Mary Ellen Welch
GREENWAY

MARY ELLEN WELCH GREENWAY
WINTHROP EXTENSION
FEASIBILITY STUDY

KITTELSON & ASSOCIATES

Weston & Sampson design studio

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The Mary Ellen Welch Winthrop Greenway Extension Feasibility Study has assessed the feasibility of extending the existing Mary Ellen Welch Greenway, which currently connect Jefferies Point to Constitution Beach in East Boston, to Winthrop and the Belle Isle Marsh Marine Ecology Park. The objective of the Winthrop Greenway Extension is to provide a safer and more pleasant multi-use connection between the existing Greenway, Orient Heights Station, and Winthrop for both transportation and recreation. Specifically, the Winthrop Greenway Extension will provide critical last-mile connectivity to Orient Heights station for both the East Boston and Winthrop communities, provide access to a variety of water-front view and unique natural habitat, and serve as a crucial link in a regional trail loop connecting users to beaches, marshes, and other destinations from East Boston all the way to Lynn.

The study was initiated through interest by East Boston and Winthrop residents, the Greenway Council, Bike Winthrop, the Winthrop Transportation Advisory Committee, and Friends of Belle Isle Marsh, leading to funding through the Commonwealth's FY2020 budget, and distributed to the Friends of Mary Ellen Welch Greenway (FoMEWG) to conduct the study by the Department of Conservation and Recreation (DCR).

The Feasibility Study is composed of the following sections:

1. **Background**: Provides the reader with the regional context, community and policy environment, and background on the impetus of the study.
2. **Goals of the Study**: Outlines the primary goals of the study and how they inform the study's structure.
3. **Process Overview**: Documents the public engagement process, data and assessment methods related to existing conditions and opportunities and constraints, and the evaluation process.
4. **Vision and Goals**: Summarizes community input and outlines the vision and goals informed by the community.
5. **Existing Conditions**: Summarizes existing conditions in the study area related to walking and biking, pedestrian and bicyclist activity, vehicle operations, crash history, property ownership, access to Orient Heights Station, and ecological and environmental areas.
6. **Opportunities and Constraints**: Synthesizes opportunities and constraints gleaned from information through the study.
7. **Evaluation**: Outlines the criteria, evaluation process, and outcomes.
8. **Path Forward**: Proposes a path forward with respect to a greenway alignment and phasing, presents preliminary cost estimates for this alignment, summarizes community input, and recommends potential funding sources and next steps.

A review of the existing conditions, opportunities, and constraints of multiple route alignments and input from the community, property owners, and relevant agencies have resulted in a recommendation to move forward with further study and preliminary design of a forked path alignment that would maximize transportation utility and recreational quality. The preferred forked alignment would consist of the following key segments:

- A fully off-street connection from Orient Heights to Morton Street in Winthrop.
- A partially off-street connection from Constitution Beach along Bayswater Street to the Belle Isle Marsh in East Boston, connecting to the off-street route into Winthrop.

Each typology within the preferred alignment has its own benefits and challenges which are detailed within the feasibility study, along with potential phasing, preliminary cost estimates, and recommendations for next steps to further the project.

1

BACKGROUND

Regional Context

Local Context

Study Background

REGIONAL CONTEXT

The Mary Ellen Welch Greenway (MEWG) is a linear recreational open space in East Boston originating at its southern terminus at the historic Jeffries Point Waterfront. From there it passes through East Boston neighborhoods of Eagle Hill and Harborview on its way northward to Constitution Beach and to the North Shore beyond with aspirations of connecting to Greenway networks and neighborhood linkages in Winthrop, Revere, and Chelsea.

Residents of all ages use it running, jogging, walking, biking, or just strolling while taking in the historic and ecological beauty of various points along its length. The Greenway has several owners and maintainers, including the City of Boston's Parks Department, Massport, and the Department of Conservation and Recreation (DCR). The Friends of Mary Ellen Welch Greenway (FoMEWG) are an organization of residents that serve as the management body and stewards of the Greenway. To further the local and regional vision of the MEWG, the FoMEWG are working on extending the Greenway further to the north to Revere and east to Winthrop, allowing more people to enjoy this amenity and access the open space and safe, beautiful, low-stress corridor for recreation and multi-modal transportation. There are several proposed extensions to the existing MEWG:

1. Winthrop Extension: Mary Ellen Welch Greenway to Winthrop
2. Revere Extension: Constitution Beach to Revere
3. Chelsea Creek to Revere Beach Parkway
4. Chelsea Spur: Wood Island Station to Chelsea

The extensions from the existing terminus of the Greenway at Constitution Beach to Winthrop, Revere, and Chelsea will contribute to a growing regional network of greenways. One day, this network could connect from East Boston to Lynn to the Northern Strand Community Trail, which runs through Everett, Malden, Revere, Saugus, and Lynn, and the East Coast Greenway, which runs from Florida to Maine along many greenway corridors including the Northern Strand. The regional network, of which the Winthrop Greenway Extension is a crucial link, will increase public access to the area's beaches via a number of DCR assets including Winthrop Parkway, Revere Beach Boulevard, Lynnway, Lynn Shore Drive, and Nahant Road *(see Figure 1)*.

This study explores the feasibility of a greenway connection for the extents from Orient Heights MBTA Station to the Belle Isle Marsh Marine Ecology Park to help realize this vision. The Winthrop Greenway Extension will provide important transportation and recreation opportunities to the communities of East Boston and Winthrop, as well as the region.

LOCAL CONTEXT

In addition to providing an important link in the regional greenway network, the Winthrop Greenway Extension (the Greenway) will connect residents of East Boston and Winthrop to the existing Mary Ellen Welch Greenway, Orient Heights Station, the Belle Isle Marsh Marine Ecology Park in Winthrop, and to each other, for both transportation and recreation. The Greenway will serve a local community that has a particular

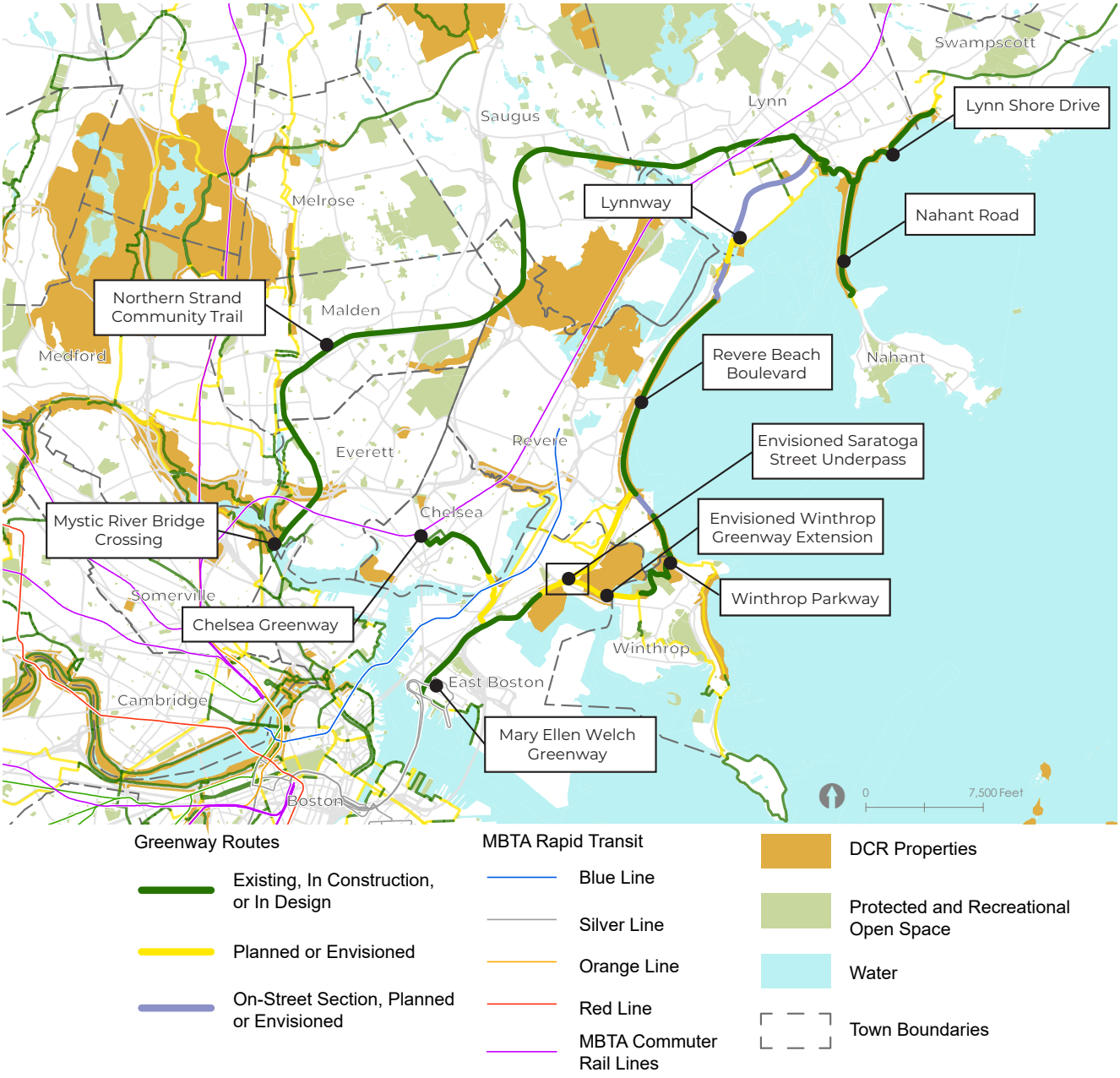

FIGURE 1: Envisioned Beach and Marsh Connector Loop

need for safer and more convenient active transportation infrastructure. Figure 2 shows environmental justice populations within the regional context of the Greenway Extension, demonstrating the accessibility and livability benefits through multiple communities.

The City of Boston's PLAN: East Boston ongoing study has found that subway ridership on the Blue Line has grown since 2014 while every other line's ridership has decreased. The population in East Boston is growing and it is doing so more quickly than passenger vehicle registrations. Furthermore, household incomes in East Boston are lower than the citywide median with 19.3% of residents living below the poverty line. 90.9% of East Boston's Block Groups (equivalent to 79.5%

of East Boston surface) are Environmental Justice Populations[1], and 2010 census data shows tracts in the Orient Heights area exceed environmental justice thresholds for minority, English isolation, and income[2]. In fact, half of East Boston's residents are foreign-born and the share of residents identifying as Hispanic or Latinx is increasing (from 39% in 2000 to 57% in 2017[3]). There is a need for safe and convenient access to transit and this need will only grow in the coming years. Additionally, East Boston has a higher percentage of children than Boston overall (21% under the age of 18 in East Boston compared to 16% for Boston[4]). In the census tracts adjacent to Orient Heights station, the rate of the population with a disability is as high as 18 percent[5]. A safe greenway system that is comfortable for all ages and abilities is of crucial importance in this community.

For the Winthrop community, the Greenway Extension will provide first and last mile connectivity to Orient Heights Station, and improve mobility, safety, and comfort for people walking and biking between the neighboring communities. Currently, the only way to cross into or out of Winthrop to East Boston for people walking or biking is Saratoga Street. Winthrop residents who today drive to Orient Heights Station to commute will have a safer and more direct off-street connection, encouraging walking and biking to transit instead. The population of Winthrop is 92.9% white, 9.5% Latino/ Hispanic, 2.2% Black, and 1.0% Asian. 8.8% of residents are living below the poverty line. 18.5% of the population is under the age

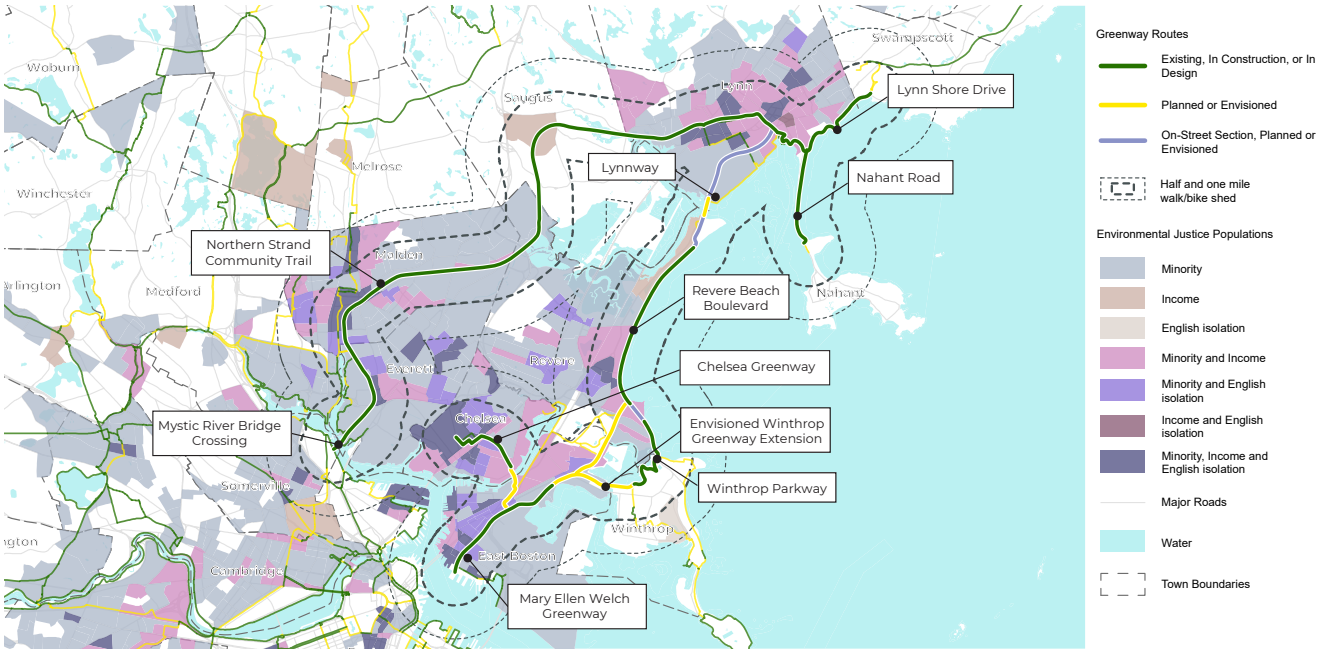

FIGURE 2: Environmental Justice Community Connections

[1] 2014-2018 American Community Survey (BPDA, 2020)
[2] 2010 U.S. Census Data, MassGIS Environmental Justice Populations
[3] 2014-2018 American Community Survey (BPDA, 2020)
[4] City of Boston East Boston Neighborhood Profile, 2019
[5] MassDOT Engage-Outreach Mapping
[6] 2019 estimates, U.S. Census

of 18 and the rate of the population with a disability under age 65 is 8.7%[6]. One census block group located approximately .5 miles away from the proposed Greenway's eastern terminus is designated as an English Isolation environmental justice population. The Winthrop community suffers enormously from geographic isolation with only two access points, both heavily dominated by heavy vehicle traffic and severely vulnerable to extreme This study explores the feasibility of a greenway connection for the extents from Orient Heights MBTA Station to the Belle Isle Marsh Marine Ecology Park to help realize this vision. The Winthrop Greenway Extension will provide important transportation and recreation opportunities to the communities of East Boston and Winthrop, as well as the region.weather and flooding.

Both Winthrop and East Boston communities will benefit from increased opportunities to access natural open spaces for active and passive recreation. The construction of the Greenway will open opportunities for remediation to improve the ecological health of the Belle Isle Marsh Reservation, improve public access to waterfront views and vital natural resources, and present opportunities to implement context sensitive resilient design. Changes in behavior from driving to Orient Heights station or between communities to walking or biking would support City of Boston mode shift and greenhouse gas emission reduction goals developed during Go Boston 2030.

FIGURE 3: Greenway Extensions Committee Preferred Route

STUDY BACKGROUND

The vision to create a "Winthrop Greenway" extension through an off-road, multi-use path has existed for decades with strong interest from East Boston and Winthrop residents, the Greenway Council, Bike Winthrop, the Winthrop Transportation Advisory Committee, and Friends of the Belle Isle Marsh. In the Massachusetts FY 2020 General Appropriations Act, a DCR earmark was included and approved for a Feasibility Study for a greenway extension to the Belle Isle Marsh Trails and Boardwalks in Winthrop from the Orient Heights MBTA Blue Line Station.

A grade-separated crossing that would connect directly from Constitution Beach to Orient Heights by going under Saratoga Street on the south side of the MBTA right-of-way was proposed by the East Boston Greenway Coalition in 2019 and the feasibility of this idea was explored by the MBTA (*see Appendix A*). The preliminary MBTA investigation found the physical and operational aspects of an underpass option to be feasible.

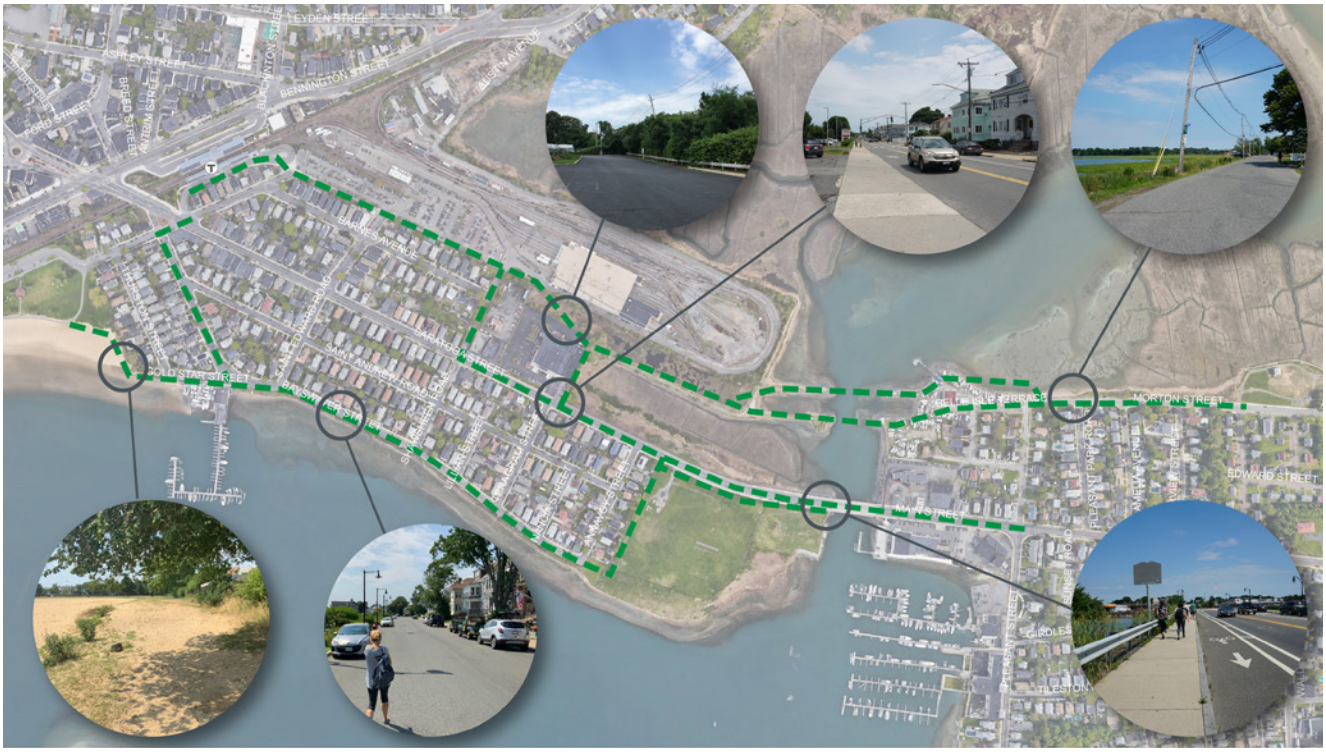

FIGURE 4: Winthrop Greenway Extension Feasibility Study Preliminary Route Segments

With an initial finding of feasibility for the first crucial link in the envisioned Greenway from the existing terminus to Orient Heights, the FoMEWG created a Greenway Extensions Committee in the winter of 2019 including representatives from Bike Winthrop, Friends of Belle Isle Marsh, Greenway Council members, Airport Impact Relief Inc. (AIR INC), and residents to work on supporting the envisioned greenway extensions. The Committee developed a preliminary preferred route alignment separated from vehicle traffic nearly the whole way by taking advantage of the MBTA parking lot, the DCR-owned Belle Isle Marsh Reservation, and a new pedestrian and bike bridge over the inlet (*see Figure 3*). This Feasibility Study was tasked with exploring this preferred route, as well as other alternatives, with the goal of being able to understand the full breadth of options available and build a strong case for future funding requests and partnerships. Figure 4 illustrates the route segments explored as part of this Feasibility Study.

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GOALS OF THE STUDY

GOALS OF THE STUDY

There were several primary goals of this study:

1. Understand the feasibility of the Greenway preferred route and alternative routes.
2. Understand technical and environmental constraints along the route alignment, including permit requirements and timeframe, high-level cost, agency/owner engagement, coordination with other projects, and alternatives analysis of various route alignments.
3. Gain support for this project from community members.
4. Connect greenways in East Boston, Winthrop, Revere, and Greater Boston to create a safe route to access greenways, the MBTA, and waterfront.

To achieve these goals, the Feasibility Study has been structured to address the following questions.

5. What are the existing conditions on segments within the study area that have connectivity potential?
6. What vision does the community have for the Greenway and what are the shared goals that will keep the greenway on track to meet the vision?
7. What are the opportunities and constraints along the route alternatives?
8. Which route alternative scores the highest based on feasibility criteria and the shared goals?
9. What steps need to be taken to make the Greenway a reality?
10. Where can we learn from successful greenway projects in other communities that have faced similar challenges?

Belle Isle Marsh

3

PROCESS OVERVIEW

Engagement

Data Gatherings & Assessments

Evaluation

This section outlines the steps taken to assess the route segments, engage with the community, evaluate the route alternatives, and identify next steps.

ENGAGEMENT

A variety of outreach methods were used, seeking to engage with a broad and diverse cross-section of the population. Throughout the study, the following engagement efforts were conducted:

- A site visit with community and agency representatives
- 2 surveys distributed in English and Spanish reaching over 510 and 580 respondents
- An on-site community event with stations at four locations throughout the study area
- 3 public meetings, including Greenway Council Meetings
- 2 Greenway Committee meetings
- Agency stakeholder and property owner interviews and follow up conversations with:
  - Department of Conservation and Recreation (DCR)
  - Massachusetts Department of Transportation (MassDOT)
  - Massachusetts Bay Transportation Authority (MBTA)
  - Massachusetts Port Authority (Massport)
  - City of Boston
  - Town of Winthrop
  - Private property owners
- 2 focus group meetings with community members and one with agency and municipal stakeholders
  - A community member focus group
  - An agency and municipality focus group

A full list of stakeholder contacts can be found in Appendix B.

Community input was used to develop a shared vision and set of goals for the success of the project, informed which segments to assess, and informed the Path Forward section of the study following the evaluation of the route alignment alternatives.

DATA GATHERINGS & ASSESSMENTS

Existing Conditions

The project team conducted an existing conditions assessment of the study area and did a thorough investigation of conditions along each route segment, including network function and context, cross sections, field observations, and utilities. An environmental assessment was conducted to consider potential constraints and permitting requirements.

Opportunities and Constraints

Drawing on the conversations with community members, agencies, municipalities, and property owners, and the findings from the existing conditions assessment, a comprehensive assessment of opportunities and constraints was developed for each route segment considered in the study.

EVALUATION

The community engagement informed the development of a shared vision and set of shared goals. These goals and a set of feasibility metrics were combined into an evaluation matrix. This matrix was used to score each route segment to understand how the costs and benefits of each route alternative compared.

Following the evaluation, the project team worked to develop a path forward that addresses community input and seeks to present a feasible Greenway alignment through an assessment of the critical infrastructure links, phasing, cost estimates, and potential funding sources.

Open House at Belle Isle Marsh Ecology Park

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VISION & GOALS

Community Feedback

Vision for the Greenway

Goals for the Greenway

COMMUNITY FEEDBACK

The vision and goals have been synthesized from the need expressed in the project RFP and though public feedback received to date. An online survey was distributed in English and Spanish and reached 516 participants *(see Appendix C Survey 1 & 2 Data Exports)*. In mid-October, an on-site open house event was hosted that reached up to 50 people at four separation stations in Winthrop and East Boston. Key findings from the survey and open house event that support the vision and goals are included below:

There is a need for the extension to connect directly to both Orient Heights and Constitution Beach.

- Almost 40% of survey participants visit the existing Greenway often or every day
- More than 70% of survey participants have either walked or biked between Orient Heights and Winthrop
- Open-house attendees travel to both Orient Heights and Constitution Beach

The character of the greenway will be critical in its success.

- More than 50% of survey participants use the Greenway for just recreation and more than 30% use it for both recreation and transportation
- Open-house attendees expressed a desire for access to open space and an escape into nature

The greenway needs to be comfortable for all ages and abilities.

- Roughly 40% of survey participants travel along the Greenway with children
- 30% of survey respondents were under 18
- Open-house attendees expressed a desire for a route option that would be comfortable for their kids
- The top priority for survey respondents is separation from cars where over 69% scored this as the most important factor to increase their likelihood of biking and walking between Winthrop and Orient Heights.
- When asked, "What is important to you about a greenway extension to Winthrop," the top 3 commodities were 1) Separation from cars, 2) Dedicated bike and pedestrian paths, and 3) Connections to existing trail systems, parks, and beaches
- 90% of survey respondents would walk or bike between Winthrop and Orient Heights more if it were safer and more pleasant

Complete results of this survey can be found in Appendix C.

VISION FOR THE GREENWAY

The vision for the greenway is an overarching statement of success for the Winthrop Greenway Extension:

"Winthrop and East Boston will be connected by a safe, pleasant, convenient, and low-stress corridor for active transportation and recreation."

GOALS FOR THE GREENWAY

The following goals support the shared vision by outlining metrics of success that can be assessed to guide the identification of a preferred route and, in the future, design decisions.

SAFETY

The greenway extension will increase safety by reducing potential for and severity of conflicts between greenway users and motorized vehicles.

CONNECTIVITY

The greenway extension will create a safe and direct connection between the Orient Heights MBTA Station and Constitution Beach in East Boston and the Belle Isle March Marine Ecology Park in Winthrop.

CHARACTER

The greenway extension will provide an aesthetically pleasing user experience by providing access to and enhancing the character of natural open spaces.

COMFORT

The greenway extension will be a low-stress walking and biking facility that is suitable for all ages and abilities.

CONVENIENCE

The greenway extension will serve as a convenient active transportation and commute corridor by maximizing route directness and providing clear wayfinding.

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EXISTING CONDITIONS

Existing Conditions Overview
Biking Activity
Pedestrian Activity
Vehicle Operations
Roadway Safety
Property Ownership
Orient Heights Access
Ecological & Environmental Areas
Route Exploration

EXISTING CONDITIONS OVERVIEW

This section covers existing conditions relevant to the transportation network, right-of-way, and environmental considerations including:

- Existing and Planned Walking and Biking Network
- Biking Activity
- Pedestrian Activity
- Vehicle Operations
- Crash History
- Property Ownership
- Orient Heights MBTA Station Access
- Ecological and Environmental Resources

Detailed assessments of each individual segment, including network function and context, cross section, field observations, and utilities can be found in Appendix D.

The study area has a complete sidewalk network with few exceptions. Generally, crosswalks and curb ramps are in good condition on Saratoga Street. Residential streets, including Bayswater Street and Barnes Avenue do not typically have crosswalks at intersections or ADA compliant curb ramps. Marked pedestrian crossings are detailed in Figure 5.

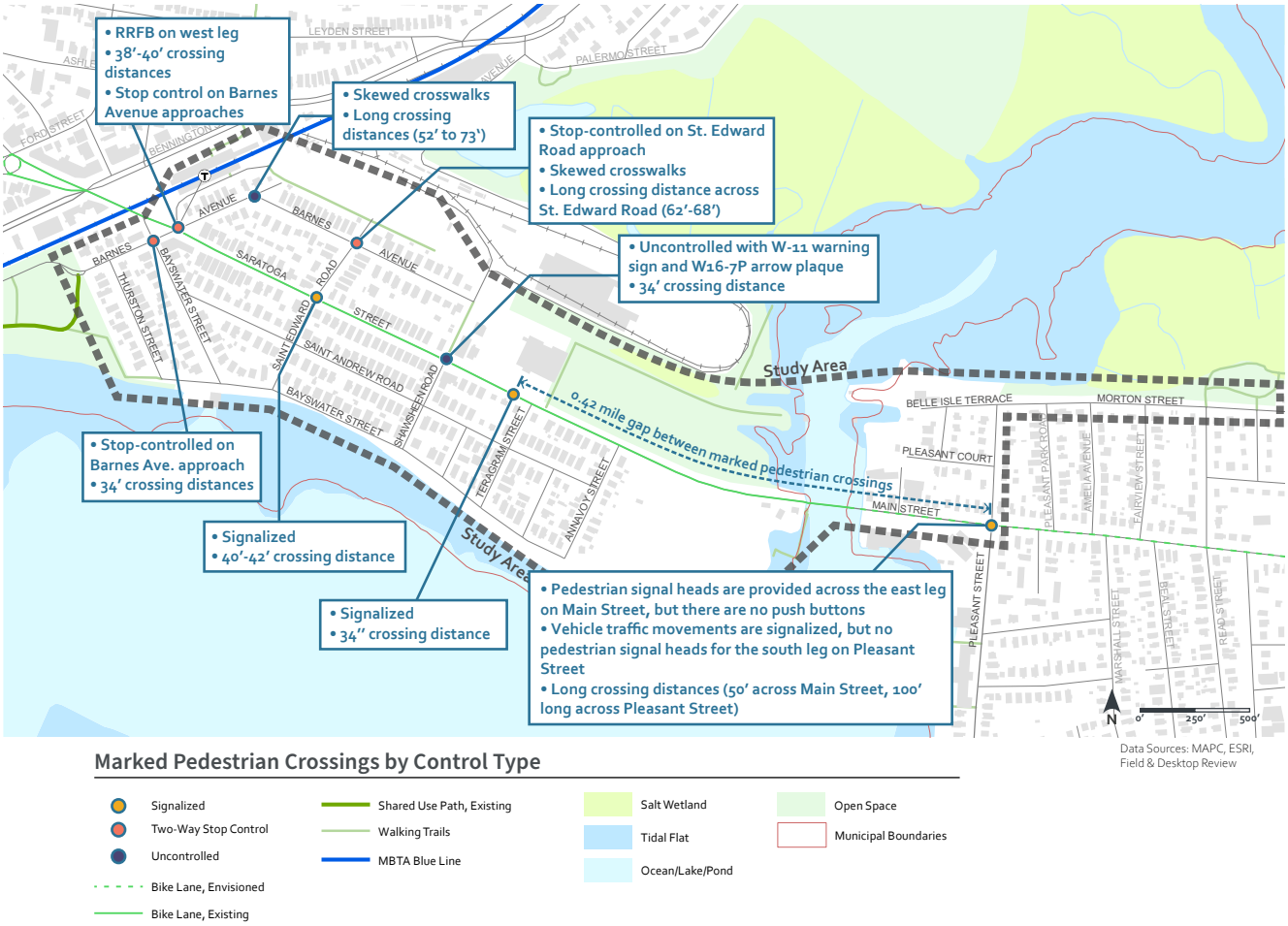


FIGURE 5: Marked Pedestrian Crossing in Site Area

Maintenance Path to MWRA Head House

The study area currently lacks a low-stress bike network. The only designated bicycle facilities in the study area are on Saratoga Street, and consist of an eastbound five-foot wide un-buffered bike lane extending from Bennington Street in East Boston to the Winthrop town line, a westbound five-foot bike lane running adjacent to the right-turn pocket lane between Barnes Avenue and Bennington Street, and five-foot bike lanes with four-foot buffers in both directions on the Saratoga Street bridge. These brief facilities do little to impact the safety and comfort of the overall bicycle network and do not have logical end points for riders.

Travelers familiar with the area can make informal connections to the existing Mary Ellen Welch Greenway's current terminus at Constitution Beach via Thurston Street and Barnes Avenue. In Winthrop, the Belle Isle Marsh Marine Ecology Park has walking trails that transition into a raised boardwalk over the marsh area.

Winthrop's Transportation Advisory Committee (TAC) has recommended a Winthrop Bike Network, focusing on:

- Main Street, Pauline Street, and Walden Street
- Veteran's Road, Shirley Street, and Lewis Lake
- River Road, Cross Street, and Main Street

BIKING ACTIVITY

Figure 6 shows a 'heatmap' of biking activity from Strava, a popular mobile app used to track biking and running activity using GPS. Strava users primarily track athletic activity and may not reflect a gender and age distribution that is representative of the overall population. However, the Strava data provides visual insight into some popular biking routes given the current study area conditions. Within the study area, Saratoga Street/Main Street, Bayswater Street, Thurston Street, and Annavoy Street have relatively high biking activity, with some biking also occurring on St. Andrew Road and Morton Street.

The most recent bicycling volume data are from Automatic Traffic Recorder (ATC) counts collected on Saratoga Street between Barnes Avenue and St. Edward Road on December 8, 2015 (Tuesday)[7]. These counts measured 229 westbound cyclists and 192 eastbound cyclists over a 24-hour period, for a total of 421 daily cyclists. According to these counts, people biking comprise two percent of the total user volume on Saratoga Street.


Eastbound Cyclist on Saratoga Street

FIGURE 6: Relative Biking Activity
Source: Strava Global Heatmap for Biking (September 2020)

[7] BTD Traffic Data Collection: https://scerisecm·boston·gov/ScerIS/CmPublic/#/SearchCriteria?f=56

PEDESTRIAN ACTIVITY

Pedestrian activity is supported by a complete network of sidewalks throughout the study area. Pedestrian counts are not available in the study area. However, Strava data, which is used to record recreational or fitness trips, provides visual insight into popular running or walking routes in and around the study area. As shown in Figure 7, running activity occurs mostly on Saratoga Street/Main Street, Bayswater Street, Thurston Street, and Annavoy Street, along with Main Street, Pleasant Street, and to some extent on Morton Street in Winthrop. Compared to biking, the Strava map for running shows more activity on Thurston Street and Constitution Beach and use of the informal connection between Thurston Street and the beach.

FIGURE 7: Relative Running Activity
Source: Strava Global Heatmap for Running (September 2020)

VEHICLE OPERATIONS

Typical vehicle traffic composition on Saratoga Street in East Boston and Main Street in Winthrop includes passenger vehicles, trucks, and MBTA buses. MBTA routes 712 and 713 run along Saratoga Street with a combined frequency of two to three buses per hour. Passenger vehicles towing boats and commercial vehicles are expected on Pleasant Street, Pleasant Court, and Belle Isle Terrace. Passenger vehicles and emergency response vehicles are expected on all other streets in the study area.

Limited historical vehicle traffic data is available in the study area. Due to COVID-19, current-day traffic volumes would likely not reflect typical trends. The only publicly available traffic counts conducted in the study area were Automatic Traffic Recorder (ATC) counts collected on Saratoga Street between Barnes Avenue and St. Edward Road on December 8, 2015 (Tuesday)[8]. These counts measured 19,708 vehicles per day, with 1,301 vehicles per hour during the PM peak hour. The counts also measured 85th percentile speeds of 30 mph, with 17 percent of vehicles exceeding 30 mph. According to MassDOT's roadway inventory[9], the posted speed is 30 mph; no speed limit signs are present along Saratoga Street within the study area based on a desktop review.

There are many one-way streets in East Boston, particularly in the residential neighborhood south of Saratoga Street. Existing circulation is illustrated in Figure 8. Thurston Street from Barnes Avenue to Bayswater Street is one-way southbound and eastbound. Bayswater Street and Barnes Avenue both have one-way segments where they intersect with Saratoga Street. There is only one one-way segments within the study area in Winthrop.

Bayswater Street

[8] BTD Traffic Data Collection: https://scerisecm.boston.gov/ScerIS/CmPublic/#/SearchCriteria?f=56

[9] The MassDOT roadway inventory provides planning-level 2018 Annual Average Daily Traffic (AADT) volumes for Saratoga Street, ranging from approximately 33,000 to 35,000 vehicles per day and dropping to 23,000 on Main Street east of Pleasant Street. The AADT volumes have limited information about their derivation or assumptions and may not have been verified against measured traffic volumes. MassDOT's traffic count data does not include traffic counter locations within the study area.

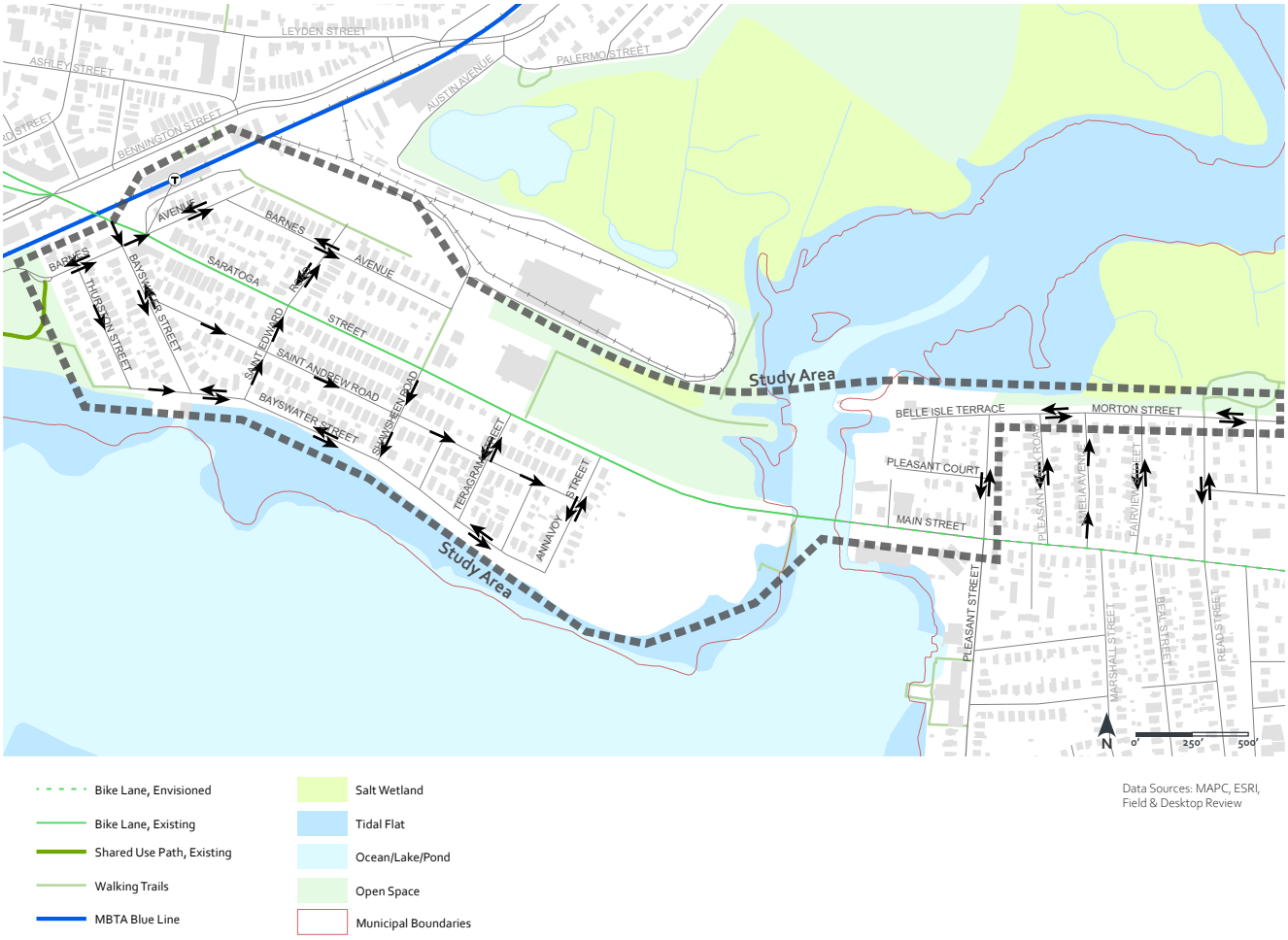


FIGURE 8: Roadway Circulation

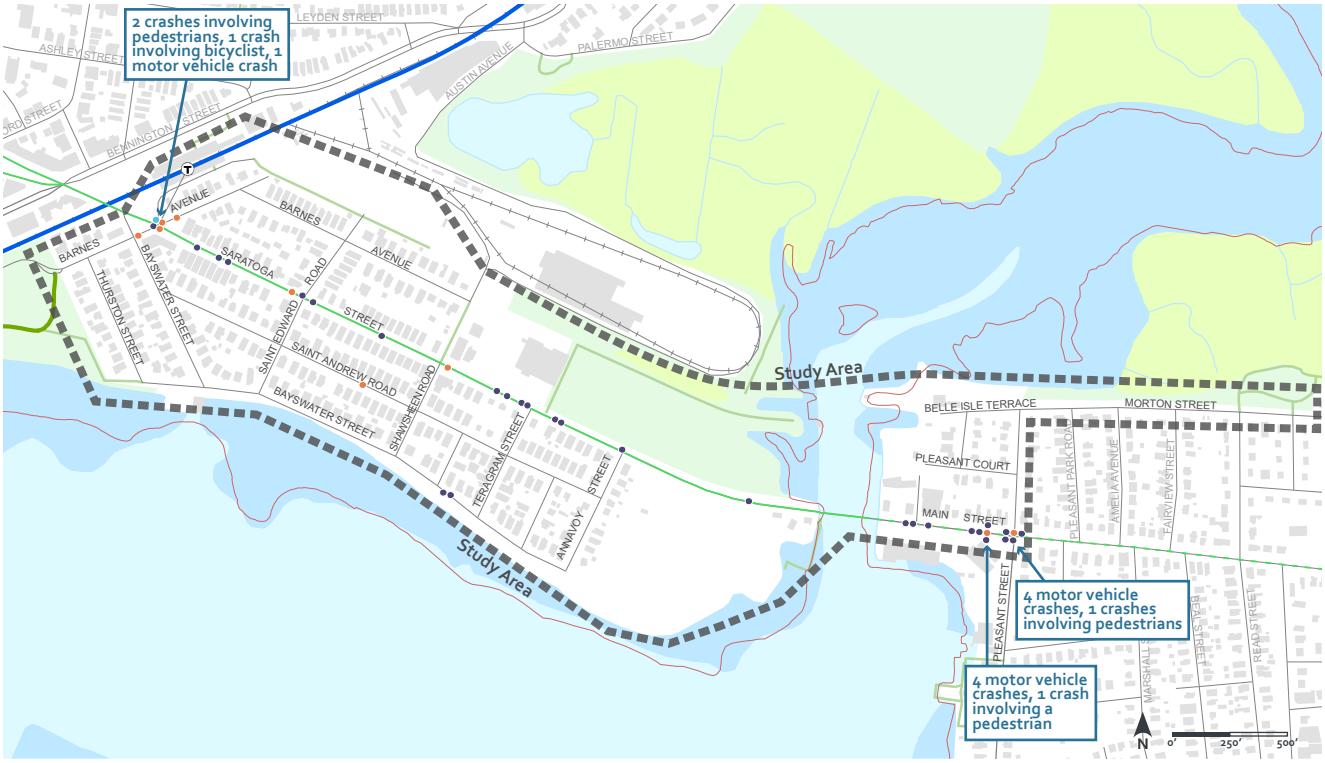


FIGURE 9: Crash Locations (2017 - 2019)

ROADWAY SAFETY

The most comprehensive crash data available for East Boston and Winthrop was analyzed to identify existing safety challenges in the study area. Vision Zero data is available for the East Boston portion of the study area and reflects crashes only where an ambulance was requested. In Winthrop, MassDOT crash data is used, which reflects crashes only where a police report was filled out. Both methods of data reporting inherently under-report the total number of crashes in the study area by not capturing less severe crashes, but do illustrate hot spots and patterns in the crash history.

Crashes that occurred within the study area from 2017 to 2019 were primarily located on Saratoga Street in East Boston and on Main Street in Winthrop as shown in Figure 9. Saratoga Street is the only connection between East Boston and Winthrop, making it a critical and high-volume route. Within Winthrop, Main Street is a denser and more commercial corridor in comparison to the surrounding residential streets. The locations of the crashes are reflective of where the most vehicular activity is occurring in the study area. The surrounding residential streets have very few crashes and crashes do not appear to be clustered near intersections as seen on Saratoga Street and on Main Street.

Most crashes that occurred in the study area involved motor vehicles exclusively. There were eleven crashes in the area from 2017 to 2019 that involved a pedestrian. Ten of those pedestrian crashes occurred on Saratoga Street or on Main Street with four crashes occurring near the intersection of Saratoga Street and Barnes Street. There was one recorded crash involving a bike recorded in the study area from 2017 to 2019 which occurred at the intersection of Saratoga Street and Barnes Street.

PROPERTY OWNERSHIP

The study area encompasses municipal, state agency, and private properties. Key properties relevant to the investigated route segments are summarized below. Figure 10 illustrates the property ownership boundaries throughout the study area.

City of Boston

- Roadways in East Boston
- Parcel within Belle Isle Marsh that could overlap with Greenway alignment. This parcel is owned by the Department of Neighborhood Development and is managed by the Boston Parks and Recreation Department

Town of Winthrop

- Roadways in Winthrop
- Belle Isle Marsh Marine Ecology Park. This parcel extends along the water's edge including a small, disconnected section north of Belle Isle Terrace
- A pumpstation west of Pleasant Court

Department of Conservation and Recreation (DCR)

- Constitution Beach
- Belle Isle Marsh Reservation

Massachusetts Water Resources Authority (MWRA)

- Maintenance access agreement through DCR owned Belle Isle Marsh Reservation to sewer headhouses
- Sewer easement from Pleasant Court to pumpstation in Winthrop

Massachusetts Bay Transportation Authority (MBTA)

- Blue Line tracks

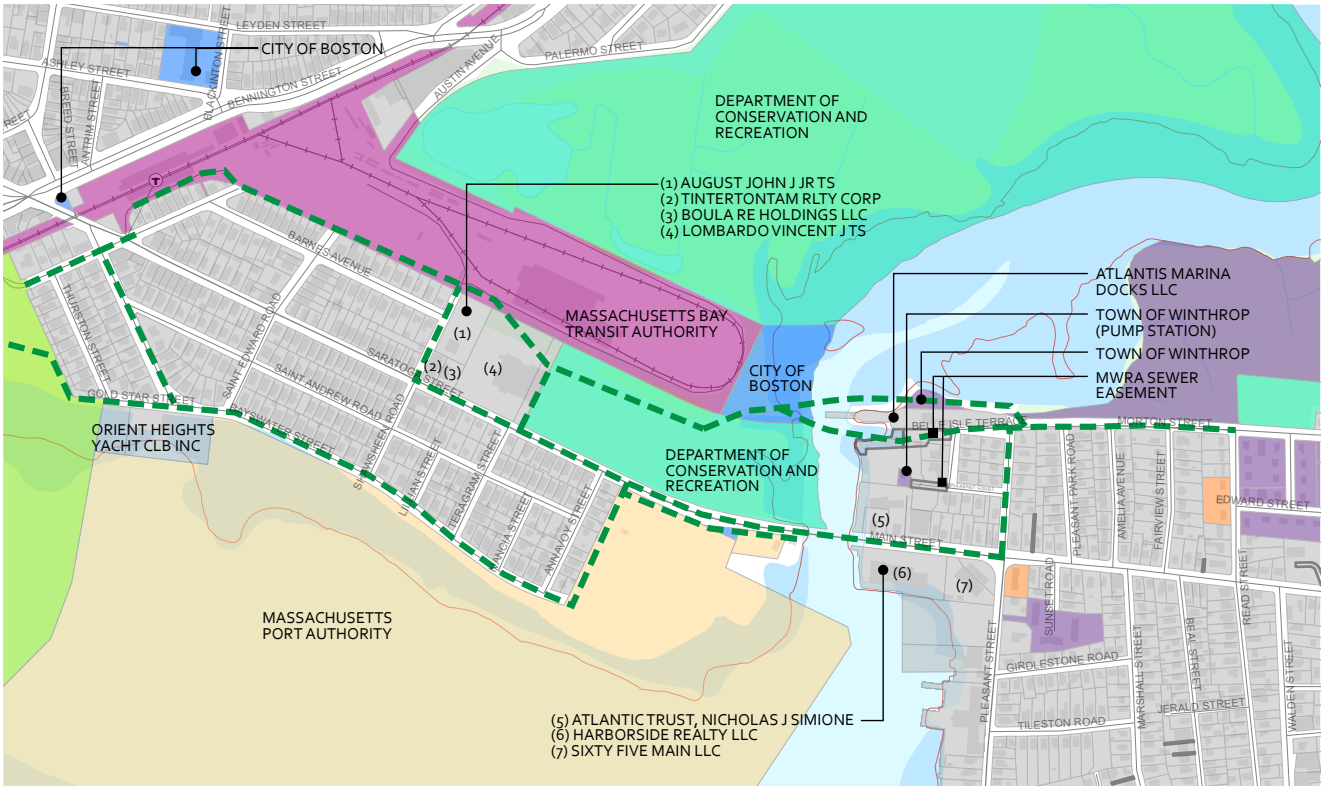


FIGURE 10: Parcel Ownership

- Orient Heights Blue Line Station
- Parking lot and maintenance yard

Massport

- Waterfront south of Bayswater Street
- Open space parcel on the south side of Saratoga Street from Annavoy Street to the bridge

Private Property

- Two privately owned boatyards at Belle Isle Terrace and Pleasant Court
- Privately owned parcels with a mix of commercial activity including the car wash and Dunkin' adjacent to the inlet and Main Street in Winthrop
- Privately owned parcels with a mix of commercial activity including the CVS and August Bros Oil Inc. on Saratoga Street in East Boston

ORIENT HEIGHTS ACCESS

Access to the Orient Heights MBTA Station is currently possible via:

- A bus-only loop on the south side that enters and exits from the intersection of Saratoga Street and Barnes Avenue
- A one-way, bus-only lane that enters and exits from Bennington Street on the north side
- A one-way pick-up/drop-up lane that enters and exits from Bennington Street on the north side
- Pedestrians can access the station via sidewalk connections from Bennington

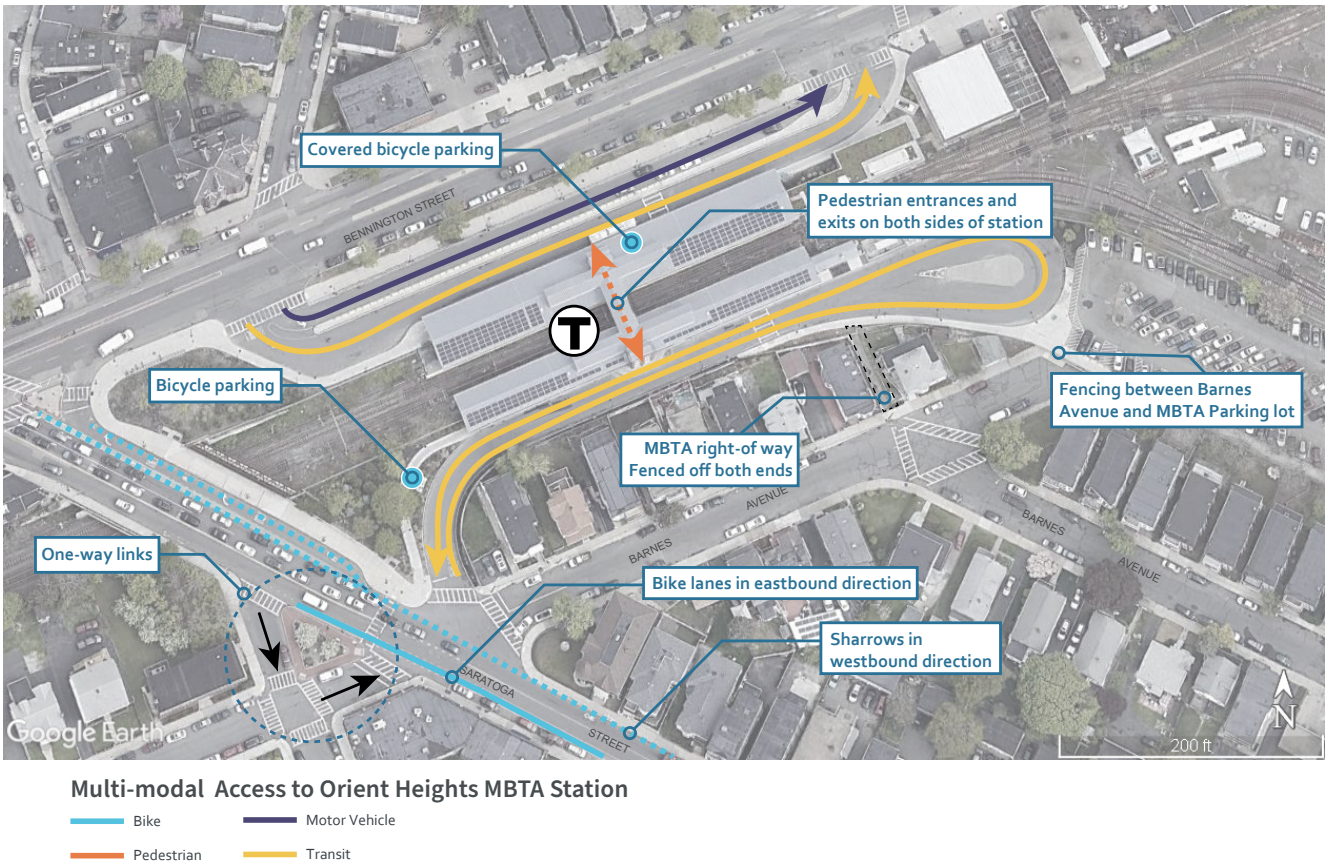


FIGURE 11: Orient Heights Station Access

Street, Saratoga Street, Barnes Avenue, and the MBTA parking lot

- Bikes can access the station via Bennington Street or the bus loop south of the station. The bus loop can be accessed from Saratoga Street and the MBTA parking lot via St. Edward Road.
- Bicycle parking is available on the Bennington Street and bus loop sides of the station.

These access points are shown in Figure 11. The intersection of Saratoga Street, Barnes Avenue, Bayswater Street, and the Orient Heights southern bus loop presents a challenge for an on-street greenway option both for its complex geometry and safety considerations. From 2017 to 2019, four pedestrians and one bicycle crash occurred within the intersection. A Rectangular Rapid Flashing Beacon (RRFB) was installed in 2017 to increase pedestrian visibility crossing Saratoga Street at Barnes Avenue. Bicycle parking is provided on the sidewalk approach to the station along the southern bus loop. Exiting the station from this location is a challenge for bicyclists desiring to connect to the existing Greenway via Constitution Beach or residential streets south of Saratoga Street as the southern approach of Barnes Avenue is one-way.

The City of Boston is currently working with the owner of the Suffolk Downs site (McClellan Highway Development Company, LLC), who has committed to the completion of the design and construction of a safe and accessible extension of the Mary Ellen Welch Greenway from Constitution Beach to the southeast corner of Suffolk Downs. The concept, alignment, and general design details will be developed in coordination with the BPDA and its Plan: East Boston initiative. As the Suffolk Downs extension takes shape, it will inform the alignment of the western terminus of the MEWG Winthrop Greenway Extension. The immediate need for a pedestrian and bike underpass under Saratoga Street could be progressed through this or other efforts.

Belle Isle Marsh from Morton Street

ECOLOGICAL & ENVIRONMENTAL RESOURCE AREAS

Portions of the off-street network in the study area are located within environmental resource areas that will require permitting on a state, local, and federal level. The Belle Isle Marsh is located within East Boston, Revere, and Winthrop. Major habitats identified are salt marsh (70%), upland parkland (12%), shrub-scrub wetland (10%), and early successional shrubland (8%). This site is one among several final remnants of salt marsh throughout the Boston Basin and contains salt marsh, a tidal creek, salt pans, a common reed stand, and upland parkland on the periphery of Boston Harbor.

The evaluations for the open resource waters, flood zones, and wetlands that pertain to the Area of Critical Environmental Concern (ACEC) are listed below.

- Conservation Status is protected, with the following considerations:
  - Logan Airport is adjacent to the marsh which is affected by the exhaust release and noise from the planes taking off and landing
  - Invasive species of Japanese knotweed and Common Reed overrun areas of the marsh
  - Boston Harbor water floods the marsh during high tide which may transfer pollutants into the marsh
  - Residents are filling in their land adjacent to the marsh leads to decreased natural flow
  - Powerboat use disturbs the various bird species using open water areas or creek edges
- Aquatic Resources
  - Classified Waters
  - Floodplains
  - Wetlands
- Threatened or Endangered Species
  - One endangered species has been found in Belle Isle Marsh: the Saltmarsh Sparrow
- Other Flora or Fauna of Significance
  - The marsh habitat is important for shorebirds (e.g., Snowy Egrets, Great Egrets, and Glossy Ibises) to roost on the salt marsh or in the salt pans. The site is also designated as an Important Bird Area (IBA) with over 250 species of birds seen in the reservation
  - Salt marsh plants: Saltwater Cordgrass, Tall Salt-hay, Saltmarsh Spike-grass, Saltmarsh Rush, Glasswort, and Orache
  - The 13-acre meadow in the site is a hub for pollinators and other native wildlife
  - The variety of flora and fauna found in this ecosystem is also used for conservation education by schools in the area

Permitting

The project will need to pursue several permitting requirements at the local, state, and federal level. Likely required local, state, and federal permits include, but are not limited to, the following *(See Appendices for full list)*:

- Local - NOI (Boston)
- Local - NOI (Winthrop)
- State - MEPA ENF
- State - MassDEP Ch 91

- State - MassDEP 401 WQC
- Federal - Corps PCN

The proposed greenway extension will occur on several different parcels with different owners. Before permits can be submitted, agreements with all landowners will need to be in place approving the project. Reviewing agencies will not approve projects that do not have approval of all landowners in place.

While not considered environmental reviewing agency, the Boston Harbor Master and U.S. Coast Guard will likely need to be consulted because of the footbridge spanning a navigable waterway into Boston Harbor.

Figure 12, Figure 13, Figure 14, and Figure 15 summarize environmental resources, human receptors, and flood hazards. A desktop review was conducted to understand the environmental resources that may be impacted as a result of a future project and to identify the environmental permits that may be required on a local, state, and federal basis. Appendix E provides the full Environmental and Cultural Resources Review that includes more information on the environmental resources that may be impacted as a result of this project, including information on environmental permits that may be required.

Several route segments fall within the FEMA flood zone which will directly impact the design and function of any proposed improvements (*see Figure 14*).

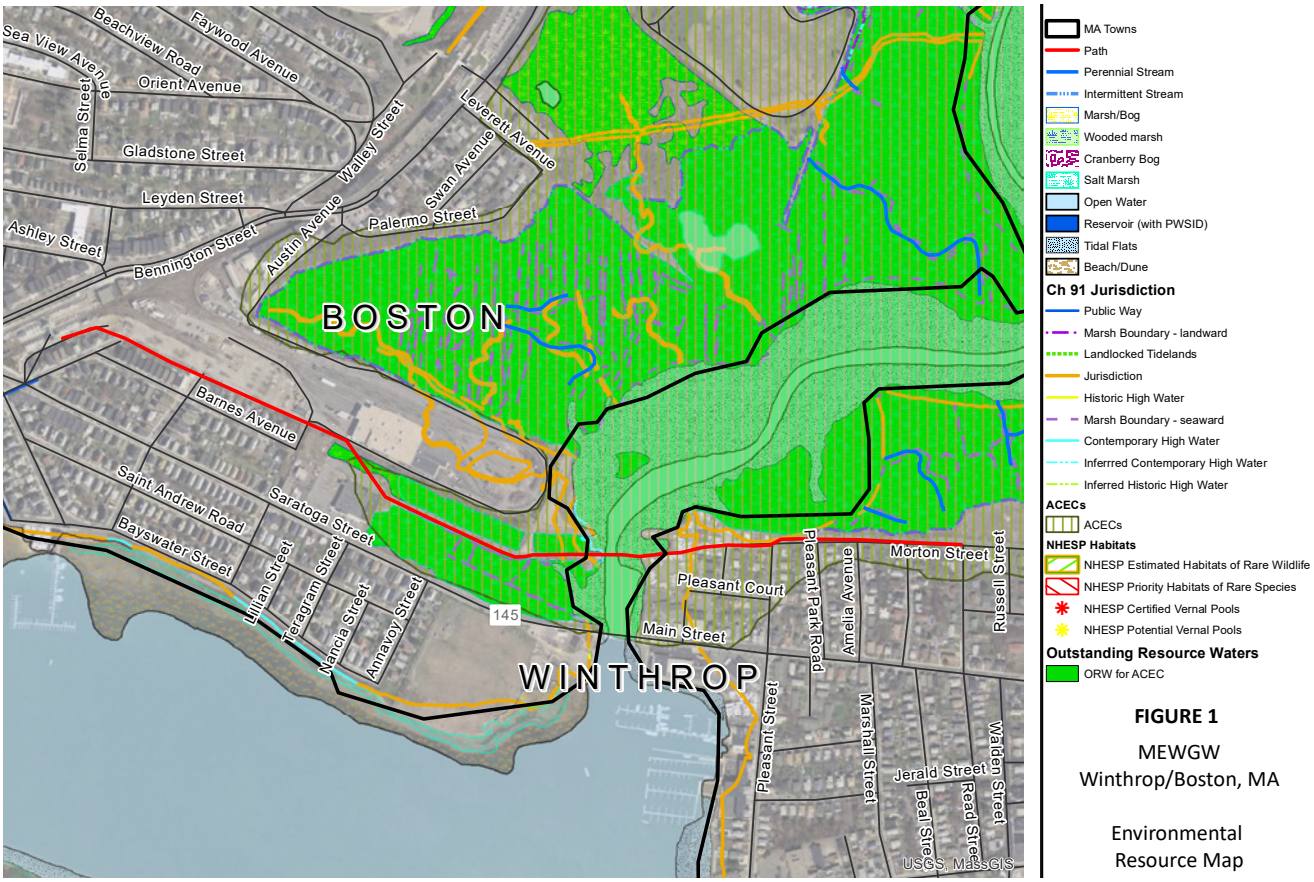


FIGURE 1

MEWGW
Winthrop/Boston, MA

Environmental
Resource Map

FIGURE 12: Environmental and Natural Resources Map (identifies key environments and ecological habitats that are fundamental to an area and should be part of any consideration of development)

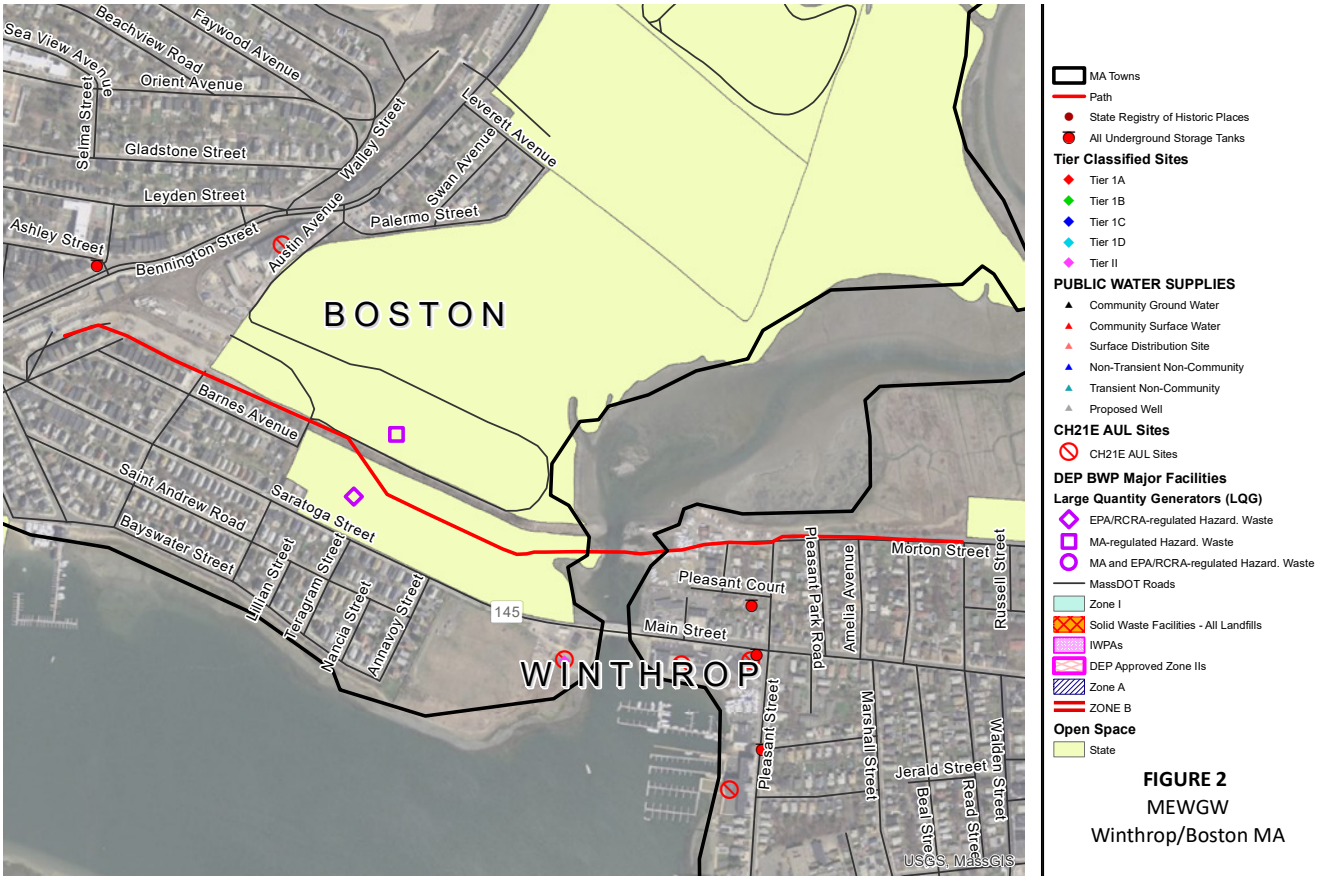


FIGURE 2
MEWGW
Winthrop/Boston MA

FIGURE 13: Human Receptor Map (identifies sites and areas that pose a risk of releasing hazardous substances at a contaminated site and subsequent dispersion into the environment that may be harmful to humans)

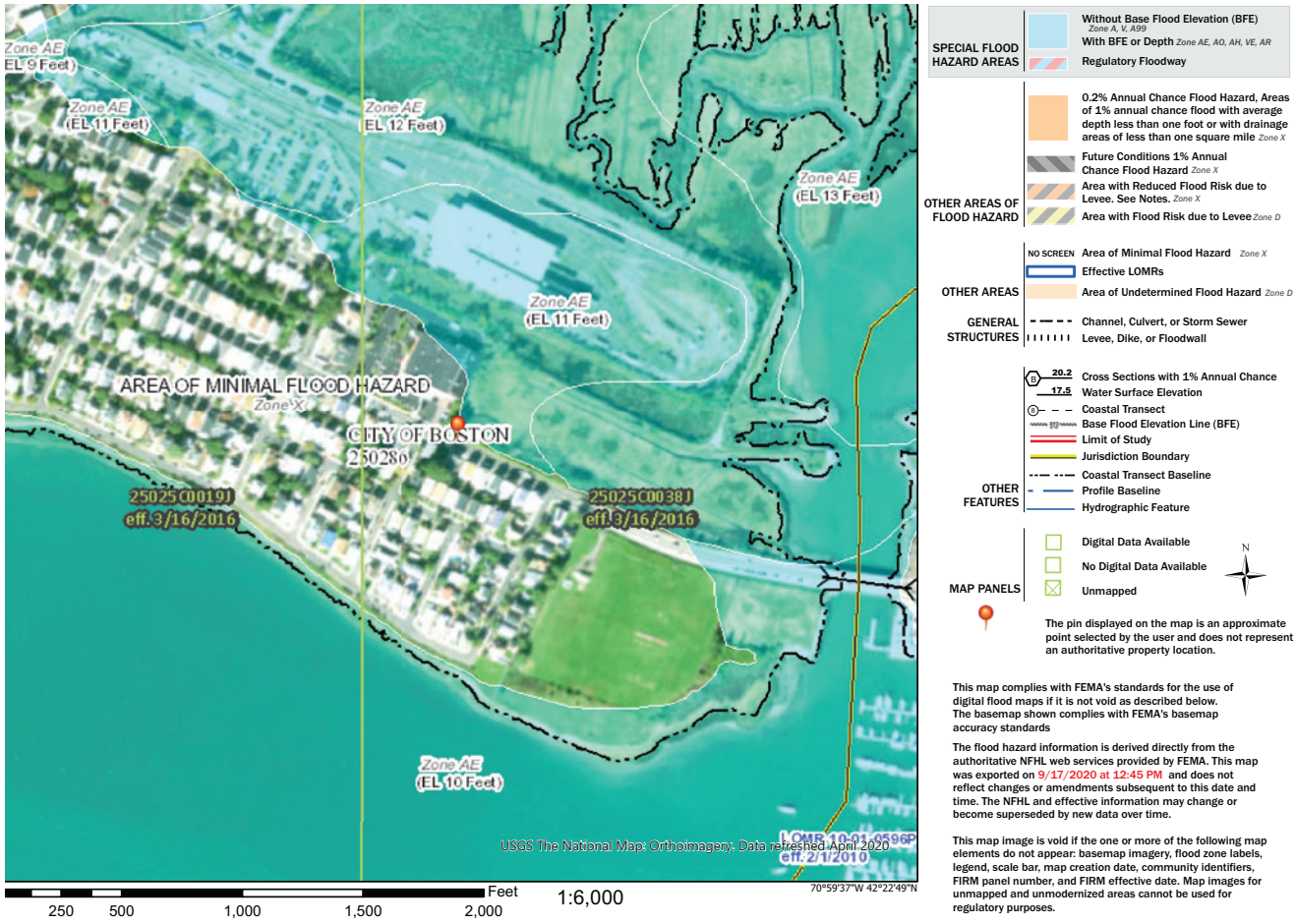


FIGURE 14: National Flood Hazard (West)

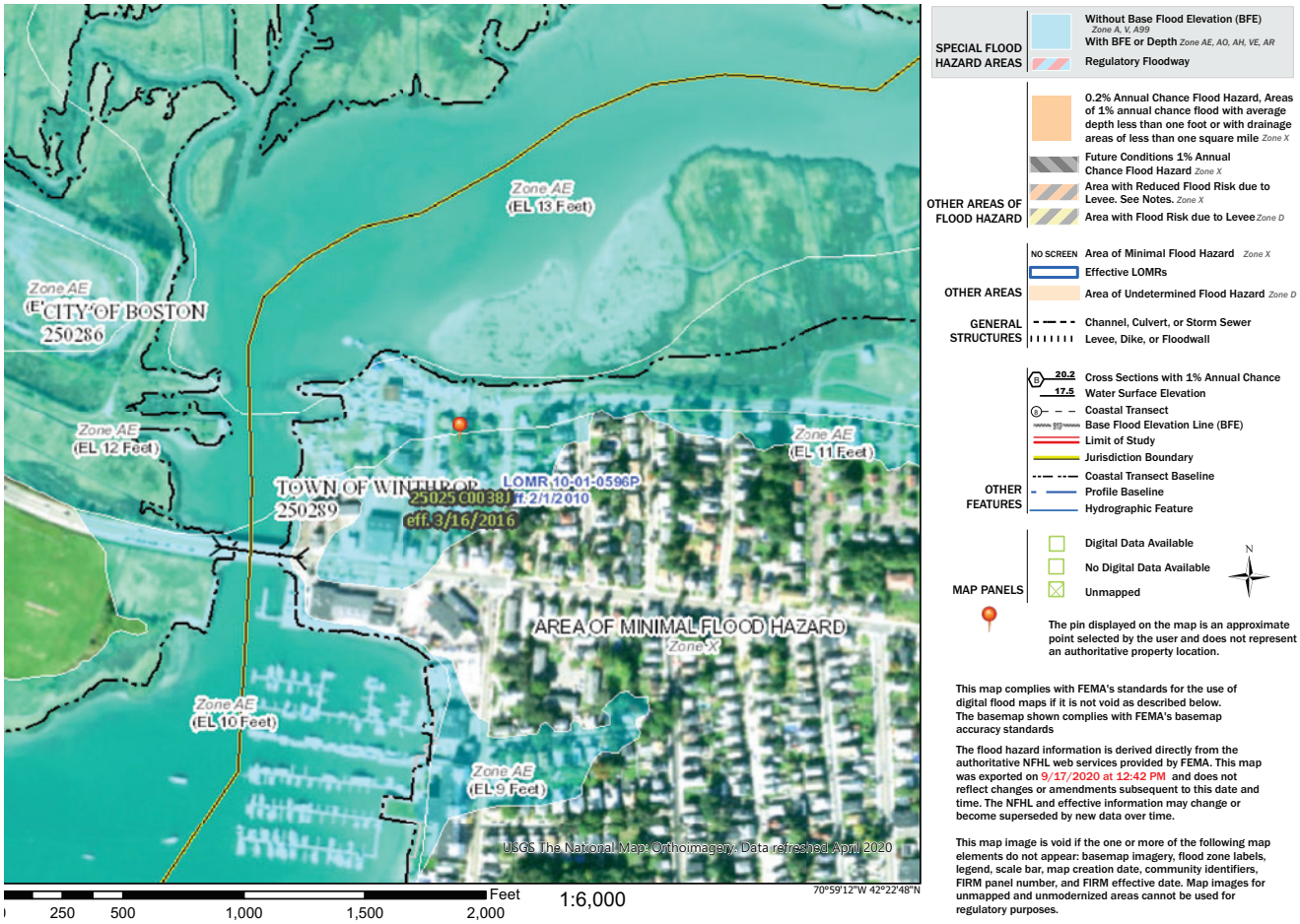


FIGURE 15: National Flood Hazard (East)

ROUTE EXPLORATION

The study area on- and off-street network is anchored by the east-west spine of Saratoga Street/Main Street. Bayswater Street and Barnes Avenue also provide east-west connections in East Boston, but only Saratoga Street crosses the Belle Isle Inlet to Winthrop. Annavoy Street provides a north-south connection between Bayswater Street and Saratoga Street, and Pleasant Street provides a north-south connection between Main Street and Morton Street. Each of these streets, along with the off-street areas, are potential route segments for the Mary Ellen Welch Greenway Extension to Winthrop and may be combined in different ways to create route alternatives. Figure 16 shows the segments assessed in the Feasibility Study and indicates a letter to identify each segment. These are used rather than street names as some streets encompass multiple cross sections or characteristics best assessed separately.

To support the vision and goals, the selection of route segments for consideration in the feasibility study focused on seeking an alignment that will separate path users from vehicle traffic as much as possible, provide access to waterfront views, and provide a convenient connection from Winthrop to both Orient Heights Station and Constitution Beach. Four primary routes were considered; the key points of each are discussed below.

FIGURE 16: Potential Route Segements Key Map

FIGURE 17: MBTA Parking Lot and Ped / Bike Bridge Route Alignment

MBTA Parking Lot & Ped / Bike Bridge Route

This route alignment was originally envisioned by the community and would utilize the MBTA parking lot as an off-street link from Orient Heights to the eastern end of Barnes Avenue. The route would then cross through the DCR owned Belle Isle Marsh Reservation and across the Short Beach Creek inlet via a pedestrian and bike bridge. The Greenway would then need to navigate the connection from the inlet to Morton Street in coordination with property owners bordering the water. This alternative presents the most direct connection between Winthrop and Orient Heights Station in East Boston and the greatest separation from roadway traffic and crossings.

- In the event that the marsh or bridge sections were found to be infeasible due to the significant environmental, property owner coordination, or cost constraints, the use of the existing bridge structure via Saratoga Street was also considered.
- In the event that the section through the MBTA lot was found to be infeasible, Barnes Avenue was considered.
- Figure 17 illustrates the MBTA parking lot and ped/bike bridge route alignment alternative.

FIGURE 18: MBTA Parking Lot and Saratoga Street Bridge Route Alignment

MBTA Parking Lot & Saratoga Street Bridge Route

- This route utilizes the existing bridge infrastructure but, due to the low comfort nature of Saratoga Street for multi-modal users, the alignment options aim to keep path users away from Saratoga Street for as much of the corridor as possible.
- Segments I, J, K, and M, as identified in the Route Segments Key Map (Figure 16), explore different ways to connect from an off-street alignment to Saratoga Street.
- Figure 18 illustrates the MBTA parking lot and Saratoga Street bridge route alignment alternative.

FIGURE 19: Bayswater Street and Saratoga Street Bridge Route Alignment

Bayswater Street and Saratoga Street Bridge Route

- Bayswater Street was considered as an option that would take advantage of a fairly high-comfort residential street in the event that the northern off-street route was found to be infeasible. Bayswater Street provides high quality views of the waterfront and Boston skyline and allows Greenway users to proceed farther west before joining Saratoga Street.
- Segment N is an off-street connection from the beach to Thurston Street/ Bayswater Street. An on-street alternative of Barnes Avenue (H2) to Bayswater Street was also examined. Teragram Street (R), Annavoy Street (P), and the MassPort parcel (Q) were considered as north-south connections to either Saratoga Street or north into the marsh.
- Figure 19 illustrates the Bayswater Street and Saratoga Street bridge route alignment alternative.

FIGURE 20: Bayswater Street and Ped / Bike Bridge Route Alignment

Bayswater Street and Ped / Bike Bridge Route

This route combines the Bayswater Street section with the northern alignment through the Belle Isle Marsh Reservation and across a separated pedestrian and bike bridge into Winthrop. It aims to maximize the path character and avoid Saratoga Street to the extent possible.

Figure 20 illustrates the Bayswater Street and ped/bike bridge route alignment alternative.

Constitution Beach to Orient Heights

Each of the primary routes discussed above is dependent on path users being able to safely cross from the existing MEWG terminus at Constitution Beach to Orient Heights Station, whether as part of the primary route alignment or, as in the case of the tow Bayswater alignments, as a spur. A grade-separated crossing that would connect directly from Constitution Beach to Orient Heights by going under Saratoga Street on the south side of the MBTA right of way was proposed by the East Boston Greenway Coalition in 2019 and the feasibility of this idea was explored by the MBTA. The preliminary MBTA investigation found the physical and operational aspects of an underpass option to be feasible. The underpass option is thus assumed to be feasible throughout this study and is not further investigated. For a thorough understanding of existing conditions and alternatives, the route segment of Barnes Avenue from Constitution Beach to Orient Heights Station, which would necessitate an at-grade crossing of Saratoga Street, was also considered preliminarily.

Details on the existing conditions of each segment considered in the existing conditions analysis can be found in Appendix D. Synthesis of the findings will be discussed in Opportunities and Constraints.

Constitution Beach

6

OPPORTUNITIES & CONSTRAINTS

Key Considerations

KEY CONSIDERATIONS

Figure 16 synthesizes the opportunities and constraints identified throughout the existing conditions assessment. This section will summarize some of the key considerations that have shaped the outcomes of the feasibility study. Figure 16 reiterates the lettering key shown in Chapter 5, Route Exploration. Not all segments are included in the key considerations; detailed information for each segment explored during the Feasibility Study can be found in Appendix D.

Orient Heights Station Access

- Connectivity to Orient Heights Station from East Boston would be best accommodated with a pedestrian and bicycle underpass under Saratoga Street to provide safe access between the station and the existing Mary Ellen Welch Greenway. This underpass would provide a safe crossing and allow path users to avoid the challenging Saratoga Street, Barnes Avenue, and MBTA Bus Loop intersection. An initial assessment of feasibility for such a connection was explored in another study and is assumed to be part of the final route alignments included in this study. If an at-grade crossing is needed, significant safety improvements will be necessary.
- In its current configuration, direct access to Orient Heights Station from the parking lot is challenging due to the limited width of the MBTA Bus Loop. The narrow width of the bus loop drive

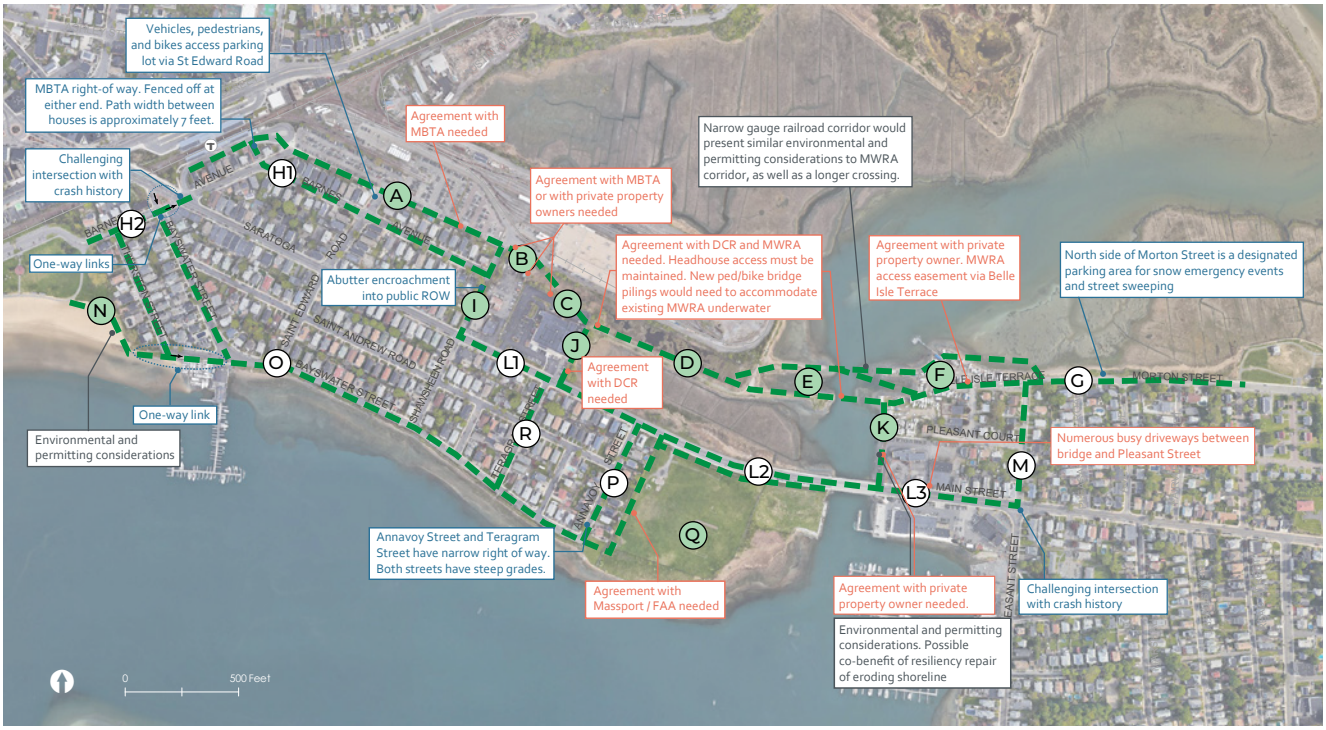


FIGURE 16: Opportunities and Constraints

and limited sight distance requires bus drivers to coordinate their movements. Although there is an existing crosswalk from the back entrance of the Station to the sidewalk leading into the parking lot, MBTA stakeholders expressed concern about having the Greenway direct path users through the Bus Loop, both for those path users trying to access the station and those making through-trips. These challenges could potentially be addressed as part of a larger effort to reconfigure the MBTA property surrounding the Orient Heights station itself. The MBTA is considering the current and future operational needs of Orient Heights station and the resulting land uses.

A | MBTA Parking Lot

- A sidepath through the MBTA parking lot would provide a route separated from roadway vehicle traffic and is already used as a cut through by pedestrians and bicyclists seeking to avoid Saratoga Street and the intersection of Saratoga Street, Barnes Avenue, and the MBTA Bus Loop. A route through the MBTA parking lot would provide the most direct continuation of an off-street connection across the water from northern Winthrop to Orient Heights Station.
- Maintenance of the 24' center lanes and keeping within the current MBTA limits of work could support an approximately 9.5' wide sidepath *(see Figure 17)*.
- Expanding the limits of work all the way to the edge of the MBTA's property line could support an approximately 12' wide sidepath *(see Figure 18)*. These findings are preliminary and would need to be confirmed with site survey and the MBTA.
- An initial exploration of incorporating the sidepath to the parking lot reconfiguration would likely result in a loss of around 14 spaces. MBTA stakeholders expressed concern over a loss of revenue generating parking in the short-term but indicated a willingness to continue a dialogue and welcome multi-modal options for riders to access

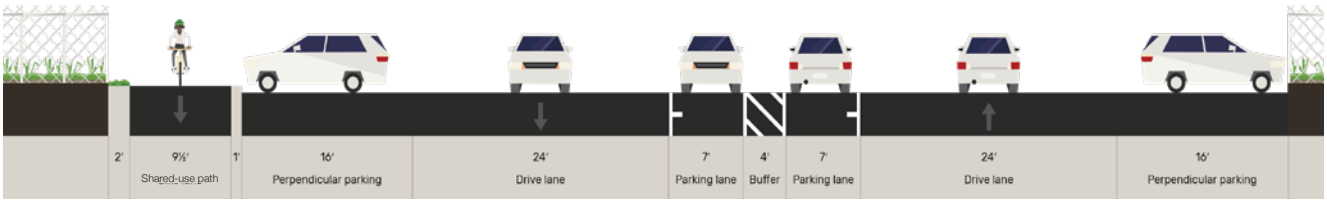


FIGURE 17: MBTA Orient Heights Preliminary Proposed Cross Section within Existing Limit of Work (facing west)

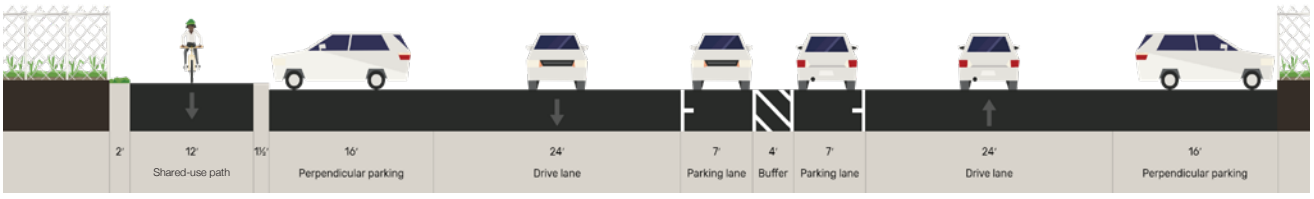


FIGURE 18: MBTA Orient Heights Preliminary Proposed Cross Section with Limit of Work Pushed to Property Line (facing west)

stations. Future analysis or conversations may seek to evaluate anticipated revenue impacts related to parking supply and improved multi-modal connectivity to the station.

- The MBTA has developed plans to reconfigure the parking lot. Potential design revisions and construction of this reconfiguration are currently on hold but present an opportunity to coordinate with the MBTA to incorporate the Greenway into the final design. Through this work and broader conversations about land use at the station, there may be opportunities to reallocate space to provide a wider, safer shared use path and incorporate a landscaped buffer or other features to improve user experience.
- This segment falls within the FEMA flood zone and any improvements will need to be designed accordingly (*see Figure 14 in Chapter 5*)

B, C & D | Belle Isle Marsh Reservation

- The off-street section from the west end of the MBTA parking lot to the inlet has permitting and environmental considerations (*see Appendix E*). The westernmost portion would likely require boardwalk to mitigate environmental impact.
- From the east side of the CVS continuing east, the off-street section is used by maintenance vehicles and recreational users. This pathway is already degraded, and the alignment should adhere to this corridor to the extent possible to mitigate further environment impact.
- This segment falls within the FEMA flood zone and any improvements will need to be designed accordingly (*see Figure 14 in Chapter 5*)

E & F | Ped/Bike Bridge

A free-standing pedestrian and bicycle bridge across the inlet could follow three potential alignments based on crossing length, property ownership, and existing infrastructure.

- The shortest path across the inlet would utilize the MWRA headhouses, continuing the existing maintenance road vehicle path, which is also used by the community, across the water. Any changes on or around the headhouses would need to maintain MWRA maintenance access. A large sewer line built in the late 1800s is located below grade and would present challenges for engineering the bridge.
- The second shortest path would cross at the former narrow gauge railroad abutments and connect path users to Belle Isle Terrace. This route passes through privately owned property requiring additional outreach.
- The final route would cross at the former narrow gauge railroad abutments and connect path users to the northern tip of land, which is owned by the Town of Winthrop. While longer, this alignment avoids the sewer infrastructure and private property. After connecting to land, this option would include a boardwalk to connect users to Morton Street, avoiding private property. These findings are preliminary and would need to be confirmed with site survey.

L1 & L2 | Saratoga Street

- Using the existing infrastructure of the Saratoga Street Bridge could result in engineering and construction cost savings. The existing span of the bridge affords width to expand pedestrian and bicycle facilities. Saratoga Street on the

East Boston side narrows, limiting the feasibility of a high comfort sidepath within the existing right-of-way.

- A sidepath on the northern side of Saratoga Street could expand into the DCR owned Belle Isle Marsh Reservation, however this could have greater environmental impact than an off-street path along the existing maintenance path used by MWRA.
- A sidepath on the south side of Saratoga Street was also explored. West of Annavoy Street, available space is limited by residences abutting the existing sidewalk. East of Annavoy Street, expanding the sidewalk south would require access to Massport property. Through discussions with Massport stakeholders, any use of Massport property has been deemed infeasible due to the challenges of gaining approval from the FAA.
- Community input throughout the feasibility study has indicated a strong desire to avoid Saratoga Street, including concerns about riding or walking with children alongside the busy street and a desire for a more aesthetic Greenway that will be a destination on its own.
- Portions of this segment fall within the FEMA flood zone and any improvements will need to be designed accordingly (*see Figure 14 in Chapter 5*)

L3 | Main Street

- Main Street in Winthrop poses challenges due to the quantity of busy commercial driveways between the bridge and Pleasant Street. Main Street and, in particular, the intersection of Main Street and Pleasant Street, are high crash locations. The Town of Winthrop has commissioned an engineering study of the intersection of Main Street and Pleasant Street which should further inform any pursuit of a route along Main Street.
- Portions of this segment fall within the FEMA flood zone and any improvements will need to be designed accordingly (*see Figure 14 in Chapter 5*)

O | Bayswater Street

- Bayswater Street provides high quality views of the waterfront and Boston skyline and is currently used by locals for walking, putting in kayaks, and as an alternative bike route to avoid a portion of Saratoga Street. Bayswater Street itself does not provide a direct connection to Orient Heights Station for users coming from Winthrop as compared to the MBTA Parking Lot or Saratoga Street. This alignment would require a spur to connect to Orient Heights Station, either with an underpass under Saratoga Street or an at-grade connection along Barnes Avenue.
- In the early 2000s, the Bayswater Street community was involved in a public process with Massport related to airport mitigation. Through this process, the community expressed concern about a path along Bayswater. Some of these concerns stemmed from perceptions of crime and loitering related to the introduction of benches and other amenities. The existing landscaped embankment along Bayswater was constructed as part of the 2000 mitigation effort.
- A sidepath would require some combination of parking removal and changes to traffic circulation. Future analysis may seek to evaluate anticipated impacts and should engage with abutters.

G | Morton Street

- Morton Street affords high quality views of the Belle Isle Marsh and, although there is not consistent sidewalk along the full corridor, it is currently used as a neighborhood shared street with pedestrian and bicyclists using the travel lane.
- All routes that have been investigated through this feasibility study will connect with Morton Street at Belle Isle Terrace or Pleasant Street, connecting users to the existing Belle Isle Marsh Marine Ecology Park.

H1, H2, M, P & R | Residential Roadway Segments

- Barnes Avenue, Bayswater Street from Barnes Avenue to the waterfront, Teragram Street, Annavoy Street, and Pleasant Street have been investigated as alternatives to the primary route alignments or as connections between longer Greenway sections. These residential streets present similar challenges with respect to limited right-of-way, driveways, utilities, and in some cases, street trees. Facility selection and configuration would be determined in the design phase and require abutter engagement.
- The Teragram Street segment or any segment intersecting with Saratoga Street will require intersection improvements to provide a safe and accessible crossing for path users.

Belle Isle Marsh from Morton Street

7

EVALUATION

Criteria

Approach

Key Findings

Outcomes

Further Considerations

The primary routes and their secondary alignments were evaluated to compare the costs and benefits of each alignment alternative. This section outlines the criteria used to assess the routes, the evaluation approach, and outcomes. The evaluation is meant to critically compare routes rather than indicate a decision on which route alignment should be progressed into design and construction.

CRITERIA

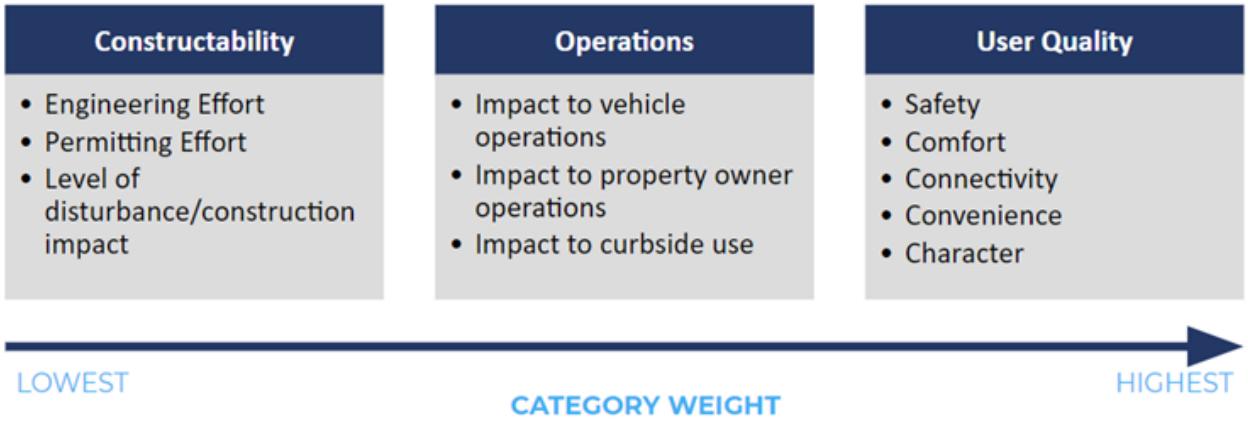
The route evaluation weighs the costs of building the Greenway—in terms of time, money, and impacts—to the benefits, which are measured with respect to how well the Greenway meets the vision and goals of the project. Each route was evaluated on the following criteria:

Constructability criteria aim to capture challenges related to design, right-of-way, environmental considerations, and coordination with various stakeholders throughout project development and construction. Operations criteria aim to capture challenges related to the project's outcome post-implementation such as impacts to vehicle operations, parking, commercial loading and operations, or impacts to property owners or abutters. User Quality criteria draw directly from the vision and goals and assess the benefits of each route based on the potential for the Greenway to be a desirable destination and preferred transportation link.

The criteria are further detailed in Table 1.

APPROACH

Each segment was evaluated individually and normalized by length. Each primary route and secondary alignment alternative was evaluated by summing the scores of the appropriate segments. Criteria were weighted based on community input such that User Quality was weighted the most, Operations were weighted second, and Constructability was weighted the lowest. Following input from the community, cost was not included in the evaluation and was only assessed for the preferred alignment alternative. Constructability and Operations criteria were scored as costs with values between -3 and 0. User Quality criteria were scored as benefits with values between 0 and +3. In this way, the costs and benefits of each route can be more easily compared in the evaluation matrix.



CATEGORY	CRITERIA	DESCRIPTION
Constructability	Engineering effort	Level of engineering effort related to level of design, construction complexity, on-going maintenance, etc.
	Permitting effort	Level of effort related to procuring environmental or other permits
	Level of disturbance	Level of construction impact to businesses, residents, the transportation network (e.g. duration, detours, closures), or ecology
Operations	Impact to vehicle operations	Impacts to vehicle circulation, level of service, or other operations
	Impact to property owner operations	Impact to public or private property owner maintenance and operations
	Impact to curbside use	Changes to curb use, such as on-street parking or loading zones
User Quality	Safety	Extent to which option could improve safety by reducing potential for and severity of conflicts between Greenway users and motorized vehicles. This criterion is impacted by driveways, street crossings, and available width for sidepaths. Perceptions of safety are also included in low-visibility areas such as segment C (behind the CVS)
	Comfort	Extent to which option could provide a low-stress walking and biking facility that is suitable for all ages and abilities. This criterion scored lower when the Greenway segment is adjacent to uses like active parking lots, traffic, or busy intersections
	Connectivity	Extent to which the option will increase connectivity between Orient Heights Station, Constitution Beach, and Belle Isle marsh Marine Ecology Park. Each route achieves the goal of connecting the key destinations listed; this criterion is used to penalize potential infrastructure gaps, such as short segments that create a choppy feel and require multiple turns
	Convenience	Extent to which the option will serve as a convenient active transportation and commuter corridor by maximizing route directness and providing clear wayfinding
	Character	Extent to which the option will provide an aesthetically pleasing user experience by providing access to and enhancing the character of natural open spaces

TABLE 1: Route Evaluation Criteria

KEY FINDINGS

This section discusses the key findings from the Evaluation process. The lettered segment keys reference Figure 16 in Existing Conditions.

L1, L2 and L3 | Saratoga Street & Main Street

In general, alignments that used Saratoga Street and Main Street scored poorly because of the right-of-way challenges and constraints on user quality. These findings reflect input received from the community that Saratoga Street is an undesirable connection. The MBTA Parking Lot to Saratoga Street Bridge route would likely result in a Greenway on the north side of Saratoga Street to minimize crossing the roadway, while the Bayswater Street and Saratoga Street Bridge route could have resulted in a Greenway on the south side of Saratoga Street into Winthrop. A Greenway on the south side of Saratoga Street has the potential to be wider and higher comfort if the sidepath can push south into Massport property, thus scoring higher for user quality. During interviews, Massport stakeholders indicated that any use of Massport property would most likely be infeasible due to the challenges of gaining approval from the FAA.

A | MBTA Parking Lot

The route through the MBTA parking lot would provide commuters from Winthrop a direct off-street connection to Orient Heights Station. Currently, this segment faces engineering constraints and the final link from the parking lot to the Station through the MBTA Bus Loop presents a safety concern in its current configuration, especially if the route alignment were intended for path users continuing past Orient Heights Station. However, there are opportunities to address these concerns through continued coordination with the MBTA on the parking lot reconfiguration project and future land use planning efforts, which could result in the design and construction of a wider, more comfortable path, beautification of the buffer between the parking lot and abutting residents, and resolution of potential conflicts at the existing Bus Loop. The utilization of spurs in the route alignment to allow through-users to bypass Orient Heights is an option for minimizing conflicts at the existing Bus Loop.

B, C & D | Belle Isle Marsh Reservation

Alignments using the Belle Isle Marsh Reservation scored very well for User Quality. With the segment consisting primarily of already degraded open space, the engineering effort is less than most other segments in the study. This section is penalized however for the significant amount of permitting and property owner coordination required. A Greenway through the Reservation would likely have minimal operations impacts.

E & F | Ped/Bike Bridge

The bridge across the inlet is highly desired as it would be a safe and comfortable alternative to the Saratoga Street bridge, would provide a second link between Winthrop and East Boston, and would provide a high-quality recreational destination. Building a new bridge presents significant costs related to engineering effort, permitting effort, and level of disturbance. An alignment using the former narrow gauge rail corridor would require a long water crossing in an area subject to large-scale storm surges and erosion. An alignment using the MWRA headhouses would be more protected but present additional operations and access considerations. All bridge alignments will

require a connection from the water to Morton Street that will pose additional permitting and construction-phase impacts to local property owners. Once implemented, the Greenway could have impacts to property owner operations. Ongoing coordination with property owners and/or abutters will need to continue into the design phase.

N & O |Bayswater Street

A Greenway alignment on Bayswater Street would provide a high-quality experience for path users. Several East Boston and Winthrop community members expressed an interest in this route alternative because of the scenic water views while others expressed concern about the potential changes to parking and a history of opposition to a Greenway in the neighborhood. Continued public engagement with the community and abutters will be necessary. The route presents moderate to significant challenges related to permitting along the waterfront and impacts to vehicle operations and curbside use that would need to be informed by the design process and continued engagement. The Bayswater Street alignment alternative includes an off-street connection from Constitution Beach to Bayswater Street along the waterfront. Although a short segment, this link presents engineering, permitting, and ecological impact challenges.

H1, M, P & R | Residential Roadway Segments

Barnes Avenue north of Saratoga Street, Bayswater Street from Barnes Avenue to the waterfront, Teragram Street, Annavoy Street, and Pleasant Street present similar conditions and cross sections. From a feasibility perspective, the residential roadway segments present moderate engineering and permitting challenges including numerous driveways and existing utilities, and construction phase impacts to abutters. Post-implementation, these segments could have significant impacts to curb use. The Teragram Street and Pleasant Street segments have an additional layer of complexity due to the necessity of creating safe crossings for path users across Saratoga Street or Main Street, respectively.

From a user quality perspective, the residential segments have limited opportunity for placemaking such as vegetated buffers or recreational amenities but benefit from low traffic speeds and volumes.

Barnes Avenue from Constitution Beach to Saratoga Street was not included in the evaluation. Following conversations with agency, municipal, and community stakeholders, it was determined that a pedestrian and bicycle underpass under Saratoga Street should be considered as the preferred alignment for the connection from Constitution Beach to Orient Heights Station. This assumption is relevant to all route alignment alternatives.

OUTCOMES

A summary of the evaluation is shown in Table 2 broken down by primary route and criteria. The MBTA Parking Lot and Saratoga Street Bridge route scored the lowest, reflecting the design challenges and user quality constraints throughout. The alignment also had the longest length along Saratoga Street.

The Bayswater Street and Saratoga Street Bridge route and MBTA Parking Lot and Ped/Bike Bridge route scored closely and in fact swapped rankings when the criteria weights were applied to emphasize user experience,

bringing the Bayswater Street and Saratoga Street Bridge route slightly above.

The Bayswater Street and Saratoga Street Bridge route benefited from the assumption that the path could utilize Massport right-of-way from Bayswater Street all the way to the bridge.

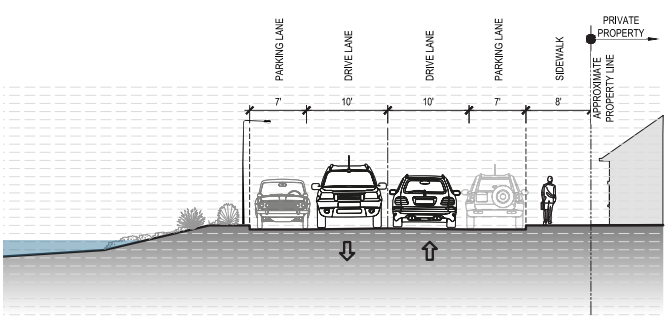
The highest scoring route was the Bayswater Street and Ped/Bike Bridge route. Despite the constructability challenges of waterfront and the Belle Isle Marsh Reservation sections and potential changes to curb use, this route alignment alternative scored very high with respect to user quality. The route assumes a spur connection from Constitution Beach to Orient Heights Station and that a Greenway physically separated from traffic is physically feasible, if potentially politically challenging.

The following images illustrate what a Greenway following the Bayswater Street and Ped/Bike Bridge route alignment could look like.

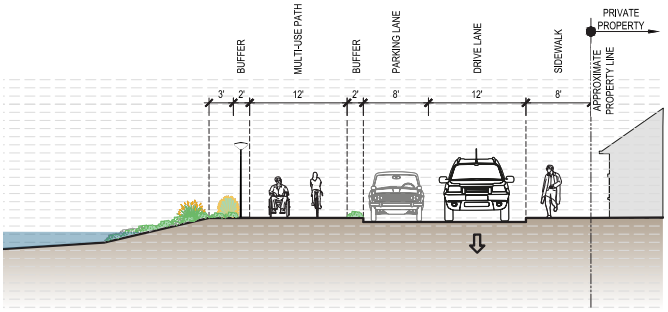
			Route Evaluation			
Category	Weight	Criteria	MBTA PARKING LOT & PED/BIKE BRIDGE	MBTA PARKING LOT & SARATOGA STREET BRIDGE	BAYSWATER STREET & SARATOGA STREET BRIDGE	BAYSWATER STREET & PED/BIKE BRIDGE
Feasibility	1	Engineering Effort	-0.9	-1.7	-2.0	-1.5
		Permitting Effort	-2.0	-2.3	-2.7	-2.6
		Level of disturbance/construction impact	-1.6	-2.7	-2.3	-1.9
Operations	2	Impact to vehicle operations	-0.3	-0.7	-1.1	-1.1
		Impact to property owner operations	-1.2	-0.8	-1.2	-0.9
		Impact to curbside use	0.0	0.0	-0.8	-0.8
User Quality	3	Safety	2.1	1.9	2.9	2.9
		Comfort	2.0	1.5	2.9	2.9
		Connectivity	2.0	2.2	2.8	2.7
		Convenience	2.6	2.6	2.6	3.0
		Character	2.1	1.7	2.7	3.0
		Route Score	4.7	1.7	3.8	5.6
		Route Score Weighted	24.8	20.2	28.6	31.8

TABLE 2: Route Evaluation Matrix

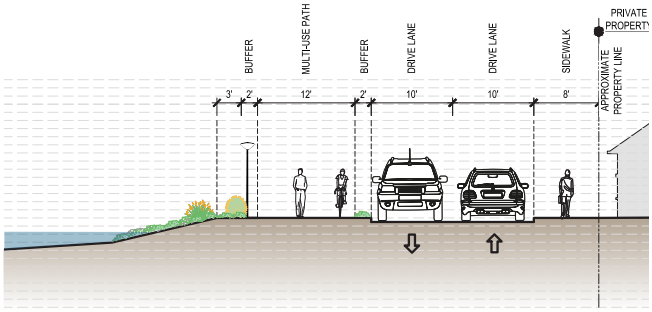
Bayswater Street



EXISTING CONDITION

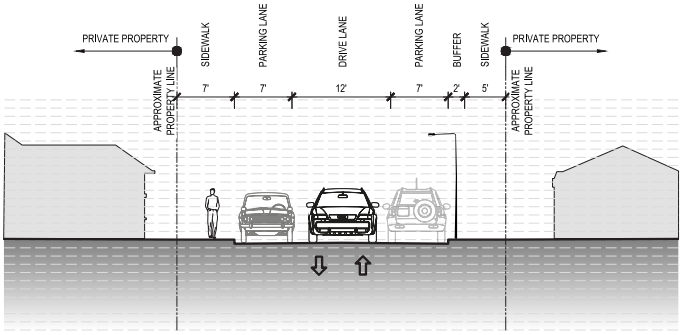


OPTION 1

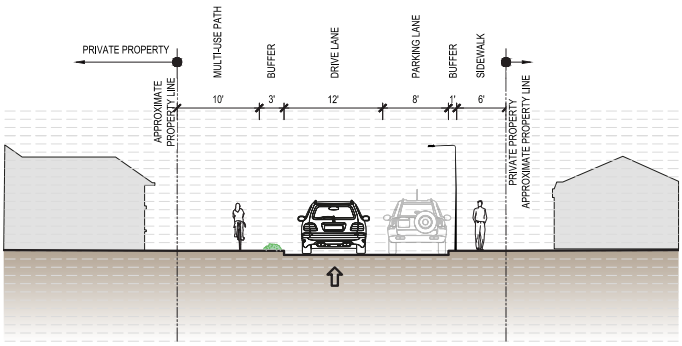


OPTION 2

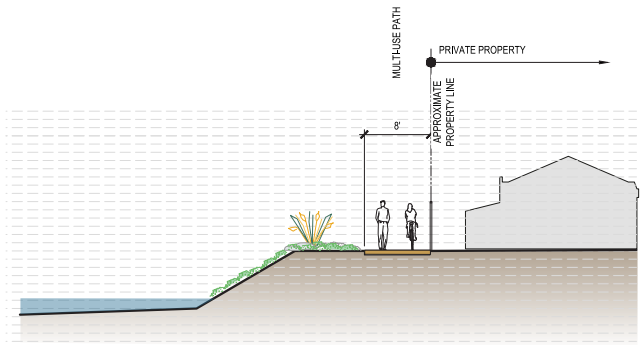
Constitution Beach Connection and Teragram Street



SECTION C-C
EXISTING CONDITION - TERAGRAM STREET

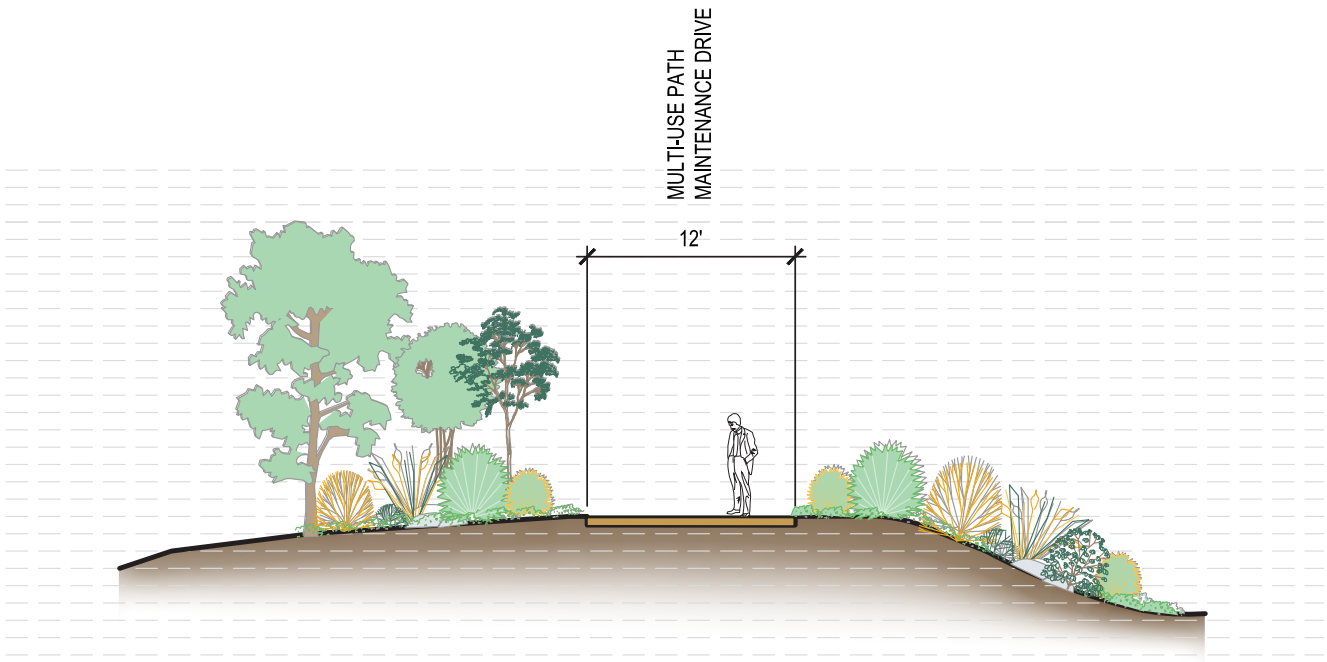


SECTION C-C
PROPOSED CONDITION - TERAGRAM STREET



SECTION B-B
CONSTITUTION BEACH

Belle Isle Marsh Reservation and Ped/Bike Bridge



FURTHER CONSIDERATIONS

Community input has indicated that the Bayswater Street abutters have historically been opposed to a Greenway link on this street. The more direct connection from Winthrop to Orient Heights Station afforded by the MBTA Parking Lot and Ped/Bike Bridge route alignment is desired by commuters and was the original vision of the Greenway Extension.

Based on these concerns and a desire to further understand community preferences, additional outreach and a second survey was conducted to gauge interest in a Bayswater Street Greenway link and preferences between a route on Bayswater Street or through the MBTA parking lot. The results of the survey and an evaluation of potential next steps are outlined in the following section, “Path Forward.”

8

PATH FORWARD

Critical Infrastructure Links

Community Input on Path Forward

Phasing

Cost Estimates

Potential Funding Sources

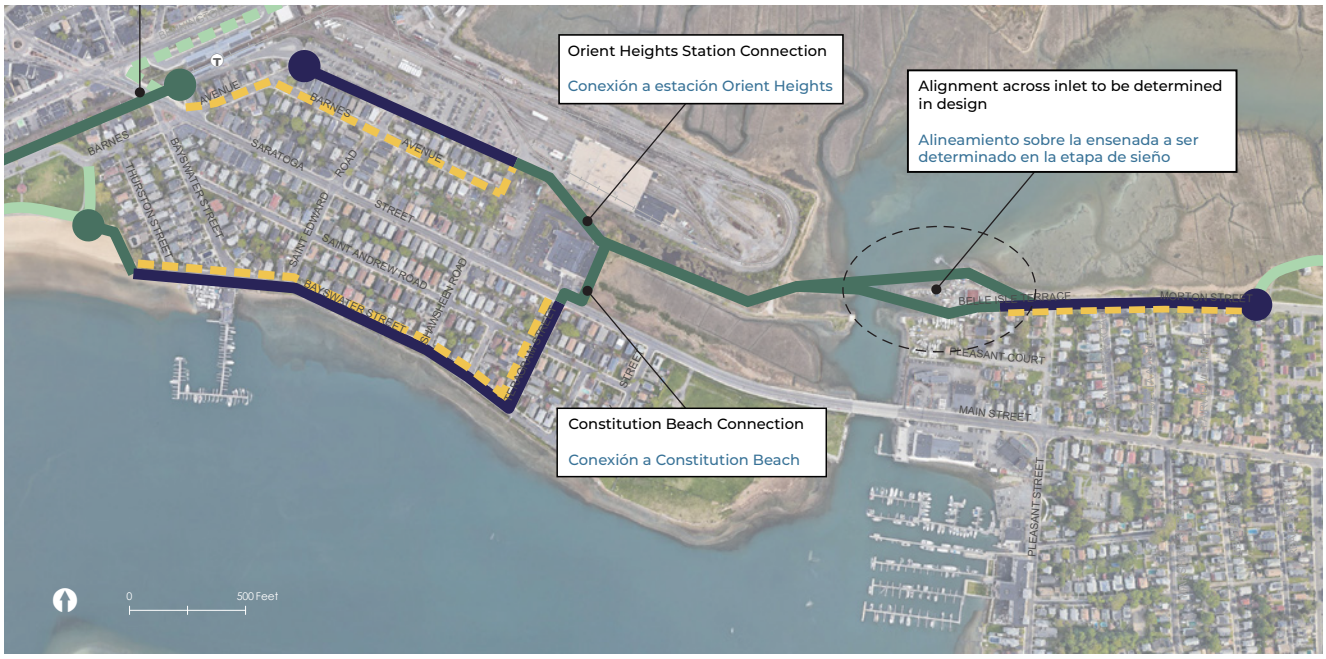
CRITICAL INFRASTRUCTURE LINKS

Throughout the feasibility study process, it has become clear that there are two key infrastructure links that will support a safe, comfortable, connective, convenient, and high-quality character Greenway:

- A safe and comfortable crossing from the existing Greenway terminus at Constitution Beach to Orient Heights, ideally through the construction of an underpass under Saratoga Street, and
- An off-street connection across the inlet from East Boston into Winthrop

Both the MBTA Parking Lot and Bayswater Street route alignments have benefits. The MBTA Parking Lot link providing greater convenience and connectivity to Orient Heights and the Bayswater Street link provides a less direct route with high quality views that appeal to recreational users. The construction of the critical infrastructure links listed above would not preclude either route in the future and both routes could be supported by on-street connections as interim treatments. Path users seeking to access Orient Heights Station could have a direct connection northbound via the Saratoga Street underpass and westbound via the MBTA Parking Lot. Path users seeking to use the Greenway for recreation or as part of the regional trail network could use the Bayswater Street fork, thus reducing the need for a through-connection at the challenging MBTA Bus Loop.

Figure 19 illustrates the forked approach to the Greenway Extension alignment, highlighting the priority off-street shared



Priority Off-Street Shared Use Path Connection
Prioridad a sendero de uso compartido fuera de la calle

Long-term Shared Use Path Connection
Conexión con sendero de uso compartido a largo plazo

Interim Shared Street Connection
Conexión temporal de calle compartida

Proposed Greenway Extension to Suffolk Downs and Revere
Propuesta de extensión del Greenway hacia Suffolk Downs y Revere

Existing Greenways
Greenway existente

FIGURE 19: Path Forward Route Synthesis

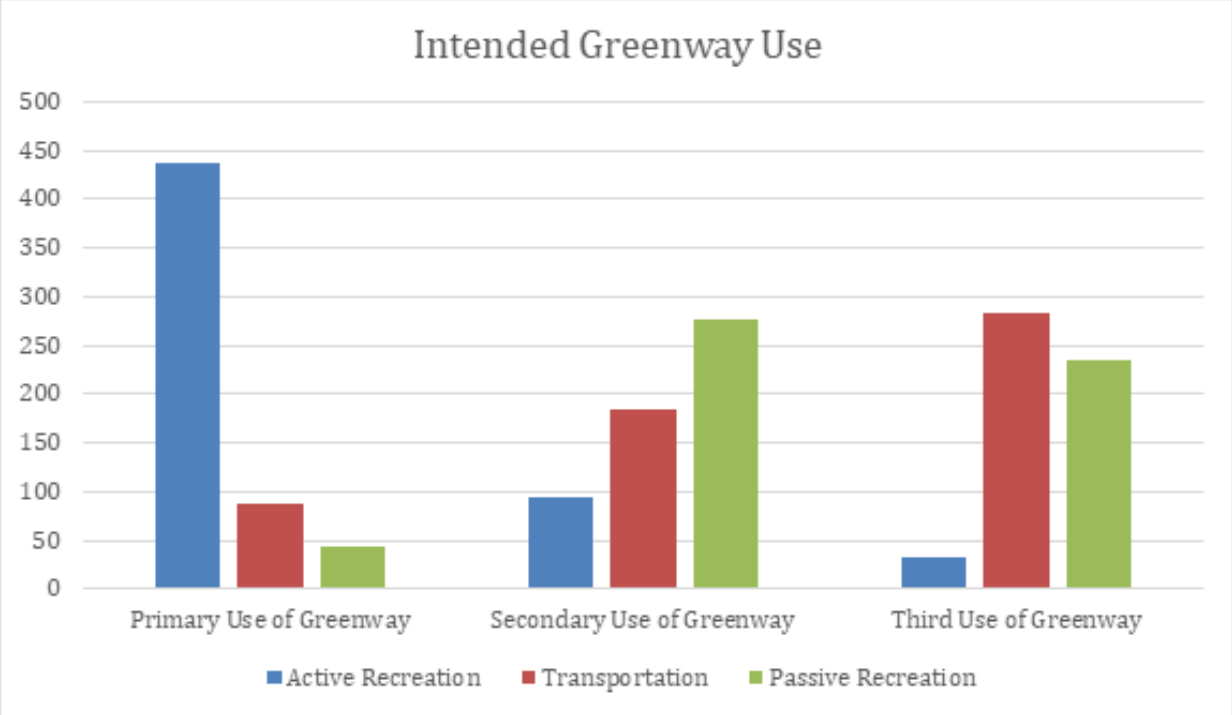
use path connections, which include the Saratoga Street underpass and Belle Isle Marsh Reservation and inlet crossing. The figure also shows proposed interim shared street connections that would support either or both long-term shared use path routes.

COMMUNITY INPUT ON PATH FORWARD

A second survey was distributed in English and Spanish to better gauge community preferences between the MBTA Parking Lot and Ped/Bike Bridge route alignment and the Bayswater Street and Ped/Bike Bridge route alignment alternatives. The survey asked respondents a series of questions related to how well the two route alternatives meet the respondent's individual recreation and transportation needs and how well the two alternatives meet the shared vision. A total of 581 responses were received, with 48 percent from Winthrop and 47 percent from East Boston. The key findings are summarized below and the full survey results can be seen in Appendix C.

Intended Use of Extension

- 97 percent of respondents said they would use the Winthrop Greenway extension.
- 77 percent indicated that they would primarily use the Greenway for active recreation (walking, biking, jogging, etc.), 16 percent would use the Greenway for transportation, and 8 percent would use the Greenway for passive recreation (sitting, birdwatching, outdoor gathering, going to the beach). The survey indicates that of the three presented options, active recreation would be the primary use of the Greenway, passive recreation would be the secondary use, and transportation would be the third most likely use.



Route Preferences

- The MBTA Parking Lot and Ped/Bike Bridge route alignment met 71 percent of respondents' recreation or transportation needs very well or well and did not meet 22 percent of respondents needs. Similarly, the Bayswater Street and Ped/Bike Bridge route alignment met 69 percent of respondents' recreation or transportation needs very well or well and did not meet 24 percent of respondents' needs.
- 74 percent of survey participants felt that the MBTA Parking Lot and Ped/Bike Bridge route alignment met the shared vision of the Greenway very well or well and 17 percent felt it did not meet the shared vision. 70 percent of survey participants felt that the Bayswater Street and Ped/Bike Bridge route alignment met the shared vision of the Greenway very well or well and 22 percent felt it did not meet the shared vision.
- When asked which route respondents preferred, 43 percent preferred the Bayswater Street and Ped/Bike Bridge route as compared to 41 percent who preferred the MBTA Parking Lot and Ped/Bike Bridge route. 14 percent of respondents preferred that both Greenway links be constructed.
- When asked which route alignment should be constructed first if both were possible, 54 percent responded that the MBTA Parking Lot route should be constructed first compared to 46 percent preferring Bayswater Street.

Orient Heights Mode Shift

- When asked how respondents currently travel to Orient Heights Station, 27 percent of participants drive a car and

Orient Heights Station Parking Lot

park and an additional 8 percent get dropped off in a car. 23 percent walk, jog, or run to get to the station, 9 percent take the bus, and 6 percent bike. The final 27 percent of respondents reported that they do not typically travel to Orient Heights.

- Of those who currently travel to Orient Heights via car (drive a car and park or ride in a car and get dropped off), 82 percent said they would be more likely to use the Greenway instead of a car or would sometimes use the Greenway instead of a car. 14 percent would still arrive by car over using the Greenway.

PHASING

Phasing of the Greenway will depend on continued dialogue with stakeholders and opportunities to coordinate with other projects and design efforts. Potential phases have been organized to maximize Greenway utility from the beginning and allow for flexibility with respect to a final route alignment as stakeholder coordination progresses. Figure 20 shows the proposed phasing.

Phase 1: Saratoga Street to Orient Heights

Although outside the scope of this feasibility study based on earlier preliminary findings of feasibility, a safe and comfortable connection from the existing Greenway terminus at

FIGURE 20: Proposed Phasing

Constitution Beach to Orient Heights Station is critical for the success of the Greenway Extension and would provide immediate benefits to the local East Boston community. This link is included here to reiterate its importance to the Greenway as a whole. An underpass under Saratoga Street, which is the preferred alignment to make the connection, will require on-going conversations with the MBTA and City of Boston and will likely require the joint support of other agency partners who can champion the connection.

Phase 2: Belle Isle Marsh Reservation and Ped/Bike Bridge

Phase 2 could begin at the east end of Barnes Avenue/MBTA Parking lot and continue across the inlet into Winthrop. Morton Street from the ped/bike bridge to the Ecology Park could be included as a shared street in the interim before potentially being upgraded to a separated pedestrian and bike facility in the future. Phases 1 and 2 would tackle the most challenging environmental, permitting, and even design hurdles. Phase 2 would create the valuable connection between Winthrop and East Boston.

Barnes Avenue could be included as a shared street interim treatment before pursuing a sidepath in the MBTA Parking Lot at a later phase. This would require safety improvements at the Saratoga Street and Barnes Avenue intersection to allow path users to safely access Orient Heights, as well as coordination with any on-going efforts to create the Saratoga Street underpass.

Phase 3: Belle Isle Marsh Reservation Fork and Constitution Beach

Phase 3 would construct the off-street fork from the Belle Isle Marsh Reservation south to Saratoga Street. This fork could potentially be combined with Phase 2 but will need to include safety improvements for path users to cross Saratoga Street onto Teragram Street. Phase 3 could also include the off-street connection from Constitution Beach to Bayswater Street. Teragram Street and Bayswater Street could be included as shared streets in the interim before potentially being upgraded to a separated pedestrian and bicycle facility in the future. Installation of wayfinding to divert path users who do not need to go to Orient Heights to the Bayswater Street fork will be part of this phase.

Phase 4: MBTA Parking Lot, Bayswater Street, and/or Morton Street

After the design or construction of Phases 1 to 3 and the ability to use either route alignment via the interim shared street treatments, community preference may coalesce on a desire to move one or both routes forward. Phase 4 can be used to develop any or all of the MBTA Parking Lot, Bayswater Street/ Teragram Street, or Morton Street segments into more formalized Greenways with separated pedestrian and bicycle facilities.

COST ESTIMATES

All cost estimates are for the full build out of a separated pedestrian and bike Greenway facility and include the cost for survey, design, and construction of the path, structures such as bridges or retaining walls, landscaping restoration and enhancements, lighting, and security features. These costs are preliminary planning level estimates to assist with identifying funding sources and should be revisited often as more information becomes available and design decisions are made. The overall cost of the Greenway is estimated to be around $17 million. The cost

FIGURE 21: Preliminary Planning Level Costs for Design and Construction

of each segment is shown in Figure 21. The Saratoga Street underpass was not estimated as it was out of scope for this feasibility study but the preliminary MBTA assessment of feasibility cited an anticipate cost around $1 million. Cost estimate summary tables, including assumptions, can be found in Appendix G.

POTENTIAL FUNDING SOURCES

The FotMEWG and project partners can seek to identify funding sources such as public grants as well as agency and municipal partners. The following are potential funding sources and considerations.

MassTrails Grants

MassTrails is an interagency initiative that seeks to expand and connect Massachusetts's network of off-road, shared use pathways and recreational trails for all users. MassTrials provides matching grants to communities, public entities, and non-profit organizations to design, create, and maintain the diverse network of trails, trail systems, and trails experiences used and enjoyed by Massachusetts residents and visitors. The program is funded through two sources: Commonwealth Trails grants supported by the state's annual Capital Investment Plan;

and Recreational Trails Program (RTP) grants which are federally funded through the Federal Highway Administration (FHWA). Applications are accepted annually. Grants are reimbursable and require a minimum match of 20% of the total project cost. Grant amounts can be awarded up to $300,000 for projects demonstrating critical network connections of regional significance[7]. The MassTrails grant program could provide a gateway into preliminary design.

Agency Partners

The identification of agency partners who support the construction of the Greenway and are willing to champion the project will be very helpful in moving the Greenway forward. These partners may be able to support certain portions of the project through their own capital funding plans.

Community Preservation Act (CPA)

The Massachusetts CPA can be used by municipalities that have adopted a local Community Preservation Act to design, acquire land for, and construct paths. The City of Boston has adopted the CPA and created a Community Preservation Fund.

Chapter 90 Program

Chapter 90 entitles cities and towns to receive reimbursements on capital improvement projects such as highway construction, preservation, and improvement projects, including bikeways, sidewalks, footbridges, traffic controls and related facilities, right of way acquisition, project associated tree planting/landscaping, and construction.

Municipal Vulnerability Preparedeness (MVP)

The MVP grant program provides support for cities and towns in Massachusetts to begin the process of planning and climate change resiliency and implementing priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resiliency plans. Communities who complete the MVP program become certified as an MVP community and are eligible for MVP Action Grant funding and other opportunities.

Brownfields Redevelopment Fund

The Brownfields Redevelopment Fund was created in 1998 to help transform vacant, abandoned, or underutilized industrial and commercial properties throughout Massachusetts where development is hampered by real or perceived environmental contamination. .

NEXT STEPS

The FoMEWG has already begun seeking opportunities to continue the work of realizing the Winthrop Greenway Extension by submitting a MassTrails grant application in February 2021. The grant application requests funding for site survey and preliminary design for the section starting at the western end of the DCR owned Belle Isle Marsh Reservation property and continuing east to the Winthrop owned Belle Isle Marsh Marine Ecology Park. The following bullets suggest additional next steps that would gather information and maintain momentum.

[7] https://www.mass.gov/guides/masstrails-grants

- Continue coordination with the MBTA. This could take the form of regular check-in meetings with the Real Estate group. The Real Estate group is a good point of contact and can coordinate other connections within the MBTA as needed. MBTA representatives can be invited to future Winthrop Greenway Extension meetings and events.
- Send a community-supported letter to the MBTA to request inclusion of the Winthrop Greenway Extension in any design or future land use planning work associated with the parking lot as a record for when funding becomes available.
- Coordinate with the MBTA to identify data on pre-COVID parking occupancy in the MBTA parking lot.
- Conduct a survey to gather more information about travel behavior to Orient Heights, such as the typical distance that people who use the parking lot drive, use of carpooling or rideshares, and specific barriers to reaching the station.
- Continue community and abutter outreach and engagement along the route and broader communities.
- Continue coordination with agency, city department, elected official, and community partners.
- Conduct a parking occupancy study on Bayswater Street.
- Conduct a traffic study on Saratoga Street at potential crossing locations to determine signal warrants and interactions with driveways.
- Create an advisory group or reframe an existing Greenway Extensions Committee to include key stakeholders such as impacted property owners, community representatives from East Boston and Winthrop, and a youth representative.
- Identify appropriate funding sources for different tasks and project phases.

Saratoga Street Bridge and Winthrop

9

CASE STUDIES

West Ashley Greenway and Bikeway

Somerville Community Path

This section includes two examples of greenway projects that have similarities to the Winthrop Greenway Extension. These examples provide insight as to how these projects were developed and funded, what partners were involved, and how these projects addressed similar challenges to realize a greenway vision.

SOMERVILLE COMMUNITY PATH (Somerville, MA)

- **Location:** Somerville, MA
- **Proponent:** City of Somerville
- **Partners:** Somerville Department of Transportation, Somerville Department of Public Works, Somerville Parks and Recreation Department, MassDOT
- **Cost:** $1.1M for bicycle and pedestrian pathway and one at-grade greenway crossings
- **Length:** 0.33 mile multimodal pathway
- **Funding:** MassDOT Transportation Improvement Program – design and construction

The Community Path is a continuously expanding public open space asset in Somerville, Massachusetts. Early efforts by the Friends of the Somerville Community Path group, the City, and collaborations with Cambridge laid the groundwork for a continuous off-road multi-use path that currently connects the Minuteman Bike Trail to the Lowell Street Bridge. This phase of the project is the critical link between the completed path and the future path alignment along the active rail right of way.

The Community Path Extension begins at former terminus of the path, crosses the intersection with Cedar Street and continues .33 miles along an abandoned rail bed, under the Lowell Street Bridge and up to street level via ramp / stairs past a new interim terminus that eagerly awaits the next phase via the Green Line Extension (GLX).

While the initial mandate from Massachusetts Department of Transportation (MassDOT) was a fairly simple 12' wide asphalt path along a former rail bed, the City of Somerville wanted more. They required a robust public engagement process that would ultimately inform the design outcomes. Not only is this stretch of right of way a critical link to future connections into Boston, but it also functionally divides residential neighborhoods through the derelict site conditions of the abandoned rail bed and severe grade changes in some areas. The new path provides several connections into these abutting neighborhoods and bridges the gap created long ago by the rail.

The vertical profile of the proposed trail became a focus of the grading design. In addition to ensuring positive drainage and optimal stormwater infiltration, the finished grade of the path negotiates bridge clearances below Lowell Street while elevating the interim terminus as much as possible to ease future extension efforts along the GLX corridor.

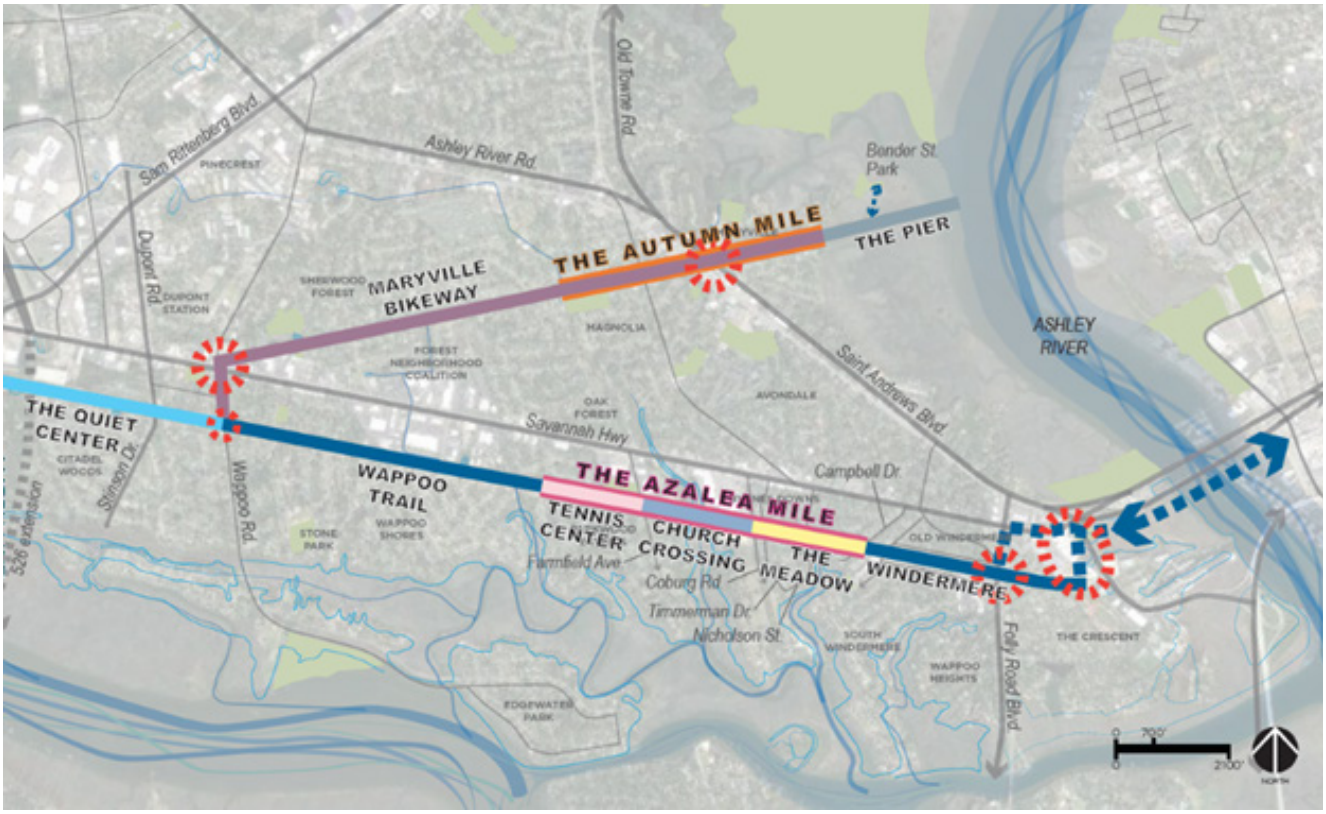
There was significant encroachment along the right of way by abutting residences and businesses alike. This property had sat unused and derelict so long it was no wonder people started to appropriate it as their own. Through a series of designer led public workshops and "kitchen table" meetings with abutters, the project moved forward without protest.

WEST ASHLEY GREENWAY AND BIKEWAY (Charleston, SC)

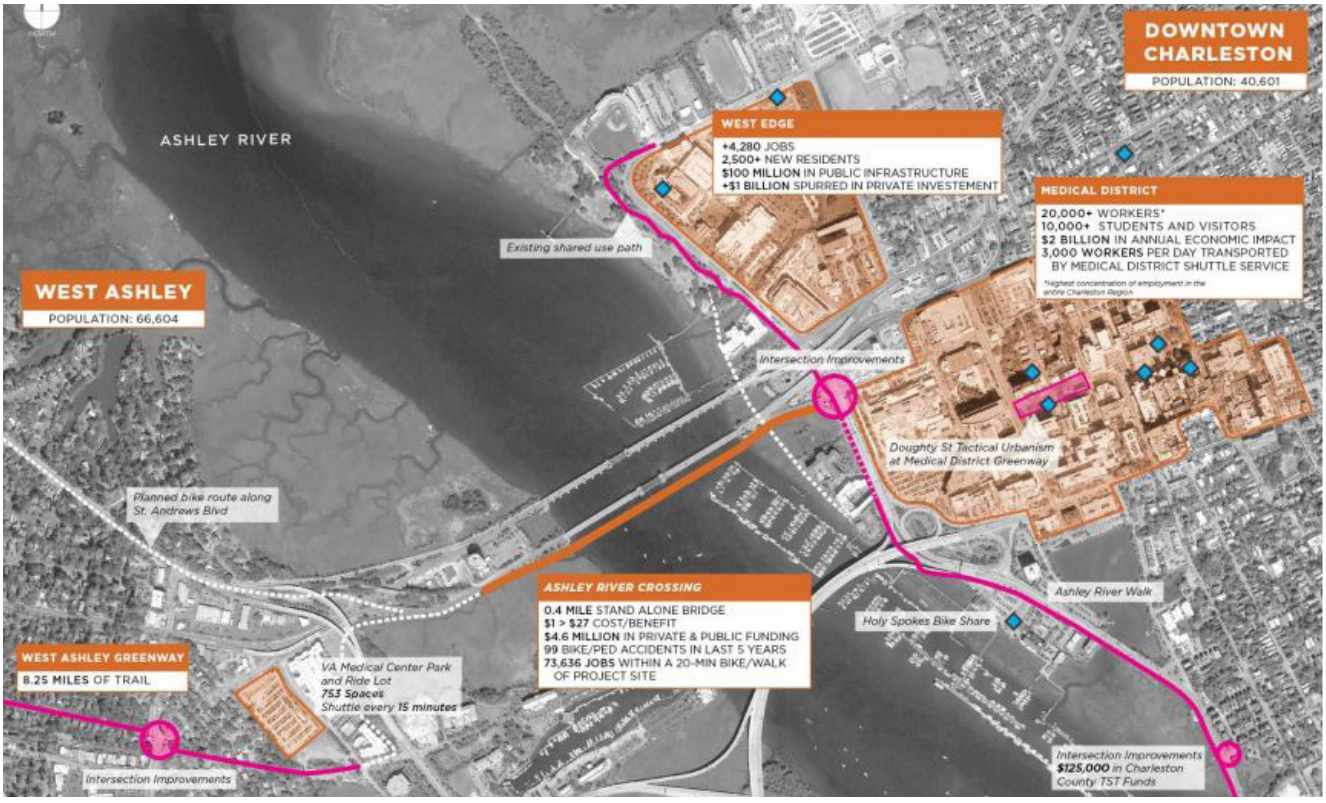
- **Location:** West Ashley neighborhood of Charleston; across Ashley River
- **Proponent:** City of Charleston
- **Partners:** Charleston Parks Conservancy, Charleston Water Department, South Carolina Department of Transportation (SCDOT), Charleston County, Army Corps of Engineers
- **Cost:** $22.7M for bicycle and pedestrian bridge and three at-grade greenway crossings; variable costs for widening of existing greenway
- **Length:** 0.4-mile bridge; 10.5-mile existing greenway
- **Funding:** Better Utilizing Investments to Leverage Development (BUILD) federal grant program – design and construction

The West Ashley Greenway and Bikeway is an existing greenway that makes up part of the East Coast Greenway (ECG). The greenway serves Charleston's historically African American neighborhoods of West Ashley and Maryville, which are separated from downtown Charleston by the Ashley River. Completing the missing bicycle and pedestrian link between West Ashley and Downtown Charleston has been a goal of planning efforts over multiple decades and is finally coming to fruition with the City of Charleston's award of a U.S. Department of Transportation Better Utilizing Investments to Leverage Development (BUILD) grant. Though the City had unsuccessfully applied for a BUILD grant several times, two major efforts converged to create a successful grant application in 2019:

- The West Ashley Greenway and Bikeway Master Plan (Master Plan) was completed in 2018, with the Charleston Parks Conservancy as the proponent of the plan. Parts of the existing greenway are narrow (8' wide) and unpaved and are proposed to be widened and paved over time. This plan also included redesigns of three at-grade intersections to create safer crossing opportunities for greenway users. Key to the success of the Master Plan was the development of a joint maintenance agreement between the Charleston Water System, which owns the right-of-way and needs to access it for utility maintenance, the Charleston Parks Conservancy, which manages the greenway amenities and furnishing, and the City of Charleston, which is responsible for repairing the greenway after utility work. In addition, traffic analysis completed for the intersection redesigns convinced SCDOT to support the intersection redesigns.
- The Ashley River Crossing was developed as a standalone project. However, the city had previously unsuccessfully applied for a BUILD grant, receiving feedback that the application needed to demonstrate the broader connectivity benefits of the project. The City of Charleston included the three at-grade intersection redesigns from the Master Plan in its FY 19 application, at last securing an $18.1 million BUILD grant for the bridge and the intersections. Support from Charleston County, which pledged $3M in local match dollars from the half-cent sales tax revenue that it controls, was critical to the success of the application.



SOURCE: West Ashley Greenway and Bikeway Master Plan



SOURCE: http://www.designdivision.org/ashley-river-crossing

APPENDICES

APPENDIX A

MBTA GREENWAY STUDY

January 25, 2019

Mr. Chris Marchi
East Boston Greenway Coalition
cbmarchi@gmail.com

Dear Mr. Marchi,

Thank you for letter regarding your group's interest in extending the East Boston Greenway from Orient Heights Beach to Orient Heights Station.

The MBTA has investigated the potential to follow an alignment under the Saratoga Street Bridge. While our results are preliminary (please see attached) the report's findings support that your proposal appears physically and operationally feasible. The right of way required seems to be in the control of the MBTA with perhaps some rights held by Massport and/or DCR to be clarified.

While the MBTA has no funds currently set aside for such a project, we have developed a preliminary project development cost of $1 million. We hope that this estimate can facilitate your fundraising efforts.

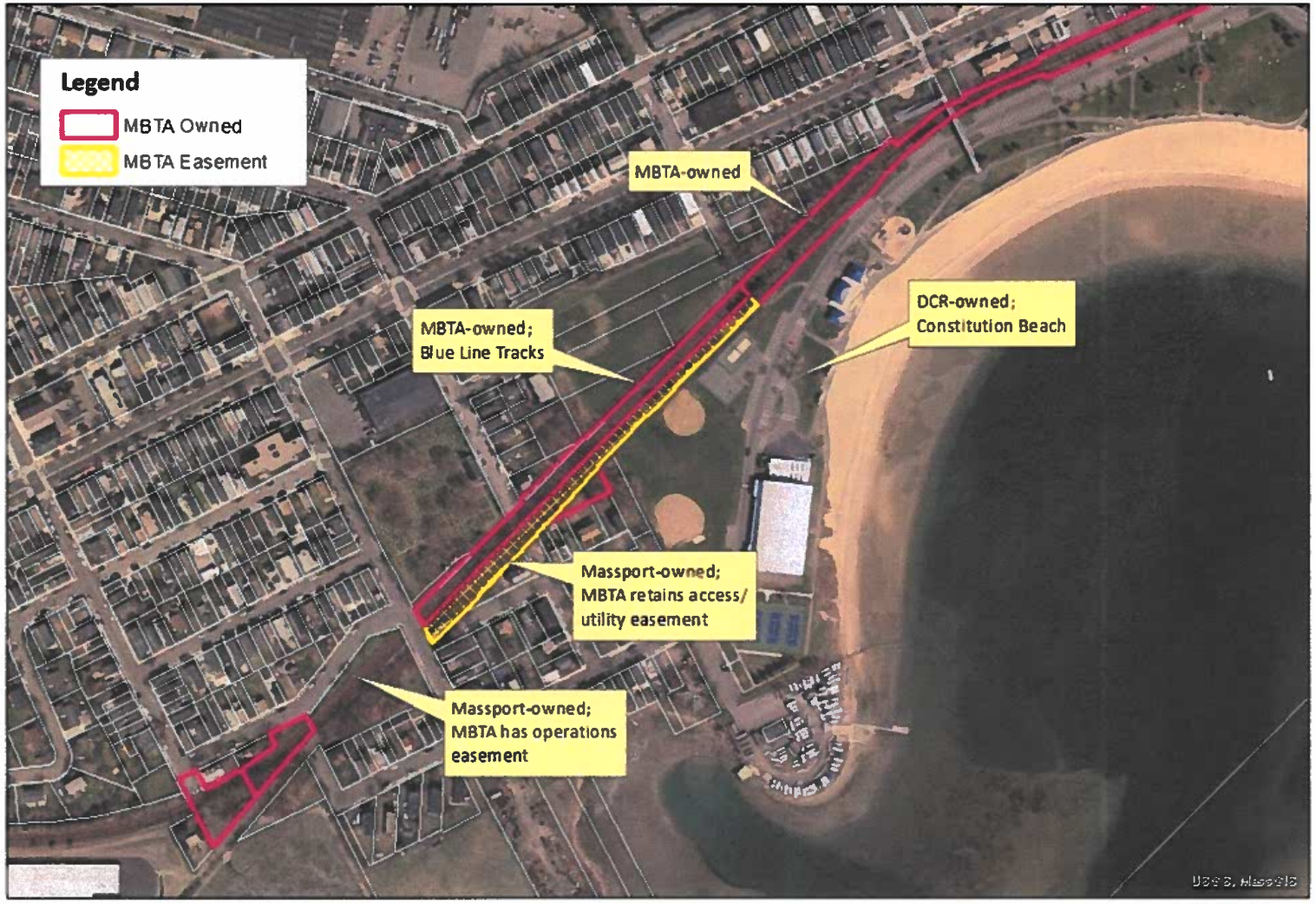
If you have any follow-up questions please contact me at jgonneville@mbta.com.

Sincerely,

Jeffrey D. Gonneville
Deputy General Manager

CC: Joseph Aiello, Chair-FMCB
Steve Poftak, General Manager
David Abdoo, MBTA Chief of Staff
Paula Fallon, MBTA Operations

Massachusetts Bay Transportation Authority
Ten Park Plaza, Boston, MA 02116
www.mbta.com



Constitution Beach Greenway
East Boston, MA

AECOM Imagine it. Delivered.

AECOM
250 Apollo Drive
Chelmsford, MA 01824
aecom.com

Project name:
Z91PS22 – TO#2
Short Duration Tasks

Project ref: 60587518

To:
James Caroselli, PE
Project Manager
MBTA - Capital Delivery

From:
Kathy Schaeffer, PE

Date:
December 18, 2018

CC:
Jay Doyle, AICP, AECOM

Memo

Subject: **Feasibility Study – Bike Path Extension**
Constitution Beach to Orient Heights Station

Introduction

AECOM was tasked to perform a preliminary feasibility study of a new bike path from Constitution Beach to Orient Heights Station along the existing Blue Line right-of-way. The bike path would be an extension of the East Boston Greenway Connector, which currently ends at Constitution Beach.

This memorandum provides a summary of the existing site conditions, the constraints and suggested next step.

Existing Conditions

The existing East Boston Greenway Connector is located on the south/east side of the Blue Line tracks, between Wood Island Station and Constitution Beach. The path currently terminates on the north side of the Constitution Beach parking lot, across from the Constitution Beach Playground.

The proposed bike path extension would be situated between the Blue Line tracks and the beach parking area. Figure 1 shows an aerial image taken from MassGIS that shows the proposed location of the bike path with approximate property lines superimposed. This feasibility analysis used this information along with the Existing Conditions Plan from the Orient Heights – Blue Line Modernization Project (August, 2011) and the Saratoga Street Bridge Inspection Report dated March 8, 2017 as data to prepare this report.

Figure 2 identifies the Flood Hazard Area and Figure 3 identifies the Resource Areas for the project area.

The width of the MBTA right-of-way varies from approximately 25' to 67'. The widest section of MBTA ROW is located in the vicinity of the existing East Boston Greenway Connector Path. Moving north, the ROW narrows near the existing pedestrian bridge from Bennington Street to the beach; and as you continue north to the Saratoga Street Bridge, the ROW widens to approximately sixty feet.

There is an existing fence located between the Blue Line tracks and the parking area. The fence is located approximately 10 feet from the center of the southern/eastern track (see photos below).

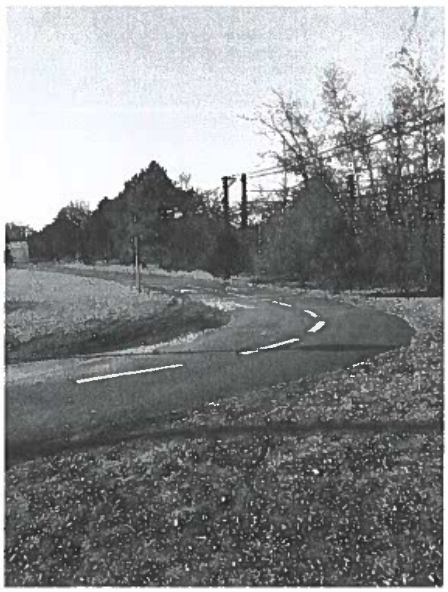


Photo 1 – End of Existing East Boston Greenway Connector Path

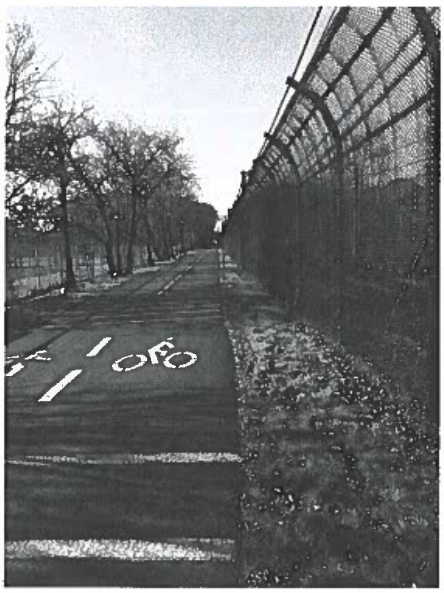


Photo 2 - Existing East Boston Greenway Connector Path and the Blue Line track (looking south)

Photo 3 - Edge of Existing East Boston Greenway Connector Path and the Blue Line track (looking north)

Photo 4 - View looking North along the MBTA Right-of-Way

Photo 5 – View looking North along the MBTA Right-of-Way (near pedestrian bridge)

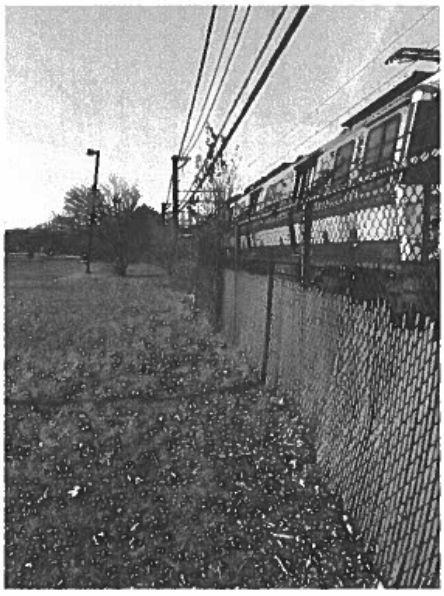


Photo 6 - View looking South along the MBTA Right-of-Way

Photo 7 - View looking North along the MBTA Right-of-Way

Photo 8 - View looking North along the MBTA Right-of-Way (near residential lots)

Photo 9 – View looking North along the MBTA Right-of-Way toward Saratoga Street Bridge

Photo 10 – View looking North through Span 3 of the Saratoga Street Bridge

Photo 11 – View looking South through Span 3 of the Saratoga Street Bridge (photo taken from Bridge Inspection Report, dated March 8, 2017)

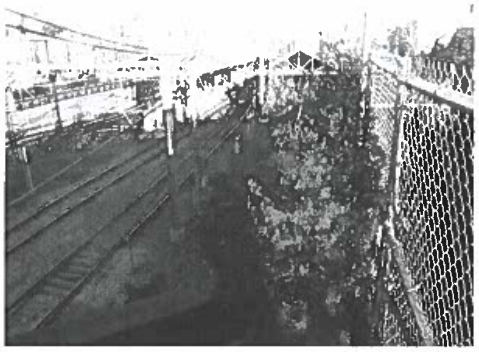


Photo 12 – Looking North towards Orient Heights Station from the Saratoga Street Bridge.

The Blue Line tracks go under the Saratoga Street Bridge. The bridge is a 3-span concrete box beam structure. According to the Bridge Inspection Report, the bridge was reconstructed in 1995.

Summary of Analysis

Alignment

A conceptual layout of a 12-foot wide bike path is shown on Figures 4 and 5. Cross sections at key locations are shown in Figure 6. The proposed bike path would be approximately 2,000 feet long.

In the area where the MBTA property abuts DCR property, the proposed bike path would be located on the south/east side of the existing fence. The proposed path would be located on both MBTA-owned and DCR-owned land. The proposed alignment is in an area with few physical constraints. At the existing pedestrian

bridge, the path would be located between the existing fence and the bridge pier. The exact location of the bridge pier is required to determine if there is sufficient width for a 12-foot wide path.

In the area where the MBTA property abuts private property, the right-of-way appears to be approximately sixty feet wide. The tracks appear to be centered within the right-of-way, which results in the centerline of the eastern track being located twenty three-feet from the right-of-way line. The 2005 Massachusetts Bay Transportation Authority Track Maintenance and Safety Standards for Blue, Orange and Red Lines, indicates that the preferred minimum horizontal clearance from the centerline of track, on a tangent section of track, is 8'-6". If the edge of the proposed path is located approximately 9.5 feet from the centerline of track, the twelve foot wide path would fit within the existing Right-of-Way. (See Section C-C). Within the MBTA Right-of-Way adjacent to the private properties, there are signal poles and catenary poles. (See photo 9). The exact locations of these elements would need to be determined in order to evaluate the impacts to the items, if a bike path were constructed.

The Saratoga Street Bridge is a 3-span concrete box beam structure. The opening of the third (east) span of the bridge is approximately thirteen feet, which is wide enough to accommodate a twelve-foot wide path.

Once the path exits the bridge, the path would turn east towards the sidewalk at the Orient Heights Station Outbound Platform entrance. It appears that the path could be sloped at a grade of less than 5% in order to meet Accessibility Guidelines. A ramp structure would most likely not be required. A detailed topographic survey would be required to confirm the preliminary analysis.

Permitting

Portions of both the MBTA ROW and DCR property are located within the 100-year Flood Hazard Area (see Figure 5). Figure 6 identifies other constraints with in the project area, based on GIS Mapping. A portion of the project area is subject to Chapter 91 Jurisdiction. The DCR-owned land is identified as Protected Open Space.

A Notice of Intent will need to be filed with the City of Boston Conservation Commission for work within the 100-year flood zone and for the areas subject to Chapter 91 Jurisdiction. Since the flood zone is a result of Land Subject to Coastal Storm Flowage, mitigation for compensatory storage is not required.

Since portions of the path will need to be constructed on land identified as Protected Open Space, additional research will be required to determine if the land is, or is not, protected under Article 97 of the Massachusetts Constitution. If the land is protected by Article 97, permitting coordination will be needed.

If the MBTA were to acquire ROW in fee from DCR, a MEPA review would be required.

If federal funding is associated with the project, a NEPA screening and identification of other potential federal permits will be necessary.

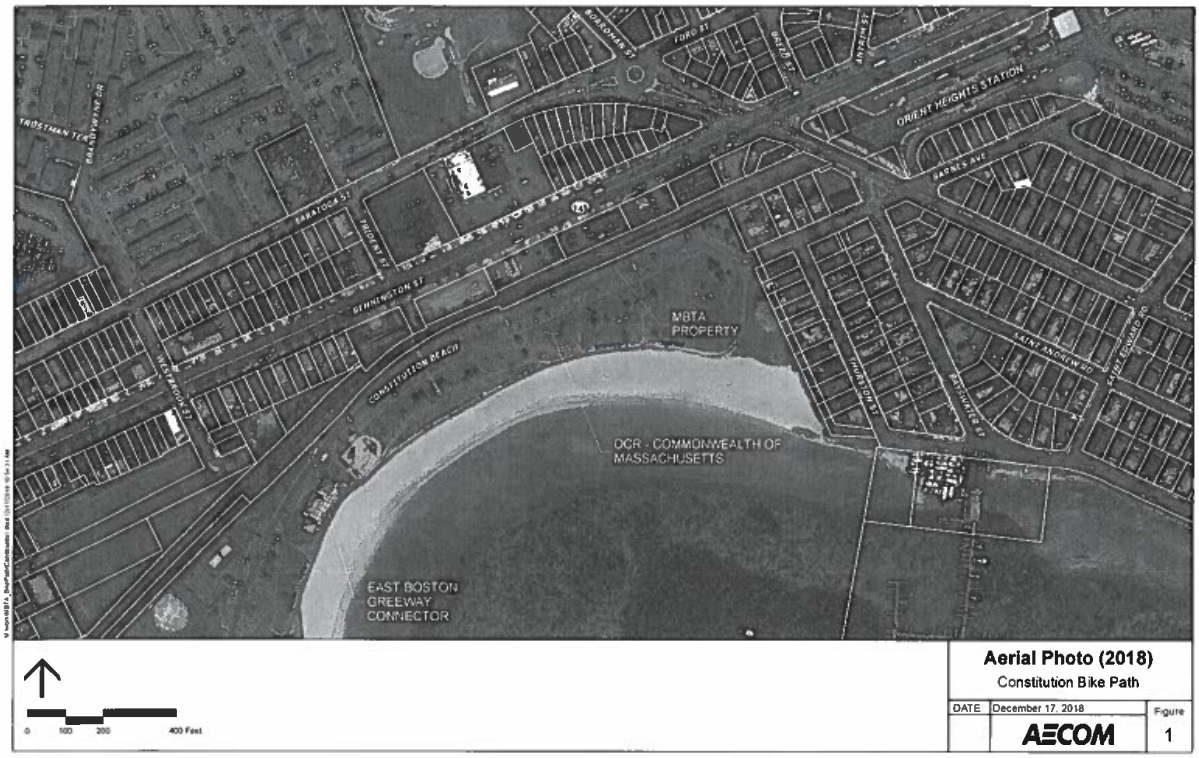
Conceptual Construction Cost

Based on recent experience with similar projects, the cost per liner foot for construction of a 12-foot wide path is approximately $360 per linear foot, which results in a cost of $720,000. This cost does not include land acquisition,

Next Steps

Additional research is required to determine if any of the project area is, or is not, protected under Article 97 of the Massachusetts Constitution.

Property line and topographic survey is also required to confirm the location if the track in relation to the property line and to identify if any of the signal poles, catenary poles or other items, within the MBTA right-of-way, would need to be relocated to accommodate the bike path. A survey is also required to confirm the location of the pier for the pedestrian bridge from Bennington Street to the beach.



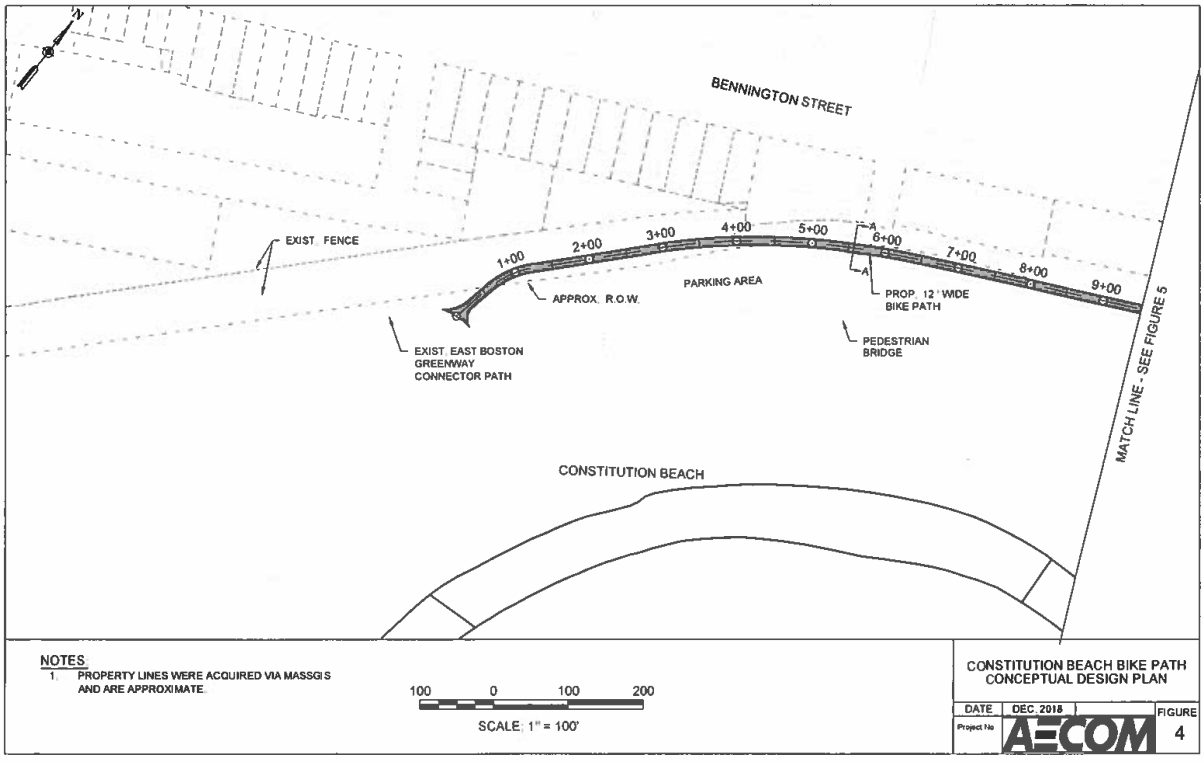
Aerial Photo (2018)
Constitution Bike Path

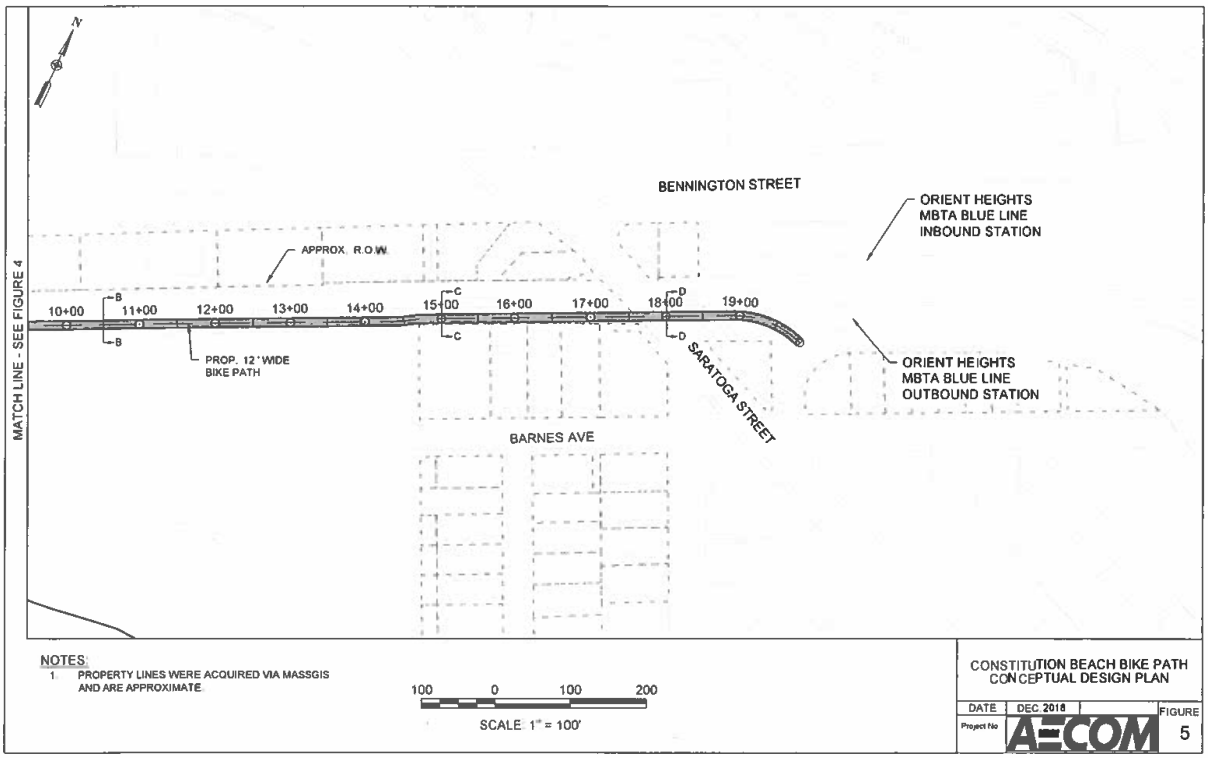
DATE	December 17, 2018	Figure
	AECOM	1

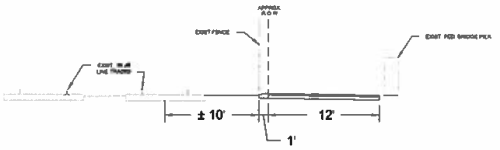
Resource Areas
Constitution Bike Path

DATE	December 17, 2018	Figure
	AECOM	2

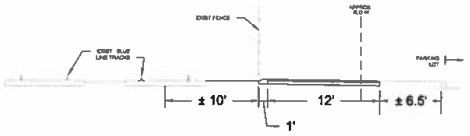

BFE: 12FT
BFE: 11FT
BFE: 9FT
BFE: 10FT
BFE: 10FT
BFE: 10FT
100-Year Flood Hazard Area
0 100 200 400 Feet
Flood Hazard Areas
Constitution Bike Path
DATE December 17, 2018
AECOM
Figure 3


BENNINGTON STREET
EXIST. FENCE
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
APPROX. R.O.W.
PARKING AREA
PROP. 12' WIDE BIKE PATH
EXIST. EAST BOSTON GREENWAY CONNECTOR PATH
PEDESTRIAN BRIDGE
CONSTITUTION BEACH
MATCH LINE - SEE FIGURE 5
NOTES
1. PROPERTY LINES WERE ACQUIRED VIA MASSGIS AND ARE APPROXIMATE.
100 0 100 200
SCALE: 1" = 100'
CONSTITUTION BEACH BIKE PATH
CONCEPTUAL DESIGN PLAN
DATE DEC. 2018
Project No
AECOM
FIGURE 4

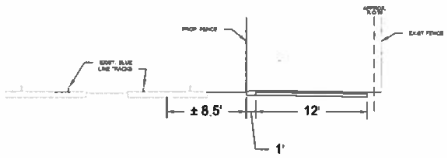




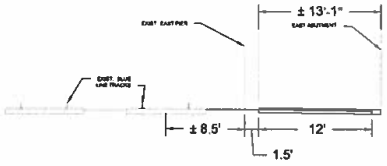
SECTION A-A (AT PEDESTRIAN BRIDGE)
STA 5+60



SECTION B-B (AT PARKING LOT)
STA 10+50



SECTION C-C (AT PRIVATE PROPERTIES)
STA 15+00



SECTION D-D (UNDER SAGAMORE ST BRIDGE)
STA 18+00

8 0 8 16
SCALE: 1" = 8'

CONSTITUTION BEACH BIKE PATH
TYPICAL SECTIONS
DATE DEC. 2018
Project No
AECOM
FIGURE
6

APPENDIX B

STAKEHOLDER CONTACTS

APPENDIX – PROPERTY OWNERS AND AGENCY STAKEHOLDERS

Date: March 25, 2021

The following table lists the property owners and relevant agency representatives who were engaged during the Feasibility Study.

Affiliation	Name	Role	Email
Boston Planning and Development Agency	Nick Schmidt	Senior Transportation Planner	nick.schmidt@boston.gov
Boston Transportation Department	Charlotte Fleetwood	Senior Planner	charlotte.fleetwood@boston.gov
Department of Conservation and Recreation	Stella Lensing	Trails and Greenways Planner	stella.lensing@mass.gov
Department of Conservation and Recreation	Dan Driscoll	Director of the Office of Recreational Facilities Planning	dan.driscoll@state.ma.gov
HYM Investment Group	Doug Manz	Director of Development	dmanz@hyminvestments.com
HYM Investment Group	Michael Barowsky	Vice President, Development	mbarowsky@hyminvestments.com
Massachusetts Department of Transportation / MassTrails Team	Michael Trepanier	Senior Project Manager	michael.trepanier@state.ma.gov
Massachusetts Water Resources Authority	Stephen Cullen	Director of Wastewater	stephen.cullen@mwra.com
Massport	Anthony Guerriero	Deputy Director for Federal Affairs and Community Relations	aguerriero@massport.com
MBTA	Roger Mann	Senior Director of Real Estate	rmann@mbta.com

MBTA	Scott Hamwey	Director, Bus Modernization Program	shamwey@mbta.com
MBTA	Bruno Lopes	Director of Parking and Station Access	blopes@mbta.com
Office of State Representative Adrian Madaro	Steven Gingras	Legislative Aide	steven.gingras@mahouse.gov
Town of Winthrop	Austin Faison	Town Manager	afaison@town.winthrop.ma.us
Belle Isle Terrace property boat yard		Owner/operator	Private

The following table lists representatives from community, interest, and advocacy groups who were engaged during the Feasibility Study.

Affiliation	Name	Role	Email
Mystic River Watershed Association	Amber Christoffersen	Greenways Director	Amber.christoffersen@mysticriver.org
LivableStreets Alliance	Ambar Johnson	Program Director	abmar@livablestreets.info
Bike Winthrop/ LivableStreets Alliance Board	Julia Wallerce	Founder / Vice Chair	julia@livablestreets.info
Bike Winthrop	Chris Aiello	Founder	Private
Winthrop Chamber of Commerce	Betsy Shane	Executive Director	betsy@winthropchamber.com
Harborkeepers	Magdalena Ayed	Founder & Executive Director	magdalena@harborkeepers.org
Friends of Belle Isle Marsh	Gail Miller	Board	friendsofbelleislemarsh@comcast.net
Friends of Mary Ellen Welch Greenway	Multiple		eastiegreenway@gmail.com
Orient Heights Neighborhood Council	Multiple		OrientheightsNC@gmail.com
Harbor View Neighborhood Council	Multiple		board@harborviewna.org

The following groups are listed as a resource to keep in mind for future meeting advertisements or survey outreach:

- Harbor Keepers
- Green Roots
- Eastie Farm
- Sailing Center
- YMCA
- East Boston Health Center
- East Boston Library
- Mothers Out Front
- Eastie Trees
- Eagle Hill Civic Association
- Eagle Hill Beautification Committee
- East Boston Open Discussion
- Trustees of Reservations
- Winthrop Citizens for Responsible Development
- Winthrop Open Discussion + many other just like it
- Winthrop Parent Group
- Winthrop Forward (google group)
- FKO (For Kids Only)
- Winthrop Parks and Rec
- PTOs for each school
- Winthrop Middle School
- Winthrop High School
- Arthur T Cummings School
- Gorman Fort Banks School

C

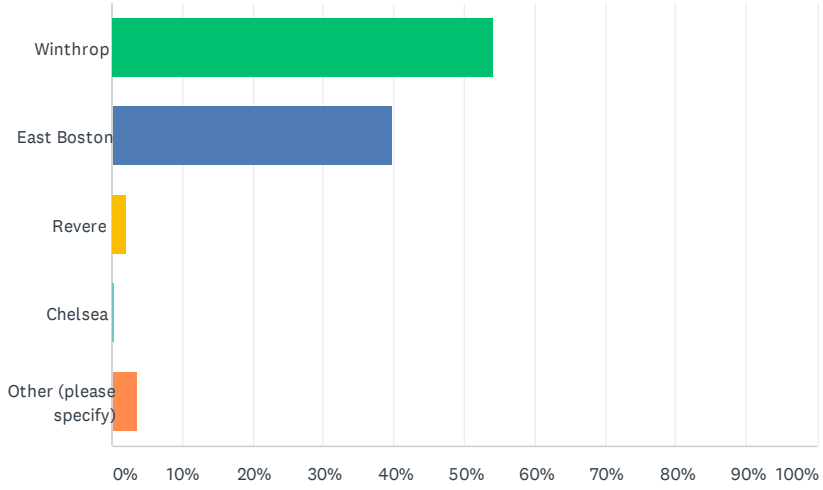
APPENDIX C

Survey 1 & 2 Data Exports

SURVEY NO. 1

Q1 Where are you a resident?

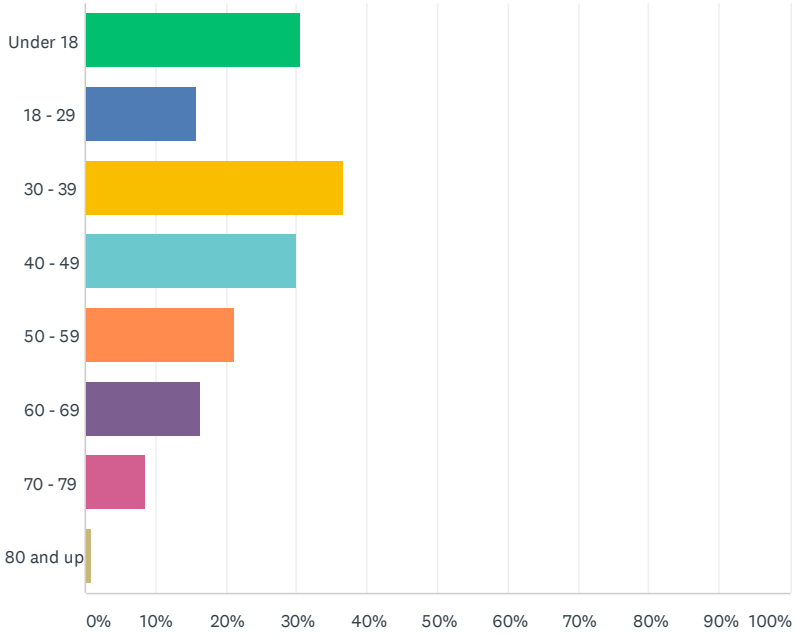
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Winthrop	54.09%	238
East Boston	39.77%	175
Revere	2.05%	9
Chelsea	0.45%	2
Other (please specify)	3.64%	16
TOTAL		440

Q2 What age groups are represented in your household?

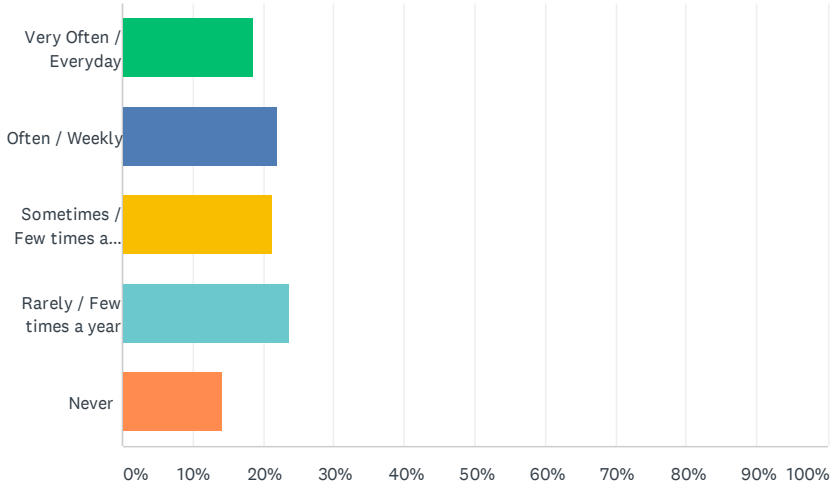
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Under 18	30.45%	134
18 - 29	15.68%	69
30 - 39	36.59%	161
40 - 49	30.00%	132
50 - 59	21.14%	93
60 - 69	16.36%	72
70 - 79	8.64%	38
80 and up	0.91%	4
Total Respondents: 440		

Q3 How often do you go to the Mary Ellen Welch Greenway?

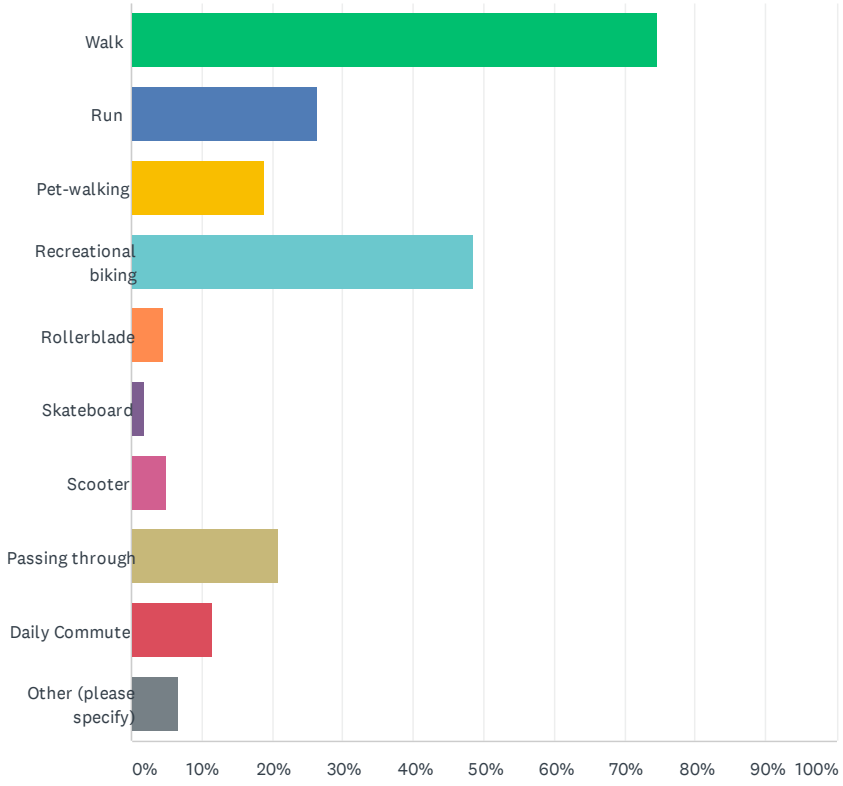
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very Often / Everyday	18.64%	82
Often / Weekly	22.05%	97
Sometimes / Few times a month	21.36%	94
Rarely / Few times a year	23.64%	104
Never	14.32%	63
TOTAL		440

Q4 How do you most often use the Greenway? (Check all that apply)

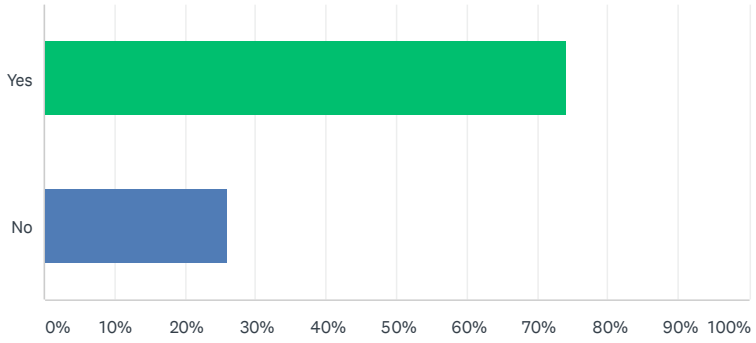
Answered: 391 Skipped: 49



ANSWER CHOICES	RESPONSES	
Walk	74.68%	292
Run	26.34%	103
Pet-walking	18.93%	74
Recreational biking	48.59%	190
Rollerblade	4.60%	18
Skateboard	1.79%	7
Scooter	5.12%	20
Passing through	20.97%	82
Daily Commute	11.51%	45
Other (please specify)	6.65%	26
Total Respondents: 391		

Q5 Have you traveled on foot or by bike between Orient Heights and Winthrop?

Answered: 440 Skipped: 0



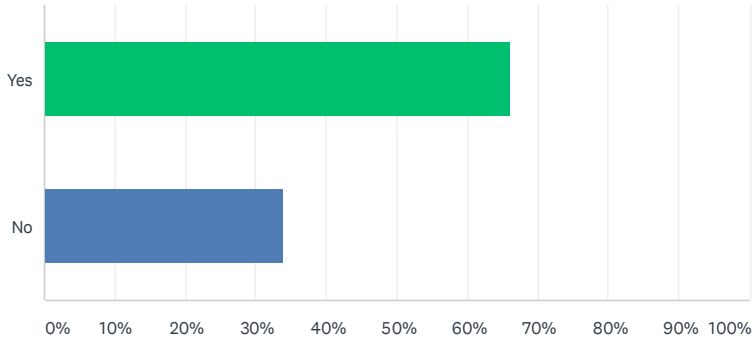
ANSWER CHOICES	RESPONSES	
Yes	74.09%	326
No	25.91%	114
TOTAL		440

Q6 If "Yes" to Question #5, is there anything you'd like to share about your route or experience?

Answered: 190 Skipped: 250

Q7 Do you currently walk, run, or bike along Saratoga Street in East Boston or Main Street in Winthrop? (See image below)

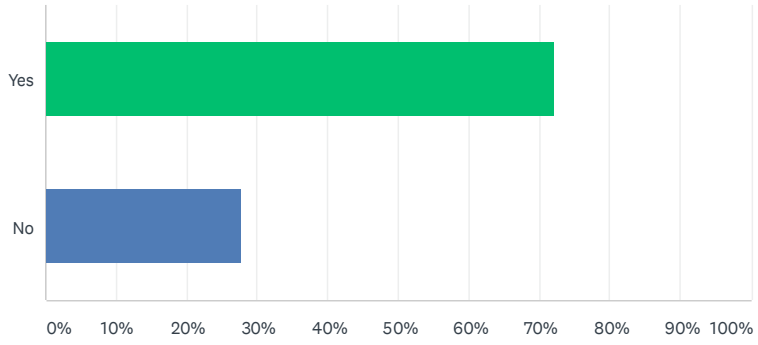
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	66.14%	291
No	33.86%	149
TOTAL		440

Q8 Have you used the existing portion of the Mary Ellen Welch Greenway that starts/ends at Constitution Beach? (See images below)

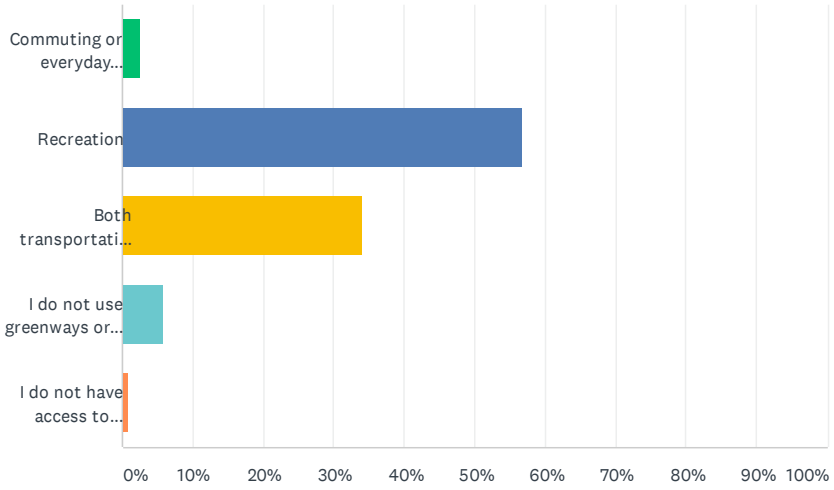
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	72.27%	318
No	27.73%	122
TOTAL		440

Q9 How do you typically use greenways or other public urban trail systems?

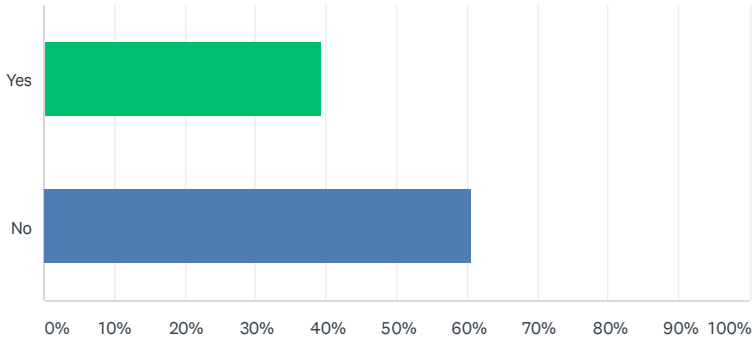
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Commuting or everyday transportation	2.50%	11
Recreation	56.59%	249
Both transportation and recreation	34.09%	150
I do not use greenways or other public urban trail systems	5.91%	26
I do not have access to greenways	0.91%	4
TOTAL		440

Q10 Do you travel with kids along greenways or other public urban trail systems?

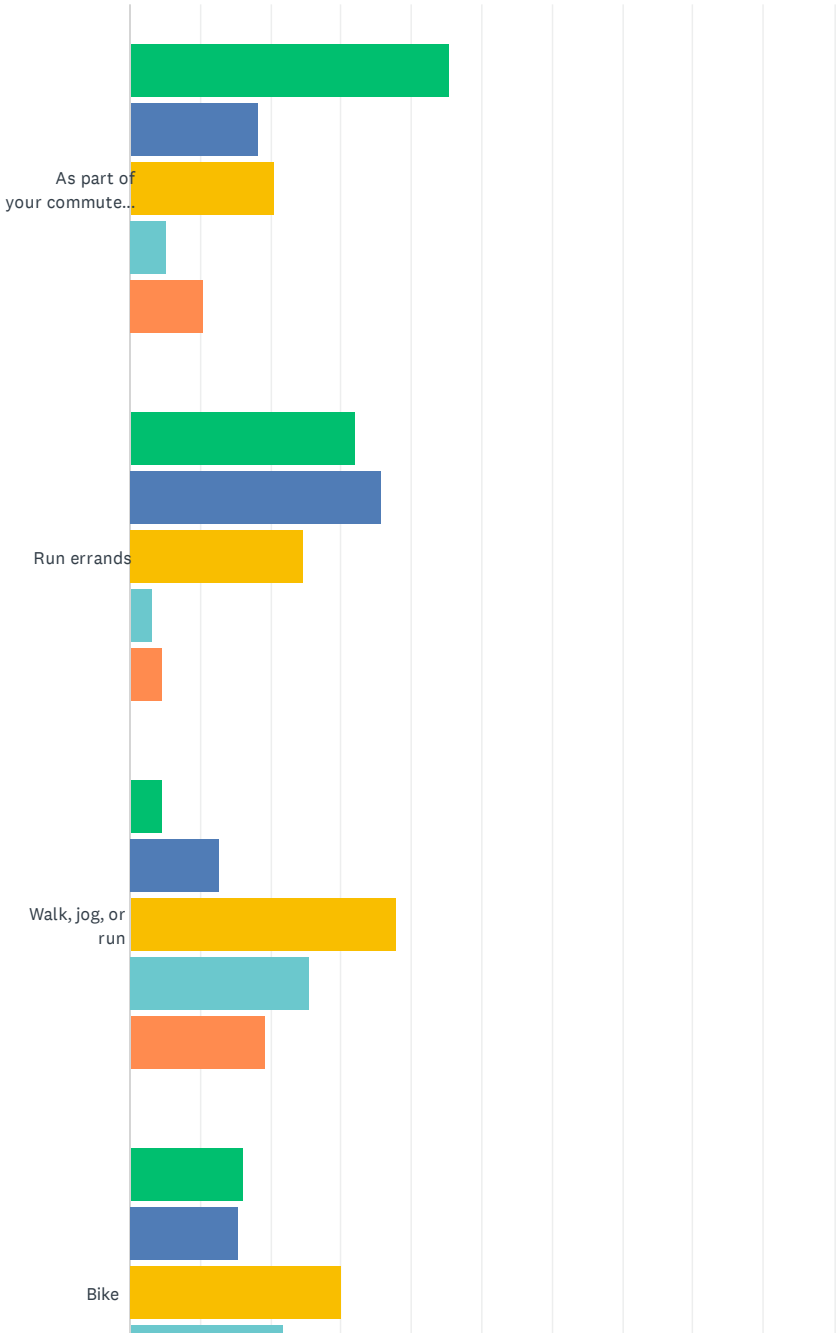
Answered: 440 Skipped: 0

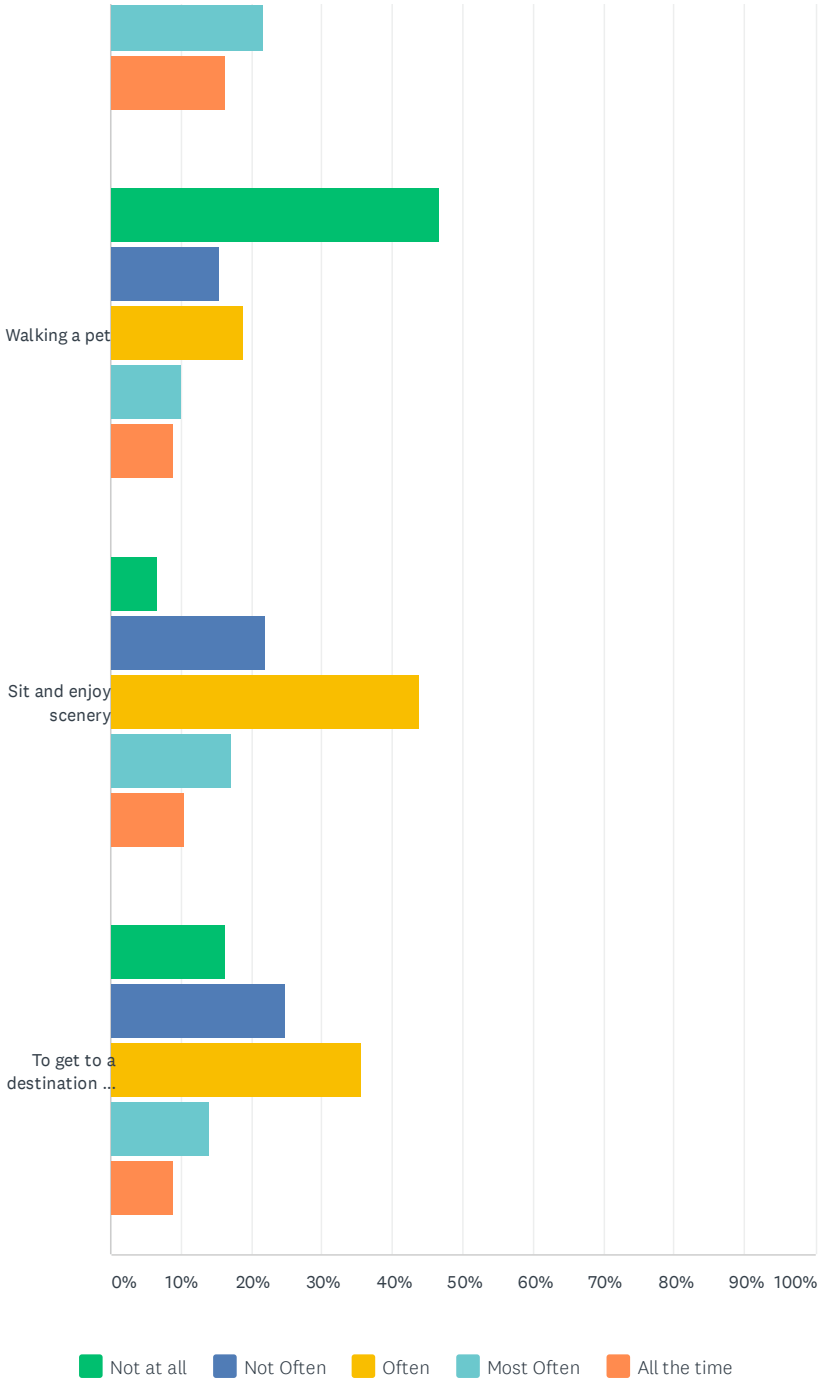


ANSWER CHOICES	RESPONSES	
Yes	39.32%	173
No	60.68%	267
TOTAL		440

Q11 If the Greenway extended to Winthrop, how would you most commonly use it?

Answered: 440 Skipped: 0

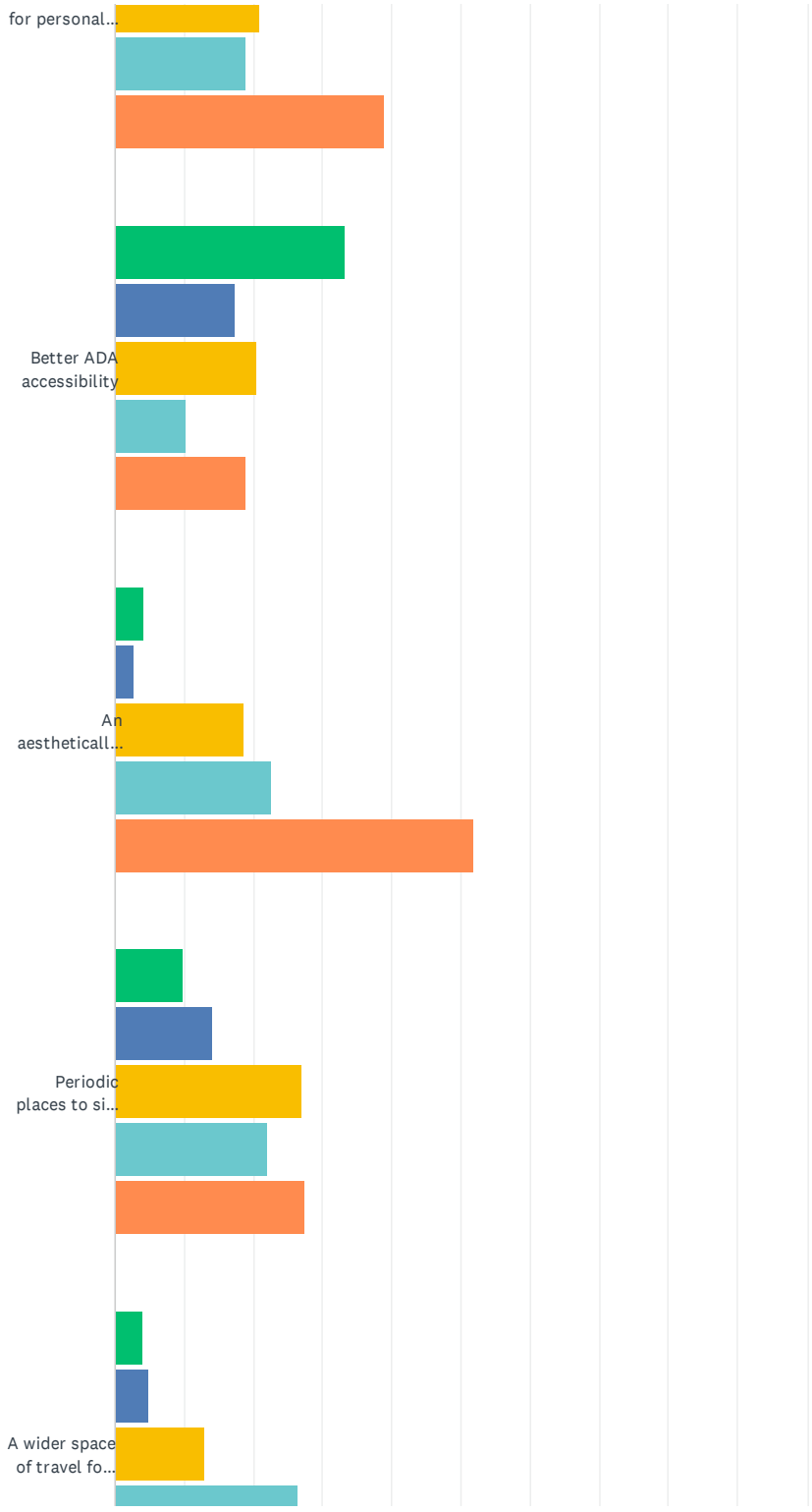


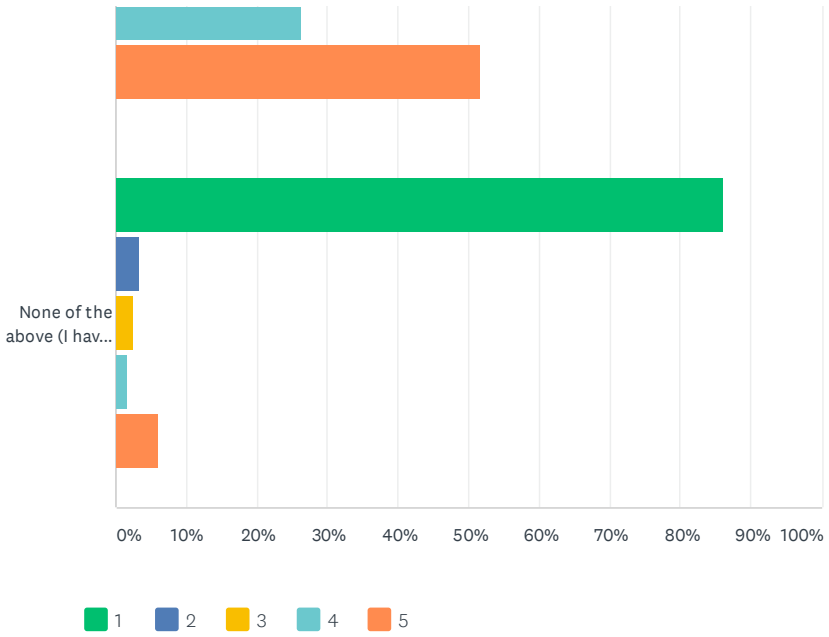

Walking a pet
Sit and enjoy scenery
To get to a destination ...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Not at all
Not Often
Often
Most Often
All the time

	NOT AT ALL	NOT OFTEN	OFTEN	MOST OFTEN	ALL THE TIME	TOTAL	WEIGHTED AVERAGE
As part of your commute to work	45.36% 181	18.30% 73	20.55% 82	5.26% 21	10.53% 42	399	2.17
Run errands	31.98% 126	35.79% 141	24.62% 97	3.05% 12	4.57% 18	394	2.12
Walk, jog, or run	4.64% 20	12.76% 55	37.82% 163	25.52% 110	19.26% 83	431	3.42
Bike	16.15% 68	15.44% 65	30.17% 127	21.85% 92	16.39% 69	421	3.07
Walking a pet	46.72% 178	15.49% 59	18.90% 72	9.97% 38	8.92% 34	381	2.19
Sit and enjoy scenery	6.75% 28	21.93% 91	43.86% 182	17.11% 71	10.36% 43	415	3.02
To get to a destination in Orient Heights (Other than the T) or Winthrop	16.34% 66	25.00% 101	35.64% 144	14.11% 57	8.91% 36	404	2.74

Q12 Which of the following would increase your likelihood of biking and walking between Winthrop and Orient Heights? Please rate your answer. (1 = lowest and 5 = highest)

Answered: 440 Skipped: 0

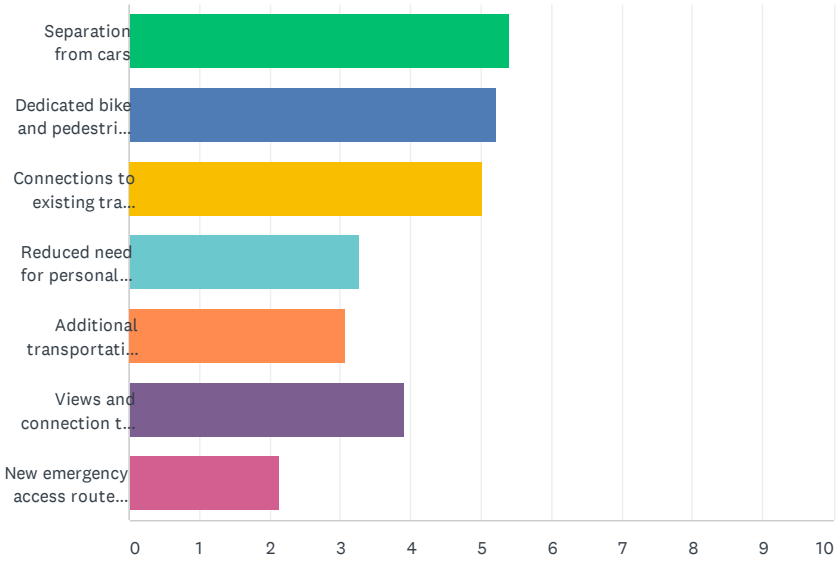

for personal...
Better ADA accessibility
An aestheticall...
Periodic places to si...
A wider space of travel fo...



	1	2	3	4	5	TOTAL
Separation from cars	4.38% 19	2.30% 10	8.06% 35	16.59% 72	68.66% 298	434
Dedicated bike and pedestrian paths	4.17% 18	2.78% 12	9.03% 39	18.98% 82	65.05% 281	432
Connections to existing trail systems, parks, and beaches	3.45% 15	1.84% 8	10.11% 44	20.00% 87	64.60% 281	435
Reduced need for personal vehicle use	9.98% 42	11.40% 48	20.90% 88	18.76% 79	38.95% 164	421
Better ADA accessibility	33.33% 137	17.27% 71	20.44% 84	10.22% 42	18.73% 77	411
An aesthetically pleasing route	4.17% 18	2.78% 12	18.52% 80	22.69% 98	51.85% 224	432
Periodic places to sit or rest along route	9.91% 42	13.92% 59	26.89% 114	21.93% 93	27.36% 116	424
A wider space of travel for walking and biking	3.96% 17	4.90% 21	13.05% 56	26.34% 113	51.75% 222	429
None of the above (I have no interest in walking or biking between Winthrop and Orient Heights)	86.27% 201	3.43% 8	2.58% 6	1.72% 4	6.01% 14	233

Q13 What is important to you about a greenway extension to Winthrop? Please rank your answer.

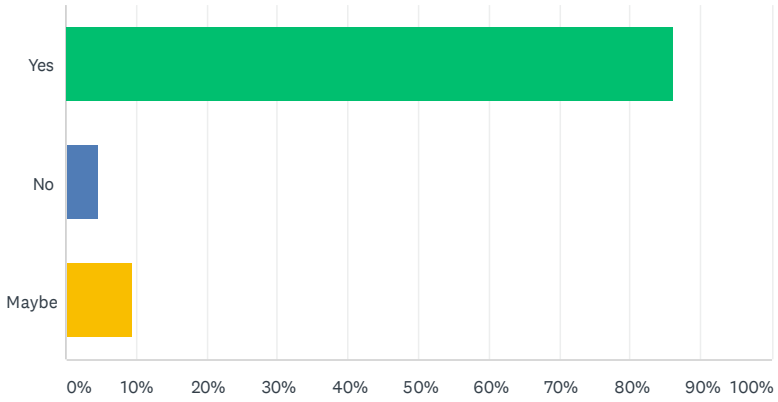
Answered: 440 Skipped: 0



	1	2	3	4	5	6	7	TOTAL	SCORE
Separation from cars	40.23% 177	20.68% 91	10.68% 47	10.45% 46	7.50% 33	5.23% 23	5.23% 23	440	5.39
Dedicated bike and pedestrian paths	22.73% 100	31.59% 139	19.09% 84	10.91% 48	5.23% 23	6.36% 28	4.09% 18	440	5.20
Connections to existing trail systems, parks, and beaches	19.55% 86	21.14% 93	28.86% 127	15.45% 68	6.14% 27	5.45% 24	3.41% 15	440	5.03
Reduced need for personal vehicle use	2.95% 13	5.91% 26	10.45% 46	20.91% 92	28.18% 124	18.64% 82	12.95% 57	440	3.27
Additional transportation choice	1.59% 7	5.23% 23	7.95% 35	17.05% 75	31.59% 139	25.00% 110	11.59% 51	440	3.07
Views and connection to nature	7.50% 33	13.18% 58	18.18% 80	20.23% 89	12.05% 53	23.18% 102	5.68% 25	440	3.92
New emergency access route during severe weather/flooding	5.45% 24	2.27% 10	4.77% 21	5.00% 22	9.32% 41	16.14% 71	57.05% 251	440	2.13

Q14 Would a safe and pleasant pedestrian or bike route between Winthrop and Orient Heights increase your likelihood of travelling by foot or bike?

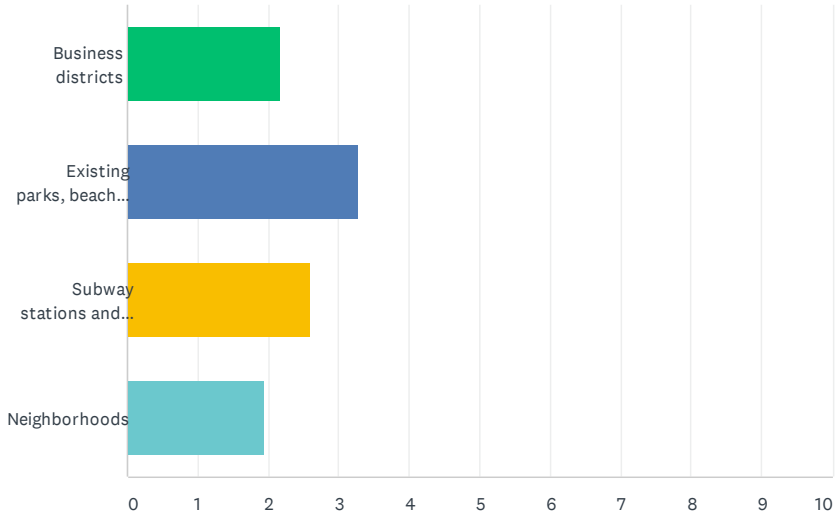
Answered: 440 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	86.14%	379
No	4.55%	20
Maybe	9.32%	41
TOTAL		440

Q15 What destination is most important for the greenway extension to connect?

Answered: 440 Skipped: 0



	1	2	3	4	TOTAL	SCORE
Business districts	11.14% 49	25.68% 113	32.73% 144	30.45% 134	440	2.17
Existing parks, beaches, and nature trails	57.27% 252	22.27% 98	12.50% 55	7.95% 35	440	3.29
Subway stations and bus stops	22.50% 99	30.91% 136	30.00% 132	16.59% 73	440	2.59
Neighborhoods	9.09% 40	21.14% 93	24.77% 109	45.00% 198	440	1.94

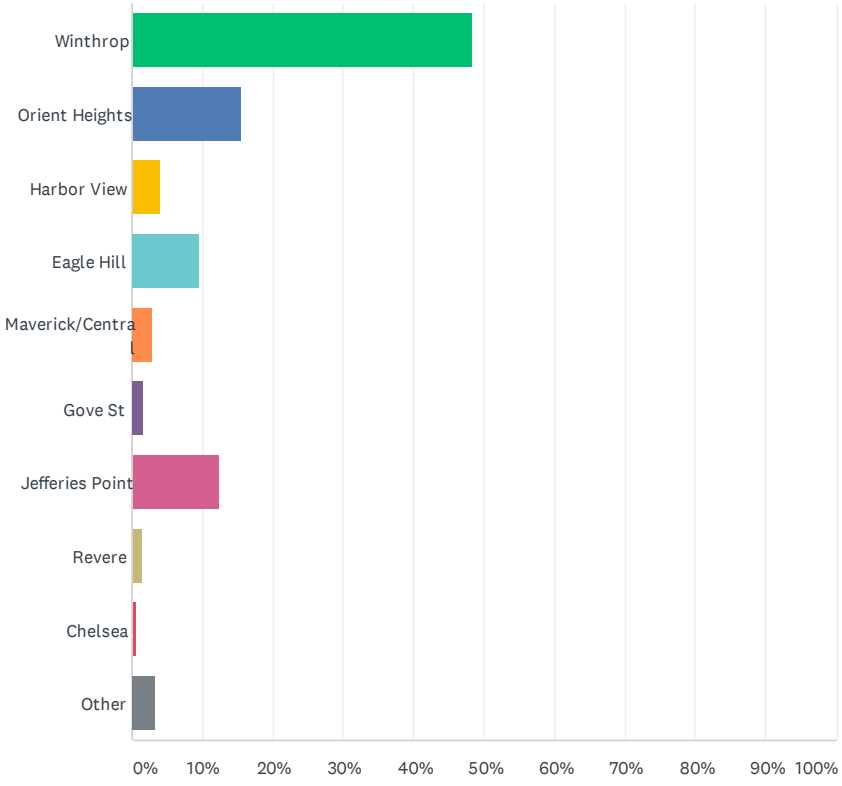
Q16 If you would like to be notified about upcoming community meetings, please add your email address. (This survey will be confidential.)

Answered: 136 Skipped: 304

SURVEY NO. 2

Q1 Where do you live?

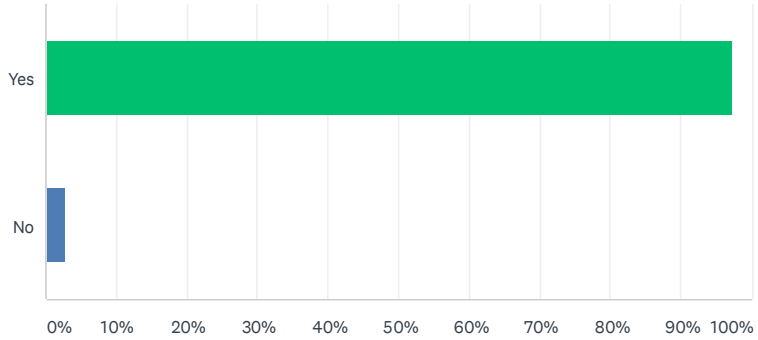
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Winthrop	48.36%	281
Orient Heights	15.49%	90
Harbor View	3.96%	23
Eagle Hill	9.64%	56
Maverick/Central	2.93%	17
Gove St	1.72%	10
Jefferies Point	12.39%	72
Revere	1.38%	8
Chelsea	0.69%	4
Other	3.44%	20
TOTAL		581

Q2 Would you use the greenway extension?

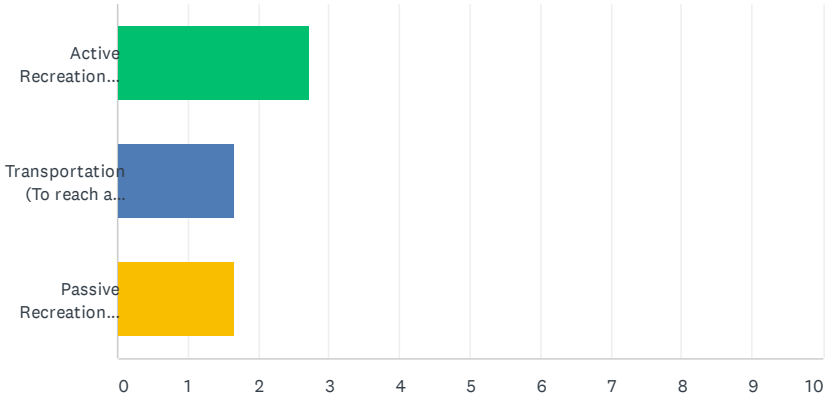
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	97.25%	565
No	2.75%	16
TOTAL		581

Q3 If yes, what would be your primary use of the greenway? (Please rank 1 to 3, one representing the activity you most do and three the activity you least do.

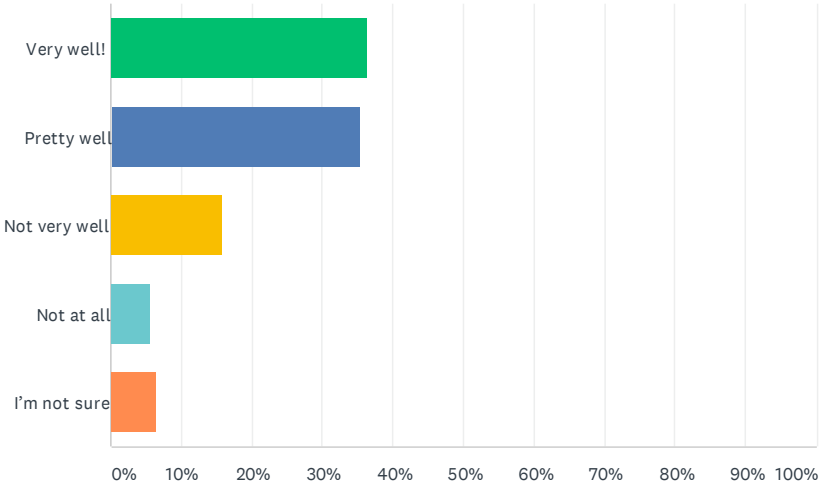
Answered: 568 Skipped: 13



	1	2	3	TOTAL	SCORE
Active Recreation (Walk, bike ride, jog, etc.)	77.48% 437	16.67% 94	5.85% 33	564	2.72
Transportation (To reach a destination such as commuting or shopping)	15.70% 87	33.21% 184	51.08% 283	554	1.65
Passive Recreation (Sit, birdwatch, outdoor gathering, go to the beach)	7.91% 44	49.82% 277	42.27% 235	556	1.66

Q4 How well does route 1 meet your transportation or recreational needs?

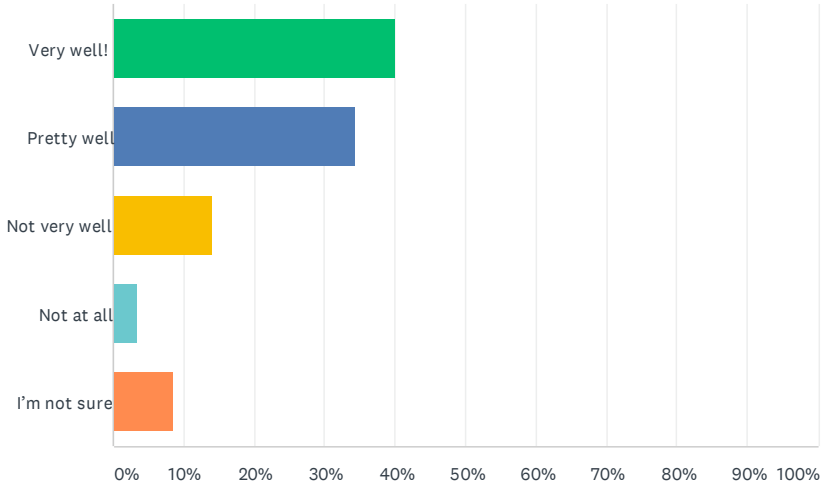
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very well!	36.49%	212
Pretty well	35.46%	206
Not very well	15.83%	92
Not at all	5.68%	33
I'm not sure	6.54%	38
TOTAL		581

Q5 How well does route 1 meet the shared vision of connecting Winthrop and East Boston by a safe, pleasant convenient, and low-stress corridor for active transportation and recreation?

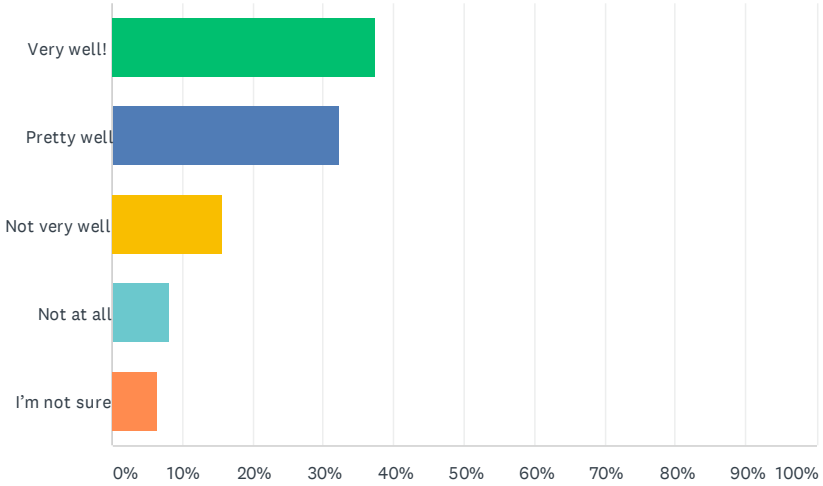
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very well!	39.93%	232
Pretty well	34.25%	199
Not very well	13.94%	81
Not at all	3.27%	19
I'm not sure	8.61%	50
TOTAL		581

Q6 How well does route 2 meet your transportation or recreational needs?

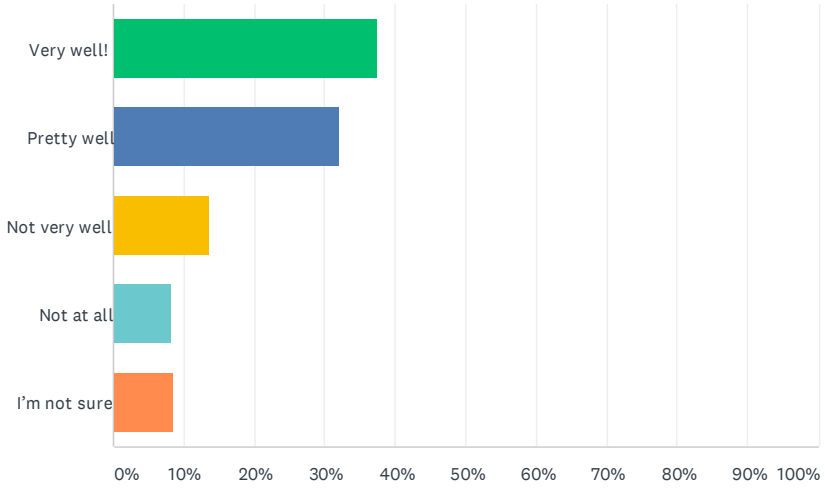
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very well!	37.52%	218
Pretty well	32.19%	187
Not very well	15.66%	91
Not at all	8.09%	47
I'm not sure	6.54%	38
TOTAL		581

Q7 How well does route 2 meet the shared vision of connecting Winthrop and East Boston by a safe, pleasant convenient, and low-stress corridor for active transportation and recreation?

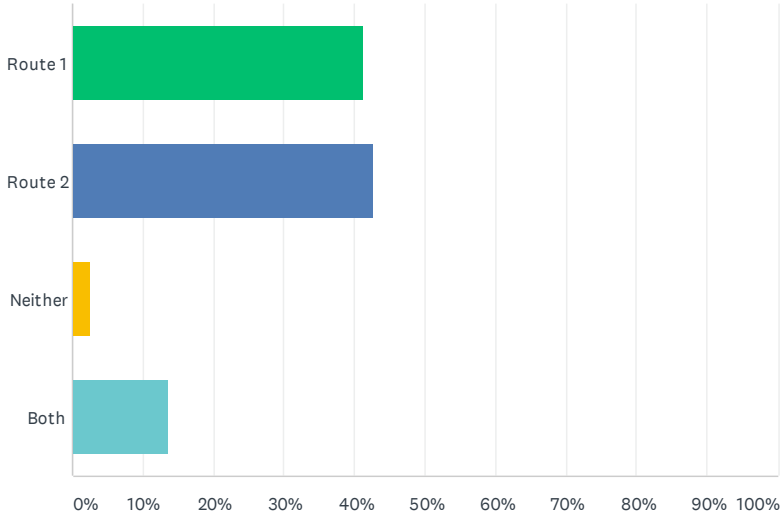
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very well!	37.52%	218
Pretty well	32.01%	186
Not very well	13.60%	79
Not at all	8.26%	48
I'm not sure	8.61%	50
TOTAL		581

Q8 Do you prefer Route 1 or Route 2, and why?

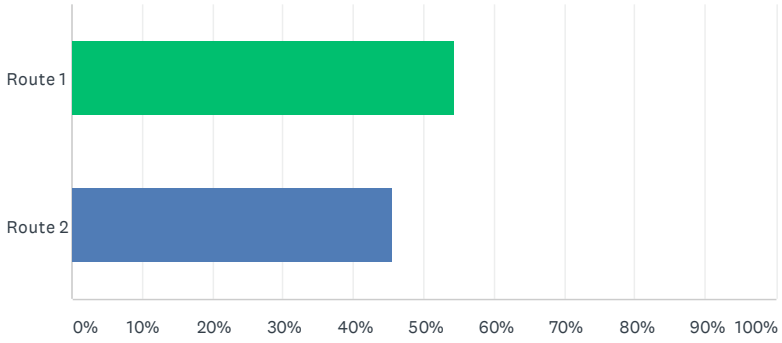
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Route 1	41.14%	239
Route 2	42.69%	248
Neither	2.58%	15
Both	13.60%	79
TOTAL		581

Q9 If both routes were possible (or if you would like both options to happen), which spur do you think should be constructed first?

Answered: 561 Skipped: 20



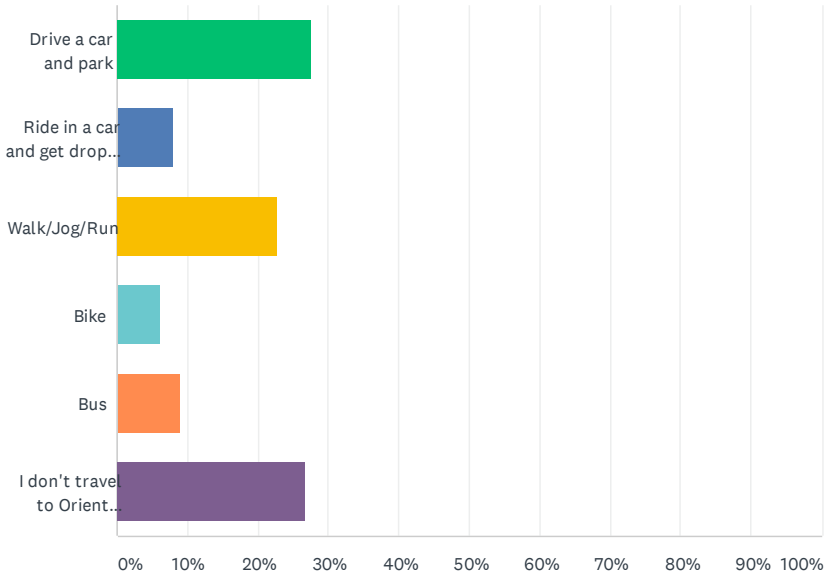
ANSWER CHOICES	RESPONSES	
Route 1	54.37%	305
Route 2	45.63%	256
TOTAL		561

Q10 Do you live or own property along either route segment? If so, on which street?

Answered: 344 Skipped: 237

Q11 How do you usually get to the Orient Heights T Station?

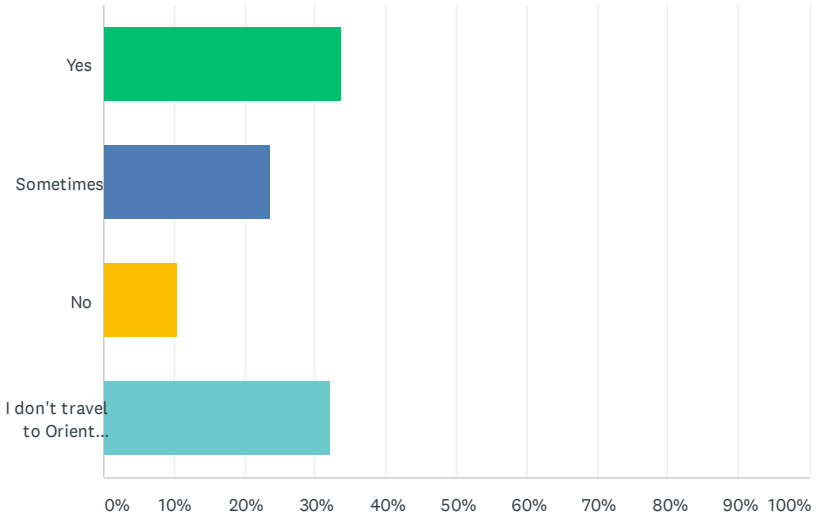
Answered: 581 Skipped: 0



ANSWER CHOICES	RESPONSES	
Drive a car and park	27.54%	160
Ride in a car and get dropped off	7.92%	46
Walk/Jog/Run	22.72%	132
Bike	6.02%	35
Bus	8.95%	52
I don't travel to Orient Heights T Station	26.85%	156
TOTAL		581

Q12 If you currently drive to Orient Heights T station, would you be more likely use the greenway instead?

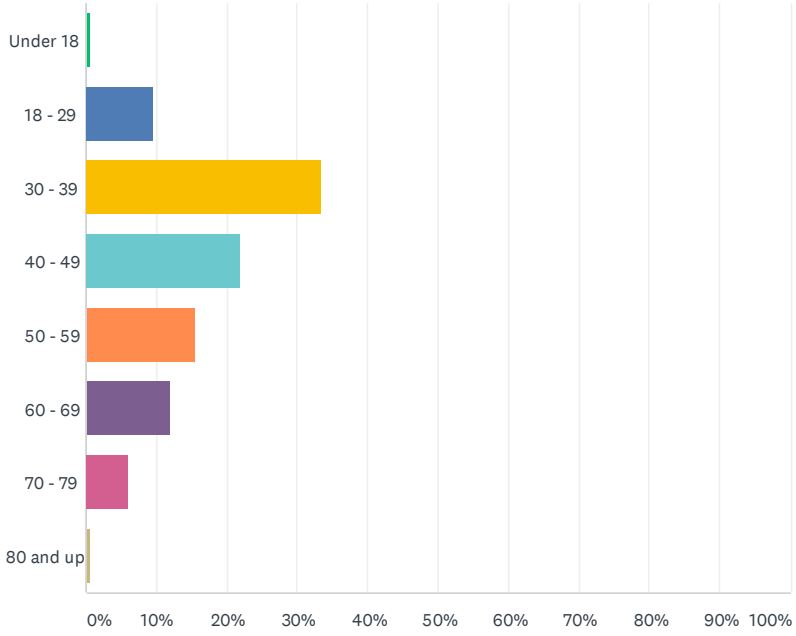
Answered: 508 Skipped: 73



ANSWER CHOICES	RESPONSES	
Yes	33.66%	171
Sometimes	23.62%	120
No	10.43%	53
I don't travel to Orient Heights	32.28%	164
TOTAL		508

Q13 What is your age?

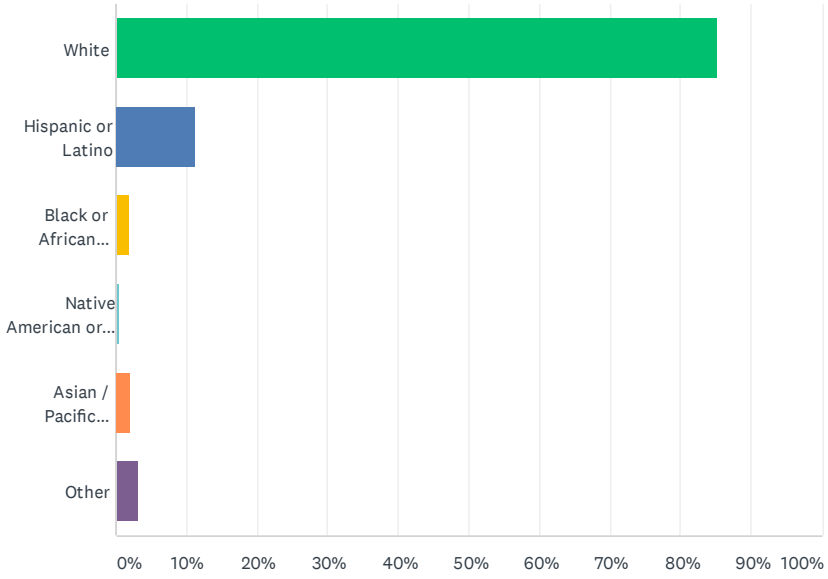
Answered: 575 Skipped: 6



ANSWER CHOICES	RESPONSES	
Under 18	0.70%	4
18 - 29	9.57%	55
30 - 39	33.57%	193
40 - 49	21.91%	126
50 - 59	15.48%	89
60 - 69	12.00%	69
70 - 79	6.09%	35
80 and up	0.70%	4
TOTAL		575

Q14 What is your ethnicity/race? Check all that apply.

Answered: 562 Skipped: 19



ANSWER CHOICES	RESPONSES	
White	85.05%	478
Hispanic or Latino	11.21%	63
Black or African American	1.96%	11
Native American or American Indian	0.36%	2
Asian / Pacific Islander	2.14%	12
Other	3.20%	18
Total Respondents: 562		

Q15 If you would like to be kept informed about the Winthrop Greenway Extension, please add your email address. (This survey will be confidential.)

Answered: 228 Skipped: 353

D

APPENDIX D

Existing Conditions Report

A | MBTA Parking Lot (East Boston)

Existing Configuration

The existing MBTA parking lot has 419 spaces of which 246 spaces are full sized, 165 spaces are angled, and 8 spaces are ADA accessible. There are 24-foot drive aisles throughout the parking lot in compliance with City of Boston parking design standards.

The existing MBTA parking lot has connections to the roadway network at St. Edward Road and Barnes Avenue as shown in *Figure 1*. However, there is currently a fence preventing access from Barnes Avenue. Therefore, all vehicles are required to enter and exit the MBTA parking lot from St. Edward Road. Existing sidewalk is located between the parking lot and residential properties along the south side of the parking lot. The sidewalk is inconsistent in width and quality due to invasive roots from surrounding street trees. The sidewalk ends prior to the end of the parking lot on the east side. Relevant utilities include lighting and are installed within the sidewalk pathway on the southern side of the parking lot.

Figure 1. MBTA Parking Lot Access

Configuration Changes

The MBTA is in the process of reconfiguring the existing parking lot to accommodate more parking spaces. The reconfiguration proposes 480 full size parking spaces and 9 ADA accessible parking spaces. The drive aisles and driveways will remain consistent with City of Boston parking standards. The reconfiguration will inform whether an off-street path option through the MBTA lot will be feasible.

Existing Sidewalk on South Side of MBTA Parking Lot – Looking east

MBTA Parking Lot - Looking east

MBTA Parking Lot - Looking west from Orient Heights Repair Shop

B | Between Orient Heights Parking Lot and CVS Parking Lot (East Boston)

Network Function and Context

This parcel of land is located at the eastern end of Barnes Avenue, north-west of the CVS parking lot. Its current function seems undefined, serving as a storage space for various vehicles. Otherwise, this asphalt lot has few trees lining the west and north edges of the area and does not have any general walkways. The owner of this property is August John J JR TS.

Existing Cross Section

- There are no sidewalks at the perimeter of the property
- This plot of land is approximately 275’ (north-south) x 155’ (east-west)

Field Observations

- The parcel can serve as part of the connection between the Orient Heights Parking Lot and the Belle Isle Marsh
- A connection to Barnes Avenue could be established

Utilities and Streetscape

- Unknown. No manholes or infrastructure is evident

Site Aerial

At the Northwest corner of the site looking east towards the fence of the property off Barnes Avenue

At the corner of Barnes Avenue facing Southeast towards the site

C | Rear of CVS Lot (East Boston)

Network Function and Context

In the north-most part of the CVS Parking lot is an asphalt driveway approximately 35’ wide with a wooden guard rail that separates the property from the adjacent marsh. Adjacent to the guard rail, a DCR interpretive sign indicates that the marsh is part of the Belle Isle Marsh Reservation. The vegetation along the guard rail consists of tall grasses and small to medium shrubs and trees. Extending about 20’ from the guard rail the vegetation is a short salt marsh grass presumably on moist soils. The owner of this property is Lombardo Vincent J TS. The eastern end of the drive also includes a basketball hoop.

Rear driveway of CVS Lot facing East

East end of parcel facing west

East end of corridor facing east towards Sewer Maintenance Path

Existing Cross Section

- No sidewalks on either side of the corridor
- Approximately 35’ from wood guard rail to curb (corridor widens moving east)
    - There are no lane markings
- Length of segment: 315’

Field Observations

- The asphalt driveway in the rear of the parking lot is approximately 35’ wide and a portion of it could potentially be designated as a path.
- This area can also serve as part of the connection from the Orient Heights Parking lot to the southeastern edge of Belle Isle Marsh.

Utilities and Streetscape

- To be determined. No manholes or infrastructure is evident.

D | Sewer Maintenance Path & Western MWRA Head House (East Boston)

Network Function and Context

This path begins at the northeast corner of the CVS parking lot, runs east parallel to Saratoga Street, and ends at an MWRA Head House at the water's edge. The path is uneven with various ranged in width of the overall path, but its clearance is maintained. The approximate width of the path is 10' wide. Along the edges of the path, after a couple of feet of flat grassy surfacing, the land slopes down towards the edge of the marsh. The sloped edges of the path contain short grasses, shrubbery, and small trees along the way.

Trail looking West towards CVS

Site Aerial

Existing Cross Section

- No sidewalks on either side of path
- Approximately 10’ of unpaved cleared path
- Both side of the path contain tall grasses, shrubbery, and small trees that slope down to the edge of the waters of Belle Isle Marsh

Field Observations

- This segment allows visual access and environment change from the urban areas to a more natural area.
- It offers the complete separation from cars and urban noise to enjoy the natural sounds of the resident animals.
- This area can also have options of small rest points for viewing.
- Narrow unpaved path spurs north from this segment to the Boston Parks parcel.

Utilities and Streetscape

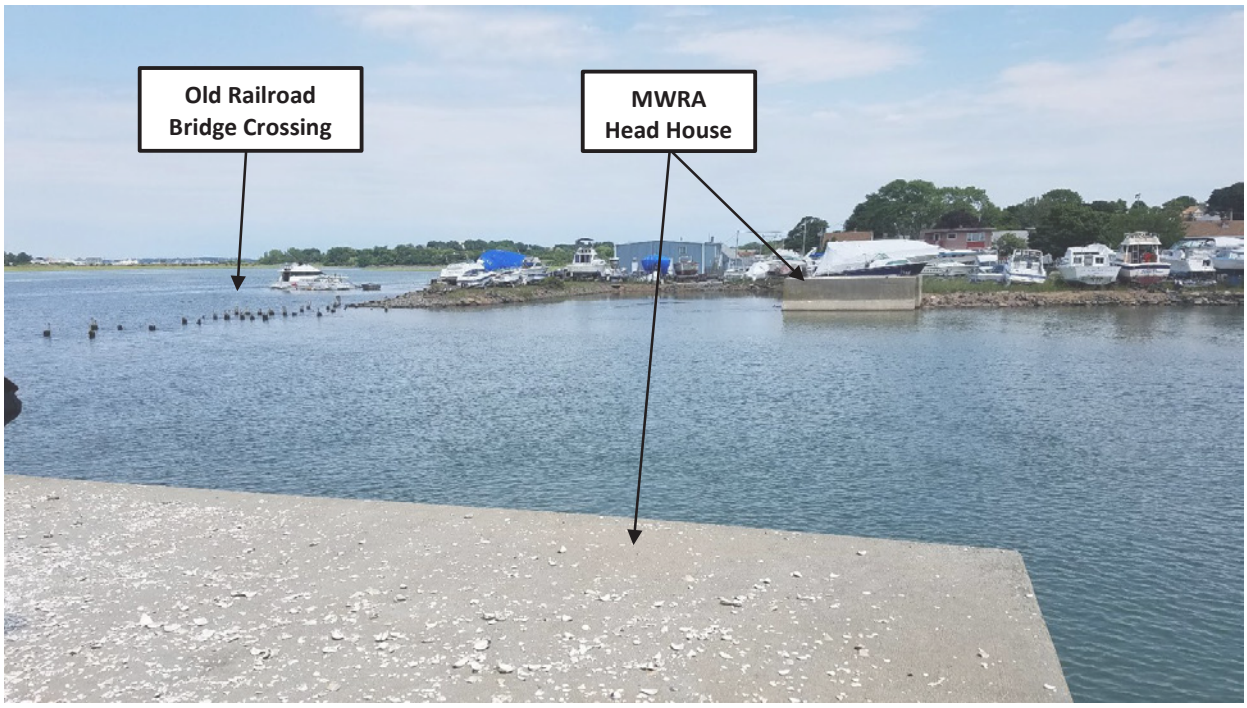
- Significant MWRA Sewer infrastructure. Maintenance access to the headhouse at the eastern end of the segment required (MW. 10’-0” width). Access to sewer manholes along segment must be maintained.

E | Belle Isle Inlet Water Crossing

Network Function and Context

These two options represent the most direct connection to Morton Street and the Belle Isle Marsh Marine Ecology Park. There are two potential routes across the Belle Isle inlet to connect the MWRA maintenance path with Morton Street and the Belle Isle Marsh Marine Ecology Park. The first connects directly with the maintenance path and terminates at the water with an MWRA Sewer head house. Directly across the inlet to the east is a second head house situated on an MWRA easement located within the boatyard property owned by Atlantis Marina Docks LLC. A bridge may be constructed connecting these head houses, but access to existing infrastructure must be maintained. Significant sewer infrastructure is also located below the inlet and is connected to the head houses. The second option would span the inlet to the north of the MWRA head houses along the old train track bridge with remnant piers still visible in the water. This option also connects to the Zeoli's Marine Services boatyard, but not in the location of the MWRA easement.

Standing on MWRA sewer head house looking east towards head house at the boat yard



Field Observations

- By creating a crossing at the inlet, the path could extend from the marsh to Pleasant Street or Morton Street without crossing over the bridge on Saratoga Street.
- Crossing over water would increase the variety on the different types environments users can experience.
- Any bridge structure would need to have a height no less than the nearby bridge on Saratoga Street

Utilities and Streetscape

- Significant MWRA Sewer infrastructure. Maintenance access required (MW. 10’-0” width). Access to sewer manholes must be maintained.

F | Zeoli's Marine Services Boatyard and Belle Isle Terrace (Winthrop)

Network Function and Context

Two boat yard properties are located between the inlet and Morton Street in Winthrop. One yard is located east of the Winthrop MWRA headhouse; the other is located east of the former narrow gauge railway abutments. The MWRA headhouse and access is part of an MWRA easement. Both boat yards have a single access point. These yards yard have boats along the entire edge of land adjacent to the water with a service building in the middle of the northern parcel. Belle Isle Terrace is the east-west street connecting from the northern parcel on the west end to Morton Street on the east.

Belle Isle Terrace facing west towards the boatyard

Standing at the west end of Pleasant Street facing west towards the boatyard fence

Vegetated water's edge looking towards the boatyard

Site Aerial

Field Observations

- The edges of these parcels connect the land and saltmarsh, making it an important ecological ecosystem. Redevelopment in this area needs to contribute to the existing ecosystem services already in place or provide more.
- There are pleasant views along the water north of this network.

Utilities and Streetscape

- Significant sewer infrastructure along MWRA easement.

G | MORTON STREET (WINTHROP)

Network Function and Context

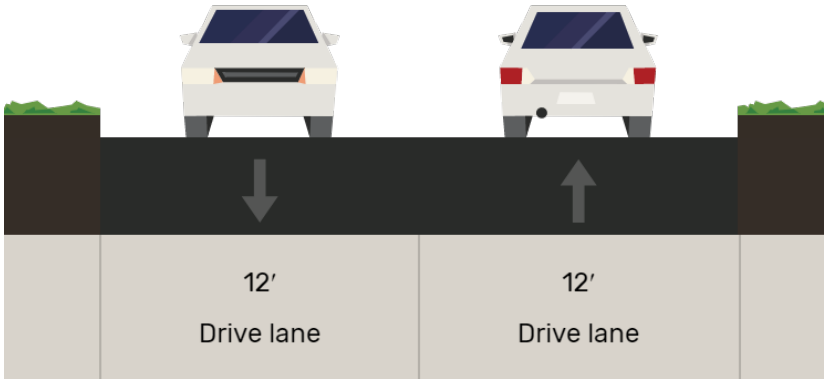
Morton Street is an east-west corridor in the northern part of Winthrop. The corridor is a two-way street in a primarily residential context. Residential uses border the south side of the corridor and marshland borders the north side of the corridor. The corridor connects to the existing Belle Isle Marsh Marine Ecology Park boardwalk that begins east of Read Street. The existing cross section of Morton Street is shown in *Figure 10*.

Morton Street - Looking east from Pleasant Street

Existing Cross Section

- No sidewalks on the north side of the street; approximately four-foot wide asphalt sidewalk on south side of street between Pleasant Park Road and Amelia Avenue
- 24’ curb-to-curb widths (corridor widens moving east)
    - Two 12’ general-purpose lanes. No pavement markings are present to demarcate this space.
- Length of segment: 1000’ from Pleasant Street to Read Street

Figure 2. Morton Street - from Pleasant Street to Read Street – Looking east



Field Observations

- There are high quality views of the water and marsh.
- Existing informal off-street parking is available on north side of street between Pleasant Park Road and Amelia Avenue.
- Despite inconsistent sidewalk and lack of designated bicycle facilities, corridor has medium- to high-comfort character.

Utilities and Streetscape

- Utility poles are located on the north side of the street.
- Trees are located adjacent to the road at various locations on both sides of the street.

H1 & H2 | Barnes Avenue (East Boston)

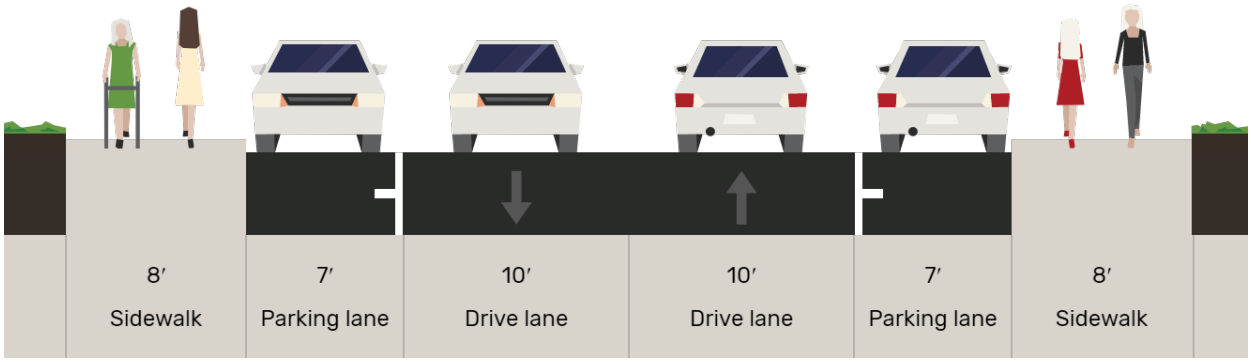
Network Function and Context

Barnes Avenue connects from Constitution Beach to the Orient Heights MBTA station and turns to run parallel to Saratoga Street until it ends approximately 560’ east of St. Edwards Road. A spur continues toward the MBTA parking lot; a chain-link fence closes the spur to passage. Barnes Avenue is two-way, except for an approximately 90’ long segment between Bayswater Street and Saratoga Street, which operates one-way northbound. Barnes Avenue is in a primarily residential context with commercial uses on the segment between Bayswater Street and Saratoga Street. The existing cross section of Barnes Avenue is shown in *Figure 11*.

Existing Cross Section

- 8’ sidewalks on both sides
- 34’ curb-to-curb widths
    - 7’ eastbound parking lane (2-hr parking Monday-Friday 6 am – 8 pm except resident sticker)
    - Two 10’ general-purpose lanes
- Length of segment: 800’ from Constitution Beach to Barnes Avenue; 1060’ feet parallel to MBTA parking lot

Figure 3. Barnes Avenue - from Saratoga Street to 560' east of St. Edwards Road – Looking east



Field Observations

- Crossing Saratoga Street on Barnes Avenue requires a two- or three-stage crossing, causing pedestrian delay.

Utilities and Streetscape

- Utility poles are located in the sidewalk path on the north side of the street.
- From Thurston Street to Saratoga Street, there are tree wells on the south side of the street.
- From Saratoga Street to Barnes Avenue, there is one mature tree in a tree well on either side of the street.
- From Barnes Avenue to Shawsheen Road, there are utility poles and tree wells on the north side of the street.

I & J | Off Street opposite Shawsheen Road, Off-Street east of CVS (East Boston)

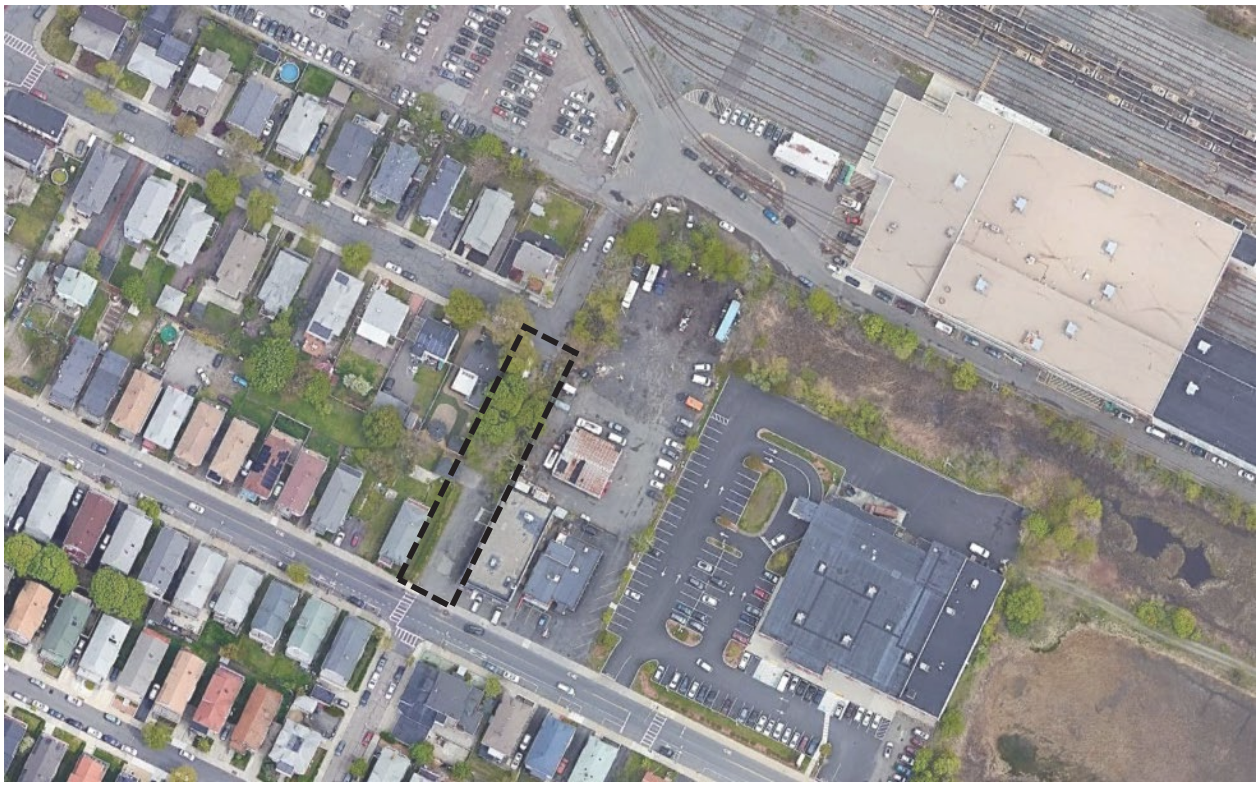
Network Function and Context

Segment I alignment runs perpendicular to Saratoga Street leading directly to the end of Barnes Avenue. The unpaved area has a few full-grown trees, and the paved area is asphalt with little to no shade. On the west side of the path are residential properties and the east side are business properties.

Segment J alignment is parallel to Network I running along the east side of the CVS property. This area is presently a thickly vegetative buffer between the CVS building and the marsh land. This parcel is owned by the Department of Conservation and Recreation.

Driveway facing north towards Barnes Avenue

Site Aerial



Existing Cross Section

- This path is roughly 30’ wide and 250’ long with half of the length being paved with asphalt and the other length is unpaved.

Field Observations

- Network I could provide a north-south connection between Barnes Avenue and Saratoga Street.
- Network J could provide a north-south connection between Saratoga Street and the informal pathway in the marsh without cutting into CVS property.
- Network J is in the marsh land and the stabilization of the ecology needs to be planned for.

Utilities and Streetscape

- Unknown

K | Off-Street along east side of Belle Isle Inlet (Winthrop)

Network Function and Context

This alignment would connect a the greenway from the private parcels east of the inlet (segment F) to Saratoga Street. It would run along the water west of the Fazio Car Wash parcel, perpendicular to Saratoga Street. The car wash's exit driveway is 18' wide from the metal guard rail of the Dunkin Donuts drive through pavement to the metal guard rail at the water's edge. The edge of this land is supported by rip rap for erosion control with few spontaneous vegetation. A potential pathway would likely need to be cantilevered over the water.

Saratoga Street bridge facing northeast towards the Fazio Car Wash

Site Aerial

Existing Cross Section

- The length of the Saratoga Bridge is approximately 200’
- The elevation of the bridge is approximately 10’ and the elevation of the water is approximately -2’. If the cantilever path is flush with the elevation of the sidewalk along the bridge, then the height of the cantilever to the surface of the water would be approximately 12’ high.

Field Observations

- Redevelopment in this network could improve the erosion control along the edge of the car wash property, providing a greater buffer and native vegetation.
- There are large traffic volumes entering and leaving the car wash and Dunkin’ Donuts.

Utilities and Streetscape

- Unknown

L1 | SARATOGA STREET FROM BARNES AVENUE TO ANNAVOY STREET (EAST BOSTON)

Network Function and Context

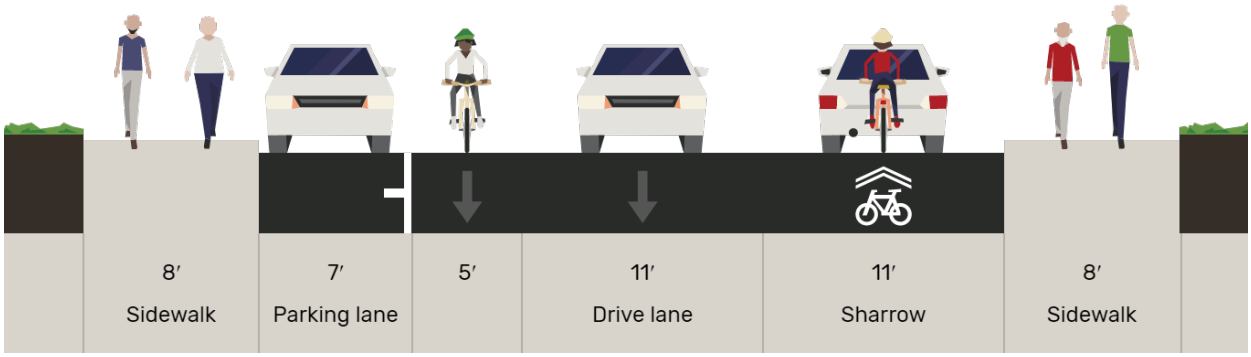
Saratoga Street is the main east-west corridor in this area of East Boston. Dense residential with commercial and institutional uses are interspersed; CVS anchors the largest commercial area with surface parking. The existing cross section of Saratoga Street is shown in *Figure 12*.

Saratoga Street – East of CVS - Looking west

Existing Cross Section

- 7’ eastbound parking lane (2-hr parking Monday-Friday 6 am – 8 pm except resident sticker)
- 5’ eastbound bike lane
- 11’ eastbound general-purpose lane, 11’ westbound lane with shared lane marking
- 8’ sidewalks on both sides
- Length of segment: 2,220’ (0.42 mi)

Figure 4. Saratoga Street - from Barnes Avenue to Annavoy Street – Looking west



Field Observations

- Saratoga Street is a busy corridor with mix of vehicles including trucks – high stress for people biking.
- While most residential properties have driveways, some lots near Barnes Avenue do not have off-street parking options.

Utilities and Streetscape

- Utility poles are installed within the sidewalk path on the south side of the street. On the western half of the block from Barnes Avenue to St. Edward Road, light poles are located on the north side of the street. Light poles are on the south side of the corridor for the rest of segment.
- Tree wells are located on the south side of the street. One tree well is located on the north side of the street between Barnes Avenue and St. Edward Road.
- Fire hydrants are located on the north side of the street.

L2 | Saratoga Street from Annavoy Street to Bridge (East Boston)

Network Function and Context

Saratoga Street, via the Saratoga Bridge across Belle Isle Inlet, is the only connection between East Boston and Winthrop, making it a critical evacuation route. The corridor is geographically constrained and is surrounded by MassPort-owned land to the south and the Belle Isle Marsh Reservation to the north.

Saratoga Street - Looking east approaching bridge

Saratoga Bridge - Looking east

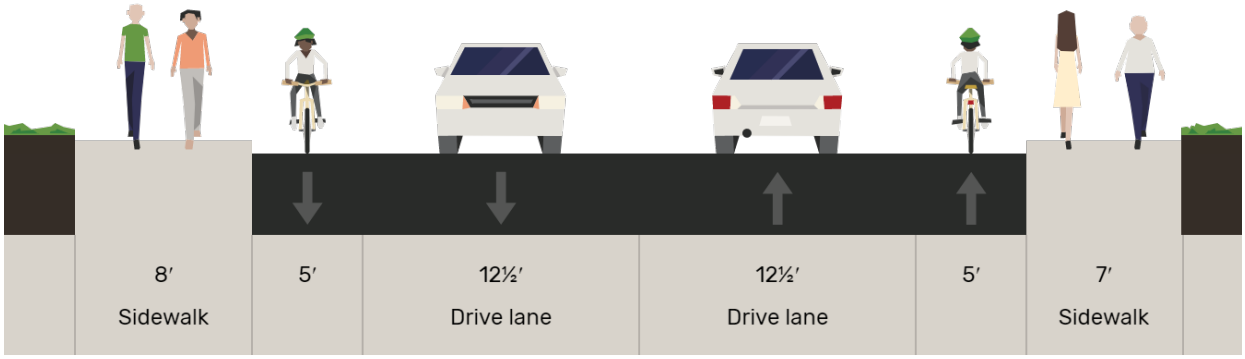
Existing Cross Sections

Four different cross sections are provided along this segment (see *Figure 13* to *Figure 16*).

Saratoga Street from Annavoy Street to 300' east of Annavoy Street

- 8' concrete sidewalk on south side and 7' asphalt sidewalk on north side
- 35' curb-to-curb width
    - 5' bike lanes on both sides
    - Two 12.5' general purpose lanes
- Length of segment: 300'

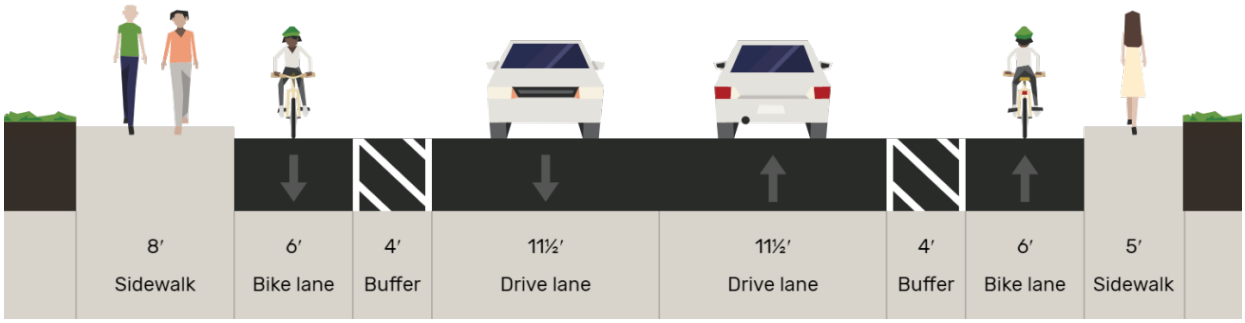
Figure 5. Saratoga Street – 300’ east of Annavoy Street – Looking west



Saratoga Street from 300’ east of Annavoy Street to 540’ east of Annavoy Street

- 8’ concrete sidewalk on south side and 5’ asphalt sidewalk on north side
- 43’ curb-to-curb width
    - 6’ bike lanes with 4’ buffers on both sides
    - Two 11.5’ general purpose lanes
- Length of segment: 240’

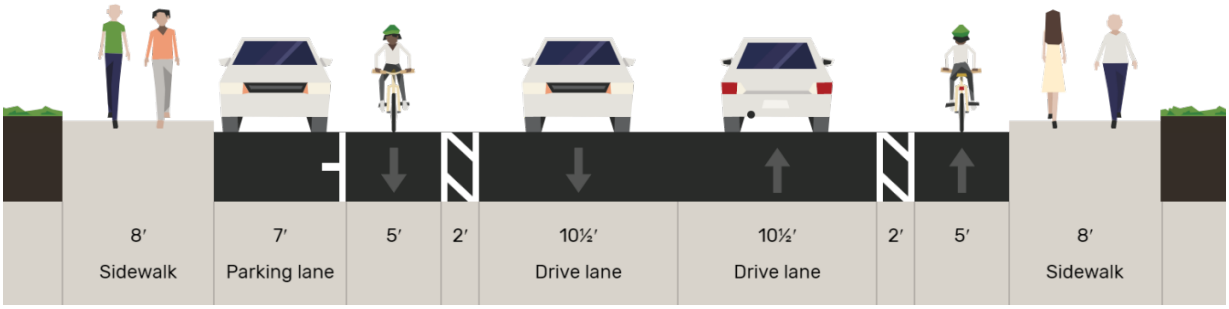
Figure 6. Saratoga Street – 300’ east of Annavoy Street to 540’ east of Annavoy Street– Looking west



Saratoga Street from 540’ east of Annavoy Street to Bridge

- 8’ concrete sidewalks on both sides
- 42’ curb-to-curb width
    - 7’ eastbound parking lane (no posted parking restrictions)
    - 5’ bike lanes with 2’ buffers on both sides
    - Two 10.5’ general purpose lanes
- Length of segment: 360’

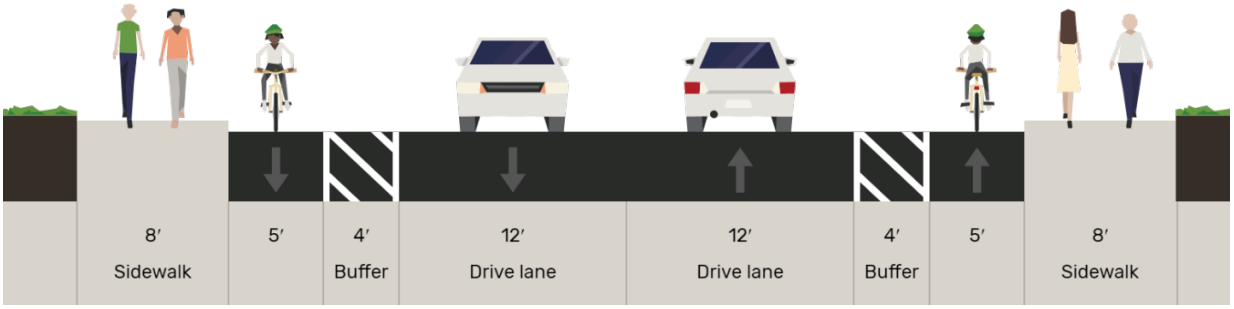
Figure 7. Saratoga Street – 540’ east of Annavoy Street to bridge – Looking west



Saratoga Bridge

- 8’ concrete sidewalks on both sides
- 42’ curb-to-curb width
    - 5’ bike lanes with 4’ buffers on both sides
    - Two 12’ general purpose lanes
- Length of segment: 200’

Figure 8. Saratoga Bridge – Looking west



Pedestrian Crossings

No marked pedestrian crossings are provided on this segment, resulting in a 2,420’ (nearly half mile) gap in pedestrian crossing opportunities between the mid-block crossing at the CVS in East Boston and Pleasant Street in Winthrop. See *Figure 7* for details.

Field Observations

- Saratoga Street is a busy corridor with mix of vehicles including trucks – high stress for people biking.
- Bicyclists observed riding on Saratoga Street. Anecdotally, bicyclists also ride on sidewalk.
- Vehicles observed shifting over centerline to create more space when passing pedestrians on sidewalk.
- Local input has indicated that the bridge is also used for fishing.

Utilities and Streetscape

- From Annavoy Street to 300’ east of Annavoy Street, utility poles are installed within the sidewalk path on the south side of Saratoga Street. Lighting is installed on the south side of the street approximately 3’ from back of sidewalk.
- From 300’ east of Annavoy Street to the bridge, utilities are installed within the sidewalk path on the north side of Saratoga Streeting and lighting is installed on the south side approximately 3’ from back of sidewalk.
- On the bridge, lighting is installed outside of the sidewalk path, at the back of the metal railing.

L3 | Main Street (Winthrop)

Network Function and Context

Main Street is a dense residential corridor with commercial and institutional uses interspersed. There are frequent driveways that intersect the sidewalk along the corridor. The existing cross section of Main Street is shown in *Figure 17*.

Main Street - Looking east toward Pleasant Street

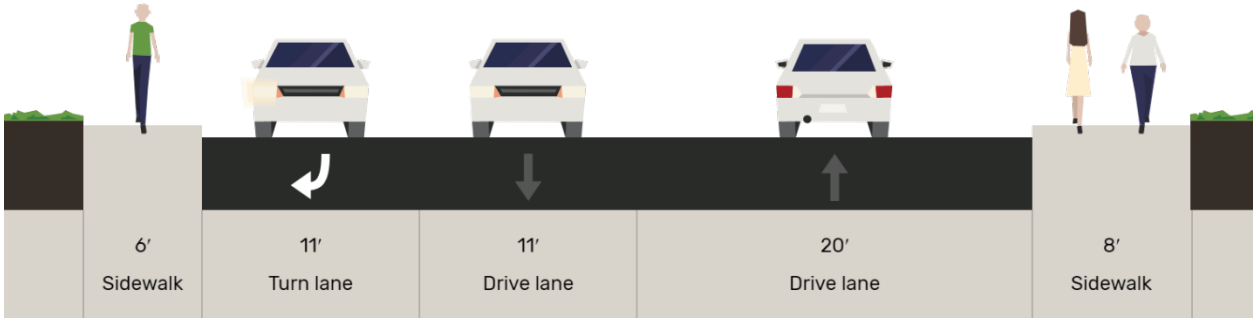
Main Street - Looking west toward bridge

Main Street at Pleasant Street - Looking west toward Saratoga Bridge

Existing Cross Section

- 6’ concrete sidewalk on south side and 8’ concrete sidewalk on north side
- 42’ curb-to-curb width
    - 20’ westbound general-purpose lane
    - Eastbound lane transitions from a 17’ lane with a 5’ parking restriction on the south side to a 11’ through lane and a 11’ right turn only lane
- Length of segment: L3: 570’

Figure 9. Main Street - from Saratoga Bridge to Pleasant Street – Looking west



Field Observations

- Frequent and wide driveways along Main Street create potential for conflict between drivers and people using the sidewalk.
- Pedestrians observed crossing Main Street at east end of bridge approximately 700’ west of nearest crosswalk at Pleasant Street.

Utilities and Streetscape

- Lighting is attached to utilities poles. Utilities poles are located within sidewalk path on both north and south sides of street.
- Tree wells are located on both north and south side of street.

M | Pleasant Street (Winthrop)

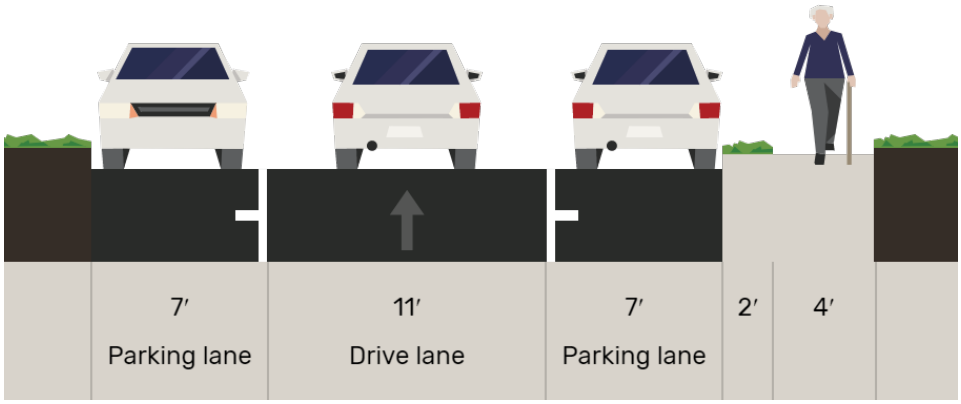
Network Function and Context

Pleasant Street is a north-south corridor in Winthrop. The corridor is a two-way street in a residential context. Residents can park on either side of the corridor which only provides space for one travel lane. Though there is only one travel lane, vehicles can travel both directions due to the relatively low vehicular volumes and speeds. The existing cross section of Pleasant Street is shown in *Figure 18*.

Existing Cross Section

- 4’ inconsistent sidewalk on east side
- 31’ curb-to-curb width
    - 7’ parking lanes on both sides
    - One 11’ general purpose lanes
- Length of segment: 550’ from Main Street to Morton Street

Figure 10. Pleasant Street - from Main Street to Morton Street – Looking north



Field Observations

- There is a view of the water for northbound travelers.
- Despite narrow sidewalk and lack of designated bicycle facilities, this street has a medium-to high-comfort character.

Utilities and Streetscape

- Utility poles are located on the west side of the street.
- Street trees are located within the grass buffer on the east side of the street.
- One fire hydrant is located on the east side of the street in the grass buffer.

N | Off-street connection from Thurston Street to Constitution Beach (East Boston)

Network Function and Context

This alignment is located at the south eastern portion of DCR's Constitution Beach adjacent to the water and connecting to the bend at Thurston Street. The eastern end of Thurston Street then turns into Bayswater Street running north adjacent to the water. The west end of this network leads to the rest of Constitution Beach.

Path from Thurston Street to Constitution Beach, View to Thurston Street

Path from Thurston Street to Constitution Beach, View to Constitution Beach

Site Aerial

Existing Cross Section

- The clear path in this alignment is approximately 6’
- The north side of the segment from the edge of the gravel path is approximately 1’ of grass, then a fence of the residential property
- South of the edge of the gravel path is approximately 9’ of grass and shrubbery and then 12’ of medium to small rocks which ends at sand
- The segment gets wider moving east
- Length of segment: 135’ (from Constitution Beach to the corner of Thurston Avenue)

Field Observations

- This area could be an extension of the already existing paved paths that run along the edge of the beach area.
- Placing the destination of Constitution Beach along the proposed greenway would allow easier access to the park’s amenities.
- This network would allow a direct connection to the beach from Bayswater Street instead of going north on Thurston Street through the residential area.

Utilities and Streetscape

- None

O| BAYSWATER STREET (EAST BOSTON)

Network Function and Context

Bayswater Street runs parallel to Thurston Street from Barnes Avenue until it intersects with Thurston Street and runs along the coast from Thurston Street to Annavoy Street. It has a residential context on the north side and parking on both sides with a 2-hr parking limit Monday-Friday 6 am – 8 pm except for those with resident stickers. The south side is a public coastal resource. The north side has an 8' sidewalk, while the south side has an approximately 5' wide landscaped area followed by a steep downward slope to the shoreline, with stairs provided in three locations. A spur along Thurston Street from the intersection of Bayswater Street and Thurston Street connects to the informal path to Constitution Beach. The existing cross section of Bayswater Street is shown in *Figure 19*.

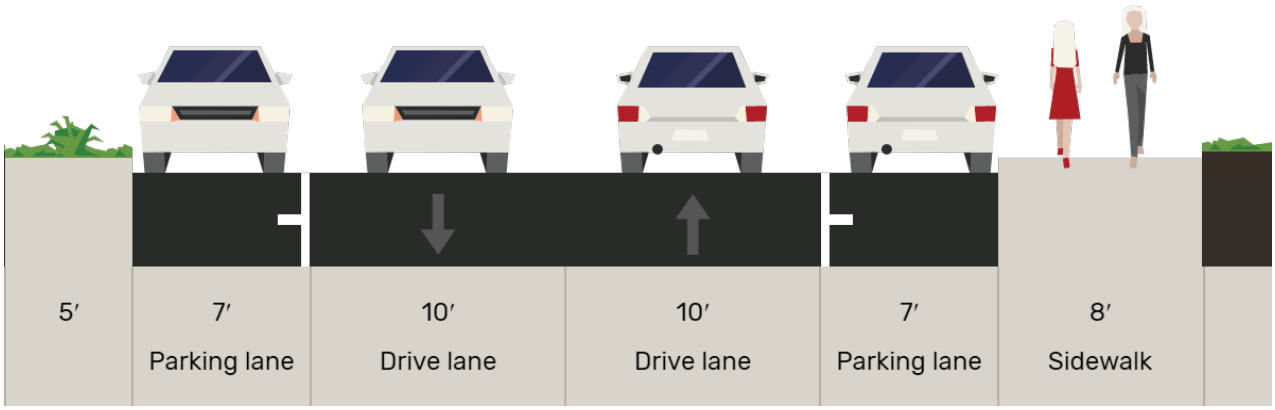
Bayswater Street - Looking east

Stairs from Bayswater Street down to shoreline

Existing Cross Section

- 8’ sidewalk on north side
- 34’ curb-to-curb width
    - 7’ parking lanes on both sides
    - Two 10’ general purpose lanes
- Length of segment: 700’ from Barnes Avenue to Thurston Street; 1800’ from Thurston Street to Annavoy Street

Figure 11. Bayswater Street - from Thurston Street to Annavoy Street - Looking east



Field Observations

- Bayswater Street is a low-speed, low-volume residential street with high quality waterfront views. Residences line the north side of the street; the south side of the street abuts the waterfront.
- The corridor is well-lit with frequent, attractive lighting fixtures.
- Approximately one third of parcels on the street have driveways.

Utilities and Streetscape

- From Barnes Avenue to Thurston Street, utility poles are installed within the sidewalk path on the south side of the street. Tree wells are located on both sides of the street.
- From Thurston Street to St. Edward Road, utility poles are located within the sidewalk path on the south side of the street. Tree wells are located on the north side.
- East of St. Edward Road, there are no utility poles. Light poles are located on the south side of the street in the landscaped waterfront buffer. There are infrequent tree wells, and fire hydrants on the north side of the street.

P | Annavoy Street (East Boston)

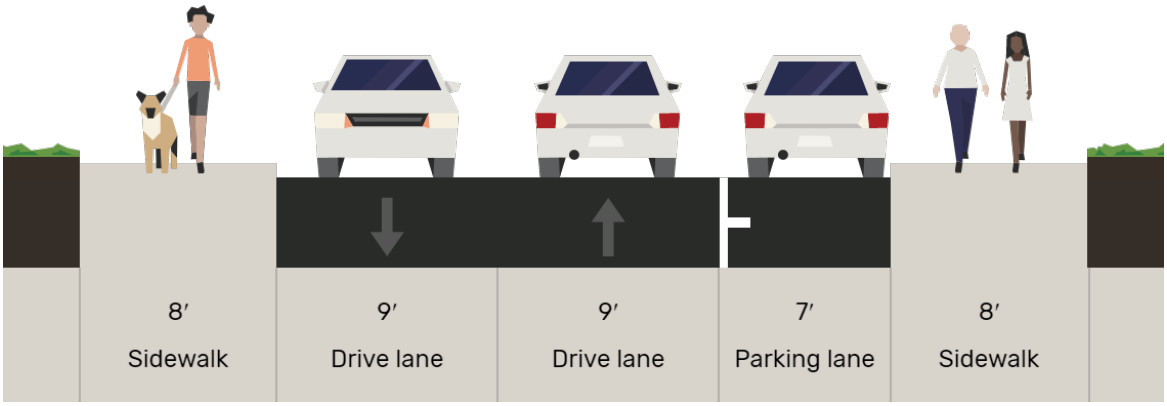
Network Function and Context

Annavoy Street is a north-south corridor between Bayswater Street and Saratoga Street. The corridor is a two-way street in a residential context with residences bordering both sides of the corridor. Annavoy Street and Teragram Street are the only two-way connectors from Bayswater to Saratoga Street. The existing cross section of Annavoy Street is shown in *Figure 20*.

Existing Cross Section

- 8’ sidewalks on both sides
- 25’ curb-to-curb widths
    - 7’ northbound parking lane
    - Two 9’ general-purpose lanes
- Length of segment: 575’ from Bayswater Street to Saratoga Street

Figure 12. Annavoy Street - from Bayswater Street to Saratoga Street - Looking north



Field Observations

- There is an inclinefrom Bayswater Street up to Saratoga Street.
- Most properties have driveways.

Utilities and Streetscape

- Utility poles installed within sidewalk path on east side of street.
- Tree wells on both sides of street.
- Fire hydrants on west side of street.

Q | MASSPORT PARCEL

Network Function and Context

This parcel contains radar equipment vital to the airplanes taking off and landing from Logan Airport on the landing strip south of the parcel. Any development is restricted between the radar system in the center of the parcel and Logan Airport to the south. North of this parcel is Saratoga Street, to the west are the backyards of residential properties, and to the east is the water. The alignment would need to be located along the western edge of the parcel, between the residences and the Massport Maintenance building. It would serve as the connection between Bayswater Street and Saratoga Street.

Standing on Saratoga Street facing south towards Massport Parcel

Site Aerial -

Field Observations

- This connection provides a north-south route, separated from cars path between the eastern end of Bayswater Street and Saratoga Street.

Utilities and Streetscape

- This parcel is the site of a significant radar system related to Logan Airport and it is assumed there is considerable electrical infrastructure present. The presence of other utility types is unknown.

R | TERAGRAM STREET

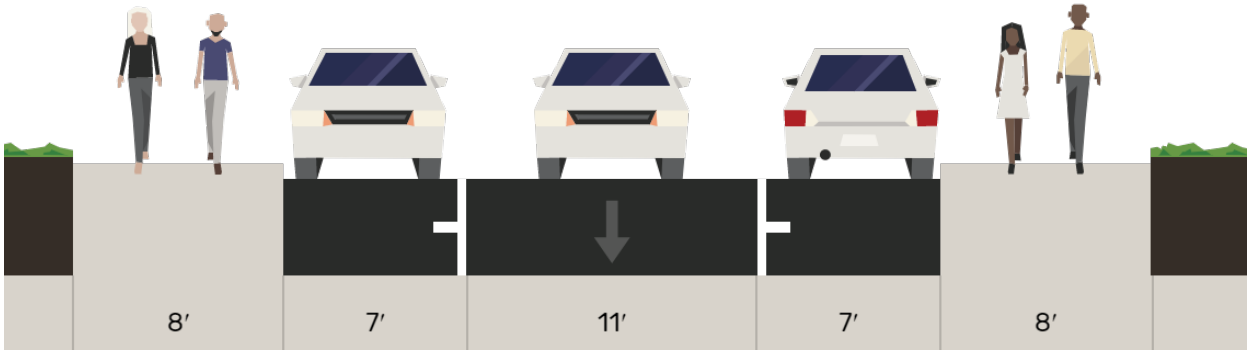
Network Function and Context

Teragram Street is a north-south corridor between Bayswater Street and Saratoga Street. The corridor is a two-way street in a residential context with residences bordering both sides of the corridor. Teragram Street and Annavoy Street are the only two-way connectors from Bayswater to Saratoga Street. The existing cross section of Teragram Street is shown in *Figure 20*.

Existing Cross Section

- 8’ sidewalks on both sides
- 25’ curb-to-curb widths
    - 7’ northbound and southbound parking lanes (2-hr parking Monday-Friday 6 am – 8 pm except resident sticker)
    - 11’ two-way general-purpose lane
- Length of segment: 490’ from Bayswater Street to Saratoga Street

Figure 13. Teragram Street - from Bayswater Street to Saratoga Street - Looking north



Field Observations

- There is a steep grade from Bayswater Street up to St Andrew Road and Saratoga Street up to St Andrew Road.
- Vehicles observed parking on-street in addition to each property having a driveway.

Utilities and Streetscape

- Utility poles installed within sidewalk path on east side of street.
- Fire hydrant on west side of street near Saratoga Street.

APPENDIX E

Environmental and Cultural Resources Review

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

M E M O R A N D U M

TO: Mary Ellen Welch Greenway Extensions Committee

FROM: Mel Higgins, PWS

DATE: September 22, 2020

SUBJECT: MEWG – Environmental Permitting Review

The Mary Ellen Welch Greenway (MEWG) currently extends from the Jeffries Point Waterfront in East Boston to Constitution Beach and beyond. This recreational open space pathway is used by local residents for various purposes, including walking, jogging, running, and biking. The proposed MEWG Winthrop extension would continue the greenway in an easterly direction towards, and into, Winthrop. While there are several options to extend the greenway into Winthrop, the current preferred alternative starts at the Orient Heights MBTA Station, proceeds along Barnes Avenue in an easterly direction, through the Orient Heights parking lot drive, over the waterbody connecting the Belle Isle tidal flats to Boston Harbor, and along Morton Street in Winthrop. Please see attached resource maps for proposed extension location.

This memorandum reviews existing environmental resources that may be impacted as a result of this project and provides environmental permits that may be required for this project. Estimated permit costs and review time periods associated with each permit are provided. The results of the environmental resources investigation are presented, below, followed by local, state and federal permitting discussions.

1.0 ENVIRONMENTAL AND HUMAN ENVIRONMENTAL RESOURCES MAPPING

To determine which permits will be required for the MEWG extension project, protected resource areas must first be identified. Once identified, area impacts must then be estimated to then determine which permits would be required as many of these permits are triggered by impact areas.

A preliminary desktop survey of environmental resource areas at the proposed limit of work for MEWG extension project was conducted in ArcView using MassGIS data layers. The environmental resources map contained the following information resources:

- Aerial photography
- Perennial rivers and intermittent streams (USGS 1:25,000 Topographic Quadrangle)
- Ponds, lakes, oceans, reservoirs (USGS 1:25,000 Topographic Quadrangle)

- MassDEP mapped wetlands (Stereo color infrared photography at 1:12,000 scale)
- Natural Heritage and Endangers Species Program (NHESP) Estimated and Priority habitats (NHESP, 2017)
- NHESP certified vernal pools (NHESP, 2017)
- Areas of Environmental Concern (ACECs) (EEA, 2009)
- Chapter 91 jurisdictional areas (MassDEP c. 91 Tidelands Jurisdiction, 2014)

Figure 1, provides an ArcGIS map showing environmental resources and limit of work indicating the following environmental resources may be impacts as a result of this project:

- Area of Critical Environmental Concern (Rumney Marshes/Belle Isle)
- Outstanding resource waters (to an ACEC)
- Wetlands (open water body, tidal flats, salt marsh, marsh)

It should also be noted that the proposed extension is also within mapped Chapter 91 and Coastal Zone jurisdiction.

Human Receptors

MassGIS data was also used to create a human receptor map to show hazardous waste sites, public water supplies and their protection areas, solid waste facilities, and open space. Figure 2, attached, provides the results of the human receptors mapping effort. As Figure 2 indicates, part of the pathway will be on the state-owned Belle Island Marsh Reserve open space land managed by Massachusetts Department of Conservation and Recreation (DCR). Figure 2 also indicates that the greenway may be located on EPA-regulated RCRA hazardous waste site and Massachusetts-regulated hazardous waste site.

Flood Zone

The online interactive FEMA website (https://msc.fema.gov/portal/home) was used to determine if the proposed greenway is in the flood zone. Figure 3E and Figure 3W provide flood mapping.

For the purposes of this review, the following assumptions have been made concerning environmental impacts:

- A pedestrian bridge will span the waterbody connecting the Belle Isle tidal flats to Boston Harbor,
    - Requires 10 helical piles in the water body, salt marsh
    - a barge will be needed with other vehicular access coming through the marsh to the west
- More than 5,000 square feet (sf) of wetlands (associated with access through the marsh),
- Dredge or discharge of fill material in outstanding resource waters (pilings associated with foot bridge),
- Fill material in salt marsh (pilings associated with foot bridge),
- Alteration of more than 1,000 sf of salt marsh (temporary impacts associated with vehicular access for foot bridge construction,
- Work will be in the flood zone, and
- Work within jurisdictional filled tidelands.

The following sections discuss likely required local, state and federal permits based on the above noted assumptions.

2.0 LOCAL ENVIRONMENTAL PERMITS

Because this project will occur in both Boston and Winthrop, local permitting requirements will need to be met in both municipalities. The Massachusetts Wetlands Protection Act (MGL c.131 § 40) (WPA) and implementing regulations (310 CMR 10.00) is a State statute administered locally by local municipal conservation commissions. The WPA requires the preparation of a notice of intent (NOI) for work in or close to wetland resource areas, which includes open water (rivers, streams, ponds, lakes, and ocean), flood zones, salt marsh and tidal flats. The general performance standards for work or activities occurring within each wetland resource are identified in the WPA.

Because work will occur within areas protected under the WPA, a NOI would need to be submitted to both the Boston conservation commission and Winthrop conservation commission for review and approval.

While not an environmental reviewing agency, the Boston Harbor Master will likely need to be consulted because of the footbridge spanning a navigable waterway into Boston Harbor. Cost and permit review schedule are not provided for consultations/permits (if required) with the Boston Harbor Master.

2.1 Local Permitting Costs

Costs associated with two distinct NOIs include the following:

- Preparation of application form(s) and address all relevant elements
- Preparation of project narrative providing history and justification of project
- Identification of resources and methods for mitigation and restoration as well as minimization of impacts
- Incorporation of plans illustrating project limits and resource areas
- Provide public advertising as required
- Attend and assist in presentation of project at public site meetings
- Continued communication with reviewing agencies throughout the permit review period
- Incorporation of agency and client comments from site meeting

Permitting costs do not include the following:

- Engineering design
- Plan set development
- Project segmentation
- Studies or monitoring efforts as may be required by the reviewing agencies as part of their permit review.

Permit costs can vary depending on resource area impacts, project complexity, and reviewer comments. Costs may be on the higher end for this project because of likely impacts to salt marsh, tidal flats and salt marsh. These are considered highly valued resources and reviewers will closely scrutinize impacts and mitigation efforts for these resources. Local environmental permitting costs are provided in Table 1, below.

Table 1. Local Permit Costs

Permit	Minimum Cost	Maximum Cost
Notice of Intent (Boston)	$6,000	$9,000
Notice of Intent (Winthrop)	$6,000	$9,000
TOTAL	$12,000	$18,000

2.2 Local Permitting Review Schedule

To efficiently gain local permit approvals, it is recommended that the project proponent meet with the reviewing agencies before finalizing design or submitting permits. It is helpful to understand what the reviewer's questions or concerns will be and incorporate their comments when applicable into the permit submission. Once reviewers' comments are incorporated into the design plans, two distinct NOIs will be submitted (one to the Boston conservation and the other to the Winthrop conservation commission). Review times may take between 2 – 3 months from the time the permits are submitted.

3.0 STATE ENVIRONMENTAL PERMITS

Based on the assumed environmental impacts noted above, the following State permits will likely be required:

Massachusetts 401 Water Quality Certification (WQC) (314 CMR 9.00): Projects in Massachusetts involving the discharge of dredged or fill material, dredging, or dredged material disposal activities in waters of the United States, which require federal licenses or permits are subject to 314 CMR 9.00. Other projects requiring a WQC are those that add fill material in any outstanding waters and any fill in salt marsh. The purpose of the 401 Water Quality Certification is to ensure that proposed discharges of dredged or fill material, dredging and dredged material disposal comply with the Surface Water Quality Standards and other appropriate requirements of the state law. Work associated with the water crossing will result in fill in waters of the United States, outstanding resource waters, and salt marsh. As such, a WQC submission will be required.

Massachusetts Waterways Regulation (310 CMR 9.00) (Ch. 91 Review): 310 CMR 9.00 was enacted for the following purposes: (1) to protect and promote the public's interest in tidelands, Great Ponds, and non-tidal rivers and streams in accordance with the public trust doctrine, (2) to preserve and protect the rights in tidelands of the inhabitants of the Commonwealth by ensuring that the tidelands are utilized only for water-dependent uses or otherwise serve a proper public purpose, (3) protect the public health, safety, and general welfare as it may be affected by any project in tidelands, Great Ponds, and non-tidal rivers and streams, (4) support public and private efforts to revitalize unproductive property along urban waterfronts in a manner that promotes public use and enjoyment of the water, and (5) foster the right of the people to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, and historic, and esthetic qualities of their environment. Because the proposed water crossing will occur in jurisdictional filled and non-filled tidelands, a Ch. 91 review will be required.

Massachusetts Environmental Policy Act (MEPA, 301 CMR 11.0): The purpose of MEPA and 301 CMR 11.00 is to provide meaningful opportunities for public review of the potential environmental impacts of a project for which a permit is required from an agency of the Commonwealth, and to assist agencies of the Commonwealth in using all feasible means to avoid damage to the environment or, to the extent damage to the environment cannot be avoided, to minimize and mitigate damage to the environment to the maximum extent practicable. MEPA review is required when one or more review thresholds are met or exceeded and a state action is involved (i.e. state funding, state permits, etc.). For this project, it is assumed that the threshold being triggered is impacts more than 1,000 sf to salt marsh while the state action is state permits (WQC and Ch. 91 review as noted, above). The submission that would be required for MEPA review would be the Environmental Notification Form (ENF).

3.1 State Permitting Costs

State permitting costs are provided, below, in Table 2, below. Costs include the same tasks noted above for the local permitting costs discussion. Permit costs can vary depending on resource area impacts, project complexity, and reviewer comments.

Table 2. State Permit Costs

Permit	Minimum Cost	Maximum Cost
MEPA ENF	$7,000	$11,000
MassDEP Ch 91 permit	$7,000	$12,000
MassDEP 401 WQC	$8,000	$12,000
TOTAL	$22,000	$35,000

3.2 State Permitting Review Schedule

As noted above in the local permitting discussion, the most efficient method to gain permit approvals, will be to meet with the reviewing agencies before finalizing design or submitting permits. Ideally, the first state permit that should be submitted is the MEPA ENF. Any comments received during the review process could then be incorporated in the submission packages that would then be submitted for Ch. 91 and 401 WQC review. The MEPA review generally takes approximately 2 -3 months, while the WQC and Ch. 91 review take up to four and nine months, respectively. If the project submits to MEPA first and then incorporates the MEPA comments into the WQC and Ch. 91 submissions, it may take up to 12 months to gain state permit approvals.

This review duration can be reduced slightly, if needed, by submitting all three state permits at the same time. If this submission option is used, it is assumed that gaining approval for the state permits will take up to nine (9) months. The drawback of this approach is that if the MEPA office required plan modifications, these modifications will need to be incorporated into all of the other permits. This would require updated modification being sent to the permitting agencies, which can make the approval process more complicated.

4.0 FEDERAL ENVIRONMENTAL PERMITS

Based on the assumed environmental impacts noted above, the following federal reviews will likely be required:

US Army Corps of Engineers General Permits for the Commonwealth of Massachusetts: The U.S. Army Corps of Engineers (Corps) regulates construction and other work in navigable waterways under Section 10 of the Rivers and Harbors Act of 1899, and has authority over the discharge of dredged or fill material into "waters of the United States" (a term which includes wetlands and all other aquatic areas) under Section 404 of the Clean Water Act. Under these laws, those who seek to carry out such work must first receive a permit from the Corps. The program considers the full public interest by balancing the favorable impacts against the detrimental impacts. This is known as the "public interest review." The program reflects the national concerns for both the protection and utilization of important resources. In Massachusetts, regional general permits can be issued for certain activities with no more than minimal adverse effects on the aquatic environment. Given the scope and extent of this project project, it is likely that the activities would be eligible for authorization under a General Permit, and would therefore require a Pre-Construction Notification (PCN) submittal based on impacts associated with the foot bridge water crossing.

Massachusetts Coastal Zone Management Federal Consistency (15 CFR 930 Subparts A-I): The federal consistency requirement of the CZMA (16 U.S.C. § 1456) holds that federal actions that have reasonably foreseeable effects on any land or water use or natural resources of a state coastal zone must be consistent with the enforceable policies of the federally approved coastal management program for that state. Within this authority of the CZMA, Massachusetts Coastal Zone Management (CZM) may review federal actions affecting their coastal uses and/or resources, regardless of whether the action occurs within or outside the state coastal zone boundary, to ensure that such activities are consistent with the state's enforceable program policies. The Massachusetts CZM reviews the coastal effects of proposed actions, including environmental effects (i.e., impacts on biological or physical resources found within the state coastal zone), as well as effects on human uses, such as fishing and boating, public access and recreation, scenic and aesthetic enjoyment, and resource creation or restoration. Because both Boston and Winthrop are considered coastal communities, and a federal action will occur (submission of the federal Corps PCN permit), CZM review will be required. Normally the CZM review occurs as part of the Corps PCN review process (the CZM office will review the project and provide comments to the Corps). It is assumed that this will be the process for CZM review for this project.

While not an environmental reviewing agency, the U.S. Coast Guard will likely need to be consulted because of the footbridge spanning a navigable waterway into Boston Harbor. Cost and permit review schedule are not provided for consultations/permits (if required) with the U.S. Coast Guard.

4.1 Federal Permitting Costs

Federal permitting costs include the same tasks noted above for the local permitting costs discussion. Permit costs can vary depending on resource area impacts, project complexity, and reviewer comments. Permit costs for the CZM review are not provided as it is assumed that the CZM review will occur as part of the Corps PCN review process. Costs with the Corps PCN review include addressing CZM comments provided to the Corps. Costs associated with federal permitting are provided in Table 3, below.

Table 3. Federal Permit Costs

Permit	Minimum Cost	Maximum Cost
Corps PCN	$8,000	$14,000
TOTAL	$8,000	$14,000

4.2 Federal Permitting Review Schedule

As noted above in the local permitting discussion, the most efficient method to gain permit approvals will be to meet with the reviewing agencies before finalizing design or submitting permits. Once reviewers' comments are incorporated into the design plans, the Corps PCN can be submitted simultaneously. The Corps review process can take up to 5 months before obtaining official Corps approval.

5.0 GENERAL PERMITTING COMMENT

The proposed greenway extension will occur on several different parcels with different owners. Before permits can be submitted, agreements with all landowners will need to be in place approving the project. Reviewing agencies will not approve projects that do not have approval of all landowners in place.

6.0 SUMMARY

To determine local, state and federal permitting requirements for the Mary Ellen Welch Greenway (MEWG) project, potentially impacted environmental resources for the entire limit of work were estimated using MassGIS data layers to map these resources. These environmental resources include:

- Area of Critical Environmental Concern (Rumney Marshes/Belle Isle)
- Outstanding resource waters (to an ACEC)
- Flood zone
- Wetlands (open water body, tidal flats, salt marsh, marsh)

Likely required local, state and federal permits were then identified for the project. These permits, and range of costs, are included in Table 4, below.

Table 4. Total Permit Costs

Permit Level	Permit	Minimum Cost	Maximum Cost
Local	NOI (Boston)	$6,000	$9,000
Local	NOI (Winthrop)	$6,000	$9,000
State	MEPA ENF	$7,000	$11,000
State	MassDEP Ch 91 permit	$7,000	$12,000
State	MassDEP 401 WQC	$8,000	$12,000
Federal	Corps PCN	$8,000	$14,000
	TOTAL	$42,000	$67,000

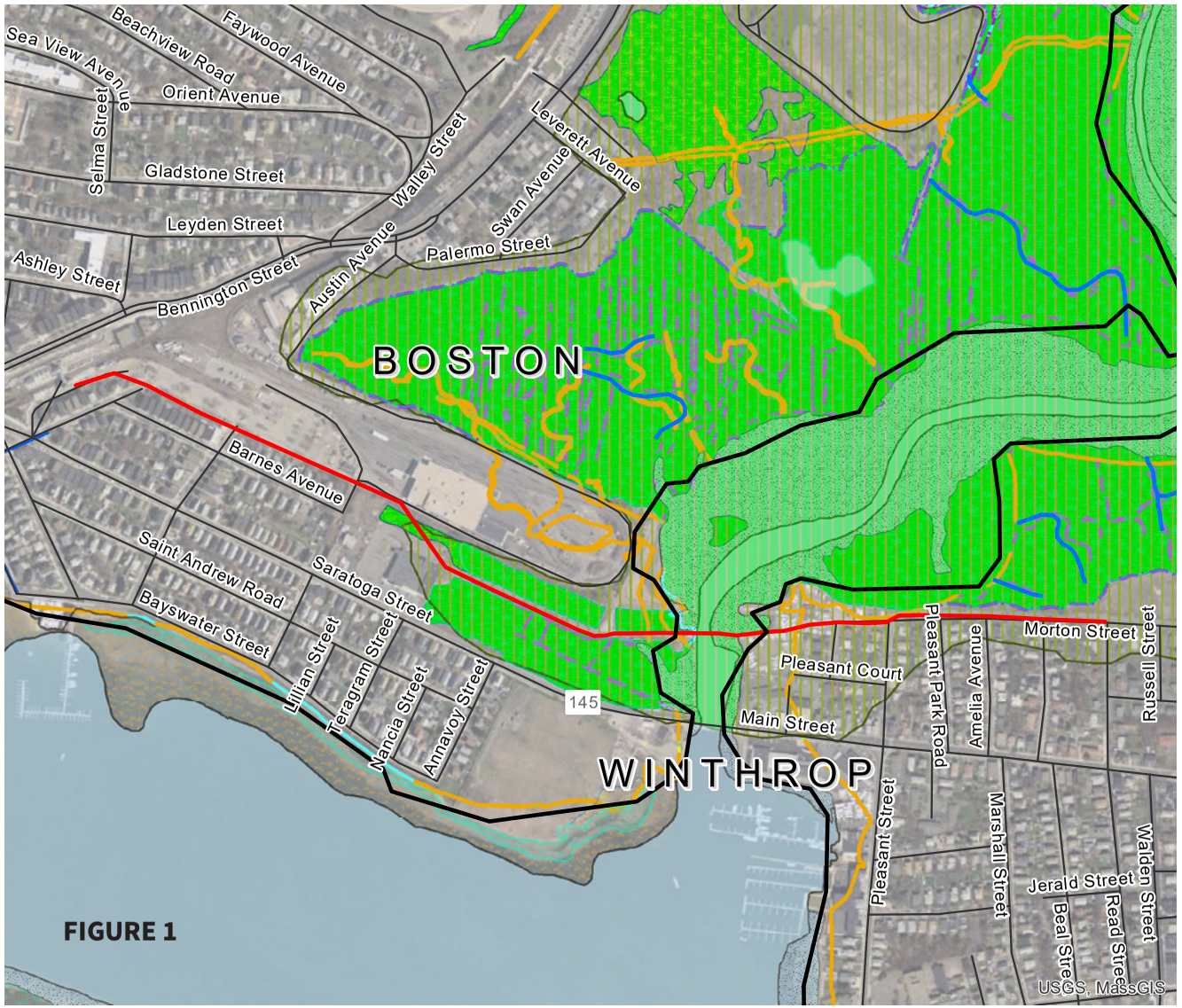
Associated permit costs and review periods were then identified for each permit. Total project environmental permitting costs are estimated to be between $52,000 and $77,000. These costs are taking into consideration that this will likely be a complex project to permit due to likely salt marsh impacts. It has been our experience that projects with salt marsh impacts are more carefully scrutinized by the reviewing agencies.

Before permits are submitted, approvals and/or agreements of all landowners of parcels where the extension will be located need to be in place.

Permit approval duration will likely require between nine and twelve months before obtaining all agency approvals. Ideally, the MEPA ENF would first be submitted with MEPA comments incorporated into the remaining permits, which would be submitted all at the same time. However, a modified, shorter permit duration could occur if all five permits are submitted concurrently.

While not considered environmental reviewing agency, the Boston Harbor Master and U.S. Coast Guard will likely need to be consulted because of the footbridge spanning a navigable waterway into Boston Harbor.

Path: \\wse03.local\WSE\Projects\MA\Winthrop, MA\MEWG Winthrop Extension Feasibility Study\Permitting\GIS\Environmental Receptor - MEWGW.mxd User: higginsm Saved: 9/15/2020 2:53:54 PM Opened: 9/15/2020 2:55:22 PM



MA Towns
Path
Perennial Stream
Intermittent Stream
Marsh/Bog
Wooded marsh
Cranberry Bog
Salt Marsh
Open Water
Reservoir (with PWSID)
Tidal Flats
Beach/Dune

Ch 91 Jurisdiction

Public Way
Marsh Boundary - landward
Landlocked Tidelands
Jurisdiction
Historic High Water
Marsh Boundary - seaward
Contemporary High Water
Inferrred Contemporary High Water
Inferred Historic High Water

ACECs

ACECs

NHESP Habitats

NHESP Estimated Habitats of Rare Wildlife
NHESP Priority Habitats of Rare Species
NHESP Certified Vernal Pools
NHESP Potential Vernal Pools

Outstanding Resource Waters

ORW for ACEC

FIGURE 1

MEWGW
Winthrop/Boston, MA

Environmental
Resource Map

Weston & Sampson

Path: \\wse03.local\WSE\Projects\MA\Winthrop, MA\MEWG Winthrop Extension Feasibility Study\Permitting\GIS\Human Receptor MEWGW.mxd User: higginsm Saved: 9/15/2020 2:58:32 PM Opened: 9/15/2020 2:58:42 PM

N
W E
S

800 400 0 800
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

MA Towns
Path
State Registry of Historic Places
All Underground Storage Tanks

Tier Classified Sites
Tier 1A
Tier 1B
Tier 1C
Tier 1D
Tier II

PUBLIC WATER SUPPLIES
Community Ground Water
Community Surface Water
Surface Distribution Site
Non-Transient Non-Community
Transient Non-Community
Proposed Well

CH21E AUL Sites
CH21E AUL Sites

DEP BWP Major Facilities

Large Quantity Generators (LQG)
EPA/RCRA-regulated Hazard. Waste
MA-regulated Hazard. Waste
MA and EPA/RCRA-regulated Hazard. Waste

MassDOT Roads
Zone I
Solid Waste Facilities - All Landfills
IWPAs
DEP Approved Zone IIs
Zone A
ZONE B

Open Space
State

FIGURE 2
MEWGW
Winthrop/Boston MA

Human Receptor Map

Weston & Sampson

National Flood Hazard Layer FIRMette

FEMA

71°0'15"W 42°23'15"N

70°59'37"W 42°22'49"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

FIGURE 3W

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- **SPECIAL FLOOD HAZARD AREAS**
  - Without Base Flood Elevation (BFE) *Zone A, V, A99*
  - With BFE or Depth *Zone AE, AO, AH, VE, AR*
  - Regulatory Floodway
- **OTHER AREAS OF FLOOD HAZARD**
  - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
  - Future Conditions 1% Annual Chance Flood Hazard *Zone X*
  - Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
  - Area with Flood Risk due to Levee *Zone D*
- **OTHER AREAS**
  - NO SCREEN Area of Minimal Flood Hazard *Zone X*
  - Effective LOMRs
  - Area of Undetermined Flood Hazard *Zone D*
- **GENERAL STRUCTURES**
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
- **OTHER FEATURES**
  - 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
  - Coastal Transect
  - Base Flood Elevation Line (BFE)
  - Limit of Study
  - Jurisdiction Boundary
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
- **MAP PANELS**
  - Digital Data Available
  - No Digital Data Available
  - Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/17/2020 at 12:45 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

FIGURE 3E

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- SPECIAL FLOOD HAZARD AREAS
  - Without Base Flood Elevation (BFE) *Zone A, V, A99*
  - With BFE or Depth *Zone AE, AO, AH, VE, AR*
  - Regulatory Floodway
- OTHER AREAS OF FLOOD HAZARD
  - 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
  - Future Conditions 1% Annual Chance Flood Hazard *Zone X*
  - Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
  - Area with Flood Risk due to Levee *Zone D*
- OTHER AREAS
  - NO SCREEN Area of Minimal Flood Hazard *Zone X*
  - Effective LOMRs
  - Area of Undetermined Flood Hazard *Zone D*
- GENERAL STRUCTURES
  - Channel, Culvert, or Storm Sewer
  - Levee, Dike, or Floodwall
- OTHER FEATURES
  - 20.2 Cross Sections with 1% Annual Chance
  - 17.5 Water Surface Elevation
  - Coastal Transect
  - Base Flood Elevation Line (BFE)
  - Limit of Study
  - Jurisdiction Boundary
  - Coastal Transect Baseline
  - Profile Baseline
  - Hydrographic Feature
- MAP PANELS
  - Digital Data Available
  - No Digital Data Available
  - Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

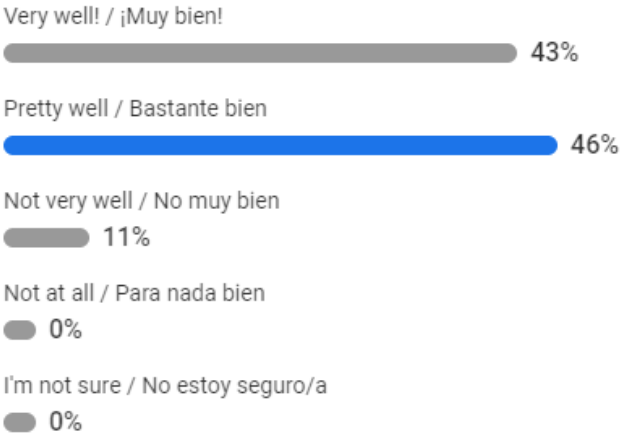
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/17/2020 at 12:42 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

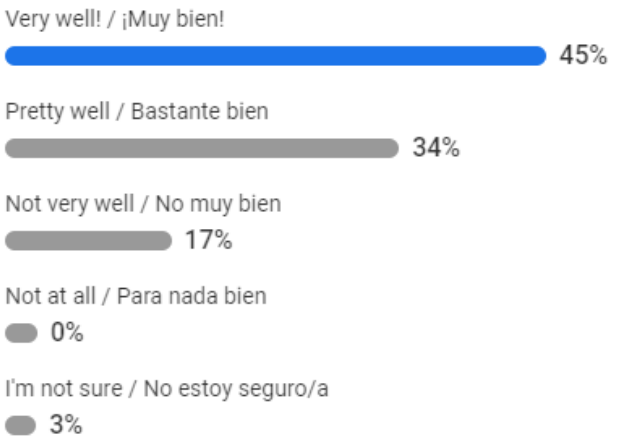
APPENDIX F

In-meeting Polling Results

How well does the highest scoring route meet the SHARED vision? / ¿Qué tan bien responde la ruta con el mayor puntaje a la visión COMÚN? 28



How well does the highest scoring route meet YOUR travel or recreational needs? / ¿Qué tan bien responde la ruta con mayor puntaje a TUS necesidades de desplazamiento o recreación? 29



G

APPENDIX G

Cost Estimate Worksheets

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 1 OF 2

	PROJECT DESCRIPTION		INPUT	CLICK INFO
1	What year is the project expected to begin construction?		2023	
2	Should the estimate include cost of engineering design and/or traffic control?		Design	
3	How many distinct segments of path are there? (differing exist. or prop. conditons)		1	
	Input a number between 1 and 4.	Segment 1		
4	What is the length of the segment of path? *(in feet)*	920 ft		
5	What are the existing conditions of the area?	Roadway		
6	What type of path is being proposed?	Roadway Sidepath		
7	What material will the shared used path be?	Asphalt		
8	What material will the shoulders be?	Grass		
9	What is the width of the path? *(Typ. range: 10 ft to 14 ft)*	10 ft		
10	Will a separate equestrian path be provided?	No		
		Clear out any extra data shown in red		
11	What length of the path requires boardwalk due to unavoidable wetlands?			
	Please see the Guidance Document and consult the MassGIS website to locate wetlands:		OLIVER	
12	Are there steep separations or resource areas that may require retaining walls?		No	
13	Is the ROW constrained in any locations?		Most of the length	
14	How many crossings with roadways are there?			
	Please fill in the information in the chart on the next page.			
15	How many crossings are there over bodies of water?			
	Please fill in the information in the chart on the next page.			
16	How many crossings are there with a active railroads?			
	Please fill in the information in the chart on the next page.			
17	What is the extent of landscape restoration and enhancements?		Advanced	
18	How many parking spaces will be provided?			
19	Will the path require lighting along its length?		No	
19a	*If not along the entire length, what length requires lighting?*			
19b	*If there is lighting, should security be included?*		No	

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 2 OF 2

Roadway Crossing Information Table

	Location Info	Speed Info	Lane Info	Traffic Info	Type Info	Lighting Info	
#	Location	Speed (mph)	Total # Lanes	Traffic	Type	Lighting Needs	**Treatment**

River Crossing Information Table

	River Info	Bridge Info	Lighting Info
#	River Width (ft)	Existing Bridge?	Lighting Needs

Railroad Crossing Information Table

	Rail Length	Type Info	Structure Info	Lighting Info
#	Length (ft)	Type	Existing Structure?	Lighting Needs

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

ESTIMATING TOOL ASSUMPTIONS

The statewide unit cost prices are exported from the MassDOT website.

Estimating tool excludes costs associated with environmental permitting and right-of-way.

Two (2) foot shoulders are also assumed on each side of the path.

Assume there is a wooden rail fence for 50% of length if area identified as hilly or waterfront; 25% otherwise. Boardwalks are assumed to have fencing along their entire length on both sides.

For a roadway sidepath, assume closed drainage and curbing are required.
Catch basins and manholes are placed every 250 feet and granite curb is estimated for the length of the segment(s).

Culverts are assumed to meet the minimum size requirements using a 10' x 16' precast box.

Light standards are placed every 50 feet along the length of the path.

The tool can perform estimates for shared use paths within the following ranges:
20 roadway crossings, 5 river crossings, 5 railroad crossings

Assume two (2) curb ramps at each intersection crossing, each with an area of about 15 square yards.

Security cameras will be hard-wired to avoid monthly fees & storage issues. Connection to data centers not included.

Surveillance cameras are assumed at every 500 feet along the length for which security is required.

The design cost associated with landscaping is included in the estimated cost.

Work limits do not extend on to side streets at intersections. This work must be calculated outside of the tool.

Survey cost is calculated using an average base price developed through analysis of current design projects and a multiplier based on existing conditions specified on Projects Inputs - Page 1 of 2.

Shared Used Path Design Guide

Cost Estimator

PROJECT COST SUMMARY

Project Name: MEWG - Winthrop Extension: Morton Street
Project Location: Winthrop, MA

PROJECT CATEGORY				ESTIMATED PRICE
Path	Length: 920 ft	Width: 10 ft		$190,600.00
	# Segments: 1	# Intersections: 0		
Structures				$13,300.00
Landscaping Restoration & Enhancements				$45,600.00
Lighting & Security				$0.00
CONSTRUCTION COST				
Traffic Control	*Traffic cost not included*		TTCP COST	$0.00
			SUBTOTAL	$249,500.00
			Contingency (assume 15%)	*$37,425.00*
			CONSTRUCTION COST	$286,925.00 **
Cost Escalation	Construction Year: 2023		**CONSTRUCTION TOTAL**	**$313,150.00**
Assumed 4.47% increase in costs per year			**COST PER MILE**	**$1,797,210.00**

***Use this estimated cost on PIF forms - escalation is already included on the MassDOT Website*

NON-CONSTRUCTION COSTS (NOT ESCALATED)			
Survey	*Based on existing conditons*	SURVEY COST	$13,100.00
Design	*Assume 16% of construction cost*	DESIGN COST	$44,858.00
		PROJECT TOTAL	**$371,108.00**

Click to Generate Error/Informational Warning Report

-Costs for ROW and permitting are not included in this estimate.
-Environmental mitigation from paving a parking lot may be required. Cost not included.
-Your project includes culverts and/or bridges. Please consult a structural engineer for more accurate costs.

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 1 OF 2

	PROJECT DESCRIPTION		INPUT	CLICK INFO
1	What year is the project expected to begin construction?		2023	
2	Should the estimate include cost of engineering design and/or traffic control?		Design	
3	How many distinct segments of path are there? (differing exist. or prop. conditons)		1	
	Input a number between 1 and 4.	Segment 1		
4	What is the length of the segment of path? *(in feet)*	1,050 ft		
5	What are the existing conditions of the area?	Roadway		
6	What type of path is being proposed?	Roadway Sidepath		
7	What material will the shared used path be?	Asphalt		
8	What material will the shoulders be?	Asphalt		
9	What is the width of the path? *(Typ. range: 10 ft to 14 ft)*	10 ft		
10	Will a separate equestrian path be provided?	No		
		Clear out any extra data shown in red		
11	What length of the path requires boardwalk due to unavoidable wetlands?			
	Please see the Guidance Document and consult the MassGIS website to locate wetlands:		OLIVER	
12	Are there steep separations or resource areas that may require retaining walls?		No	
13	Is the ROW constrained in any locations?		Most of the length	
14	How many crossings with roadways are there?			
	Please fill in the information in the chart on the next page.			
15	How many crossings are there over bodies of water?			
	Please fill in the information in the chart on the next page.			
16	How many crossings are there with a active railroads?			
	Please fill in the information in the chart on the next page.			
17	What is the extent of landscape restoration and enhancements?		Advanced	
18	How many parking spaces will be provided?			
19	Will the path require lighting along its length?		Yes	
19a	*If not along the entire length, what length requires lighting?*			
19b	*If there is lighting, should security be included?*		No	

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 2 OF 2

Roadway Crossing Information Table

	Location Info	Speed Info	Lane Info	Traffic Info	Type Info	Lighting Info	
#	Location	Speed (mph)	Total # Lanes	Traffic	Type	Lighting Needs	**Treatment**

River Crossing Information Table

	River Info	Bridge Info	Lighting Info
#	River Width (ft)	Existing Bridge?	Lighting Needs

Railroad Crossing Information Table

	Rail Length	Type Info	Structure Info	Lighting Info
#	Length (ft)	Type	Existing Structure?	Lighting Needs

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

ESTIMATING TOOL ASSUMPTIONS

The statewide unit cost prices are exported from the MassDOT website.

Estimating tool excludes costs associated with environmental permitting and right-of-way.

Two (2) foot shoulders are also assumed on each side of the path.

Assume there is a wooden rail fence for 50% of length if area identified as hilly or waterfront; 25% otherwise. Boardwalks are assumed to have fencing along their entire length on both sides.

For a roadway sidepath, assume closed drainage and curbing are required.
Catch basins and manholes are placed every 250 feet and granite curb is estimated for the length of the segment(s).

Culverts are assumed to meet the minimum size requirements using a 10' x 16' precast box.

Light standards are placed every 50 feet along the length of the path.

The tool can perform estimates for shared use paths within the following ranges:
20 roadway crossings, 5 river crossings, 5 railroad crossings

Assume two (2) curb ramps at each intersection crossing, each with an area of about 15 square yards.

Security cameras will be hard-wired to avoid monthly fees & storage issues. Connection to data centers not included.

Surveillance cameras are assumed at every 500 feet along the length for which security is required.

The design cost associated with landscaping is included in the estimated cost.

Work limits do not extend on to side streets at intersections. This work must be calculated outside of the tool.

Survey cost is calculated using an average base price developed through analysis of current design projects and a multiplier based on existing conditions specified on Projects Inputs - Page 1 of 2.

Shared Used Path Design Guide

Cost Estimator

PROJECT COST SUMMARY

Project Name: MEWG - Winthrop Extension: Orient Heights T Station to End of Barnes Street
Project Location: East Boston, MA

PROJECT CATEGORY			ESTIMATED PRICE
Path	Length: 1,050 ft	Width: 10 ft	$242,800.00
	# Segments: 1	# Intersections: 0	
Structures			$32,700.00
Landscaping Restoration & Enhancements			$51,300.00
Lighting & Security			$224,600.00

CONSTRUCTION COST

Traffic Control	*Traffic cost not included*	TTCP COST	$0.00
		SUBTOTAL	$551,400.00
		Contingency (assume 15%)	*$82,710.00*
		CONSTRUCTION COST	$634,110.00 **
Cost Escalation	Construction Year: 2023	**CONSTRUCTION TOTAL**	**$692,070.00**
Assumed 4.47% increase in costs per year		**COST PER MILE**	**$3,480,120.00**

***Use this estimated cost on PIF forms - escalation is already included on the MassDOT Website*

NON-CONSTRUCTION COSTS (NOT ESCALATED)

Survey	*Based on existing conditons*	SURVEY COST	$14,900.00
Design	*Assume 10% of construction cost*	DESIGN COST	$60,610.00
		PROJECT TOTAL	**$767,580.00**

Click to Generate Error/Informational Warning Report

-Costs for ROW and permitting are not included in this estimate.
-Environmental mitigation from paving a parking lot may be required. Cost not included.
-Your project includes culverts and/or bridges. Please consult a structural engineer for more accurate costs.

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 1 OF 2

	PROJECT DESCRIPTION	INPUT	CLICK INFO
1	What year is the project expected to begin construction?	2023	
2	Should the estimate include cost of engineering design and/or traffic control?	Design	
3	How many distinct segments of path are there? (differing exist. or prop. conditons)	3	
	Input a number between 1 and 4.		

		Segment 1	Segment 2	Segment 3	
4	What is the length of the segment of path? *(in feet)*	275 ft	570 ft	1,680 ft	
5	What are the existing conditions of the area?	Wooded/hilly	Roadway	Roadway	
6	What type of path is being proposed?	Other SUP	Roadway Sidepath	Roadway Sidepath	
7	What material will the shared used path be?	Asphalt	Asphalt	Asphalt	
8	What material will the shoulders be?	Grass	Asphalt	Asphalt	
9	What is the width of the path? *(Typ. range: 10 ft to 14 ft)*	10 ft	10 ft	10 ft	
10	Will a separate equestrian path be provided?	No	No	No	

Clear out any extra data shown in red

11	What length of the path requires boardwalk due to unavoidable wetlands?		
	Please see the Guidance Document and consult the MassGIS website to locate wetlands:	OLIVER	
12	Are there steep separations or resource areas that may require retaining walls?	No	
13	Is the ROW constrained in any locations?	Most of the length	
14	How many crossings with roadways are there?	1	
	Please fill in the information in the chart on the next page.		
15	How many crossings are there over bodies of water?		
	Please fill in the information in the chart on the next page.		
16	How many crossings are there with a active railroads?		
	Please fill in the information in the chart on the next page.		
17	What is the extent of landscape restoration and enhancements?	Advanced	
18	How many parking spaces will be provided?		
19	Will the path require lighting along its length?	Yes	
19a	*If not along the entire length, what length requires lighting?*	275 ft	
19b	*If there is lighting, should security be included?*	No	

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 2 OF 2

Roadway Crossing Information Table

	Location Info	Speed Info	Lane Info	Traffic Info	Type Info	Lighting Info
#	Location	Speed (mph)	Total # Lanes	Traffic	Type	Lighting Needs
1	Intersection (Uncontrolled)	<30	2	Heavy	At-Grade	Yes, new lighting

Treatment
Traffic Device

River Crossing Information Table

	River Info	Bridge Info	Lighting Info
#	River Width (ft)	Existing Bridge?	Lighting Needs

Railroad Crossing Information Table

	Rail Length	Type Info	Structure Info	Lighting Info
#	Length (ft)	Type	Existing Structure?	Lighting Needs

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

ESTIMATING TOOL ASSUMPTIONS

The statewide unit cost prices are exported from the MassDOT website.

Estimating tool excludes costs associated with environmental permitting and right-of-way.

Two (2) foot shoulders are also assumed on each side of the path.

Assume there is a wooden rail fence for 50% of length if area identified as hilly or waterfront; 25% otherwise. Boardwalks are assumed to have fencing along their entire length on both sides.

For a roadway sidepath, assume closed drainage and curbing are required.
Catch basins and manholes are placed every 250 feet and granite curb is estimated for the length of the segment(s).

Culverts are assumed to meet the minimum size requirements using a 10' x 16' precast box.

Light standards are placed every 50 feet along the length of the path.

The tool can perform estimates for shared use paths within the following ranges:
20 roadway crossings, 5 river crossings, 5 railroad crossings

Assume two (2) curb ramps at each intersection crossing, each with an area of about 15 square yards.

Security cameras will be hard-wired to avoid monthly fees & storage issues. Connection to data centers not included.

Surveillance cameras are assumed at every 500 feet along the length for which security is required.

The design cost associated with landscaping is included in the estimated cost.

Work limits do not extend on to side streets at intersections. This work must be calculated outside of the tool.

Survey cost is calculated using an average base price developed through analysis of current design projects and a multiplier based on existing conditions specified on Projects Inputs - Page 1 of 2.

Shared Used Path Design Guide

Cost Estimator

PROJECT COST SUMMARY

Project Name: MEWG - Winthrop Extension: Back of CVS to End of Bayswater
Project Location: East Boston and Winthrop, MA

PROJECT CATEGORY				ESTIMATED PRICE
Path	Length: 2,525 ft	Width: 10 ft		$603,600.00
	# Segments: 3	# Intersections: 1		
Structures				$55,800.00
Landscaping Restoration & Enhancements				$123,200.00
Lighting & Security				$85,900.00
CONSTRUCTION COST				
Traffic Control	*Traffic cost not included*		TTCP COST	$0.00
			SUBTOTAL	$868,500.00
			Contingency (assume 15%)	*$130,275.00*
			CONSTRUCTION COST	$998,775.00 **
Cost Escalation	Construction Year: 2023		**CONSTRUCTION TOTAL**	**$1,090,060.00**
Assumed 4.47% increase in costs per year			**COST PER MILE**	**$2,279,410.00**

***Use this estimated cost on PIF forms - escalation is already included on the MassDOT Website*

NON-CONSTRUCTION COSTS (NOT ESCALATED)			
Survey	*Based on existing conditons*	SURVEY COST	$36,500.00
Design	*Assume 13% of construction cost*	DESIGN COST	$131,880.00
		PROJECT TOTAL	**$1,258,440.00**

Click to Generate Error/Informational Warning Report

-Costs for ROW and permitting are not included in this estimate.
-Environmental mitigation from paving a parking lot may be required. Cost not included.
-Your project includes culverts and/or bridges. Please consult a structural engineer for more accurate costs.

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 1 OF 2

	PROJECT DESCRIPTION	INPUT			CLICK INFO
1	What year is the project expected to begin construction?	2023			
2	Should the estimate include cost of engineering design and/or traffic control?	Design			
3	How many distinct segments of path are there? (differing exist. or prop. conditons)	3			
	Input a number between 1 and 4.	Segment 1	Segment 2	Segment 3	
4	What is the length of the segment of path? *(in feet)*	1,000 ft	750 ft	900 ft	
5	What are the existing conditions of the area?	Utility Corridor	Waterfront	Wooded/hilly	
6	What type of path is being proposed?	Other SUP	Other SUP	Other SUP	
7	What material will the shared used path be?	Asphalt	Unpaved	Asphalt	
8	What material will the shoulders be?	Grass	Unpaved	Stabilized Aggregate	
9	What is the width of the path? *(Typ. range: 10 ft to 14 ft)*	10 ft	10 ft	10 ft	
10	Will a separate equestrian path be provided?	No	No	No	
	Clear out any extra data shown in red				
11	What length of the path requires boardwalk due to unavoidable wetlands?	900 ft			
	Please see the Guidance Document and consult the MassGIS website to locate wetlands:	OLIVER			
12	Are there steep separations or resource areas that may require retaining walls?	No			
13	Is the ROW constrained in any locations?	Most of the length			
14	How many crossings with roadways are there?				
	Please fill in the information in the chart on the next page.				
15	How many crossings are there over bodies of water?	1			
	Please fill in the information in the chart on the next page.				
16	How many crossings are there with a active railroads?				
	Please fill in the information in the chart on the next page.				
17	What is the extent of landscape restoration and enhancements?	Advanced			
18	How many parking spaces will be provided?				
19	Will the path require lighting along its length?	Yes			
19a	*If not along the entire length, what length requires lighting?*				
19b	*If there is lighting, should security be included?*				

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 2 OF 2

Roadway Crossing Information Table

	Location Info	Speed Info	Lane Info	Traffic Info	Type Info	Lighting Info	
#	Location	Speed (mph)	Total # Lanes	Traffic	Type	Lighting Needs	**Treatment**

River Crossing Information Table

	River Info	Bridge Info	Lighting Info
#	River Width (ft)	Existing Bridge?	Lighting Needs
1	750	No	Yes, new lighting

Railroad Crossing Information Table

	Rail Length	Type Info	Structure Info	Lighting Info
#	Length (ft)	Type	Existing Structure?	Lighting Needs

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

ESTIMATING TOOL ASSUMPTIONS

The statewide unit cost prices are exported from the MassDOT website.

Estimating tool excludes costs associated with environmental permitting and right-of-way.

Two (2) foot shoulders are also assumed on each side of the path.

Assume there is a wooden rail fence for 50% of length if area identified as hilly or waterfront; 25% otherwise. Boardwalks are assumed to have fencing along their entire length on both sides.

For a roadway sidepath, assume closed drainage and curbing are required.
Catch basins and manholes are placed every 250 feet and granite curb is estimated for the length of the segment(s).

Culverts are assumed to meet the minimum size requirements using a 10' x 16' precast box.

Light standards are placed every 50 feet along the length of the path.

The tool can perform estimates for shared use paths within the following ranges:
20 roadway crossings, 5 river crossings, 5 railroad crossings

Assume two (2) curb ramps at each intersection crossing, each with an area of about 15 square yards.

Security cameras will be hard-wired to avoid monthly fees & storage issues. Connection to data centers not included.

Surveillance cameras are assumed at every 500 feet along the length for which security is required.

The design cost associated with landscaping is included in the estimated cost.

Work limits do not extend on to side streets at intersections. This work must be calculated outside of the tool.

Survey cost is calculated using an average base price developed through analysis of current design projects and a multiplier based on existing conditions specified on Projects Inputs - Page 1 of 2.

Shared Used Path Design Guide

Cost Estimator

PROJECT COST SUMMARY

Project Name: MEWG - Winthrop Extension: Barnes Street to Morton Street
Project Location: East Boston and Winthrop, MA

PROJECT CATEGORY				ESTIMATED PRICE
Path	Length: 2,650 ft	Width: 10 ft		$154,000.00
	# Segments: 3	# Intersections: 0		
Structures				$9,191,600.00
Landscaping Restoration & Enhancements				$186,400.00
Lighting & Security				$643,800.00

CONSTRUCTION COST

Traffic Control	*Traffic cost not included*	TTCP COST	$0.00
		SUBTOTAL	$10,175,800.00
		Contingency (assume 15%)	*$1,526,370.00*
		CONSTRUCTION COST	$11,702,170.00 **
Cost Escalation	Construction Year: 2023	**CONSTRUCTION TOTAL**	**$12,771,730.00**
Assumed 4.47% increase in costs per year		**COST PER MILE**	**$25,447,070.00**

***Use this estimated cost on PIF forms - escalation is already included on the MassDOT Website*

NON-CONSTRUCTION COSTS (NOT ESCALATED)

Survey	*Based on existing conditons*	SURVEY COST	$39,600.00
Design	*Assume 14% of construction cost*	DESIGN COST	$1,682,208.00
		PROJECT TOTAL	**$14,493,538.00**

Click to Generate Error/Informational Warning Report

-Costs for ROW and permitting are not included in this estimate.
-Environmental mitigation from paving a parking lot may be required. Cost not included.
-Your project includes culverts and/or bridges. Please consult a structural engineer for more accurate costs.

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 1 OF 2

	PROJECT DESCRIPTION		INPUT	CLICK INFO
1	What year is the project expected to begin construction?		2023	
2	Should the estimate include cost of engineering design and/or traffic control?		Design	
3	How many distinct segments of path are there? (differing exist. or prop. conditons)		1	
	Input a number between 1 and 4.	Segment 1		
4	What is the length of the segment of path? *(in feet)*	525 ft		
5	What are the existing conditions of the area?	Clear/flat		
6	What type of path is being proposed?	Other SUP		
7	What material will the shared used path be?	Porous Pavement		
8	What material will the shoulders be?	Grass		
9	What is the width of the path? *(Typ. range: 10 ft to 14 ft)*	10 ft		
10	Will a separate equestrian path be provided?	No		
		Clear out any extra data shown in red		
11	What length of the path requires boardwalk due to unavoidable wetlands?			
	Please see the Guidance Document and consult the MassGIS website to locate wetlands:		OLIVER	
12	Are there steep separations or resource areas that may require retaining walls?		No	
13	Is the ROW constrained in any locations?		Most of the length	
14	How many crossings with roadways are there?			
	Please fill in the information in the chart on the next page.			
15	How many crossings are there over bodies of water?			
	Please fill in the information in the chart on the next page.			
16	How many crossings are there with a active railroads?			
	Please fill in the information in the chart on the next page.			
17	What is the extent of landscape restoration and enhancements?		Advanced	
18	How many parking spaces will be provided?			
19	Will the path require lighting along its length?		No	
19a	*If not along the entire length, what length requires lighting?*			
19b	*If there is lighting, should security be included?*		No	

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

PROJECT INPUTS - PAGE 2 OF 2

Roadway Crossing Information Table

	Location Info	Speed Info	Lane Info	Traffic Info	Type Info	Lighting Info	
#	Location	Speed (mph)	Total # Lanes	Traffic	Type	Lighting Needs	**Treatment**

River Crossing Information Table

	River Info	Bridge Info	Lighting Info
#	River Width (ft)	Existing Bridge?	Lighting Needs

Railroad Crossing Information Table

	Rail Length	Type Info	Structure Info	Lighting Info
#	Length (ft)	Type	Existing Structure?	Lighting Needs

CHECK FOR ERRORS ← *Click Button before proceeding*

Shared Used Path Design Guide

Cost Estimator

ESTIMATING TOOL ASSUMPTIONS

The statewide unit cost prices are exported from the MassDOT website.

Estimating tool excludes costs associated with environmental permitting and right-of-way.

Two (2) foot shoulders are also assumed on each side of the path.

Assume there is a wooden rail fence for 50% of length if area identified as hilly or waterfront; 25% otherwise. Boardwalks are assumed to have fencing along their entire length on both sides.

For a roadway sidepath, assume closed drainage and curbing are required.
Catch basins and manholes are placed every 250 feet and granite curb is estimated for the length of the segment(s).

Culverts are assumed to meet the minimum size requirements using a 10' x 16' precast box.

Light standards are placed every 50 feet along the length of the path.

The tool can perform estimates for shared use paths within the following ranges:
20 roadway crossings, 5 river crossings, 5 railroad crossings

Assume two (2) curb ramps at each intersection crossing, each with an area of about 15 square yards.

Security cameras will be hard-wired to avoid monthly fees & storage issues. Connection to data centers not included.

Surveillance cameras are assumed at every 500 feet along the length for which security is required.

The design cost associated with landscaping is included in the estimated cost.

Work limits do not extend on to side streets at intersections. This work must be calculated outside of the tool.

Survey cost is calculated using an average base price developed through analysis of current design projects and a multiplier based on existing conditions specified on Projects Inputs - Page 1 of 2.

Shared Used Path Design Guide

Cost Estimator

PROJECT COST SUMMARY

Project Name: MEWG - Winthrop Extension: Constitution Beach to Bayswater
Project Location: East Boston, MA

PROJECT CATEGORY			ESTIMATED PRICE
Path	Length: 525 ft # Segments: 1	Width: 10 ft # Intersections: 0	$45,900.00
Structures			$3,700.00
Landscaping Restoration & Enhancements			$24,000.00
Lighting & Security			$0.00

CONSTRUCTION COST

Traffic Control	*Traffic cost not included*	TTCP COST	$0.00
		SUBTOTAL	$73,600.00
		Contingency (assume 15%)	*$11,040.00*
		CONSTRUCTION COST	$84,640.00 **
Cost Escalation	Construction Year: 2023	**CONSTRUCTION TOTAL**	**$92,380.00**
Assumed 4.47% increase in costs per year		**COST PER MILE**	**$929,080.00**

***Use this estimated cost on PIF forms - escalation is already included on the MassDOT Website*

NON-CONSTRUCTION COSTS (NOT ESCALATED)

Survey	*Based on existing conditons*	SURVEY COST	$6,700.00
Design	*Assume 13% of construction cost*	DESIGN COST	$10,912.00
		PROJECT TOTAL	**$109,992.00**

Click to Generate Error/Informational Warning Report

-Costs for ROW and permitting are not included in this estimate.
-Environmental mitigation from paving a parking lot may be required. Cost not included.
-Your project includes culverts and/or bridges. Please consult a structural engineer for more accurate costs.