

RESILIENT BENNINGTON STREET AND FREDERICKS PARK PROJECT (PHASE II)

SCHEMATIC DESIGN REPORT

June 2025

CITY of BOSTON



City of Revere





BENNINGTON STREET FACING EAST BOSTON | DECEMBER 2022

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PHOTO CREDIT

All photos were taken by Project team members, unless otherwise noted.



BENNINGTON STREET FACING REVERE | DECEMBER 2022

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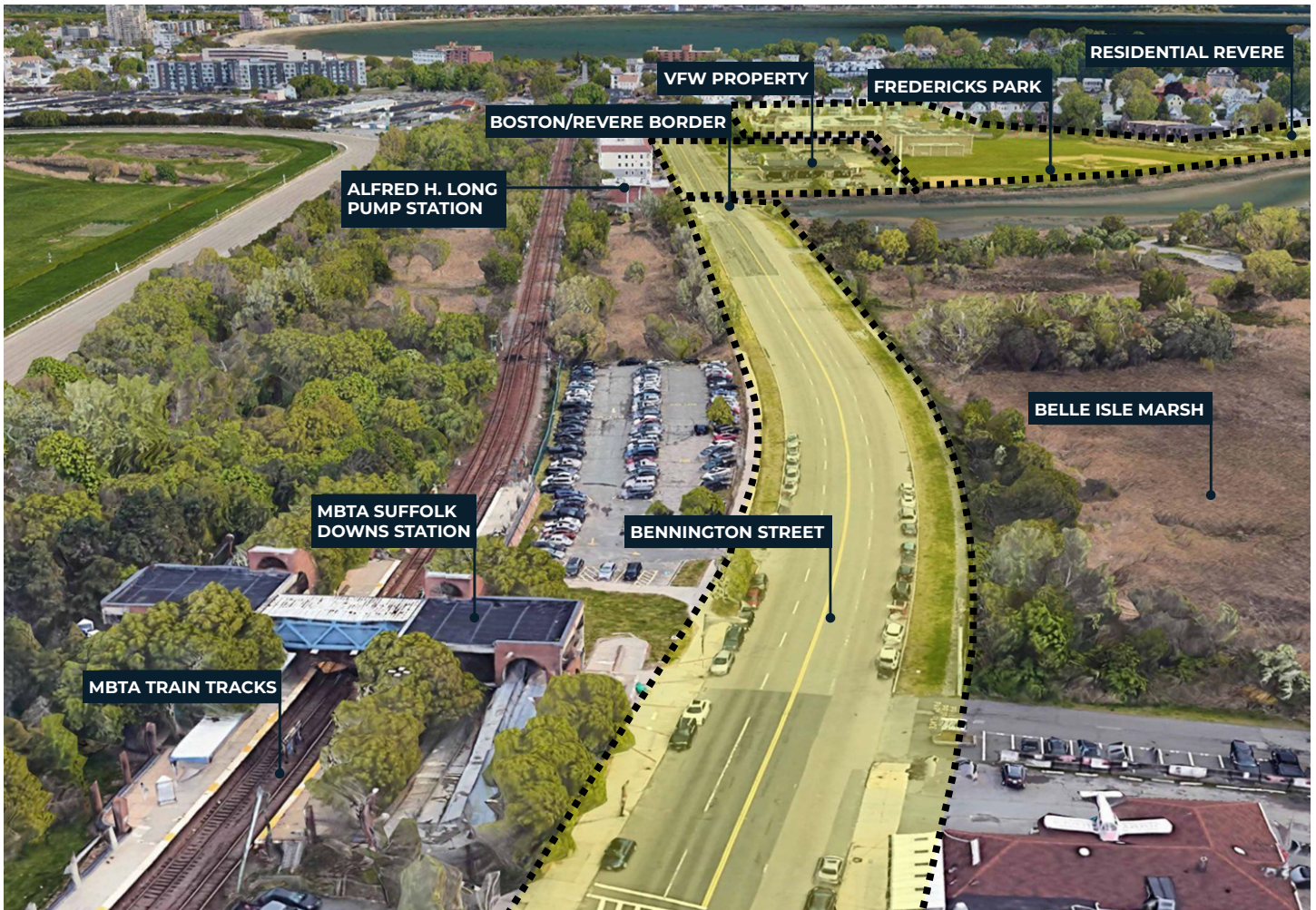
01 | INTRODUCTION

PROJECT HISTORY

The Resilient Bennington Street and Fredericks Park Project (“the Project”) is an ongoing effort between the cities of Boston and Revere to address coastal flooding under both current and future conditions. To address shared flood risk across both cities, Boston and Revere jointly pursued and received funding through the Commonwealth of Massachusetts’ Municipal Vulnerability Preparedness (MVP) grant program in 2023 to develop design alternatives for flood risk reduction on Bennington Street in East Boston as well as Fredericks Park and adjacent areas in Revere (**Figure 1: Project Area**).

The ongoing partnership between Boston and Revere attests to the tremendous benefit of working across municipal boundaries to develop resilience solutions as a region. Phase I of the Project consisted of site investigations, community and stakeholder engagement, and a detailed analysis of possible alternatives that could reduce flood risk in the Project area (see page 8-11 for a summary of the Feasibility Assessment and Alternatives Analysis Report). Boston and Revere subsequently received a second MVP grant in 2024 to advance the Project to further stages of design. Phase II of work consisted of additional site investigations, community and stakeholder engagement, and the development of schematic designs for the Project area, which are presented in this report.

Figure 1: Project Area



PROJECT TIMELINE AND PRIOR PLANNING

The Project builds upon several years of local and regional planning efforts (**Figure 2: Project Timeline and Prior Plans**).

City of Boston and City of Revere Climate Change and Natural Hazard Mitigation Plans:

At the local level, the City of Boston Climate Ready Boston initiative completed the [Coastal Resilience Solutions for East Boston \(Phase II\) plan](#) in 2022, which identified this area as a near-term priority for coastal resilience due to the extreme flood risk to the East Boston neighborhood. In 2019, Revere's [MVP Summary of Findings Report](#) identified the Belle Isle Marsh, Fredericks Park, Beachmont Veterans Memorial School ("Beachmont School"), and the adjacent Beachmont neighborhood as critical concerns due to current flood risk and the crucial need of preserving valuable recreational open space. The climate change impacts in this area are also identified in [Boston's Natural Hazard Mitigation Plan](#), which was adopted by Boston's City Council in 2021, as well as in [Revere's Natural Hazard Mitigation Plan](#), which was adopted by Revere's City Council in 2022.

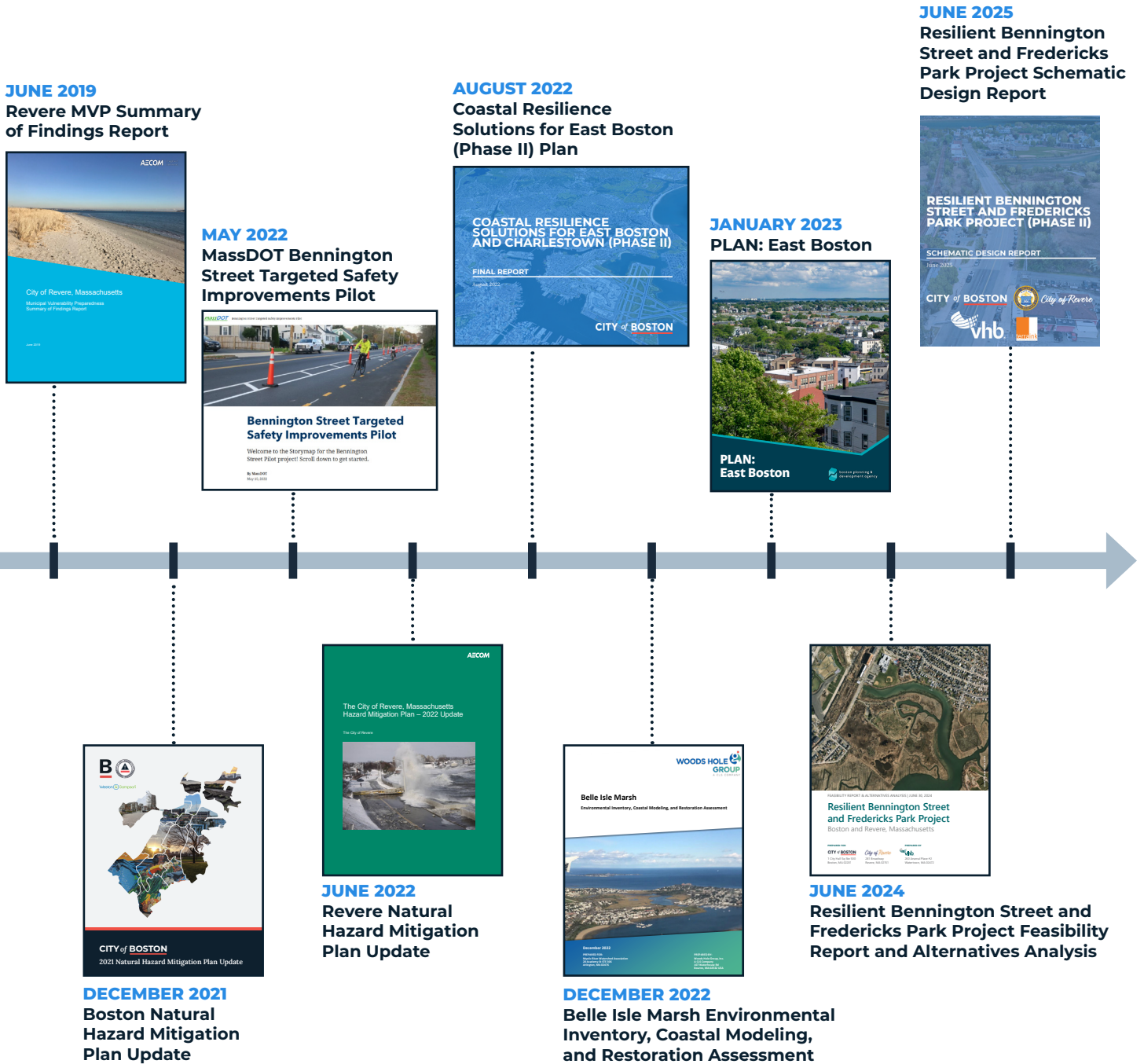
State and Local Transportation Plans:

The Massachusetts Department of Transportation (MassDOT) completed the [Bennington Street Targeted Safety Improvements Pilot](#) study in 2022, which studied opportunities to slow vehicle speeds, enhance pedestrian crossings, and close a gap in the bicycle network between the MBTA Suffolk Downs Station and Beachmont Station on the Blue Line with a goal of eventually connecting the Mary Ellen Welch Greenway in East Boston and Ocean Avenue in Revere. MassDOT's study evaluated the existing conditions of Bennington Street, traffic patterns and counts, and safety improvement options. The study's proposed conceptual design featured a reduction in the number of vehicle travel lanes from four to two, the addition of a shared center-running turn lane, and a two-way bike lane on one side of the street (closest to Belle Isle Marsh). The conceptual design was developed with the Boston Transportation Department (BTD) and the Boston Planning Department, and included in the City's [PLAN: East Boston](#), which was adopted by the City of Boston in 2023, as a supported recommendation for the corridor. The Project team continues to coordinate closely with MassDOT and the BTD to integrate the recommendations of this study into the resilient design for Bennington Street. MassDOT is planning to construct the Safety Improvements Project in late 2025/early 2026.

Study of Belle Isle Marsh:

Since 2021, Boston and Revere have been participating in a multi-year regional study to assess the current and future impacts of flooding and coastal storms on the Belle Isle Marsh and its adjacent communities, and to evaluate potential flood risk reduction strategies and marsh restoration efforts (the "Study of Belle Isle Marsh"). The [Study of Belle Isle Marsh](#) identified preliminary nature-based and hybrid solutions that prevent flood damage to the neighboring communities and Massachusetts Bay Transportation Authority (MBTA) Blue Line, promote public safety, and enhance and extend the habitat value of Belle Isle Marsh, based on the Massachusetts Coastal Flood Risk Model (MC-FRM) flood projections for 2070. Participants in a Regional Stakeholder Collaborative have been meeting monthly since 2021, including the City of Boston, City of Revere, Town of Winthrop, the Department of Conservation and Recreation (DCR), Massachusetts Department of Transportation (MassDOT), MBTA, the U.S. Army Corps of Engineers, Mystic River Watershed Association, The Nature Conservancy, Friends of the Belle Isle Marsh (FBIM), and Woods Hole Group. The Project was a top priority identified by the Regional Stakeholder Collaborative and was initiated through Boston and Revere's participation in the group.

Figure 2: Project Timeline and Prior Plans



PLANNING AND DESIGNING FOR CLIMATE CHANGE

The cities of Boston and Revere are already living with the impacts of rising seas, including extreme high tides and coastal storms that result in flooding. The Project area has experienced significant flooding during recent storm events, including Winter Storm Grayson in January 2018, the December 2022 nor'easter (as shown in the photos below), and the January 2024 nor'easter.



Flooding overtopping Bennington Street, looking northbound towards Revere.



Flooding overtopping Bennington Street, looking southbound towards East Boston.



Flooding overtopping Bennington Street, looking at Belle Isle Marsh.



Flooding in the VFW Property parking lot, facing Fredericks Park in Revere.



Flooding at the Beachmont Memorial School parking lot in Revere.



Flooding within Belle Isle Marsh.

The project will be designed to reduce coastal flooding that enters Boston and Revere via flood pathways originating in the Belle Isle Marsh under current conditions by elevating the coastal edge of the project area to address, at a minimum, the 1% annual chance flood event with up to 2.5 feet of sea-level rise projected by 2050 modeled in the Massachusetts Coast Flood Risk Model (MC-FRM) (Figure 3A and 3B: Project Area Flood Risk in 2030 and 2070, and Figure 3C and 3D: Project Area 2030 and 2070 Flood Depths - 1% Annual Coastal Flood Exceedance Probability).

Figure 3A: Project Area Flood Risk - MC-FRM 2030 Sea Level Rise

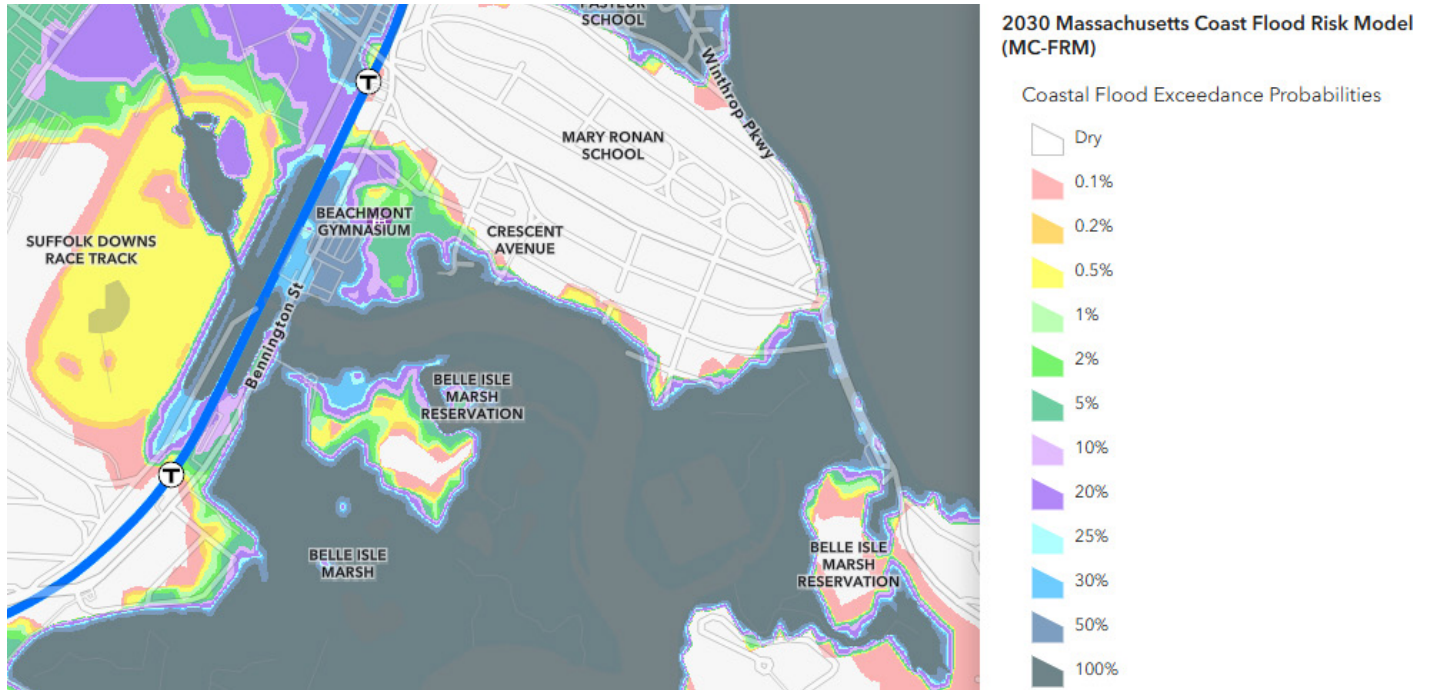
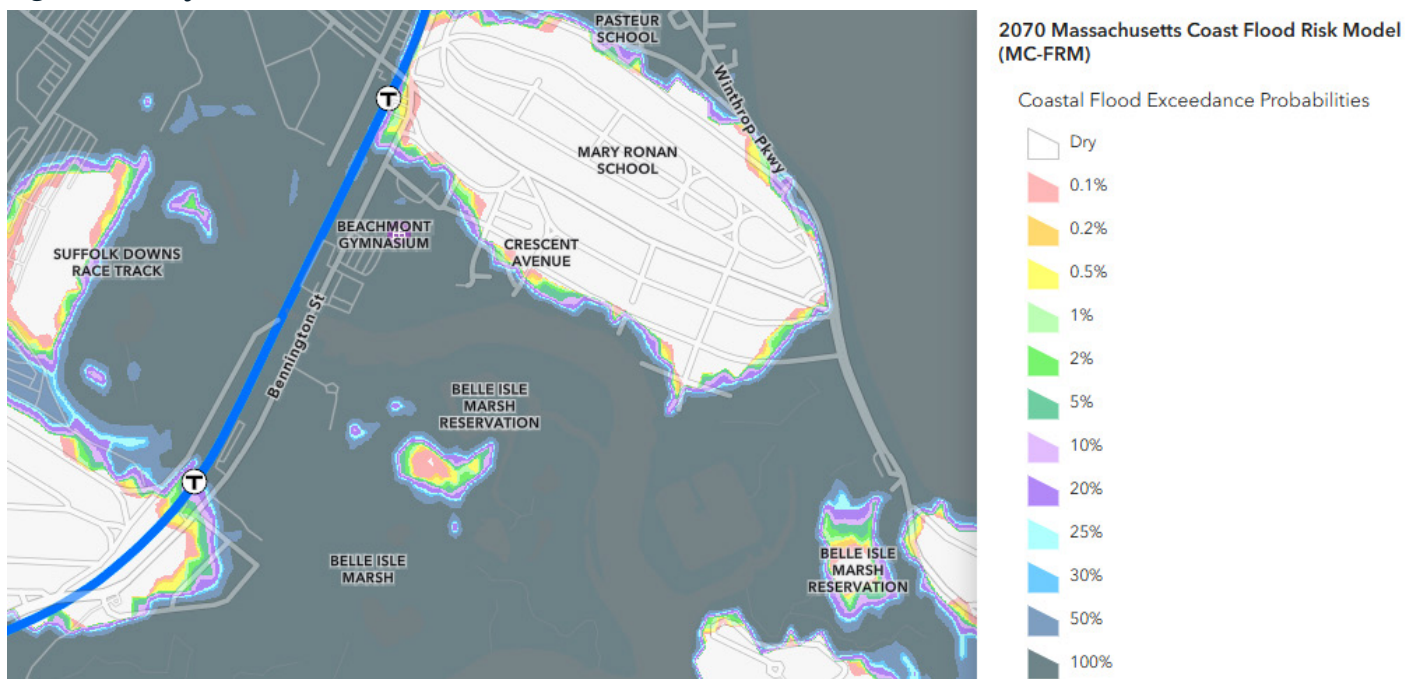


Figure 3B: Project Area Flood Risk - MC-FRM 2070 Sea Level Rise



The flooding scenarios (e.g., 2030 and 2070 flooding) display the full range of annual coastal flood exceedance probabilities (ACFEP). Coastal Flood Exceedance Probabilities shown in the legend display the modeled outputs ranging from 0.1% (0.001, otherwise known as the 1,000-year storm) to 100% (1.0), which corresponds to the one-year storm. *Source:* Massachusetts Coast Flood Risk Model, Massachusetts Office of Coastal Zone Management; developed by Woods Hole Group.

Figure 3C: Project Area 2030 Flood Depths - 1% Annual Coastal Flood Exceedance Probability



Figure 3D: Project Area 2070 Flood Depths - 1% Annual Coastal Flood Exceedance Probability



The flood depths scenarios (e.g., 2030 and 2070 Flood Depths - 1%) show the relative depth of water above land during a coastal flooding event with a 1% annual coastal flood exceedance probabilities (ACFEP). Source: Massachusetts Coast Flood Risk Model, Massachusetts Office of Coastal Zone Management; developed by Woods Hole Group.

Once constructed, the Project will reduce the risk of coastal and stormwater flooding to East Boston, including Bennington Street and the MBTA Blue Line, and Revere, including Bennington Street, Fredericks Park, the Beachmont School, the Beachmont Post 6712 Veterans of Foreign Wars property (the “VFW Property”), MBTA Beachmont Station Blue Line, and over a thousand low-lying residential homes along Bennington Street and in the East Boston, Beachmont and Shirley Avenue neighborhoods (**Figure 4: Flood Risk Before and After Project Construction**). The Project is especially critical for avoiding future damage and loss of service to the MBTA Blue Line for the 42,000 daily riders and preserving vehicular access along Bennington Street, both of which serve as regionally significant critical infrastructure.

The Belle Isle Marsh is adjacent to the Project area and is one of the last remaining salt marshes in Boston Harbor. In addition to being a valuable ecological resource for wildlife and climate resilience, it is an important regional recreation space for East Boston, Revere, Winthrop, and other surrounding communities. The Belle Isle Marsh’s long-term health is influenced by human impacts, both historical and present-day, and by the anticipated effects of climate change. The marsh is existentially threatened by rising sea levels, increasingly intense coastal storms, and dense development along its inland borders.

Addressing the current and future resilience challenges in the Belle Isle Marsh and the surrounding communities is essential to ensure the healthy function of the marsh as a habitat for plants and animals and as a place for community recreation. The Project aims to improve outcomes for both the natural and built environments by integrating a hybrid of nature-based and engineered solutions.

Figure 4: Flood Risk Before and After Project Construction

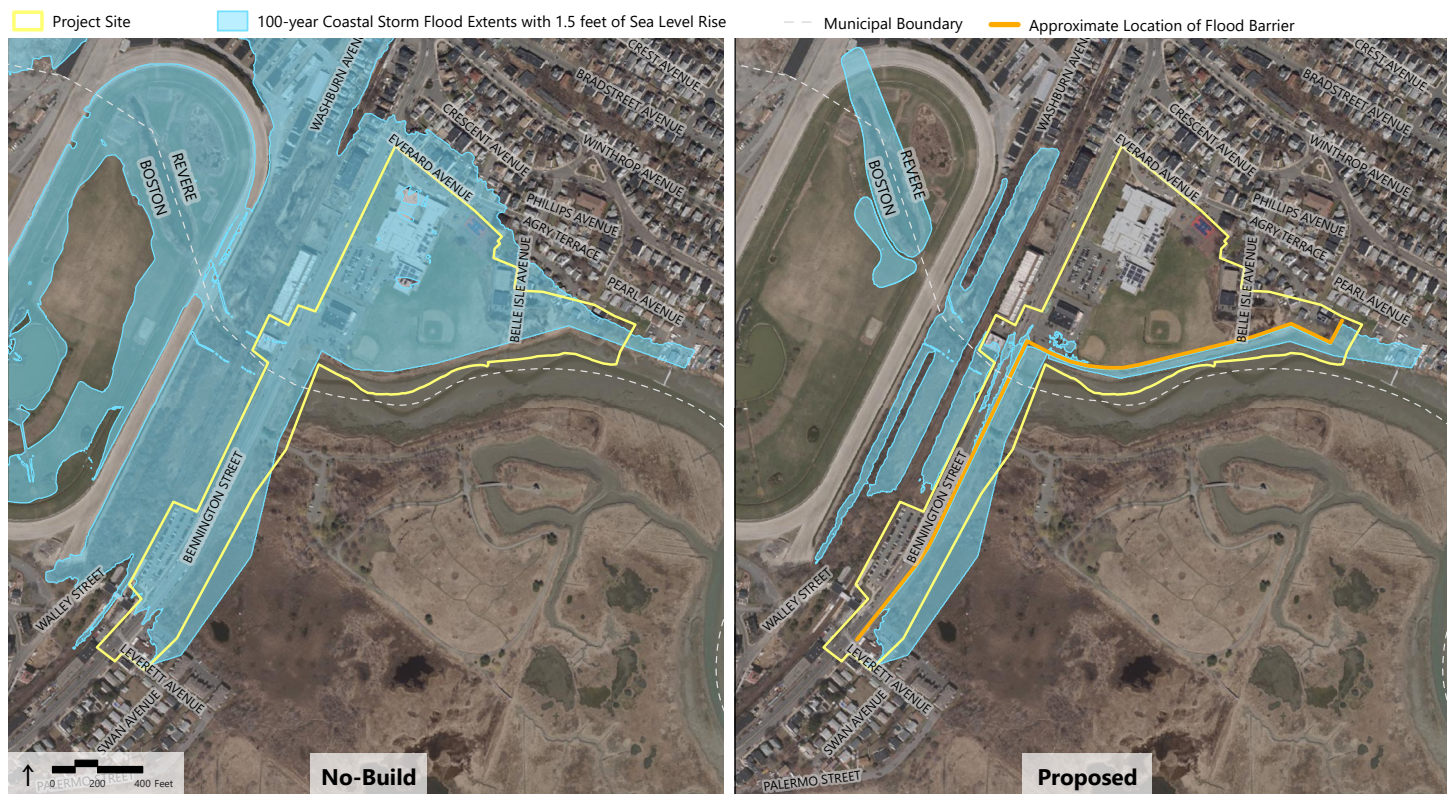


Figure 4 shows the modeled extent of flooding in 2070 with and without the Project. VHB previously built a district-scale nested flood model of the Shirely Avenue, Beachmont, and East Boston neighborhoods to study flooding from current and future events as part of the adjacent Suffolk Downs Redevelopment Project. The model integrates existing flood protection measures including the Alfred H. Long Pump Station, the Bennington Street Tide Gate, and the Roughan’s Point Flood Protection System. Based on a Letter of Map Revision (LOMR) issued by the Federal Emergency Management Agency (FEMA) on May 31, 2023, the Project team’s model is now the regulatory model for these neighborhoods. Residual flood risk originates from other parts of the East Boston and Revere waterfronts and must be addressed through other efforts. *Source:* Resilient Bennington Street and Fredericks Park Project Feasibility Report and Alternatives Analysis, June 2024.

PROJECT GOALS AND BENEFITS

The core goals and benefits of the Project include:

- Reduce coastal flood risk to protect the East Boston and Revere communities and critical infrastructure from the impacts of sea-level rise and coastal storms during a 1% annual chance flood with near- and long-term sea level rise;
- Minimize impacts to and increase ecological benefits for Belle Isle Marsh to support its health and preservation;
- Integrate co-benefits along Bennington Street, including green stormwater infrastructure, tree canopy, traffic calming, and multi-modal transportation;
- Enhance Fredericks Park to improve recreation and ecological habitat along the marsh;
- Improve the public realm by maintaining connectivity to the waterfront, adding native salt-tolerant plantings, and improving pedestrian safety; and
- Integrate stormwater management best practices to provide increased resilience against rainfall runoff and water quality treatment for runoff from the Project area.

FEASIBILITY ASSESSMENT AND ALTERNATIVES ANALYSIS REPORT

As described previously, the first phase of the Project concluded with a [Feasibility Report and Alternatives Analysis](#) in June 2024. It described the initial alternatives screening approach, an evaluation of effective flood risk reduction strategies, a description of permitting requirements and pathways, and cost estimates. The report also presented recommended design alternatives for each section of the Project area.

The Project team first screened 19 potential alternatives. Of these, 11 alternatives were selected for further study based on their ability to prevent flooding from the 1% annual chance event through 2070, and enhance recreation facilities: three for Bennington Street, two for the VFW Property, and five for Fredericks Park. The alternatives included coastal resilience strategies such as elevated land and roadways, living levees, and retaining walls and seawalls, as well as co-benefits such as shared-use paths to enhance public access and multi-modal transportation, and marsh replication and restoration.

To ensure that the alternatives under consideration would effectively reduce flood risk as the primary goal of the Project, the Project team used a flood model of the Shirley Avenue, Beachmont, and East Boston neighborhoods to run simulations of flooding conditions from the 100-year coastal event in 2050 and 2070 both with and without the various flood risk reduction alternatives. This allowed the team to quantify the alternatives' flood protection benefits across the entire district, which includes over 1,000 properties.

Next, a recreation analysis was performed. It found that for Bennington Street, all alternatives would improve recreation by adding pedestrian and bicycle facilities. All of the Fredericks Park alternatives would result in some loss of recreation land, but would still provide enough space to improve recreational amenities and community use of the space. The co-benefit analysis looked at each alternatives' ability to accomplish the following:

- Allow potential salt marsh migration,
- Include bicycle and pedestrian improvements on Bennington Street,
- Accommodate green stormwater infrastructure,
- Minimize the need for inland drainage,
- Allow an increase in tree canopy, and
- Provide/maintain waterfront connectivity.

The alternatives screening evaluation acknowledges that there are many different strategies that could potentially meet the Project goals. However, identifying alternatives that fully meet all of the Project goals is a challenge. For example:

- Selecting a preferred alternative involves a complex interplay among physical practicability, environmental sustainability, social welfare, and feasibility of implementation, which are deeply interlinked.
- There is a trade-off between maximizing the area of land available for future marsh migration and/or green infrastructure while simultaneously maintaining the existing amount of land available for recreation at Fredericks Park, which is an important active recreation space for Revere.
- Flood levees cannot structurally support mature trees, so opportunities for substantial new tree canopy are limited along Bennington Street.
- Belle Isle Marsh is physically constrained and will be impacted by sea level rise, whether or not any flood protection measures are implemented.

Last, a permitting and regulatory compliance analysis identified which alternatives would comply with a variety of applicable regulations, and which would be more challenging to implement from a regulatory perspective. The cost analysis provided order of magnitude cost estimates for 2024 and projected out to 2029.

Ultimately these analyses resulted in the selection of a preferred alternative for Bennington Street and the VFW property, and two potential alternatives for further study for Fredericks Park (**Figure 5A and 5B: Illustrative Site Plans from Phase I of the Project**). These were:

- **Bennington Street:** Elevate the roadway and integrate a lane diet to reduce impervious surface, slow vehicle speeds, and create space for a shared-use path and a vegetated levee with a gradual slope towards the Belle Isle Marsh.
- **VFW Property:** Construct a living levee along the marsh, the space for which would be accommodated through the removal of some impervious surface from the VFW parking lot that will be compensated through a land swap on the adjacent City of Revere-owned parking lot at the Beachmont Memorial School.
- **Fredericks Park:** Elevate the park to preserve as much land as possible for recreation with off-site salt marsh restoration for any impacted wetland resource areas east of the park OR elevate the park and construct a seawall around the wetland resource areas east of the park.

Figure 5A: Illustrative Site Plans from Phase I of the Project - Alternative 1

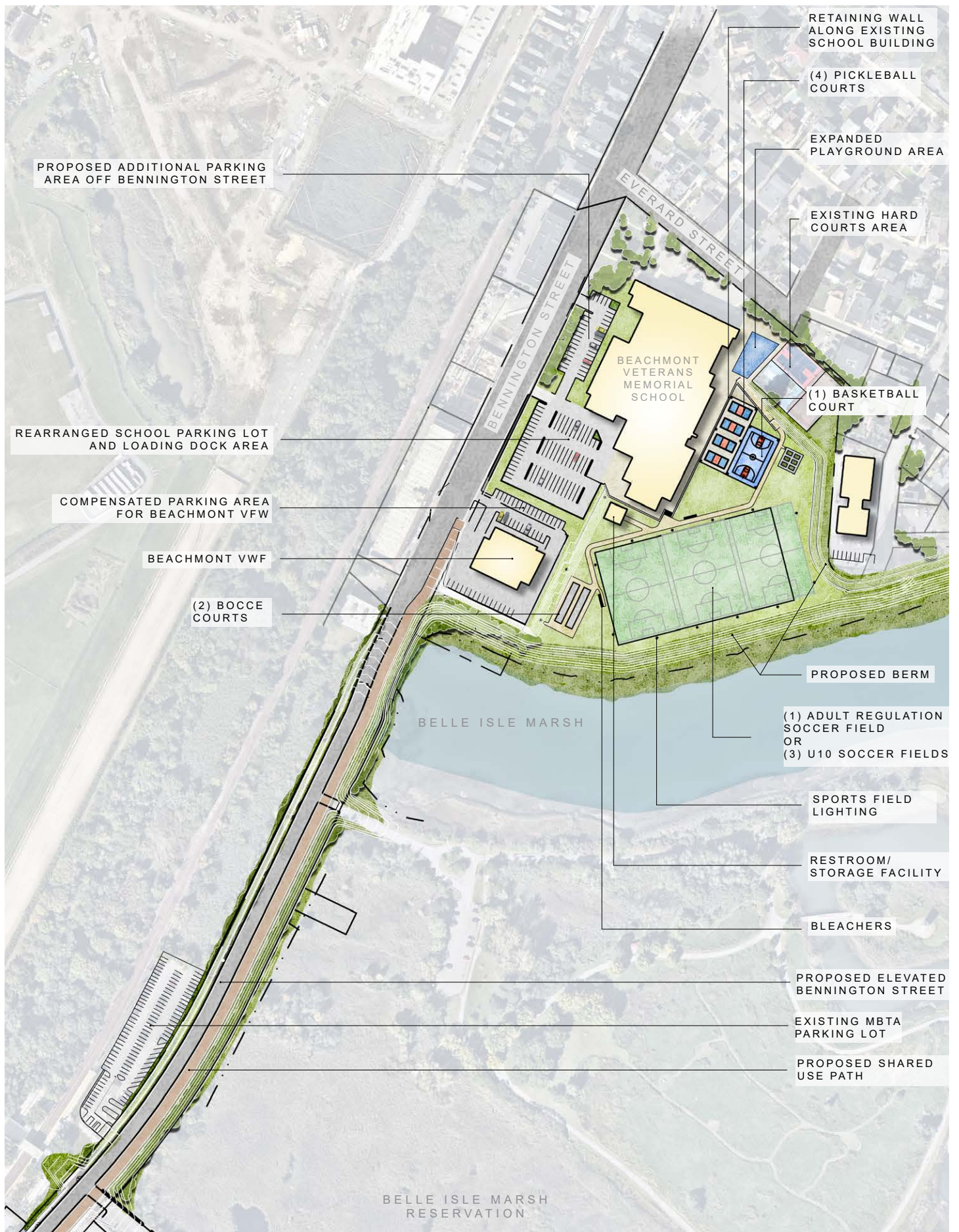
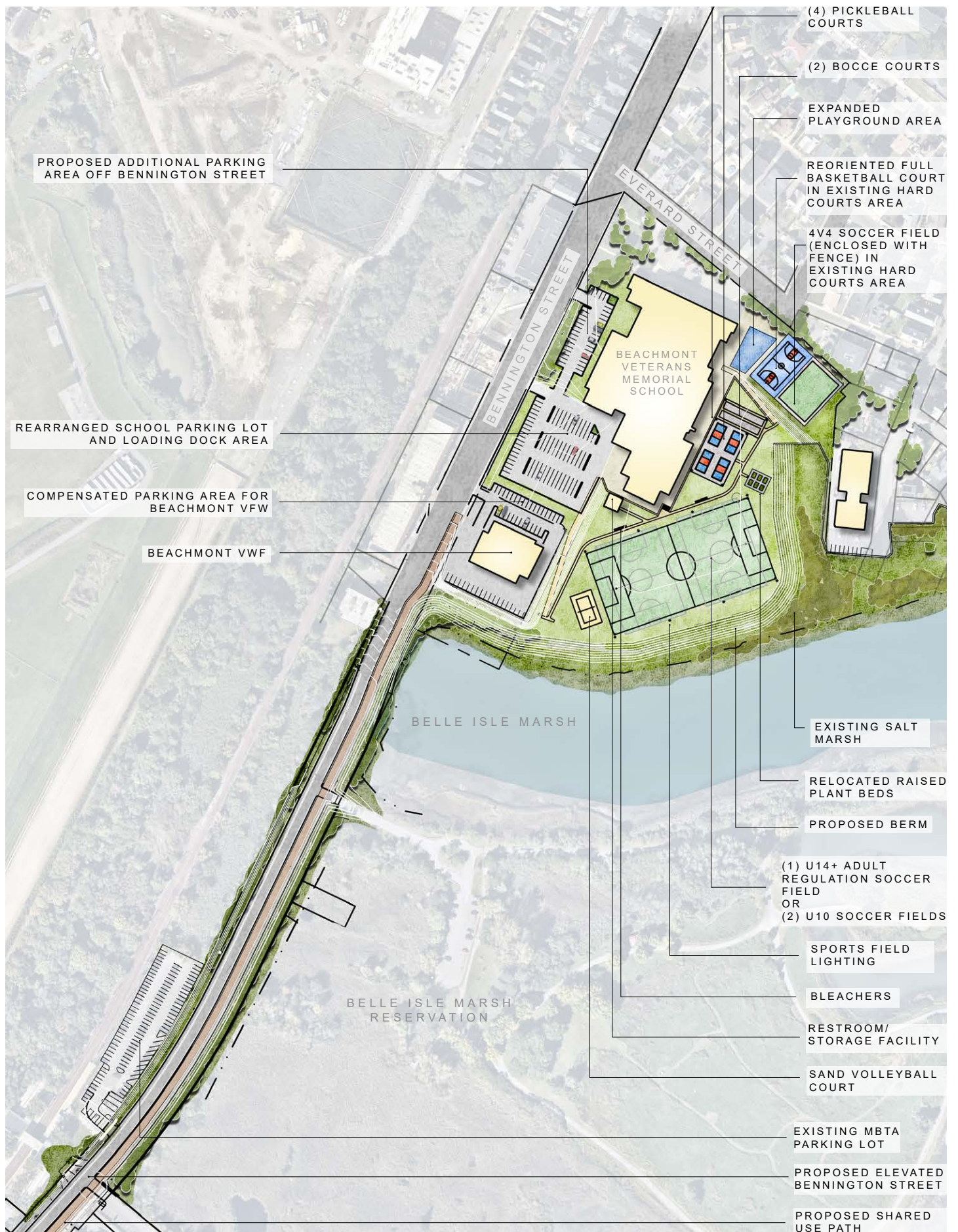


Figure 5B: Illustrative Site Plans from Phase I of the Project - Alternative 2



02 | SCHEMATIC DESIGN

DESIGN DEVELOPMENT

The Project team advanced the design of the preferred alternatives to schematic design. The following is a description of the site investigations and community and stakeholder engagement that informed the schematic design's development.

SITE INVESTIGATIONS

As part of Phase I and II of the Project, the Project team completed site investigations including topographic survey, wetlands delineation, and geotechnical borings.

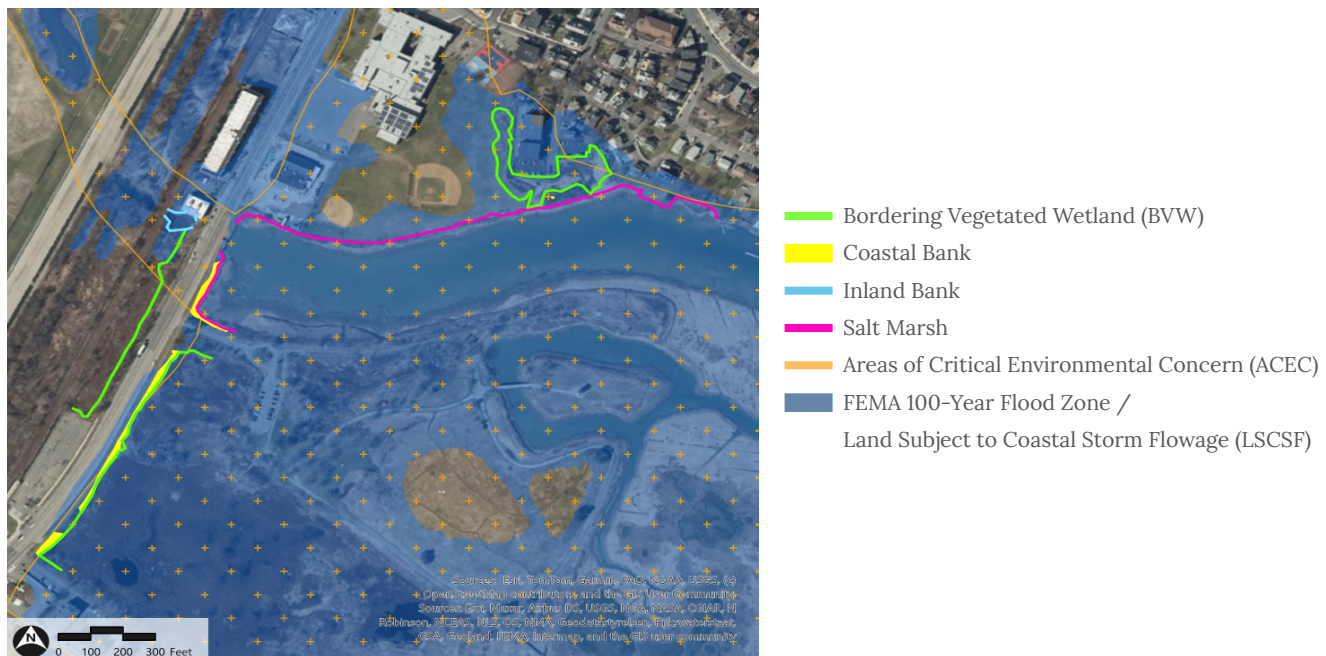
Topographic Survey:

Brennan Consultants was contracted to complete a land survey within the extent of the Project area during both phases of the Project. The survey was completed in January 2024 along Bennington Street and Fredericks Park as part of Phase I, and in February 2025 for the area to the east of Fredericks Park as part of Phase II. The survey identified existing utilities, structures, right-of-way, and topographic conditions as described in the subsequent sections. See **Appendix A** for the topographic survey.

Wetlands Delineation:

The Project team submitted Notices of Intent (NOI) with the Revere Conservation Commission (DEP File No. 061-0838) and Boston Conservation Commission (DEP File No. 006-2026) to acquire permits for the geotechnical borings and confirm the jurisdictional wetland resource areas. Orders of Conditions allowing the borings and confirming resource area delineations were issued in the Spring of 2025. Multiple wetland resource areas were found within and directly adjacent to the Project area (**Figure 6: Project Area Wetland Resource Areas**). In addition, portions of the overall Project area are within a designated Area of Critical Environmental Concern (ACEC), and portions of the Belle Isle Marsh are identified as a Priority Habitat of Rare Species. See **Appendix B** for detailed maps of the delineated wetlands.

Figure 6: Project Area Wetland Resource Areas



Geotechnical Borings:

Geotechnical borings were completed in the Spring of 2024 and the Spring of 2025 along Bennington Street, Fredericks Park, and near Montfern Avenue east of Fredericks Park. The borings generally found layers for topsoil, fill, estuarine deposits, and clays. As design development progresses, geotechnical analysis for slope stability, permeability, and settlement will be completed.

COMMUNITY AND STAKEHOLDER ENGAGEMENT

Community and stakeholder engagement has taken place through both phases of the Project to inform the alternatives analysis and the schematic design development. In Phase II, the Project team organized a public meeting with partners from the Study of Belle Isle Marsh Regional Stakeholder Collaborative, and met with numerous public agencies and private property owners to collect feedback to inform the schematic design.

Belle Isle Marsh Regional Climate Resilience Update Public Meeting:

In March 2025, Boston and Revere worked with the Belle Isle Marsh Regional Stakeholder Collaborative to organize a virtual public meeting to provide updates on climate resilience efforts in and around the Belle Isle Marsh. The presentation included Project updates from the communities of Boston, Revere, and Winthrop, DCR, the MBTA, the Friends of Belle Isle Marsh, the Mystic River Watershed Association, and Woods Hole Group, followed by answering community members' questions and hosting an open discussion with participants. This meeting served as an opportunity for multiple municipalities, State agencies, local non-profits, and coastal scientists to inform community members about the projects underway within Belle Isle Marsh to restore the ecological conditions as well as projects underway around Belle Isle Marsh to reduce flood risk to the surrounding communities. It also demonstrated the coordination taking place across multiple stakeholders to comprehensively study climate change impacts and take collective action to address climate hazards.

Presentation materials and a recording of this meeting in English and Spanish are available on the [Project webpage](#).

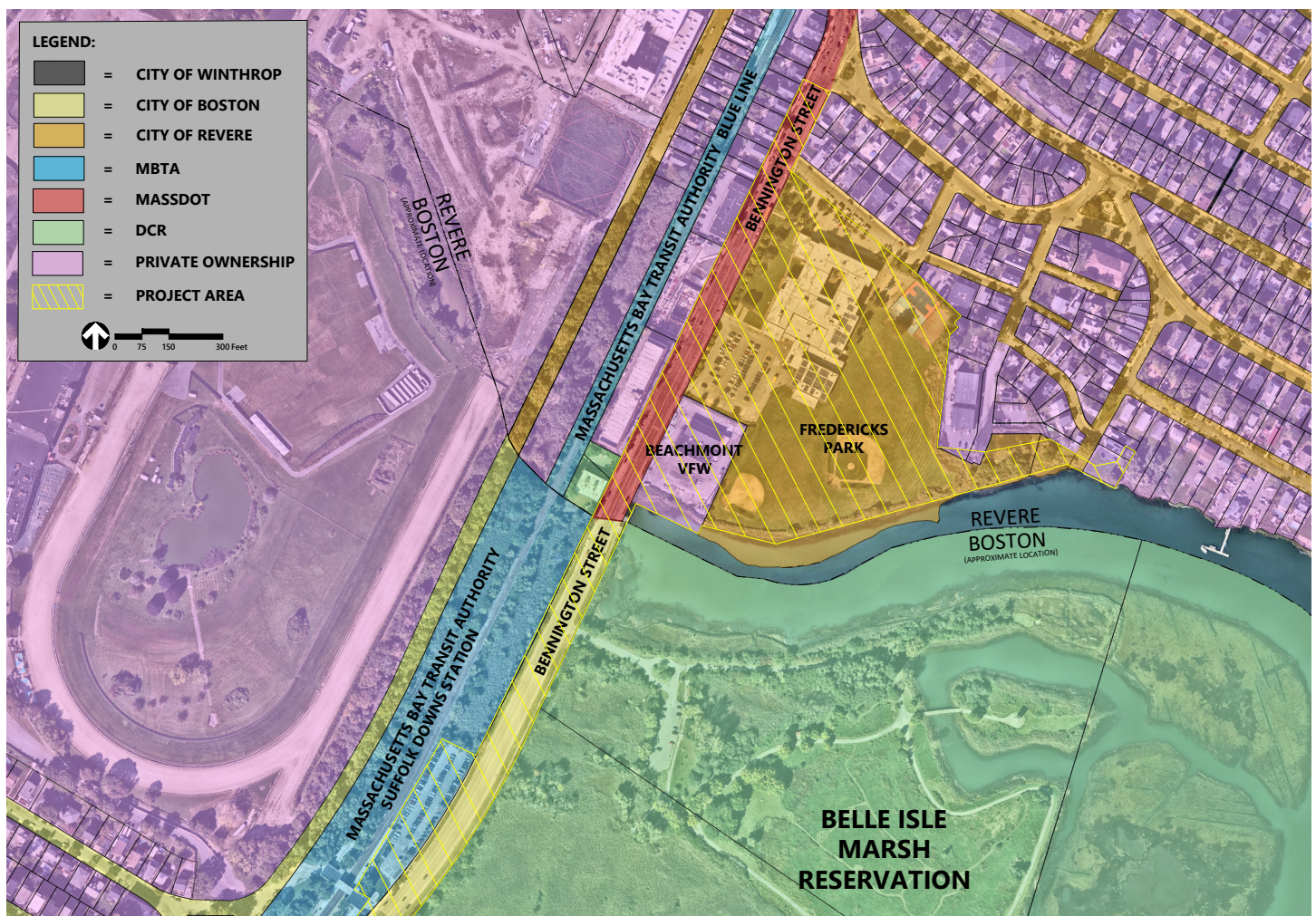
Public Agency Meetings:

There are many public and private landowners within and adjacent to the Project area (**Figure 7: Project Area Land Ownership**).

The Project team held numerous coordination meetings with various departments/agencies from the Commonwealth of Massachusetts, the City of Boston, and the City of Revere to inform the schematic design development.

- **U.S. Army Corps of Engineers (USACE):** The Project team met with the USACE team that is leading Boston's Coastal Storm Risk Management (CSRM) Study to discuss the Project's design and inclusion in the CSRM. USACE advised the Project team to integrate a buried seawall into the design (see pages 21 and 40 for more detail).
- **Massachusetts Bay Transportation Authority (MBTA):** The Project team met with the MBTA as the owner of the Suffolk Downs Station and Suffolk Downs parking lot to discuss potential grading impacts to the parking lot and stormwater management considerations, examine opportunities for adjustments to the access points into the parking lot, and identify potential improvements that could be incorporated into the Project, such as sidewalk upgrades.

Figure 7: Project Area Land Ownership



- Massachusetts Department of Transportation (MassDOT):** The Project team met with MassDOT as the owner of Bennington Street within the City of Revere and the leader of the Bennington Street Targeted Safety Improvement Pilot Project to discuss integrating MassDOT’s roadway recommendations into the coastal resilience design and grading tie-ins to the MassDOT-owned section of the roadway. The Project team and MassDOT also discussed funding opportunities for the Project’s construction since the Project will protect a critical evacuation route along Bennington Street and the MBTA Blue Line.
- Massachusetts Department of Conservation and Recreation (DCR):** The Project team met with DCR as the owner of the Belle Isle Marsh Reservation, Sales Creek Culvert, and the Alfred H. Long Pump Station to discuss potential grading impacts to the reservation’s parking lot and the pump station’s driveway, and identify suitable plantings along Bennington Street that will support the Belle Isle Marsh’s ecosystem.
- Massachusetts Office of Coastal Zone Management (CZM) and Department of Environmental Protection (DEP):** The Project team met with CZM and DEP as regulatory agencies with jurisdiction over wetland resources within the Project area to discuss the Project’s potential wetland impacts and mitigation strategies in advance of forthcoming environmental permitting.

- **City of Boston Transportation Department (BTD) and Public Works Department (PWD):** The Project team met with BTD and PWD as the owner of Bennington Street within the City of Boston to discuss integrating MassDOT's roadway recommendations into the coastal resilience design and the City's streetscape design standards and criteria.
- **Boston and Revere Conservation Commissions:** The Project team presented the Project to the Boston and Revere Conservation Commissions during the permitting applications for geotechnical borings, and discussed wetland resource areas within the Project area, potential wetland resource area impacts, and wetland resource area delineation and confirmation.
- **City of Revere Parks and Recreation Department:** The Project Team prepared several concept plans for the improvements to Fredericks Park and presented them to the Revere Parks and Recreation Design. Through an iterative design process with the Parks and Recreation Department, the concepts were refined into a preferred alternative which is presented in this report.
- **City of Revere Public Schools:** The Project Team met with the City of Revere Public Schools who identified the operations and needs of the Beachmont Memorial School. This included the required parking spaces, delivery operations, and bus drop-off routes.
- **City of Revere Fire Department:** The Project team met with the City of Revere Fire Department to present the schematic design. The Fire Department provided feedback regarding evacuation routes from the school and emergency access to the soccer field.

Private Property Owner Meetings:

The Project team held meetings with private property owners within the Project area to update them about the project and collect feedback on the schematic design development.

- **Beachmont Post 6712 Veterans of Foreign Wars Property:** The Project team met with members of the VFW as the owner of the VFW Property within the Project area to provide a summary of the schematic design development. During this meeting, the Project team provided a plan showing the location, height, and footprint of the coastal resilience strategy. The Project team and VFW members discussed tradeoffs, such as impacts to parking spaces on the VFW Property (which are proposed to be replaced on adjacent City of Revere property), the necessary relocation of the cell tower, temporary construction impacts, fence replacement, and more, as well as stormwater management improvements. The Project team will continue to work with the VFW members as the Project's design advances.
- **Residential Revere:** The City of Revere conducted outreach to the residential property owners east of Fredericks Park who will be impacted by the Project, which included sending a letter to each owner requesting a meeting and door-knocking. One owner responded and the Project team met with them to provide a summary of the schematic design development and discuss proposed impacts to their property. This owner expressed that flooding on their property has become more frequent and intense in recent years, and was pleased that the Project includes protection for their property. The Project team will continue to work with this property owner as the design advances, and will conduct additional outreach to other property owners in the next phase of the project.

BENNINGTON STREET DESIGN

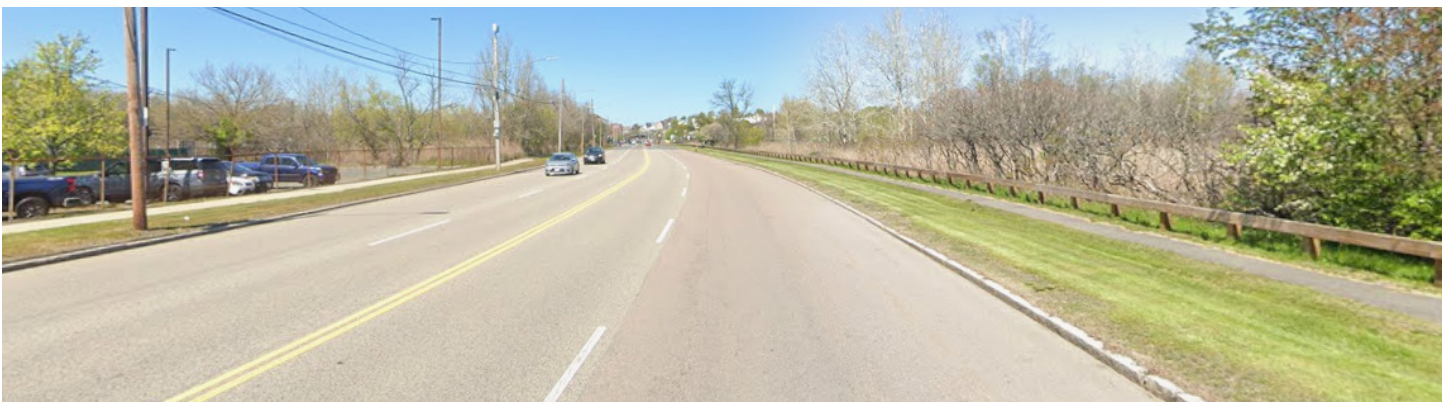
This section describes the existing conditions, design constraints and considerations, and schematic design outcome for the Bennington Street portion of the Project area. See **Appendix C: Engineering Plans** for supplemental information.

EXISTING CONDITIONS

Bennington Street is the main thoroughfare for the northeastern portion of the East Boston neighborhood. It serves local and regional traffic connecting Boston to Revere, creating a key local link among East Boston's Orient Heights neighborhood and Revere's Beachmont neighborhood. It also creates a connection to businesses, schools, beaches, and open space, including Fredericks Park and the Belle Isle Marsh Reservation, the main entrance to which is located on Bennington Street. Furthermore, it is one of two designated evacuation routes for East Boston and the Town of Winthrop.

Bennington Street was designed to facilitate vehicle through-travel, with two vehicle travel lanes in each direction and no median. The speed limit ranges from 25 to 30 mph throughout this segment of the corridor, but vehicles frequently travel well above the speed limit. Sidewalks line both sides of the street, and the portion of the roadway adjacent to Belle Isle Marsh features wide grass buffers between the edge of the street and the sidewalk. There are no bicycle facilities present. While there is no on-street parking in Boston, on-street parking is allowed on both sides of Bennington Street in Revere. According to data collected in January 2022 by MassDOT, slightly over 10,000 vehicles use Bennington Street per day.¹

Notable utilities located within the Bennington Street corridor include Massachusetts Water Resources Authority (MWRA) water mains, Boston Water and Sewer Commission (BWSC) stormwater pipes, and telecommunications infrastructure.



Bennington Street existing conditions adjacent to the MBTA Suffolk Downs Station parking lot (left) and Belle Isle Marsh (right).



Bennington Street existing conditions at the Border of Boston and Revere.

¹ Bennington Street Redesign Traffic Analysis Technical Memorandum. February 24, 2023. Toole Design for MassDOT.

Bennington Street has an average elevation of 9.0 to 10.0 ft NAVD88, ranging from approximately 14.0 ft NAVD88 near Leverett Avenue and reaching a low point of 7.5 ft NAVD88 where the road crosses over Sales Creek, which is a primarily man-made drainage channel that runs through the Suffolk Downs site and discharges to the Belle Isle Inlet. The elevation of the current 1% annual chance flood event ranges from 7.0 to 12.0 ft NAVD88.

Due to its low elevation, Bennington Street and adjacent areas have a long history of coastal flooding. In the 1980s, DCR installed the Alfred H. Long Pump Station and Bennington Street Tide Gate at Sales Creek to protect up-gradient areas in Revere that would otherwise be directly exposed to coastal flooding, including thousands of homes, the MBTA Blue Line tracks, and Beachmont station. While this facility reduces flooding, it does not eliminate it. A coastal storm event occurred on January 13, 2024 and caused extensive flooding on Bennington Street and at the pump station.

DESIGN CONSTRAINTS

Wetland Resource Areas:

Jurisdictional wetland resources within the Bennington Street Project area include Land Subject Coastal Storm Flowage (LSCSF). Wetland resources adjacent to this Project area include Bordering Vegetated Wetland (BVW), Coastal Bank and Salt Marsh. Any changes to Bennington Street to address coastal flooding must limit, to the extent practicable, any negative impacts to on-site or adjacent wetland resource areas, including LSCSF, BVW, Coastal Bank, and Salt Marsh. See **Appendix B** for maps of the delineated wetlands.

Site Constraints:

Changes to the existing elevations of Bennington Street must be able to accommodate the intersection with Leverett Avenue and the driveway entrances to 10-20 Leverett Avenue, the MBTA parking lot, the Belle Isle Marsh Reservation, the Alfred H. Long pump station, and the VFW Property. In addition, existing utility infrastructure within the Bennington Street corridor, including several MWRA water mains, BWSC stormwater pipes, a telecommunication duct bank, and overhead wires, must either be maintained or relocated as part of the Project.

SCHEMATIC DESIGN

Design Flood Elevation:

The Project team used the MC-FRM to determine a Design Flood Elevation (DFE) for Bennington Street that would reduce coastal flood risk during 1% annual chance flood event with projected sea level rise in 2070, which includes approximately 4.2 feet of sea level rise. Based on the MC-FRM, the DFE for Bennington Street is 16.1 ft. NAVD88. The Project team further evaluated this with a site-specific hydraulic analysis which was consistent with the MC-FRM results.

Roadway Cross-Section:

The roadway design will enhance functionality and aesthetic appeal while maintaining environmental sensitivity by integrating vehicular streetscape changes recommended by MassDOT and the Boston Transportation Department (BTD), enhancing existing pedestrian facilities and safety, adding new bicycle facilities, and reducing impervious pavement by approximately 5 to 20 feet along the eastern side of the roadway to increase vegetated open space. The schematic design for Bennington Street incorporates a thoughtfully designed section, described in order from east to west of the street (**Figures 8A-D**:

Bennington Street Cross-Sections; illustrative site plans and renderings of the full Project area are shown in **Figure 12A-D** on page 33-36):

- An elevated Bennington Street to 16.1 ft. NAVD88 to reduce coastal flood risk during a 1% annual chance flood event with 2070 projected sea level rise.
- A vegetated slope from the Belle Isle Marsh to the proposed shared-use path ranging in slope. A 5H:1V slope is preferred where possible, which means that for every 5 units of horizontal distance, there is 1 unit of vertical distance.
- A buried structure to stabilize slope and reduce horizontal permeability (also known as seepage) of floodwaters through the embankment.
- A 12-foot shared use path with an approximately 5-foot abutting vegetated buffer.
- An 8-foot parking lane, except some constricted sections notably near the Alfred H. Long Pump Station.
- Two 11-foot travel lanes, allowing for one-way traffic in each direction.
- A 2-foot shoulder along the western curb line, a 3-foot vegetated buffer, and a 5-foot sidewalk.
- A guardrail to protect steep slopes or vertical retaining walls, which create a roadway hazard.

Public Realm:

The increased elevation of the roadway will maintain the public's views and connectivity to the abutting waterfront and Belle Isle Marsh. Pedestrian and bicyclist improvements, including a dedicated and separated shared-use path as well as a dedicated street crossing at the entrance to the Belle Isle Marsh, are proposed to enhance public access and safety.

The reduction in pavement along Bennington Street provides an ecological improvement by increasing space for vegetation. The design focuses on increasing the existing buffer from the roadway to the Belle Isle Marsh with coastal salt-tolerant native seed mixes and vegetation that supports high marsh habitat. Due to the ecological sensitivity of the restoration areas along the Belle Isla March, non-cultivar native species will be specified. Once the roadway is elevated, the existing adjacent grassed buffer areas will be planted with native salt-tolerant shrubs and street trees that are well-suited for a roadway corridor.

Stormwater Improvements:

The roadway design includes an improved stormwater management system that will increase water quality from rainfall-runoff entering Belle Isle Marsh. The design of this is currently preliminary and will advance as design development progresses. Stormwater Best Management Practices being considered will include deep sump hooded catch basins, water quality units, and green infrastructure best practices including on-site infiltration. The roadway will also have improved capacity with new inlets, piping, and a higher elevation which will reduce the potential for flooding on the roadway from rainfall-runoff.

Design Speed/Safety Considerations:

The enhancements proposed for Bennington Street are based on a 25 mph design speed in Boston and Revere. These improvements are consistent with the existing posted speed limit, ensuring adherence to local traffic regulations. This design aims to enhance overall traffic efficiency and commuter safety.

Figure 8A: Bennington Street Cross-Section at MBTA Suffolk Downs Parking Lot - Existing Conditions

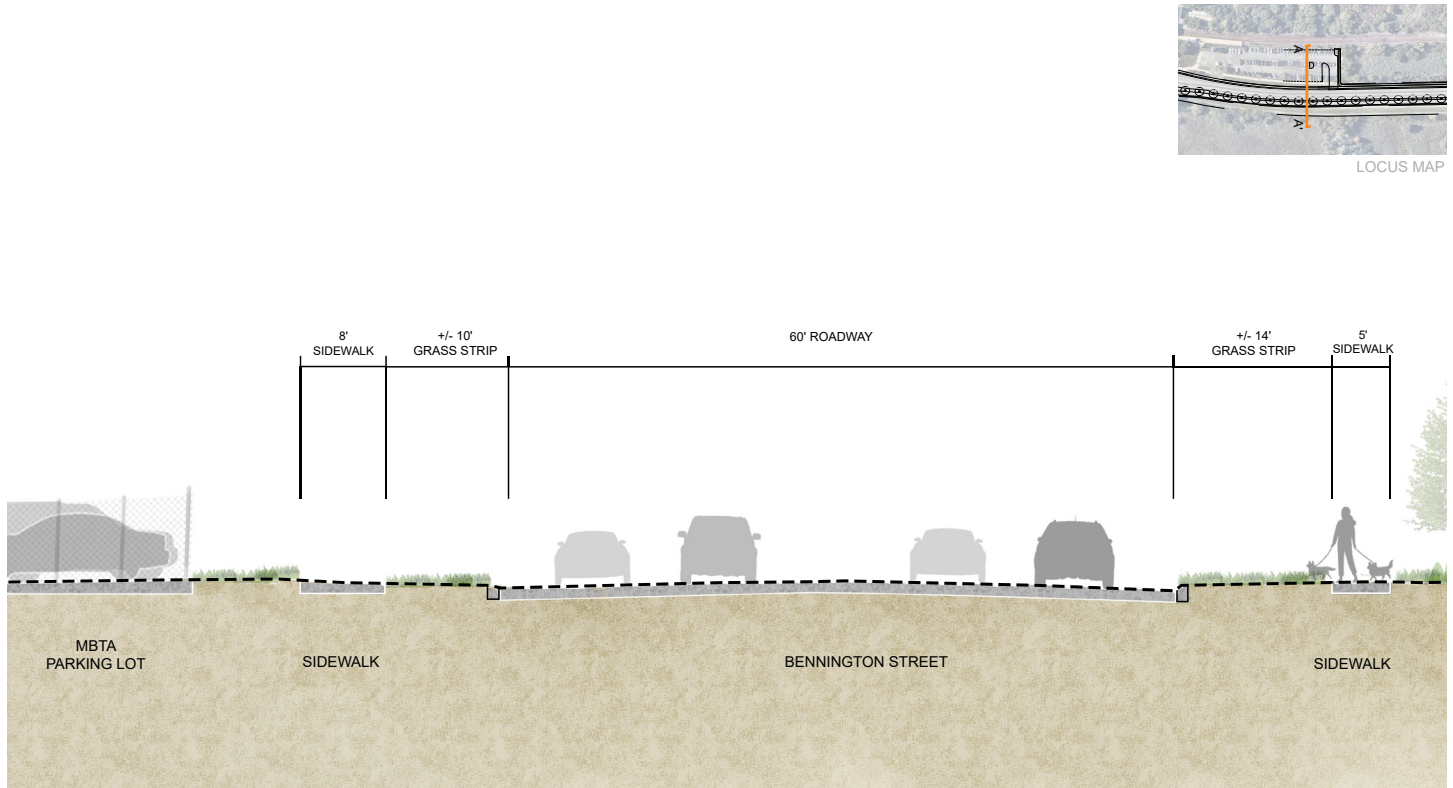


Figure 8B: Bennington Street Cross-Section at MBTA Suffolk Downs Parking Lot - Proposed Conditions

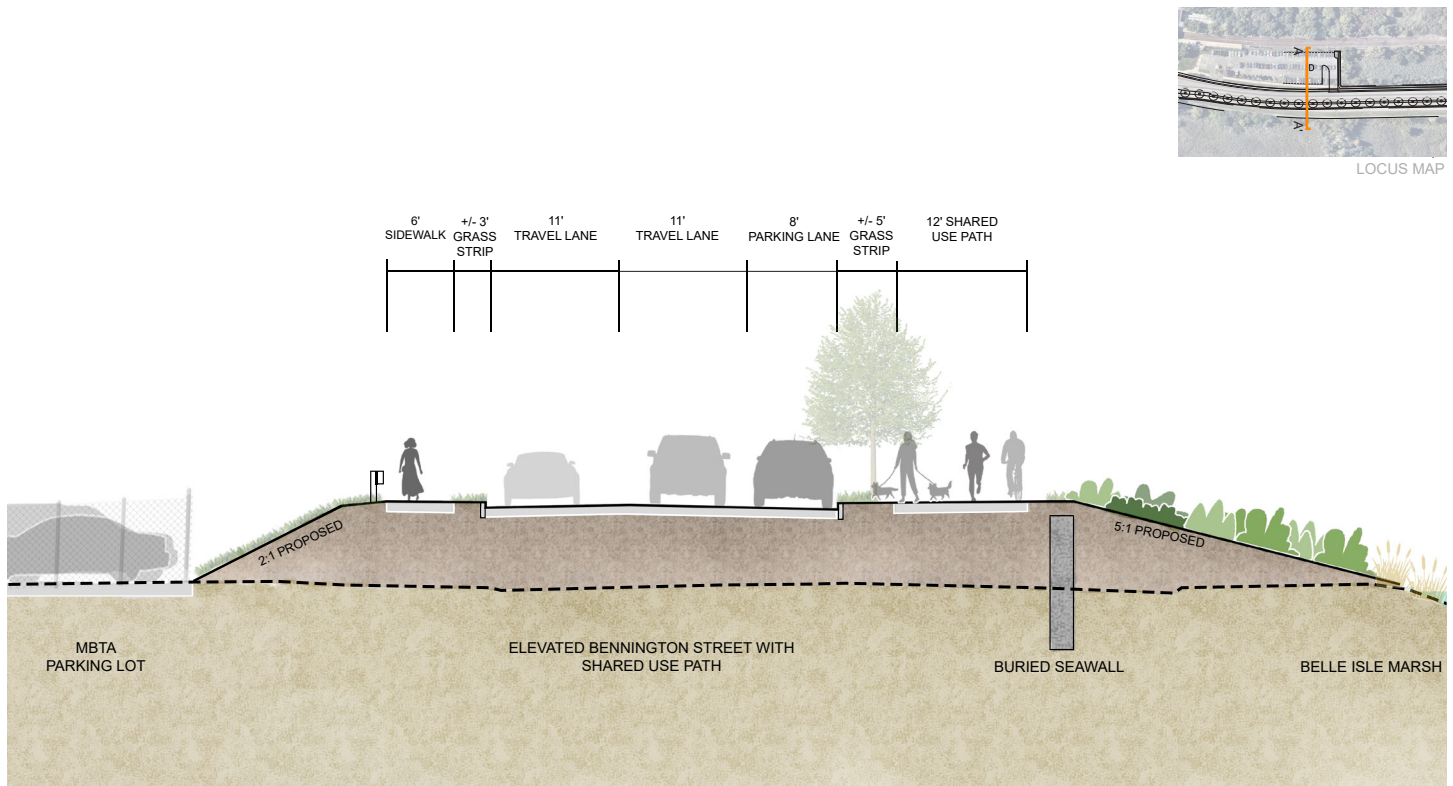


Figure 8C: Bennington Street Cross-Section Approaching Revere - Existing Conditions

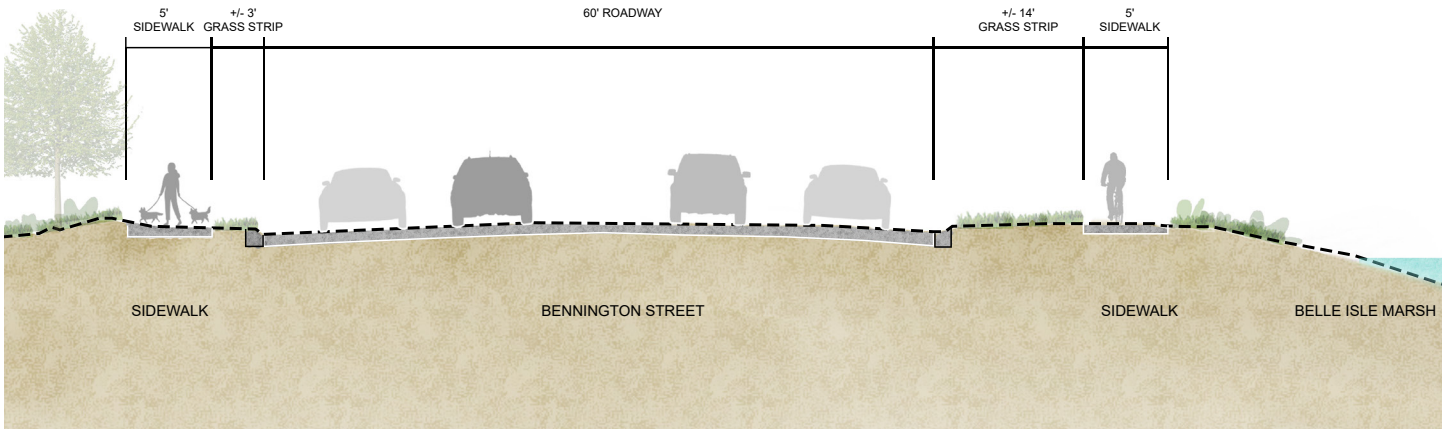
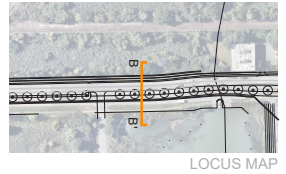
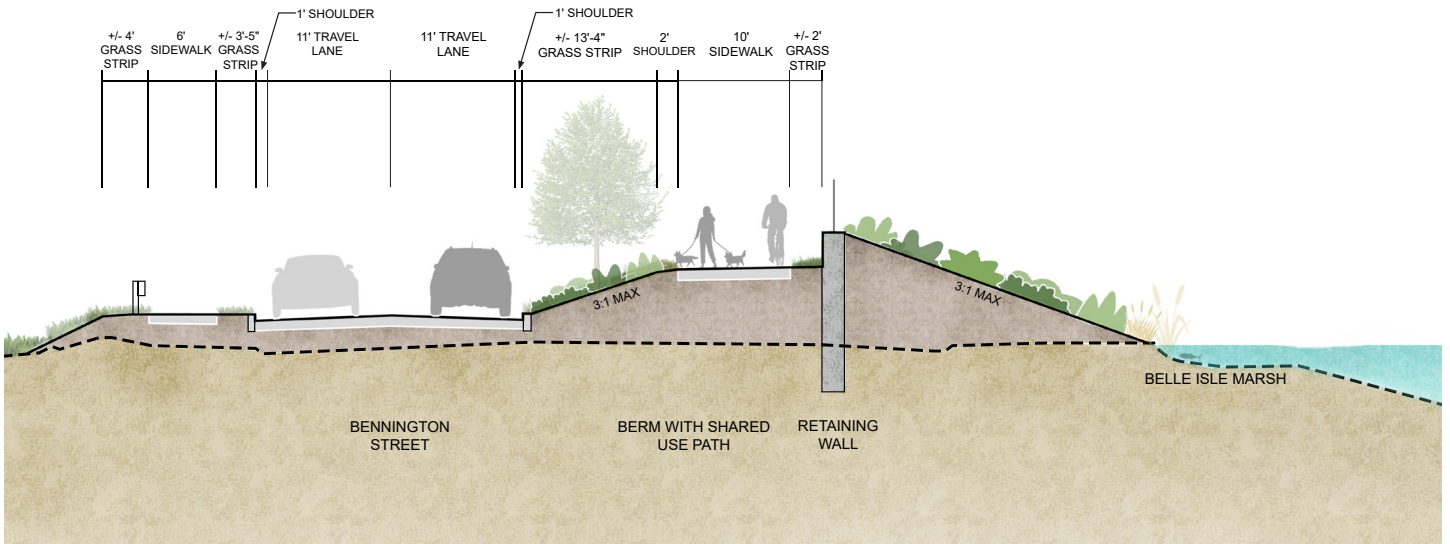
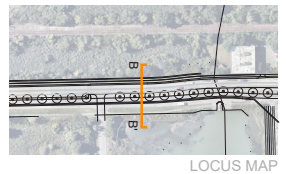


Figure 8D: Bennington Street Cross-Section Approaching Revere - Proposed Conditions



Connection to Abutting Properties:

By elevating Bennington Street to prevent coastal flooding from overtopping the roadway, it is essential to create a smooth connection to abutting properties, which will enhance accessibility and ensure the successful integration of the Bennington Street improvements into a broader urban infrastructure.

- **MBTA:** The Project proposes a new entrance to the MBTA Suffolk Downs Station parking lot north of the existing entrance which will provide additional space for southbound traffic on Bennington Street to queue at the Leverett Avenue intersection, thereby minimizing congestion and interference with access to the MBTA Suffolk Down Station. The Project will require regrading the entrance to the parking lot to reach the elevated roadway. The precise location of the adjusted parking lot entrance will require further coordination with the MBTA as design development progresses.
- **DCR:** DCR owns and operates the Belle Isle Marsh and Alfred H. Long Pump Station. The Project will require regrading the intersection to the Belle Isle Marsh parking lot to reach the elevated roadway, which will require work within the DCR right-of-way and a DCR Access Permit. The grade of Bennington Street will be lowered near the Alfred H. Long Pump Station to tie into existing grades.
- **VFW Property:** The existing VFW entrance/exit to Bennington Street will need to be realigned to match the proposed site improvements. See the detailed descriptions of these improvements in further sections of the VFW schematic design.
- **Other Private Properties:** The Project is proposing to maintain the location of all other existing entrances for all other private properties along Bennington Street. Driveway improvements are necessary, which would have temporary right-of-way impacts.

Northern Tie-In:

In response to recommendations from MassDOT officials, the Project team extended the streetscape improvements for Bennington Street northerly past the VFW to connect to proposed improvements at Donnelly Square, which is being completed by the Suffolk Downs Redevelopment project. This portion of the design was completed based on aerial backgrounds only, and a comprehensive survey, including right-of-way analysis, is required for north of the VFW portion to advance this design.

Structural Considerations:

The United States Army Corps of Engineers (USACE) recommended the Project provide a buried floodwall structure to reduce the horizontal permeability (also known as seepage) of floodwaters through the elevated roadway, as well as to enhance structural stability. The schematic design incorporates this recommendation. The structure becomes exposed near the VFW (on the landward side), and at the southern tie-in as the roadway is lowered to tie into existing grades.

The buried structure does provide the added benefit of allowing limited vegetation to plant the seaward slope, which would otherwise be prohibited. Plantings on the seaward slope will be restricted to seed mixes and shrubs, as larger trees are not permitted due to concerns about root intrusion, piping, and being uprooted during an extreme storm event.

BEACHMONT VETERANS OF FOREIGN WARS PROPERTY DESIGN

This section describes the existing conditions, design constraints and considerations, and schematic design outcome for the VFW Property within the Project area. See **Appendix C: Engineering Plans** for supplemental information.

EXISTING CONDITIONS

The VFW Property is located on 1.49 acres of land at 150 Bennington Street in Revere. The VFW's approximately 10,000 SF building was constructed in 1965. The post is run by a non-profit organization, serving as a function hall and a place for its members to gather, hold meetings, and provide programs and services, such as veterans activities, charitable work, and tributes. It also offers parking spaces for rent and provides an easement to Metro PCS for a cell tower.

The existing elevation of the VFW Property ranges approximately from 7.0 to 10.0 ft NAVD88. Under existing conditions, the VFW site periodically experiences coastal and rainfall-related flooding.



VFW Property parking lot existing conditions.



VFW Property waterfront existing conditions, facing Fredericks Park.

DESIGN CONSTRAINTS

Wetland Resource Areas:

Jurisdictional wetland resources on the VFW Property include LSCSF and Salt Marsh. Any changes to the VFW Property that would negatively impact on-site or adjacent wetland resource areas, including LSCSF and salt marsh, must be limited to the extent practicable. See **Appendix B** for maps of the delineated wetlands.

Site Constraints:

The VFW Property's two existing driveways are accessed from Bennington Street, requiring that any changes to the elevation of Bennington Street maintain access to the site. Since the site directly abuts the Beachmont School and Fredericks Park, any changes in elevation must be coordinated with those properties. While the VFW would like to eliminate flooding on the property, they also wish to maintain existing conditions to the maximum extent practicable, including parking capacity and the ability to continue to host the cell tower. This limits the City of Revere's ability to implement solutions that may involve major site changes.

SCHEMATIC DESIGN**Design Flood Elevation:**

The Project team used the MC-FRM to determine a Design Flood Elevation (DFE) for the VFW Property that would reduce coastal flood risk during 1% annual chance flood event with projected sea level rise in 2050, which includes approximately 2.4 feet of sea level rise. Based on the MC-FRM, the DFE for the VFW Property is 13.0 ft. NAVD88. To address feedback from MassDEP, CZM, and input from the VFW, the Project team proposes a DFE of 13.0 ft NAVD88 for the VFW Property to minimize disruption to the existing environment while still ensuring adaptability to future sea level rise projections. The coastal resilience strategy for the VFW Property is being designed with capacity to be extended to elevation 16.1 ft. NAVD88 as part of a potential future phase, which can support long-term resilience during a 1% annual chance flood event with projected sea level rise in 2070.

Site Improvements:

The Project proposes a living levee along the seaward edge of the VFW Property (**Figure 9A-B: VFW Property Cross-Sections**; illustrative site plans and renderings of the full Project area are shown in **Figure 12A-D** on page 33-36). A living levee is a type of flood protection that combines a traditional levee structure, with natural features like vegetation and habitat that provides both flood protection and environmental benefits. The living levee will increase permeable area that will be planted with native and locally adapted salt-tolerant vegetation. Due to the ecological sensitivity of the restoration areas along the marsh, non-cultivar native species will be used. To accommodate the levee structure, the Project proposes improvements at the VFW Property that include reconfiguring the existing parking lot to maintain the number of parking spaces and relocating the existing cell tower. These improvements will require a right-of-way agreement with the VFW.

Stormwater Improvements:

The Project proposes stormwater improvements on the VFW Property to address precipitation-based flooding. These improvements include increasing inlet capacity, rerouting of drainage, and expanding pipe capacity. In addition to preventing coastal flooding with the living levee, these stormwater improvements will reduce stormwater flooding and improve overall site resilience.

Figure 9A: VFW Property Waterfront Cross-Section - Existing Conditions

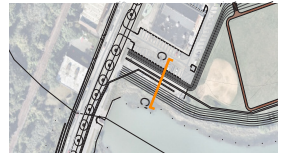
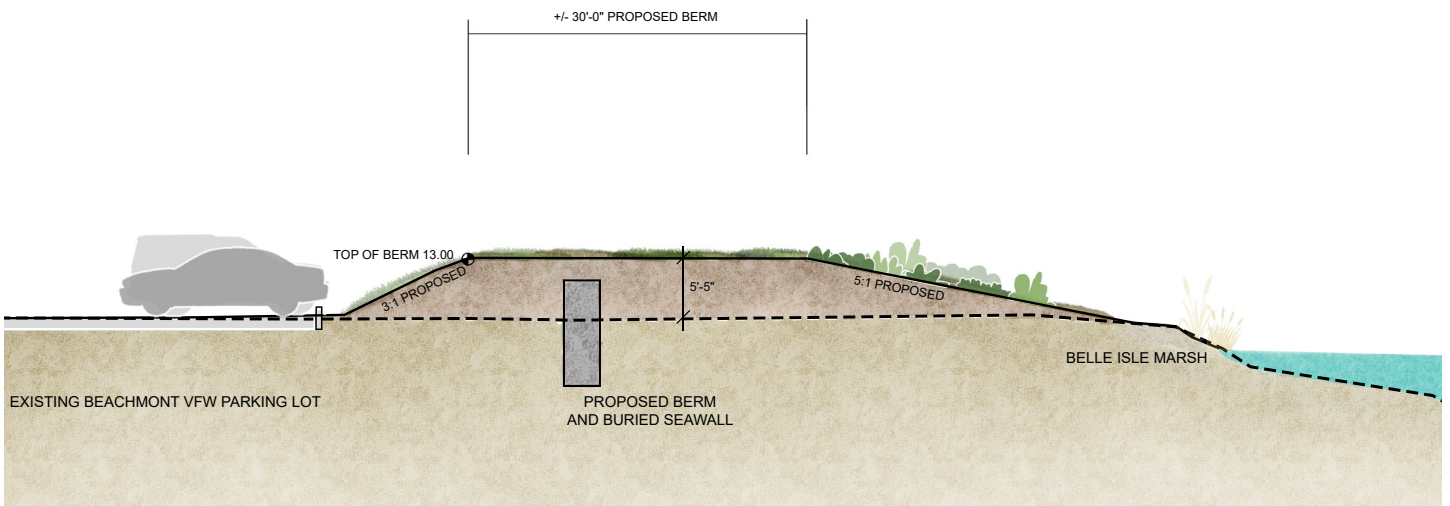
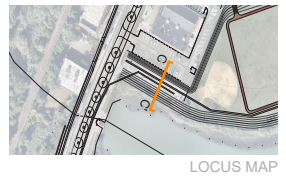


Figure 9B: VFW Property Waterfront Cross-Section - Proposed Conditions



FREDERICKS PARK DESIGN

This section describes the existing conditions, design constraints and considerations, and schematic design outcome for the Fredericks Park portion of the Project area. See **Appendix C: Engineering Plans** for supplemental information.

EXISTING CONDITIONS

The Fredericks Park, located at 15 Everard Street in Revere, is an approximately 15.05-acre park created in 1891 by filling a portion of the Belle Isle Inlet. It was previously referred to as Belle Isle Park. In 1979, the Beachmont School was built on an approximately 4.83-acre portion of the parcel. An approximately 6.97-acre portion of Fredericks Park was rehabilitated in the 1990s with grants that require retention of the site for recreation use in perpetuity. Additionally, Fredericks Park is also designated as recreation land under Article 97 (see page 38 for more information).

In its current configuration, Fredericks Park includes a soccer field, two basketball courts, a hockey court, a tot-lot, a baseball field, and a softball field. These facilities are available for use by the community as well as by the Beachmont School community, which serves a diverse student body of just under 300 students from Pre-K through 5th Grade, as well as approximately 115 students at the City Lab alternative High School for grades 9 through 12.

Fredericks Park ranges in elevation from 7.5 NAVD88 near the shoreline to 9.0 NAVD88 near the baseball diamond. The park experiences frequent flooding during high tides and coastal storms today, rendering much of the space unusable for large portions of the year.



Fredericks Park existing conditions, facing the Beachmont Memorial School.



Fredericks Park existing conditions, facing the Bordering Vegetated Wetland (BVW) and residential properties at 45-55 Belle Isle Avenue.

DESIGN CONSTRAINTS

Wetland Resource Areas:

Due to its low elevation, nearly all of Fredericks Park is characterized as LSCSF. It also contains over 37,000 SF of BVW along the eastern boundary. There is Salt Marsh located adjacent to the south side of the park. Any changes to Fredericks Park that would negatively impact on-site or adjacent wetland resource areas, including LSCSF, BVW, and Salt Marsh, must be limited to the extent practicable. See **Appendix B** for maps of the delineated wetlands.

Parkland Preservation and Article 97:

The Fredericks Park is subject to strict Federal and State requirements to maintain the entire property as a recreational facility. It was rehabilitated with a grant from the National Park Service's Urban Park and Recreation Recovery (UPARR) program, which requires it to be maintained for public recreation use in perpetuity. Converting the recreation area to a non-recreational use, including conversion to conservation area, requires approval from the National Park Service and provision of replacement recreation land.

The Park is also subject to Article 97 of the Amendments to the Constitution of the Commonwealth, which requires that any change in use from Recreation to another use (including "Conservation," wherein activities are non-facility based) complies with the Public Lands Preservation Act (PLPA) and 301 CMR 52.00: Disposition or Change in Use of Article 97 Interests. This would require a submission to the legislature of petitions to authorize the change in use, which is a lengthy process that must culminate in a two-thirds vote of the legislature for approval.

Site Constraints and Adjacent Uses:

The Beachmont Memorial School parking lot south of the school provides parking for school employees and Fredericks Park, a loading area for deliveries, and bus drop-off. According to school officials, the school is also used for election voting. These uses need to be maintained and enhanced as part of the Project.

Directly to the east of Fredericks Park is the Residential Revere area, described below. Changes to Fredericks Park's stormwater management must be designed to avoid negative impacts to that area or displacement of floodwaters.

SCHEMATIC DESIGN

Design Flood Elevation:

The Project team used the MC-FRM to determine a Design Flood Elevation (DFE) for the VFW Property that would reduce coastal flood risk during 1% annual chance flood event with projected sea level rise in 2050, which includes approximately 2.4 feet of sea level rise. Based on the MC-FRM, the DFE for Fredericks Park is 13.0 ft. NAVD88. To address feedback from MassDEP and CZM the Project team proposes a DFE of 13.0 ft NAVD88 for the park to minimize disruption to the existing environment and adjacent jurisdictional wetland resources while still ensuring adaptability to future sea level rise projections. The coastal resilience strategy for the park is being designed with capacity to be extended to elevation 16.1 ft NAVD88 as part of a potential future phase, which can support long-term resilience during a 1% annual chance flood event with projected sea level rise in 2070.

Site Improvements:

The schematic design considers the site improvements for both Fredericks Park and the Beachmont Memorial School to integrate resilience planning and enhance site accessibility and functionality (**Figures 10A-D: Fredericks Park Cross-Sections**; illustrative site plans and renderings of the full Project area are shown in **Figure 12A-D** on page 33-36).

Fredericks Park

The Project proposes to raise the grade of the majority of Fredericks Park along the seaward edge and throughout the soccer field with a gradual slope to the marsh. This elevation adjustment will enhance Frederick's Park's resilience and improve the usability of the fields during high tides and after storm events. The proposed features for Fredericks Park include:

- A full-size adult soccer field, which can be programmed as two U10 and two U8 soccer fields;
- A reconstructed and expanded playground;
- A full-size basketball court;
- A 4x4 soccer field;
- Two bocce courts;
- A restroom/storage facility; and
- Open space/green space for the school to utilize during school days.

Beachmont Memorial School

The proposed improvements to the parking lot of the Beachmont Memorial School will facilitate the proposed easement and expand parking capacity for VFW and increase a total of 110 parking spaces. Opportunities for stormwater retention within the parking lot will be evaluated as the design advances. Additionally, improvements will be made to ensure compliance with the ADA accessibility for all users.

Landscape and Ecological Design:

Similar to the proposed improvements for Bennington Street and the VFW Property, native salt-tolerant seed mixes and vegetation are proposed to allow for a natural transition between Fredericks Park and the marsh. Once Fredericks Park is elevated, the adjacent, gradually sloped grassed areas will be planted with pockets of native shrubs and trees that are well suited for a recreational facility while framing connecting views into Belle Isle Marsh. This approach will enrich the aesthetic appeal and foster ecological resilience and biodiversity.

Figure 10A: Fredericks Park Southern Edge Cross-Section - Existing Conditions

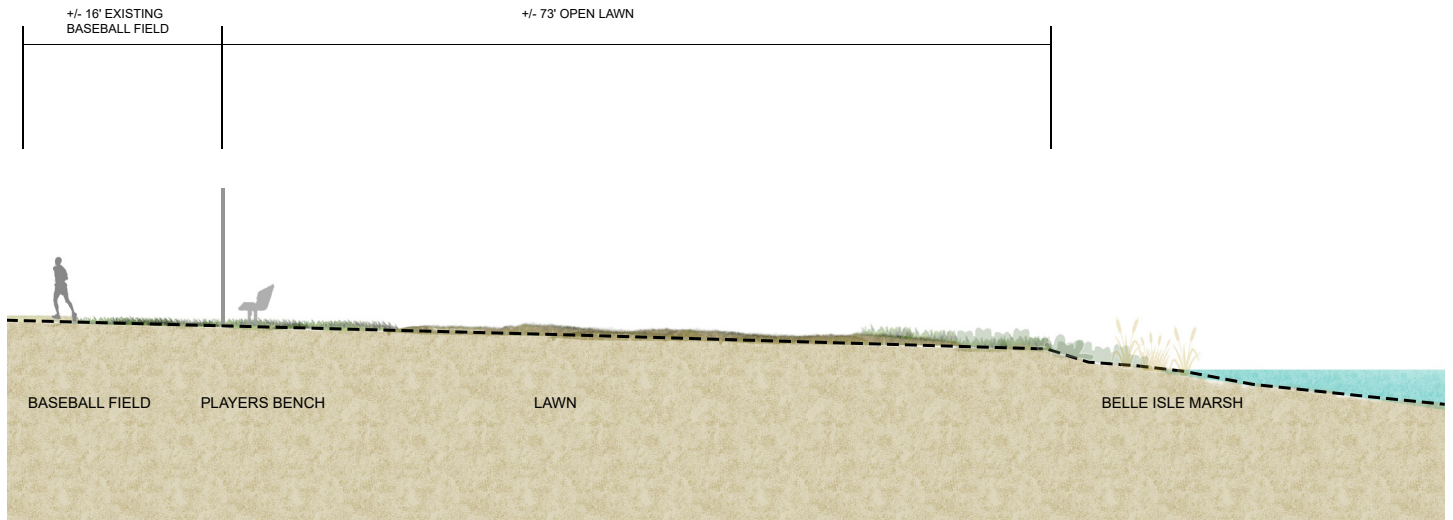
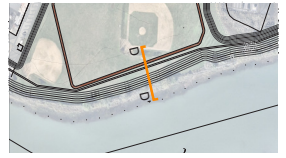


Figure 10B: Fredericks Park Southern Edge Cross-Section - Proposed Conditions

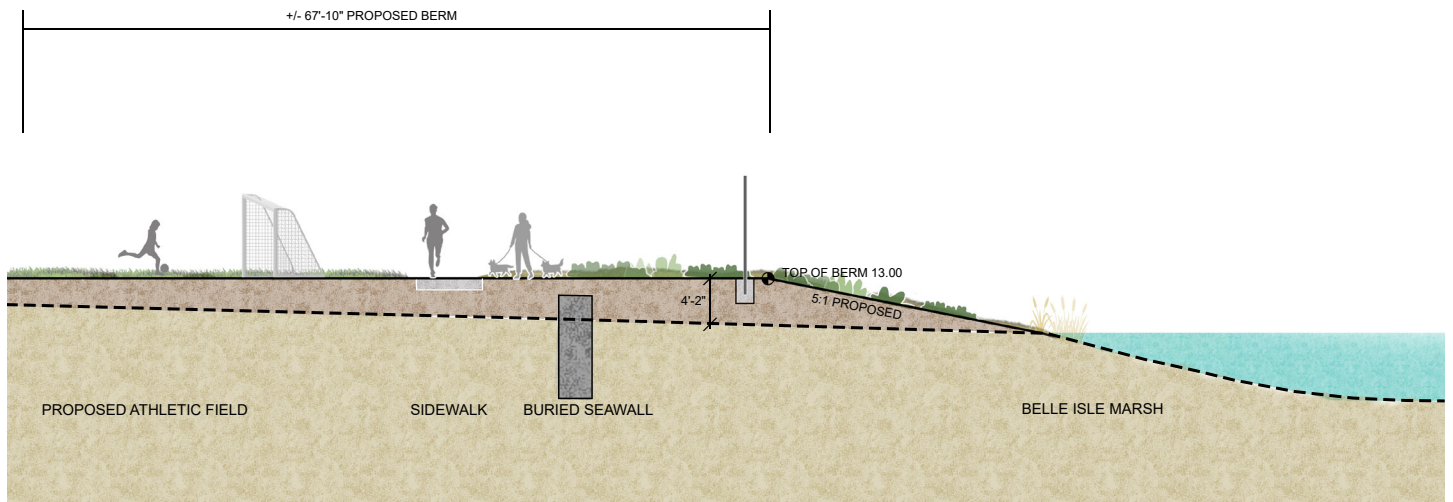
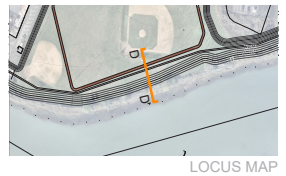


Figure 10C: Fredericks Park Eastern Edge Cross-Section - Existing Conditions

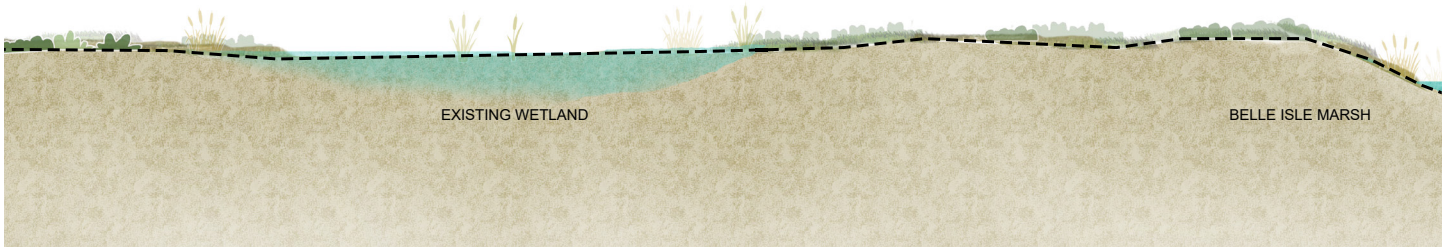
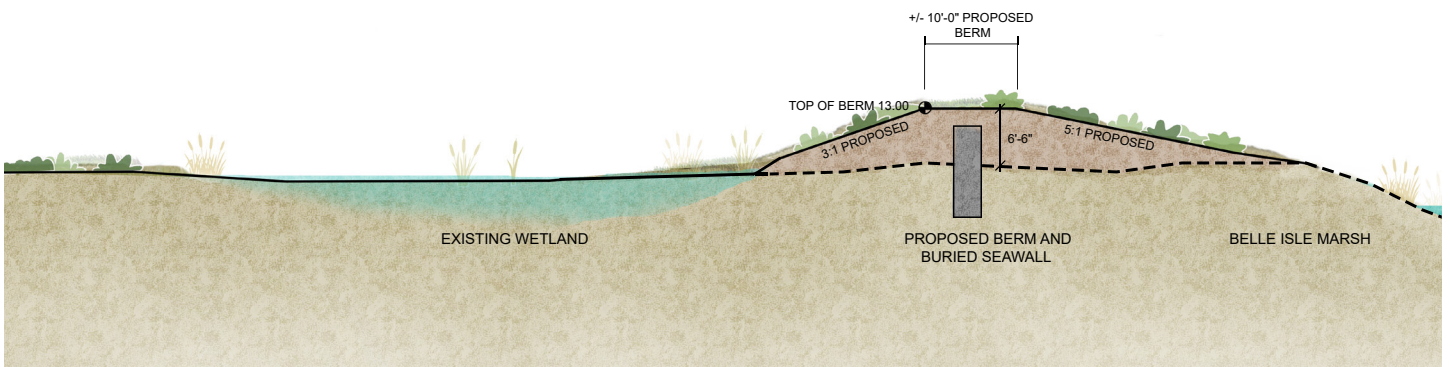
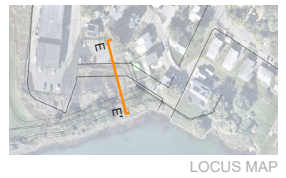


Figure 10D: Fredericks Park Eastern Edge Cross-Section - Proposed Conditions



RESIDENTIAL REVERE DESIGN

This section describes the existing conditions, design constraints and considerations, and schematic design outcome for the residential area east of Fredericks Park in Revere. See **Appendix C: Engineering Plans** for supplemental information.

EXISTING CONDITIONS

The Residential Revere area within the Project is bounded by Belle Isle Marsh to the south, Fredericks Park to the west, and residential properties to the east and north. It includes vacant City-owned land as well as several single-family and two-family homes and apartment buildings. This portion of the Project is at existing elevations ranging from 5.0 to 9.0 feet in NAVD88.

During nor'easters in December 2022 and January 2024, over three feet of water inundated Belle Isle Avenue and Montfern Avenue and the entire parking lot at 45-55 Belle Isle Avenue, causing damage to vehicles and immobilizing residents for hours until the tide receded. Less severe events impact 45-55 Belle Isle Ave on average four times per year. The current flooding conditions frequently cause damage to personal and public property, negatively impacting the quality of life for people living in this area, which is a State-designated environmental justice population. This threat is consistently increasing in frequency and severity, and MC-FRM projections show that this flood risk will continue to worsen with time as sea level rises.



Residential Revere waterfront existing conditions, facing southeast.



Residential Revere waterfront existing conditions, facing northwest.

DESIGN CONSTRAINTS

Wetland Resource Areas:

Jurisdictional wetland resources within the Residential Revere area include LSCSF, BVW, and Salt Marsh adjacent to the south. Any changes to the area that would negatively impact on-site or adjacent wetland resource areas, including LSCSF, BVW and Salt Marsh, must be limited to the extent practicable. See **Appendix B** for maps of the delineated wetlands.

Site Conditions:

Roadway access to the properties along Orchard Street and Montfern Avenue must be maintained, which eliminates any alternatives that would include raising these roadways. In addition, the properties in the Residential Revere area are primarily privately owned, which limits the City of Revere's ability to implement solutions that may involve major site changes on land it does not own.

SCHEMATIC DESIGN

Design Flood Elevation:

The Project team used the MC-FRM to determine a Design Flood Elevation (DFE) for the Residential Revere area of the Project that would reduce coastal flood risk during 1% annual chance flood event with projected sea level rise in 2050, which includes approximately 2.4 feet of sea level rise. Based on the MC-FRM, the DFE for the Residential Revere area is 13.0 ft. NAVD88. To address feedback from MassDEP and CZM the Project team proposes a DFE of 13.0 ft NAVD88 for this area to minimize disruption to the existing environment and adjacent jurisdictional wetland resources while still ensuring adaptability to future sea level rise projections. The coastal resilience strategy for this area is being designed with capacity to be extended to elevation 16.1 ft NAVD88 as part of a potential future phase, which can support long-term resilience during a 1% annual chance flood event with projected sea level rise in 2070.

Site Improvements:

The Project is proposing a living levee from the elevated portion of Fredericks Park to approximately Orchard Street, where it transitions into a seawall that ties into high ground behind the properties located at 40 and 42 Orchard Street (**Figure 11A-B: Residential Revere Cross-Sections**; illustrative site plans and renderings of the full Project area are shown in **Figure 12A-D** on page 33-36). The living levee portion will be similar to the proposed along the VFW, with native and locally adapted salt-tolerant vegetation. Non-cultivars will be used due to the ecological sensitivity at this location. The top of the seawall will be elevated approximately 5 feet above existing ground. The schematic design calls for a sheet pile with concrete facing for the proposed seawall

Figure 11A: Residential Revere Cross-Section - Existing Conditions

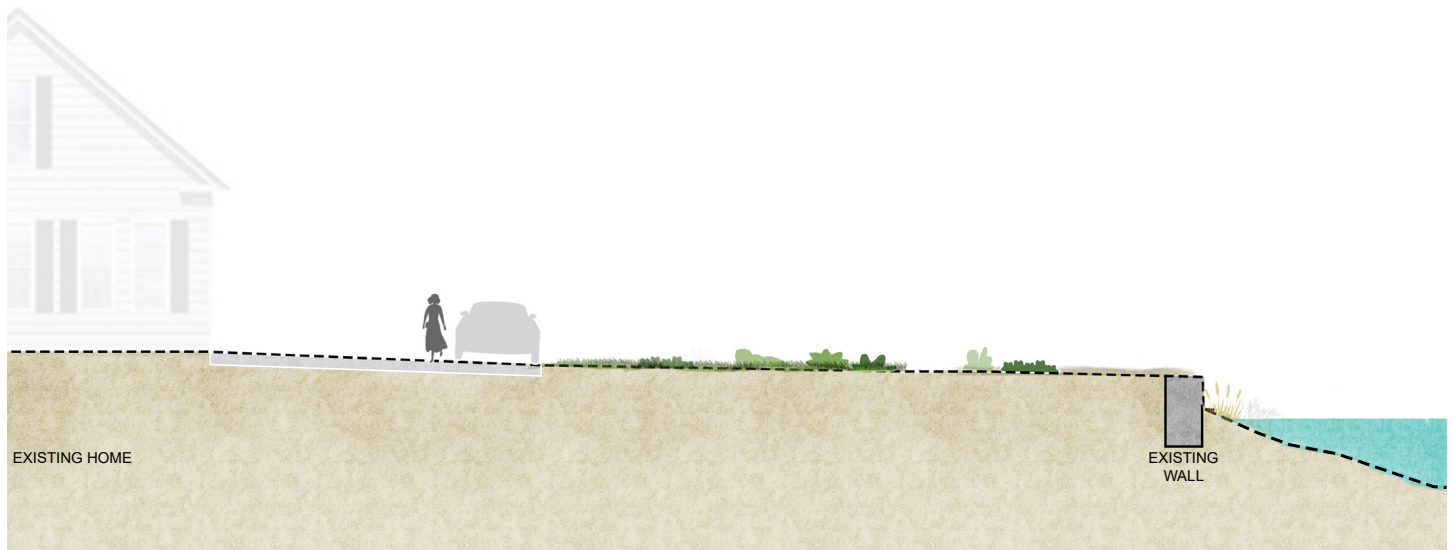
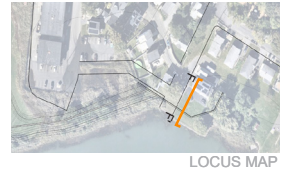


Figure 11B - Residential Revere Cross Section - Proposed Conditions

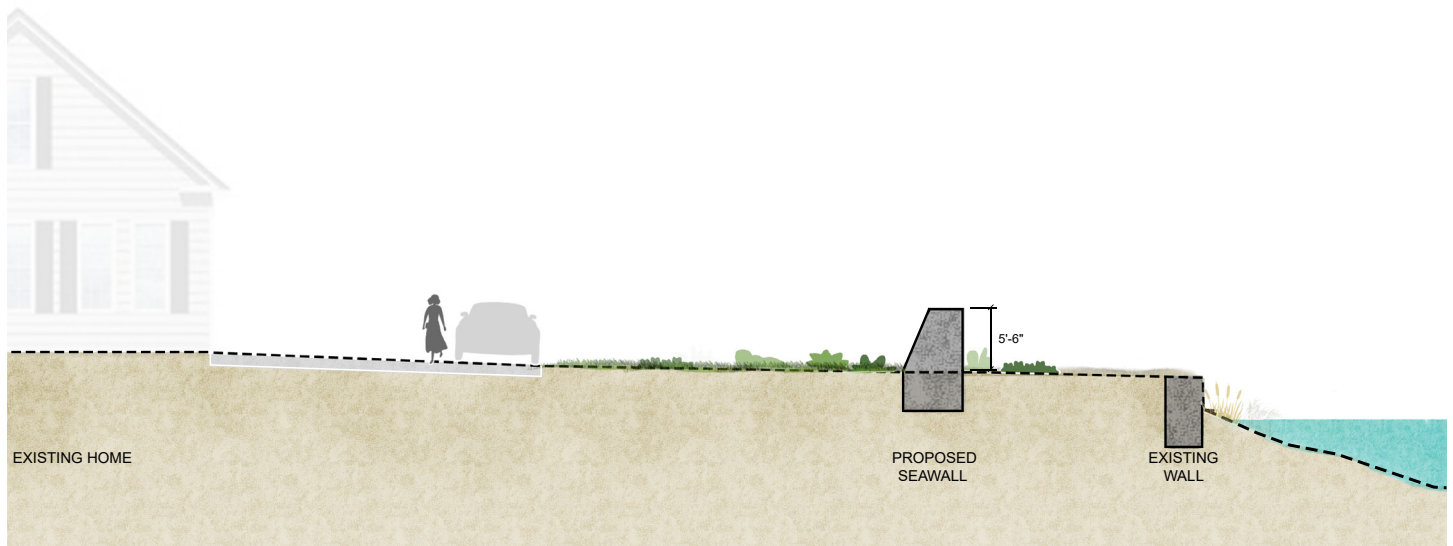
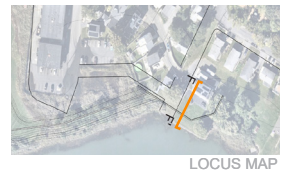


Figure 12A: Full Project Area Illustrative Site Plan



Figure 12B: VFW Property, Fredericks Park, and Residential Revere Illustrative Site Plan



Figure 12C: Full Project Area Proposed Conditions Rendering



LEGEND

- Roadway Improvements
- Green Infrastructure and Nature-Based Solutions
- Pedestrian/Bicyclist and Recreation Enhancements



Existing Conditions

Figure 12D: VFW Property and Fredericks Park Proposed Condition Rendering



LEGEND

- Roadway Improvements
- Green Infrastructure and Nature-Based Solutions
- Pedestrian/Bicyclist and Recreation Enhancements



Existing Conditions

03 | NEXT STEPS

ADVANCING DESIGN

Upon the conclusion of the MVP grant period that is supporting Phase II of the Project in June 2025, the Project team will launch Phase III of the Project: Final Design and Permitting. This will involve subsequent technical analyses to inform more detailed design, and permit submittals to local, State, and Federal regulatory agencies. The Project team will continue to work with the East Boston and Revere communities, public agencies, and private landowners throughout the next phase of design.

MASSDOT PROJECT REVIEW COMMITTEE

MassDOT has a Project Review Committee (PRC) for reviewing and approving funding for transportation projects, including design funding proposals. The PRC, composed of MassDOT staff, assesses the merits of each project and makes recommendations for funding. Design funding proposals are reviewed and ranked by the Metropolitan Planning Organization (MPO) based on certain criteria.

The City of Boston, in partnership with the City of Revere and with guidance from MassDOT, submitted the Project to MassDOT's PRC in April 2025. MassDOT subsequently accepted the Project through the PRC process, and the Project will go through the MassDOT design process as a next step. The MassDOT process will begin with a Project scoping meeting to help define the required studies and evaluation to be completed during the MassDOT design review process.

SITE INVESTIGATIONS

As the Project's design advances past schematic design, the Project team anticipates that there are several technical analyses that will be necessary to further inform the Project.

Topographic Survey:

The schematic design is shown conceptually in several locations because an existing conditions survey is needed in these areas. As design development progresses additional survey is required at the VFW Property, Beachmont Memorial School, Bennington Street (between the VFW Property and Crescent Avenue in Revere), MBTA Suffolk Downs Station parking lot, and the DCR access driveway to the Belle Isle Marsh Reservation's parking lot.

Traffic Studies:

The Project team anticipates that MassDOT may require additional traffic studies at the intersection of Everard Street in Revere and potentially Leverett Avenue in Boston as part of their review. The Project team will coordinate with MassDOT prior to the next phase of design to identify the scope of work for these traffic studies. These studies may result in signal or intersection improvements being required.

Culvert Replacement:

The Project team evaluated the additional fill on the DCR culverts under Bennington Street that convey Sales Creek and the Pump Station as part of the schematic design process. The Project team is recommending a full replacement of the existing Sales Creek stone culvert. The conceptual culvert alternative is proposed as a concrete replacement while maintaining the existing tide gate and hydraulic opening. The Project team intends to review the culvert replacement with MassDOT prior to advancing the detailed design of the replacement.

Geotechnical Studies:

The Project team has completed geotechnical borings along Bennington Street and Fredericks Park as part of the Project during both Phase I and Phase II. Additional geotechnical studies will be required to evaluate slope stability, settlement, and structure foundation as part of the next phase of design.

Utilities:

The Project team will advance the design and location of utilities within the Bennington Street corridor as part of the next design phase. Additional coordination with MWRA, BWSC, and electrical and telecommunication companies is required prior to advancing detailed design.

PERMITTING

The Project must comply with applicable regulations related to recreation and environmental protection. These include but are not limited to:

- MassDEP Wetlands Protection Act (WPA) Variance;
- Massachusetts Environmental Policy Act (MEPA);
- Boston Conservation Commission's Wetlands Ordinance (BWO) Review;
- Revere Conservation Commission Review;
- Boston Parks Commission Review (BPRD Sec. 7-4.11);
- DCR Access Permit;
- MWRA 8(m) Permit;
- MassDEP Section 401 Water Quality Certification;
- MassDEP Chapter 91 License;
- CZM Federal Consistency Review; and
- U.S. Army Corps of Engineers Section 404 of the Clean Water Act.

Applicable permits are described in greater detail in the [Feasibility Report and Alternatives Analysis](#) (pages 43-47). **Table 1** indicates which portions of the Project area are subject to the permits listed above, and **Figure 13** depicts the anticipated permitting sequence. As described previously, Fredericks Park is subject to additional Federal and State regulations limiting changes of use per the National Parks Service UPARR Program and Article 97.

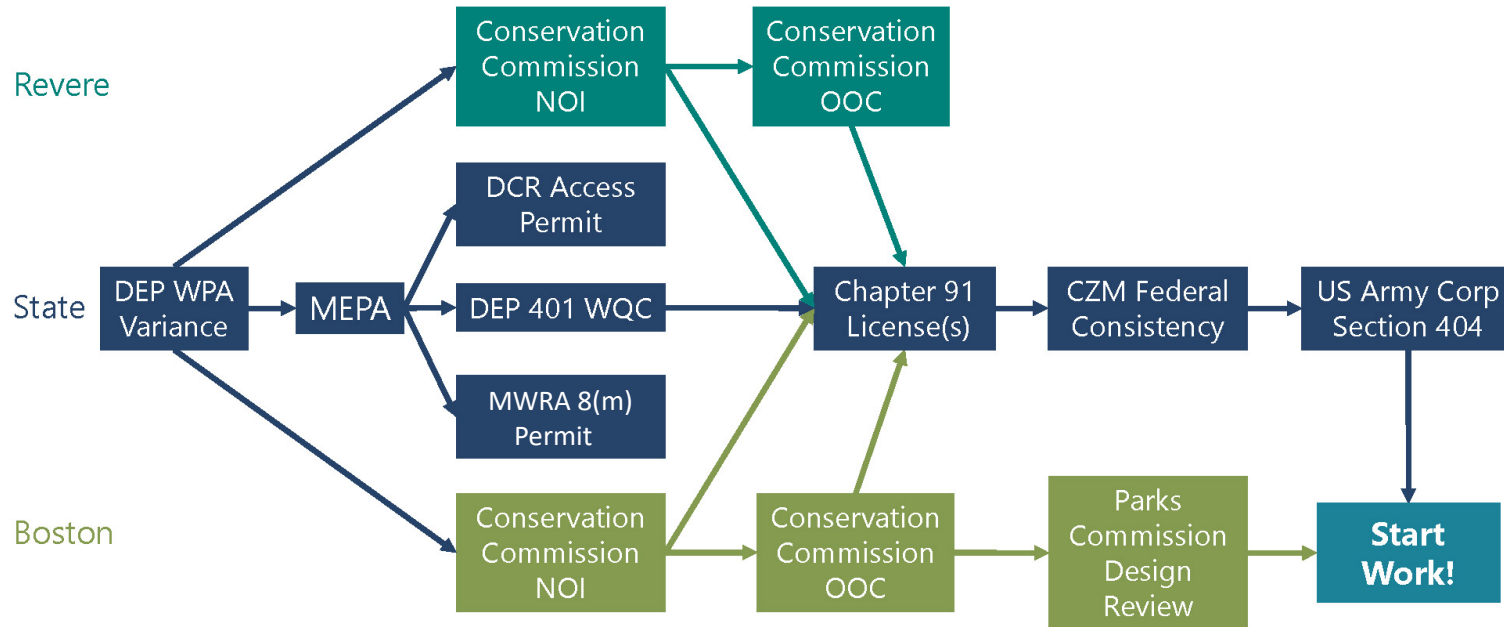
The following permits have been obtained as part of Phase I and II of the Project:

- Order of Conditions (DEP File No. 006-2026/BOS File No. 2025-005) for exploratory borings and confirmation of jurisdictional wetland resource area boundaries, issued March 5, 2025 by the Boston Conservation Commission.
- Order of Conditions (DEP File No. 061-0838) for exploratory borings and confirmation of jurisdictional wetland resource area boundaries, issued April 4, 2025 by the Revere Conservation Commission.
- Geotechnical boring permits include an MWRA 8M and the City of Boston Inspectional Services Department (ISD). A separate MWRA 8M permit and ISD permit will be required for the final design.

Table 1: Applicable Local, State, and Federal Permits and Reviews

PROJECT AREA	WPA	MEPA	BOSTON CONCOM BWO	BPRD SECTION 7-4.11	REVERE CONCOM	DCR ACCESS PERMIT	MWRA 8(M) PERMIT	WQC	CHAPTER 91	SECTION 404
Bennington Street	✓	✓	✓	✓		✓	✓		✓	
VFW Property	✓	✓			✓					
Fredericks Park	✓	✓			✓			✓	✓	✓
Residential Revere	✓	✓			✓			✓	✓	✓

Figure 13: Anticipated Permitting Sequence



CONSTRUCTION FUNDING

As described in **Appendix D: Preliminary Cost Estimates**, the construction cost estimate in 2025 based on the current schematic design is approximately \$58,100,000. As described previously, the Project was accepted by MassDOT's PRC in April 2025. Acceptance by MassDOT's PRC makes the Project eligible for construction funding through the MPO based on certain criteria, as well as from [MassDOT discretionary funds](#). While construction funding is not guaranteed at this time, these potential avenues to fund the Project's construction are promising.

The Project team identified several potential alternative funding sources that will be evaluated and pursued as the Project's design advances in the event that funding through MassDOT or the MPO is not secured.

City Capital Funding:

The City of Boston could use capital funds for work within the Boston limits of the Project area along Bennington Street, and City of Revere could use capital funds for work within the Revere limits of the Project area along the VFW waterfront, Fredericks Park, and the waterfront of the residential area east of Fredericks Park. This funding could be supplemented by the State resilience grants, including MVP, which has a limit of \$5 million for regional construction projects, and/or CZM's Coastal Resilience Grant Program, which has a limit of \$2 million for construction projects.

U.S. Army Corps of Engineers:

The City of Boston is partnering with the USACE to complete a Coastal Storm Risk Management (CSRM) study, which builds upon the City's Climate Ready Boston Coastal Resilience Solutions plans, assesses existing flood preparation, and opens Boston to potential federal investment. The study is considering long-term flood risk and existing city, federal, state, and local plans and projects. USACE will develop potential strategies to manage flood risk and recommend solutions that would be eligible for federal funding from Congress. Conversations with USACE indicate that the full scope of the Project in Revere could be eligible for funding as part of the CSRM in Boston since it is necessary to reduce flood risk within Boston.

Federal Grants:

While the future of Federal grants for climate change and coastal resilience projects is evolving, two grant programs may continue to be an option for funding the Project's construction, including:

- FEMA's Hazard Mitigation Grant Program (HMGP); and
- U.S. Department of Transportation's Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Grant program.

These grants typically have a limit of \$50 million per project and would require supplemental funding from the City of Boston, City of Revere, and/or Commonwealth of Massachusetts.