pocahontas (Concept F8)

Consistency with Local and Regional Planning

This project is consistent with local and regional trail planning efforts underway by Columbia Township and Great Parks of Hamilton County. At its eastern terminus, the proposed trail extension will connect to the recently opened stretch of the Columbia Connector, which runs west from the LMST at the northern end of the Newtown Road bridge and continues along US 50 to Walton Creek. At its western terminus, the proposed trail will connect to the Murray Path extension, currently under development by the Village of Mariemont. The proposed trail extension will be part of the proposed CROWN (Cincinnati Riding or Walking Network) a planned 34-mile urban trail loop around Cincinnati. When it is complete, CROWN will connect regional trails currently in development including Wasson Way, Ohio River Trail East, LMST, Ohio River Trail West, Mill Creek Greenway Trail, and Canal Bikeway and will provide a link to 54 communities (TriState Trails, 2022.). The proposed trail is included in the Ohio-Kentucky-Indiana (OKI) 2050 Metropolitan Transportation Plan (approved June 11, 2020).

2.0 PURPOSE AND NEED

2.1 PROJECT PURPOSE

The purpose of the proposed project is to address pedestrian and bicycle connectivity issues along US 50 between the Columbia Connector Trail to the east and Pocahontas Avenue to the west.



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2.2 NEED ELEMENTS

2.2.1 Pedestrian and Bicycle Connectivity

Connectivity Between Residential Areas in Mariemont and Columbia Township and the LMST and Regional Trail System

There is a need to improve pedestrian and bicycle connectivity between residential communities in Mariemont and Columbia Township and the LMST, as well as to other local and regional trails, including the Wasson Way, the Ohio River Trail, Mill Creek Greenway Trail, Canal Bikeway, the Lunken Airport Trail, and the Otto Armleder Memorial Park Trail. In addition, this trail is a vital connection in the CROWN (Cincinnati Riding or Walking Network) which will connect Greater Cincinnati's regional trails to Downtown Cincinnati.

Connectivity to Businesses on the South Side of US 50

There is also a need to improve connectivity for bicyclists and pedestrians traveling along US 50 to visit businesses located along the south side of US 50. Currently there is a sidewalk on both sides of US 50 between the Walton Creek intersection at the project's eastern terminus and the western terminus at Pocahontas Avenue. Through this section, however, bicyclists are expected to share the road with vehicles, as indicated by sharrows¹ marked on the roadway pavement in some areas along this stretch of roadway. In the lanes with sharrows markings, there is no additional road space for the bicycles. Instead, these lanes are meant to be used in situations where cyclists and drivers must coexist in the same lane, and bicyclists are not separated from vehicular traffic. Having a dedicated bike/pedestrian path would improve safety for bicyclists traveling along US 50.

3.0 ALTERNATIVES

3.1 NO BUILD ALTERNATIVE

Under the No Build Alternative, there would be no improvement in bicycle connectivity along US 50 between Walton Creek at the eastern terminus and Pocahontas at the western terminus. Bicyclists traveling to the LMST from the surrounding neighborhoods in Columbia Township and the Village of Mariemont would continue to travel on US 50 which would be a safety concern.

¹ Sharrows are symbols which show a white bicycle outline topped with two chevrons which are on the road pavement.



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3.2 BUILD ALTERNATIVES

As previously mentioned, this project is divided into two contiguous sections for funding purposes. The eastern section (Spring Hill Extension) begins at the existing Columbia Connector near US 50 West and extends west to Spring Hill Drive. The western section (Pocahontas Extension) continues from Spring Hill Drive west to Pocahontas Avenue. These sections will be discussed separately throughout the remainder of the Feasibility Study Report.

Spring Hill Extension (PID 114496)

The Spring Hill Extension includes a shared-use path between the Columbia Connector Trail and Spring Hill Drive. During the 2019 *Conceptual Alternatives Implementation Plan*, a concept was developed to address pedestrian and bicycle connectivity along US 50 from Newtown Road to Spring Hill Drive, a need previously identified in the 2017 Needs Analysis and discussed in Section 1.2. This concept, identified as F7, follows an old railroad bed to connect to the LMST. Concept F7 was recommended for further study as a “High Priority” project in the *Conceptual Alternatives Implementation Plan*. This alternative is proceeding in phases, the first phase, which was constructed in 2019, included completion of a shared-use path which extends from the LMST at the northern end of the Newtown Road bridge and then goes behind 50 West Brewing Co. and several other businesses along Wooster Pike to Walton Creek.

At the initiation of the Feasibility Study the project team discussed two build alternatives for the Spring Hill Extension from Walton Creek. These alternatives include:

- Alternative 1: This alternative extends the Columbia Connector Trail over Walton Creek and follows an alignment parallel to the Little Miami River along the back side of Kroger at Walton Creek. This alignment then curves away from the Little Miami River along the west side of Miami Run and ends at the US 50/Miami Run/Spring Hill Drive intersection.
- Alternative 2: This alternative extends the Columbia Connector Trail over Walton Creek and follows an alignment parallel to Walton Creek up to US 50. The alignment then turns northwest and follows immediately adjacent to US 50, utilizing the existing sidewalk space, and ends at the US 50/Miami Run/Spring Hill Drive intersection.

Pocahontas Extension (PID 114497)

At the initiation of the Feasibility Study, the project team discussed two build alternatives for the Pocahontas Extension. These were:

- Alternative 1: This alternative begins at the US 50/Miami Run/Spring Hill Drive intersection and parallels US 50 on the south side, utilizing existing sidewalk space. The alignment crosses US 50 at the entrance to Mariemont Promenade, and then crosses Mariemont Way. This alignment then switchbacks up the hill to Warrior Way, crosses Warrior Way, parallels an existing utility corridor,



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and ends at Pocahontas Avenue, across from the future Murray Path Extension positioned between Rembold Avenue and Hiawatha Avenue.

- Alternative 2: This alternative begins at the Wooster Pike/Miami Run/Spring Hill Drive intersection where it immediately crosses US 50, then parallels US 50 on the north side, utilizing existing sidewalk space, and crosses Mariemont Way. This alignment then switchbacks up the hill to Warrior Way, crosses Warrior Way parallel to an existing utility corridor, and ends at Pocahontas Avenue across from the future Murray Path Extension positioned between Rembold Avenue and Hiawatha Avenue.

The alternatives for both the Spring Hill Extension (PID 114496) and the Pocahontas Extension (PID 114497), as well as typical sections for the alternatives are shown on the figures provided in **Attachment C**.

4.0 KEY ISSUES

This section summarizes the technical studies and information that were considered as part of the evaluation and selection of a preferred alternative.

The design user for this proposed shared use path project is the “interested but concerned” user as defined by ODOT’s Multimodal Design Guide (MDG). This user profile matches the user profile believed to be using the adjacent Little Miami Scenic Trail and includes users of all ages and skill levels. Based on Figure 3-1 of the MDG, “Bicyclist Design User Profiles”, 51 to 56 % of the total population are interested in using bike facilities but are concerned for their safety and may not use less protected bike facilities, such as bike lanes, if these facilities don’t meet their perceived level of comfort.

4.1 SAFETY ANALYSIS

4.1.1 No Build Alternative

Without construction of the proposed project, there would be no improvement in bicycle and pedestrian facilities between the LMST and Pocahontas Avenue. Bicyclists traveling to the LMST from the surrounding neighborhoods in Columbia Township and the Village of Mariemont would continue to travel along US 50, which would not improve safety for cyclists by removing them from the roadway. Sidewalks exist on both sides of US 50, which currently provide pedestrian connectivity to the surrounding neighborhoods in Columbia Township and the Village of Mariemont.

Bicycle and pedestrian safety along US 50 from Pocahontas Avenue to Newtown Road was evaluated by reviewing five years of bicycle and pedestrian crash data from January 1, 2017 through December 31, 2021 using ODOT’s GIS Crash Analysis Tool (GCAT). One bicycle and two pedestrian crashes were reported in the five-year period. The bicycle crash occurred in front of the Tire Discounters and was caused by a vehicle hitting a bicycle travelling eastbound in the outside lane of the road. One pedestrian crash occurred in the



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crosswalk at the Pocahontas Avenue intersection and the other occurred in front of Kroger when a pedestrian actively fleeing law enforcement ran into the road.

In general, there are potential safety issues for bicyclists traveling along US 50 since bicyclists must share the outside lane of US 50 with automobiles. There are sharrow road markings along this section of roadway, which alert motorists that they must share the road with bicyclists. However, there are no physical barriers between cars and bikes, making this area challenging for inexperienced bicyclists. US 50 has a posted speed limit of 40 mph and had an average daily traffic (ADT) volume of 20,412 vehicles per day in 2019, so it is a very busy corridor. A dedicated bicycle lane was recently constructed in the eastbound direction from Spring Street to Newtown Road, which improved bicycle safety for users willing to ride within the roadway. Pedestrians have a dedicated sidewalk system on both sides of US 50; however, portions of the sidewalk are adjacent to the street without a tree lawn buffer. This results in bicycles/pedestrians crossing or traveling next to vehicular traffic, which creates conflicts with vehicular traffic and puts bicycles and pedestrians at greater risk when compared to dedicated bicycle and pedestrian facilities that are physically separated from roadways.

Providing bicyclists and pedestrians with separated facilities also reduces the level of traffic stress of the facility. Bicycle Level of Traffic Stress (LTS) is used as a way to quantify the level of stress or discomfort one may feel when biking close to traffic. LTS is determined by the posted speed of the roadway, daily volume of the roadway (vehicles per day), the number of vehicular lanes and the type of separation between vehicular traffic and bicyclists. (ODOT, MDG section 2.5.2) There are four (4) levels of traffic stress:

- LTS 1 – Very low stress, suitable for all ages and abilities
- LTS 2 – Low stress, comfortable for most adults
- LTS 3 – Medium stress, ridden by enthused/confident cyclists
- LTS 4 – High stress, ridden by strong/fearless cyclists.

Currently, there is a “medium” LTS within the project area between the existing terminus of the Murray Path at Plainville Rd and the terminus of the Columbia Connector at Walton Creek. Whereas, both the Murray Path and the Columbia Connector Trail have a very low LST. The No Build Alternative will not address this area of medium LTS.

4.1.2 Build Alternatives

Each of the Build Alternatives include the construction of a shared-use path which is physically separated from vehicular traffic and would, therefore, be safer for bicycles and pedestrians than the No Build Alternative. Additionally, the construction of either Build Alternative would reduce the LTS within this segment of US 50. Either of the Build Alternatives would have a low LTS. Connecting the Murray Path and Columbia Connector trails mentioned above with a low LTS facility would be a substantial improvement in the regional connectivity for the interested but concerned user profile which represents 51-56% of the total



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population. This project will fill a portion of the gap between the Murray Path and Columbia Connector trails and it is anticipated that the Mariemont Connector Trail will fill the rest.

The Build Alternatives also help bridge the gap between two areas of high “Active Transportation Need”. Active Transportation Need measures several indicators to determine the level of need for bicycle and pedestrian facilities in a particular area. These indicators include concentrations of minority groups, youth, older adults, poverty, adults with no high school diploma, people with limited English proficiency, and people with no access to a motor vehicle. Building bicycling and walking facilities in these high need areas can help provide multiple transportation options and decrease some of the economic and health burdens experienced by residents. (ODOT, Needs Analysis, 2020).

Each Build Alternative also provides a facility to and from areas of moderate “Active Transportation Demand”. Active Transportation Demand is determined by the following factors: employment density, population density, walk/bike commute mode share, park density, presence of college/university, retail employment density, and number of people 200% below poverty line. The area north of US 50, has an area of high Active Traffic Need and moderate Active Traffic Demand (ODOT, Demand Analysis Survey, 2020). Therefore, each Build Alternative provides a safer facility that connects the communities north of US 50 to the retail stores along US 50, the parks along the Little Miami River, as well as the schools and businesses in the area for those that commute via biking.

The safety differences between the Build Alternatives for the Spring Hill and Pocahontas Extensions are described below.

Spring Hill Extension (PID 114496):

Alternative 1 follows along the old railroad bed behind the Kroger Shopping Center and has two potential bicycle/pedestrian conflicts with automobiles – one at the trail crossing of Miami Run and one at the trail crossing of the Kroger Fuel Center.

Alternative 2, which runs along the south side of US 50, has four potential bicycle/pedestrian conflicts with automobiles. These include three driveways and the crossing of Miami Run.

Pocahontas Extension (114497):

Alternative 1 parallels the south side of US 50 and Alternative 2 runs along the north side of US 50. Alternative 1 has 3 crossings at intersections and 1 driveway crossing. Alternative 2 has one less driveway crossing compared to Alternative 1, and would, therefore, have fewer potential bicycle/pedestrian conflicts with automobiles than Alternative 1.

4.2 SHARED-USE PATH DESIGN ISSUES

This section discusses design issues which were important considerations in the development of the shared-use path alternatives. The biggest design challenge of this project was developing a trail through the project area which would maintain a vertical grade that would meet the requirements of the Americans



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with Disabilities Act (ADA) Accessibility Guidelines for Public Rights-of-Way (U.S. Access Board, 2022). The elevation difference between the two project ends is approximately 100 feet. As can be predicted by such a large elevation change, there are some areas of the proposed shared-use path that will be quite steep. Section R302.5 of these guidelines provides specific vertical grade requirements for proposed facilities. For shared-use paths within an existing street right-of-way, the maximum grade shall not exceed the general grade established for the adjacent street. For shared-use paths that are not contained within an existing street right-of-way, the vertical grade for accessible routes shall be less than or equal to 5 percent. Section R305.2.4 states that where compliance with the requirements listed above “is not practicable due to existing terrain or infrastructure, right-of-way availability, a notable natural feature, or similar existing physical constraints, compliance is required to the extent practicable.” (U.S. Access Board, 2022) This approach has been used in the design of the vertical grade of all alternatives. All alignments have been designed to meet the accessibility requirements of the ADA to the greatest degree possible.

Design Exceptions, which are documented decisions to deviate from minimum established design standards, will not be required on US 50 or the shared use path for any of the alternatives. Design considerations and challenges specific to each alternative are discussed in the paragraphs below.

Spring Hill Extension (PID 114496)

Walton Creek Crossing: Both Alternatives 1 and 2 will cross Walton Creek utilizing an old railroad bridge. The bridge was rehabilitated in 2020 by removing the existing superstructure and rehabilitating and rebuilding the existing stone abutments. Cast-in place concrete facing walls 8-inches thick in front of geosynthetic reinforced soil were constructed to replace the missing sections of the stone abutments. A formliner was utilized to match the appearance of the stone abutments. A concrete cap was constructed on top of the existing stones and the new geosynthetic reinforced fill to support a future bridge superstructure. The overall length of the bridge is approximately 26 feet, and the abutments were modified to accept up to a 14-foot-wide superstructure. It is anticipated that the future superstructure would consist of 12-inch-deep prestressed concrete box beams with a 3 ½-inch thick asphalt wearing surface. In order to determine the work that would be required for the existing bridge, coordination was undertaken with Great Parks to acquire all information they have relating to the bridge rehabilitation. The only information they have available is the plans and as-builts for the rehabilitation work.

From discussions with Great Parks, it has been determined the superstructure for the proposed bridge will be a prefabricated steel truss matching the style of the nearby bridges where the LMST crosses the Little Miami River. The truss bridge will provide a clear width of twelve feet between AASHTO-compliant handrails. Additional modifications to the abutments will be required to accommodate the truss bridge. The Structures Type Study, which details the bridge analysis, is included in **Attachment D**.

Alternative 1: The length of Alternative 1 is 1800 ft and it is anticipated that the width of the shared-use path will be 14 ft throughout the length of the alternative. This shared-use path has a minimum design speed of 20 mph. A new bridge will be required to carry the path over Walton Creek, as discussed above. The construction of Alternative 1 will require the placement of permanent erodible fill within the floodway and floodplain of the Little Miami River behind Kroger. More information about floodplain impacts can be



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found in section 4.6. The main design issue for Alternative 1 is the steep grade of the path along Miami Run. The existing vertical grade of Miami Run is approximately 7%. While it is desirable to keep shared-use path grades below 5% for accessibility, a 5% grade is not feasible in this location because of the existing topography and confined space. The shared-use path along Miami Run, between US 50 and the Kroger Fuel Center drive, will follow the 7% grade of Miami Run as much as possible. A small 50-foot section of shared-use path between the Kroger Fuel Center drive and Miami Run will have a slope of approximately 10%. This steeper grade is caused by the installation of ADA compliant curb ramps across the Mariemont Landing subdivision entrance. In order to reduce the grade in this location, a longer alignment behind the Kroger Fuel Center was evaluated. However, this alignment still was found to have steep grades.

Alternative 2: The length of Alternative 2 is 1800 ft and the width of the shared-use path will be 12 ft along US 50 and 14 ft elsewhere. This shared-use path has a minimum design speed of 20 mph. A new bridge will be required to carry the path over Walton Creek, as discussed above. The construction of Alternative 2 will require the placement of permanent erodible fill within the floodway and floodplain of the Little Miami River to the west of Walton Creek. More information about floodplain impacts can be found in section 4.6. There will be a 4.5 ft vegetated buffer (5 ft from face of curb) between US 50 and the shared-use path. It was assumed for this study that the existing bicycle lane on US 50 between Kroger and Walton Creek would be removed to make space for the shared-use path and minimize private property impacts. Along US 50, the path will cross two signalized commercial drive entrances and two unsignalized commercial drive entrances.

A small retaining wall is needed along Alternative 2 to reduce impacts to the McDonald's parking lot on the south side of US 50. This wall will replace an existing retaining wall that is being impacted by the proposed shared-use path and is needed to support the new fill required for the proposed shared-use path. The anticipated maximum exposed height of the wall is 6.5 feet with an average exposed height of approximately 4.5 feet. The proposed wall is 215 feet in length. A gravity or soil reinforced modular block wall is proposed for this location based on the exposed height, fill condition, and expected load on the wall. Fill will be constructed behind the wall to support the proposed shared-use path. No vehicular loads are anticipated to be applied to the wall. Modular block walls are an economical and attractive solution for walls under these conditions. Portions of the wall may require the fill behind the wall be reinforced with geogrid where required by wall height or loading on the fill behind the wall. As US 50 approaches Miami Run from the east, the grade starts to increase to just over 5% as it climbs the hill into the Village of Mariemont. Alternative 2 has a grade over 5% for this portion as well. Since this alternative is along US 50 and the path mirrors the grade of the roadway, this grade is compliant with the ADA accessibility guidelines.

Pocahontas Extension (PID 114497)

Alternatives 1 and 2 are the same from Pocahontas Ave to Mariemont Promenade.

Both Alternatives 1 and 2 have been designed with a mid-block crossing of Warrior Way. Appropriate countermeasures for mid-block crossings will be considered at this location such as high-visibility crosswalk markings and crossing warning signs.



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Both Alternatives 1 and 2 traverse the area between Warrior Way and Mariemont Way where the existing grade is approximately 10%. Several concepts were considered and/or explored to reduce the vertical grade of the path in this area. These concepts included various alignments to try to avoid the steep grade, an underpass for Warrior Way, replacing the sidewalk with a shared-use path along Mariemont Way, and constructing an alignment with switchbacks². Based on the engineering analysis it was determined that the vertical grade of the shared-use path along this segment could be reduced to 5% by lengthening the trail and constructing switchbacks to navigate the steep terrain. The switchbacks designed would not require any retaining walls or permanent impacts to existing pavements or utility structures. The design speed of the path in this area is reduced to 12 mph to fit the horizontal geometry necessary for the switchbacks.

Alternative 1: The length of Alternative 1 is 2000 ft and it is anticipated that the width of the shared-use path will be 12 ft along US 50 and 14 ft elsewhere. This shared use path has a minimum design speed of 12 mph. Approximately 1300 ft of the 2000 ft length of Alternative 1 will have a grade of approximately 5%. As a result, pull-offs will be added to the path for users to rest.

A retaining wall will be required along Alternative 1 between Mariemont Crescent and US 50 to support the proposed shared-use path on the existing slope. This wall is proposed to support the new fill required for the proposed shared-use path with a 3:1 slope between the edge of trail and the top of wall. The anticipated maximum exposed height of the wall is 11 feet with an average exposed height of approximately 6.9 feet. The proposed wall is 125 feet in length and will be constructed on an existing slope for portions of the wall and on level ground behind an existing wall for other portions. It appears the proposed wall is a sufficient distance behind the existing wall to avoid creating additional loading on the wall. Fill will be placed behind the wall to support the proposed trail. No vehicular loads are anticipated to be applied to the wall. Stantec is proposing a cast-in-place cantilever wall for this location to support the high fill and 3:1 slope behind the wall. The foundation type will be determined by a geotechnical investigation.

Alternative 2: The length of Alternative 2 is 2000' and it is anticipated that the width of the shared-use path will be 12 ft along US 50 and 14 ft elsewhere. This shared use path has a minimum design speed of 12 mph. Approximately 1300 ft of the 2000 ft length of Alternative 2 will have a grade of approximately 5%. As a result, pull offs will be added to the path for users to rest.

When the shared-use path is adjacent to US 50, there will be a 4.5 ft vegetated buffer (5' from face of curb) between US 50 and path. In this same area, a retaining wall will be required between Mariemont Way and Spring Hill Drive north of US 50. This wall is proposed to support an existing hillside where the toe of the slope is being excavated for the proposed shared-use path. The anticipated maximum exposed height of the wall is 10 ft with an average exposed height of approximately 9.7 ft. The proposed wall is 900 ft in length. Stantec proposes a soldier-pile wall with a cast-in-place concrete facing to allow for aesthetic treatments. This wall type avoids significant disturbance to the ground behind the wall and allows a "top-down" construction sequence which is efficient and cost effective. This wall type is also well-suited for

² A switchback is a path up a sharp ascent or descent that makes a series of bends to flatten the grade.



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resisting the loads from the hillside behind the wall. Should aesthetics not be a concern at this location, precast concrete lagging could be used between the soldier piles to reduce project cost.

4.3 POST-CONSTRUCTION STORM WATER BEST MANAGEMENT PRACTICES

This section discusses the preliminary post-construction stormwater best management practices (BMP). Post-Construction Storm Water Best Management Practices (BMPs) are provided for long-term management of storm water runoff quality and quantity so that a receiving stream's physical, chemical and biological characteristics are protected, and stream functions are maintained. This analysis was performed to identify challenges associated with BMP installation and ensure that the construction limits for each alternative incorporate the BMP areas. The BMP analysis was conducted in accordance with the Ohio Department of Transportation, Location and Design Manual, Volume 2. Stantec also utilized several other ODOT BMP resources including the BMP calculation spreadsheet and the ODOT BMP tool. The BMP analysis is included in **Attachment E**.

4.3.1 No Build Alternative

No BMPs would be required under the No Build Alternative.

4.3.2 Build Alternatives

Spring Hill Extension (PID 114496)

Alternative 1: The total project earth disturbed area for post-construction storm water BMP is 2.01 acres. Because the earth disturbed area is larger than one acre, permanent BMPs will be required. The overall treatment area required is 0.09 acres. This alternative will utilize vegetated filter strips to treat stormwater runoff for the project.

Alternative 2: The total project earth disturbed area for post construction storm water BMP is 1.48 acres. Because the earth disturbed area is larger than one acre, permanent BMPs will be required. The overall treatment area required for Alternative 2 will be 0.36 acres. Due to the limited space between the proposed shared-use path, and the existing roadway, vegetated BMPs, such as vegetated filter strips or enhanced bankful width ditches, will not fit. A manufactured system will need to be installed to treat post-construction storm water runoff. This manufactured system will be placed just west of Walton Creek near the Little Miami River. Storm water treated by the manufactured system will need to be isolated from the main storm sewer trunk line along US 50 so that the manufactured system is not overloaded. This manufactured system will require regular maintenance and a backflow preventer will need to be installed at the outlet to prevent inundation during flood events.



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Alternative 1: The total project earth disturbed area for post-construction storm water BMP is 1.95 acres. Because the earth disturbed area is larger than one acre, permanent BMPs will be required. The required area for overall treatment is 1.21 acres. This alternative will utilize a bioretention cell, a manufactured system, and vegetated filter strips to treat storm water runoff. The bioretention cell and the manufactured system will be constructed between Mariemont Way and Warrior Way. These BMPs will require regular maintenance. There may not be enough project width to construct vegetated filter strips with this alternative. If PID 114496 Alternative 1 is also constructed, it is suggested that additional vegetated filter strips be constructed as part of that project to earn treatment credit for this project. If this alternative advances, additional BMP options may be explored to reduce cost and future maintenance obligations.

Alternative 2: The total project earth disturbed area for post-construction storm water BMP is 1.99 acres. Because the earth disturbed area is larger than one acre, permanent BMPs will be required. The required area for overall treatment is 0.82 acres. This alternative will utilize a bioretention cell and a manufactured system to treat storm water runoff. Both the bioretention cell and manufactured system will be constructed between Mariemont Way and Warrior Way and will require regular maintenance. If this alternative advances, additional BMP options may be explored to reduce cost and future maintenance obligations.

4.4 MAINTENANCE OF TRAFFIC (MOT)

This section discusses the temporary traffic impacts required to construct the various build alternatives.

4.4.1 No Build Alternative

There would be no MOT impacts under the No Build Alternative.

4.4.2 Build Alternatives

The following sections discuss the Maintenance of Traffic (MOT) that would be required for the project alternatives.

Spring Hill Extension (PID 114496)

Alternative 1: The location of this alternative behind the businesses along US 50 eliminates most temporary traffic impacts during construction. The section of the alignment located directly behind these properties has no vehicular or pedestrian traffic present and little to no maintenance traffic considerations will be necessary. As the route crosses and travels along Miami Run, Mariemont Landing Condominiums, and the Kroger Fuel Center driveway, two-lane, two-way traffic will be maintained to construct curb cuts, drop curbs, and curb ramps on the existing curbs using drums to delineate the work zone. To maximize the width of the travel ways at the intersections and driveways, work will be limited to one curb of each intersection at any given time. No full closures of any kind are anticipated for the construction of this alternative. Vehicular and pedestrian access to all properties will be maintained at all times. Construction



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equipment access will be provided through the back of the Kroger parking lot for construction on the west side of Walton Creek. Temporary curb cuts may be necessary at the back of the parking lot to facilitate access. Construction equipment access could also be provided just west of Walton Creek with similar temporary curb cuts. Construction equipment access on the east side of Walton Creek can be provided through the east end of the Fifty West parking lot. Equipment would travel along the existing Columbia connector trail to access the bridge. Care should be taken not to damage the existing trail.

Alternative 2: Construction of the bike path along US 50/Wooster Pike in Alternative 2 will require a daily lane closure of the outside lane of the eastbound US 50 traffic. These lane closures will be set in place with drums prior to the start of work and the lane will be restored once work is completed at the end of each day. The work to be performed during the lane closures will include relocating the curb line and constructing the shared-use path. Temporary closure of multiple parking stalls on the McDonald's property will be required for work zone activities including building a new retaining wall on the McDonald's property. Parking spaces will be temporarily impacted, however, the circulatory movements of vehicles around the McDonald's will be maintained at all times. Since there are existing sidewalks on the north and south sides of US 50/Wooster Pike, a pedestrian detour will be set up forcing pedestrians to utilize the north sidewalk during construction. To maximize the width of the travel ways at the intersections and driveways, work will be limited to one curb of each intersection at any given time. No full closures of any kind are anticipated for the construction of this alternative. Vehicular and pedestrian access to all properties will be maintained at all times.

Pocahontas Extension (PID 114497)

Maintenance of traffic is not expected to be a major differentiator between the two Pocahontas Extension alternatives. Construction of the bike path along US 50/Wooster Pike in both alternatives will require a daily lane closure of the outside lane of either eastbound or westbound US 50 traffic. These lane closures will be set in place with drums prior to the start of work and the lane will be restored once work is completed at the end of each day. The work to be performed during the lane closures will include relocating the curb line and constructing the shared-use path. Pedestrian traffic will be maintained along US 50/Wooster Pike by installing a pedestrian detour using the existing crosswalks at Mariemont Way and Miami Run to detour pedestrian traffic to the north or south side US 50/Wooster Pike opposite of the work area. This detour will remain in place throughout the duration of the work. To maximize the width of the travel ways at the intersections and driveways, work will be limited to one curb of each intersection at any given time.

The alignment on the west end of the Pocahontas Extension diverts away from US 50/Wooster Pike eliminating maintenance of traffic concerns along US 50/Wooster Pike. Both alternatives are the same from this point westward. As the proposed alignment crosses over Warrior Way and ends at Pocahontas Avenue, curb ramps will need to be constructed at the existing curb line. This will be performed by reducing the traffic lanes with drums to a minimum width that will still accommodate two-lane, two-way traffic. In order to maintain both lanes, work will be restricted to one side of the street at a time. This alignment also avoids conflict with existing pedestrian facilities in the area and will not require considerations for maintaining pedestrian traffic.



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No full closures of any kind are anticipated for the construction of either alternative. Vehicular and Pedestrian access to all properties will be maintained at all times.

4.5 RIGHT-OF-WAY REQUIREMENTS

This section discusses impacts to private property and provides an estimate of permanent property acquisition that would be required for the construction of each of the shared-use path alternatives. The project sponsors have determined that no private property will be appropriated for this project. Therefore, the impacts shown below will need to be transferred willingly by each property owner. Meetings with the property owners is ongoing. Several meetings have occurred to date and are documented in **Table H-1 in Attachment H**.

4.5.1 No Build Alternative

There would be no right-of-way impacts under the No Build Alternative.

4.5.2 Build Alternatives

Spring Hill Extension (PID 114496)

Alternative 1: This alternative would result in a total of 0.73 acres of temporary and permanent impacts to private property from four owners. These owners include Kroger and McDonald's. Impacts to private property would include drive modifications along Miami Run but would not include any significant impacts to other structures such as monument or advertising signs. Much of this alternative utilizes property already owned by Great Parks.

Alternative 2: This alternative would result in a total of 0.67 acres of temporary and permanent impacts to private property from six owners. These owners include Carriage House Car Wash, McDonald's, and several other outlot properties in front of the Kroger development. Impacts to private property would include drive modifications along US 50 as well as significant impacts to multiple existing McDonald's structures. Property impacts to McDonald's would include an encroachment into the parking lot with a new retaining wall. This would reduce the number of existing spaces from 19 to 16 along US 50. The existing advertising sign and two existing light poles would also need to be relocated or replaced as it is in direct conflict with the shared-use path. Much of this alternative utilizes state right of way along US 50.

Pocahontas Extension (PID 114497)

Alternative 1: This alternative would result in a total of 1.81 acres of temporary and permanent impacts to private property from six owners. These owners include Mariemont Board of Education, Public Library of Cincinnati & Hamilton County, Mariemont Promenade, Kroger and other commercial owners. Impacts to private property would include drive modifications along US 50 and the relocation or replacement of the Kroger Fuel Center advertising sign. A portion of this alternative utilizes state right of way along US 50.



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Alternative 2: This alternative would result in a total of 1.31 acres of temporary and permanent impacts to private property from four owners. These owners include Mariemont Board of Education, Public Library of Cincinnati and Hamilton County, and the Spring Hill Condominium Owners Association. Impacts to private property would include the construction of the trail and permanent grade changes but would not include any significant impacts to other structures such as monument or advertising signs. A portion of this alternative utilizes state right of way along US 50.

4.6 UTILITY ISSUES

Preliminary utility coordination was conducted as a part of this Feasibility Study. This coordination included design coordination with OHIO811 for information on utilities in the project area. Based on information received through OHIO811, Duke Energy has aerial electric lines and underground gas lines in the project area. There are also aerial communication lines in the project area owned by Cincinnati Bell and Charter Communications and MCI Communications/Verizon. Greater Cincinnati Water Works owns water distribution lines in the area. (MSD) owns sanitary and combined sewer facilities in the project area. The Cincinnati Stormwater Management Utility owns storm sewers in the project area. ODOT owns storm sewers along with underground and overhead traffic signal equipment in the project area. A brief description of utility impacts for each alternative is described below. Further coordination with the utility providers will occur throughout project development.

4.6.1 No Build Alternative

There would be no impacts to utilities as a result of the No Build Alternative.

4.6.2 Build Alternatives

Spring Hill Extension (PID 114496)

Alternative 1: There are no major utility impacts associated with Alternative 1. This alternative is located away from US 50 and consequentially away from most utilities as well. Likely utility impacts include the signal support pole on the southwest corner of the US 50/ Miami Run intersection and minor modifications to existing storm systems. The above signal pole will likely be impacted regardless of which Spring Hill Extension Alternative is chosen.

Alternative 2: Alternative 2 impacts multiple existing utilities. The alternative will be constructed adjacent to US 50 in existing right of way right where the existing utilities are located. This alternative will impact the existing overhead electric lines, overhead communication lines and water supply lines on the south side of US 50. It is anticipated that multiple utility poles will need to be relocated as well as fire hydrants for the proposed shared-use path. As mentioned with Alternative 1, it is likely that the signal support pole in the southwest corner of the US 50/Miami Run intersection will need to be relocated. Other signal support poles on the south side of US 50 may be impacted as well. The curb line on the south side of US 50 will be relocated with this alternative. This will require numerous adjustments to the existing storm sewer trunk line and to catch basins associated with the existing curb line.



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Alternative 1: Utility impacts related to Alternative 1 are limited to two overhead electric power pole relocations, signal support relocations at the Mariemont Promenade, and private utility impacts at the Mariemont Promenade and Mariemont Landing Condominiums. These private utility impacts include at least the Fire Department Connection at the Promenade and a ground mounted electric transformer for the Condominiums. West of Mariemont Way this alternative avoids impacts to the existing electric transmission lines on the north side of US 50.

Alternative 2: Utility impacts related to Alternative 2 are limited to adjustments to the existing storm system along the north side of US 50 including catch basins, two fire hydrant relocations, and signal support relocation at the US 50/Mariemont Way intersection. West of Mariemont Way, this alternative avoids impacts to the existing electric transmission lines on the north side of US 50.

4.7 ENVIRONMENTAL ANALYSIS

The following is a summary of the environmental resources within the project area and the anticipated impacts to those resources with the implementation of the alternatives for the Spring Hill Extension (PID 114496) and the Pocahontas Extension (PID 114497). Information for environmental features in the study area was obtained from secondary sources as well as a field survey of the project area. Environmental maps and other information referenced in this section are included in **Attachment F** and documented in the Environmental Resources Technical Memorandum provided in **Attachment G**.

4.7.1 No Build Alternatives

There would be no impacts to ecological features (rivers, streams, wetlands, and habitat), Section 4(f)/6(f) resources, cultural resources, regulated materials, or underserved populations as a result of the No Build Alternative.

4.7.2 Build Alternatives

The potential impacts of each Build Alternative are described below by resource category.

Rivers, Streams, and Wetlands: The proposed project is located within the Sycamore Creek-Little Miami River watershed (HUC-12 050902021405) and within an Ohio Environmental Protection Agency (OEPA) Nationwide Permit “Ineligible” area. The project area contains four (4) potentially jurisdictional streams – Stream 1 (Walton Creek), Stream 2, Stream 3, and Stream 4 (Little Miami River) (See **Attachment F.1**). In addition, one (1) wetland was delineated within the project area – Wetland A (scrub/shrub/emergent). Based on National Wetland Inventory (NWI) mapping, Stream 4 (Little Miami River) is a riverine habitat classified as a R2UBH wetland (See **Attachment F.2**). The National and State Scenic Little Miami River is also designated by OEPA as an exceptional warmwater habitat (EWH). The project area in total contains 3,583 linear feet (lf) of streams and 0.007 acre (ac) of scrub/shrub/emergent wetland. Additional information regarding the ecological features in the study area and photographs of these features are provided in the



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Ecological Resources Technical Memorandum included in **Attachment G**. The potential impacts under each alternative are described below:

Spring Hill Extension (PID 114496)

Alternative 1: The construction limits for Alternative 1 are expected to impact approximately 128 lf of streams (99 lf of Stream 1 and 29 lf of Stream 2). There would be no wetland impacts.

Alternative 2: The construction limits for Alternative 2 are expected to impact approximately 99 lf of Stream 1. There would be no wetland impacts.

Pocahontas Extension (PID 114497)

Alternative 1: There would be no stream impacts and no wetland impacts.

Alternative 2: The construction limits for Alternative 2 are expected to impact approximately 31 lf of Stream 3. There would be no wetland impacts.

Floodplain: The southeastern portion of the project area falls within the 100-year floodplains of Walton Creek and the Little Miami River (See **Attachment F.3**). A limited hydraulic analysis has been performed to ensure structures designed with this project will be located out of the floodways for Walton Creek and the Little Miami River. A detailed hydraulic study will be performed during final design of the preferred alternative to determine any impact to the regulatory flood water surface elevation. It is not anticipated that the construction of this project will have any adverse effects on regulatory water surface elevations. The potential floodplain impacts of each alternative are described in terms of acres of encroachment to the 100-year floodplain and regulatory floodway as described below.

Spring Hill Extension (PID 114496)

Alternative 1: This alternative would result in an expected 0.12 ac of encroachment of the 100-year floodplain of the Little Miami River, 0.37 ac of encroachment of the combined 100-year floodplain of the Little Miami River and Walton Creek, and an additional 1.32 acres of encroachment to the regulatory floodway of the Little Miami River. Since this alternative encroaches into the floodway, some shared-use-path flooding can be expected. Based on the preliminary design, it is anticipated that this path may flood during a 30-year recurrence interval storm. The preliminary analysis of the improvements being placed along the Little Miami River shows no rise in the 100-year water surface elevation for the Little Miami River. It may be possible, to reduce shared-use path flooding without adversely affecting flood elevations. This will be investigated during detailed design.

Alternative 2: This alternative would result in an expected 1.28 acres of encroachment of the combined 100-year floodplain of the Little Miami River and Walton Creek. Based on the preliminary design, it is anticipated that this path may flood during a 50-year recurrence interval storm. The preliminary analysis of the improvements being placed along the Little Miami River shows no rise in the 100-year water surface elevation for the Little Miami River. It may be possible, to reduce shared-use path flooding without adversely



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affecting flood elevations. This will be investigated during detailed design. There would be no encroachment to the regulatory floodway of the Little Miami River.

Pocahontas Extension (PID 114497)

Alternative 1: No impacts to 100-year floodplain or regulatory floodway are expected.

Alternative 2: No impacts to 100-year floodplain or regulatory floodway are expected.

Threatened and Endangered Species: The project is located within Hamilton County, Ohio. Hamilton County is within the known habitat ranges of the Indiana bat, the northern long-eared bat, the bald eagle, and fanshell, rayed bean, sheepnose, snuffbox, and pink mucket pearly mussels. Suitable habitat for the federally listed mussel species was found within the project area (in the Little Miami River). There is approximately 6.1 acres of suitable wooded habitat (SWH) for the federal endangered Indiana bat (*Myotis sodalis*) and federal threatened northern long-eared bat (*Myotis septentrionalis*), in the form of scrubby Upland Forest (UF), and Floodplain Forest (FF) adjacent to Walton Creek and the Little Miami River, located within the project survey area (See **Attachment F.4**). Approximately 5.18 acres of SWH occurs within 100 feet of existing edge of pavement, encompassing habitat from upland forest and floodplain forest. Approximately 0.77 ac of SWH occurs beyond 100 feet of existing edge of pavement and within 50 feet of perennial streams. Approximately 0.15 ac of SWH occurs between 100 feet and 300 feet of existing edge of pavement. No records of Indiana bat or northern long-eared bat captures or hibernacula were found within a 1-mile radius of the project area and a field survey found no potential maternity roost trees beyond 100 feet of existing edge of pavement or suitable winter habitat within the project area. No bald eagle nests were observed within the project area.

The ODNR-DOW NHDB records check found eight records of state-listed species within a 1-mile radius of the project areas: elktoe (*Alasmodonta marginata*), wartyback (*Cyclonaias nodulata*), three-horn wartyback (*Obliquaria reflexa*), deertoe (*Truncilla truncata*), fawnsfoot (*Truncilla donaciformis*), mountain madtom (*Noturus eleutherus*), purple passionflower (*Passiflora incarnata*), and Carolina willow (*Salix caroliniana*) (See **Attachment F.4**). The five state-listed mussel species and mountain madtom all occur in the Little Miami River. Although a relatively narrow portion of the right descending channel of the Little Miami River occurs within the Spring Hill Extension project area, no impacts to the Little Miami River are expected. There is no additional suitable habitat for these six state-listed species within the project area for either the Spring Hill Extension or Pocahontas Extension sections. Therefore, no impacts to these six state-listed species are expected. Purple passionflower is found in fields, rocky slopes, smaller wooded areas, and along roads and fences. It needs a lot of sunlight and well drained soils. Purple passionflower can be found in fertile soils as well as clay soil. The ODNR-DOW NHDB record for purple passionflower is located approximately 3,200 feet to the south of the project areas across the Little Miami River. Although there is some suitable habitat for purple passionflower in the project area, no individual purple passion-flower plants were observed. Carolina willow grows well in nutrient-poor soil and in wet areas like thickets and swamps and is right at home along a stream bank or next to a pond. It can be found growing near riverbanks, sandbars, interdune ponds, canal banks, and other wet sites. It is not drought tolerant and requires consistently moist soils. The ODNR-DOW NHDB record for Carolina willow is located along the Little Miami



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River beginning approximately 1,200 feet to the east of the project areas. Although there is some suitable habitat for Carolina willow in the Spring Hill Extension section (along Streams 1, 2, and 4), no individual Carolina willow plants were observed. Additional information regarding potential impacts to threatened and endangered species is included in the Ecological Resources Technical Memorandum included in **Attachment G**. The potential impacts under each alternative are described below:

Spring Hill Extension (PID 114496)

Alternative 1: The construction limits for Alternative 1 are expected to impact approximately 1.28 acres of suitable wooded habitat for listed bats as well as limited suitable habitat for the purple passionflower and Carolina willow.

Alternative 2: The construction limits for Alternative 2 are expected to impact approximately 0.09 acres of suitable wooded habitat for listed bats as well as limited suitable habitat for the purple passionflower and Carolina willow.

Pocahontas Extension (PID 114497)

Alternative 1: The construction limits for Alternative 1 are expected to impact approximately 0.31 ac of suitable wooded habitat for listed bats as well as limited suitable habitat for the purple passionflower.

Alternative 2: The construction limits for Alternative 2 are expected to impact approximately 0.52 ac of suitable wooded habitat for listed bats as well as limited suitable habitat for the purple passionflower.

Cultural Resources: A Section 106 Scoping Request Form was completed for this Feasibility Study which covered both the Spring Hill Extension (PID 114496) and the Pocahontas Extension (PID 114497) sections. Based on a review of the State Historic Preservation Office's online mapping, the western edge of the Poahontas Extension project area is located within the National Register Boundary of the Village of Mariemont National Historic Landmark (see **Attachment F.5**). A portion of the project areas for both the Spring Hill Extension and Pocahontas Extension sections are located within previously surveyed Phase 1 cultural resources surveys. A literature search concluded that there are scattered inventoried buildings (OHI), but no known archaeological sites (OAI) in the surrounding area. Previously identified inventoried buildings along US 50 have succumbed to highway widening projects and modern commercialization of the area. Therefore, no inventoried resource and no listed or eligible historic properties are found in the project area or in the area of potential effects (APE). Multi-use trail construction is exempt from further cultural resource consideration by the Cultural Resource PA (Agreement 19319) dated November 8, 2017, as long as no new permanent right-of-way from a historic property will be acquired and when no contributing element of a historic property of a National Register (NR) district will be diminished by construction. In accordance with Stipulation V© and Appendix B of the Section 106 Programmatic Agreement executed on November 8, 2017 (Agreement No. 19319), amended on July 11, 2019, ODOT-OES has determined that the proposed project is a type of undertaking that has 'minimal potential to cause effects' to historic properties and is not part of a larger undertaking. No further cultural resource investigations are required for either Spring Hill Extension (PID 114496) or Pocahontas Extension (PID 114497) sections.



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Section 4(f)/6(f): Section 4(f)/6(f) properties include publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites. The only Section 4(f) properties within the project area which are adjacent to the project are the Columbia Connector Trail, which is on the east end of the project, and land behind the Kroger property, which is owned by Great Parks and is adjacent to the Little Miami Scenic River. There are no Section 6(f) properties in the project areas. The potential 4(f) impacts are described below.

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Each of the Build Alternatives of the Spring Hill Extension (PID 114496) would connect to the existing western terminus of the Columbia Connector, which extends eastward between US 50 and the Little Miami River to the LMST at the northern end of the Newtown Road bridge. Alternative 1 would run along the property owned by Great Parks behind Kroger. Section 4(f) coordination would be required for this project.

Pocahontas Extension (PID 114497)

There are no Section 4(f)/6(f) properties (publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites) that would be impacted by the Pocahontas Extension (PID 114497).

Air and Noise Quality: There would be no adverse air and noise quality impacts associated with this project. The project would have an overall positive impact on air and noise quality as a result of individuals biking and walking instead of driving. Overall emissions would decrease, and traffic noise would be reduced.

Drinking Water Resources: Both the Spring Hill Extension and Pocahontas Extension are located within the boundaries of a designated sole source aquifer. Two ODNR water wells are also located within the Spring Hill Extension project area (See **Attachment F.6**). The proximity of the project to a sole source aquifer requires that a plan note to be included in the project's construction plans in accordance with ODOT's *Standard Operating Procedure for Drinking Water Resources*. The plan note would include an environmental commitment to ensure that contractors employ basic protective measures, such as avoiding refueling and maintenance activities in environmentally sensitive areas to minimize the potential for contamination (ODOT, 2005).

Farmland: The project is located entirely within an urbanized area and would not require coordination under the Farmland Protection Policy Act (See **Attachment F.7**).

Regulated Materials: A Regulated Materials Review (RMR) Screening was conducted for the Spring Hill Extension (PID 114496) and the Pocahontas Extension (PID 114497) project. Based on this screening, there are a total of 57 regulated material (RM) sites within the project area as mapped by the Ohio Regulated Properties Search (ORPS) Tool (See **Attachment F.8**). These include four Resource Conservation and Recovery Act (RCRA) sites, 36 underground storage tank (UST) locations, 14 leaking underground storage tank (LUST) locations, and three spill sites. At this writing, the Spring Hill Extension and Pocahontas Extension project is currently being reviewed by ODOT-OES to determine if further Regulated Materials Review investigations are required.



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Underserved Populations: American Community Survey (ACS) 5-year estimates from 2014-2018, obtained from ODOT's TIMS mapping and the U.S. Census Bureau website, were used to identify underserved populations (UP) in the project area for the Spring Hill Extension and Pocahontas Extension, which is summarized in **Table 1**. These populations include racial/ethnic minority groups, low-income households, people with limited English proficiency (LEP), older adults (over the age of 64), and people with disabilities. The data collected shows that the populations of underserved communities within the census block groups within and adjacent to the project area are generally not disproportionately high when compared to the rates of UPs at the county level. The only instances of higher percentages of UPs at the block group level are the older adult populations within block group 1 of tract 248, and block group 3 of tract 244. However, these populations are anticipated to benefit from these projects.

The proposed project would not result in residential or business displacements and there would be no adverse impacts to underserved populations as a result of the proposed project (See **Attachment F.9a-e**). The project would provide benefits for low-income and elderly residents by providing pedestrian and bicycle access from Mariemont to the LMST and other regional trails, as well as other recreational amenities accessed by the LMST including Bass Island Park, Avoca Park, Robert Short Park, Clear Creek Park and Soccer Complex, and the Main Street Business District in the Village of Newtown.

Table 1. Underserved Populations in the Spring Hill Extension (PID 114496) and Pocahontas Extension (PID 114497) Project Area

Block Group	Population	Minority (%)	Low-Income (%)	LEP (%)	Older Adult (%)	Disabled ¹ (%)
<i>Block Group 39061024800 1</i>	1,065	0.4	13.5	0.0	28.0	2.2
<i>Block Group 39061024800 2</i>	1,605	12.1	11.1	0.0	7.5	2.2
<i>Block Group 39061024400 3</i>	1,935	10.5	12.8	0.0	21.0	9.2
<i>Block Group 39061024400 4</i>	930	18.8	23.2	0.0	12.3	9.2
<i>Hamilton County</i>	812,037	34.5	32.5	1.4	14.7	12.4

1: Disability statistics at the census tract and county levels



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Source: ACS 2018 5-year estimates from ODOT Transportation Information Mapping System (TIMS) and U.S. Census Bureau, accessed June 2, 2022.

Public Involvement: As discussed in Section 1.1, the need for improvements to pedestrian and bicycle connectivity between residential communities in Mariemont and Columbia Township and the LMST was identified in the *Eastern Corridor Segments II and III (PID 86462) Transportation Needs Analysis*, which was prepared in July 2017. This study was followed by the *Conceptual Alternatives Implementation Plan for Eastern Corridor Segments II and III (PID 86462)*, prepared in 2019, which identified the proposed shared-use path from the LMST to Spring Hill and the proposed shared-use path along US 50 from Spring Hill to Pocahontas as two of 68 projects that should be prioritized for implementation. The public involvement process for each of these studies is detailed in the reports cited above and summarized briefly as follows.

Transportation Needs Analysis: During the Needs Analysis study, stakeholder input was gathered through an Eastern Corridor Development Team (ECDT) meeting, which included Eastern Corridor Partners, community representatives, leadership of the Eastern Corridor communities, business associations, and other stakeholder groups that have an interest in the Eastern Corridor Program. In addition, a series of Focus Area Workshops were held for smaller geographic areas within Segments II and II of the Eastern Corridor area to gather public input regarding community values and priorities along with the transportation needs of the focus areas. To reach all residents within the Eastern Corridor area, an online interactive survey was conducted which solicited information from residents and commuters about transportation issues in Segments II and III of the Eastern Corridor. ODOT also held a Public Open House to update the public on the Eastern Corridor Segments II and III Transportation Needs Analysis Study and provide an opportunity for the public to provide comments on the needs identified for the six focus areas.

Conceptual Alternatives Implementation Plan: As part of the development of the Implementation Plan, Advisory Committees were established for the six Focus Areas within Segments II and III. These committees included elected officials, transportation planning professionals, and community and interest group representatives, including representatives of the Sierra Club, Tri-State Trails/Green Umbrella, and the Ohio-Kentucky-Indiana (OKI) Regional Council of Governments. Each Focus Group held four meetings with ODOT over the course of the study to further refine transportation needs in the Focus Areas and assist with developing solution concepts. Two Public Open House Meetings also were held throughout the development and refinement of the transportation concepts to ensure that the public had an opportunity to provide input at key decision points.

Ham – LMST Spring Hill Drive (PID 114496) and Pocahontas Avenue (PID 114497) Feasibility Study: Input received from the stakeholders and public on the proposed alternatives is an important component in the selection of the preferred alternative. The public involvement undertaken as part of the Feasibility Study for the trail extension projects included stakeholder meetings, a Virtual Open House, and an in-person Open House, as discussed in the following sections.



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Stakeholder Meetings: As part of the Feasibility Study, the study team held several meetings with stakeholders to discuss possible shared-use path alignments along US 50 to connect with the LMST. As mentioned in Section 4.4, Right-of-Way Requirements, there will be no private property appropriated for this project. Therefore, coordination with private landowners along the project which will be impacted by the project will continue throughout this project. To date, meetings have been held with Kroger Real Estate, the Village of Mariemont, Mariemont Promenade, Mariemont Schools, and the Mariemont Library. These meetings are summarized in **Table H-1** provided in **Attachment H**. Coordination with the stakeholders and property owners impacted by this project will be ongoing throughout the project.

Public Open Houses: On Oct. 19, 2022, ODOT, in coordination with Great Parks, Columbia Township, and Mariemont, launched a virtual Open House to share information about the proposed Columbia Connector Trail and to gather input from the public regarding which alternatives they prefer and why. The Virtual Open House was accessed through a project website developed and managed by the project team using the Public Input platform and was open for review and comment for 45 days.

To complement the Virtual Open House, an in-person Open House was also held at the Mariemont Elementary School on Nov. 3, 2022, from 5 pm to 7 pm. Like the virtual session, the in-person meeting was held as an open house and visitors were invited to stop by at their convenience any time during the meeting hours. At the in-person meeting, participants were invited to review exhibits highlighting the project and the alternatives under consideration (the exhibits shared at the in-person meeting were the same exhibits featured on the virtual Open House site). Project team members were available to discuss the proposed project in greater detail and answer questions. Participants were provided with a fact sheet about the project and a hardcopy version of the questions that were embedded into the virtual meeting site. All participants were encouraged to complete either the hardcopy questionnaire or visit the Public Input site to submit their responses online.

Both the Virtual Open House and the in-person Open House are summarized in the Public Input Summary Report provided as **Attachment H**. Appendix A of the Summary Report, Open House Materials, contains documentation of the Open House website and the content shared on its pages. Questions were embedded throughout the pages of the Virtual Open House site. Also included in Appendix A of the Summary Report are materials shared at the in-person meeting, which included a fact sheet of the project and a hardcopy version of the questions that were embedded into the virtual meeting site. All participants of the in-person meeting were encouraged to complete either the hardcopy questionnaire or visit the Public Input site to submit their responses online. To ensure that project information was shared throughout the community, a comprehensive notification effort was implemented which included news releases, eblasts, social media posts, newspaper ads, open house flyers, and yard signs. These efforts are detailed in Appendix B: Notification Efforts of the Summary Report.

Nearly 2,800 people visited the Virtual Open House during the public review and comment period. Of these, 340 answered one or more of the questions embedded throughout the site and together, offered nearly 500 comments. Fifty-six community members signed in at the November 3rd in-person Open House. Because some visitors opted not to sign in, the number of attendees was closer to 60 to 65. Of these, 33 completed



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the hardcopy question form. The project team entered the responses provided on the hardcopy forms into the Public Input response system so that all data received could be tabulated and analyzed together.

Following is a summary of the key findings gathered from the public input. Additional details on the public input received is included in the Public Input Summary Report (**Attachment H**):

- Most respondents live (99%) and work in the Greater Cincinnati- Northern Kentucky region, with a concentration of respondents living and/or working near the project area. A majority of respondents are interested in the project either because they live in area (69%), regularly bike or walk through the area (62%), and/or are frequent users of the regional shared-use trail system (61%).
- For the Spring Hill trail, 87% of respondents said they would be more likely to use Alternative 1, which runs parallel to the Little Miami River along an old railroad bed and would be located behind Kroger and other nearby businesses. When asked why, respondents most often said they perceived this option to be safer (127 mentions out of 224 comments; 56%). They also said Alternative 1 would be more scenic (102 mentions, 46%) and there would be less conflicts with vehicular traffic (77 mentions, 34%). Some said they preferred Alternative 1 because its estimated cost is lower than Alternative 2 (27 mentions, 12%).
- For the Pocahontas trail, approximately 62% of respondents said they would be more likely to use Alternative 1, which runs parallel to the south side of US 50/Wooster Pike. When asked why, respondents most often cited its lower cost (42 mentions out of 132 comments; 32%). Many also felt that crossing US 50 at the Mariemont Promenade is safer (and some said it would also provide better access to nearby businesses), and that Alternative 1 has fewer conflict points or crossings (16 mentions, 12%), which contributes to a perception that Alternative 1 is the safer option.
- Approximately 90% of respondents said that adding the shared-use path would encourage them to ride a bike or walk in the area more often.
- When asked what the project team should keep in mind as it selects a preferred alternative, respondents offered a variety of responses, but many centered on making the safety of users, particularly students and young children, a priority (16 mentions out of 98 comments, 16%); considering the needs of those on bicycles as well as those using other light transport vehicles (scooters, skateboards, wheelchairs) when planning the street crossings (12 mentions, 12%); and build the new shared-use path as soon as possible as many felt the stated timeline was too long (12 mentions, 12%).

4.8 COST ESTIMATE

A preliminary construction cost estimate for each Build Alternative has been developed as a part of this study. The preliminary cost estimates are provided in **Attachment I** and shown in the evaluation matrices provided in **Tables 2** and **3**. Detailed construction costs will be developed during development of the Preferred Alternative.



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5.0 COMPARISON OF ALTERNATIVES

Detailed evaluation matrices, which summarize purpose and need, environmental, engineering, safety, and public input evaluation criteria for the Spring Hill Extension (PID 114496) and Pocahontas Extension (PID 114497) alternatives, are provided as **Tables 2** and **3** on the following pages.



Table 2: Evaluation Matrix Spring Hill Extension (PID 114496)			
Feature/Consideration	Preliminary Alternatives		
	No Build Alternative	Alternative 1	Alternative 2
Purpose and Need			
Improve pedestrian and bicycle connectivity along US 50 between the Columbia Connector Trail to the east and Spring Hill Drive	No	Yes	Yes
Cultural Resources			
NRHP-Listed Sites	No impact	No impact	No impact
Section 4(f)/6(f) Sites	No impact	Minimal Impact	Minimal impact
Ecological Resources			
Streams	No impact	Expected impact of 128 lf to potentially jurisdictional streams	Expected impact of 99 lf to potentially jurisdictional streams
Wetlands	No impact	No impact or minimal impact	No impact or minimal impact
Jurisdictional Ditches	No impact	None	None
Threatened & Endangered Species	No impact.	Expected encroachment of 1.28 ac of potential habitat for federally-listed bats; limited suitable habitat for state-listed purple passionflower, and Carolina willow	Expected encroachment of 0.09 ac of potential habitat for federally-listed bats; limited suitable habitat for state-listed purple passionflower, and Carolina willow
100-Year Floodplain			
100-Year Floodplain Encroachment	No impact	Expected 0.12 acres encroachment of Little Miami River floodplain; 0.37 ac encroachment of combined 100-year floodplain for Little Miami River and Walton Creek	Expected 1.28 acres encroachment of combined 100-year floodplain of Little Miami River and Walton Creek
100-Year Floodway Encroachment	No impact	Expected 1.32 acres encroachment	No impact or minimal impact
Frequency of Flooding on Shared-Use Path	N/A	Flooding on the proposed trail can be expected during a 30-year recurrence interval storm	Flooding on the proposed trail can be expected during a 50-year recurrence interval storm
Hazardous Materials			
Regulated Materials Review	No impact	Multiple sites found within project area. Project is currently under review by ODOT-OES to determine if further RMR investigations required.	Multiple sites found within project area. Project is currently under review by ODOT-OES to determine if further RMR investigations required.
Drinking Water Resources			
Sole-Source Aquifer	No impact	Within boundaries of sole source aquifer; plan note would be required.	Within boundaries of sole source aquifer; plan note would be required.
Source Water Protection Area	No impact	No impact	No impact
Air Quality and Noise			
Air Quality	No impact	Slight improvement in air quality due to reduced emissions	Slight improvement in air quality due to reduced emissions
Noise	No impact	No impact to slight improvement due to reduced traffic	No impact to slight improvement due to reduced traffic
Community and Land Use			
Relocations	None	None	None
Right-of-Way	No impact	A total of 0.73 acres of permanent and/or temporary ROW required from 4 owners.	A total of 0.67 acres of new permanent and/or temporary ROW required from 6 owners.
Traditionally Underserved Populations (TUP)	No impact	Improves Bike/Pedestrian Connectivity for Low-Income/Elderly Residents	Improves Bike/Pedestrian Connectivity for Low-Income/Elderly Residents
Public Input			
Alternative Receiving Most Public Support	No	87% of Respondents to Public Input site support	No

Table 2: Evaluation Matrix Spring Hill Extension (PID 114496)			
Feature/Consideration	Preliminary Alternatives		
	No Build Alternative	Alternative 1	Alternative 2
Engineering Considerations			
Length of Shared Use Path	N/A	1800 ft	1800 ft
Width of Shared Use Path	N/A	14'	12' along US 50, 14' elsewhere.
Design Speed	N/A	20 mph	20 mph
Safety Analysis	Bicycle and pedestrians must travel along US 50 between Walton Creek at eastern terminus and Spring Hill Dr. at the western terminus. Traveling next to vehicular traffic is a safety concern.	Two bicycle/pedestrian conflicts with automobiles – one at the trail crossing of Miami Run and one at the trail crossing of the Kroger Fuel Center.	Four potential bicycle/pedestrian conflicts with automobiles. These include three driveways and the crossing of Miami Run.
Roadway Design Issues	No impact None	Steep grade along Miami Run. Shared-Use Path grade will match the Miami Run roadway grade of 7%. One 50' section increases to 10% grade.	Steep grade, just over 5% as the path climbs the hill approaching Miami Run.
Structural Design Issues	None	Required bridge over Walton Creek.	Required bridge over Walton Creek. Requires a 5' high 215' long retaining wall to reduce impacts to McDonald's parking lot.
Utility Relocations and/or Issues	No impact	Minor modifications to existing storm drain. A signal pole may need to be relocated.	Existing overhead electric lines, and overhead communication lines will be impacted. Multiple utility poles will need to be relocated. Water supply lines and a fire hydrant may need to be relocated.
Post-Construction BMPs	N/A	Requires a treatment area of 0.09 acres; vegetated filter strips would be utilized to treat storm water runoff.	Requires a treatment area of 0.36 acres; a manufactured system will be required to treat storm water runoff.
Bicycle Level of Traffic Stress	Medium Stress	Very Low Stress	Very Low Stress
Preliminary Cost Estimates			
Preliminary Construction Costs ¹	\$0.00	\$1,663,000	\$1,920,000
Preliminary Utility Costs	\$0.00	\$0	\$206,000
Preliminary Right-Of-Way Costs	\$0.00	\$548,000	\$499,000
Conclusion			
Recommended as Preferred Alternative?	NO	YES	NO

1) Estimates do not include costs for design. Inflation contingency is based on construction during 2026/2027

Table 3: Evaluation Matrix Pocahontas Extension (PID 114497)			
Feature/Consideration	Preliminary Alternatives		
	No Build Alternative	Alternative 1	Alternative 2
Purpose and Need			
Improve pedestrian and bicycle connectivity along US 50 between Spring Hill Drive to the east and Pocahontas Avenue to the west.	No	Yes	Yes
Cultural Resources			
NRHP-Listed Sites	No impact	No impact or minimal impact	No impact or minimal impact
Section 4(f)/6(f) Sites	No impact	No impact or minimal impact	No impact or minimal impact
Ecological Resources			
Streams	No impact	No impact or minimal impact	Expected impact of 31 lf to potentially jurisdictional streams
Wetlands	No impact	No impact or minimal impact	No impact or minimal impact
Jurisdictional Ditches	No impact	No impact or minimal impact	No impact or minimal impact
Threatened & Endangered Species	No impact	Expected encroachment of 0.31 ac of potential habitat for federally-listed bats; limited suitable habitat for state-listed purple passionflower	Expected encroachment of 0.52 ac of potential habitat for federally-listed bats; and limited suitable habitat for state-listed purple passionflower
100-Year Floodplain			
100-Year Floodplain Encroachment	No impact	No impact or minimal impact	No impact or minimal impact
100-Year Floodway Encroachment	No impact	No impact or minimal impact	No impact or minimal impact
Frequency of Flooding on Shared-Use Path	N/A	N/A	N/A
Hazardous Materials			
Regulated Materials Review	No impact	Multiple sites found within project area. Project is currently under review by ODOT-OES to determine if further RMR investigations required.	Multiple sites found within project area. Project is currently under review by ODOT-OES to determine if further RMR investigations required.
Drinking Water Resources			
Sole-Source Aquifer	No impact	Within boundaries of sole source aquifer; plan note would be required.	Within boundaries of sole source aquifer; plan note would be required.
Source Water Protection Area	No impact	No impact	No impact
Air Quality and Noise			
Air Quality	No impact	Slight Improvement in air quality due to reduced emissions	Slight Improvement in air quality due to reduced emissions
Traffic Noise	No impact	Slight Improvement in traffic noise due to reduced autos	Slight Improvement in traffic noise due to reduced autos
Community and Land Use			
Relocations	None	None	None
Right-of-Way	No impact	A total of 1.81 acres of permanent and/or temporary ROW required from 6 owners.	A total of 1.31 acres of permanent and/or temporary ROW required from 4 owners.
Traditionally Underserved Populations (TUP)	No impact	Improves Bike/Pedestrian Connectivity for Low-Income/Elderly Residents	Improves Bike/Pedestrian Connectivity for Low-Income/Elderly Residents
Public Input			
Alternative Receiving Most Public Support	No	62% of Respondents to Public Input site support	No

Table 3: Evaluation Matrix Pocahontas Extension (PID 114497)			
Feature/Consideration	Preliminary Alternatives		
	No Build Alternative	Alternative 1	Alternative 2
Engineering Considerations			
Length of Shared Use Path	N/A	2000'	2000'
Width of Shared Use Path	N/A	12' along US 50, 14' elsewhere.	12' along US 50, 14' elsewhere.
Design Speed	N/A	12 mph	12 mph
Safety Analysis	Bicycle and pedestrians must travel along US 50 between Spring Hill Dr. at eastern terminus and Pocahontas at the western terminus. Traveling next to vehicular traffic is a safety concern.	Four bicycle/pedestrian conflict points with automobiles – three at the intersections and one at a driveway.	Three bicycle/pedestrian conflict points with automobiles – all three are at the intersections.
Roadway Design Issues	A dedicated bicycle lane was recently constructed in the eastbound direction from Spring Street to Newtown Road which improved bicycle safety. Pedestrians have a dedicated sidewalk system on both sides of US 50; however, portions are directly adjacent to the street without a tree lawn buffer. This results in bicycles/pedestrians crossing or traveling next to vehicular traffic, creating conflicts with vehicular traffic and putting bicycles and pedestrians at greater risk compared to dedicated bicycle and pedestrian facilities which are physically separated from roadways.	Steep grade, of the 2000' length, approximately 1300' will have a grade of approximately 5%.	Steep grade, of the 2000' length, approximately 1300' will have a grade of approximately 5%.
Structural Design Issues	No structural deficiency issues	Requires a 7' high 125' long retaining wall on the south side of US 50 above Mariemont Landing.	Requires a 10' high 900' long retaining wall on the north side of US 50 west of Spring Hill Dr.
Utilities	No impact	Limited to two overhead electric power pole relocations, signal support relocations, private utility impacts to the Fire Department Connection and a ground mounted electric transformer.	Limited to adjustments to the existing storm system including catch basins, two fire hydrant relocations and signal support relocation.
Post-Construction BMPs	N/A	Requires a treatment area of 1.21 acres; a bioretention cell, a manufactured system, and vegetated filter strips will be required to treat storm water runoff.	Requires a treatment area of 0.82 acres; a bioretention cell and manufactured system will be required to treat stormwater runoff.
Bicycle Level of Traffic Stress	Medium Stress	Very Low Stress	Very Low Stress
Preliminary Cost Estimates			
Preliminary Construction Costs ¹	\$0.00	\$2,158,000	\$5,744,000
Preliminary Utility Costs	\$0.00	\$66,000	\$256,000
Preliminary Right-Of-Way Costs	\$0.00	\$926,000	\$979,000
Conclusion			
Recommended as Preferred Alternative?	NO	YES	NO

1) Estimates do not include costs for design. Inflation contingency is based on construction during 2026/2027

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6.0 PREFERRED ALTERNATIVE/NEXT STEPS

The Preferred Alternatives for the Spring Hill Extension (PID 114496) and Pocahontas Extension (PID 114497) were selected based on the results of the engineering and environmental studies summarized in this Feasibility Study, as well as the extensive public input received on this project. The Preferred Alternatives are summarized below.

6.1 SPRING HILL EXTENSION (PID 114496)

Alternative 1 was selected as the Preferred Alternative for the Spring Hill Extension (PID 114496). Alternative 1 extends the Columbia Connector Trail over Walton Creek and follows an alignment parallel to the Little Miami River along the back side of Kroger at Walton Creek. This alignment then curves away from the Little Miami River along the west side of Miami Run and ends at the US 50/Miami Run/Spring Hill Drive intersection. ODOT will continue to work with Great Parks to identify funding sources, complete the design of the preferred alternative, and construct the project.

6.2 POCAHONTAS EXTENSION (PID 114497)

Alternative 1 was selected as the Preferred Alternative for the Pocahontas Extension (PID 114497). Alternative 1 begins at the US 50/Miami Run/Spring Hill Drive intersection and parallels US 50 on the south side, utilizing existing sidewalk space. The alignment crosses US 50 at the entrance to Mariemont Promenade, and then crosses Mariemont Way. This alignment then switchbacks up the hill to Warrior Way, crosses Warrior Way, parallels an existing utility corridor, and ends at Pocahontas Avenue, across from the future Murray Path Extension positioned between Rembold Avenue and Hiawatha Avenue. ODOT will continue to work with Great Parks, Columbia Township and the Village of Mariemont to identify funding sources, complete the design of the preferred alternative, and construct the project.



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7.0 REFERENCES

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