

Feasibility Study for the [Mystic River Path Connection to the Minuteman Bikeway]



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Executive Summary

The Feasibility Study for the Mystic River Path Connection to the Minuteman Bikeway has evaluated options for a path that will strengthen the walking and biking network in and around Arlington while bolstering community access to the unique natural areas of Lower Mystic Lake and Mystic River.

The Recommended Conceptual Design offers a continuous, accessible shared use path connecting the Minuteman Commuter Bikeway to the Alewife Brook Greenway via the Mystic Valley Parkway corridor along Lower Mystic Lake and the Mystic River. The path supports the vision and goals of the Town of Arlington’s 2021 Connect Arlington Sustainable Transportation Plan, adding safe transportation facilities for all modes, and promoting low-carbon travel in and around Arlington. It will also enhance regional bike and pedestrian connectivity, linking major trails and local active transportation facilities in Arlington, Medford, and surrounding communities.

The recommendations of this report were developed through extensive site analysis, community input, and an iterative process of conceptual design. To accommodate a variety of mobility needs and preserve opportunities for experiencing nature and riverside strolling, the Recommended Conceptual Design includes pedestrian-only paths and on-street bike lanes in addition to the continuous shared use path for multiple non-motorized modes. The path connects through intersections that are redesigned to improve safety, comfort, and ADA accessibility. Connections from neighborhood streets are formalized and made accessible for greater integration of the path into adjacent residential areas.

The plan also proposes various spaces to enhance the experience of path users. Placemaking proposals for the corridor focus on celebrating and protecting parkland trees and the natural ecosystems along the lake and river. A placemaking plan identifies potential gateway spaces to welcome path users with wayfinding, interpretative materials, and seating. Potential locations for waterside overlooks and opportunities for ecological restoration or other nature-based design are also identified.

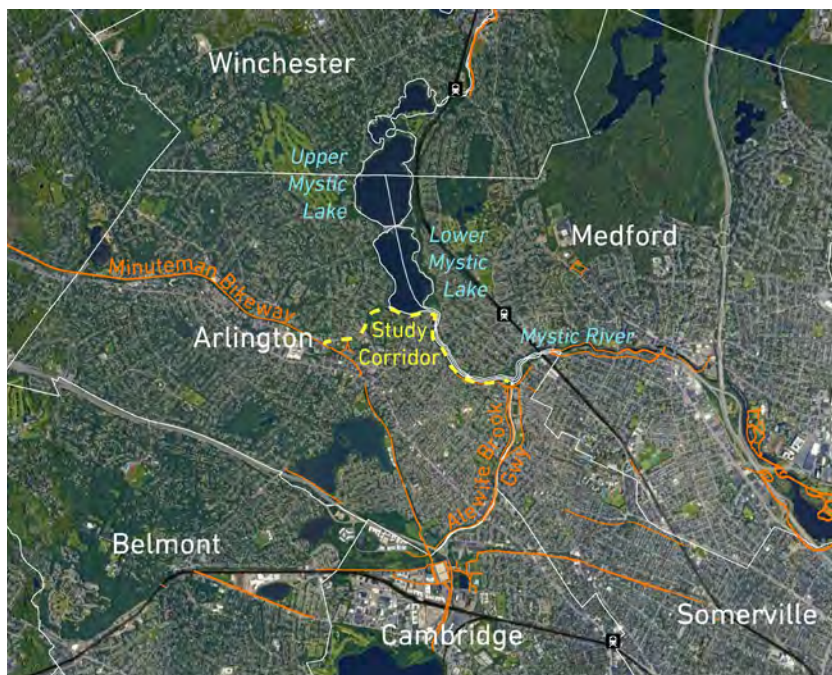


Figure 1: Regional map showing the study corridor (dotted yellow line) south of Lower Mystic Lake and Mystic River and connecting to the Minuteman Bikeway and Alewife Brook Greenway

This feasibility study was a joint effort of the Town of Arlington and the Mystic River Watershed Association, with support from Massachusetts Department of Conservation and Recreation, Massachusetts Department of Transportation, the City of Medford, and the Lawrence and Lillian Solomon Foundation. Extensive input from stakeholders and community members was essential to developing a conceptual design that meet the needs of all potential users.

The project is funded by an \$80,000 grant from the MassTrails program and \$10,000 from the Lawrence and Lillian Solomon Foundation.

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PROJECT CONTEXT

01

Introduction

This project is the result of years of planning in the Town of Arlington to expand active transportation and promote an environment in which non-motorized modes are viable and appealing options for people of all ages, identities, and abilities. The purpose of the Feasibility Study is to weigh options for path implementation that align with the vision of previous planning efforts and goals for future use.

Related Initiatives and Plans

The scope of this project has been identified in several previous plans for expanding active transportation networks in the area, including the Mystic River Watershed Association (MyRWA) [Mystic Greenways Initiative](#), LiveableStreets Alliance [Emerald Network initiative](#), and the Metropolitan Area Planning Council (MAPC) [LandLines Network Plan](#). This project additionally helps meet connectivity, access, safety, and sustainability goals of the Boston Metropolitan Planning Organization’s (MPO) Long-Range Transportation Plan, [Destination 2040](#), and the [MAPC MetroCommon x 2050](#) long-range regional plan.

Priorities for this project align with the recommendations of the Department of Conservation and Recreation (DCR) [2009 Mystic River Master Plan](#) and [2020 Parkways Master Plan](#) related to use of parkland and options for bike facilities along Mystic Valley Parkway.

This project is particularly informed by the priorities laid out in the Town of Arlington’s [2021 Connect Arlington Sustainable Transportation Plan](#) (“Connect Arlington”). Connect Arlington emphasizes a people-first vision that aims to encourage active and shared modes of transportation, such as walking and rolling, bicycling, or taking public transit, and to reduce reliance on driving and private vehicles. The Mystic to Minuteman connection is one of the projects Connect Arlington proposed as a step toward developing a low-stress biking and walking environment. The major intersections along the project corridor are also identified within Connect Arlington as Priority Intersections for safety improvements, as shown in Figure 2 and listed as follows:

1. Summer Street (Rte 2A) at Mill Street / Cutter Hill Road
2. Summer Street (Rte 2A)/Mystic Street (Rte 3)/Mystic Valley Parkway



Figure 2: Map of project area with proposed trail corridor and priority intersections for safety improvements

3. Mystic Valley Parkway / Medford Street (Rte 60) rotary in Arlington
4. Mystic Valley Parkway / High Street (Rte 60) rotary in Medford
5. Mystic Valley Parkway at River Street / Harvard Avenue bridge (Arlington only)

See the Town of Arlington’s [Minuteman Bikeway Planning Project](#) for recommendations at the connection point between the Minuteman Bikeway and the proposed Mystic River Path at Mill Street. Also see the traffic impact report for changes associated with access to Arlington High School. Details on DCR and other Town of Arlington plans and recommendations that informed this feasibility study can be found in the “Appendix A: Memorandum of Existing Conditions” on page 51.

Connections with Medford

This project is a priority for many residents in the City of Medford, which lies north of the Mystic River adjacent to the path corridor. City staff and residents were included in stakeholder and focus group meetings. Their input and review of the City of Medford’s 2016 Bicycle Infrastructure Master Plan helped inform needed bike connections and goals for path development.

Path Connection Goals

Goals for the path connection were established in collaboration with the Project Team and through feedback from the first community meeting. Priorities expressed by respondents to the first public survey also helped guide development of the goals, which are:

- Provide an accessible route that contributes to a regional biking network by connecting the Minuteman Bikeway, Mystic River Paths, and Alewife Brook Greenway
- Strengthen the walking and biking network between Arlington, Medford, and Somerville by developing connections to perpendicular streets, sidewalks, and planned bike routes
- Increase safety and comfort for all users, particularly at intersections and rotaries
- Improve access to the banks of the Mystic River and Mystic Lakes to enhance people’s experience and draw them to these resources



Figure 3: Medford Street rotary in Arlington, one of the priority intersections for safety improvements



Figure 4: High Street rotary in Medford matches its Arlington counterpart in excess pavement, resulting in high vehicle speeds. This project proposes to establish safe walking and biking connections between the two rotaries and municipalities.

- Reduce emissions by increasing bicycle mode share, and incorporate planning and design concepts that contribute to climate resiliency
- Preserve and enhance wetlands, trees canopy, and animal and plant habitat

Project Process

The progression of this Feasibility Study followed a typical process for such projects. It started with gaining a full understanding of the study area through desktop review of existing documents, plans, previous studies and available data, as well as work done in the field to gather information first-hand. The team's understanding of the site was enriched through input from the public and stakeholder groups as part of a robust engagement process.

The team identified the applicable regulations, defined known safety strategies, and embraced guiding principles driven by community input for the development of path alternatives. Conceptual path options and potential complementary spaces were designed. These options were compared to identify the most feasible approach to the design.

The public engagement process was integral to the project's progression, and was critical to decision-making. This process resulted in the Recommended Conceptual Design and Implementation strategy that will guide future design development of the shared use path.

Desktop Review

This initial research addressed project area demographics and cultural context, crashes, pedestrian and cyclist activity, and land ownership. Existing regional and local plans that might affect the development of the Mystic to Minuteman path were also reviewed, and existing traffic operations were analyzed.

Cultural Context

The Mystic Valley Parkway is on the National Register of Historic Places. This corridor, along with parkland adjacent to the Mystic river, is defined by large trees on lawn and a roadway that curves with the river.

Environmental Justice Communities

Much of the project area is home to Massachusetts Environmental Justice (EJ) Minority populations. The EJ designation confers extra responsibility on agencies to ensure that public land in the project area is preserved, remains accessible and well-maintained, and helps support community climate resilience, all of which are principles this project supports.

Traffic Safety

Toole Design conducted a high-level review of available data on crashes occurring at project intersections between 2017 and 2020. A total of ninety-one (91) collisions occurred across the five intersections, with the greatest number of crashes, thirty-one (31), at the Medford Street/High Street rotary. Of all crashes, eight (8) or nine percent (9%) of all collisions involved pedestrians or cyclists with non-fatal injuries or no injury.

Bike and Pedestrian Activity

Toole Design used data from the Strava Global Heatmap to study existing pedestrian and bicycle use patterns in the project area. Walking and running activity are higher along Mystic River paths than on connecting streets. Biking activity is evenly distributed between the parkway and large connecting streets.

Land Ownership

Summer Street is Town of Arlington jurisdiction, with some abutting properties under the Arlington Housing Authority and Arlington Parks and Recreation Commission. The Mystic Valley Parkway and adjacent parkland are owned and managed by DCR. Bridges and the culvert at Mill Brook are owned and maintained by MassDOT. Several private residential properties and businesses abut the project corridor.

Field Observations

Toole Design staff walked the length of the corridor and observed and documented conditions in field with photographs and measurements to determine opportunities and constraints for incorporating a path. The corridor and key intersections were assessed for safety and accessibility, maintenance needs, utilities, topography, amenities, vegetation, and connections to adjacent neighborhoods. A summary of Existing Conditions observations is provided in the following pages, and the full Memorandum of Existing Conditions can be found in Appendix A.

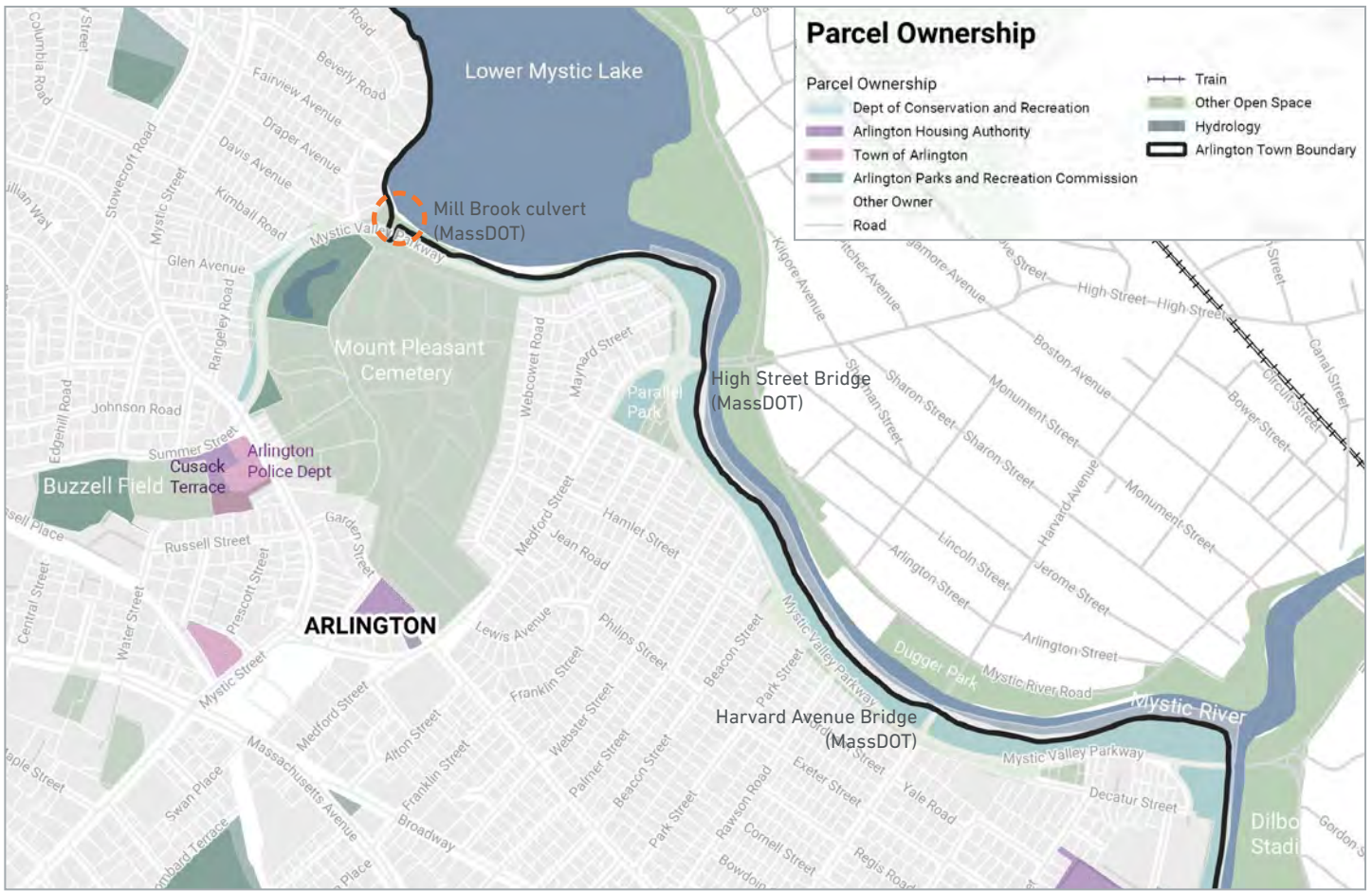


Figure 5: Public land ownership within the project area

Existing Conditions

For the purpose of analysis and conceptual design, the study area is divided into three segments based on roadway character and cross section. Segment A includes Summer Street between Mill Street and Mystic Street, while Segments B and C include the Mystic Valley Parkway corridor.

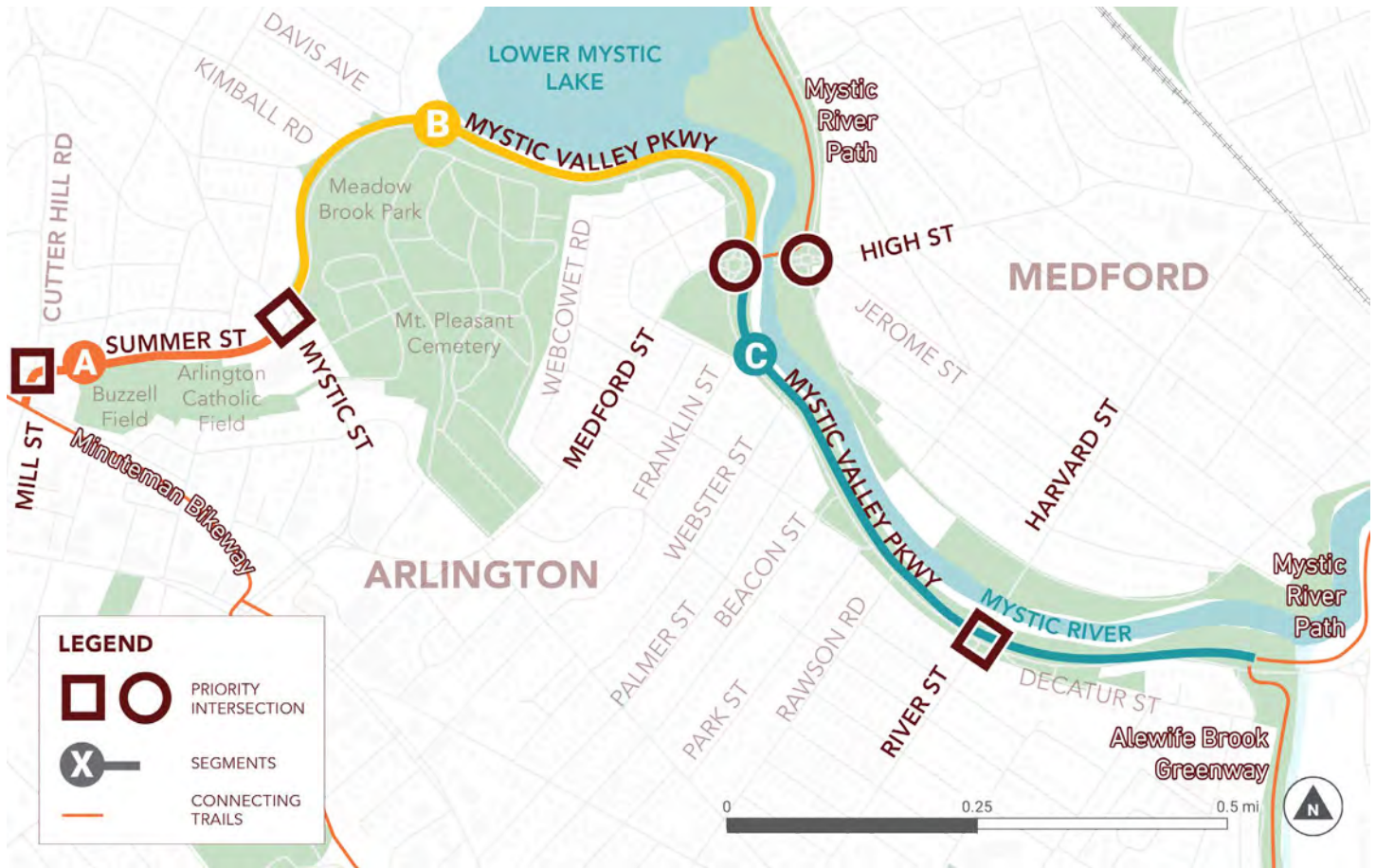


Figure 6: Segments and priority intersections in the project area

The project area encompasses approximately .25 miles of the south shore of Lower Mystic Lake, part of the Mystic Lakes State Park, which supports activities such as swimming, non-motorized boating and sailing, paddling, picnicking, and bird watching. The project area also includes approximately .95 miles of the Mystic River from the lake to the Alewife Brook. A narrow asphalt path runs south of the lake, while earth and stone dust paths run along the river. The lake, river, and adjacent parkland provide a scenic experience for people walking, biking, and driving.



Figure 7: View east on Summer Street across from Victoria Road

Segment A: Summer Street from Mill Street to Mystic Street

Roadway Character and Dimensions

The Summer Street segment is approximately a .25 miles long and runs between the intersection of Summer Street with Mill Street / Cutter Hill Road and the Summer Street / Mystic Street / Mystic Valley Parkway intersection. This segment lines the north side of Buzzell Field and the Arlington Catholic practice field. The curb-to-curb roadway width is 38', with two 13-14' lanes.

This segment also includes a 36' wide and approximately 85' long portion of Mill Street down to the Minuteman Bikeway.

Pedestrian Infrastructure

Sidewalks are present on both sides of Summer Street and Mill Street. Utility poles, signposts, and hydrants on the south side of Summer Street make the pedestrian clear space too narrow in some areas to meet ADA standards.

Bike Infrastructure

There are currently no bike facilities in this segment.

Intersections

Three streets (Edgehill Road, Victoria Road, and Brookdale Road) intersect with the north side of Summer Street. With the park and practice field forming a continuous recreation area on the south side, there are no cross streets, and a long stretch of uninterrupted sidewalk exists between the residential complex driveways at each end of the block.

One marked pedestrian crossing is located on the east side of Victoria Road. This crossing has poor sight lines for both pedestrians and drivers, due to the roadway curve and presence of parked cars next to the crosswalk. The combination of obstructed sight lines and frequent speeding on Summer Street makes this crossing risky and uncomfortable for pedestrians.

Parking

While there are no formally designated parking lanes, both sides of the street and particularly the southern shoulder are heavily used for parking by people attending events at the fields.

Landscape

From Mill Street to Buzzell Field, landscape south of the existing sidewalk is constrained by the property line and fence. Along Buzzell Field, a row of mature honeylocust trees lines the existing sidewalk and 4' high chain link fence. At Arlington Catholic practice field, the row of trees ends, and a tall chain link fence stands adjacent to the sidewalk. A grassy embankment about 10 to 15 feet wide runs the length of the park and practice field, sloping down from the sidewalk to the athletic facilities.

The Buzzell Field path, which connects south to the Minuteman Bikeway, meets the sidewalk across but offset from Victoria Road.

Segment B: Mystic Valley Parkway from Mystic Street to High Street Bridge

Roadway Character and Dimensions

Segment B is approximately .7 miles long, running north from the Summer Street / Mystic Street / Mystic Valley Parkway intersection along Mount Pleasant Cemetery before it turns east to run along the south side of Lower Mystic Lake to the Medford Street / High Street rotary. Its wooded parkway character provides the occasional opening for views of the lake. The curb-to-curb roadway width varies between 30' and 40' and is narrowest at the Mill Brook culvert at the southwest corner of the lake. Significant slopes along the east/south side of the parkway constrain curb movement in that direction.



Figure 8: View west of the narrow asphalt path and Mill Brook culvert on Mystic Valley Parkway

Pedestrian Infrastructure

A 7-8' wide asphalt path runs along the west/north side of the roadway, separated from the curb by a narrow lawn strip that shows evidence of heavy pedestrian use.

Bike Infrastructure

There are no existing bike facilities in this segment.

Intersections

Between Mystic Street and High Street, three intersections exist with neighborhood streets (Hayes Street, Mystic Lake Drive, and Maynard Street). There are no marked crossings.

Parking

Parking is not permitted on Mystic Valley Parkway.

Landscape

This segment marks the start of the parkway corridor. From Mystic Street to the lake, the corridor is wooded, with canopy extending over the roadway in some areas. On both sides of the roadway, the land slopes up from the road, with the embankment along Meadow Brook Park to the east, and a wooded slope up to residential areas to the west.

Along Lower Mystic Lake, the existing path runs along the top of the lake edge, with intermittent views north to the water between stands of trees and shrubs. Along the south side, residences line the parkway. Where the parkway turns south at the Mystic River, there is a large open area of lawn at the river's mouth, just north of the High Street bridge.

Segment C: Mystic Valley Parkway from High Street bridge to Alewife Greenway

Roadway Character and Dimensions

Segment C, running along the Mystic River from the Medford Street/High Street rotary to the Alewife Brook Greenway, is approximately .7 miles long with a curb-to-curb roadway width of 38-40'. Just south of the High Street rotary, the roadway is grade separated from the parkland along the river where an existing pedestrian trail is located. The park space widens near Palmer Street, and the roadway descends back to parkland grade.

Pedestrian Infrastructure

There is a soft-surface pedestrian trail along the river, approximately 7' wide, and closer to the river than to the roadway. This pedestrian facility does not meet national and local accessibility requirements.

Bike Infrastructure

There are no designated bike-only facilities. The soft-surface path is sometimes used by cyclists, but its narrow width and tree root-filled surface makes it uncomfortable (and unsafe) for most users in the stretch between High Street and River Street. East of River Street, the path is surfaced with stone dust and is more comfortable for people biking.

Intersections

Eight intersections exist between High Street and the Alewife Brook Greenway, including a signalized intersection at River Street / Harvard Avenue Bridge.

Parking

Parking is not permitted on Mystic Valley Parkway.

Landscape

This segment is characterized by the linear parkland along the Mystic River, with open lawn, earthen paths, and mature canopy trees. The riverbank is vegetated with shrubs and



Figure 9: View east on Mystic Valley Parkway toward the river and roadway heading uphill. Large trees line the parkway.

small trees, and there are no formal water access points. Near the mouth of Alewife Brook there is a known nesting site for swans.

Intersections

Several intersections exist within the study area, and most of them are connections to neighborhood streets. Victoria Road serves as an example of these intersections, which are identified in “Neighborhood Connections” on page 34.

Five Priority Intersections exist within the study area and make up a large part of the site analysis and recommendations. As shown in Figure 6 on page 6, they are:

1. Summer Street (Rte 2A) at Mill Street / Cutter Hill Road
2. Summer Street (Rte 2A)/Mystic Street (Rte 3)/Mystic Valley Parkway
3. Mystic Valley Parkway / Medford Street (Rte 60) rotary in Arlington
4. Mystic Valley Parkway / High Street (Rte 60) rotary in Medford
5. Mystic Valley Parkway at River Street / Harvard Avenue bridge (Arlington only)

In short, each intersection has serious safety and operational shortcomings for pedestrians and people on bikes. These include excess pavement and wide curb radii that encourages higher turning speeds plus a lack of designated crossings and facilities for cyclists, among other things. Roadway conditions and safety observations are detailed for each intersection in “Appendix A: Memorandum of Existing Conditions” on page 51.

Bridges

Arched bridges with natural stone masonry cross the Mystic River at Medford/High Street and Harvard Avenue/River Street and are a visual asset along the Mystic River. Both have excess pavement that can be reconfigured with paint and, potentially, lightweight delineators to increase connectivity for cyclists. Reconfiguring deck curbing is not a short-term option and will require structural analysis and design. The Project Team also ruled out running the path underneath the bridges due to expense and potential impacts to habitat and paddling activities. A culvert at Mill Brook (see location in Figure 5 on page 5) will likely require improvements as the path is installed in that area.

Concepts, Recommendations, and Implementation

Conceptual options were developed for segment cross sections and priority intersections and included designations of path facility types and dimensions. A high-level placemaking plan was also developed to recognize the

types of opportunities that will enhance user experience and connection with the project corridor’s unique natural resources.

A recommended concept was designated following stakeholder and public feedback. Chapters 2-4 describe the options, recommended concept, plus implementation information such as permitting, maintenance considerations, and cost opinions.

Engagement with Stakeholders & the Public

The project process has incorporated an extensive amount of engagement with stakeholders and the public, including four Project Team meetings, three public meetings, a Focus Group meeting, and a meeting with residents of Cusack Terrace. All public meetings were conducted virtually, and meeting recordings were made available on the Town of Arlington’s website for later viewing. The stakeholder Project Team was formed with representatives of the following agencies:

- Arlington Department of Planning and Community Development
- Mystic River Watershed Association (MyRWA)
- City of Medford
- MA Department of Transportation (MassDOT)
- MA Department of Conservation and Recreation (DCR)
- Metropolitan Area Planning Council (MAPC)
- Lawrence and Lillian Solomon Foundation

Through four meetings held over the course of the project, the Project Team informed a better understanding of road and intersection operations and function of adjacent park spaces. The team also guided the development of concepts and selection of a recommended option to meet safety and user experience goals.

The Focus Group included residents from Arlington and Medford who are also active transportation and/or open space advocates. The group provided valuable input on draft concepts before the second public meeting. Cusack Terrace residents lent their thoughts and concerns about the project related to Summer and Mystic Streets.

Public input on existing conditions and feedback on initial concept recommendations has also been sought between two surveys and two public meetings, with a third meeting held to present the recommendations of this report and next steps. The surveys and public meetings are briefly described on pages 10, 21, and 37, and in more detail in Appendix B.

Guiding Principles

How the First Public Meeting & Survey Drove Project Priorities

The first public meeting took place on January 26, 2022 following the initial desktop review and field observations. After the presentation, attendees broke into groups to discuss the project corridor. This meeting was followed by an online public survey to gauge community concerns and aspirations for the path. From these initial community touchpoints, common themes emerged to guide priorities for the development of design concepts.

Safety

Safety for people biking and walking was a primary concern for meeting and survey participants, with the High Street bridge and rotaries identified as the most dangerous and confusing part of the trail. The Multimodal Safety strategies listed on this and the next page highlight methods to enhance safety. These methods are incorporated throughout the conceptual design options and final recommendations.

Universal Accessibility

Community members recognized that the existing facilities are not accessible to everyone. Meeting and survey participants expressed the desire for fully accessible facilities to welcome the broadest possible range of ages and ability levels, including children, seniors, and people with varying types of bikes, strollers, and mobility devices. Chapter 3 of this study recommends high-level strategies to develop a fully accessible asphalt path in compliance with national and local standards, to make the path more universally welcoming to different types of users.

Nature Experience & Ecological Preservation

Many meeting attendees and survey respondents actively recreate along the river and lake and they provided suggestions for enhancing connections to these resources. The Placemaking and Ecological Preservation section on “Ecological Preservation” presents things to consider for enhancing user experience of the natural landscape, and strategies for minimizing ecological and water quality impacts, preserving trees, and restoring habitat. Three key types of placemaking strategies are recommended to enhance and preserve the trail corridor.

Multimodal Safety Strategies

The following are strategies for achieving safety for people across all modes, whether walking, biking, or driving. These strategies are common to all conceptual design options in Chapter 2 and the recommended design in Chapter 3.

Dedicated Facilities for Active Users

Sidewalks, separated bike lanes, and shared use paths all provide dedicated space separate from motor vehicles. Sidewalks are intended for use only by pedestrians. Separated bike lanes are only intended to be used by people biking and include at least a horizontal buffer from motor vehicles. Vertical separation, such as placement behind a curb, is preferred. Shared use paths offer family-friendly space to many types of users, including people walking and biking, and can be used in a constrained right-of-way, and/or in parallel to sidewalks or separated bike lanes.

Narrowed Travel Lanes

Research shows that a correlation exists between wider travel lanes and higher vehicle speeds.¹ Narrowing travel lanes to encourage slower speeds can reduce the severity of collisions, whether with other vehicles or active users. For pedestrians and cyclists, narrowed travel lanes reduce crossing distances and time exposed in the travel way.

Reduced Roadway Corner Radii

Intersections with large corner radii allow vehicles to make turns at high speeds. This can lead to high-severity crashes at conflict points. Reconstructing intersections with reduced radii can reduce speeds and shorten crossings for path users. Radii reduction can be achieved with quick-build treatments such as paint and vertical delineators, or through reconstruction that moves curb lines. Mountable truck aprons can be installed to reduce radii for passenger vehicles while still allowing larger trucks to execute turns.

Curb Extensions

Curb extensions extend sidewalk space and shorten crossings for active users while reducing roadway space. Curb extensions can help make pedestrians more visible to oncoming traffic, and shortened crossing time can mean more efficient timings at signalized intersections. Extensions at intersections result in a narrowed field of view for motorists, which can help reduce travel speeds. Curb extensions can be constructed with quick-build (paint and flexible delineators) or permanent materials.

¹ National Association of City Transportation Officials, Urban Street Design Guide, Lane Width, <https://nacto.org/publication/urban-street-design-guide/street-design-elements/lane-width/>



Figure 10: Example of a curb extension with plantings

Raised Crossings

Raised crossings reduce traffic speeds and encourage motorists to yield to crossings pedestrians and cyclists. Raised crossings are typically elevated to sidewalk level, making for a more comfortable, level crossing that indicates to drivers that they are entering a shared space. The shared environment can be emphasized further with pavement markings or supplemental warning signage or through different paving materials, such as concrete unit pavers.



Figure 11: Example of a raised crossing

Rectangular Rapid Flashing Beacons

Rectangular rapid flashing beacons (RRFBs) signal a crossing pedestrian or cyclist to motorists. Where RRFBs have been installed, the rates of cars yielding to pedestrians have been as high as 98% at marked crosswalks, and pedestrian crashes have been reduced by 47%.² RRFBs are often installed with advanced warning signage or markings to alert approaching motorists of the crossing.

² Federal Highway Administration, Rectangular Rapid Flashing Beacon (RRFB), Safe Transportation for Every Pedestrian Countermeasure Tech Sheet, https://safety.fhwa.dot.gov/ped_bike/step/docs/TechSheet_RRFB_508compliant.pdf



Figure 12: Example of a Rectangular Rapid Flashing Beacon (RRFB)

Modern Roundabouts

Modern roundabouts are circular intersections where drivers traverse counter-clockwise around a center island within the intersection. Some features of roundabouts are:

- Center islands with truck aprons that maintain narrow lanes for passenger vehicles but allow larger vehicles to pass.
- Splitter islands to deflect and slow vehicles on their approach and provide space for pedestrians and cyclists to pause while crossing.
- Non-tangential vehicle approaches so vehicles are not able to enter or exit the circular travel lane at high speeds.

Roundabouts foster slower speeds while reducing the number of motor vehicle conflicts compared to traditional intersections controlled by traffic signals or signs.



Figure 13: Example of a Modern Roundabout

Signal Timing and Phasing Adjustments

Signal timing and phasing can be programmed to provide frequent crossing opportunities for active users at an intersection. Options are discussed in “Appendix C: Notes from Project Team, Focus Group, & Cusack Terrace Meetings” on page 55.

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**CONCEPT DESIGN
OPTIONS**

02

Segment Concepts

Dimensional requirements, safety strategies, and the guiding principals were used to develop options for conceptual design of the path. These options were compared to identify the most feasible approach. In addition, complementary spaces were defined with potential locations to incorporate them along the path. Public engagement during this iterative process informed the Project Team’s comparisons of the design options and ultimate recommendations.

This section presents brief narratives and pros and cons for all the cross section concepts and major considerations explored for each segment. For the most part, the priority intersections did not have alternative design options, so the discussion on intersection designs is included in Chapter 3. Discussion of path design in each segment is followed by a description of proposed placemaking and ecological preservation strategies to enhance the path corridor.

Segment A: Summer Street (Mill Street to Mystic Street)

Some early concepts discussed with the Project Team were quickly routed out of further development:

- **One-way bike lanes or a two-way bikeway next to the existing sidewalk.** The Project Team expressed that a shared use path was preferred, as it would maximize comfortable space for all active users and maintain consistency with proposals in Segments B and C.
- **Reduction of berm width along Arlington Catholic Field to create more space for formal parking.** This was considered too complex and would require a rethinking of where people sit to watch games.
- **A connection through Buzzell Field to the Minuteman Bikeway.** An analysis of field space showed the high potential for conflict between path and field users in multiple areas. A master plan would be needed to reconfigure the field for a comfortable connection.

Having eliminated these options, two options (Concepts A and B) came to the fore and were focused largely on the feasibility of replacing street parking space with a wider path and landscaped buffer cross-section.

Both alternative Concepts A and B are intended to represent the design concept of maximizing the path width over the width of other elements in the cross-section. It is important to note that final cross section dimensions and features may change somewhat during design development.

Concept A: No Street Parking, Wider Landscaped Buffer

As shown in Figure 16, Concept A includes standard 11’ travel lanes and removes parking to provide a 6’ wide buffer and 12’ wide shared use path.

Benefits:

- Prioritizes active use as much as possible
- Landscaped buffer offers potential for additional plantings or green stormwater infrastructure

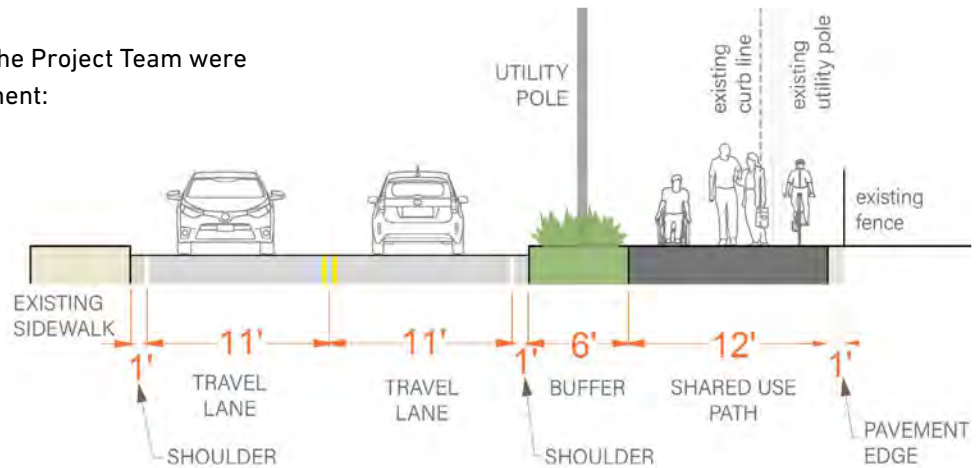


Figure 14: Concept A for Summer Street with no parking

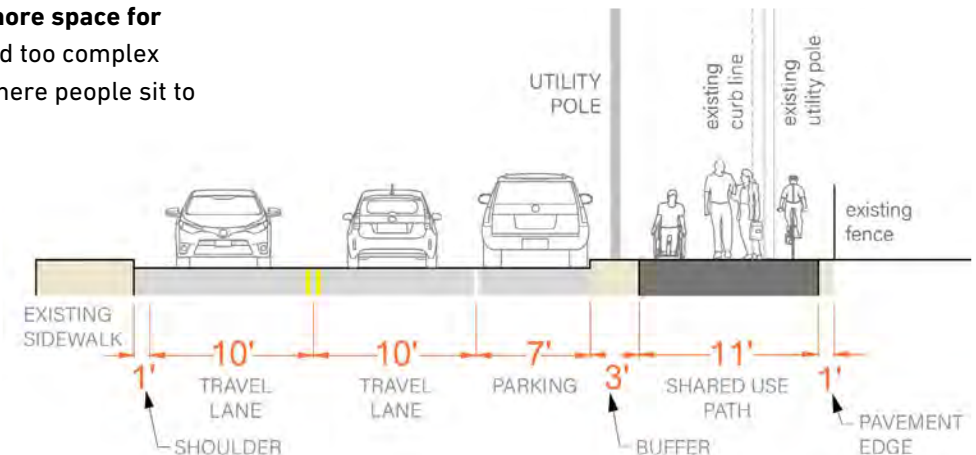


Figure 15: Concept B with narrow travel lanes and parking

- The majority, 75%, of survey respondents supported this option

Drawbacks:

- Street parking is heavily used for athletic events
- Parking prohibition on Summer Street could lead to even greater parking on neighborhood side streets, causing inconvenience to residents
- Six-foot landscape buffer may be too narrow to support healthy trees

Concept B: Retain Street Parking, Narrow Hardscape Buffer

Street parking is formalized on the south side of Summer Street along Buzzell Field and Arlington Catholic Field in Concept B, which requires narrower travel lanes and narrow parking.

Benefits:

- Retain almost half of existing street parking for athletic field events and daily usage, and prevent full inundation of cars onto neighborhood side streets
- Reduce potential for heated debate over parking

Drawbacks:

- Conflicts will need to be mitigated between people using the trail and people accessing cars parked at curb
- Path is one foot narrower than Concept A in a busy area, and the buffer is three feet narrower. Given curbside use for parking, the buffer cannot support extensive plantings.

Recommendation: Concept B & Further Study

The majority of survey respondents preferred to remove parking, and it is preferable to construct a wider path and buffer by removing parking as presented in Concept A. However, with input from the Arlington Parks and Recreation Commission, it is clear that the removal of all parking on Summer Street would present major operational challenges for the fields. This study recommends to retain parking on the south side unless an alternate parking solution can be achieved. A parking study would help provide a clearer picture of needs and help drive a conversation over alternate solutions.

Segment B: Mystic Valley Parkway from Mystic Street to High Street Rotaries

Segment B is constrained in comparison to Segment C due to the steep slope on the east/south side of the roadway and Lower Mystic Lake to the north. Some early concepts discussed with the Project Team were quickly routed out of further development.

On-Street Bike Lanes: On-street bike lanes were considered for this segment as members of the public had expressed some preference for separation between pedestrians and faster cyclists. This includes input from pedestrians, and from confident cyclists who prefer to have separation so they can move more quickly than when mixing with pedestrians on a path. However, both a pair of one-way bike lanes and a two-way bikeway were deemed infeasible due to roadway width constraints at the Mill Brook Culvert.

Concept: Shared Use Path

A shared use path was confirmed as the sole preferred option for this segment. Narrowing traffic lanes provides space for a 12-14' shared use path and 6-14' wide landscape buffer depending on the amount of roadway width reduced.

See Chapter 3 for representative cross sections as part of the recommended concept.

Buffer Considerations

Given the proximity of the existing and proposed path to the roadway, discussion with Project Team members and the public focused on the types of horizontal and vertical separation necessary for path users' safety and comfort. Currently a guardrail is located between the lake and the narrow pedestrian path. Discussion considered whether curb separation and a grassy buffer is enough, or if a guardrail should be located between pedestrians and the roadway to prevent a motor vehicle from veering into the pedestrian space. During future phases of design, the DCR will perform a formal analysis to determine whether a guardrail is necessary, and further community engagement will establish what is needed for path users' comfort.

Segment C: Mystic Valley Parkway from the Rotaries to Alewife Brook Greenway

While roadway width stays a consistent 38'-40' throughout Segment C, parkland width varies. Thus, multiple facility types and materials were considered for this segment.

A shared use path was proposed from the outset. However, several members of the public expressed concerns over a paved path and how it would affect the pedestrian experience, riverbank character, and ecological impacts. The following ideas from the public and Project Team impacted decision-making over materials for the path:

- Asphalt was viewed by several people as harsh, less comfortable, and not in keeping with the natural area. Asphalt will also reduce stormwater infiltration.
- Stabilized aggregate was proposed in place of asphalt for a stable but more “naturalized” path surface that would prevent cyclists from speeding through. Consider permeable asphalt to maintain infiltration.
- No path exists on the Medford side of the river in this segment, so the Arlington side must support higher use.
- An asphalt-paved path better supports mobility needs and family-friendly biking away from the roadway.
- An asphalt path is more durable and lower maintenance than stabilized aggregate on a yearly basis.

Concept: Shared Use Path

The Project Team ultimately settled on recommending an asphalt shared use path with reinforced shoulders. The path was originally proposed to be 12'-14' wide. The materials

considerations listed above resulted in a proposal for an asphalt path that was 10' wide to minimize impacts on stormwater infiltration. However, 10' does not adequately support side by side riding in two directions. Thus, the Project Team agreed on a path that is primarily 11' wide and which can widen to 12' where space allows or reduce where needed to 10' in constrained spaces.

Shoulders were originally discussed to be 2' wide and stabilized aggregate to support pedestrians seeking a softer surface. However, stabilized aggregate set against asphalt requires a high level of maintenance, so shoulders are proposed to be reinforced turf instead.

Concept: Pedestrian Path

While the primary path is proposed as asphalt, Project Team members agree that additional pedestrian-only paths with soft surfaces should be installed wherever the riverbank area is wide enough to accommodate them in addition to the paved path. The pedestrian paths will help provide more of a nature-trail experience that is valued by community members. Surfacing for this facility is recommended to be stabilized aggregate.

On-Street Bike Lanes

Given excess roadway width in Segment C, additional on-street bike lanes were proposed to respond to those who expressed a desire for as much user separation as possible.

Option A: Two-Way Bikeway

Beyond establishing the need for on-street bike lanes, the type of bike facility was discussed as well. When asked,

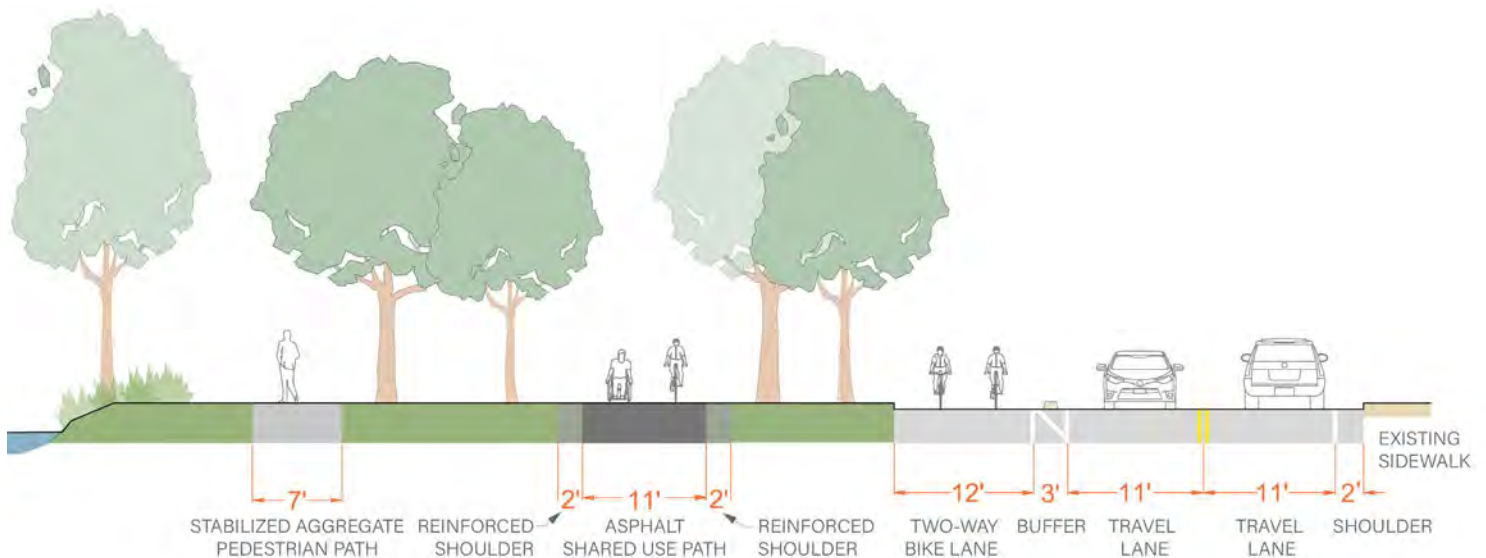


Figure 16: Segment C with a two-way bikeway option and additional pedestrian path in wide parkland area

the public confirmed, via survey, a preference for a two-way buffered bike lane on the river side of the parkway. This would support social riding and easier passing while keeping cyclists away from driveways and numerous intersection crossings.

Given existing roadway width, an 11'-wide two-way bike lane with 3' wide buffer could be matched with 11'-wide travel lanes and 2' shoulder on the south or sidewalk-side of the parkway.

One challenge to implementing the two-way facility, however, is the need to install a vertical buffer that provides more separation and more comfortable riding for cyclists headed counter to the direction of vehicular traffic. Many types of buffers exist, but DCR has not yet confirmed a low maintenance option for standard use on parkways. In the long-term a two-way bikeway might be incorporated with a raised curb buffer, whether achieved with poured-in-place concrete or precast concrete curb drilled into the pavement. In the short-term, a two-way facility may not be comfortable or safe.

Option B: One-Way Bike Lanes

For the short term, a pair of one-way buffered bike lanes is recommended to more quickly improve conditions for cyclists along Mystic Valley Parkway, though it is acknowledged that a lack of a vertical buffer is likely to result in more drivers parking or temporarily pulling over into the bike lanes.

Each bike lane is proposed at 6'-wide and matched with 2' buffers and 11' travel lanes.

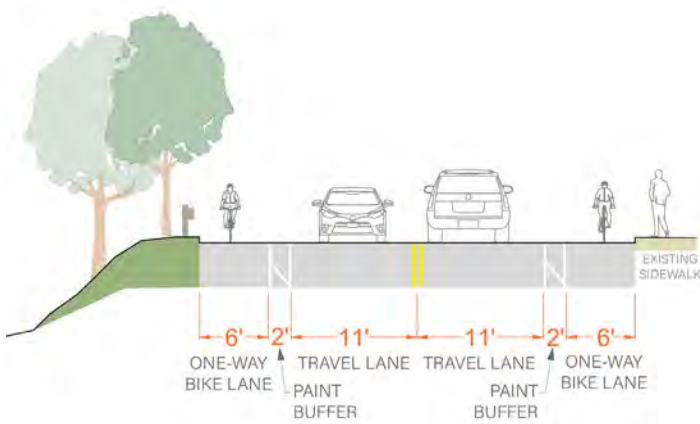


Figure 17: One-way bike lane pair option in Segment C

Placemaking and Ecological Preservation

Placemaking

Placemaking is a dynamic set of practices focused on reflecting and celebrating local culture and history in the design and programming of public spaces. Placemaking can take many forms, intersecting with public art, wayfinding, and preservation practices. While the term “placemaking” does not inherently recognize an existing sense of place and cultural and natural assets, it is recognized in this study that a strong sense of place already exists and should be protected.

The Mystic Valley Parkway parkland corridor is a beloved resource, offering valuable connections to the Mystic River and Lower Mystic Lake. Placemaking should focus on protecting and enhancing ecosystems and viewsheds, and adding opportunities for nature observation and immersion. While not limited to these, three types of placemaking spaces are proposed below that are intended to support enjoyment and understanding of the ecology of the river and lake.

Gateway

Gateways are small plaza areas located at key access points to the trail, and serve to welcome trail users with orientation and wayfinding information. Some may include amenities such as bike parking (see bike rack considerations on page 20), seating, and interpretive materials. Gateways can be placed near intersections or neighborhood connections to the trail.



Figure 18: Gateway example from Clinton River Spillway Bike Path, MI (photo credit: Peter Pahl)

Scenic Overlook

Overlooks offer opportunities to rest, relax, and take in views of Lower Mystic Lake and Mystic River. “Stepdowns,” stone steps or ramps that provide direct access to the river, may also be considered at certain locations. Overlooks and stepdowns can stand alone or be integrated with a nature opportunity area.



Figure 19: Overlook example from Charles River Greenway, MA (photo credit: Herb Nolan)



Figure 20: Stepdown example from Habirshaw Park, Yonkers, NY

Nature Opportunity Area

Nature opportunity areas are immersive natural areas that can be experienced along the shared use path. As noted above, they may include an overlook, or simple seating to allow people to linger and relax. Nature opportunity areas may encompass riparian restoration, native pollinator habitat plantings, and rain gardens for stormwater filtration. Interpretive materials and programming can help to foster stewardship for the ecosystems of Lower Mystic Lake and the banks of Mystic River.

Locations for Placemaking

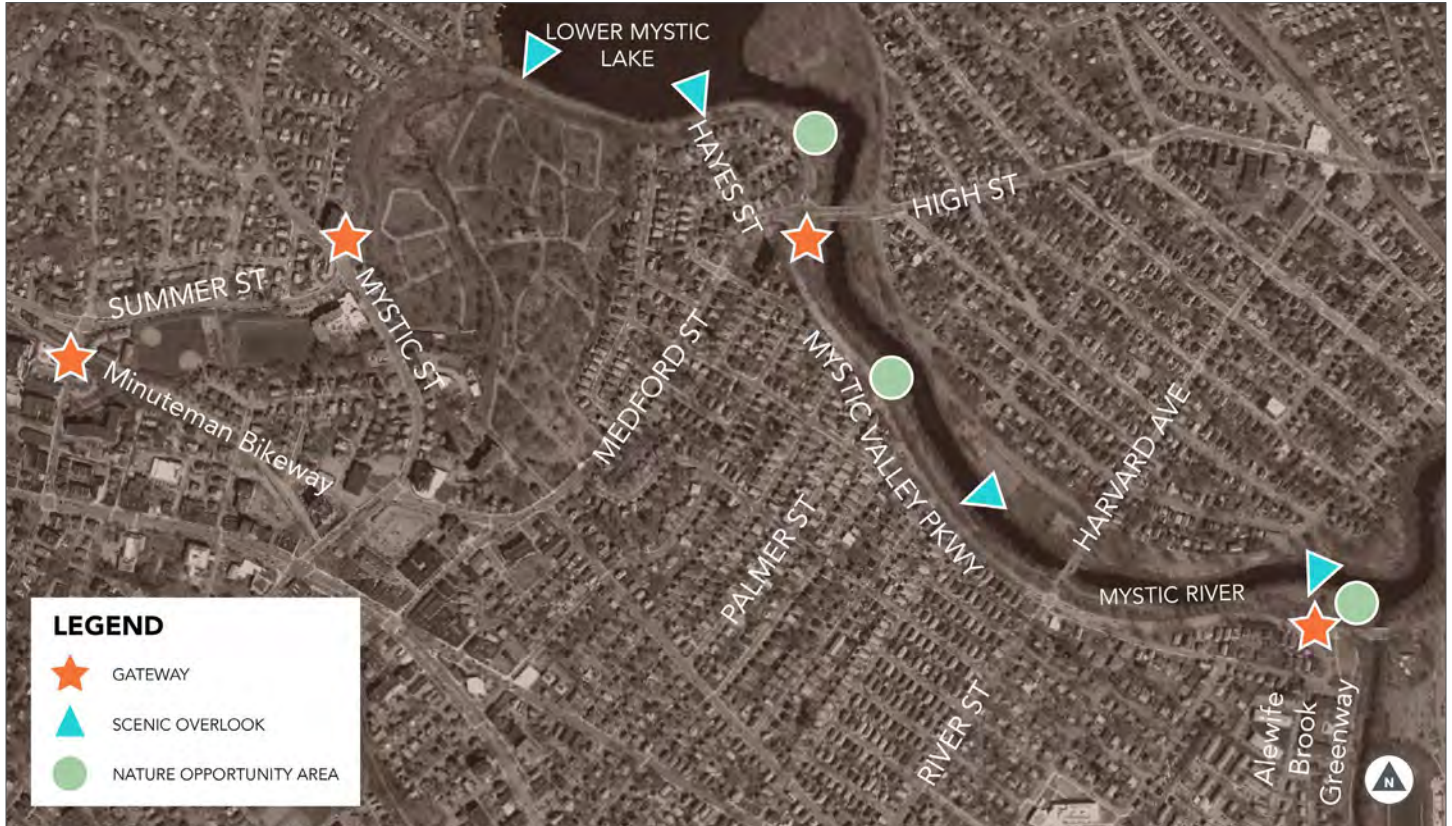


Figure 21: Placemaking types and proposed locations

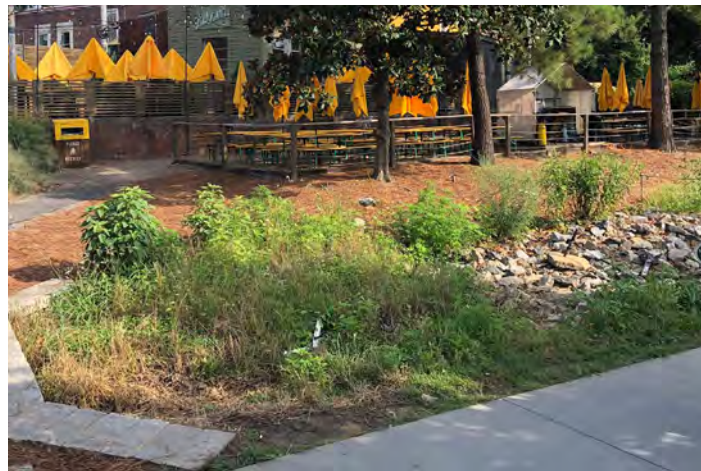


Figure 22: Rain garden with native plants along the Atlanta Beltline

The plan above proposes locations for gateways, overlooks, and nature opportunity areas based on available space, existing use, and site context. The final quantity, locations, and detailing of these spaces will be developed in future design phases.

Other Placemaking Considerations

Wayfinding

Community meeting attendees and survey respondents identified a need for wayfinding throughout the corridor. Wayfinding includes signage, pavement markings, and other features that make up a directional system. Wayfinding can help brand the corridor and establish spatial hierarchy so users are able to recognize entrances or intersections. Wayfinding can be designed to aid the aging, visually challenged, and others. Wayfinding might be integrated into a larger trail or bike network program that helps people navigate between the Minuteman Bikeway, Alewife Brook Greenway, and other paths and bike lanes in the area to local destinations.

Seating

Several benches are located along the riverside paths today. While bench locations are not shown in Figure 22, seating areas are recommended at regular intervals along the path to provide opportunities for respite. Benches, seatwalls or other types of seating are recommended. Barrier-free access to each seating area will be included as well as open paved space that can accommodate companion seating for those in wheelchairs, strollers, and the like.

Bike Racks

It is of the utmost importance that bike racks are provided throughout the corridor to allow people on bikes to fully enjoy unique spaces and adjacent uses. Bike racks should be located in areas where people are likely to rest, temporarily leave the path, or switch transportation modes. This includes gateways, bus stops, and viewsheds/overlooks, among others.

Provide sufficient parking space to support cargo bikes and wider bikes and tricycles often used by adaptive cyclists. Racks should be placed so they do not obstruct path activity. Rack styles should allow two points of contact, and tubing should be no greater than 2" in diameter for bike lock compatibility.

Ecological Preservation

It is important to protect existing healthy vegetation throughout the corridor. Several large canopy trees are located in the parkland area along Mystic Valley Parkway, and both canopy and understory species are located along the banks of the river and Lower Mystic Lake. As many trees as possible will be maintained and protected along with understory plants that provide a variety of wildlife habitats. Even dead tree snags and leaf litter perform important roles of supporting those habitats and should be allowed to remain. Preserving trees will help maintain shade, habitat, and carbon storage while additionally helping to prevent erosion.

Beyond trees, consider how to use Nature Opportunity Area plant selection to support habitat, infiltrate stormwater, and prevent erosion. Plantings can be incorporated into rain gardens or swales along the path to mitigate the impacts of constructing an impervious asphalt path in regulated Riverfront Area (see "Permitting" on page 40).

Unprompted, some public meeting and survey participants requested lighting for safety reasons and to support evening path use, while others opposed lighting for the aforementioned reasons. Since lighting contributes to light pollution and has significant affects on wildlife, we recommend carefully considering these environmental aspects as well as goals of the community, safety and sense of security, expected use (such as morning and evening commuting), and maintenance. If incorporating lighting, ensure fixtures adhere to [Dark Sky](#) principles.



Figure 23: Large canopy trees provide shade along Mystic Valley Parkway and in parkland between the parkway and Mystic River.



Figure 24: Leaf litter should be allowed to remain to provide habitat for pollinators and invertebrates and to replenish soil nutrients as leaves decay.

Second Public Meeting and Survey

The second public meeting was held virtually on March 30, 2022 to gather community feedback on proposed trail design and placemaking concepts. A presentation was followed by a question and answer period to help clarify concepts, and a general discussion period produced several comments related to concerns about materials, the need for vertical separation (a guardrail) from cars south of the lake, roundabout operations, and parking and path access along Summer Street.

A second public survey was released with the meeting and addressed facility types, materials, placemaking, and concerns at selected intersections. See key highlights on this page and a full survey report in Appendix B.

Summary of Survey Results by Project Segment Segment A: Summer Street (Mill Street to Mystic Street)

The majority, 75%, of respondents supported removing parking, narrowing vehicular travel lanes, and providing a landscaped buffer for the shared-use path. However, many respondents anticipated conflict over parking removal, and several suggested the Town seek other long-term parking solutions for events at the athletic fields.

Segment B: Mystic Valley Parkway from Mystic Street to Rotaries

Respondents requested improved trail connections from Kimball Road and Davis Avenue to the path.

Segment C: Mystic Valley Parkway from the Rotaries to Alewife Brook Greenway

The focus of voting and comments in this segment was on path materials as described under Shared Use Path: Materials and Width on the previous page. The majority, 88%, of respondents support an asphalt path.

Summary of Survey Results by Intersection Summer Street at Mill Street / Cutter Hill Road

Some respondents are concerned about the loss of turn lanes. One respondent suggested signaling the Minuteman Bikeway crossing on Mill Street.

Summer Street/Mystic Street/Mystic Valley Parkway

The majority, 86%, of respondents supported the diagonal bike/pedestrian crossing at this intersection. There were concerns about traffic backups on the Mystic Valley Parkway, and interest in measures that could be taken to

minimize additional congestion with the implementation of the crosswalk and signal.

High Street Rotaries and Bridge

Respondents supported the proposed multimodal safety measures but requested further information on bicycle movements around the rotaries. There was concern over driver behavior in both the existing and proposed conditions.

River Street / Harvard Avenue Bridge

Respondents recommended an automatic bike/pedestrian phase with each signal cycle.

Summary of Responses to Placemaking

Respondents broadly want placemaking efforts to uphold and enhance natural character along Lower Mystic Lake and the Mystic River. The following are comments on questions that asked about overlooks and nature opportunity areas:

Scenic Overlooks

- An overlook at the southeast side of Lower Mystic Lake, at Hayes Street, is the preferred of four options provided.
- Integrate overlooks with nature opportunity areas, or find other ways to locate them at some distance from the roadway to provide trail users with a relaxing experience.
- Avoid constructing overlooks in sensitive habitat areas, such as a swan-nesting site at the mouth of Alewife Brook.

Nature Opportunity Areas

- Native plantings for stormwater filtration and wildlife habitat were the most favored features proposed for nature opportunity areas.
- Respondents suggested ways to minimize ecological impacts of new trails in the floodplain, including permeable materials or boardwalk.

Additionally, respondents recommended adding interpretive materials on local culture and history along the trail.

Requested amenities included benches, picnic tables, bike parking, restrooms, drinking fountains, interpretive and wayfinding signage, river access, a dog park or off-leash area, public art, and a parking area north of High Street bridge. (The Project Team eliminated this as an option for parking for safety reasons.)

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**RECOMMENDED
CONCEPTUAL DESIGN**

03

Design Recommendations by Segment

The content of Chapter 3. Concept Design Options, outlined the many details considered for the path. Discussions with the Project Team, focus group, and the public resulted in a recommended concept for a 10'-14' wide asphalt shared use path as the unifying element throughout the project corridor. The asphalt path is supplemented by existing sidewalks along Summer Street and south of the Medford Street/High Street roundabout along the Mystic Valley Parkway. Also south of the roundabout, pedestrian-only soft-surface paths within parkland and on-road bike lanes are proposed where feasible.

This chapter details widths, materials, safety and accessibility considerations, and placemaking recommendations for the path as it responds to the distinct character of the three corridor segments. Safety, placemaking, and operational improvements for priority intersections are also addressed in detail, as are recommendations for neighborhood connections. Chapter 4 includes implementation recommendations to guide the next stage of development for the connector.

Long-Term vs Short-Term

The recommended shared use and pedestrian path concepts are proposed for the long-term. One-way buffered bike lanes in Segment C are a quick build solution given they will be painted. It is recommended to consider options for vertical separation, as painted buffers do not prevent cars from entering and parking in bike lanes. Consider whether either one-way bike lanes or one 12' wide two-way bike lane with a 3' buffer can be constructed with durable materials into the parkway over a longer timeline.

Intersection improvements detailed in this chapter are also proposed for the long-term. However, some spot improvements are identified where they will provide major benefits for little cost in the short-term.



Figure 25: The recommended concept includes a continuous shared use path plus on-street bike lanes and pedestrian paths as feasible

Segment A: Summer Street from Mill Street to Mystic Street

Multimodal Safety & Accessibility

While a cross section without parking is preferable so that path and buffer width can be maximized, removing all the parking next to Buzzell Field and Arlington Catholic Field will require a parking study and plan for parking redistribution. For this reason, the near-term recommended design for Segment A maintains parking on the south side, so widths of each portion of the corridor are minimized to support the widest path possible while parking is present.

The corridor includes an 11' wide shared use path, the minimum width needed to support side-by-side riding. The path is buffered 1' from the chain link fence along Buzzell Field to provide shy space for path users while providing a hard edge to support the asphalt.

On the roadway side, the path is separated from parked vehicles by a 3' wide buffer that is recommended to be paved for use by those accessing vehicles. This buffer is the minimum width necessary to prevent vehicle passengers from opening doors into the path and to support signage. It is recommended that overhead utility lines be buried if feasible. Alternatively, they will need to be relocated to the new buffer, allowing for a safe, unimpeded path for people walking, rolling, and biking. Seating cannot be located in the buffer.

New striping is proposed to formalize parallel parking along the south curb with a 7' wide parking lane. Vehicular travel lanes are narrowed to 10' wide. The existing sidewalk on the north side of Summer Street is maintained.

All cross sections between pages 25 and 27 face east. Cross sections are preliminary concepts only and not for construction.

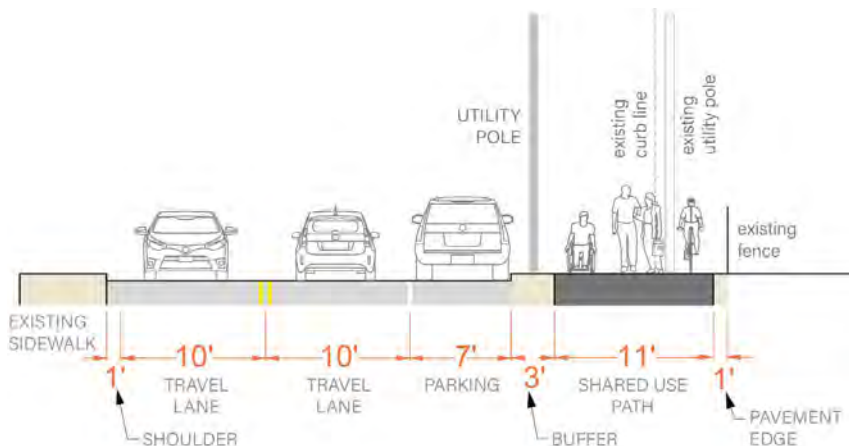


Figure 26: Segment A - Summer Street next to Buzzell Field and Arlington Catholic Field



Figure 27: Looking west on Summer Street along the narrow sidewalk with utility poles adjacent to a chain link fence and Buzzell Field. Recommendations in this chapter detail the path as it responds to the changing character of the corridor.

The small portion of the path on Mill Street connecting to the Minuteman Bikeway is addressed within the “1. Summer Street at Mill Street” on page 30.

Placemaking/ Ecological Preservation

Planting and bike rack opportunities are limited in this segment to intersections and crossings as the narrow buffer will provide access to vehicles. However, pedestrian scale lighting, wayfinding, and buffer materials that enhance the look of the trail can be considered for use in the Design Development phase.

Segment B: Mystic Valley Parkway from Mystic Street to High Street Rotaries

Multimodal Safety & Accessibility

For Segment B, a 12'-14' wide shared use path is located along the west to north side of the parkway as it curves. The path width can change according to available space as the roadway is narrowed.

Closer to the Mystic Valley Parkway/Mystic Street/Summer Street intersection, a 6'-10' wide buffer is proposed to be located between the path and roadway. As the curve rounds

to the east, the buffer is proposed between 6' and 14' wide depending upon available space.

Vehicular travel lanes are narrowed to 11' with 2' shoulders, though shoulders may be required to narrow briefly at the Mill Brook culvert to maintain adequate path width.

Where feasible, it is recommended to pull the path away from the lake to increase space for stormwater management and to help prevent erosion by allowing for more vegetation to stabilize the bank. More narrow travel lanes are proposed that will help reduce vehicular speeds.

While speeds will be reduced with narrowed roadways and the buffer between the roadway and path will be widened in

some locations, guardrails are recommended to be analyzed for use in the buffer along the full length of this segment. Guardrails may particularly be necessary along Lower Mystic Lake given the bank steeply drops off. The public had also called for guardrails to increase a sense of safety and comfort.

Placemaking/ Ecological Preservation

Tree planting can be considered where the buffer is at least 10' wide. However, also analyze whether the path might be pulled away from edge of the lake to allow for an expansion of the riparian edge.

A scenic overlook is proposed along the lakeshore for path users to enjoy expansive views of Lower Mystic Lake. The overlook(s) can be located either near the Mill Brook culvert or across from Hayes Street.

The open lawn area just north of the High Street bridge is envisioned as a Nature

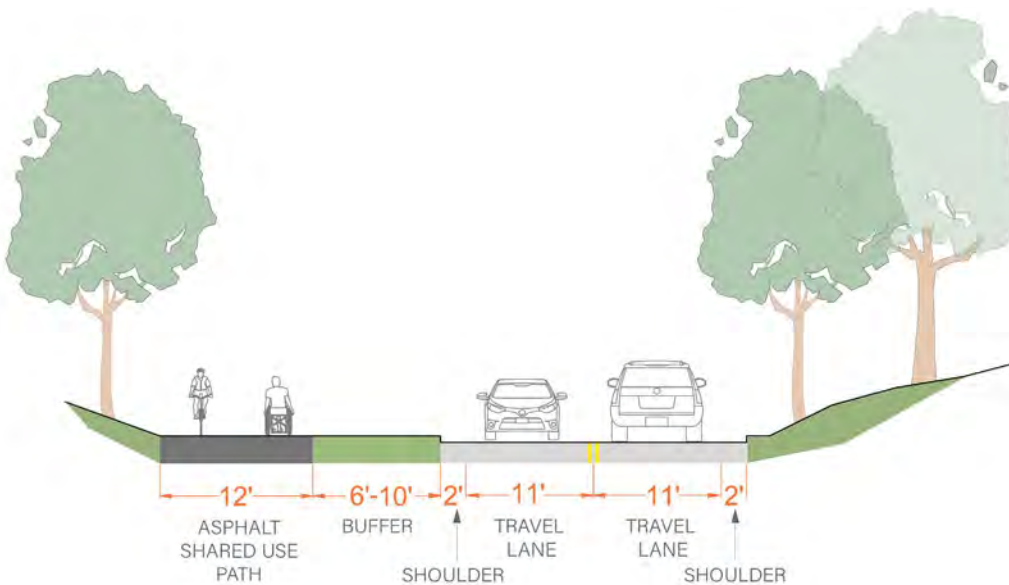


Figure 28: Segment B - Mystic Valley Parkway just east of Mystic Street/Summer Street/ Mystic Valley Parkway intersection

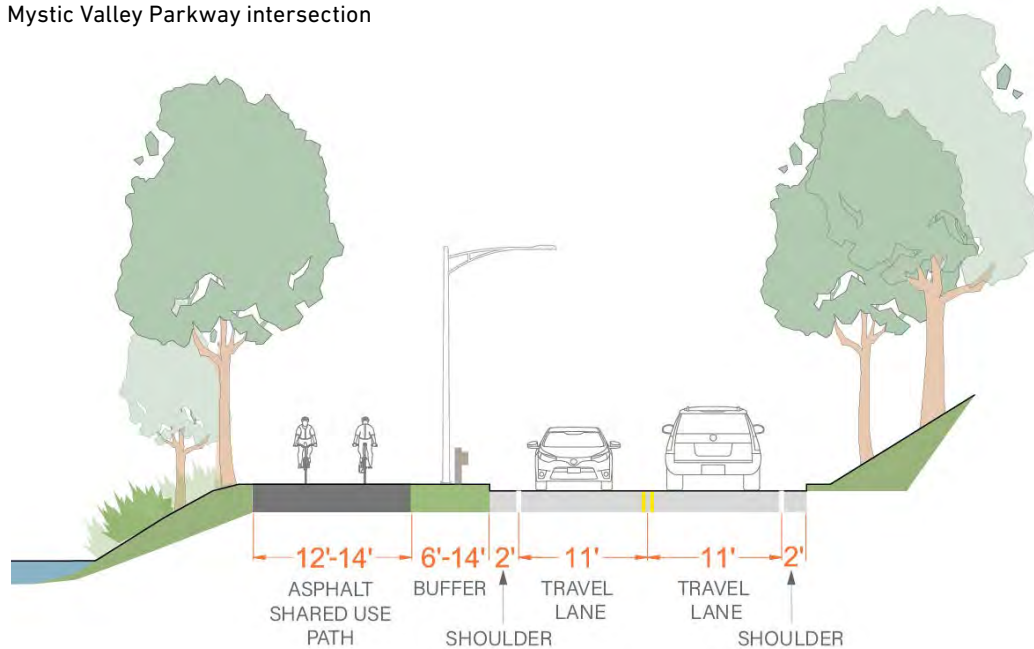


Figure 29: Segment B - Mystic Valley Parkway along Lower Mystic Lake

Opportunity Area, with native plantings that support habitat and rain gardens as well as space for passive recreation.

Segment C: Mystic Valley Parkway from the Rotaries to Alewife Brook Greenway

Multimodal Safety & Accessibility

Segment C includes many opportunities for active recreation. Along the river, the primary facility is an asphalt shared use path, primarily 11' in width. This width can be adjusted up or down by 1' to respond to wider or more constrained conditions. The path is lined by 2' reinforced turf shoulders to each side for users who prefer a soft-surface for running or walking.

With vehicular travel lanes on Mystic Valley Parkway narrowed to 11', a pair of 6' wide bike lanes with 1' wide buffers is proposed in the roadway. It is recommended to provide vertical delineation in these buffers for added safety and to prevent vehicles from parking in the bike lanes.

Where parkland width allows, an additional 6'-7' wide pedestrian-only stabilized aggregate path is proposed between the shared use path and Mystic River.

Placemaking/ Ecological Preservation

Nature Opportunity Areas are proposed to be incorporated in locations with the highest anticipated use and appropriate settings for riparian restoration, habitat protection, and environmental education purposes. Another scenic overlook is proposed at the river's edge, and stepdowns are recommended for use in limited locations so people can more easily access the water. Path Gateways with wayfinding and information will be located at key access points to the path, such as major intersections or neighborhood connections.

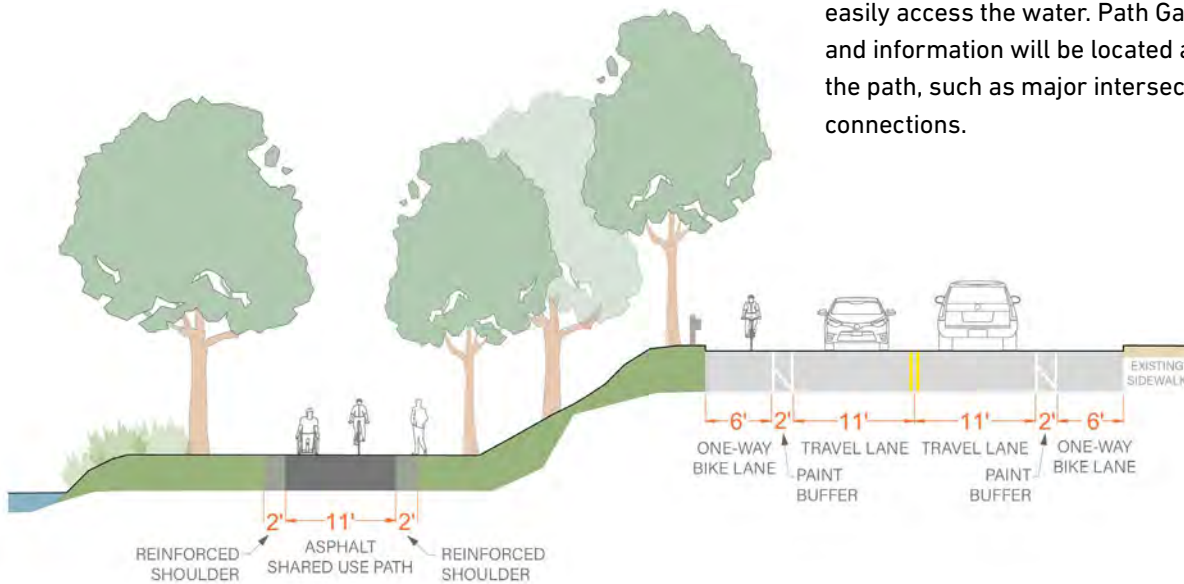


Figure 30: Segment C - Mystic Valley Parkway along Mystic River just south of Medford Street rotary

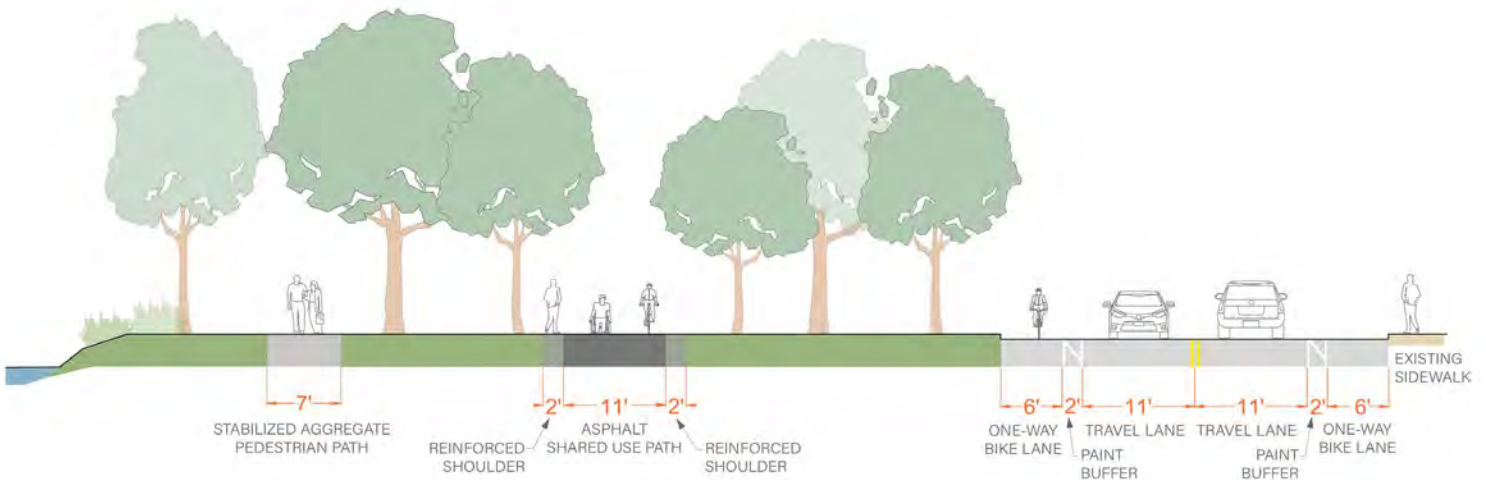


Figure 31: Segment C - Mystic Valley Parkway along Mystic River where space for a pedestrian path is available

Path Perspectives

The perspective graphics on this and the following page offer conceptual visions for how the Mystic path connector will look and feel once installed. These graphics reflect the cross section and placemaking recommendations provided in this chapter.

Lower Mystic Lake: The perspective below illustrates how a narrowed roadway along Lower Mystic Lake can provide space for a wide shared use path. A small overlook opens views of the lake and provides a resting area for path users. Existing roadway lighting must move with the buffer and can be designed to provide pedestrian scale path lighting, though limit fixtures to prevent light pollution.



BEFORE: The existing path along the Mystic Valley Parkway is too narrow to support shared use, and only confident cyclists bike in the roadway.



Figure 32: (above) the existing condition and (below) proposed path corridor and overlook along Lower Mystic Lake



BEFORE: A crosswalk at Palmer Street leads to green space but no path. The soft surface path near the river is inaccessible for many users.

Mystic River at Palmer Street Crossing: The perspective illustrates how the asphalt shared use path and stabilized aggregate pedestrian path can be incorporated together into this wide space, with an accessible connection made to both paths from the Palmer Street crossing. The shared use path has stabilized shoulders for runners. Native plantings can be incorporated in limited masses or a more extensive nature opportunity treatment.



Figure 33: (above) the existing condition and (below) proposed path and parallel pedestrian path across from Palmer Street on the river

Priority Intersections

1. Summer Street at Mill Street

Summer Street at Mill Street/Cutter Hill Road intersection is envisioned as a gateway to the Minuteman Bikeway or the Mystic trail connector for active users headed eastbound on Summer Street and for those connecting between paths. Changes to the Minuteman Bikeway crossing would be made in coordination with the Minuteman Bikeway Planning Project. Multimodal safety and operations recommendations are keyed to the plan below.

Multimodal Safety & Accessibility

- ① Install a shared use path on the east side of Mill Street from the Minuteman Bikeway north to the intersection and continuing on the south side of Summer Street to better support travel adjacent to athletic fields while reducing potential crossing conflicts at intersections.
- ② Add bike lanes west of the intersection while maintaining the existing bus stop on the northwest corner.

- ③ Narrow travel lanes, and remove existing medians to create space for bike lanes and path.
- ④ Remove the eastbound and northbound right turn lanes to provide space for the path and buffer.
- ⑤ Provide high visibility pedestrian and bike crossing markings on all legs. Where feasible, consider providing protected queuing space for cyclists on corners.
- ⑥ Provide ADA compliant, directional curb ramps and pedestrian signals.
- ⑦ Shorten the Minuteman Bikeway crossing with a curb extension. See the Minuteman Bikeway Planning Project for other recommendations for the crossing.

Operations

Intersection operations will change with the removal of the eastbound and northbound right turn lanes. Overall intersection delay increases during the peak hours, but all movements will be operating within capacity and with acceptable delay for the urban context.

Short-Term: Reduce corner radii with painted curb extensions and flexposts, separator curb, or planters.

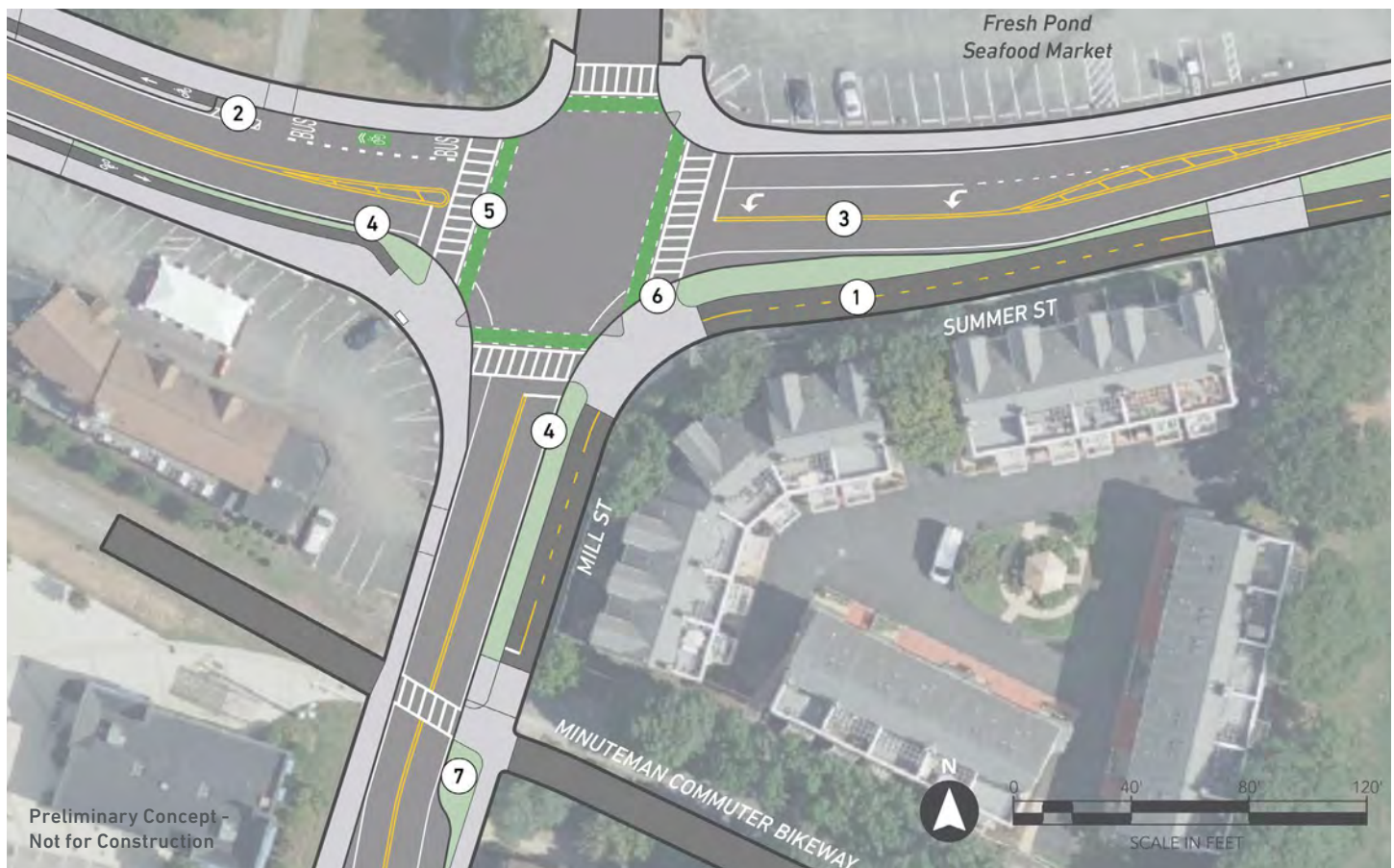


Figure 34: Proposal for Summer Street at Mill Street intersection south to the Minuteman Commuter Bikeway.

2. Mystic Valley Parkway at Summer Street / Mystic Street

This oblong, offset intersection is envisioned with a diagonal crossing for path continuity and conflict-free crossing for path users.

Multimodal Safety & Accessibility

- ① Provide a direct, one-phase (exclusive phase) crossing for people biking and walking on the path.
- ② Realign the right turn slip lane, and add a large curb extension to reduce intersection size and shorten crossings.
- ③ Provide bike lane connections through the intersection with transitions from the path where space allows.
- ④ Consider providing truck aprons where painted lines are shown on corners to reduce turning radii.
- ⑤ Add a high visibility crosswalk across the southern leg of Mystic Street to create a more direct connection for pedestrians headed down to Mount Pleasant Cemetery. Provide directional crossings with ADA compliant ramps and pedestrian signals throughout.

- ⑥ As the parkway moves downslope, grade the path with curves as needed to ensure ADA accessibility.
- ⑦ Consider closing the gas station driveway in the long-term. The one-way entry driveway can also be narrowed. Reduce turning radii as much as feasible.

Placemaking

- ⑧ Consider options for stormwater planting and other placemaking features on the southwest corner.
- ⑨ Establish a gateway onto the path with wayfinding, plantings and other features on the northeast corner.

Operations

- Provide an exclusive diagonal crossing phase every cycle to give path users frequent crossings and to maintain similar average pedestrian delay to existing conditions.
- Motor vehicle operations are anticipated to remain operating at or under capacity during peak hours.

Short-Term: Reduce corner radii with paint and delineators. Evaluate signal timing adjustments and potential for shorter cycle lengths that reduce pedestrian/cyclist delay.

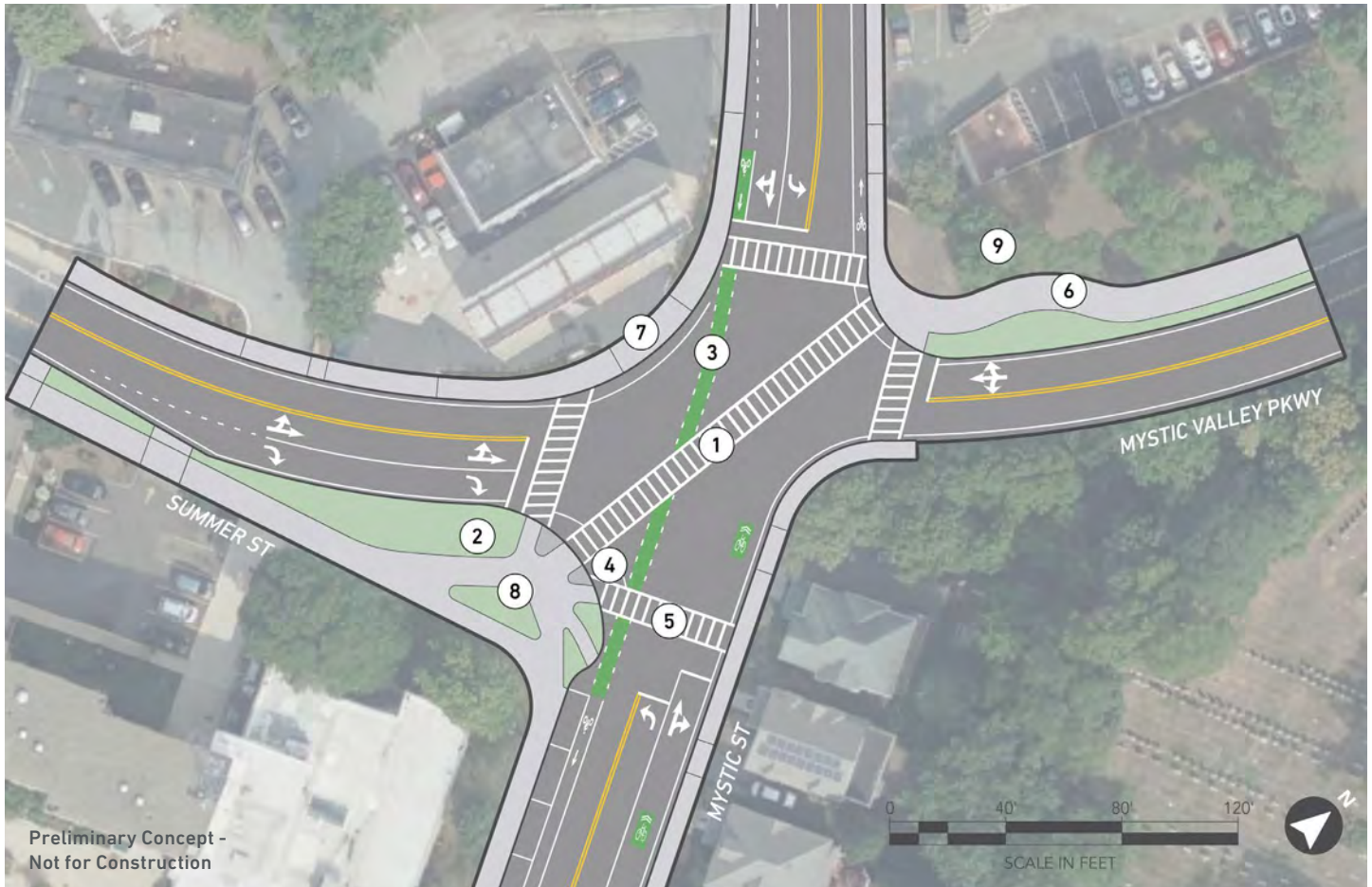


Figure 35: Proposal for diagonal crossing at Mystic Valley Parkway / Mystic Street / Summer Street intersection

3 & 4. Medford Street / High Street Rotaries & High Street Bridge

The rotaries in Arlington and Medford are proposed to be substantially redesigned to create modern roundabouts with safe facilities and crossings for walking and biking.

Multimodal Safety & Accessibility

- ① Tighten and formalize traffic lanes, particularly within both rotaries to create a single travel lane.
- ② Provide wide, high visibility crossings on all legs, including both ends of High Street bridge, for use by pedestrians and cyclists. Set crossings at least one car length away from the roundabout yield lines so drivers do not block crossings as they wait to enter the roundabout.
- ③ Consider RRFBs at the primary path crossing.
- ④ Provide at least 6' of refuge width within splitter islands on all roundabout legs.
- ⑤ Configure roundabouts with mountable truck aprons around the center islands and perhaps on outside corners to keep the travelway narrow for passenger vehicles but traversable for trucks and buses on Medford Street/High Street (Route 60).
- ⑥ Add bike lanes across the bridge. Due to excess roadway size, two-way bike lanes can be provided on both the north and south side of the bridge. Whenever the bridge is

slated for major modifications, consider providing generous shared use paths on both sides.

- ⑦ Provide seamless transitions to paths on both sides of the Mystic River. Parkland slopes will require attention to grading to ensure accessibility.
- ⑧ Consider the transition to one-way bike lanes to the south on Mystic Valley Parkway. Add bike lanes to connecting streets (Medford St, High Street, Arlington St).
- ⑨ Provide signage at the driveway to encourage path users to look for incoming vehicles.

Placemaking and Ecological Preservation

- ⑩ Configure path to avoid tree removal.
- ⑪ Consider providing a small gateway area with seating and signage as a midpoint along this trail and for those connecting in from other streets.
- ⑫ Provide accessible seating, and consider areas to maintain open views to river.

Operations

Motor vehicles see reduced delay in the morning peak hour and no changes to operations in the evening and Saturday midday peak hours.

Short-Term: Tighten geometry with quick-build materials. Install crosswalks and curb ramps across legs that do not have them already.

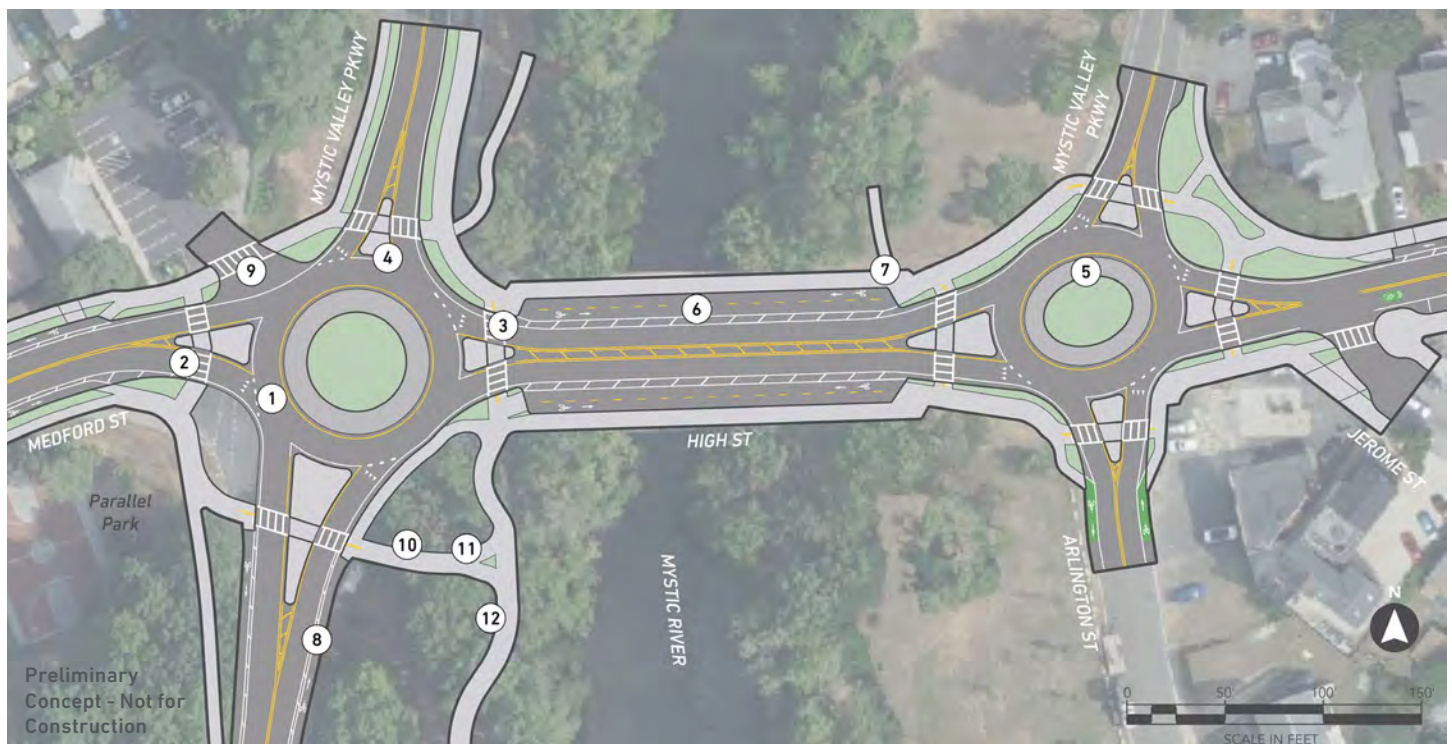


Figure 36: Proposal for Medford Street / High Street rotaries to modern roundabouts between Arlington and Medford

5. Mystic Valley Parkway at River Street / Harvard Avenue Bridge

Toward the eastern end of the study area, the Mystic Valley Parkway at River Street and Harvard Avenue Bridge is envisioned to consolidate crossings north of the intersection.

Multimodal Safety & Accessibility

- ① Provide a wide crosswalk on the north side of the intersection for path users plus pedestrians on existing sidewalks.
- ② Construct the trail so it curves in toward the crossing and discourages people from crossing midblock to the north. Ensure that curb ramps meet ADA, and consider push button location for path and intersection use.
- ③ Provide two-stage bicycle turn boxes to support bike connections in all directions in the intersection. Two-stage turn boxes require Interim Approval for use under FHWA.
- ④ Add bike lanes across Harvard Avenue Bridge to strengthen connections between Arlington and Medford.
- ⑤ Connect the proposed one-way bike lanes on Mystic Valley Parkway through the intersection.

- ⑥ Close the gas station entrance on the southeast corner to provide queuing space for cyclists and pedestrians.
- ⑦ Narrow other gas station driveways and mark bike crossings.

Placemaking and Ecological Preservation

- ⑧ Configure path to avoid tree removal.
- ⑨ Provide accessible seating, and consider areas to maintain open views to the river.

Operations

- Active users will have frequent crossing opportunities with the exclusive pedestrian phase placed on recall. Users will experience less delay with shortened cycle lengths in the evening and Saturday midday peak hours.
- Motor vehicles continue to see intersections operate similar to existing conditions in all peak hours.

Short-Term: Reconstruct curb ramps to be ADA compliant. Evaluate signal timing adjustments to reduce pedestrian/cyclist delay.



Figure 37: Proposal for River Street / Harvard Avenue Bridge intersection

Neighborhood Connections

While major intersections must be prioritized for safety and operational improvements, some minor intersections and neighborhood access paths also require modifications. These locations provide walking and biking connections to/from neighborhood streets and help increase path function and comfort for both recreational cyclists and commuters.

In the study area, neighborhood connections are proposed at Buzzell Field, Lower Mystic Lake, and along Mystic River. Specific locations include the following intersections as listed below and shown in Figure 38:

- Summer Street at Victoria Road,
- Mystic Valley Parkway at Hayes Street, and
- Mystic Valley Parkway at Palmer Street.

Existing neighborhood connections for pedestrians and cyclists are desired to be improved at Mystic Valley Parkway at Kimball Road and Mystic Valley Parkway at Davis Avenue. New automobile access or parking near these paths is not recommended. These are access paths with different issues to address versus the road crossings. See "Neighborhood Access Paths" on page 36 for more detail.

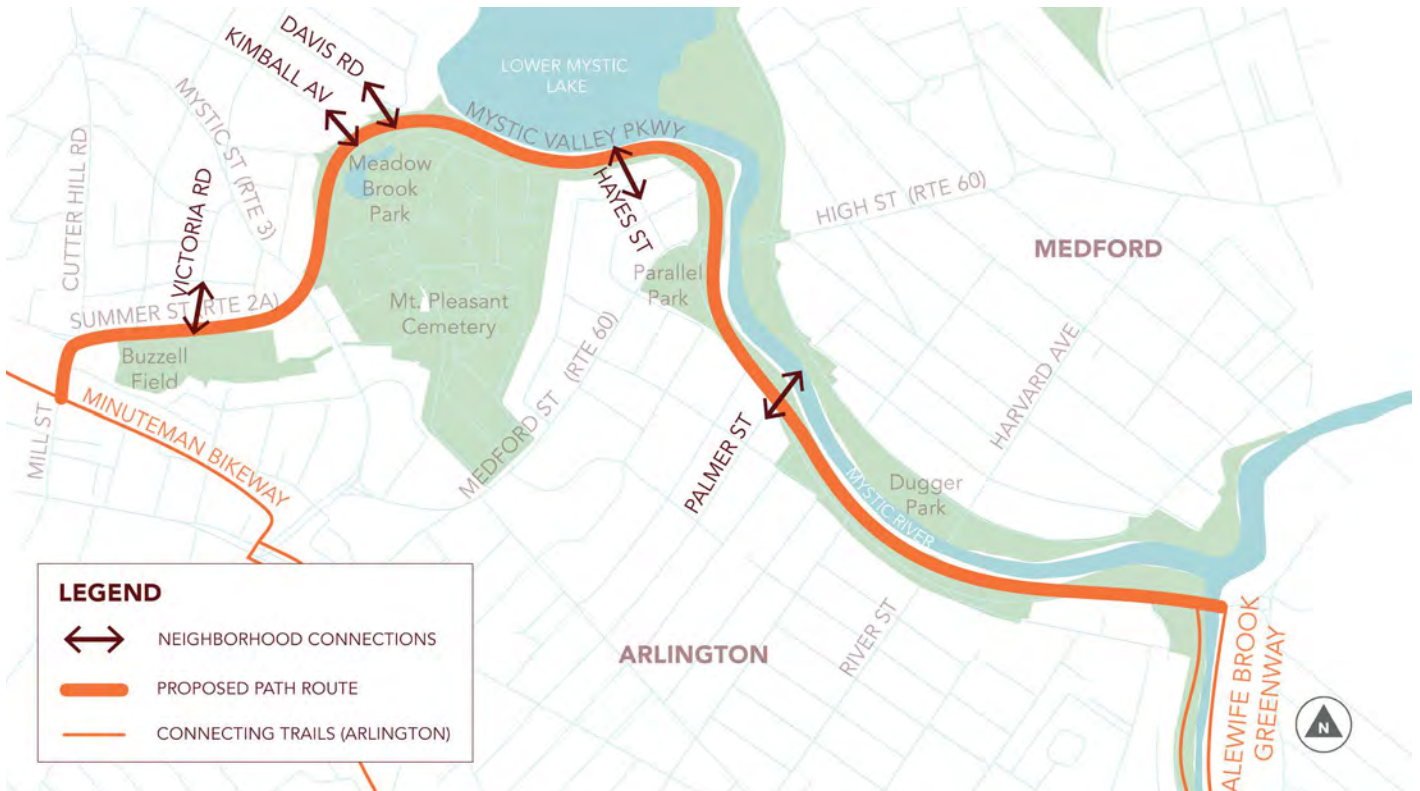


Figure 38: Map of proposed neighborhood connection locations, including existing connections that are recommended to be modified

Recommendations for Minor Intersections

Where path users must cross either Summer Street or Mystic Valley Parkway in a mid-block crossing, enhanced crosswalk treatments can be used to reduce crossing lengths and increase visibility. Possible countermeasures include the following:

- Narrower travel lanes (recommended throughout this project)
- High visibility marked crosswalks (recommended at all marked crosswalks)
- Raised crosswalks
- In-street pedestrian crossing signs (R1-6)
- Curb extensions
- RRFBs



Figure 39: R1-6

Neighborhood Connection Example: Summer Street at Victoria Road

Summer Street at Victoria Road is detailed in Figure 41 on page 35 as an example of a neighborhood intersection connection. This intersection is important as it incorporates the entry to Buzzell Field.

The example shows parking retained on the south side, and the existing crosswalk on Summer Street is moved to the west side of Victoria Road to align the crossing with the entry to Buzzell Field. By placing the crosswalk on the west side, those crossing from north to south will gain improved sightlines. However, those crossing south-to-north will still need to look over parked cars.

Install a curb extension on the south side of Summer Street if retaining parking to shorten the crossing and to prevent parked vehicles from blocking sightlines directly next to the crosswalk. Consider installing raised crosswalks to slow vehicles. Provide yield markings and signage to make drivers aware of expected yielding behavior.

If parking is retained, and sight distance is restricted by parked cars for northbound crossings, consider an RRFB to increase visibility of people crossing.

Mystic Valley Parkway At Hayes Street

Mystic Valley Parkway at Hayes Street currently does not include a marked crossing, but neighbors use this location to cross to Lower Mystic Lake. Vehicles currently move fast along this stretch of road, so crosswalk enhancements are essential. At a minimum, pair a high-visibility marked crosswalk with

advanced warning signage for drivers and in-street pedestrian signage (R1-6 sign).

Placing the crossing on the west side of the intersection will maximize visibility for westbound drivers as they exit the large curve. This placement also distances vulnerable users from abutter fences that block visibility on the eastern side of the intersection. Due to the potential for high speeds and restricted visibility, an RRFB should be considered at this location.



Figure 40: Mystic Valley Parkway at Hayes Street lacks a crossing

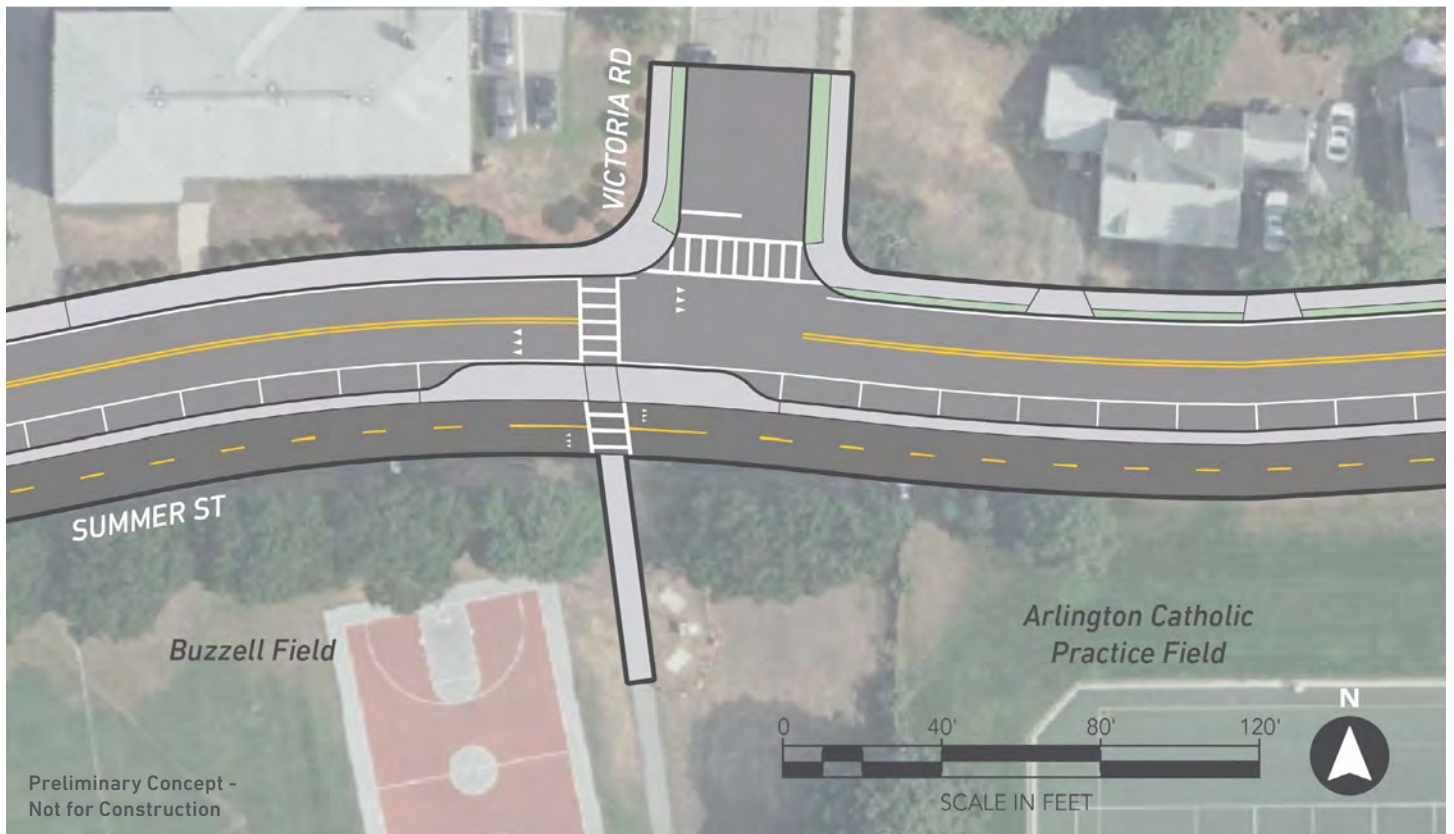


Figure 41: Proposal for realignment of crosswalk and other safety improvements and formalized parking at Victoria Road neighborhood connection across from Buzzell Field

Mystic Valley Parkway At Palmer Street

Mystic Valley Parkway at Palmer Street includes an existing crosswalk across Palmer Street and across the parkway to the north of the intersection. Install bike conflict markings given the addition of on-road bike lanes.

Replace existing pedestrian warning signage on the park side with pedestrian/bike warning signage or in-street pedestrian signage (R1-6 sign). Consider installing advanced warning signage and a raised crosswalk or RRFB to increase visibility and suggest priority for vulnerable users. Curb extensions to reduce corner radii should be considered to slow vehicles turning to and from Palmer Street. Finally, update curb ramps to meet ADA.



Figure 42: Mystic Valley Parkway at Palmer Street

Neighborhood Access Paths

The existing access paths at Kimball Road and Davis Avenue currently collect leaf litter from overhead trees and will require maintenance as formal neighborhood connections.

Mystic Valley Parkway At Kimball Road

The access path from Kimball Road to the existing path along Mystic Valley Parkway includes cracked asphalt and metal bollards. An accessible connection is possible through the removal of tree saplings and a diagonal or switchback path alignment. A curb or low retaining wall will protect the path edge from wearing away. Large granite markers (see Figure 44) or boulders on either side of the path will identify the access point and keep a clear width for pedestrian use but not for vehicular use. Special signage and pavement will be incorporated in certain locations to highlight these gateways.

Mystic Valley Parkway At Davis Avenue

The Davis Avenue access path is also asphalt-paved. Determine the condition and use of drainage structures within the path. Repave and provide an edge treatment. Also consider installing granite markers that signal path entry. Due to greater steepness and surrounding trees, this connection might not achieve ADA accessibility.



Figure 43: Mystic Valley Parkway at Davis Avenue



Figure 44: Granite marker signaling the entry to the Alewife Brook Greenway. The same type of marker can be used for neighborhood access paths.

Third Public Meeting

The third and final public meeting was held virtually on June 22, 2022. The meeting presentation included an overview of the feasibility study report, results from the 2nd public meeting and survey, and discussion of recommended concepts for path cross sections and priority intersections. Highlights from the question and comment period are summarized here. Full notes on public feedback, including Project Team responses to comments, and a record of the Zoom chat is located in “Appendix B: Public Meeting Notes & Automated Survey Reports” on page 53.

Comments on Path Material and Project Process

As with the previous meetings and surveys, at least a few meeting attendees expressed concern over path material and chosen widths. There is concern that the path is really for people on bikes, and that fast cyclists will make the space uncomfortable for other users. One commenter pointed out that the path along Summer Street will have too much conflict with people biking past those dropping kids off to the field. Others stated that the path needs to be asphalt to be bikeable, but designers should be cautious about creating straight shots that turn the path into a bike highway.

Stemming from the discussion about path materials and width, a few community members expressed concern about the project process. They questioned whether the project had been advertised to equal bases of interest in case there was a particular messaging boost in the cycling community. The commenters feel that the voices of people on bikes were outweighing those of pedestrians and other potential path users. The Project Team response included a listing of all the ways the project meetings and surveys have been advertised, but the Team acknowledges that some voices may have gotten lost. The Team also stated that wrestling with path width and material has been a big component of the project.

Intersection Operations

- When asked about intersection operation impacts, the Project Team responded that, based on traffic modelling analysis, all intersections will operate similar to existing conditions and/or the incoming volumes will be under capacity (the amount of vehicle traffic is able to be accommodated without oversaturating the signal).
- Commenters expressed concern about impacts to the Mill/Summer intersection with changes to access at Arlington High School.

Bike Lanes

- Those who would use the on-street bike lanes asked about the possibility for vertical separation. The Project Team stated that there are options, including flexposts and planters. However, in the short-term, vertical separators are not planned along Mystic Valley Parkway due to maintenance concerns.
- Responding to a question about bike signals, the Project Team stated that while those are not currently in the design, they will be considered in the next stage of design.

Rotaries

- One commenter requested that the Town collaborate with the project team for Parallel Park reconstruction, which is planned to happen within the next two years.
- A couple individuals expressed concern about pinch points for those trying to travel from Arlington east and north up Mystic Valley Parkway on the Medford side toward Winchester.
- Finally, one attendee expressed a preference for a style of roundabout design with more separation between pedestrians and cyclists. This may be considered in the next stage of design, but the current concept shows multiuse mixing zones.

Hayes Street Crossing

An attendee asked whether pedestrian signals would be installed at Hayes Street, noting that several cars have crashed into a fence there and that the curve is dangerous. The Project Team acknowledges the need for advanced warning signage and very likely an RRFB in addition to narrowed travel lanes slowing vehicles.

Flooding

Some people asked about plans to mitigate flooding both on the path and in the roadway. The Project Team addressed big-picture pieces of the design, and the Town stated that they are looking into funding opportunities to address flooding more widely around Arlington. It was noted in the chat that Segment B from the Mystic/Summer/MVP intersection to the Medford Street rotary closes due to flooding.

Other Considerations

- Rules, etiquette, and routing expectations should be made clear with signage and signals, particularly at the roundabouts and for cyclists using pedestrian signals.
- Trees are critical infrastructure and need to be preserved.

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IMPLEMENTATION

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This chapter covers implementation considerations to help advance pieces of the trail and connections with other bike infrastructure. Considerations include phasing, permitting, cost opinions, and maintenance.

Phasing

Phase I

The short-term improvements recommended under intersection concepts are proposed as Phase I, to be completed in the next 1-2 years. These are not accounted for in costs.

Phase II

It is recommended that the Town of Arlington modify Segment A - Summer Street, Priority Intersection 1 - Mill Street/Summer Street intersection, and Priority Intersection 2 -Mystic Valley Parkway/Mystic Street/Summer Street as part of a single phase to ensure continuity in construction and path operations.

Phase III

Along the Mystic Valley Parkway, DCR might choose either to install the entire trail and two intersections in one project. Or, consider splitting Phase III into two projects:

- **Phase IIIa**, Priority Intersections 3 and 4 - Medford Street/High Street Rotaries & High Street Bridge. The rotaries will be a significant undertaking to reconstruct into roundabouts. It is recommended to install the roundabouts before the path, if not installing both simultaneously, given the path will be much easier to adjust than the roundabouts.
- **Phase IIIb**, Segments B and C plus Priority Intersection 5 - Mystic Valley Parkway at River Street/Harvard Avenue Bridge. Intersection 4 is proposed for inclusion with the segments given the lack of geometric changes required.

Permitting

The environmentally and culturally sensitive areas within the path corridor are described in this section and in "Appendix A: Memorandum of Existing Conditions" on page 51. The next steps of design should include a complete site survey showing the exact extents of these regulated areas. Only when they are mapped and the design progresses through 75% Construction Documents will the full potential impacts be clarified and quantified.

Because of the historic significance of this parkway and ecological importance of the corridor, the permitting and review process may be extensive. The following section provides an overview of likely permits required.

During the further development of the plan, the design should take measured to avoid impacts to sensitive areas. If it is unavoidable, mitigation measures will be necessary.

Wetland Resource Areas

Along the trail corridor the following Wetland Resources Areas have been identified, for which their protection is legislated by the Massachusetts Wetlands Protection Act (WPA, MGL c.131 § 40) and its implementing regulations at 310 CMR 10.00. The Massachusetts Department of Environmental Protection (DEP) implements 310 CMR on the state level. The Town of Arlington Conservation Commission implements 310 CMR through their Article 8 Wetlands Protection Bylaw and Regulations for Wetlands Protection. As previously noted, the exact impacts on these areas will be determined in future design phases.

Freshwater Wetland Bordering on Lake/Pond (Great Pond)

Lower Mystic Lake is classified as a Great Pond, a lake or pond with a water surface area of 10 acres or more. The Lake and Mystic River fall under Chapter 91 jurisdiction and may require review if structures, such as an overlook, or fill are located inside the high water line of the pond.

Land Subject to Flooding (Bordering and Isolated)

The boundary of bordering land subject to flooding is the maximum lateral extent of floodwater which will theoretically result from a 1% annual chance (or 100-year) storm. The boundary is determined by reference to the most recently available flood profile data prepared for the Town with work as proposed through the National Flood Insurance Program (NFIP) under the Federal Emergency Management Agency (FEMA). FEMA Flood Insurance Rate Maps are reflected in the FEMA Q3 Flood Zone layer in Figure 45. The Q3 Flood layers identify 1% annual chance floodways (layer AE) and regulatory floodway (layer X).

Per the Arlington Regulations for Wetlands Protection, compensatory flood storage shall be at a 2:1 ratio, minimum, for each unit volume of flood storage lost at each elevation.

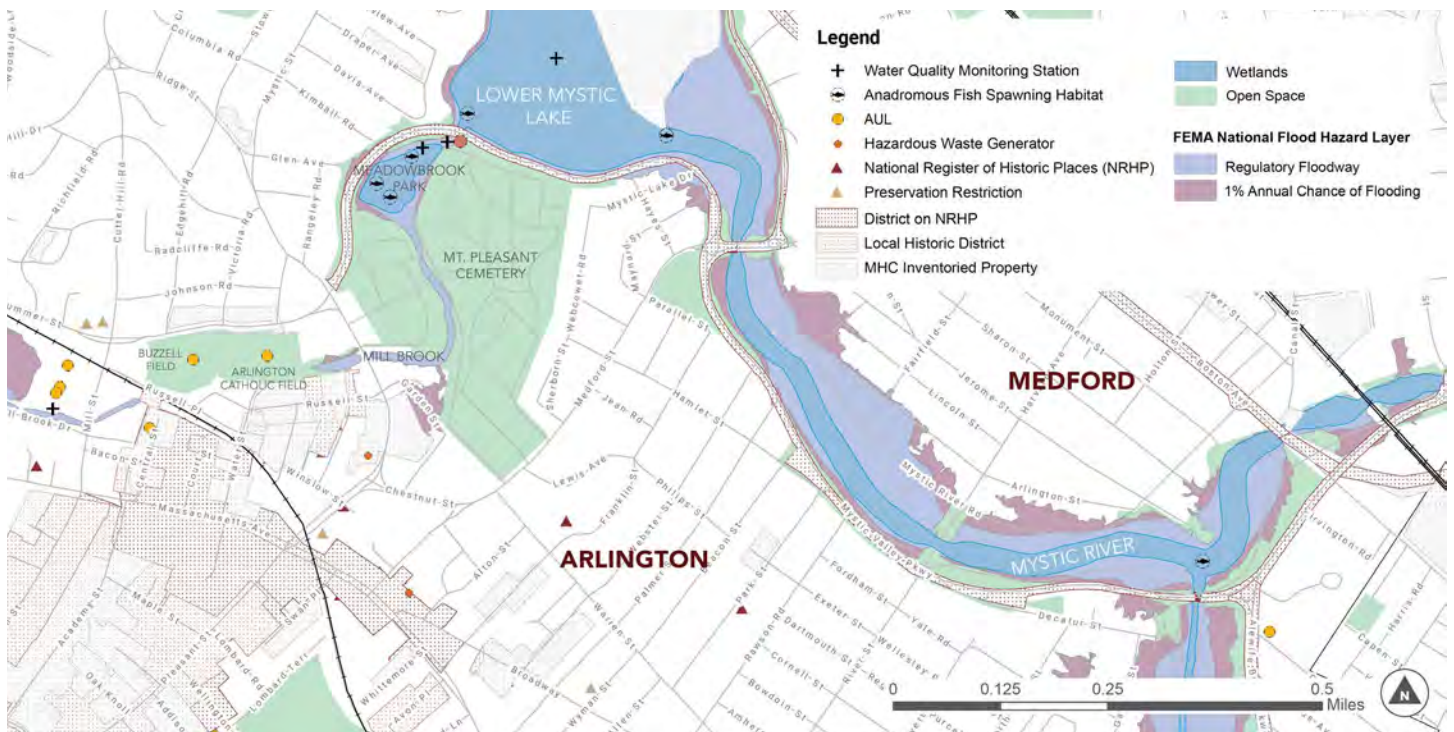


Figure 45: Map of floodways, wetlands, open space, and hazardous waste sites

Riverfront

Land within 200’ of Mystic River and Mill Brook is considered regulated Riverfront Area. Landscape/habitat restoration may be necessary. A determination about mitigation will partly be based on whether any development exists closer to the rivers than the work proposed. If closer development exists, no mitigation would be required. Regardless, along the river and Lower Mystic Lake, it is recommended to try and increase the buffer width between the path and banks.

Habitat

It was determined in the site analysis that no NHESP Natural Communities of Conservation Interest or Estimated or Priority Habitats of rare wildlife are located within the study area. Similarly, no Areas of Critical Environmental Concern (ACECs) as designated by the Secretary of Energy and Environmental Affairs (EEA) are located in the project area. These determinations were made with data from the MassMapper GIS portal; additional field assessment of habitat must be made by a qualified environmental scientist.

Anadromous fish spawning habitat and water quality monitoring stations are located around the mouth of Mill Brook into Lower Mystic Lake.

Hazardous Material Sites

Buzzell Field and Arlington Catholic playing field are identified as MassDEP regulated hazardous material site

with Activity and Use Limitations (AULs) as these properties were once a solid waste disposal area according to the 2010 Comprehensive Site Assessment & Remedial Action Plan.

MEPA

It is not anticipated that this project will require an Environmental Impact Report under the Massachusetts Environmental Protection Act (MEPA, 301 CMR 11.00). However, an Environmental Notification Form or other MEPA review may be needed depending on the amount of fill and design of overlook facilities in the floodway, or removal of five (5) or more trees of 14” diameter at breast height or larger.

Historic and Cultural Resources

Major project area components are designated historic or cultural resources. The Mystic Valley Parkway is listed on the National Register of Historic Places. The High Street bridge, Medford Street Rotary, Nelson Circle (rotary on the Medford side of the High Street bridge), and Meadow Brook culvert are all documented historic structures by the Massachusetts Historical Commission (MHC). Notably, the Mystic Valley Parkway tree canopy is also an MHC designated historic resource. With this concentration of cultural resources in the study area and as parkway land is owned by DCR, changes to the parkway corridor will require MHC review, in compliance with both federal and state regulations.

Table 2: Regulated elements, permit review and agencies, and application requirements

Regulated Resources	Permit or Review Required	Permitting Agency	Project Area or Component	Application Requirements
Floodplain and Floodway	No Rise Certification	FEMA	All areas within 100' of Mystic River or Lower Mystic Lake	75% CDs <ul style="list-style-type: none"> Hydraulic impacts evaluation by PE State Engineer review and approval
Floodplain and Floodway (bordering land subject to flooding)	Mass DEP review (per 310 CMR 10.57)	Mass. DEP	Mystic River floodplain	75% CDs
Floodplain/Floodway, Riparian Habitat, Wetlands, Waterbodies	Conservation Commission Review	Town of Arlington	<ul style="list-style-type: none"> All areas within 200' of Mystic River Areas within 100' of Lower Mystic Lake Meadow Brook wetlands 	75% CDs NOI Administrative Filing Documents (4)
Wildlife Habitat	Mass DEP review (per 310 CMR 10.59-10.60)	Mass. DEP	TBD: riparian and aquatic habitat areas along Mystic River and Lower Mystic Lake	75% CDs Site evaluation by ecologist or wildlife biologist
Public Waterfront	Public Waterfront Act review (Chapter 91)	Mass. DEP	Mystic River and Lower Mystic Lake frontage	75% CDs
Historic Landscapes and Structures	Mass. Historical Commission Review	Mass. Historical Commission (MHC)	<ul style="list-style-type: none"> Mystic Valley Pkwy Mystic Valley Pkwy tree canopy High Street bridge Rotaries at either end of High Street bridge Meadow Brook culvert 	75% CDs
Impervious area, Wetlands, Historic structures, Mature trees	Mass. Environmental Protection Act (MEPA)	Mass. Executive Office of Energy and Environmental Affairs (EEA)	<ul style="list-style-type: none"> Mystic River floodplain Meadow Brook wetlands Historic Meadow Brook Culvert Historic Mystic Valley Parkway tree canopy Other trees and forested areas 	Environmental Notification Form (ENF)

Summary of Planning-Level Cost Opinion

As reflected in Table 3, and in “Appendix D: Traffic Analysis for Proposed Concepts”, planning-level cost opinions have been created for each segment and Priority Intersection 3. Medford Street / High Street Rotaries & High Street Bridge as a separate project. These cost opinions give a preliminary sense of potential expense for construction, mobilization, temporary traffic control, plus escalation to 2026, an assumed construction year.

Cost opinions do not include easement and right-of-way acquisition, design services or construction engineering, permitting, inspection, or construction management, or the cost for ongoing maintenance. Cost opinions include a 30% contingency because at the conceptual level of design and without a topographic survey, there are many unknowns.

Cost opinions reflect the split between the Town of Arlington and DCR jurisdictions and potential phasing. Generally, cost items were identified for each cross section and applied on mileage basis, and the various features of each intersection were added into the appropriate segment.

Cost opinions for Summer Street include two versions, the primary where utility lines are undergrounded, and an alternate opinion with only relocation of existing utility poles. Undergrounding utilities adds significantly to the expense of building the path but also provides significant benefits to the feel and functionality of the path corridor.

The Priority Intersection 3 and 4 rotaries to roundabouts conversion is pulled out as its own project given potential complexities to redesign both sides of the bridge in this area. However, the rotaries could be included in either DCR segment or one large project as desired.

Table 3: Segment and planning-level cost opinion summary. Values are rounded up.

Segment/Intersection	Planning-Level Cost Opinion
Town of Arlington	
Phase II: Segment A & Priority Intersections 1 and 2 - Minuteman Bikeway to Mystic Street via Mill Street and Summer Street. Includes Mill Street and Mystic Street/Mystic Valley Parkway Intersections	\$5,170,000 (Underground Power & Telecoms)
	\$2,800,000 (Utility Poles Relocated)
DCR	
Phase IIIa: Priority Intersections 3 & 4 - Medford Street/High Street Rotaries and High Street Bridge (MassDOT)	\$2,405,000
Phase IIIb: Segments B & C + Priority Intersection 5 - Mystic Valley Parkway from Mystic Street to Alewife Brook Greenway (no rotaries) + River Street/Harvard Avenue Bridge Intersection	\$7,830,000

Maintenance Recommendations

Maintenance is essential to guaranteeing that the path is an asset to the Town of Arlington and to the regional trail network for years to come. An organized maintenance program will ensure that path infrastructure is usable, safe, and accessible. Maintenance should not only address path infrastructure but also protect site vegetation and habitat and prevent erosion or water quality impacts to Lower Mystic Lake and the Mystic River. Maintenance should be regularly scheduled plus planned to address long-term needs as the upkeep of the path affects whether users enjoy their experience and the perception of the path as safe and inviting.

This section provides information on maintenance items for the Town of Arlington and DCR. Information is provided on routine maintenance, maintenance schedule considerations, and monthly and seasonal maintenance items. Annual and long-term remedial maintenance are addressed as well.

Design for Maintenance

As this feasibility study was developed in coordination with landowners, design decisions were made in part to reduce maintenance burdens. Path and shoulder materials, the configuration of bike lanes, and potential types of Nature Opportunity Areas were all discussed in terms of maintenance. It is recommended that design continue to recognize maintenance needs and limitations in balance with the goals of the project.

Maintenance Responsibilities

Responsibility for maintenance of the Mystic River Path is that of the Town of Arlington and DCR in their respectively owned Segments.

The Town of Arlington will maintain the path from the Minuteman Bikeway crossing at Mill Street to the start of the Mystic Valley Parkway at Mystic Street. This segment includes Priority Intersection 1 - Summer Street/Mill Street and the north, south, and western legs of Priority Intersection 2 - Mystic Valley Parkway/Mystic Street/Summer Street.

Maintenance for the DCR-owned portions of the trail includes Segments B and C, the east side of Priority Intersection 2 - Mystic Valley Parkway/Mystic Street/

Summer Street, and Priority Intersections 3, 4, and 5 (the rotaries and River Street/Harvard Avenue bridge).

MassDOT is responsible for the inspection and maintenance of High Street Bridge, Harvard Avenue Bridge, and the Mill Brook Culvert.

Path Elements to Be Maintained

The following are basic path elements to be maintained by both the Town or Arlington and DCR in their respective segments. In addition to the path itself, maintenance should also include all support spaces along the corridor - Gateways, Scenic Overlooks, and Nature Opportunity Areas. Management of these spaces can be coordinated with other agencies or local environmental preservation groups.

Path and Intersection Pavements

- Pavement markings
- Debris removal
- Pavement sweeping
- Seal cracks / patch pavement
- Infill, level, re-stabilize 'soft-surface' paths
- Snow removal

Vegetation

- Mow lawns
- Clear sight-lines
- Control overgrowth
- Re-plant dying or displaced vegetation

Signage

Site Amenities (Seating, Bike Racks, etc.)

- Maintain components
- Remove graffiti

Structures, such as Overlooks

A Coordinated Approach

Both the Town and DCR are experienced trail operators and managers. For this path, it is recommended to develop a coordinated management and maintenance approach that ensures the path is constructed and maintained to the same standards. Trail managers should:

- Ensure that protocols for inspection, maintenance, and reporting exist and are followed

- Document all issues and crashes, and review this documentation regularly to determine whether changes to the trail should be made to reduce risk
- Seek funding plus partnerships to assist with maintenance
- Establish and communicate means for community members to report maintenance issues

Routine Maintenance

Routine maintenance is regularly scheduled, addresses minor maintenance, and reduces long-term costs by preventing major issues. This includes weekly, monthly, and annual maintenance in addition to regular trail inspections.

Trail Inspections

It is recommended to conduct regular trail inspections as part of routine maintenance to document issues and provide a baseline for determining future maintenance costs. Inspections can also help track maintenance response rates, which when analyzed and addressed, can lead to a more efficient maintenance system. Documented inspections and responses are important to risk management and addressing potential liability.

The best trail maintenance programs inspect and respond to maintenance issues at the same time. This requires planning and equipment, such as paint, saws, graffiti removal supplies and trash bags, to always be carried with maintenance staff.

Weekly Maintenance

Weekly routine maintenance addresses safety issues and maintains the natural beauty of the trail. Issues such as encroaching vegetation can impede trail users, reduce visibility, and damage trail surfaces. The best trail maintenance programs inspect and respond to maintenance issues at the same time. See Table 4 for weekly maintenance items.

Monthly and Seasonal Maintenance

Seasonal maintenance is performed at standard times throughout the year. Concerns include the repair or replacement of facilities and the management of vegetation. Vegetation management may include replacing plant material and controlling invasive species. Seasonal maintenance also prepares facilities for expected weather conditions. See Table 5 for seasonal maintenance items.

Issue	Description of Activity
Trash	Pick up trash/recycling along the trail
Trash Cans	Empty trash/recycling cans
Glass and/or Debris	Sweep up glass/debris gathered on the trail
Graffiti	Paint over or clean graffiti via spot chemical wash
Landscaping	Trim shrubs and trees that encroach on the trail
Inspection	Perform inspection focused on issues that can be easily addressed and issues affecting trail user safety

Table 4: Sample Weekly Maintenance Schedule

Frequency				Issue	Description of Activity
Spring	Summer	Fall	Winter		
X	X	X		Mowing	Mow and edge grass
X		X		Landscaping	Perform major pruning of trees and shrubs to ensure limbs do not encroach on clear zones
X	X	X		Weed Control	Trim or remove weeds encroaching on or growing through the trail
X	X	X	X	Drainage / Erosion	Stabilize eroded areas
X	X	X	X	Inspection	Perform detailed inspection of all trail features

Table 5: Sample Routine Monthly Maintenance Schedule by Season

Annual Maintenance

Annual maintenance remedies specific issues, as well as repairs, replaces, or restores major components that have been damaged during the trail's lifetime. Table 6 below provides a glimpse of annual maintenance items.

Issue	Description of Activity
Signage	Replace signage
Amenities	Repair/repaint benches, trash cans, and other trail amenities
Lighting	Inspect lighting system and upgrade where necessary
Revegetation	Fill in locations in landscape where plants and trees have died. Consider a climate-smart native planting requirement
On-Street Bike Facilities	Inspect 2x per year and identify needed repairs
	Sweep at least 2x per year or according to street sweep schedule

Table 6: Sample Annual Maintenance Schedule

Annual maintenance should address the natural assets of the trail corridor. To manage vegetation, replace any diseased or dead plant material and control invasive species. Maintaining vegetation also helps to control erosion and facilitate natural drainage. Extreme erosion damage can cause hydroplaning, washouts, or trail blockages. Clear debris from all drainage devices to keep drainage features functioning as intended, thus minimizing trail erosion and resulting environmental damage. Inspect and repair any damage to trails due to drainage issues.

Remedial Maintenance

Remedial maintenance occurs in longer time intervals, from 5 years to 10-20 year cycles, for maintenance issues that do not need to be addressed annually. Remedial maintenance issues may require more advanced planning, such as bridge repair, restriping, and path resurfacing or replacement.

Issue	Description of Activity
Pavement Markings	Restripe pavement markings (at crosswalks, along bike lanes, etc.)
Trail Surface	Seal-coat asphalt trail surface (in the spring)

Table 7: Five Year Maintenance Schedule

Prioritizing Projects

Major maintenance needs will need to go through a prioritization process to determine which needs are addressed first and to help coordinate staff and allocate maintenance funds. Consider establishing a process that classifies priorities according to:

- **Priority Issues**, such as wash-outs, that affect user safety, risk management, and environmental degradation
- **Priority Needs**, as expressed by the public or through political requests, that affect safety, user experience, or partnerships
- **Projects for Construction**. These are projects to move forward based on funding and the combination of issues they address or needs they meet.
- **Locations**. Consider areas likely or known to develop maintenance issues that affect safety and accessibility.

Where Do We Go From Here?

Following this feasibility study report, the next step is to complete a topographical survey and initiate schematic design. It is also recommended to incorporate an arborist to assess tree health while survey work is ongoing. The arborist will help determine which trees can be preserved and which are poor condition, which will inform design decision-making in regard to path alignment, grading, and detailing. Following the completion of a survey(s), the project should move through the following typical phases of development:

- **Schematic Design** Confirm the concepts against the survey, making necessary adjustments to the plan approach and preliminary estimated costs.
- **Design Development** The beginning of the technical work, such as detailed grading and utility coordination, is developed, and estimated construction costs are refined to the point of understanding the level of funding necessary for construction of the project.
- **Construction Documents** (the production of technical plans and specifications for public bidding),
- **Bidding and then Construction** Funding will need to be secured for the survey and each consecutive phase of design and for construction.

Public engagement should continue through schematic and design development to afford the community opportunities to provide input on design details and materials selection. This process will ensure the public is up to date on plan development and that the design continues to meet the needs of the community and maintain community support.

Coordination Between Jurisdictions

The Town of Arlington and DCR should be coordinating throughout next design phases to ensure consistency in path design and a cohesive gateway and intersection crossing design where their jurisdictions meet at the Mystic Valley Parkway / Mystic Street / Summer Street intersection. It is equally important for DCR and the City of Medford to collaborate as well given the desired connections from Medford streets through the High Street rotary, over High Street Bridge, and over Harvard Avenue Bridge. MassDOT will need to be involved in regard to bridges and the culvert at Mill Brook.

Resolve Parking on Summer Street

Parking along Summer Street is an important issue to the community that is continuing to evolve before final decisions will be made. Several steps are needed to fully inform the design and the community including, but not necessarily limited to: a topographic survey of the actual conditions in the area, schematic design to confirm the design approach based on the survey, and conducting a parking utilization study to better understand use patterns and needs. These pieces of information then need to be shared and discussed with the community, Arlington Parks and Recreation, the Arlington Housing Authority and other departments and local business so everyone can provide informed input and determine the best way to move forward.

This feasibility study report is the result of close collaboration between the Town of Arlington, Mystic River Watershed Association, other stakeholders, residents, and advocates. A continued devotion to public and stakeholder engagement will ensure the Mystic path connection is as safe and comfortable as possible, serves the needs of a wide variety of users, and draws people to the important natural resources that are the Lower Mystic Lake and Mystic River.

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APPENDICES

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Appendix A: Memorandum of Existing Conditions

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Appendix B: Public Meeting Notes & Automated Survey Reports

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Appendix C: Notes from Project Team, Focus Group, & Cusack Terrace Meetings

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Appendix D: Traffic Analysis for Proposed Concepts

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Appendix E: Planning Level Cost Opinions