

NEW BEDFORD RIVERWALK PRELIMINARY DESIGN REPORT

JUNE 2023

PREPARED FOR

The City Of New Bedford and The
Executive Office Of Energy And
Environmental Affairs, MA

PREPARED BY

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Foth Infrastructure And Environment LLC
Stantec Consulting Services
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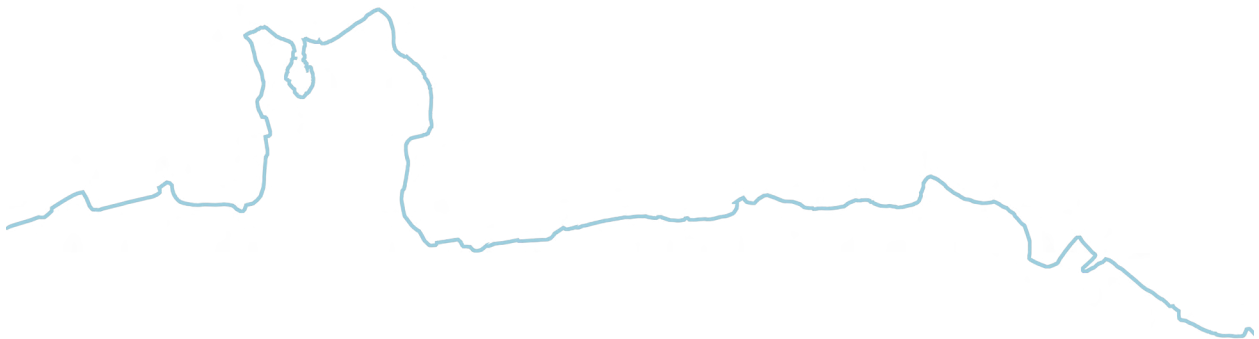


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Appendix A: Coastal Edge Preliminary Review - Foth

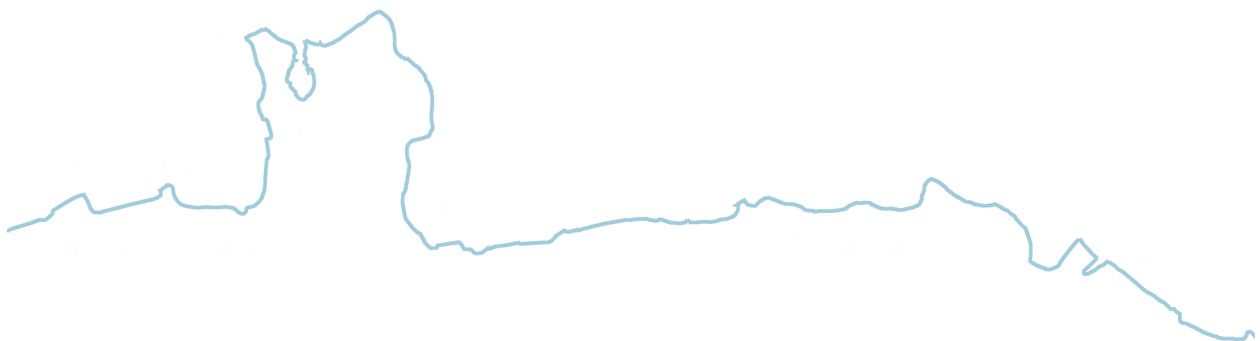
Appendix B: Hazardous Materials Assessment - Stantec

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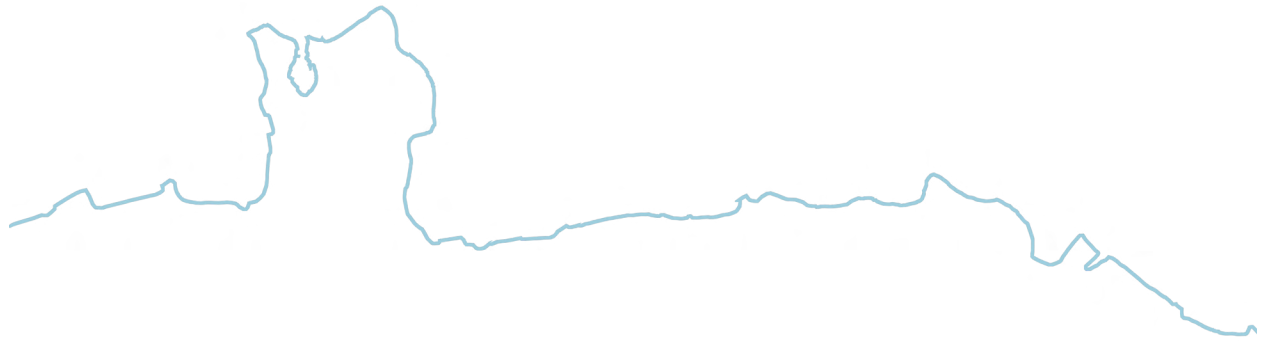
Appendix D: Existing Conditions Plans - Brown, Richardson + Rowe

Appendix E: River's Edge Sections - Brown, Richardson + Rowe

Appendix F: Preliminary Design Plans - Brown, Richardson + Rowe



This New Bedford RiverWalk Preliminary Design Report was prepared by Brown, Richardson + Rowe, Inc., with subconsultants Foth Infrastructure and Environment, LLC, Stantec Consulting Services, and the Woods Hole Group. The Report was prepared for the City of New Bedford and the Executive Office of Energy and Environmental Affairs, who funded the project through the Gateway City Parks Program.

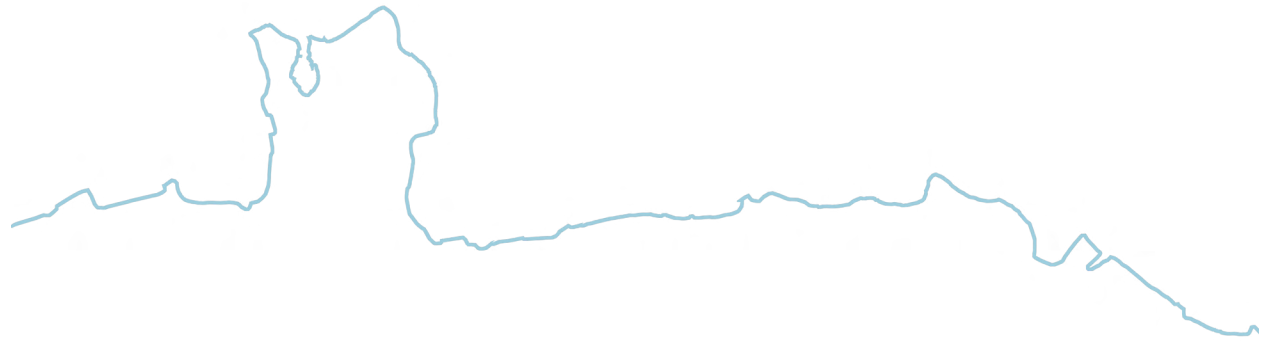


1 Executive Summary

The intent of this Preliminary Design Report is to develop a more detailed RiverWalk alignment and design that will be used as the basis for future RiverWalk construction and permitting documentation. This Report builds on prior plans and reports prepared for the RiverWalk, particularly the *New Bedford River Walk Feasibility Study Update*, prepared in 2020. This Preliminary Design Report establishes a number of key design parameters that can be used to provide the framework for future RiverWalk permitting and construction plans. The following tasks were completed:

- Updated sea level rise projections to inform the RiverWalk design elevation,
- Refined the assessment and characterization of impacted soils for parcels affected by the RiverWalk and provided recommendations for soil management during design and construction.
- Performed a visual inspection of the riverbank conditions and determined shoreline stabilization requirements and potential design solutions.
- Proposed a recommended RiverWalk Design Elevation.
- Engaged with private land owners affected by the proposed RiverWalk.
- Prepared an updated Existing Conditions Plan that takes into account the recent EPA intertidal zone work.
- Proposed a Preliminary RiverWalk Design including a preferred alignment, desired RiverWalk amenities, potential RiverWalk materials, proposed climate resiliency measures, and potential impacts to abutters.

This report contains a brief summary of the stages of work performed as part of this project. The report is organized into five sections: Review Prior Work, Existing Conditions Research, Basis of Design, Preliminary RiverWalk Design, and Next Steps. and Summary. These stages of work are summarized in the following sections and are supported by more detailed analysis, memos, and design plans, that are provided in the Appendices.



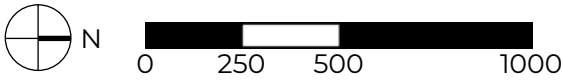
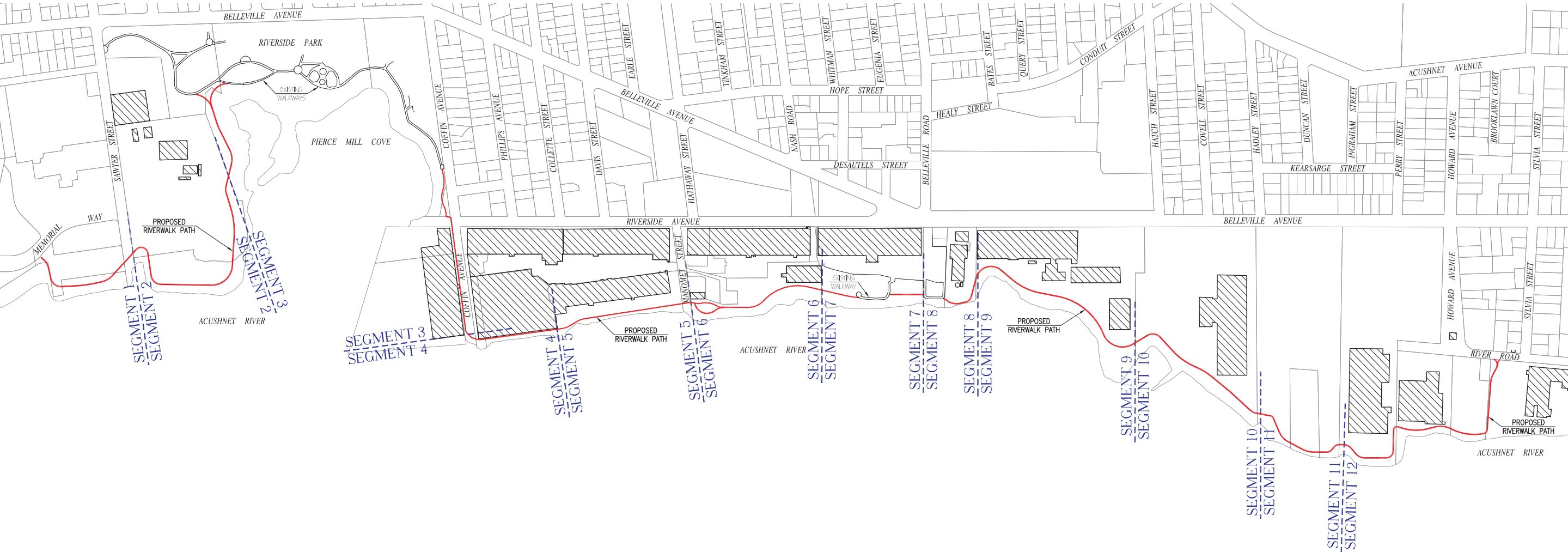
2 Review of Prior Work

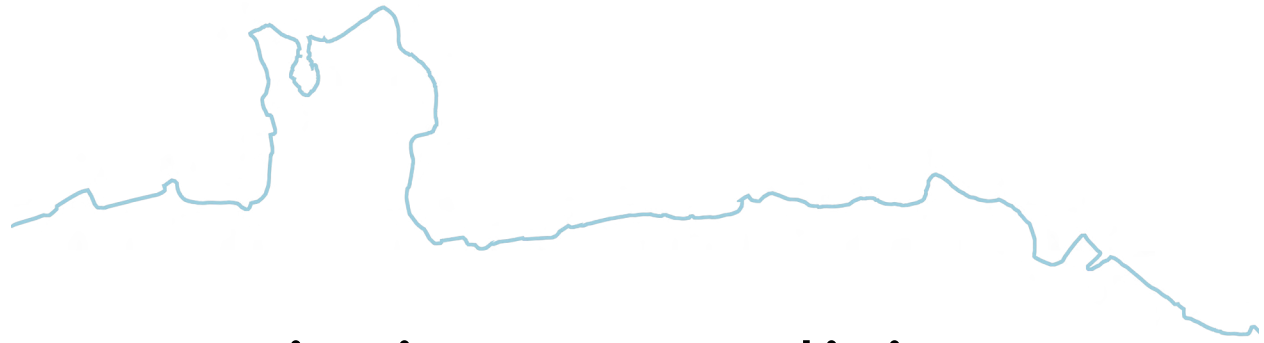
To commence this work stage, the design team reviewed two key document sets to inform this Preliminary Design Report. The primary document reviewed was the 2020 *New Bedford River Walk Feasibility Study Update* prepared by Brown, Richardson, + Rowe, Inc. (BRR), Stantec Consulting Services (Stantec), LEC Environmental Consultants (LEC), and the Woods Hole Group (WHG). This Feasibility Study was a comprehensive review of the entire project area, and included its own review of previous reports, including the 2015 *New Bedford Riverwalk Planning and Design* feasibility study and the *Acushnet River Upland Riparian Restoration Project*. As part of this Preliminary Design Report, BRR also reviewed the *Riverwalk Restoration* design plans prepared by the Farland Corp. in 2016 which provided the team with a site survey.

To facilitate the preparation of the Preliminary Design, the design team used the topographic and boundary survey developed as part of the 2016 *Riverwalk Restoration* design documents as the primary base plan. This survey is missing some important site features and has incomplete topographic information. Furthermore, the resource area delineation is over six years old and does not include the recent EPA internal zone work which has altered the riverbank. Despite these deficiencies, the survey was deemed suitable for the preparation of the Preliminary Design. Before formal construction and permitting plans commence, a new, comprehensive topographic and boundary survey including a new resource area delineation, must be prepared.

The 2016 *Riverwalk Restoration* plans established RiverWalk segments to identify individual portions of the riverfront. These segments were used in the 2020 *New Bedford River Walk Feasibility Study* and this Preliminary Design Report. The following page includes a plan identifying the riverfront segments.

RIVERWALK RESTORATION PROJECT SEGMENT INDEX MAP
BY FARLAND CORP.





3 Existing Conditions Research

The Design Team performed initial Site Investigations and background research to inform the preparation of the Preliminary Design. Four main site investigation and background research efforts were performed:

Ongoing and Future Projects

There are several main ongoing or future projects located within the proposed RiverWalk extents that will affect the RiverWalk design. Most of the projects listed below relate to impacted soil cleanup on various riverfront parcels. The Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) have proposed post-closure design drawings that indicate the intended ground conditions after closure. The design team used this publicly available information in the preparation of the Existing Conditions Plan and the Preliminary Design Plan. Starting from the south end of the project site and moving northward, these ongoing and future projects are as follows:

Sawyer Street Facility

In addition to removing or remediating existing impacted soils, the EPA created land along the eastern shoreline to permanently contain excavated materials. The materials remaining in the “Confined Disposal Facility” on site will be permanently capped. After closure, the City of New Bedford plans to redevelop this site as a public park along its riverside edges, and as a vertical development in the landward portions. Closure activities are slated for completion in 2025.

Parcel 100-117, 1R Coffin Avenue

This parcel contains a privately owned building that is partially collapsed. The City of New Bedford intends to formally take this property and the building’s demolition has been recently approved. Future uses for this parcel are to be determined, but include the possibility of at least partial use as a public park on the riverside edge and potentially compensatory parking.

EPA Intertidal Zone and Shoreline Remediation Projects

Nearly the entire riverbank of the project site required remediation and cleanup as part of the New Bedford Harbor Superfund Cleanup. The EPA has already completed their intertidal zone and shoreline remediation work from the parking lot on Veterans Memorial Way northward to the Nashawena Mills site (Segments 1-7). Additional intertidal and shoreline remediation work will occur from Nashawena Mills to the Titleist property (Segments 8-11). Clean up of this northern segment of the RiverWalk site will be complete by the end of 2024.

Titleist and Aerovox Sites

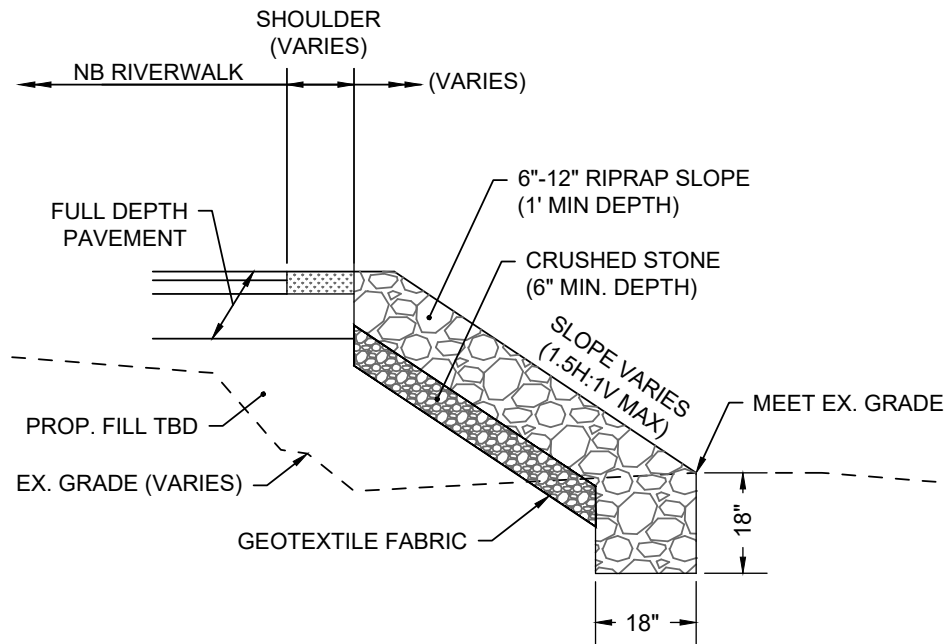
Although these are separate projects, these two adjacent parcels required significant cleanup from prior site uses. A combination of removing material from the site and burying and capping material on site is occurring. In addition, the shoreline and intertidal zone are being replanted and stabilized. This work is ongoing and is scheduled for completion in 2023.

Site Investigation and Project Design Alternatives

Foth performed an in-field visual site investigation to assess the existing conditions of the river bank and any coastal structures along the proposed RiverWalk extents. Foth prepared potential design alternatives and a typical slope stabilization approach for any instances where the project requires a higher riverbank edge or RiverWalk design than the site grades existing in 2023.

The key outcomes from their investigation and alternatives are as follows:

- The existing riverbank established as part of the EPA's remediation work shall not be disturbed wherever feasible.
- The existing riverbank and stabilization measures installed by the EPA are sufficient for use. In locations where these stabilization measures may not address future sea level rise or increased storm surge, the project team will propose additional stabilization measures to protect the RiverWalk project investment. Any new slope stabilization or climate resiliency measures for the RiverWalk project should generally be located landward of the existing or proposed EPA work.
- The desired overlook structures, raised boardwalk structures, and possible kayak launches will have challenging permitting processes given their location within buffer zones or, in some cases, within the boundaries of the resource areas. In some instances, locating these structures within the resource area or buffer zone is necessary to facilitate the implementation of the proposed RiverWalk project. In these instances, the design team will propose the least harmful method of construction.



Typical Rip Rap Riverbank Section - Foth

Hazardous Materials Assessment

Stantec has built upon their prior impacted soils research, performed as part of the 2020 Feasibility Study, by reviewing the specific Release Tracking Numbers (RTN) for each parcel along the proposed RiverWalk alignment. Individual Activity and Use Limitations (AUL) and Disposal Boundaries for each affected parcel were downloaded. Stantec prepared a memorandum outlining their assessment of the known impacted soils, provided design parameters for the design team when locating and designing the RiverWalk, and provided recommendations for the future construction contractor. Key recommendations and outcomes of the Assessment are as follows:

- The existing known impacted soils do not present a significant public safety concern, as long as appropriate soil management procedures are followed.
- The design of the RiverWalk should seek to minimize the need for excavation. Given some excavation is inevitable, such as excavation for subbase materials, footings for site features, to achieve appropriate planting depth, drainage infrastructure, etc., any excavated materials shall be reused and relocated within their original parcel boundary in a suitable location, following the recommendations of the Hazardous Materials Assessment. Movement of excavated soil must be carefully tracked.
- When feasible, locate the RiverWalk alignment so it avoids the known AUL or Disposal Boundary areas. It is noted that this recommendation is not always feasible.
- The contractor shall prepare a Soil Management and Health and Safety Plan to outline all procedures being implemented to guide the handling of soil during construction.

HAZARDOUS MATERIALS SITES AND RELEASE TRACKING NUMBERS MATRIX
BY STANTEC

TABLE 1 HAZARDOUS MATERIALS SITES AND RELEASE TRACKING NUMBERS											
MAP KEY	DEP RTN	CITY	RELEASE ADDRESS	SITE NAME LOCATION AID	REPORTING CATEGORY	NOTIFICATION DATE	COMPLIANCE STATUS	DATE	PHASE	RAO CLASS	CHEMICAL TYPE
1	4-0000245	New Bedford	85 Coggeshall Street	FAIRHAVEN MILLS	NONE	4/15/1988	RTN CLOSED	10/01/1993			PAHs, Metals, Petroleum (0-8' bgs)
1	4-0014995	New Bedford	94 Sawyer Street	FAIRHAVEN MILLS	72 HR	9/3/1999	RAO	12/16/2010		A3	No. 2 fuel oil
1	4-0019924	New Bedford	94 Sawyer Street	FAIRHAVEN MILLS SE CORNER OF MILL 1	72 HR	07/19/2006	RTN CLOSED	04/12/2010			Gasoline
2	4-0011675	New Bedford	206-378 Belleville Avenue	NO LOCATION AID	TWO HR	09/19/1995	RAO	12/05/2001		B1	No. 4 fuel oil; No. 6 fuel oil
3	4-0000437	New Bedford	19 and 41 Coffin Avenue	PROPERTY	NONE	01/15/1988	RAO	07/31/2001		A2	Soil COCs: Pb
3	4-0019705	New Bedford	90 Riverside Avenue	WHALER'S PLACE	120 DY	04/06/2006	RAO	08/07/2006		A1	Soil COCs: Petroleum, metals
3	4-0019527	New Bedford	10 Manomet Street	NO LOCATION AID	120 DY	12/13/2005	RAO	02/01/2006		A2	Petroleum, metals, PAHs, PCBs in soil
3	4-0015213	New Bedford	10 Manomet Street	NO LOCATION AID	120 DY	12/30/1999	RAO	12/30/1999		B1	Pb in soil (0-3')
4	4-0023674	New Bedford	194 Riverside Avenue	CLIFTEX CORP	120 DY	05/04/2012	RAO	09/06/2012		A2	PCBs, metals
4	4-0014111	New Bedford	194 Riverside Avenue	CLIFTEX CORP	TWO HR	08/06/1998	RAO	05/04/2012		A1	Bags of asbestos
4	4-0014112	New Bedford	194 Riverside Avenue	CLIFTEX CORP	72 HR	08/06/1998	PSC	12/29/2017		PA	Groundwater COCs: fuel oil; Soil COCs: fuel oil
4	4-0023093	New Bedford	200 Riverside Avenue	FORMER MANOMET MILL	120 DY	02/25/2011	RAO	01/04/2013		B2	Groundwater COCs: cVOCs; Soil COCs: EPH and PAHs
5	4-0014529	New Bedford	686 Belleville Avenue	FIBRE LEATHER CORP	TWO HR	02/12/1999	RAO	02/14/2000		A3	No. 6 fuel oil in soil (0-7' below foundation)
6	4-0027583	New Bedford	700 Belleville Avenue	TITLEIST PROPERTY - ACUSHNET COMPANY	120 DY	12/20/2018	UNCLASSIFIED	12/20/2018	PHASE II	EPA-Oversight	PCBs in soil
6	4-0000601	New Bedford	740 Belleville Avenue	AEROVOX INC	72 HR	11/28/1988	TIER I	08/15/2013	PHASE IV	EPA-Oversight	PCBs and cVOCs in soil (3.5' to depth) and groundwater; PCBs (0-2' down to 12')

AUL Implemented/EPA regulatory controls pending

Sea Level Rise and Climate Projections

The Woods Hole Group updated their future flooding conditions and coastal storm risk projections that were prepared as part of the 2020 Feasibility Study to inform this current Preliminary Design project. The WHG provided the team with the latest results from the Massachusetts Coast Flood Risk Model (MC-FRM) and future water level and design conditions for the project area. Their work included the probabilistic flooding results, water surface elevation data, wave information, and design flood conditions for present day conditions and future climate projections for the years 2030, 2050, and 2070. They also provided the future tidal benchmarks at the specific future year projection periods. Key data points used by this Preliminary Design include the following:

Tidal Benchmarks (Assumes New Bedford Hurricane Barrier is open)

Benchmark	Climate Horizon			
	Present [^] (ft, NAVD88)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
MLLW	-1.7	-0.5	0.9	2.7
MLW	-1.5	-0.4	1	2.8
MTL	0.3	1.5	2.8	4.6
MHW	2.1	3.4	4.6	6.4
MHHW	2.3	3.6	4.9	6.6

[^] = Based on 2008 centered tidal epoch

Stillwater Return Period Water Levels (Assumes New Bedford Hurricane Barrier is closed and functional during storm events)

Values are presented as a range of elevations as they change spatially in the area and overland

Return Period	Climate Horizon			
	Present [^] (ft, NAVD88)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
10-year	3.1-3.2	4.2-4.4	5.2-5.4	7.1-7.3
50-year	3.3-3.6	4.4-4.7	5.4-5.5	7.2-7.6
100-year	3.4-3.7	4.5-4.9	5.4-5.5	7.3-7.7

[^] = Based on 2008 centered tidal epoch

Wave Heights at Shoreline

Return Period	Climate Horizon			
	Present [^] (ft)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
10-year	1	1.5	2	3
50-year	1.5	2	2.5	3.5
100-year	2	2.5	3	4

[^] = Based on 2008 centered tidal epoch

Maximum Wave Crest Elevation in Overland region

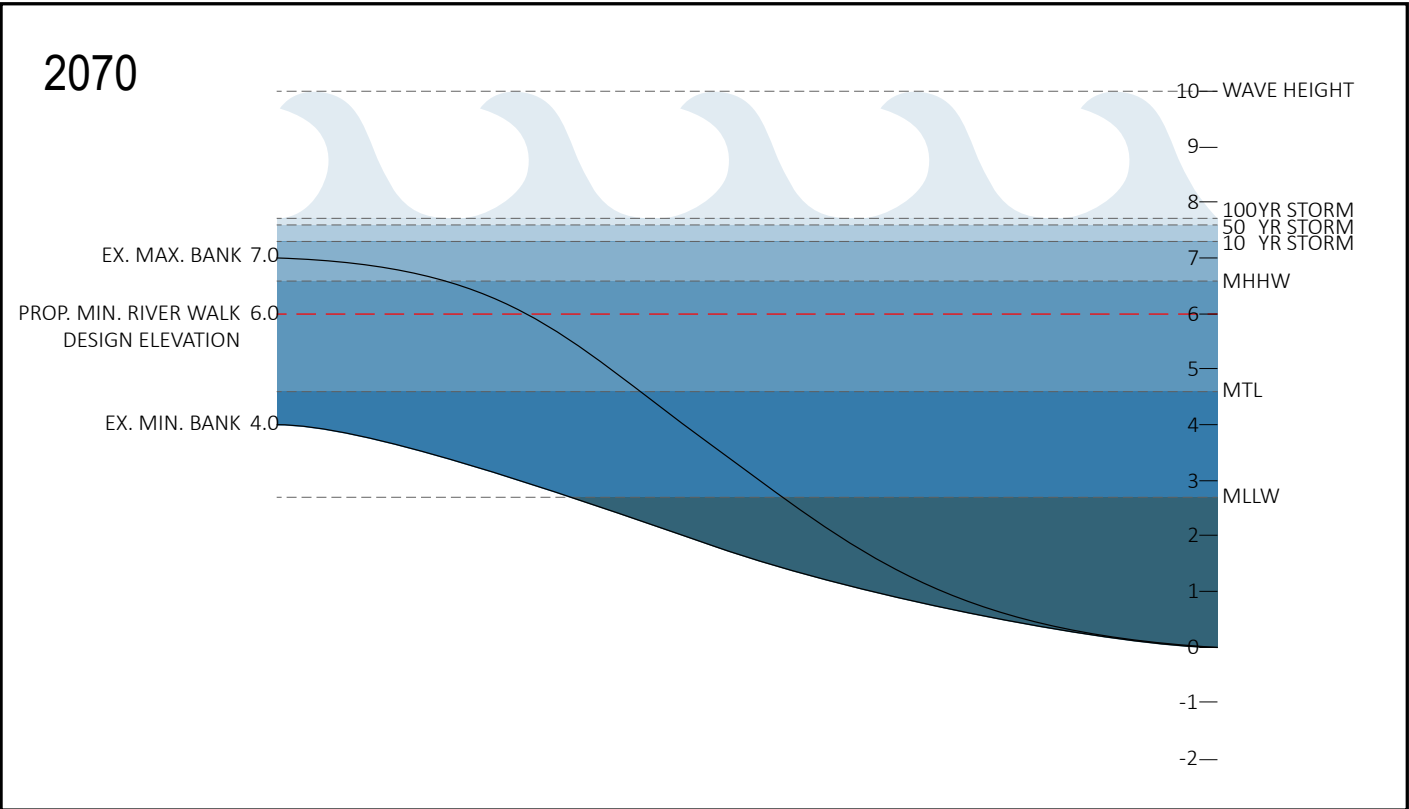
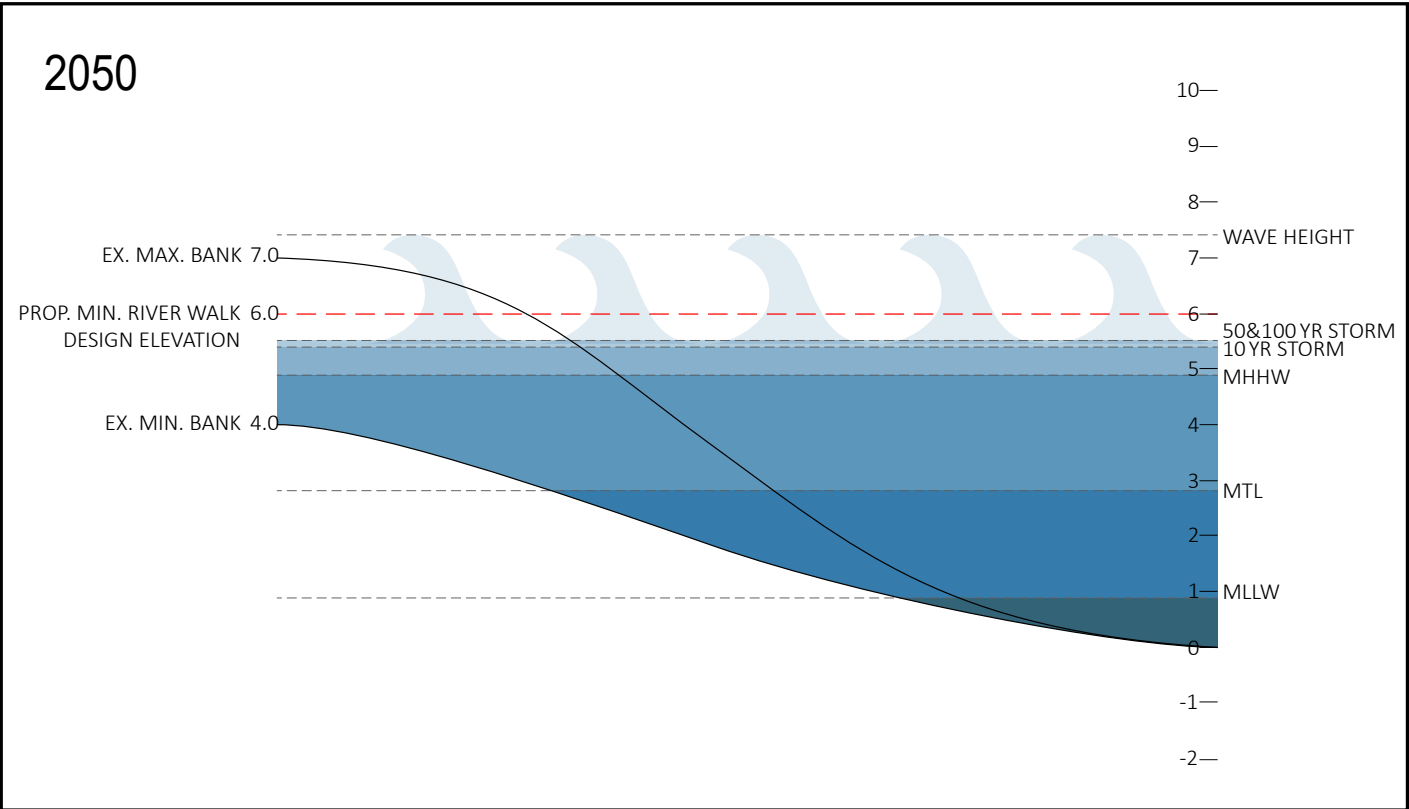
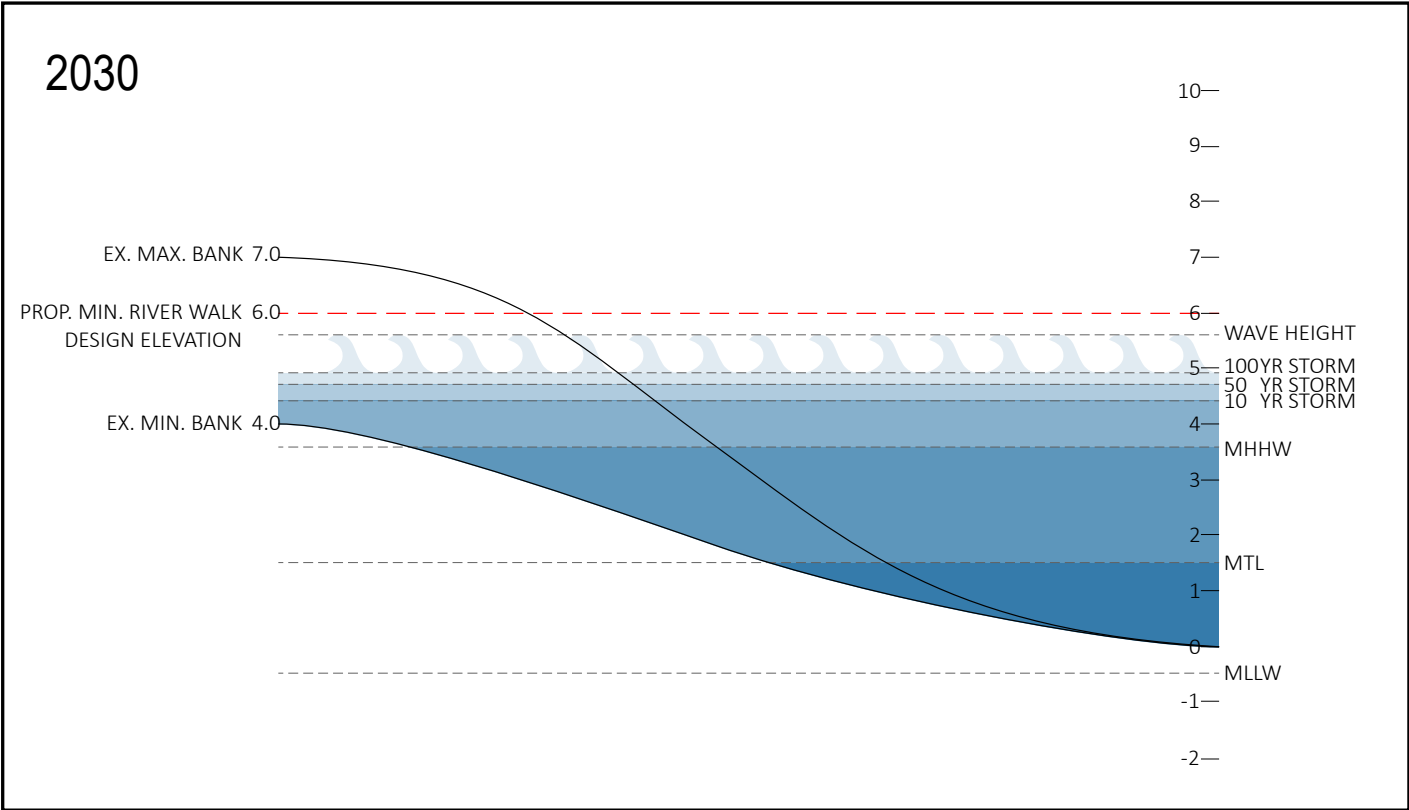
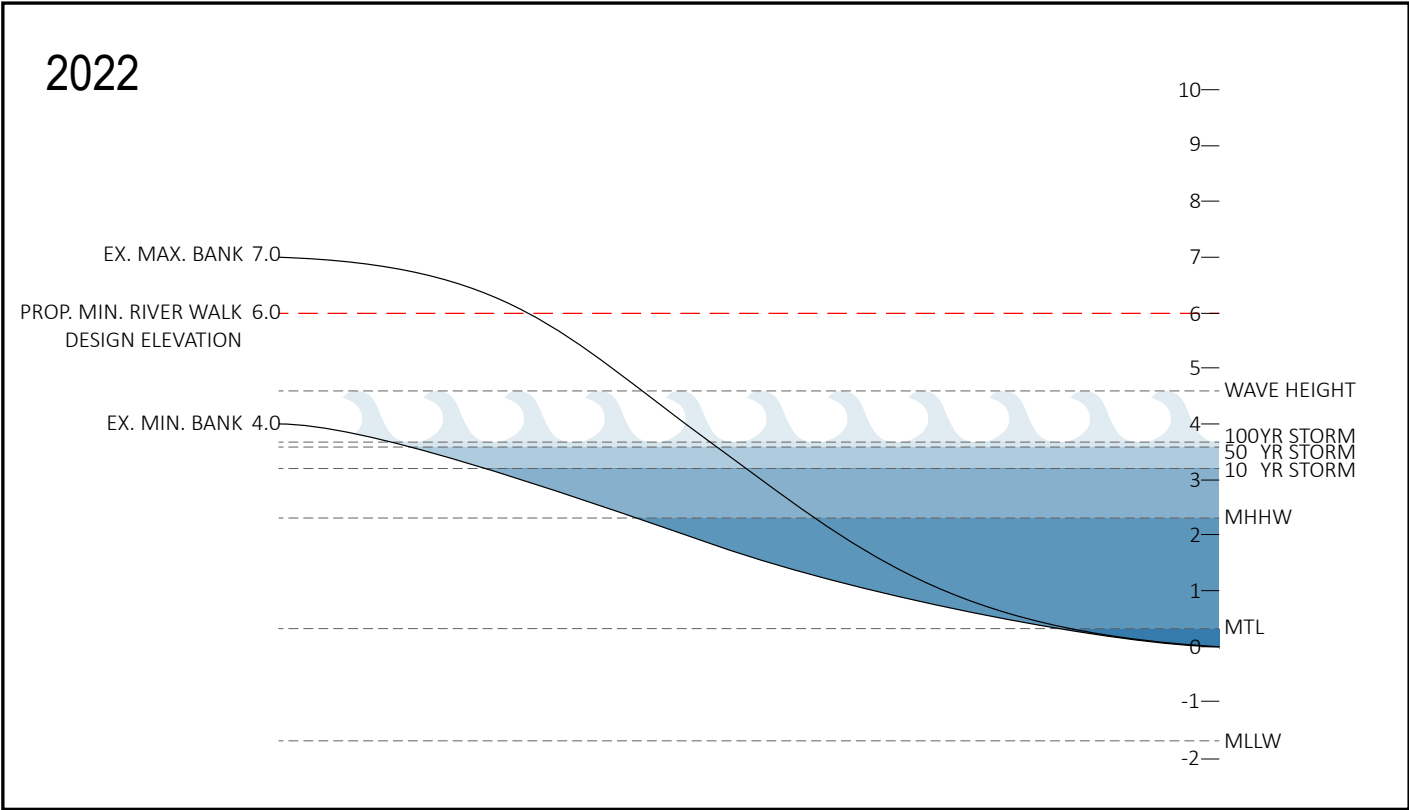
Values are presented as a range of elevations as they change spatially in the area and overland

Return Period	Climate Horizon			
	Present [^] (ft, NAVD88)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
10-year	3.9-4.0	5.1-5.4	6.4-6.6	9.1-9.3
50-year	4.1-4.2	5.2-5.5	6.5-6.9	9.2-9.6
100-year	4.3-4.6	5.3-5.6	7.0-7.4	9.6-10.0

[^] = Based on 2008 centered tidal epoch

Sea Level Rise Projections Chart - Woods Hole Group

ILLUSTRATIVE SECTIONS OF SEA LEVEL IMPACTS ON EXISTING TYPICAL RIVERBANKS
BY WHG / BRR

























BRR Existing Conditions Plan

To facilitate the preparation of the Preliminary Design, BRR produced an Existing Conditions Plan. BRR used the 2016 Farland survey as a base, and then supplemented the existing survey with new information gleaned from site visits and publicly available resources. This supplemental information included AUL and Disposal Zone Boundaries downloaded from available state databases, the New Bedford Harbor Remedial and After Action Reports available from the EPA, and Google aerial photographs. BRR traced line work downloaded from these resources and overlaid this information on top of the Farland survey to create the Existing Conditions Plan. Therefore, it must be noted that the Existing Conditions Plan is for informational purposes only, as the supplemental line work added to the survey is only an estimate. Despite known inaccuracies and missing field data, the Existing Conditions Plan is acceptable for the Preliminary Design, however, it is not suitable for construction or permitting plans.

In addition, the Existing Conditions Plans provided an initial RiverWalk alignment that was used to facilitate early stage discussions and coordination with abutters. This RiverWalk alignment approximated the locations where the RiverWalk would need to be raised to achieve a 6.0' NAVD88 minimum design elevation, identified where the RiverWalk could likely follow existing grades, and determined locations where the RiverWalk could possibly follow the alignment of the existing EPA haul roads that remain on site. The Preliminary Design plan provides a more accurate RiverWalk alignment and a more refined design that demonstrates a potential application of the intended resiliency measures, amenity areas, impacts to abutters, and other site improvements such as planting and seating areas.

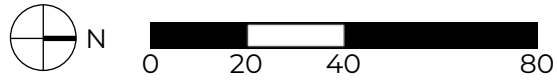
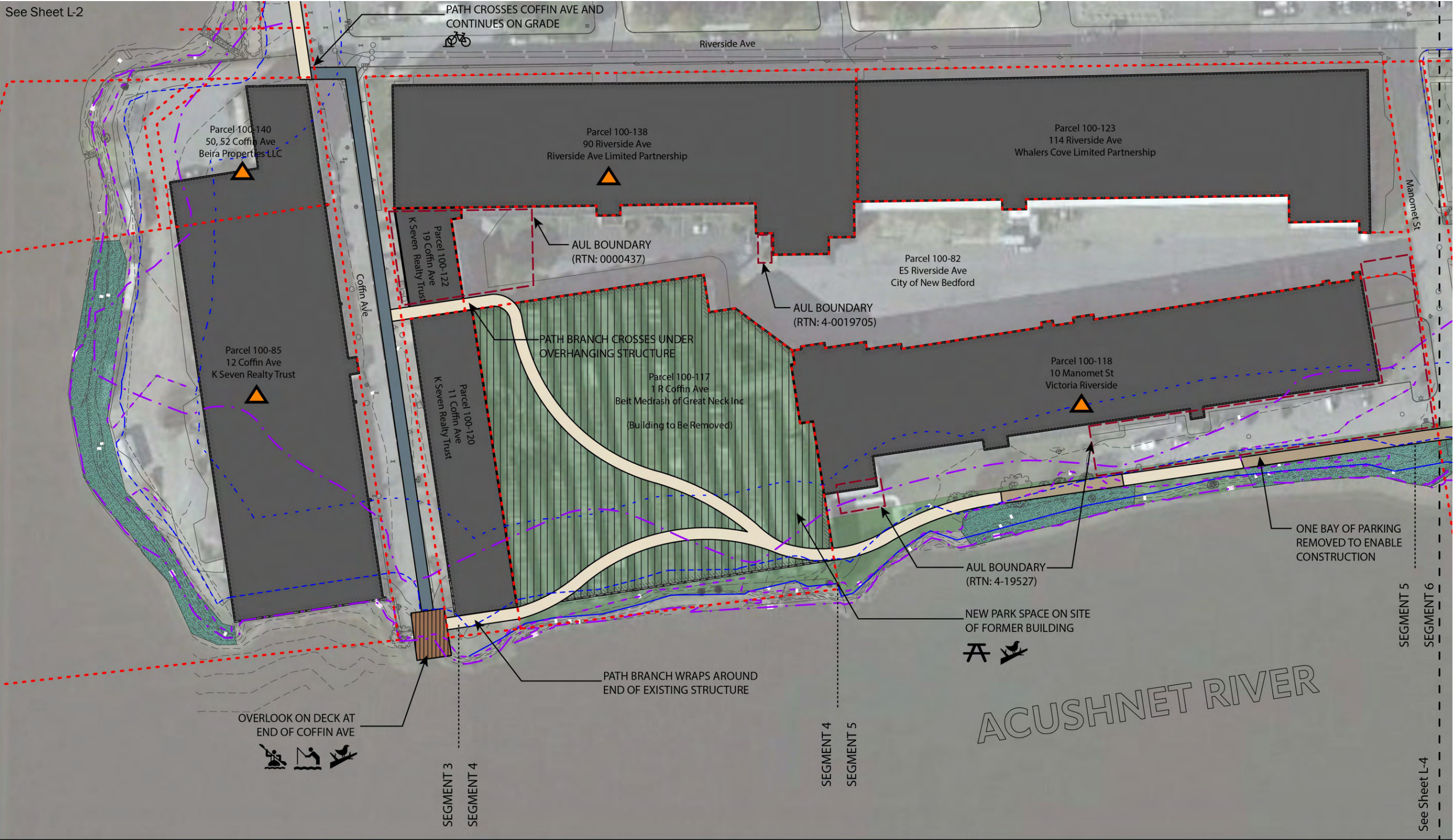
The Existing Conditions Plans are contained within Appendix D. The following page includes is an enlargement demonstrating one sheet of the Existing Conditions Plan. Both the Existing Conditions Plans and the Preliminary Design Sheets follow the RiverWalk segments that were established in prior planning exercises.

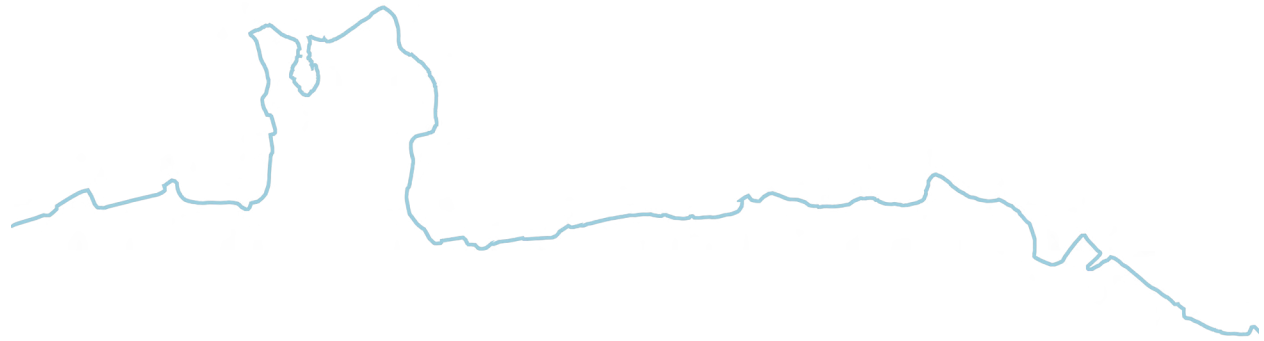
LEGEND

	Property Line		Proposed Path on Existing Grade		
	Coastal Bank		Proposed Path on Fill		
	25' Buffer Line		Proposed Path on Deck/Structure		
	100' Buffer Line		Proposed Path on Roadway		
	FEMA Flood Elevation (6')		Path Located on Existing Base		
	Chapter 91 Jurisdiction				
	AUL Boundary				
	Disposal Site Boundary				
	Potential Passive Recreation/ Ecological Restoration		Bike Parking		Fishing
	Approximate Extents of Ecological Restoration by EPA/Jacobs		Tables/Benches		Kayak/Boat Launch
	Known Disposal Site or Hazardous Materials		Grill Stations		Nature View/Signage

Legend for Existing Conditions Plan Excerpt - Segments 3, 4, & 5

EXISTING CONDITIONS PLAN - SEGMENT 3, 4, & 5
BY BRR





4 Basis of Design

Through the course of multiple meetings with City of New Bedford staff, New Bedford Harbor Trustee representatives, state agency representatives, and project abutters, and outcomes from the initial project research, the Design Team established the Basis of Design. The following are the key design parameters established by the design team:

Preserve and Protect Completed Intertidal Zone Remediation Work

The EPA, and current or former property owners have performed, or are currently performing, remediation work on nearly all parcels along the RiverWalk route. It is assumed that the proposed RiverWalk alignment and limit of disturbance necessary to construct the future proposed RiverWalk project, should preserve and protect the planting material, soil, or capping layer installed by the EPA or private parties. There may be minor instances where surface soil or planting is disturbed but under no circumstances should the capping material be exposed or disturbed. At the Aerovox site, it is understood that the final site condition will consist of a bituminous concrete cover up to the 25' river buffer line. Further coordination with the DEP and an LSP will be necessary to determine how minor disturbance to this paved cover will be permitted, given the narrow 25' of space available for the RiverWalk construction.



View Looking South at Riverside Lofts (Segment 5) - BRR

Reuse the Existing EPA Haul Roads

To access the riverbank, the EPA often installed aggregate haul roads near the top of the riverbank. The EPA has left these haul roads in place with the intention that these haul roads might be used as a subbase for the future RiverWalk. Therefore, the Design Team has sought to locate the RiverWalk in the same alignment as these EPA haul roads, wherever feasible. There will be locations however, where the haul road alignment is not suitable for the intended RiverWalk. As part of future construction plans, the Design Team will need to test the suitability of this haul road material for reuse as a subbase for the bituminous concrete RiverWalk pavement.



View Looking North Showing Existing EPA Haul Road at the Powder Pro Building (Segment 6) - BRR

Minimize the Extent of Excavation

The entire RiverWalk is located in a former or current industrial area. Most parcels along the RiverWalk have RTNS associated with known impacted soils. The Hazardous Materials Assessment random provided in Appendix B and summarized in Section 2.2, outline the nature of impacted soils present. The Assessment provides recommendations to guide the design team and includes an approach for soil management during construction. While the known contaminants are not deemed to present significant public safety issues, responsible management of excavated soil and the minimization of soil excavation are necessary. A careful cut and fill analysis for each parcel will be necessary to ensure excavated soil from one parcel does not cross into an adjacent parcel.

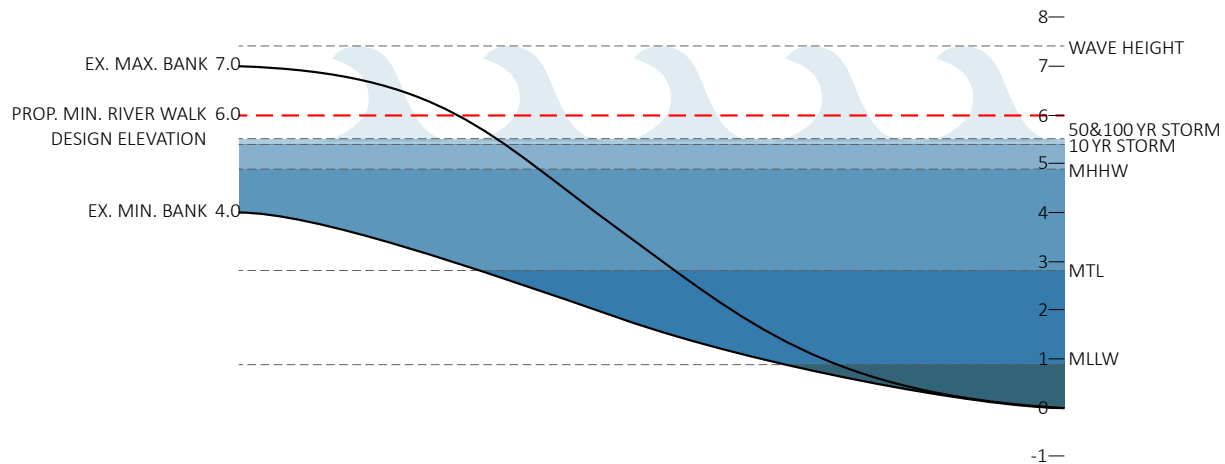
It is proposed that the RiverWalk is generally built above existing finish grade, particularly in areas of known AULs or Disposal Boundaries. In instances where some excavation will be necessary to construct the RiverWalk, the excavated material is intended to be used as a subbase material for the RiverWalk when appropriate. When the excavated material is deemed to be inappropriate for subbase use, it will be used on site within landscaping areas. It should be noted that excavated materials used for landscaping areas will still require planting soil in accordance with the project's planting specifications. In addition, the Hazardous Materials Assessment outlines additional measures that are required to be taken to safeguard construction crews, the public, and maintenance staff.

Provide a Minimum RiverWalk Elevation of 6.0' NAVD88.

The Woods Hole Group's sea level rise projections and the presumed design life of the RiverWalk were used to assist the Design Team and City when determining the preferred minimum design elevation. It was estimated that the RiverWalk has an approximate design life of 20-30 years. Therefore the climate projection year of 2050 provided in the data developed by the WHG, was selected as the target year to determine a suitable elevation for the RiverWalk.

In the year 2050, the Mean Higher High Water (MHHW) water level was estimated to be 4.9' NAVD88. During the 100-year storm in 2050, the Stillwater Return Period Water Level is projected to be 5.4'-5.5' NAVD88. And finally, the projected Maximum Wave Crest in Overland Regions, is estimated to be 7.0'-7.4' NAVD88. It was determined that a base design elevation for the RiverWalk of 6.0' NAVD88 would allow the RiverWalk to remain dry in normal weather conditions in 2050. In order to protect the RiverWalk from waves during a storm, the path would likely need to be located no lower than 7.4' NAVD88. This additional 1.4' in elevation was deemed to be too restrictive on the daily functioning of the RiverWalk for the next 20-30 years as well as creating some accessibility concerns when accessing the RiverWalk from adjacent entry points.

The proposed design elevation does not safeguard the RiverWalk project or properties behind the RiverWalk from storm waves in the year 2050 or beyond. Providing climate resiliency or flood defense measures for land parcels along the river will be an ongoing challenge. Therefore, the selected minimum design elevation of 6.0 NAVD88 was chosen to protect the investment of the RiverWalk for its intended design life. Because the minimum design elevation is still below the maximum wave crest height, the RiverWalk project will need to be designed to handle inundation during major storm events. Nonetheless, it should be noted that future measures to raise the top of the river bank are still feasible should the City and property owners decide that this additional riverbank height is desired.



Illustrative Section Showing 2050 Sea Level Rise Projections with the Proposed Design Elevation - By WHG/BRR

After 2050, a re-evaluation of the elevation of the RiverWalk will likely be required, as a better understanding of harbor conditions, the continued proper functioning of the hurricane barrier, and sea level rise projections for 2070 and 2100 come into sharper relief.

Design the RiverWalk Project to Handle Inundation

It is assumed that much of the RiverWalk will be subject to storm inundation at some point in its existence. Therefore, all RiverWalk project areas, both paved and planted, should be designed to allow for periodic salt water inundation, rapid drainage after river levels have receded, and easy cleaning and maintenance after storm events. Selected paving materials shall be chosen to withstand the pressures from water inundation. For example, unit paving should be used selectively as it is least likely to be able to withstand inundation water movement. Consideration should be given to using separate electrical circuits for lighting in the inundation zones, site furniture must be corrosion resistant, and planting materials in close proximity to the water must be salt tolerant.

The project is also proposing that a resiliency edge be provided on the riverside of the RiverWalk for all locations where the RiverWalk is below elevation 8.0' NAVD88. A resiliency edge can protect the RiverWalk surface material and subbase even if the landscape around the RiverWalk erodes due to forces from inundation waters. Two methods for providing the resiliency edge are proposed:

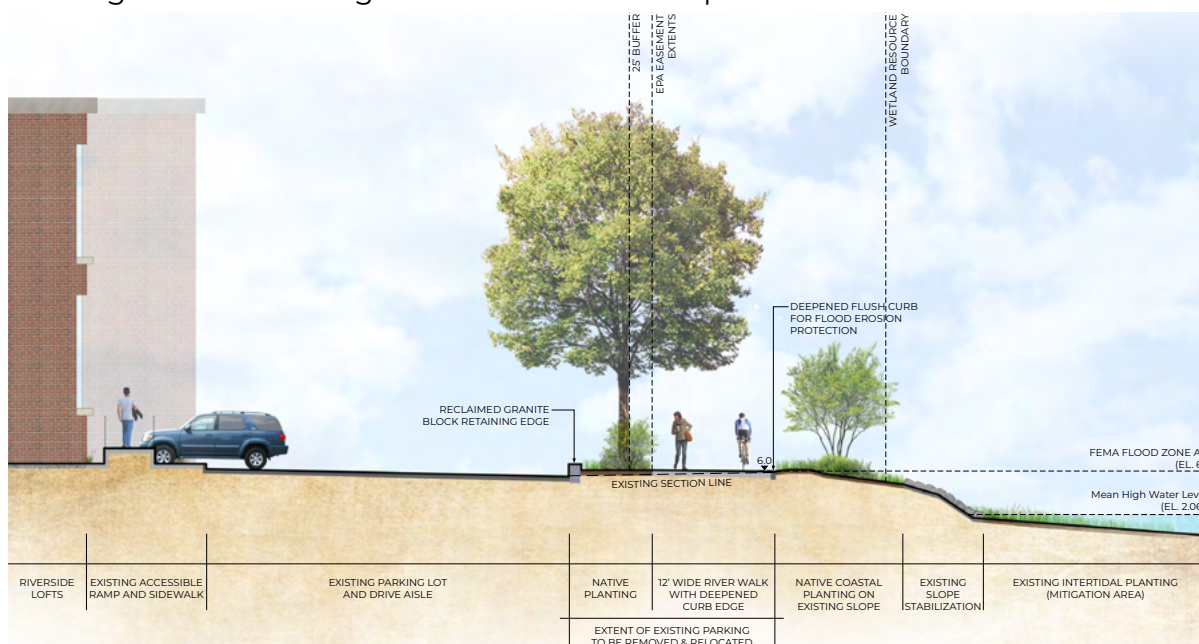
- **Revetment Stones:** In conditions where the existing grades are below elevation 6.0', the path will be raised to an elevation of 6.0' NAVD88 and revetment stones (rip rap) will be used to support the RiverWalk and to protect the pavement and subbase.
- **Flush Granite Curb:** When the existing site grades are near or above 6.0' NAVD88, the path can follow existing site grades. However a deepened flush granite curb is to be provided on the riverside of the RiverWalk. Where there is minimum change in elevation, the soil grades may be sloped in lieu of using a revetment stone.



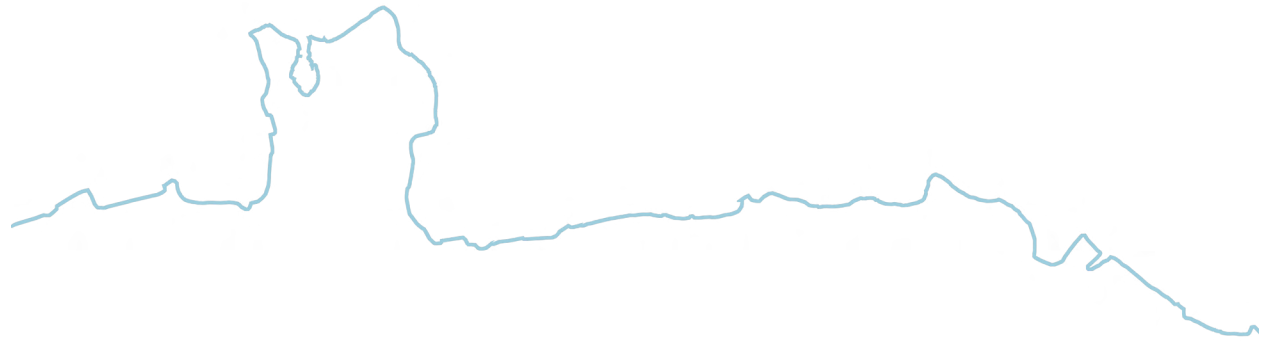
Illustrative Sections Showing Resiliency Edge Approaches - By BRR

Balance Preferences of Abutters and the Public/City of New Bedford

Much of the RiverWalk will be sited on private property and require permanent easement agreements between the City of New Bedford and the private land owners. The Design Team will seek to locate the RiverWalk as close to the top of coastal bank as possible to limit the impact on private property. The City has an ordinance prohibiting any project from working in the 25' buffer from a resource area, without receiving special permission. It is acknowledged that in some locations the RiverWalk alignment enters into the 25' buffer. In some cases, there are physical site constraints that would prevent the RiverWalk being constructed outside the buffer zone, whereas in other cases, the recommended location would minimize the impact on abutting properties. The Design Team has sought to balance these impacts wherever feasible.



Proposed RiverWalk Impacts at the Riverside Lofts Property - By BRR



5 Preliminary RiverWalk Design

The intent of this Preliminary Design is to develop a more detailed RiverWalk alignment and design that will be used as the framework for the construction and permitting stage. The preliminary RiverWalk alignment begins at the south end of the parking area on Veterans Memorial Way and continues to the northern end of the Aerovox Site at Graham Street. A segment of this RiverWalk will use the existing paths in Riverside Park while another segment will be on-street along Coffin Avenue.

The Preliminary Design outlined in this report, is intended to demonstrate one potential option for implementing the basis of design concepts. It is assumed that future project teams may interpret the basis of design differently. As outlined previously, the Existing Conditions Plan that was used as a base plan for this design, is an approximation of the existing site features, and does not include final site conditions for existing ongoing and future projects that will impact the ground conditions and project constraints of the construction and permitting plans.

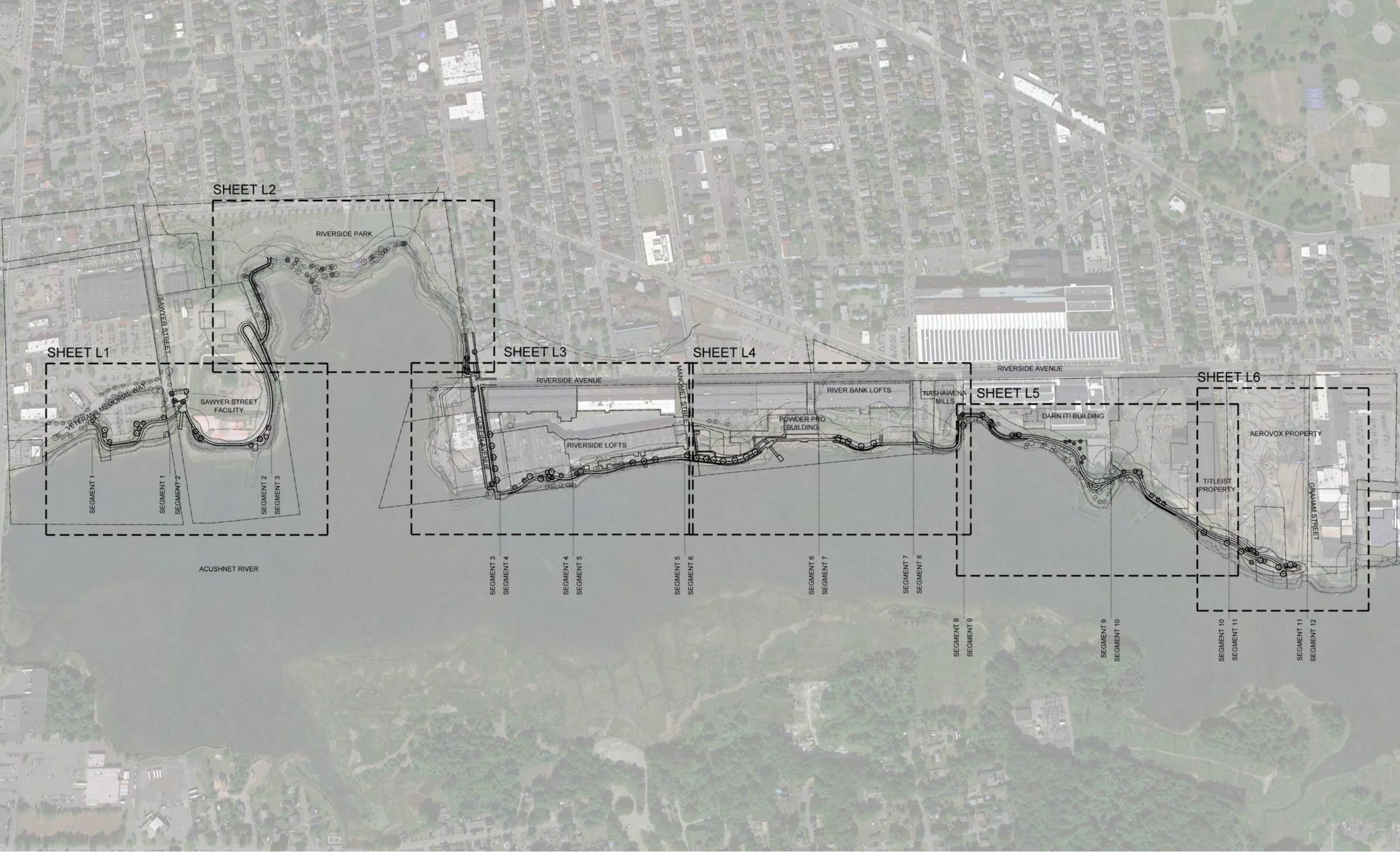
The main Design Parameters or tools used to implement the design are as follows:

- The RiverWalk will be a 10' wide bituminous concrete path, with no vertical structures within 3' of the edges of the path.
- The RiverWalk will be accessible along its entire length.
- The minimum RiverWalk elevation will be 6.0' NAVD88.
- A resiliency edge will be provided for the RiverWalk up to elevation 8.0' NAVD88, to protect the path from potential undermining caused by storm water erosion forces.
- The resiliency edge will be either a deepened, flush granite curb or a reinforced edge consisting of revetment stones. Typically, the flush curb will be used in locations where the existing grades do not need to be raised to achieve the 6.0' minimum design elevation, while the revetment stones will be used to support the path in locations that require raising of existing grades.
- The RiverWalk will be located outside of the 25' river buffer zone wherever feasible.
- The RiverWalk will follow the existing EPA haul roads where applicable.
- The RiverWalk project will seek to minimize the disturbance and impact on private property.
- The existing EPA and DEP intertidal zone planting, riverbank stabilization, and impacted soil capping will be retained whenever possible.
- Seating and overlooks will be provided long the RiverWalk to promote access to nature and views of the river.
- New kayak launch locations will be provided where possible.

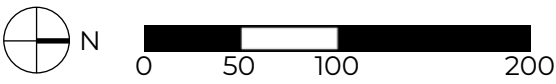
RiverWalk Design

The following sections illustrate each portion of the RiverWalk, starting at its southern end at Veterans Memorial Way and continuing northward to Graham Street at the Aerovox site. These sheets are divided into the segments established in the earlier stage planning exercises for the RiverWalk and include Segments 1 through 11.

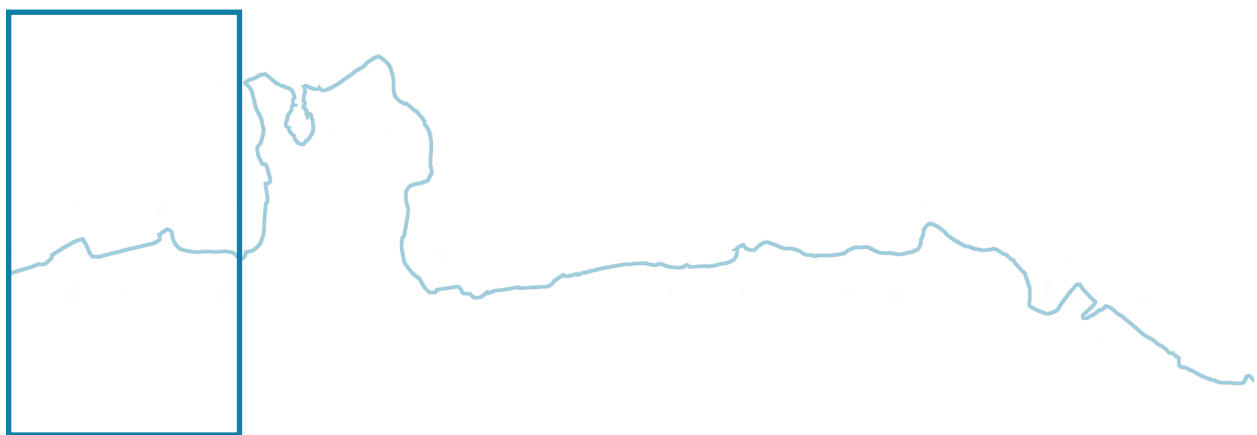
PRELIMINARY DESIGN LAYOUT SEGMENTS - OVERALL



Preliminary Design Layout Segments - BRR



Segments 1 & 2



Segment 1

A gateway to the RiverWalk starts on Veterans Memorial Way at the south end of the existing Market Basket overflow parking lot. The RiverWalk continues on the riverside of the parking lot and arrives at a new gathering space near the end of Sawyer Street. An AUL is located within this segment. Refer to Hazardous Materials Assessment for more information.

RiverWalk Segment 1 Description

- Provide a flush granite curb Resiliency Edge. Gently slope lawn area to achieve 6.0' design elevation.
- Provide a low retaining wall or raised curb, if required, to retain the existing parking lot grades.
- Preserve and Protect existing buffer and intertidal zone planting.
- Provide bicycle racks at Veterans Memorial Way gateway.
- Provide a new parking lot on the Sawyer Street facility property.
- Create a new gathering area with picnic tables, benches, and bicycle racks.
- Refurbish the existing boat launch/kayak launch to create improved connection to River.

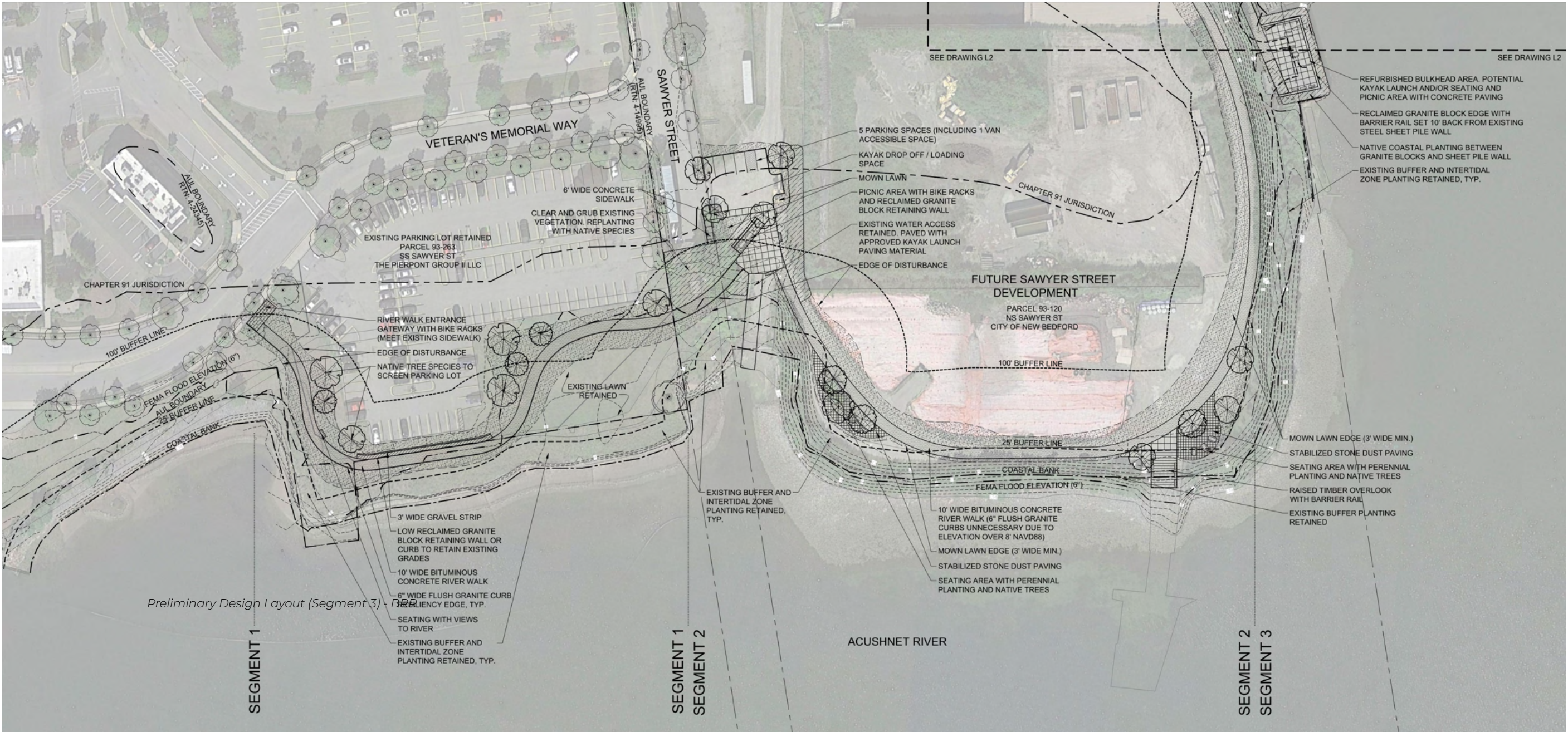
Segment 2

This RiverWalk segment, should begin at the new parking lot at the end of Segment 1, continue around the east and north sides of the Sawyer Street facility property, and down the existing access road to the existing bulkhead and connection to Riverside Park. The eastern edge of the Sawyer Street site is land created to serve as a disposal facility for impacted soil excavations produced as part of the EPA's clean up activities along the Acushnet River. This area of the site is slated to be permanently capped and closed in 2025. Refer to the Hazardous Materials Assessment for more information.

RiverWalk Segment 2 Description

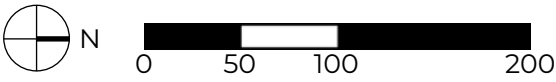
- A resiliency edge is unnecessary at elevations above 8.0'. Use a flush granite curb for areas below 8.0'.
- The RiverWalk should follow the existing gravel road alignment and elevation as closely as possible on the eastern capped area, to avoid disturbing the buried capping material. Locate all trees, shrubs, and perennial planting outside of cap extents, unless the planting soil is mounded above existing grades.
- Provide periodic seating areas with native planting at areas shown.
- Provide an overlook at the existing clearing.
- Refurbish the existing steel bulkhead to create a riverside overlook & seating area and potentially as a kayak launch.

PRELIMINARY DESIGN LAYOUT - SEGMENTS 1 & 2



Preliminary Design Layout (Segments 1 & 2) - BRR

MATERIALS LEGEND			
TYPE	DESCRIPTION	TYPE	DESCRIPTION
	BITUMINOUS CONCRETE RIVER WALK		SECURITY FENCE
	STABILIZED STONE DUST PAVING		BENCH
	CONCRETE PAVING		PICNIC TABLE
	SPECIALITY PAVING		BIKE RACK
	TIMBER OVERLOOK / BOARDWALK		TRASH RECEPTACLE
	GRAVEL STRIP		MOWN LAWN
	RIP-RAP EDGE		SHRUB PLANTING
	6" FLUSH GRANITE CURB RESILIENCY EDGE		PROPOSED TREES
	RECLAIMED GRANITE BLOCK RETAINING WALL		EXISTING TREES TO REMAIN
	BARRIER RAIL		



Segments 3 & 4



Segment 3

This RiverWalk segment connects the Sawyer Street facility to Coffin Avenue and down to the riverfront. The existing Riverside Park pathways will serve as the RiverWalk through the park limits. The RiverWalk is an on-street protected two-way bicycle lane and pedestrian sidewalk along Coffin Avenue.

RiverWalk Segment 3 Description

- The following images show two portions of Segment 3: the connection from the Sawyer Street facility to Riverside Park on the left hand side, and the connection to Coffin Ave on the right hand side.
- Provide a flush granite curb as the resiliency edge. When the RiverWalk transitions to an on street bicycle lane and sidewalk on Coffin Avenue, the resiliency edge is not used.
- The RiverWalk should follow the existing alignment and grade of the EPA haul road where applicable.
- Connect to the existing Riverside Park pathway network on the southern end and to the park gateway on the northern end.
- The RiverWalk transitions to an on-street protected two-way bike lane with an improved 6' sidewalk.
- Typical on-street dimensions used are as follows: two 11' roadway lanes, 3' curbed buffer, 10' wide two-way bicycle lane, 6' sidewalk.

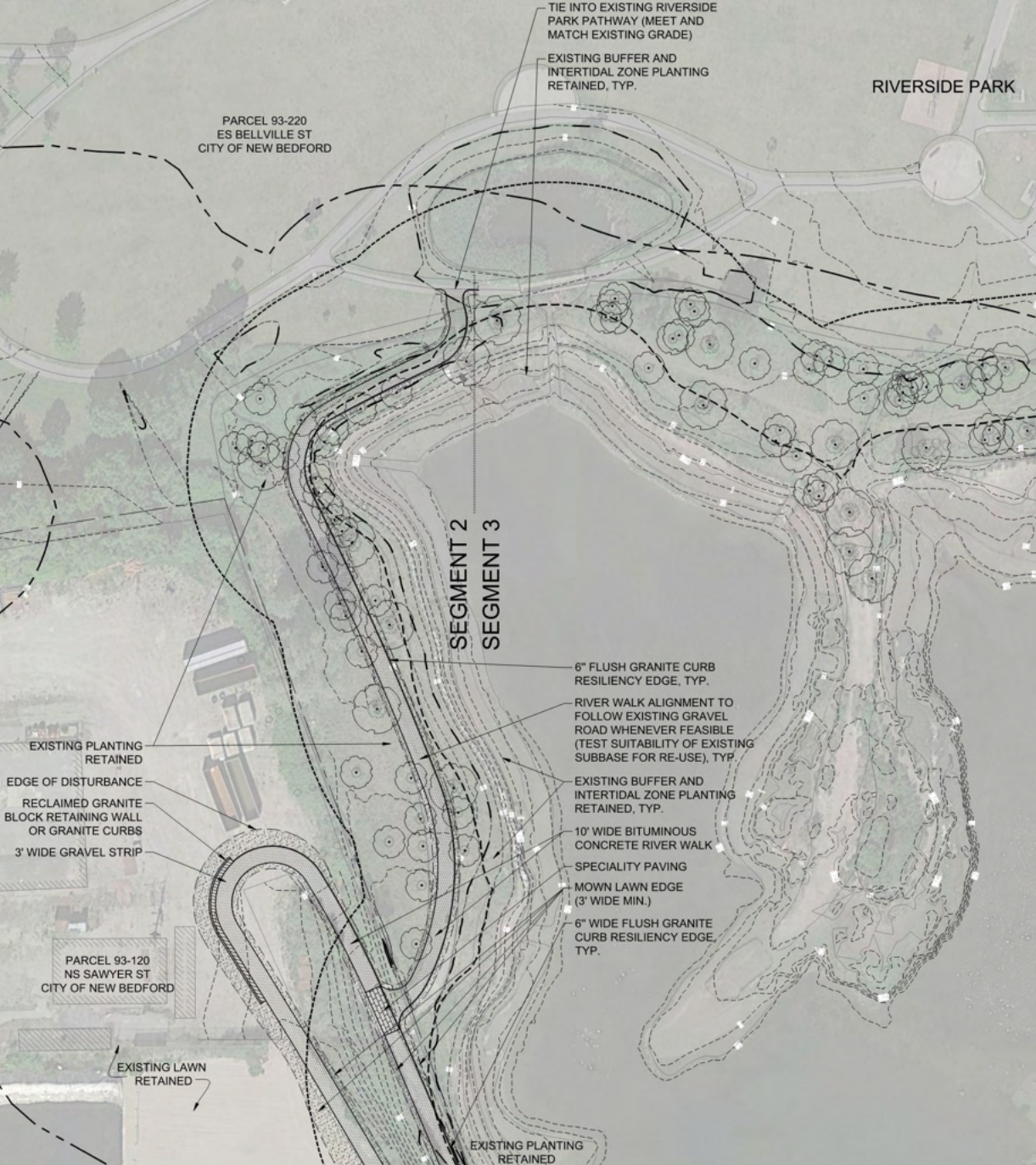
Segment 4

This RiverWalk segment begins the end of Coffin Avenue and runs northward to Riverside lofts. The building at 1R Coffin Ave, Parcel 100-117, is slated for demolition and could be used for a potential future public open space and compensatory parking to offset lost parking resulting from the RiverWalk project implementation. An AUL is located adjacent to, but likely outside of, the project's limit of work.

RiverWalk Segment 4 Description

- Provide a raised timber overlook structure at the end of Coffin Avenue, with bicycle racks and benches.
- Provide a seating area with native planting with water views.
- A portion of the RiverWalk will likely be within the 25' buffer.
- Provide a flush granite curb as a resiliency edge

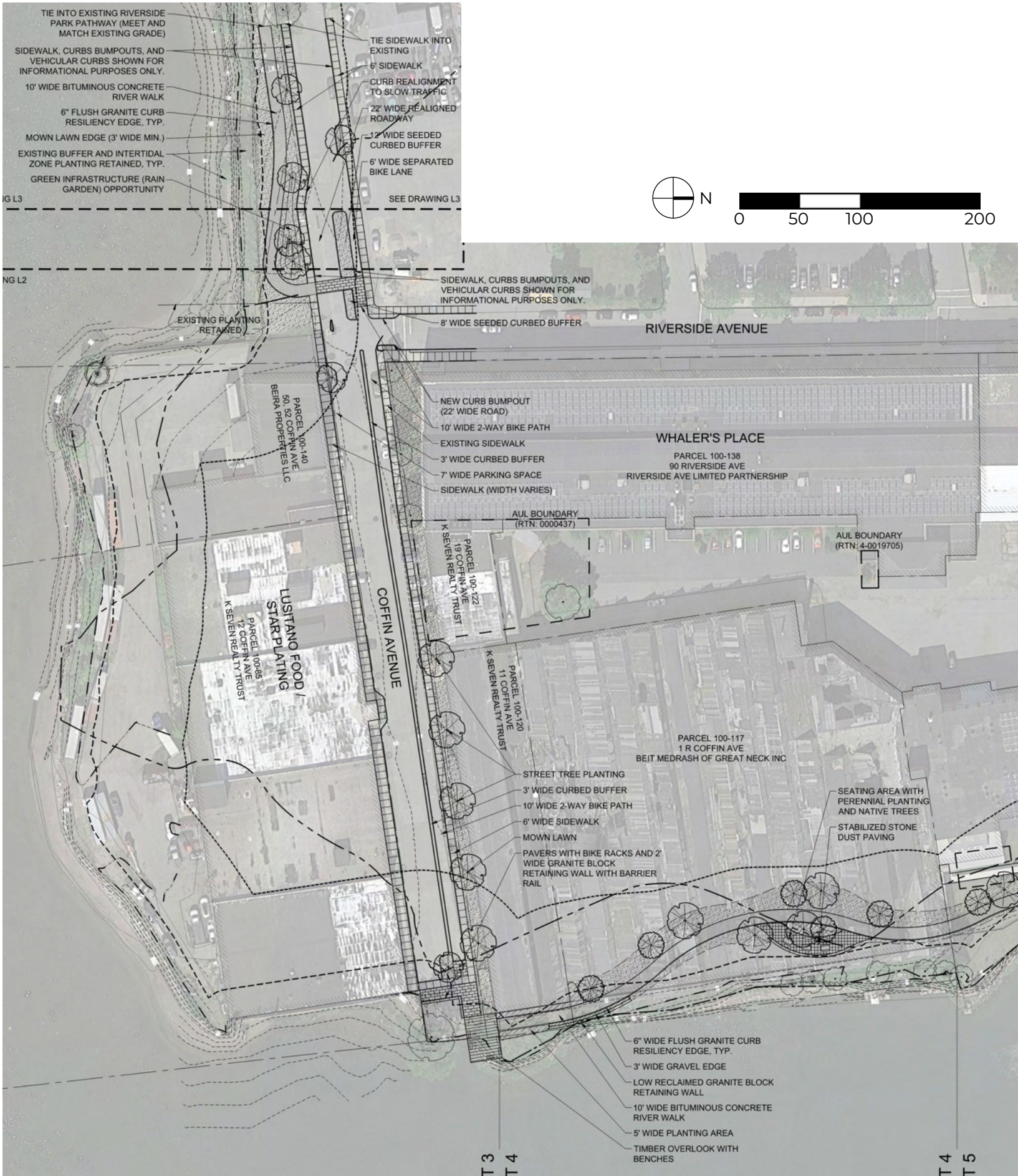
PRELIMINARY DESIGN LAYOUT - SEGMENTS 3 & 4



Preliminary Design Layout (Segment 3) - BRR

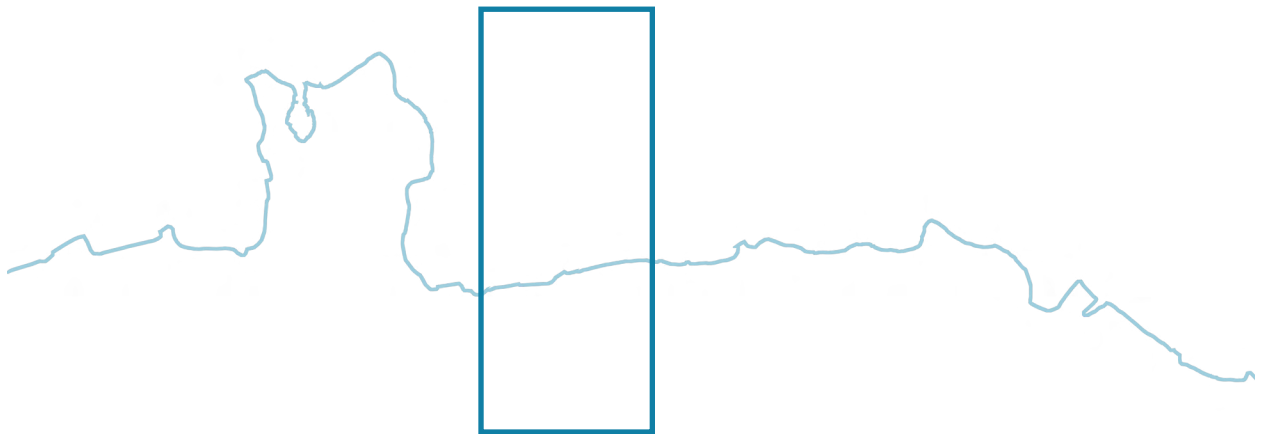
MATERIALS LEGEND

TYPE	DESCRIPTION	TYPE	DESCRIPTION
	BITUMINOUS CONCRETE RIVER WALK		SECURITY FENCE
	STABILIZED STONE DUST PAVING		BENCH
	CONCRETE PAVING		PICNIC TABLE
	SPECIALITY PAVING		BIKE RACK
	TIMBER OVERLOOK / BOARDWALK		TRASH RECEPTACLE
	GRAVEL STRIP		MOWN LAWN
	RIP-RAP EDGE		SHRUB PLANTING
	6" FLUSH GRANITE CURB RESILIENCY EDGE		PROPOSED TREES
	RECLAIMED GRANITE BLOCK RETAINING WALL		EXISTING TREES TO REMAIN
	BARRIER RAIL		



Preliminary Design Layout (Segments 3 & 4) - BRR

Segments 5 & 6



Segment 5

This RiverWalk segment begins at the south end of the Riverside Lofts and continues to Manomet Street. There is insufficient space to locate the RiverWalk between the existing parking lot and the riverbank. Therefore, the removal and relocation of parking spaces is proposed. Two AUL's are located underneath the proposed RiverWalk alignment. Refer to the Hazardous Materials Assessment for more information.

RiverWalk Segment 5 Description

- A potential revised parking lot design is shown to partially mitigate loss of existing parking spaces (31 spaces removed, 12 new spaces provided, net loss of 19 spaces).
- Provide an 8' planted buffer between the RiverWalk and the existing parking lot.
- Provide granite block retaining walls to retain grades where needed.
- Provide a 3' strip of grass or gravel between the RiverWalk and vertical structures.
- Reconstruct the relocated Riverside Loft resident seating area.
- Provide revetment stones where required to elevate RiverWalk and use a flush granite curb in other locations
- RiverWalk will likely be within 25' buffer

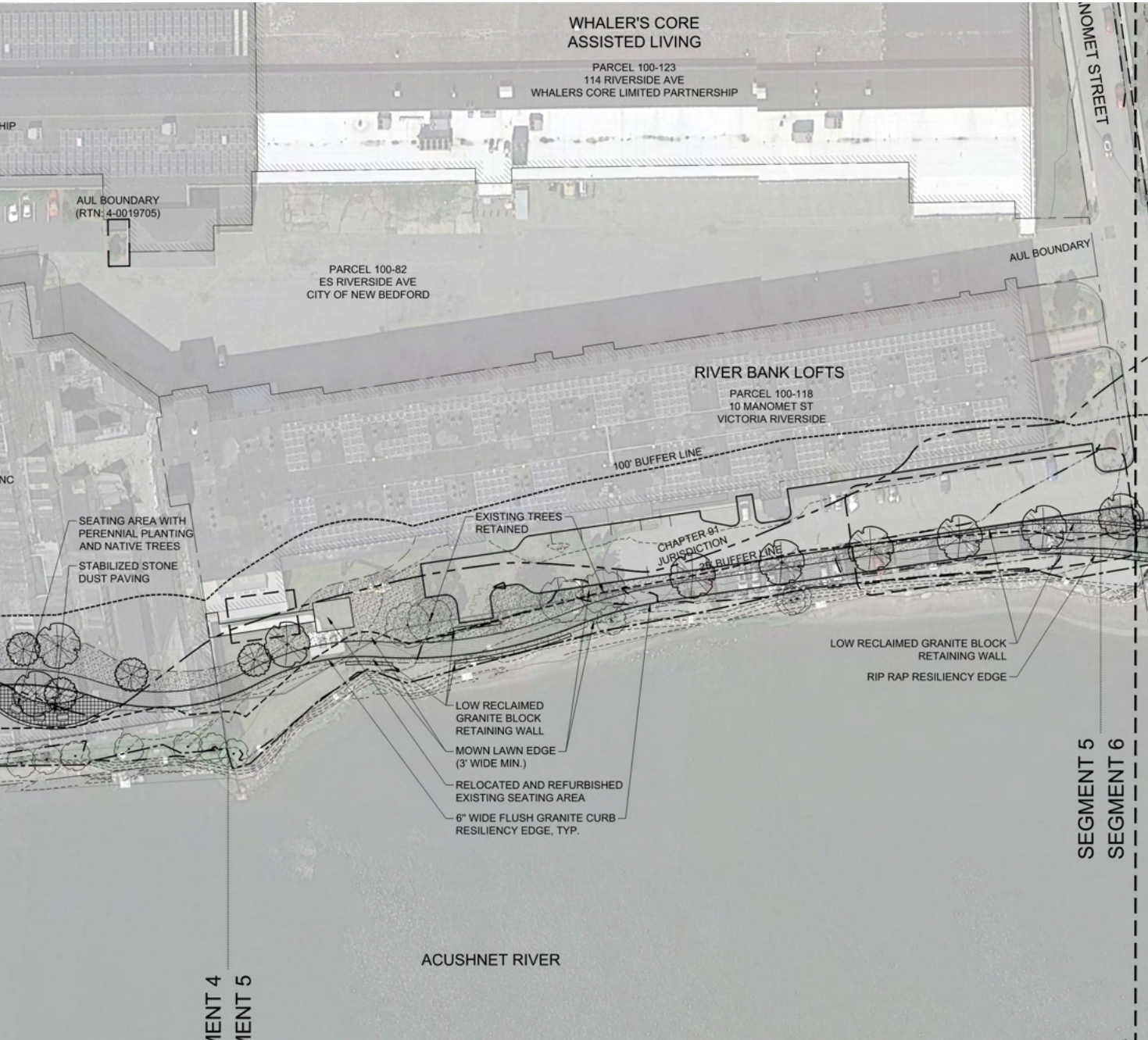
Segment 6

This RiverWalk segment begins at Manomet Street and continues to the Powder Pro building. Future RiverWalk plans should consider consolidating use of the three small parcels of land between Manomet Street and the Powder Pro property. Two of these parcels are city-owned. This Plan assumes that the city and the Powder Pro owner will cooperatively agree to convert a certain portion of land into a parking lot with public use. An AUL and disposal boundary are located within this segment. Refer to the Hazardous Materials Assessment for more information.

RiverWalk Segment 6 Description

- Potential parking lot curbs and a vehicular entrance off Manomet Street are shown for reference purposes only.
- Consider improving the sidewalk on north side of Manomet Street to create an accessible connection to the RiverWalk.
- Locate the RiverWalk as close to the riverbank as possible.
- Provide a kayak launch opportunity near the Powder Pro building to avoid disturbing the AUL and Disposal Boundary at the end of Manomet Street.
- Raise and support the RiverWalk with revetment stones to achieve a 6.0' elevation.
- Maintain a 20'-25' offset from the Powder Prop building for a future outdoor deck.
- The raised berm created to elevate the RiverWalk, stops before the Powder Pro building to allow natural drainage patterns for upland areas to remain intact.
- Provide a raised boardwalk over the low lying marsh on the riverside of the building.
- A portion of the RiverWalk will be in the resource area as it passes in front of the Powder Pro building.

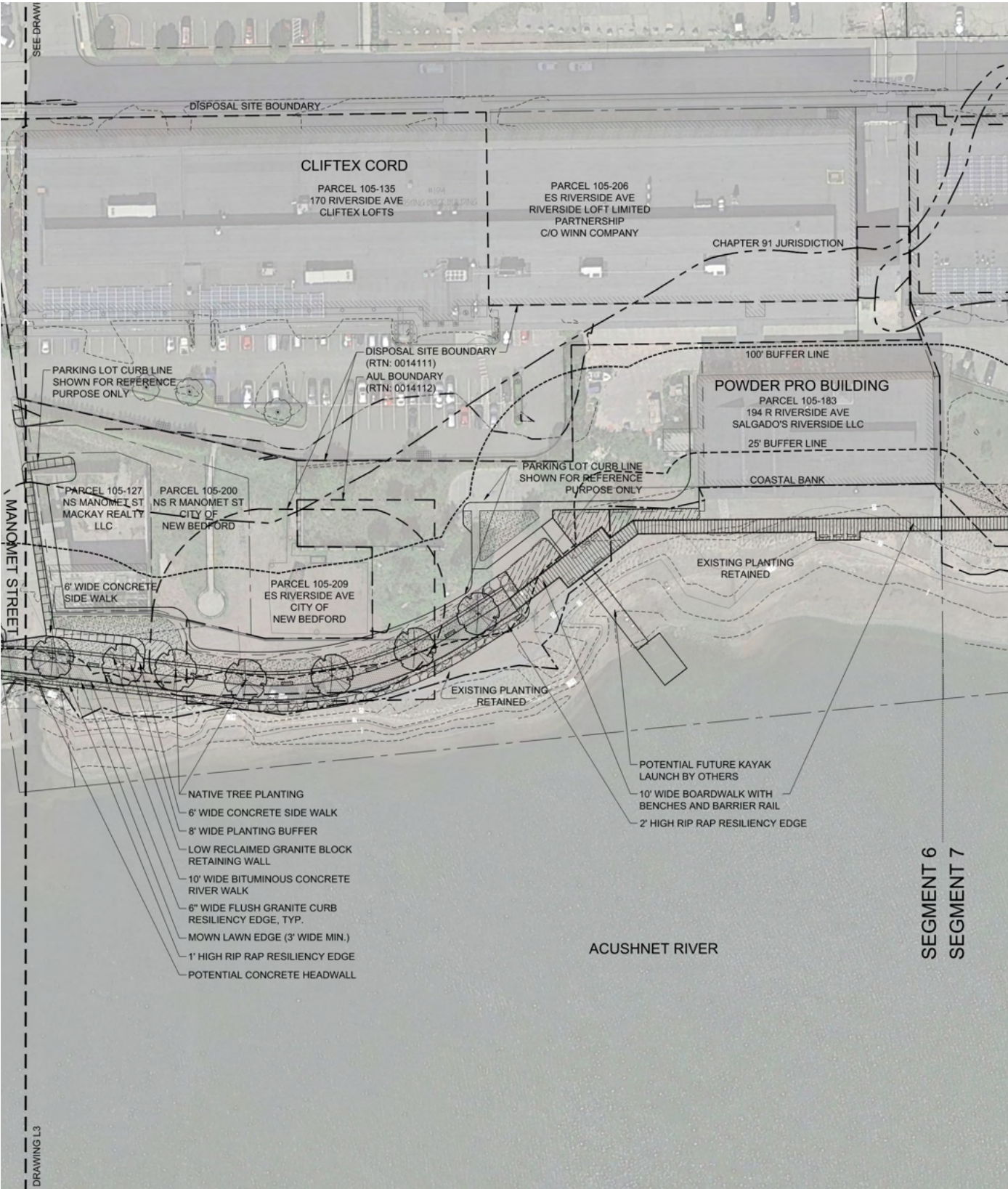
PRELIMINARY DESIGN LAYOUT - SEGMENTS 5 & 6



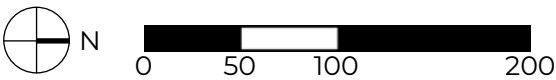
Preliminary Design Layout (Segment 5) - BRR

MATERIALS LEGEND

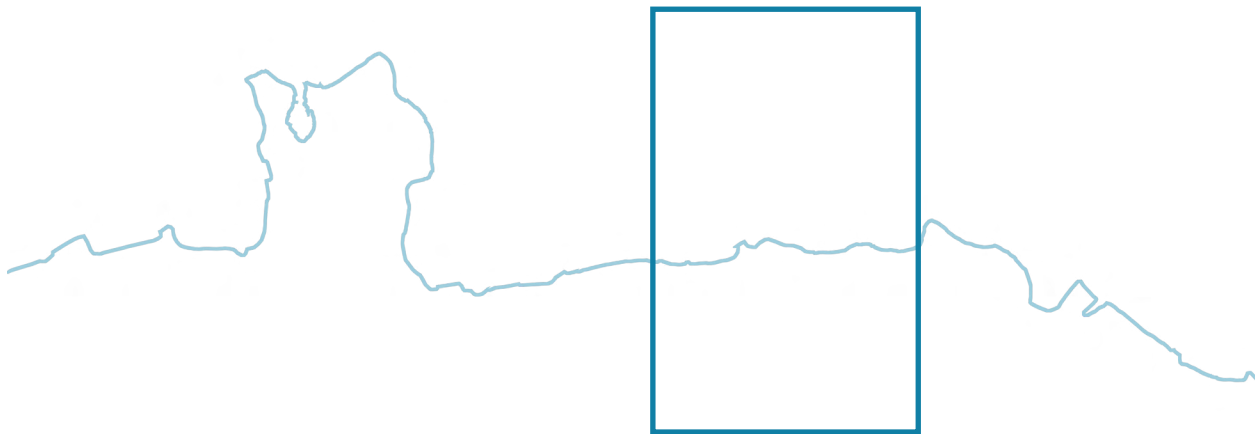
TYPE	DESCRIPTION	TYPE	DESCRIPTION
	BITUMINOUS CONCRETE RIVER WALK		SECURITY FENCE
	STABILIZED STONE DUST PAVING		BENCH
	CONCRETE PAVING		PICNIC TABLE
	SPECIALITY PAVING		BIKE RACK
	TIMBER OVERLOOK / BOARDWALK		TRASH RECEPTACLE
	GRAVEL STRIP		MOWN LAWN
	RIP-RAP EDGE		SHRUB PLANTING
	6" FLUSH GRANITE CURB RESILIENCY EDGE		PROPOSED TREES
	RECLAIMED GRANITE BLOCK RETAINING WALL		EXISTING TREES TO REMAIN
	BARRIER RAIL		



Preliminary Design Layout (Segment 6) - BRR



Segments 7 & 8



Segment 7

This RiverWalk segment begins at the Powder Pro building and ends at the parking lot at the north end of the River Bank Lofts building. A disposal boundary is located within the proposed alignment of the RiverWalk in this segment. An AUL extends around the River Bank lofts building. Refer to the Hazardous Materials Assessment for more information.

RiverWalk Segment 7 Description

- Continue a raised boardwalk in front of Powder Pro building. The RiverWalk alignment is within the resource area boundaries.
- Raise and extend the existing berm to meet the northern end of the raised boardwalk. Berm stops short of building to retain the existing drainage patterns.
- Provide a raised boardwalk through and over the existing coal storage foundation walls.
- Retain the existing buffer and intertidal zone planting.
- Provide revetment stones where required to elevate the RiverWalk.
- Provide a flush granite curb resiliency edge for areas not requiring revetment stones.

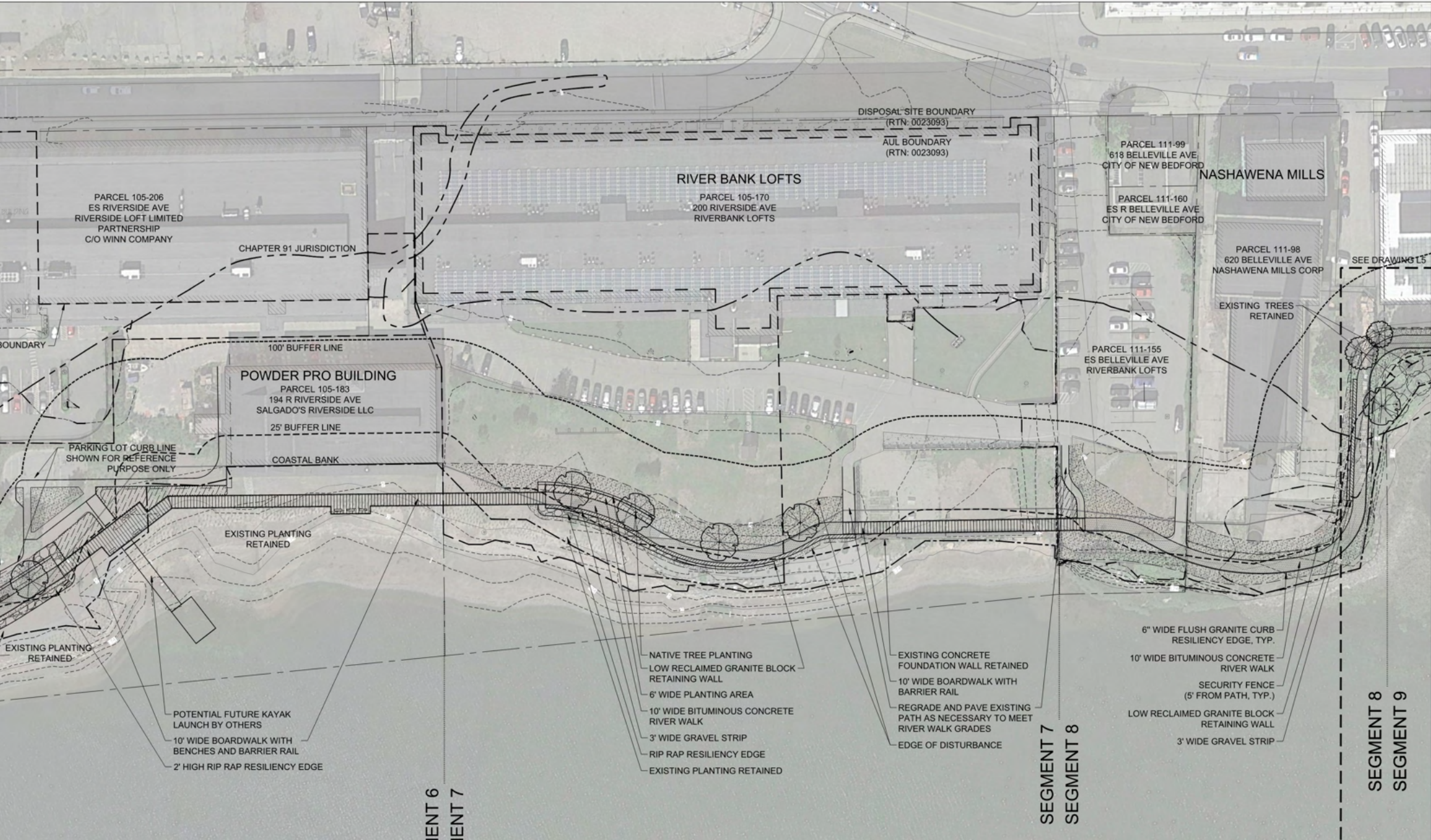
Segment 8

This is a short segment of the RiverWalk beginning at the north end of the River Bank Lofts property and continuing to the north side of the Nashawena Mill property. The south end of the segment includes an existing parking lot and pathway along the riverbank, constructed in compliance with the parcel's prior ch. 91 obligations.

RiverWalk Segment 8 Description










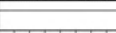
- Locating the raised boardwalk over the existing coal storage area's foundation walls will require reconfiguring and raising the existing pathways constructed on the riverside of the existing parking lot.
- The RiverWalk should be kept as close to the top of bank as possible to minimize encroachment into the private parcel.
- The RiverWalk will likely require a retaining wall or curb to retain existing grades as it runs along the north side of the mill building.
- A security fence is proposed on the Nashawena Mills property at the parcel owner's request.
- The RiverWalk alignment must retain the existing vehicular access to the rear of the Darn It! mill.
- Provide a flush granite curb as a resiliency edge.

PRELIMINARY DESIGN LAYOUT - SEGMENTS 7 & 8

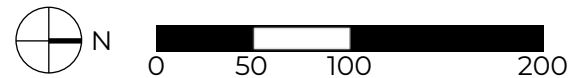


Preliminary Design Layout (Segment 7 & 8) - BRR

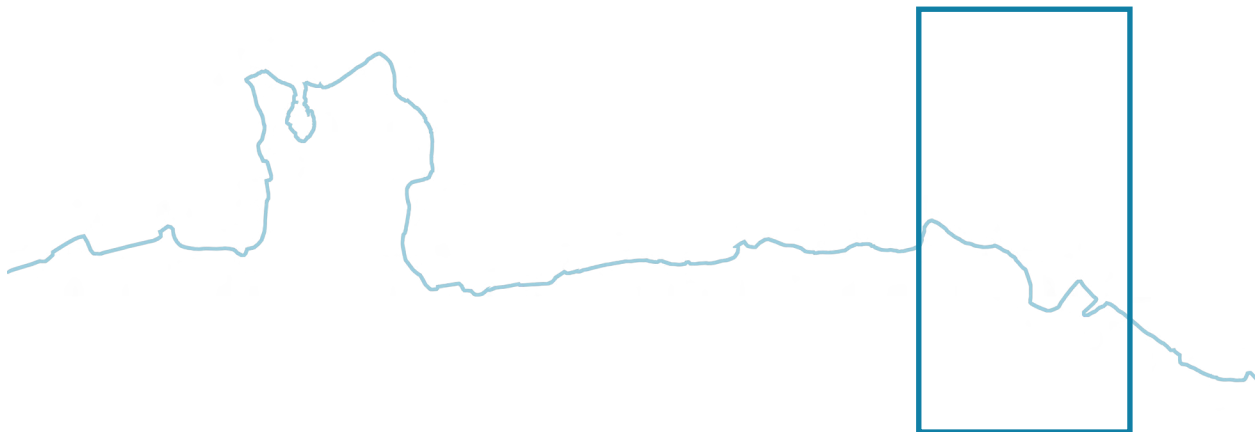
MATERIALS LEGEND

TYPE	DESCRIPTION
	BITUMINOUS CONCRETE RIVER WALK
	STABILIZED STONE DUST PAVING
	CONCRETE PAVING
	SPECIALITY PAVING
	TIMBER OVERLOOK / BOARDWALK
	GRAVEL STRIP
	RIP-RAP EDGE
	6" FLUSH GRANITE CURB RESILIENCY EDGE
	RECLAIMED GRANITE BLOCK RETAINING WALL
	BARRIER RAIL

TYPE	DESCRIPTION
	SECURITY FENCE
	BENCH
	PICNIC TABLE
	BIKE RACK
	TRASH RECEPTACLE
	MOWN LAWN
	SHRUB PLANTING
	PROPOSED TREES
	EXISTING TREES TO REMAIN



Segments 9 & 10



Segment 9

This segment begins at the north side of the Nashawena Mill building, and runs along the river to the boundary of the Titleist property. An AUL is located within the footprint of an existing building and therefore it should not affect the RiverWalk alignment. Refer to the Hazardous Materials Assessment for more information. Careful coordination is required to ensure a sufficient area for truck turning is retained.

RiverWalk Segment 9 Description

- Ensure the existing vehicle access is retained at the south end of the Darn It! building.
- Retain as many of the existing trees as possible, particularly at the southern end.
- Provide a security fence as requested by the parcel owner.
- Retain sufficient turning area for trucks.
- Provide a planted buffer between RiverWalk and parking/driving area.
- Realign RiverWalk as necessary to minimize disruption to existing, newly planted trees at northern end.
- Provide revetment stones where required to elevate RiverWalk.
- Provide a flush granite curb resiliency edge for areas not requiring revetment stones. Localized regrading is assumed to raise existing grades.
- Provide a potential viewing area on the existing outcropping of land. This work may require localized removal of existing vegetation within the buffer zone.

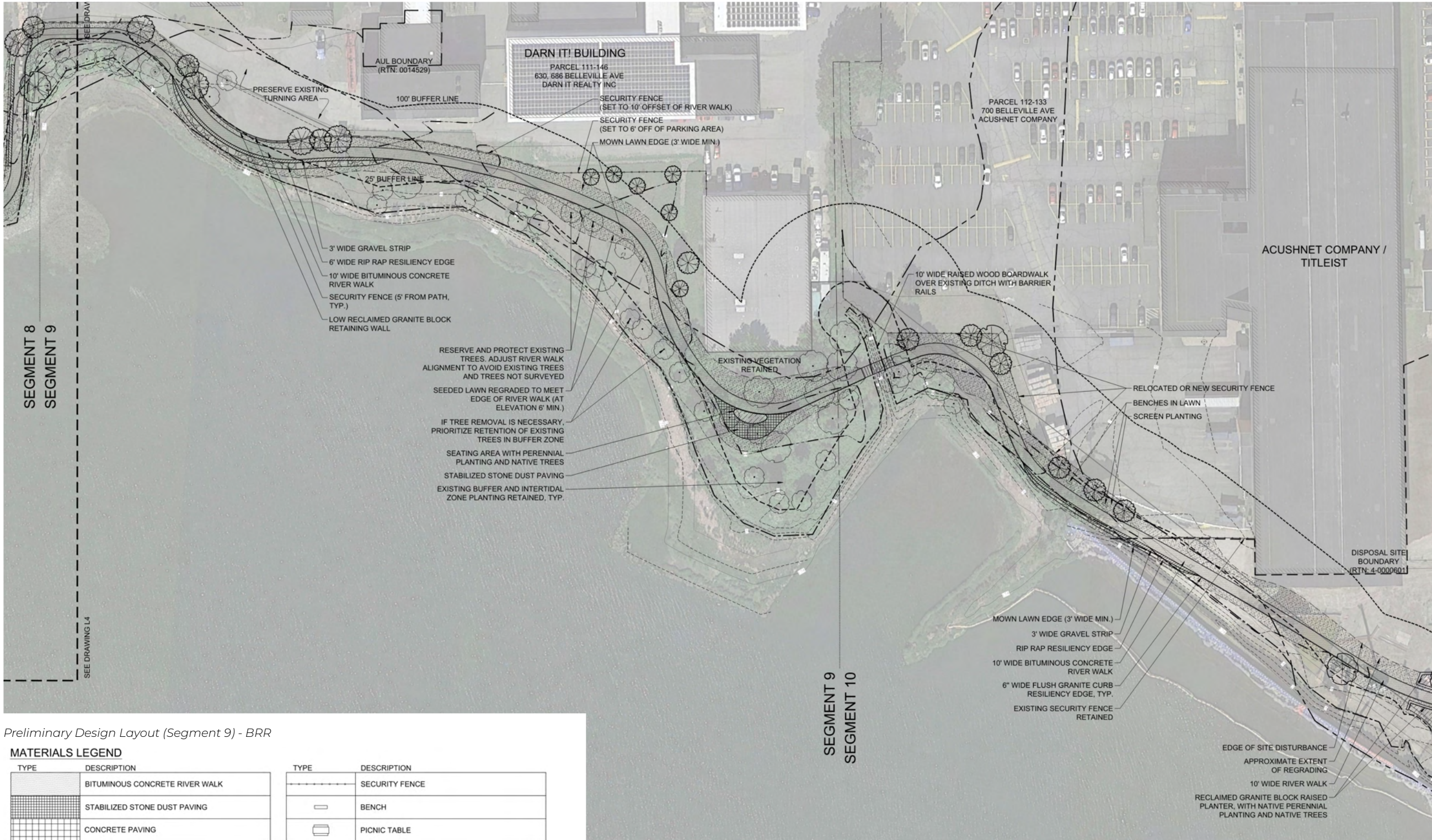
Segment 10

Segment 10 contains the whole Titleist property up to the southern boundary of the Aerovox parcel. An AUL and Disposal Boundary are located on the Titleist parcel and substantial excavation and remediation has occurred on this site. Future uses are required to adhere to the yet to be finalized remediation efforts. Careful coordination with Titleist is required to discuss the proposed impacts on their parcel, such as the proposed relocation of existing fencing.

RiverWalk Segment 9 and 10 Description

- Provide a small wood raised boardwalk over the existing drainage channel.
- The proposed RiverWalk alignment is shown extending landward of the existing Titleist fence line, and proposes to move the existing fence line approximately 10' into the existing parking lot.
- Provide a planted buffer between the RiverWalk and the relocated fence line.
- Locate the RiverWalk as close to the riverbank and completed intertidal zone remediation work as possible, while minimizing or avoiding disturbance.

PRELIMINARY DESIGN LAYOUT - SEGMENTS 9 & 10



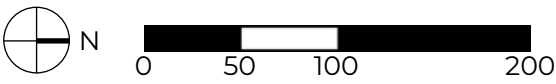
Preliminary Design Layout (Segment 9) - BRR

MATERIALS LEGEND

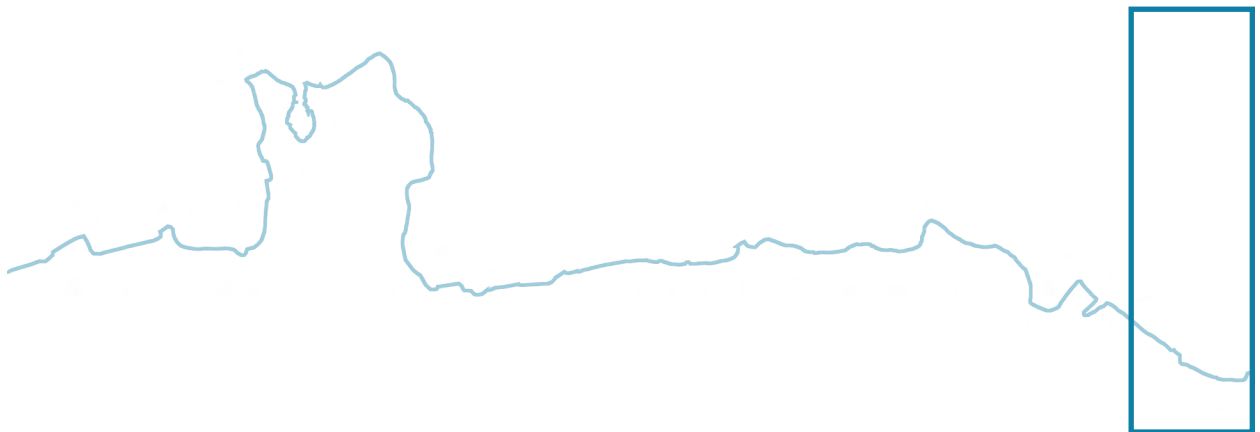
TYPE	DESCRIPTION
	BITUMINOUS CONCRETE RIVER WALK
	STABILIZED STONE DUST PAVING
	CONCRETE PAVING
	SPECIALITY PAVING
	TIMBER OVERLOOK / BOARDWALK
	GRAVEL STRIP
	RIP-RAP EDGE
	6" FLUSH GRANITE CURB RESILIENCY EDGE
	RECLAIMED GRANITE BLOCK RETAINING WALL
	BARRIER RAIL

TYPE	DESCRIPTION
	SECURITY FENCE
	BENCH
	PICNIC TABLE
	BIKE RACK
	TRASH RECEPTACLE
	MOWN LAWN
	SHRUB PLANTING
	PROPOSED TREES
	EXISTING TREES TO REMAIN

Preliminary Design Layout (Segment 9 & 10) - BRR



Segment 11



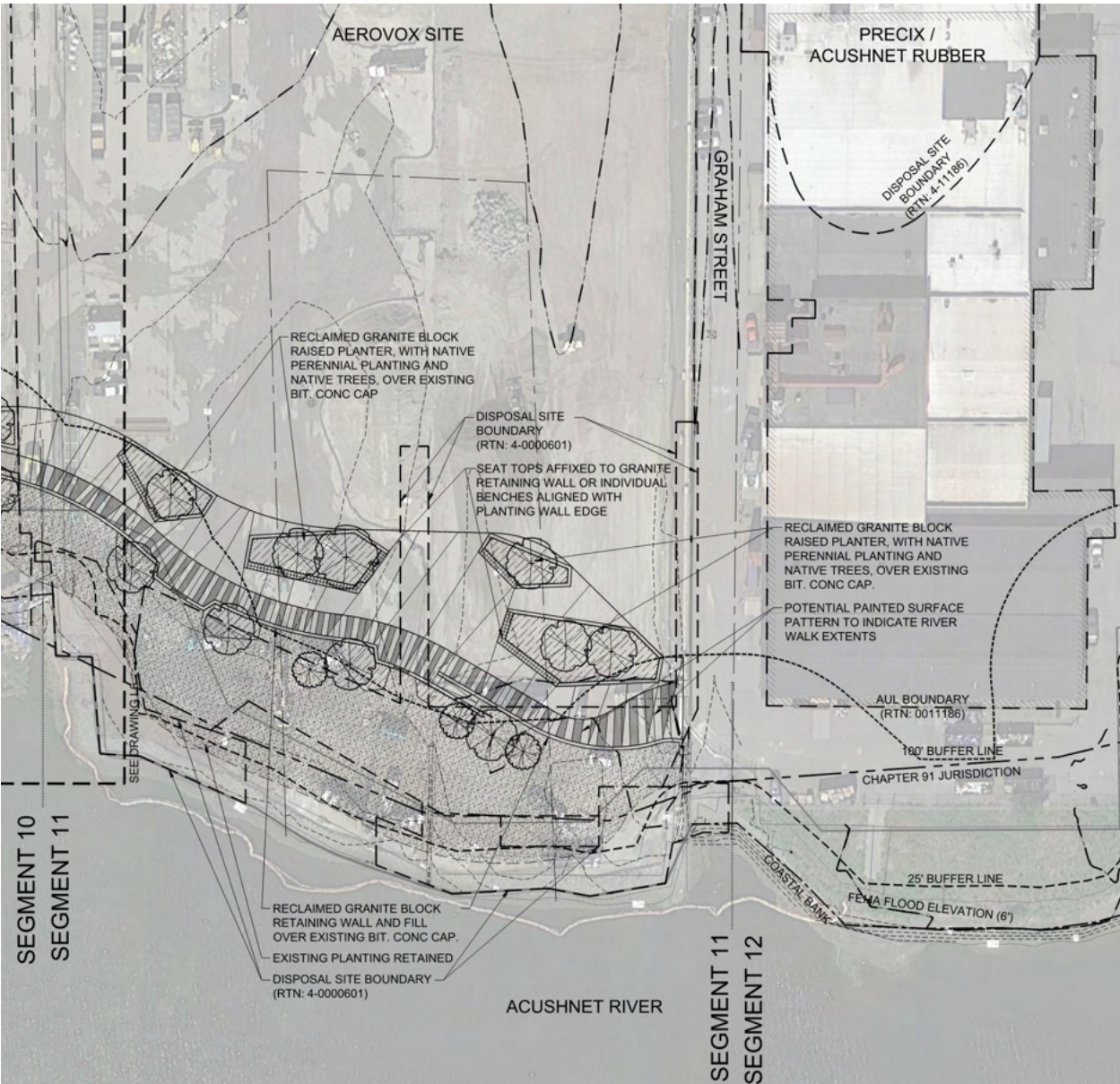
Segment 11

This segment includes the entire Aerovox parcel. The Aerovox parcel is one of the major contributors to the New Bedford Harbor Super Fund site but is not part of the Super Fund Site itself. Extensive remediation and containment work by the former operator of the site is underway. Inland portions of the parcel have been capped with a permanent barrier and surface pavement that extends down to the 25' riverfront buffer. The riverfront buffer remediation consists of material removal and replacement with clean fill. The intertidal zone and buffer area is currently being replanted. After the completion of the remediation efforts, the City of New Bedford anticipates using this parcel as a large parking area and event space, as well as a boating center with a boat and/or kayak launch facility. This RiverWalk Preliminary Design assumes that the raising of grades above the paved cap is feasible, including the installation of trees and other planting material in areas with appropriate planting soil depth. The development of an appropriate drainage approach will be necessary for these areas of fill over the cap. Further coordination with the City and permitting agencies will be necessary to ensure the cap is not damaged by the proposed work.

RiverWalk Segment 11 Description

- Use reclaimed granite blocks to create a retaining wall to elevate the ground plane on the river side of the path to an elevation of 6.0' minimum.
- The RiverWalk alignment pulls away from the riverbank to create a sloping lawn for passive recreation between the RiverWalk and the riverbank.
- The RiverWalk path can follow the existing grades of the paved cap.
- Consider painting the surface of the paved cap to provide interest and to identify the limits of the RiverWalk.
- Use reclaimed granite blocks to create raised planting areas on top of the cap on the landward portion of the RiverWalk path. Locate seating areas on top of or along the edge of the reclaimed granite block planter edges to capitalize on river views.
- Allow for potential future RiverWalk segments to connect to the RiverWalk at the most northerly point.
- Allow for future connections to the inland portions and planned uses of the site.

PRELIMINARY DESIGN LAYOUT - SEGMENTS 11 & 12

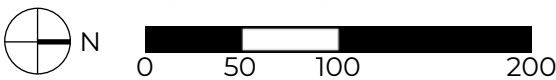


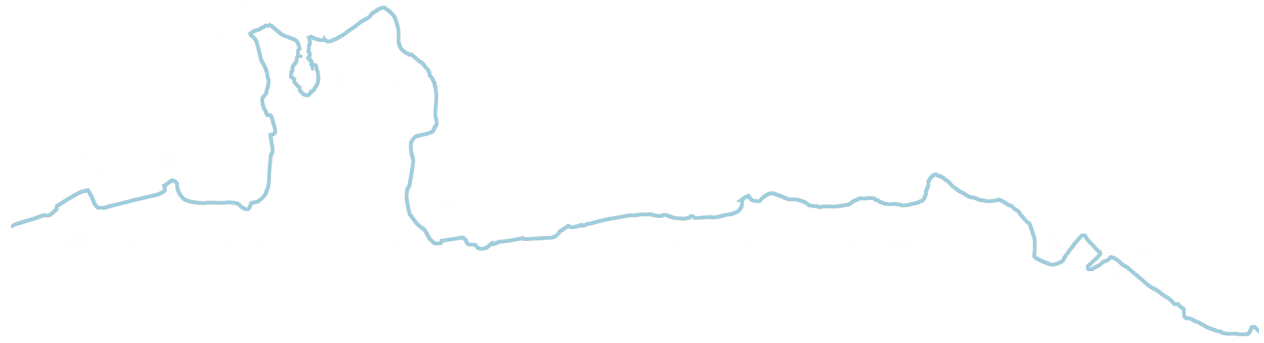
Preliminary Design Layout (Segment 11) - BRR

MATERIALS LEGEND

TYPE	DESCRIPTION
	BITUMINOUS CONCRETE RIVER WALK
	STABILIZED STONE DUST PAVING
	CONCRETE PAVING
	SPECIALITY PAVING
	TIMBER OVERLOOK / BOARDWALK
	GRAVEL STRIP
	RIP-RAP EDGE
	6" FLUSH GRANITE CURB RESILIENCY EDGE
	RECLAIMED GRANITE BLOCK RETAINING WALL
	BARRIER RAIL

TYPE	DESCRIPTION
	SECURITY FENCE
	BENCH
	PICNIC TABLE
	BIKE RACK
	TRASH RECEPTACLE
	MOWN LAWN
	SHRUB PLANTING
	PROPOSED TREES
	EXISTING TREES TO REMAIN





6 Next Steps and Summary

Outcomes from the analysis of prior information, the site investigations and research stage, and meetings with the city and abutters, provided the design team with new information that was used to develop the RiverWalk alignment proposed in this Preliminary Design. While the proposed design is conceptual in nature, it demonstrates the application of the various design elements for Segments 1 through 11, such as identifying the approximate locations and extent of the revetment stabilization or the flush granite curb resiliency edge. It is assumed that the form of the amenity areas will change in future iterations of the plan, but is included here to show intent. The path alignment demonstrates a preferred approach but the exact alignment will change based on additional coordination with abutters or updates to ongoing remediation efforts. Specifically, the path alignment through the Sawyer Street facility, treatment on Coffin Avenue, through the portion of land on 1R Coffin Avenue in the footprint of the yet to be demolished building, and the Titleist and Aerovox sites will require updating when additional information becomes available. Additionally, assumptions were made about a potential RiverWalk alignment through private parcels and the proposed impacts such as removed parking spaces, altered turning areas, or realigned fences, will require further negotiation and agreement. Regardless, it is intended that the proposals contained herein, provide a productive framework for future RiverWalk design.

The 2020 *New Bedford RiverWalk Feasibility Study Update* identified a series of important next steps that should be used to guide the future of the project. While the 2020 next steps are still accurate, some immediate next steps, following on from this Preliminary Design, are as follows:

- Meet with representatives from the Mass MEPA and Chapter 91 offices to discuss an agreed permitting strategy for the RiverWalk. This discussion should include how the project team can successfully permit the project given ongoing work still occurring on site. For example, can the project be permitted in phases to allow certain portions of the RiverWalk to be designed and constructed?
- Conduct a topographical and boundary survey for the entire RiverWalk project area, including an updated resource area delineation. The timing of the survey and delineation may occur in phases to allow for the completion of ongoing remediation work.
- Continue discussions with affected abutters regarding impacts of the proposed alignment.
- Continue to secure funding for the project design and construction.

The New Bedford RiverWalk project remains a feasible and important project to revitalize the riverfront along the Acushnet River. Much coordination, agreement, and permitting will be required, but the RiverWalk will be an incredible amenity for the City, residents, and visitors alike. Public access along the river will mark the transformation of this previously inaccessible and impacted land into a major public asset.

APPENDIX

Appendix A: Coastal Edge Preliminary Review - Foth

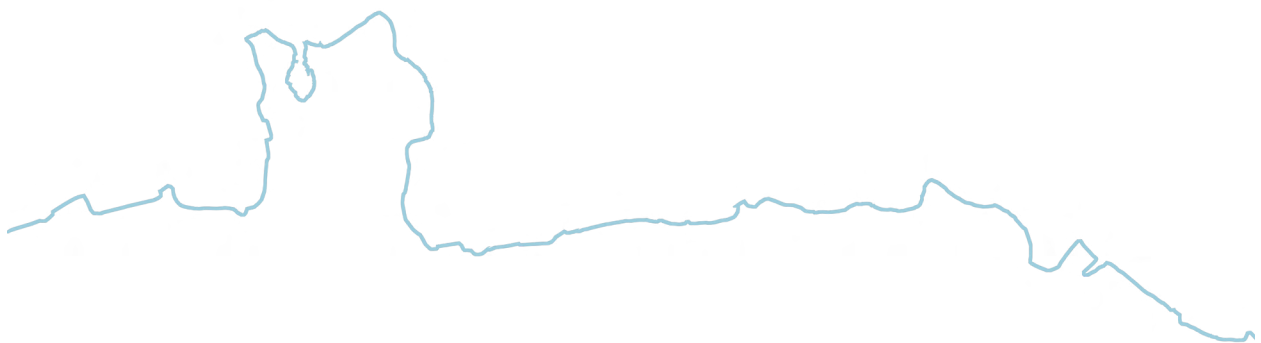
Appendix B: Hazardous Materials Assessment - Stantec

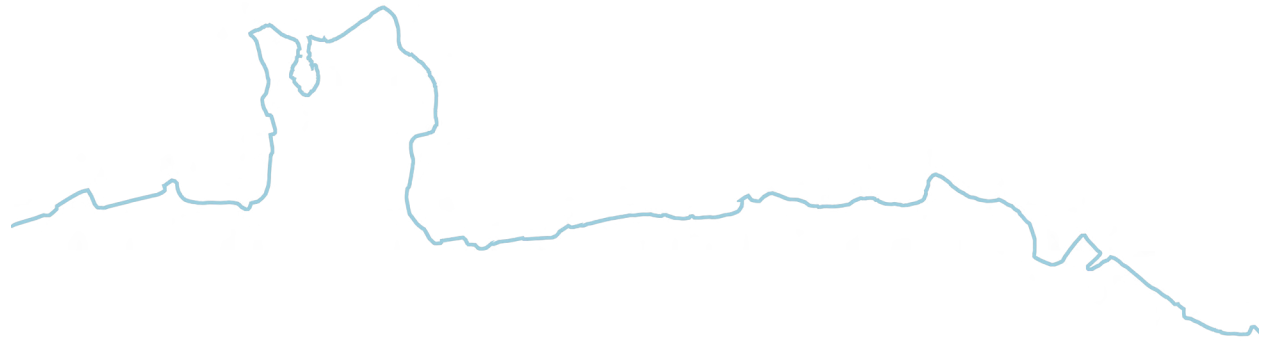
Appendix C: Sea Level Rise Projections - WHG

Appendix D: Existing Conditions Plans - BRR

Appendix E: River's Edge Sections - BRR

Appendix F: Preliminary Design Plans - BRR





Appendix A

Coastal Edge Preliminary Review

Foth Infrastructure & Environment

June 23, 2023

David Andrews, RLA
Brown, Richardson, + Rowe, Inc.
Landscape Architects and Planners
65 Franklin Street, 4th Floor
Boston, Massachusetts 02110 USA

**Re: New Bedford River Walk
Coastal Edge Preliminary Review**

Dear Mr. Andrews,

Foth Infrastructure & Environment, LLC (Foth) has been engaged with the Brown, Richardson + Rowe (BRR) team since June 2022 as a coastal engineering subconsultant to aid with the preparation of a feasibility study related to the construction of a shared-use path project known as the River Walk in New Bedford, Massachusetts. The following memorandum summarizes our understanding of the project, work to-date, key findings, design considerations, and permitting requirements.

Introduction & Summary of Work

The project is located in the North End of New Bedford, Massachusetts along the shoreline of the Acushnet River beginning at Veteran's Memorial Way, extending northerly through Riverside Park, and ultimately terminating at Graham Street. The project area lies within and adjacent to coastal resource areas protected by the Wetlands Protection Act, the Clean Water Act, and the Rivers and Harbors Act, and within the AE Flood Zone (Elevation 6.0') as shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) 25005C0391H, effective 7/6/2021.



Figure 1: NB River Walk Project Location

Foth's role in the project is to aid in the conceptual design and planning for coastal edge treatment of the shared-use path. On August 2, 2022 Foth met with the project team and stakeholders including representatives from BRR, Stantec, the City of New Bedford, MassDEP, and EPA to review the proposed path corridor and identify site constraints or opportunities. The Foth team then performed a working site visit on August 24, 2022 to more closely inspect the existing shoreline, gather supplemental survey data, and further develop considerations for the coastal edge treatment of the proposed shared-use path. Following the site meetings and review of existing site documentation, Foth prepared conceptual site plans and cross sections at critical locations throughout the project area showing the proposed path and edge treatment locations, a public pier at the end of Coffin Avenue, and a rip-rap slope treatment detail.

Key Findings

The project area and adjacent waterway is highly contaminated with polychlorinated biphenyls (PCBs) and heavy metals due to industrial discharges from manufacturing operations in the mid-1900s. Cleanup efforts have been ongoing since the 1900s which include dredging of contaminated river sediments and construction of sediment caps to isolate and stabilize the contaminated sediments. Several of these sediment caps along the intertidal shoreline within the project area have been recently completed and must be considered in the design of the proposed River Walk.



Figure 2: Replanted shoreline sediment cap near the Victoria Riverside Lofts

Existing ground elevations within a majority of the proposed path alignment north of Coffin Avenue are below the predicted water level during a 100-year storm event and increase moving landward (west) away from the shoreline, creating a steep watershed area which drains over the

project area into the Acushnet River. There are multiple wet weather discharge outfalls throughout the project area. During a storm, the ability of the riverfront area to absorb flood waters, buffer inland areas from flood and wave damage, and to transmit both surface runoff and floodwater from bank overtopping is significant.



Figure 3: Typical Wet Weather Discharge Outfall

River Walk Design Considerations

At a minimum, the design of the River Walk must allow the project area to continue performing the vital functions listed above while providing for resiliency of the path itself to allow for its continued use and public benefit. Further, the proposed profile elevations of the path should be elevated to avoid inundation during a 100-year storm, proposed slope treatments must be able to withstand stormwater inundation and choppy wind-swept wave action, and any stormwater which has collected landward of the proposed path location must be able to flow back to the tidal waters of the Acushnet River.

The original intent for coastal edge treatment of the River Walk was to amend the existing shoreline treatments and sediment caps installed as part of the ongoing contamination cleanup efforts to accommodate construction of the shared-use path along the banks of the Acushnet River. However, after visiting the site and gaining more information regarding the history of cleanup efforts made to-date, Foth does not recommend disturbance of the coastal edge of the Acushnet River for construction of the New Bedford River Walk. Instead, the embankment for the River Walk should be set back from the shoreline to avoid any potential for disturbance and resuspension of contaminated sediment.

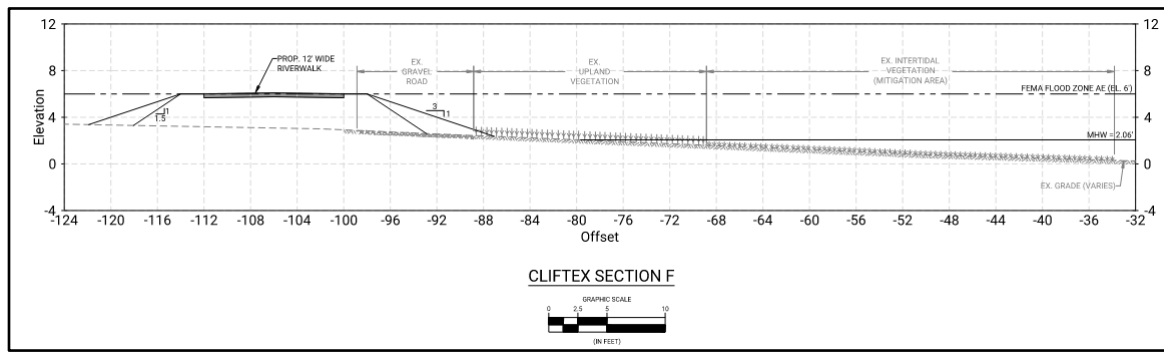


Figure 4: Cross section of River Walk elevated to the 100-year flood elevation on proposed fill

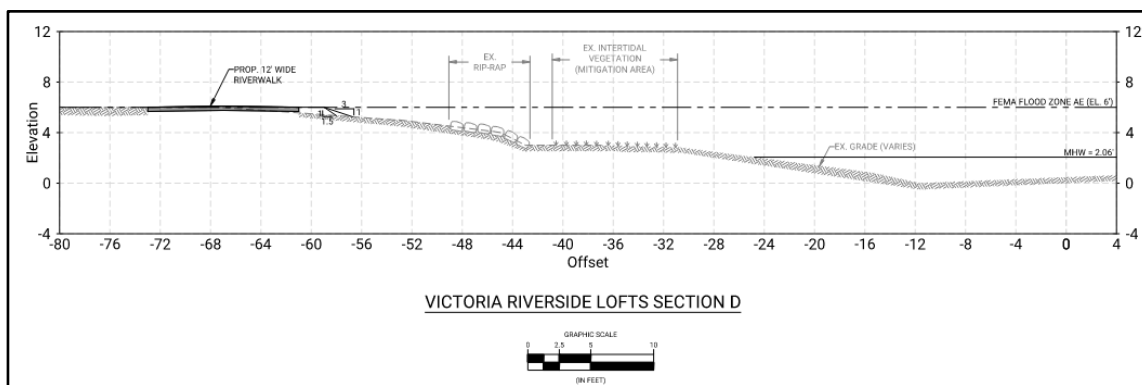


Figure 5: Cross section of River Walk constructed on existing grade above the 100-year flood elevation

Even with separation from the shoreline, a majority of the River Walk will be subject to inundation and wave action during a coastal storm event. The proposed side-slope grading extending from the top of the path embankment down to existing grade must be able to withstand these conditions without significant damage or loss of fill material. For an at-grade path option, Foth recommends installing a geotextile layer and armoring side slopes with riprap stone of sufficient size to withstand anticipated storm conditions.

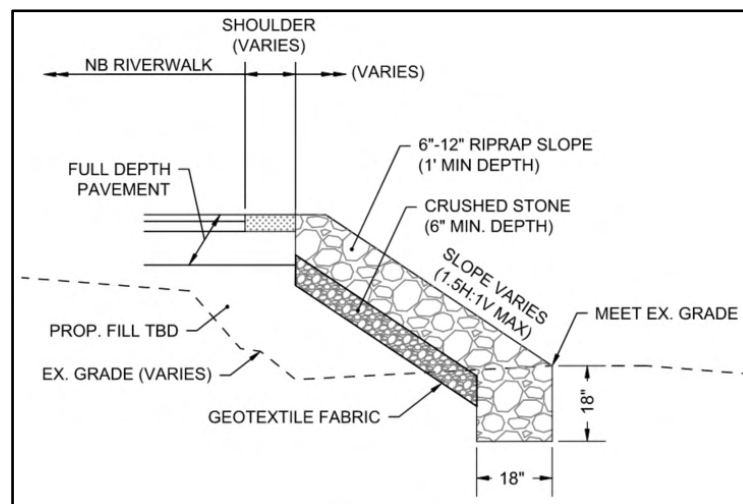


Figure 6: Riprap sideslope treatment

Given the scenic nature of the project area, there are opportunities to provide sitting/observation areas as well as public fishing (catch and release) locations along the path alignment. The eastern terminus of Coffin Avenue at the shoreline of the Acushnet River is one such location that would benefit from the construction of a pier for public use and enjoyment. The pile-supported structure could extend from the existing stone seawall over the waters of the Acushnet River and provide a pleasant location for public passive recreational use. A cross section showing a conceptual layout of the pier is provided below.

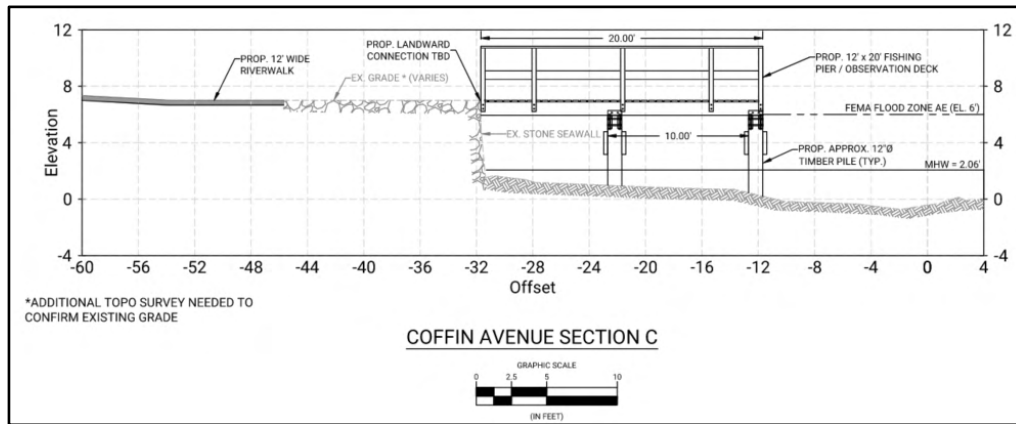


Figure 7: Cross section of pile-supported pier at the end of Coffin Avenue

A pile-supported boardwalk structure would eliminate most issues with the performance standards of the riverfront area by maintaining the project area's current ability to absorb flood waters and allowing the unimpeded transmission of both surface runoff and floodwater from bank overtopping. Such a structure could incorporate a resilient and robust design for the River Walk via structural member sizing and deck elevations, as well as avoid the need to protect a new embankment slope subject to inundation. While likely not feasible for the entire length of the proposed path due to construction and ongoing maintenance costs, Foth recommends that the option be explored as part of the alternatives analysis as the proposed project design is advanced.

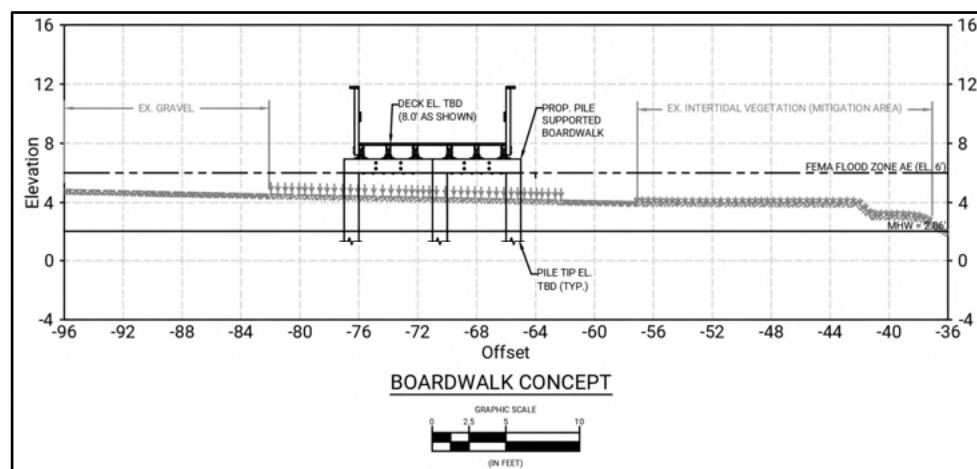


Figure 8: Cross section of pile-supported boardwalk concept

Environmental Permitting

The project area includes multiple coastal resource areas and regulatory jurisdictional limits. Once the alignment and proposed features of the River Walk are advanced to a preliminary design (30%) stage, Foth recommends scheduling a pre-filing meeting with the Massachusetts Environmental Protection Agency (MEPA). This action will initiate a joint-agency project review for agencies with jurisdiction over the project area and provide a line-of-sight on the filings and authorizations necessary to advance the project. Based on the current proposal, the following filings are anticipated to be necessary for the project at a minimum:

1. New Bedford Conservation Commission – Notice of Intent
2. MassDEP - Chapter 91 License (for proposed features seaward of the historic high-water mark)
3. USACE – Pre-Construction Notification (for pier and other features proposed seaward of the high-water mark)
4. MEPA – Environmental Notification Form (ENF) and Single Environmental Impact Report (SEIR) due to proximity to environmental justice census tracts

Foth appreciates the opportunity to work on this project on behalf of the City of New Bedford as part of the BRR team. Should you have any questions regarding the content of this memorandum or would like to request any additional information, please feel free to contact me via email at jeramy.packard@foth.com.

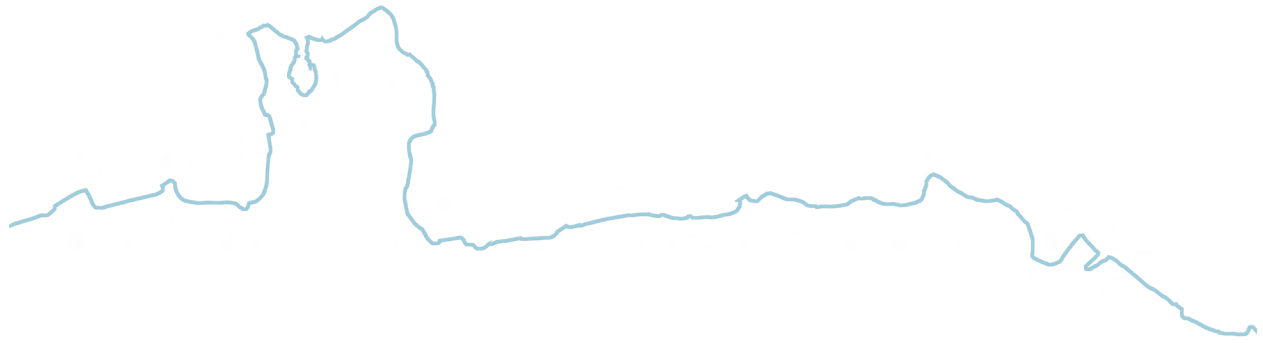
Kind Regards,

Foth Infrastructure & Environment, LLC

A handwritten signature in black ink, appearing to read "JP", written over a light gray horizontal line.

Jeramy Packard, P.E.

Senior Project Manager – Ports & Harbors



Appendix B

Hazardous Materials Assessment

Stantec Consulting Services



Stantec Consulting Services Inc.
300 Crown Colony Drive, Suite 110
Quincy, MA 02169

July 10, 2023

Project/File: 195602466

David Andrews

Brown, Richardson, + Rowe, Inc.
Landscape Architects and Planner
65 Franklin Street, 4th Floor
Boston, Massachusetts 02110

Dear Mr. Andrews,

Reference: Hazardous Materials Assessment for Proposed New Bedford River Walk

INTRODUCTION

The City of New Bedford is developing planning and design recommendations for the New Bedford River Walk, an ADA-compliant multiuse path adjacent to the west bank of the upper Acushnet River. The River Walk project is an opportunity to construct a linear park between Veteran's Memorial Way north to Graham Street that will serve as a safe and positive community amenity, encouraging active and passive recreational opportunities along the banks of the Acushnet River for city residents and visitors. The objectives of this Hazardous Materials Assessment Summary are to 1) identify the locations of known hazardous materials releases along the River Walk between Veteran's Memorial Way at the southern extent and the City of New Bedford's property at 740 Belleville Avenue at the northern extent (referred to as the proposed path); and 2) recommend soil management strategies to maintain compliance during construction and use of the path and park. Based upon anticipated construction design, no significant excavation of soil is proposed. Groundwater dewatering or exposures to impacted groundwater are not considered likely during construction.

ENVIRONMENTAL RELEASE SITES

New Bedford Harbor Superfund Site

The upper Acushnet River is within the New Bedford Harbor Superfund site, which was historically contaminated with polychlorinated biphenyls (PCBs) and heavy metals. New Bedford Harbor, extending to the Upper Acushnet River, has been the subject of an ongoing remediation effort led by the U.S. Environmental Protection Agency (EPA). The River Walk borders the Acushnet River which is included in the New Bedford EPA Superfund Site. The EPA and the U.S. Army Corps of Engineers have been conducting remediation actions in the harbor and along the Acushnet River and its shoreline. Further cleanup along the shoreline is anticipated which would include soil/sediment excavation and backfilling with clean material. Construction of the River Walk cannot proceed until remediation of the Acushnet River and adjacent intertidal areas are completed. Remediation of the upper Acushnet River has been on-going for several years and significant progress has been made. During remediation activities by EPA, a construction haul road was constructed along portions of the riverbank on the west side of the Acushnet River. This construction haul road was built following impacted soil removal and placement of clean material. Where the location of the construction road overlaps the path of the River Walk, the intent is to

Reference: Hazardous Materials Assessment for New Bedford River Walk

use the construction haul road location as the River Walk path. Contingent upon the availability of funding, remediation of the intertidal area is scheduled to be completed by 2026.

EPA's work has included use of the Sawyer Street facility south of Riverside Park as a disposal site for excavated soils and sediment associated with the New Bedford Harbor Superfund site. Impacted soils and sediments remaining on site will be permanently capped. Regulatory closure will likely include implementation of institutional controls such as an Activity and Use Limitation (AUL).

State-listed Environmental Release Sites

The following section presents information related to the existing known hazardous materials release sites and information related to management of soils during construction of the River Walk and associated features. The potential exists for contaminants to be present along the entire length of the River Walk due to the area's history of urbanization and industrial/commercial activities. Oil and hazardous materials (OHM) impacts associated with urban fill include petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs) and heavy metals. PAHs are formed during the incomplete burning of organic material historically associated with human activities such as cooking and heating or fires in structures. Coal and wood ash are also historically present which also contain naturally occurring heavy metals. Although there are regulatory exemptions for background concentrations of urban fill materials associated with coal and wood ash, their presence warrants a need for soil management and future exposure concerns (see General Recommendations section below).

Informational Sources:

The following information was reviewed to prepare this memorandum:

- Massachusetts Department of Environmental Protection (MassDEP) Waste Site and Reportable Releases online database (MassDEP database);
- New Bedford River Walk Preliminary Design Plans prepared by Brown, Richardson, + Rowe, Inc. (the BRR Plan).

Based on a review of the MassDEP database, the following locations are within or adjacent to the proposed path. Table 1 summarizes the locations, environmental concerns and status for these sites, and a discussion of their environmental status related to soil management considerations follows. For Sheet and Parcel information, refer to the BRR Plan in Attachment A. The disposal sites are reviewed starting at the southern end of the proposed path and advancing to the northern end.

1. RTN 4-0000245 – SHEET L1

This property was part of the former location of the Fairhaven Mills and is within Parcel 93-263. MassDEP files indicate that in the 1960s, sediments from the Acushnet River were dredged and staged at this site possibly in the northeast corner adjacent to the Acushnet River. The sediments may have contained PCBs and metals. This RTN was linked to RTN 4-0014995.

Soil management considerations:

Soil management considerations discussed in RTN 4- 0014995, section 2 below are relevant with the additional potential for encountering PCB and metals-impacted soils.

Reference: Hazardous Materials Assessment for New Bedford River Walk

2. RTN 4-0014995 – SHEET L1

This disposal site was part of the former location of the Fairhaven Mills located between Coggeshall and Sawyer Streets. The disposal site was redeveloped into 3 parcels in 2010. Only Parcel 93-263 is located within or adjacent to the proposed path (see BRR Plan). Anthropogenic fill material containing ash, wood, metal, glass, plastic, leather, and other materials was observed on the surface and in the subsurface soils. PAHs, petroleum hydrocarbon, and metals impact to soil were observed during environmental assessment and redevelopment activities.

An AUL was implemented at the Parcel. The AUL allows recreational, commercial, industrial, and multi-family uses which do not cause and/or result in direct contact with, disturbance of, and/or relocation of the contaminated soil currently located at depths of 2 inches to 12 feet below paved areas of the Site and 2 inches to 12 feet below landscaped areas of the Site. Excavation associated with short-term (six months or less) underground utility work, landscaping, routine maintenance, and/or construction work is also allowed, provided that it is conducted in accordance with a Soil Management Plan (SMP) and Health and Safety Plan (HASP).

Soil management considerations:

Based upon the AUL requirements, prior to conducting subsurface intrusive activities such as excavating, grading and landscaping, the Contractor should prepare a SMP and Site-specific HASP (see General Recommendations section below). Stantec recommends coordinating excavating and soil management during path construction with an LSP.

We note from Sheet L1 that the proposed path through the AUL area is along existing grade or over areas where fill material will be placed. Therefore, significant soil excavation is not expected. However, the impacted soil is at grade. Therefore, contact with impacted soils may occur which would warrant soil management.

3. RTN 4-0019924 – SHEET L1

This release occurred near former Fairhaven Mill Building #1. No. 2 fuel oil leaked from two USTs. The tanks were removed along with impacted soil.

Soil management considerations:

It appears the locations of the former USTs are west of the path and under either Veteran's Way or a paved parking area. No significant soil management is anticipated due to this disposal site.

4. RTN 4-0011675 – SHEET L2

This disposal site is the location of the former Pierce Mill and associated buildings. It is currently known as Riverside Park owned by the City of New Bedford. Removal of several USTs and above ground storage tanks and impacted soil was conducted. Follow up assessment across the park resulted in identifying low-level metals, petroleum hydrocarbons, PAHs, and PCBs impacts in soil due to the historical site use.

Soil management considerations:

Short sections of the proposed path are indicated along the southern and northern extents of the Riverside Park in Sheet L2. Existing walkways within the park connect these new path sections. The assessment results indicated no significant risk exists due to the low-level residual soil impacts which were identified west of the proposed walk.

Reference: Hazardous Materials Assessment for New Bedford River Walk

We note from Sheet L2 that the proposed path sections are along existing grade and include a portion of the haul road to the south. Therefore, significant soil excavation and management is not expected.

5. RTN 4-0000437 – SHEET L3

The disposal site is known as the Star Plating company located on Coffin Avenue. Metals, in particular lead, were detected in soil. A condition of no significant risk was achieved after excavation of impacted soil in two localized areas.

Soil management considerations:

We note from Sheet L3 that the proposed path is along Coffin Avenue in the area of soil impacts at this disposal site. Additional path sections are depicted through an area where the building labeled 1R Coffin Ave. is located. The Sheet indicates this building is to be removed. Soil quality beneath the building is unknown. Therefore, there is a potential that impacted soil may be encountered (if not addressed during building demolition) which would warrant soil management.

6. RTN 4-0019705 – SHEET L3

This disposal site is located at 90 Riverside Drive known as Whaler's Place. Petroleum hydrocarbons, PAHs and metals (chromium and lead) were detected in soil beneath the wooden basement floor of a former boiler room. During excavation of the impacted soil a lower concrete floor was discovered which prevented further migration of the contaminants into the surrounding subsurface soils.

Soil management considerations:

From the site plans and descriptions of the location of the release in the boiler room, it appears that this area is west of the proposed path.

7. RTN 4-0019527 – SHEET L3

This disposal site is also located at 10 Manomet Street. Petroleum hydrocarbons, PAHs, lead, and PCBs were detected in soil in a 10 foot by 10 foot area at the southeast corner of the property. Impacted soil in this area was excavated up to 12 feet below grade. A risk characterization indicated that residual impacts to soil remaining at the disposal site did not pose a risk to human health.

Soil management considerations:

The proposed path appears to run through or adjacent to this disposal site which is currently a grassed area. It appears the proposed path runs over existing grade in the area of this disposal site. The majority of impacted soil was removed via excavation. Therefore, potential exposure to impacted soils is not considered significant. However, if soil management of any excavated soil is warranted, Stantec recommends coordinating any excavating and soil management during path construction with an LSP.

8. RTN 4-0015213 – SHEET L3

This disposal site is located at 10 Manomet Street (formerly part of the Cliftex Mills property). Elevated lead concentrations up to 1,100 mg/kg were detected in soil in the northeast corner of the property. A risk characterization indicated the average concentration (300 mg/kg) did not pose a risk to human health. No remediation was conducted, and the lead-impacted soil was left in place.

Soil management considerations:

The proposed path appears to run through or adjacent to this disposal site which is currently a paved

Reference: Hazardous Materials Assessment for New Bedford River Walk

parking area. Lead-impacted soil exists below the pavement and would be encountered if the pavement was removed. Therefore, potential exposure to impacted soils could occur so soil management of any excavated soil is warranted. Stantec recommends coordinating any excavating and soil management during path construction with an LSP.

9. RTN 4-0023674 – SHEET L4

This disposal site is located at 194 Riverside Avenue and was part of the Cliftex Mill property. Environmental investigations encountered barium, cadmium, nickel, lead, PCBs, and PAHs in the soil. The soil impacts were detected within a fill layer located from zero to six feet below grade throughout the property. The fill reportedly contained coal, coal ash and gasified coal. No remedial efforts were conducted, and a risk characterization indicated the contaminants in the fill pose no risk to human health.

Soil management considerations:

The proposed path appears to run to the east of this disposal site which appears to be mostly paved. It appears the proposed path runs over existing grade in the area of this disposal site. Potential exposure to impacted soils in this disposal site is not expected. However, the fill material containing metals, PAHs and PCBs may exist in the area of the proposed path. Any soil excavation would warrant soil management considerations. Stantec recommends coordinating any excavating and soil management during path construction with an LSP.

10. RTN 4-0014111 – SHEET L4

This disposal site is also located at 194 Riverside Avenue. MassDEP personnel observed several bags of asbestos containing material (ACM) in a partially demolished boiler room and ACM was also observed on the boilers. MassDEP considered this condition a threat of release of ACM. Disposal of the ACM material eliminated the threat.

Soil management considerations:

This site is west of the path so potential exposure is not considered significant and s soil management considerations would not be necessary.

11. RTN 4-0014112 – SHEET L4

This disposal site is also located east of 194 Riverside Avenue and adjacent to the Acushnet River. MassDEP identified a threat of release associated with two abandoned USTs estimated to contain 30,000 gallons of No. 6 fuel oil. Non-aqueous phase liquid (NAPL) was observed in close proximity to the USTs on the south and east sides at depths greater than several feet. The highly viscous and dense nature of the No. 6 oil minimized migration from the USTs. Two 75,000 gallon USTs were emptied and closed in place. In addition, petroleum hydrocarbons, semi-volatile organic compounds (SVOCs), PAHs, metals and PCBs were detected in soil samples. Fill material (i.e., ash, coal, brick, etc.) consistent with the “coal” and “coal pockets” identified in this general location on the Sanborn Maps from the 1920s and 1950s was also encountered.

A risk characterization indicated no significant risk to human health from the remaining subsurface contaminants. This was based upon an AUL implemented to provide notice to the current and potential future property owners about the presence of the NAPL and the need to manage potential exposures.

Soil management considerations:

Based upon the AUL requirements, prior to conducting subsurface intrusive activities such as excavating,

Reference: Hazardous Materials Assessment for New Bedford River Walk

grading and landscaping, the Contractor should prepare a SMP and Site-specific HASP (see General Recommendation section below). Stantec recommends coordinating excavating and soil management during path construction with an LSP. Any soil excavation would warrant soil management considerations.

We note from Sheet L4 that the proposed path through the AUL area is over areas where fill material will be placed. Therefore, significant soil excavation is not expected.

12. RTN 4-0023093 – SHEET L4

This disposal site is located at 200 Riverside Avenue. An historic release of petroleum hydrocarbons and PAHs impacted soil. The soil impacts were mainly located beneath the building. No remediation was conducted. A risk characterization indicated no significant risk to human health from the remaining subsurface contaminants. This was based upon an AUL implemented to provide notice to the current and potential future property owners about the presence of the petroleum hydrocarbons and PAHs in soil and the need to manage potential exposures. The AUL covers the footprint of the building.

Soil management considerations:

We note from Sheet L4 that the AUL area will not be encountered since the proposed path is east of the building. Also, the path runs over existing grade and a portion is within the disposal site boundary. Stantec recommends coordinating excavating and soil management during path construction with an LSP.

13. RTN 4-0014529 – SHEET L5

This disposal site is located at 686 Belleville Avenue. It was the location of the Fibre Leather Manufacturing Company when a No. 6 fuel oil NAPL was discovered within the site building and an unused exterior cistern. A 20,000-gallon heating oil tank was identified as the most likely source of the release. The tank was located partially below grade in an aboveground sand-filled vault on the east side of the building. Remedial efforts included the removal of the tank, excavation and disposal of petroleum-impacted soil, removal of petroleum-impacted water, and recovery of No. 6 heating oil. Petroleum migration was contained within the foundation walls of a Pump House and was limited to 3 to 7 feet below grade. An AUL was implemented for a portion of the building to provide notice that oil contamination is present beneath a former Pump House.

Soil management considerations:

We note from Sheet L5 that the AUL area will not be encountered since the proposed path is east of the building. The AUL boundary is also the disposal site boundary. The path runs over existing grade and significant soil excavation is not expected.

14. RTN 4-0027583 – SHEET L6

This disposal site is located at 700 Belleville Avenue and is known as the Acushnet Company. The site is used by the Acushnet Company for activities and operations associated with customization of golf balls, which includes creation of custom artwork and pad transfer printing of customized artwork or logos provided by customers onto golf balls using solvent based inks; limited golf ball R&D, including golf ball hitting research and a small lab; storage of raw materials and finished products; and shipping and receiving.

In 2018 PCBs were detected in the soil at the site. Subsequent assessment identified VOC and SVOC impacts. According to a 2019 Phase I report, the Acushnet Company disposal site boundaries are believed to be limited to the northeast portion of the site and along the bank of the Acushnet River. The conceptual site model (CSM) for the former Aerovox facility states that surficial soils within the eastern landscaped area

Reference: Hazardous Materials Assessment for New Bedford River Walk

of the Acushnet Company disposal site are believed to have been impacted through migration of contaminated storm water runoff via overland flow and during flooding episodes from the Aerovox property drainage. Site remediation is ongoing and will likely include implementation of an AUL.

Soil management considerations:

We note from Sheet L5 that the proposed path runs over existing grade or where fill will be placed. Therefore, significant soil excavation is not expected. Stantec recommends coordinating any excavating and soil management during path construction with an LSP. Any soil excavation would warrant soil management considerations.

15. RTN 4-0000601 – SHEET L6

This disposal site is located at 740 Belleville Avenue and is known as Kyocera AVX Corporation (KAVX, formerly Aerovox). The property is a vacant 10-acre lot bounded by Graham Street to the north, Belleville Avenue to the west, Hadley Street to the south, and the Acushnet River to the east. It is owned by the City of New Bedford. Electrical component manufacturing began at the Aerovox Facility in approximately 1938 and included the use of PCB-containing dielectric fluid in the capacitor manufacturing process. PCB use began in the 1940s and was discontinued in 1978 when PCBs were prohibited under the Toxic Substances Control Act (TSCA). Aerovox also used solvents in the manufacturing process, including TCE, until the facility closed in 2001. Disposal site contaminants of concern (COCs) are chlorinated ethenes (primarily trichloroethene, TCE) and PCBs.

Assessment and remediation of the Site is subject to a MassDEP Administrative Consent Order (ACO) and associated modifications; an EPA Administrative Order on Consent (AOC); and the Cooperation and Settlement Agreement between the City and KAVX. Site remediation is ongoing and will likely include implementation of an AUL.

Soil management considerations:

We note from Sheet L6 that the proposed path runs along the eastern edge of this disposal site over areas where fill and pavement will be placed. Therefore, significant soil excavation is not expected. The end of the currently proposed path is located at the northeast corner of this disposal site. Stantec recommends coordinating excavating and soil management during path construction with an LSP. Any soil excavation would warrant soil management considerations.

GENERAL RECOMMENDATIONS

Stantec recommends coordinating excavating and soil management during path construction with an LSP. Any soil excavation would warrant soil management considerations. The presence of an AUL and working within a disposal site boundary will require oversight by an LSP.

The design of the River Walk should seek to minimize the need for excavation and limit the amount of soil that would need to be characterized for off-site disposal. Soil analytical testing will be required in order to identify an appropriate soil disposal facility. Any soil generated by excavation should be reused to the maximum extent practical from the property from which it was generated. This could include landscaping features such as berms and plantings. Soils should not be relocated from one property to another without review by an LSP.

To access the riverbank, the EPA installed aggregate construction haul roads near the top of the riverbank. The EPA has left these haul roads in place with the intention that they might be used as a subbase for the future River Walk. Wherever feasible, the Design Team has sought to locate the River Walk in the same

Reference: Hazardous Materials Assessment for New Bedford River Walk

alignment as these EPA haul roads. This will result in minimal soil disturbance along these sections of the proposed path.

Prior to initiating construction, the contractor shall prepare a Soil Management and Health and Safety Plan (SMP/HASP) for the path construction. This SMP/HASP should be suitable for identified disposal sites and those with AULs.

Construction of the path will include placement and addition of fill in the FEMA 100 year floodplain of the Acushnet River. This resource area is designated as Land Subject to Coastal Flooding under the Wetland Protection Act. Because of this designation, the addition of fill will not require creation of compensatory storage to offset the volume of fill added to construct the path. This will avoid the need for additional soil management associated with creating areas of compensatory storage within the project area.

Soil Management

If any soil excavation is planned (i.e., digging for plantings, installing curbing and rip rap shoring, revetment stones, retaining walls, lighting, utility or drainage system components, etc.), an objective should be to reuse as much of the soil as possible and, therefore, minimize soil that must be disposed. For surplus soil, the SMP can identify the least costly disposal option and should be a primary component of estimating soil management and disposal costs. The Contractor should prepare a SMP with LSP oversight that describes appropriate soil excavation, handling, storage, transport, and disposal procedures and includes a description of the engineering controls and air monitoring procedures necessary to ensure that workers and receptors in the vicinity are not affected by fugitive dust particulates. On-Site workers shall be informed of the requirements of the SMP, and the plan shall be available On-Site throughout the course of the project.

The receptors of concern during the construction phase include construction workers coming in contact with the soil, nearby residents, and the general public (inhaling vapors or dust generated from the project or coming in contact with the soil), and environmentally sensitive areas/species. If impacted soil is encountered, the Contractor should implement risk reduction measures in coordination with a LSP. The potential for exposure exists during any excavation but will need to be managed and is limited due to regulatory closure and AUL implementation having been achieved for the MassDEP disposal sites.

The Contractor should stop work and notify the City of New Bedford if they encounter soil that appears to be impacted or underground structures that may contain OHM.

To the extent feasible, excavated soil should be replaced as backfill as close to its original location as possible. Transport and relocation of excavated soil to areas outside the project is not recommended. Surplus soils that cannot be reused as backfill in the area where it was removed should be stockpiled and characterized to determine reuse or disposal options. Stockpiled soil should be placed on an impermeable barrier such as asphalt or polyethylene sheeting, and sheeting and should be bermed to prevent runoff and dispersion of soils away from the piles. The piles should be covered with impermeable material such as tarps or polyethylene sheeting to prevent infiltration or runoff of precipitation.

Transportation and disposal of potentially impacted soil will need to be done in accordance with the applicable rules and regulations of the United States Department of Transportation (USDOT), the United States Environmental Protection Agency (USEPA), and the MassDEP. There are several disposal options for surplus soil depending upon the quality of the soil. Additional characterization of the soil may be necessary to evaluate disposal options. The degree of characterization and the testing frequency will be dependent upon the receiving facility requirements. As a guide, soil samples should be analyzed for the parameters included in Table 1 of MassDEP's policy titled Reuse and Disposal of Contaminated Soil at

Reference: Hazardous Materials Assessment for New Bedford River Walk

Massachusetts Landfills (Policy # COMM-97-001). Typically, soil with concentrations less than RCS-1 reportable concentrations and soils that meet the COMM-97 limits can go to a Massachusetts lined or unlined landfill to be disposed, used as daily cover or for sloping and grading purposes. Typical testing frequency is one sample per every 500 cubic yards. Some facilities require a 100 cubic yard testing frequency for VOCs.

Soil containing impacts greater than the COMM-97 limits will need to be disposed at an approved facility. Petroleum-impacted soil may be approved for recycling via asphalt batching. Soil that contains a characteristic or listed hazardous waste will require out-of-state disposal.

Transportation of non-impacted soil or soil with impacts less than RCS-1 can be conducted using a Material Shipping Record (MSR) form. Soils with greater impacts (i.e., greater than the applicable reportable concentrations) will need to be transported using a Bill of Lading (BOL). BOLs are prepared and submitted on-line using the MassDEP's eDEP website portal. Hazardous soils will be transported using a Uniform Hazardous Waste Manifest (UHWI).

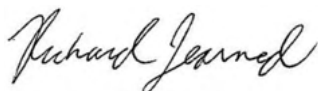
The Contractor should consider the time to characterize the soil and prepare and obtain approvals of the shipping documents. This can sometimes take several weeks or longer. Identifying surplus soils early can expedite the permitting process, and the Contractor should coordinate this activity with the LSP and City of New Bedford.

Health & Safety Plan

The Contractor should prepare a Site-specific HASP that specifies the type of personal protective equipment (i.e., clothing, respirators), engineering controls, and/or environmental monitoring necessary to prevent worker exposures to contaminated soil through dermal contact, ingestion, and/or inhalation. Workers shall be informed of the requirements of the HASP, and the plan shall be available On-Site throughout the course of the project. Stantec recommends coordinating excavating and soil management during operations with an LSP and the City of New Bedford.

Regards,

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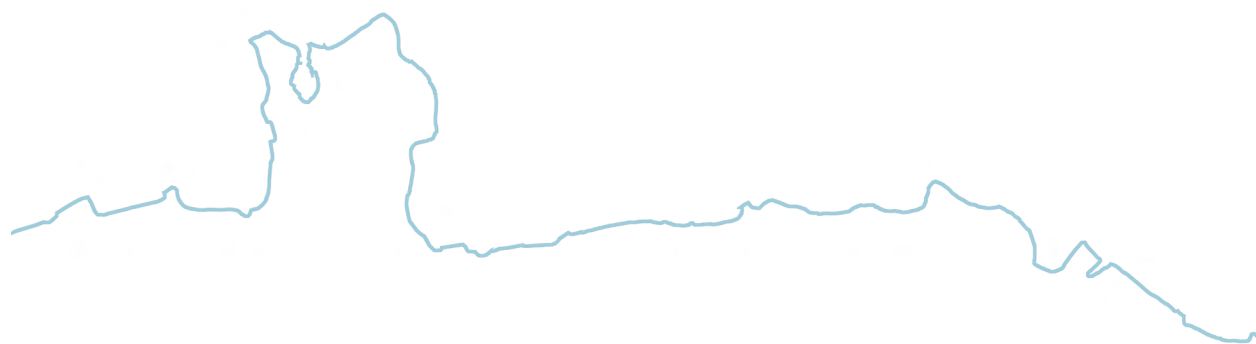
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Attachments: Table 1 - Hazardous Materials Sites and Release Tracking Numbers
Attachment A - New Bedford River Walk Preliminary Design Plans

HAZARDOUS MATERIALS SITES AND RELEASE TRACKING NUMBERS MATRIX
BY STANTEC

TABLE 1 HAZARDOUS MATERIALS SITES AND RELEASE TRACKING NUMBERS											
MAP KEY	DEP RTN	CITY	RELEASE ADDRESS	SITE NAME LOCATION AID	REPORTING CATEGORY	NOTIFICATION DATE	COMPLIANCE STATUS	DATE	PHASE	RAO CLASS	CHEMICAL TYPE
1	4-0000245	New Bedford	85 Coggeshall Street	FAIRHAVEN MILLS	NONE	4/15/1988	RTN CLOSED	10/01/1993			PAHs, Metals, Petroleum (0-8' bgs)
1	4-0014995	New Bedford	94 Sawyer Street	FAIRHAVEN MILLS	72 HR	9/3/1999	RAO	12/16/2010		A3	No. 2 fuel oil
1	4-0019924	New Bedford	94 Sawyer Street	FAIRHAVEN MILLS SE CORNER OF MILL 1	72 HR	07/19/2006	RTN CLOSED	04/12/2010			Gasoline
2	4-0011675	New Bedford	206-378 Belleville Avenue	NO LOCATION AID	TWO HR	09/19/1995	RAO	12/05/2001		B1	No. 4 fuel oil; No. 6 fuel oil
3	4-0000437	New Bedford	19 and 41 Coffin Avenue	PROPERTY	NONE	01/15/1988	RAO	07/31/2001		A2	Soil COCs: Pb
3	4-0019705	New Bedford	90 Riverside Avenue	WHALER'S PLACE	120 DY	04/06/2006	RAO	08/07/2006		A1	Soil COCs: Petroleum, metals
3	4-0019527	New Bedford	10 Manomet Street	NO LOCATION AID	120 DY	12/13/2005	RAO	02/01/2006		A2	Petroleum, metals, PAHs, PCBs in soil
3	4-0015213	New Bedford	10 Manomet Street	NO LOCATION AID	120 DY	12/30/1999	RAO	12/30/1999		B1	Pb in soil (0-3')
4	4-0023674	New Bedford	194 Riverside Avenue	CLIFTEX CORP	120 DY	05/04/2012	RAO	09/06/2012		A2	PCBs, metals
4	4-0014111	New Bedford	194 Riverside Avenue	CLIFTEX CORP	TWO HR	08/06/1998	RAO	05/04/2012		A1	Bags of asbestos
4	4-0014112	New Bedford	194 Riverside Avenue	CLIFTEX CORP	72 HR	08/06/1998	PSC	12/29/2017		PA	Groundwater COCs: fuel oil; Soil COCs: fuel oil
4	4-0023093	New Bedford	200 Riverside Avenue	FORMER MANOMET MILL	120 DY	02/25/2011	RAO	01/04/2013		B2	Groundwater COCs: cVOCs; Soil COCs: EPH and PAHs
5	4-0014529	New Bedford	686 Belleville Avenue	FIBRE LEATHER CORP	TWO HR	02/12/1999	RAO	02/14/2000		A3	No. 6 fuel oil in soil (0-7' below foundation)
6	4-0027583	New Bedford	700 Belleville Avenue	TITLEIST PROPERTY - ACUSHNET COMPANY	120 DY	12/20/2018	UNCLASSIFIED	12/20/2018	PHASE II	EPA-Oversight	PCBs in soil
6	4-0000601	New Bedford	740 Belleville Avenue	AEROVOX INC	72 HR	11/28/1988	TIER I	08/15/2013	PHASE IV	EPA-Oversight	PCBs and cVOCs in soil (3.5' to depth) and groundwater; PCBs (0-2' down to 12')

AUL Implemented/EPA regulatory controls pending



Appendix C

Sea Level Rise Projections

Woods Hole Group

Sea Level Rise Projections Chart

Tidal Benchmarks (Assumes New Bedford Hurricane Barrier is open)

Benchmark	Climate Horizon			
	Present [^] (ft, NAVD88)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
MLLW	-1.7	-0.5	0.9	2.7
MLW	-1.5	-0.4	1	2.8
MTL	0.3	1.5	2.8	4.6
MHW	2.1	3.4	4.6	6.4
MHHW	2.3	3.6	4.9	6.6

[^] = Based on 2008 centered tidal epoch

Stillwater Return Period Water Levels (Assumes New Bedford Hurricane Barrier is closed and functional during storm events)

Values are presented as a range of elevations as they change spatially in the area and overland

Return Period	Climate Horizon			
	Present [^] (ft, NAVD88)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
10-year	3.1-3.2	4.2-4.4	5.2-5.4	7.1-7.3
50-year	3.3-3.6	4.4-4.7	5.4-5.5	7.2-7.6
100-year	3.4-3.7	4.5-4.9	5.4-5.5	7.3-7.7

[^] = Based on 2008 centered tidal epoch

Wave Heights at Shoreline

Return Period	Climate Horizon			
	Present [^] (ft)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
10-year	1	1.5	2	3
50-year	1.5	2	2.5	3.5
100-year	2	2.5	3	4

[^] = Based on 2008 centered tidal epoch

Maximum Wave Crest Elevation in Overland region

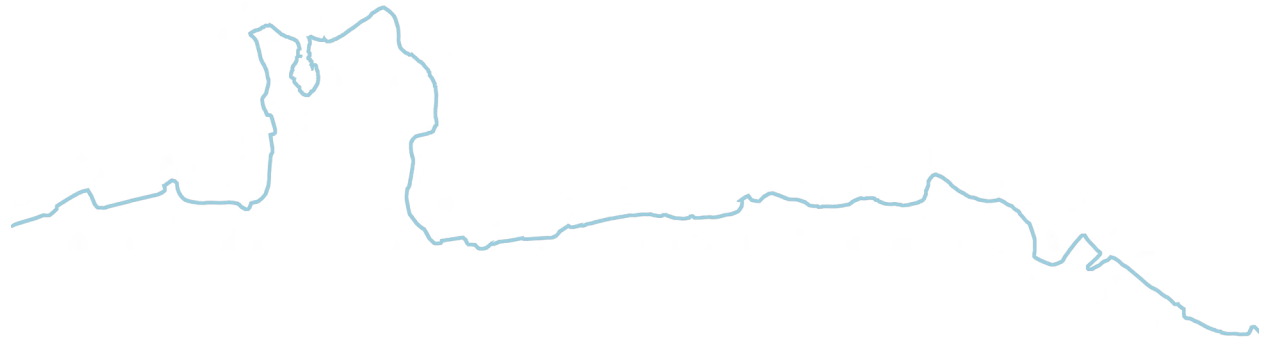
Values are presented as a range of elevations as they change spatially in the area and overland

Return Period	Climate Horizon			
	Present [^] (ft, NAVD88)	2030 (ft, NAVD88)	2050 (ft, NAVD88)	2070 (ft, NAVD88)
10-year	3.9-4.0	5.1-5.4	6.4-6.6	9.1-9.3
50-year	4.1-4.2	5.2-5.5	6.5-6.9	9.2-9.6
100-year	4.3-4.6	5.3-5.6	7.0-7.4	9.6-10.0

[^] = Based on 2008 centered tidal epoch

Table Notes:

1. The present day tidal benchmarks utilize a tidal epoch centered in 2008, which is an updated tidal epoch compared to the present day epoch current day epoch utilized by the National Oceanographic and Atmospheric Administration (NOAA). As such, sea level changes that have occurred between 1992 and 2008 are included in the assessment and provide more accurate information for present day conditions.
2. All data (tidal benchmarks and storm return periods) are generated by the Massachusetts Coast Flood Risk Model. These model results are widely used to develop design conditions under current and future climate conditions and build climate change adaptation plans throughout the Commonwealth of Massachusetts. The flood risk models are used as the state standard, align with state regulatory requirements, are consistent with the state-based climate projections, and form the foundation of numerous design projects in coastal Massachusetts.
3. The sea level rise projections include in the model/analysis for this project are consistent with the standard being applied across the state.
4. Tidal benchmarks (MLLW, MLW, MTL, MHW, MHHW) assume the New Bedford Hurricane Barrier is open under present day and future conditions.
5. Storm (10-yr, 50-yr, 100-yr) return periods values assume the New Bedford Hurricane Barrier would be closed to limit storm surge-based flooding in the Acushnet River estuary. The model also assumes the Hurricane Barrier does not fail and functions as intended. However, some storms will overtop the Hurricane Barrier in 2050, and even more storms will overtop the Hurricane Barrier in 2070. This overtopping is included in the modeling and assessment of the estuary upstream of the Hurricane Barrier. The Hurricane Barrier, while overtopped, does still reduce the peak flood levels in the estuary.
6. Maximum wave Crest Elevation data includes the stillwater surface elevation with the impacts of waves, so this is the maximum crest of the water elevation that is reached. The water is not consistently at the level, but can reach this level with the crest of the wave.



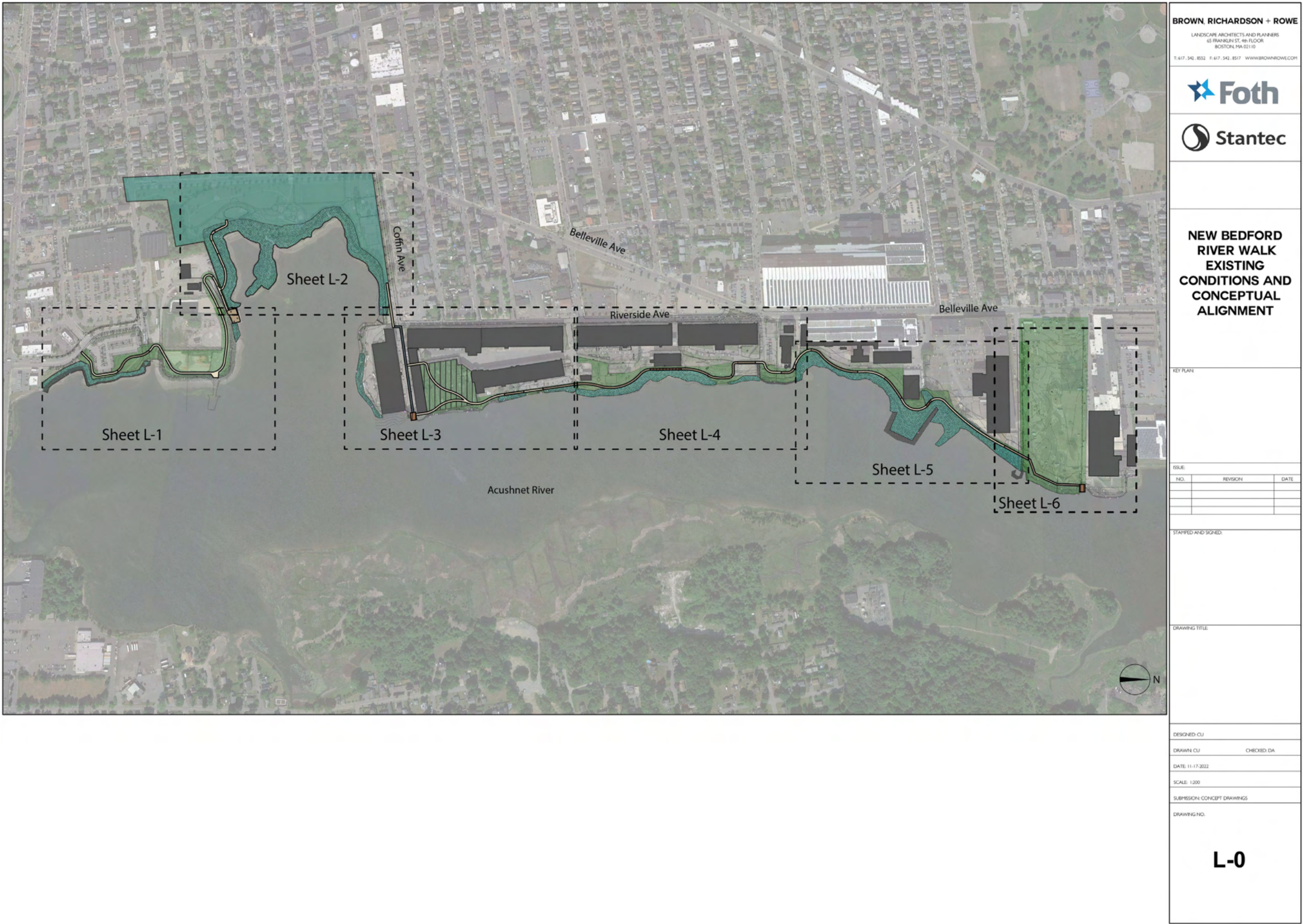
Appendix D

Existing Conditions Plans

Brown, Richardson + Rowe, Inc.

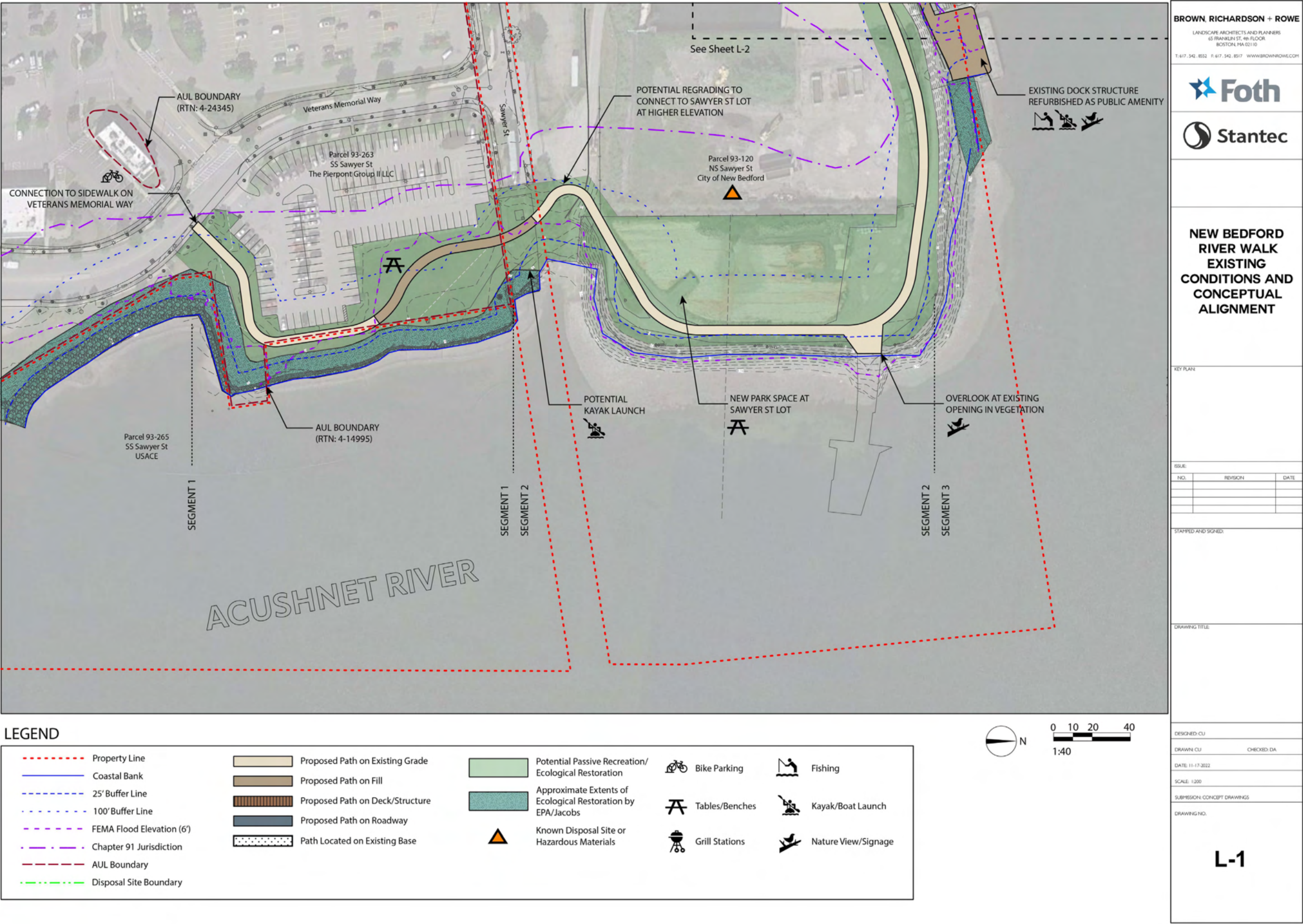
EXISTING CONDITIONS PLAN - OVERALL

Full-sized plans available seperately



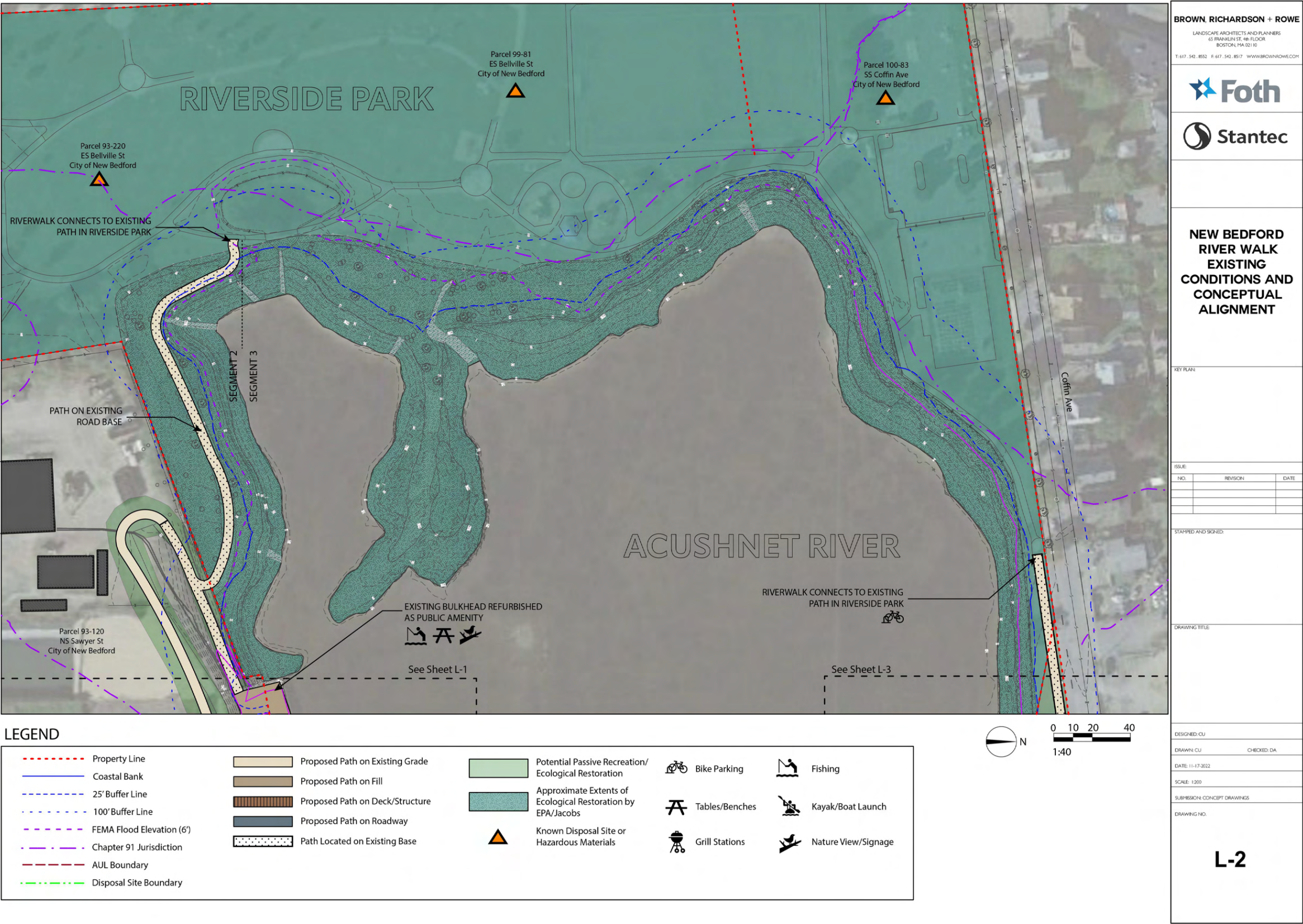
EXISTING CONDITIONS PLAN - SEGMENTS 1 & 2

Full-sized plans available seperately



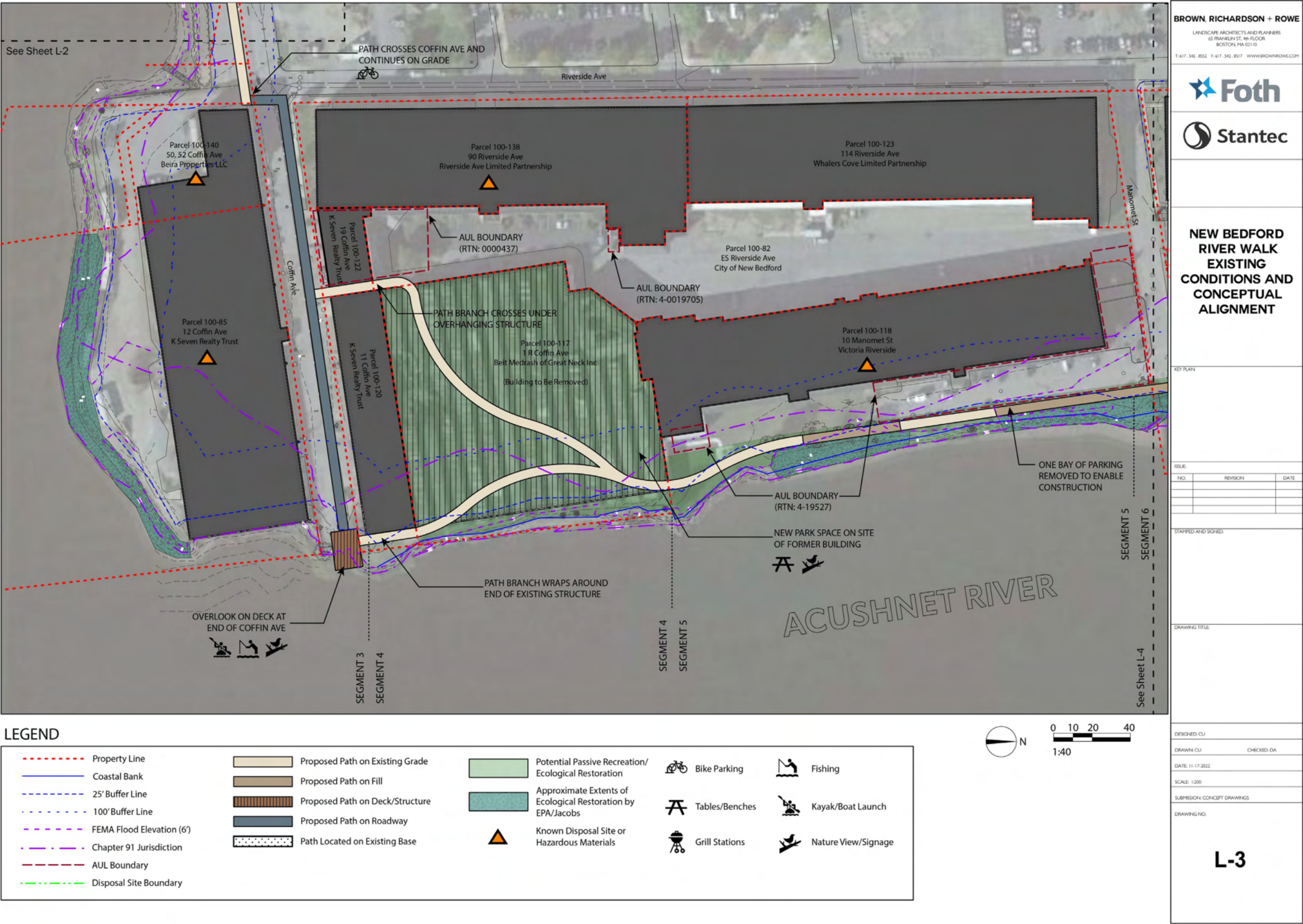
EXISTING CONDITIONS PLAN - SEGMENTS 2 & 3

Full-sized plans available seperately



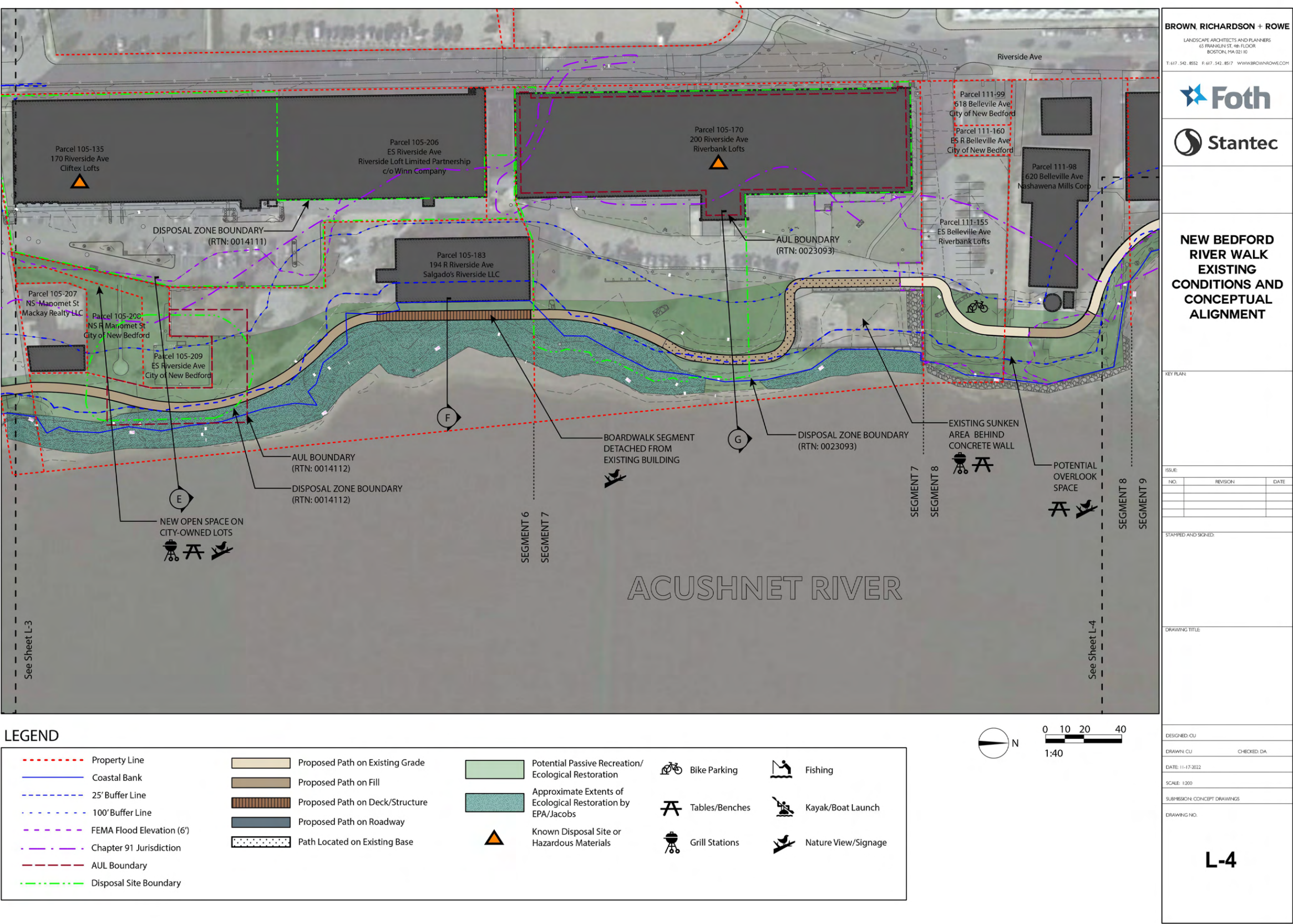
EXISTING CONDITIONS PLAN - SEGMENTS 3, 4, & 5

Full-sized plans available seperately



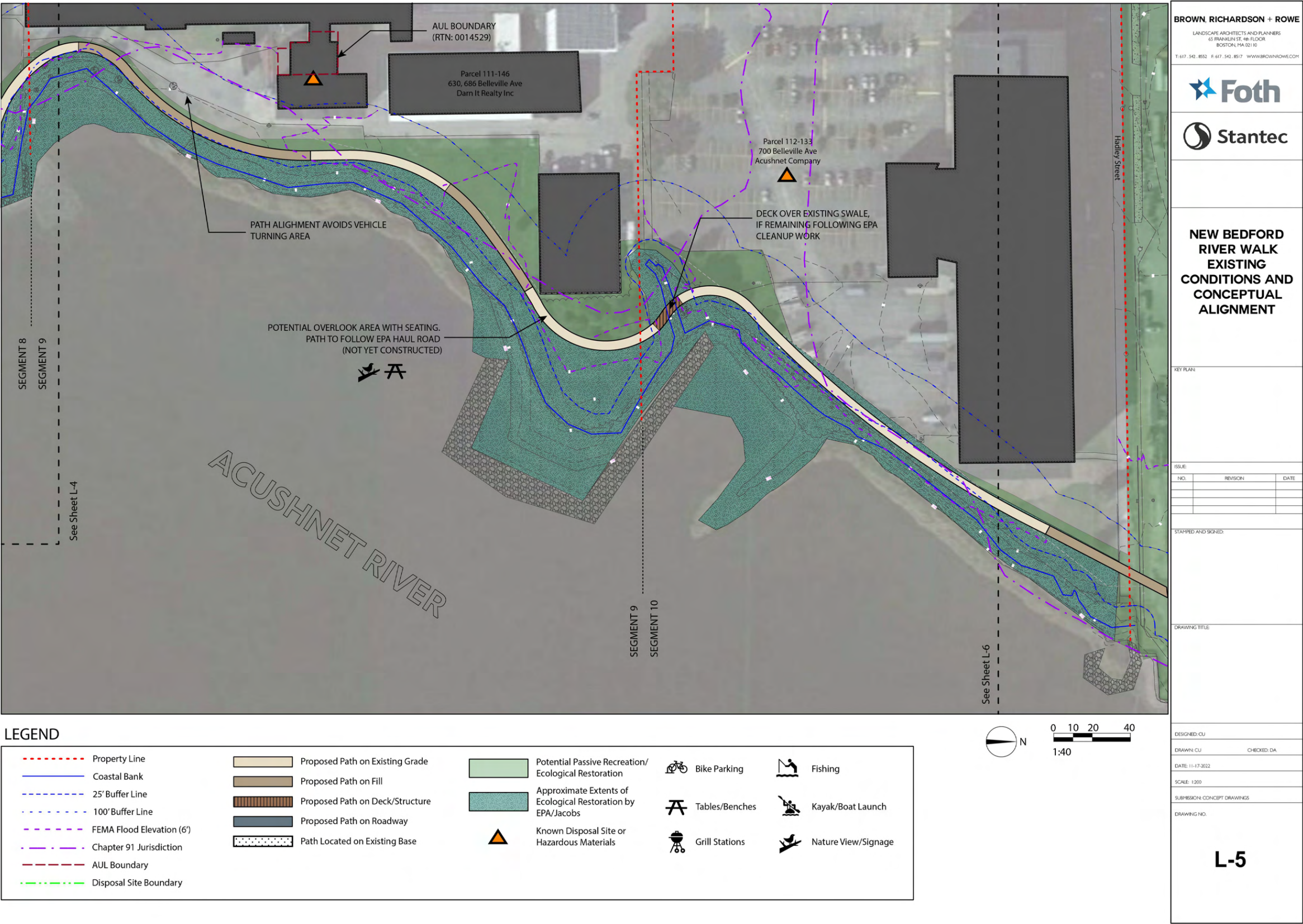
EXISTING CONDITIONS PLAN - SEGMENTS 6 & 7

Full-sized plans available seperately



EXISTING CONDITIONS PLAN - SEGMENTS 8, 9, & 10

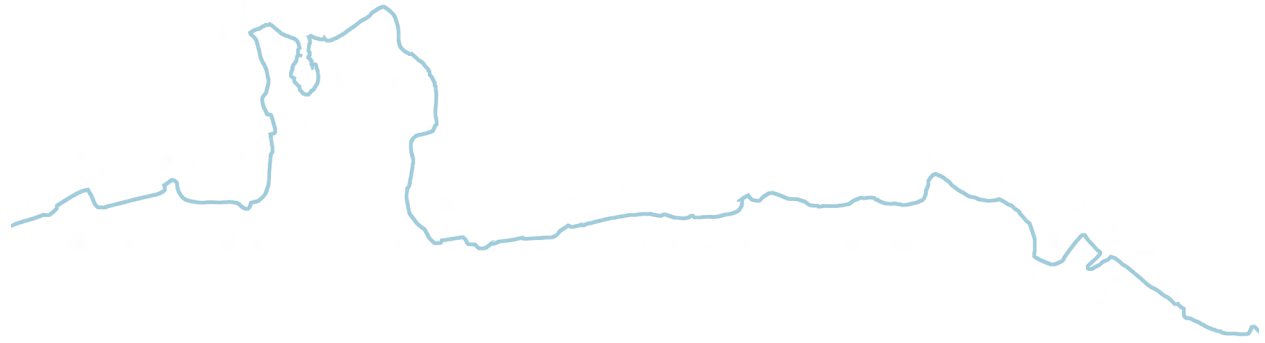
Full-sized plans available seperately



EXISTING CONDITIONS PLAN - SEGMENT 11

Full-sized plans available seperately



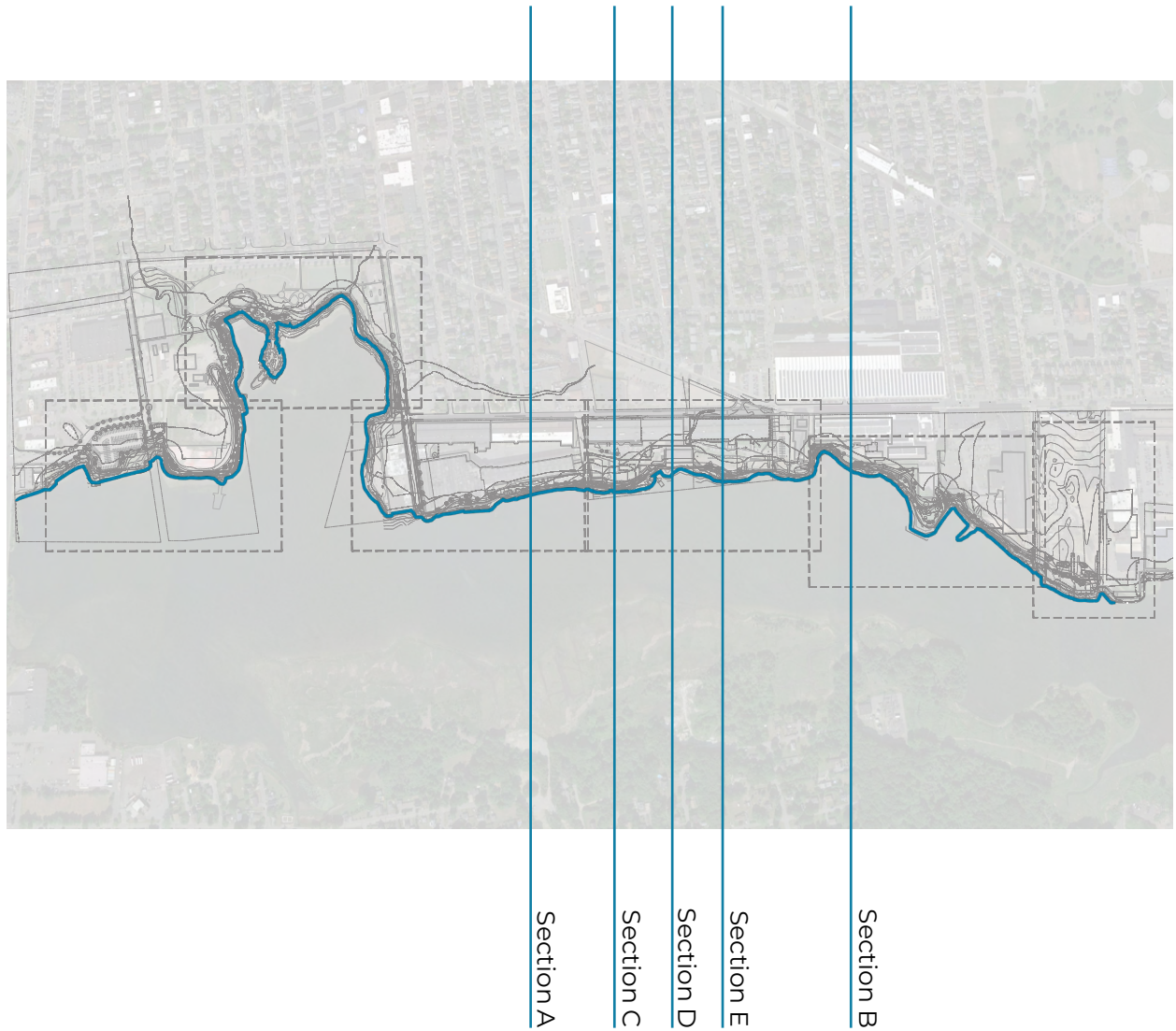


Appendix E

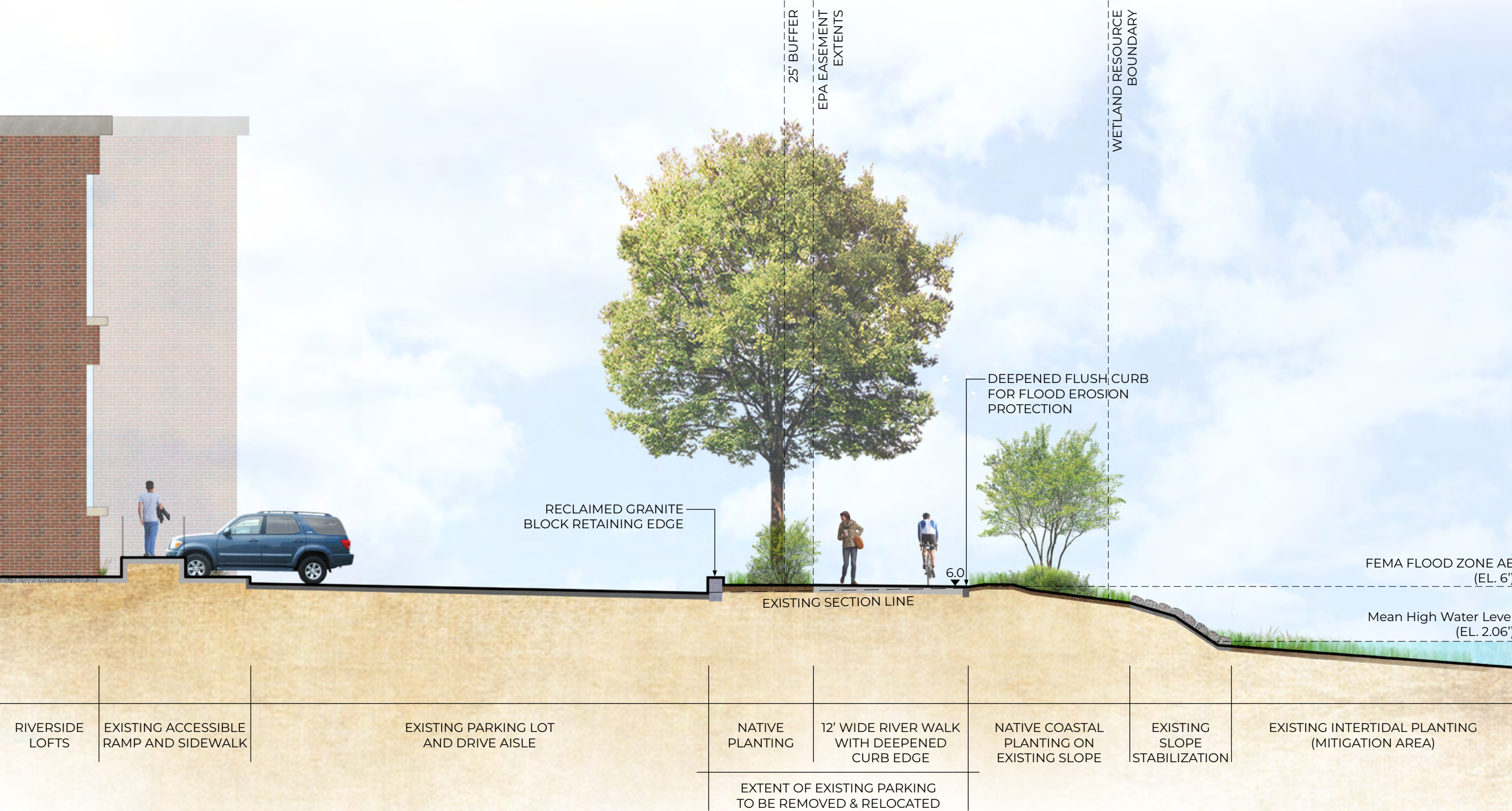
River's Edge Sections

Brown, Richardson + Rowe, Inc.

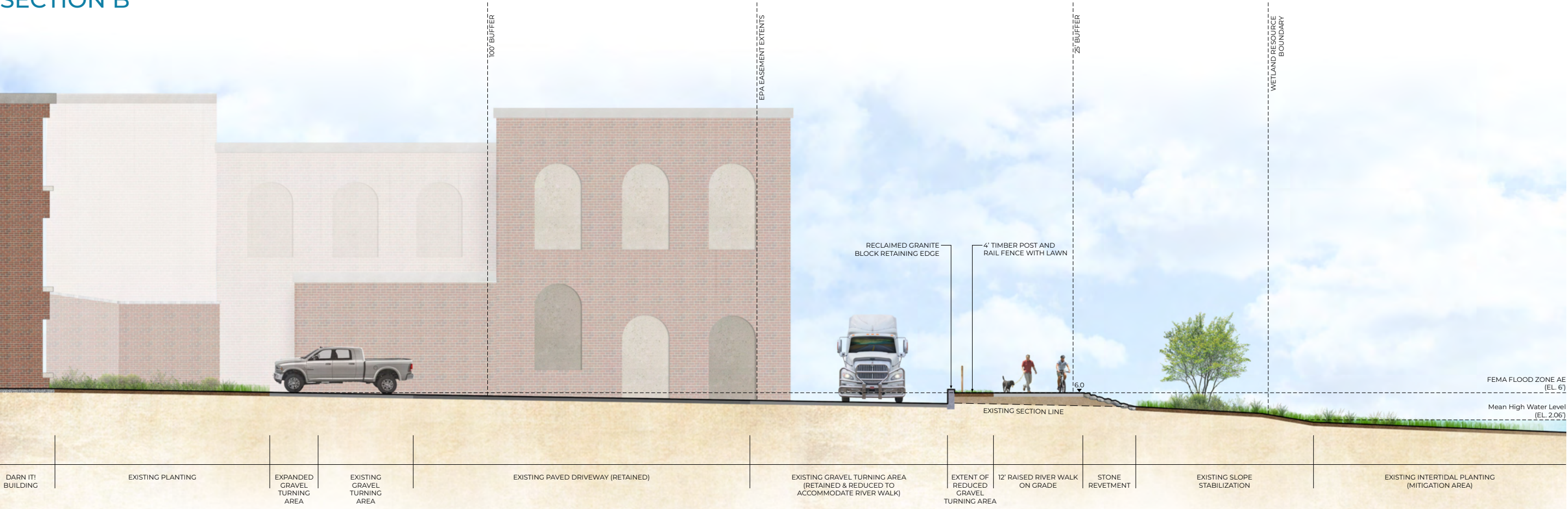
RIVER'S EDGE SECTIONS - OVERALL SITE MAP



SECTION A



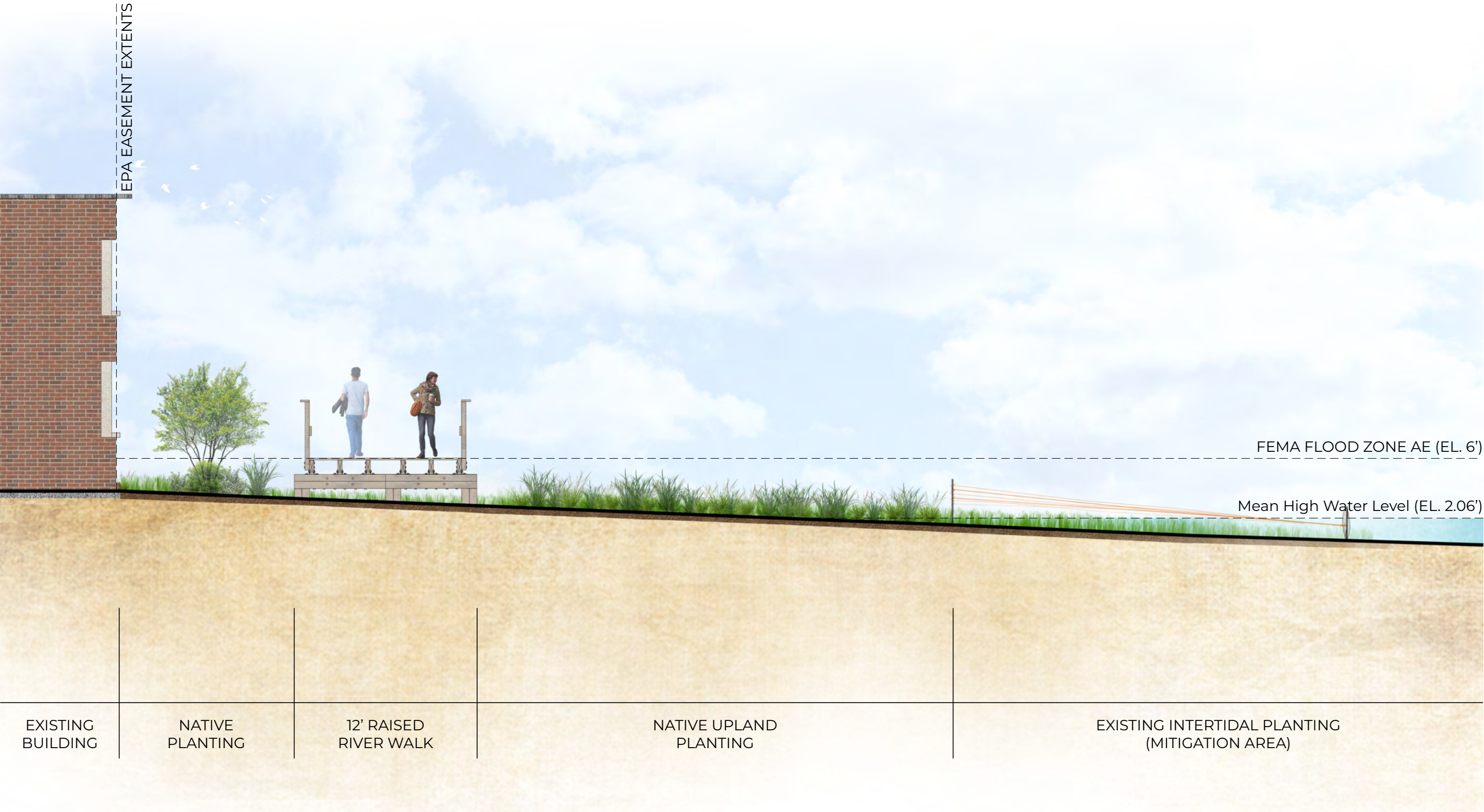
SECTION B



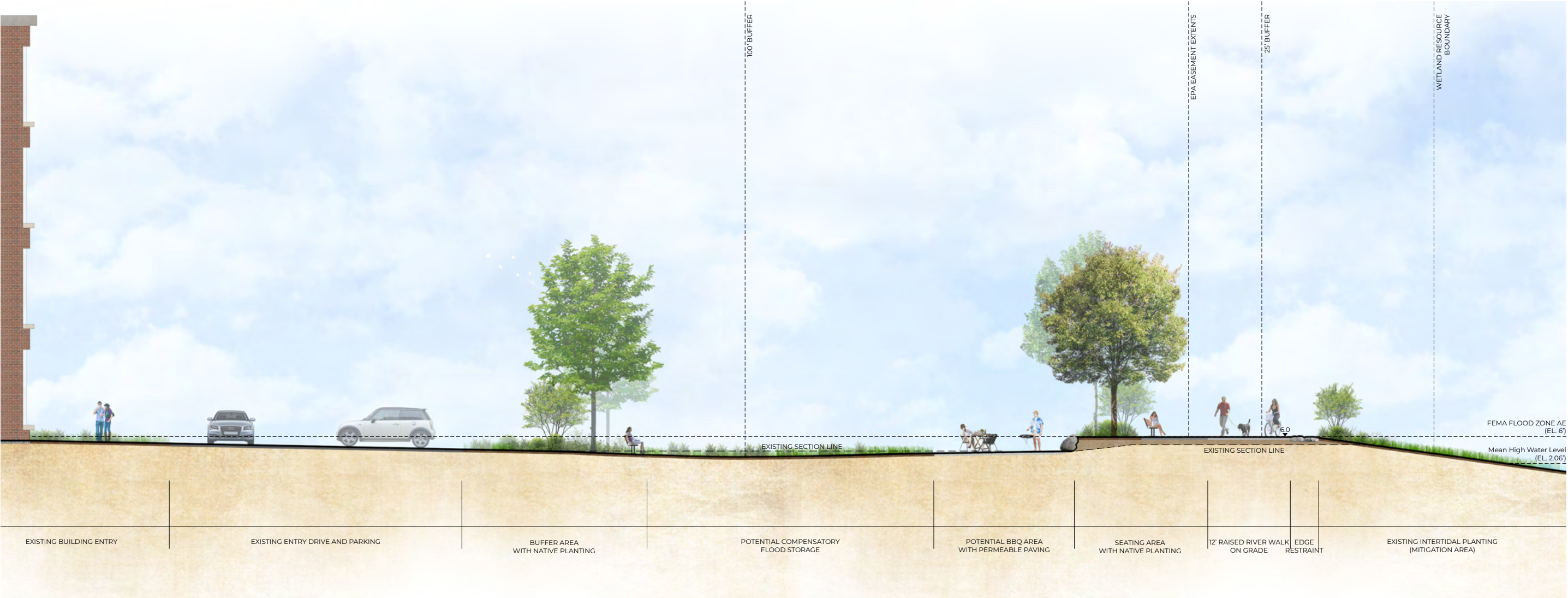
SECTION C

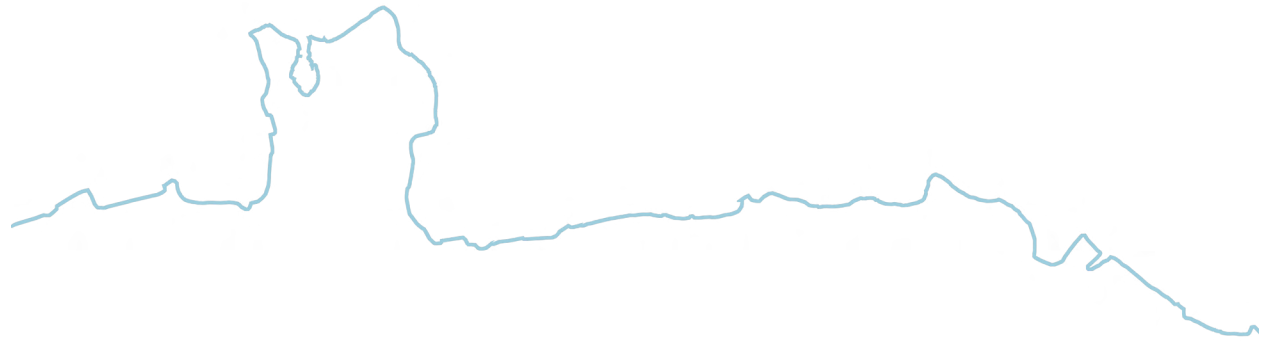


SECTION D



SECTION E





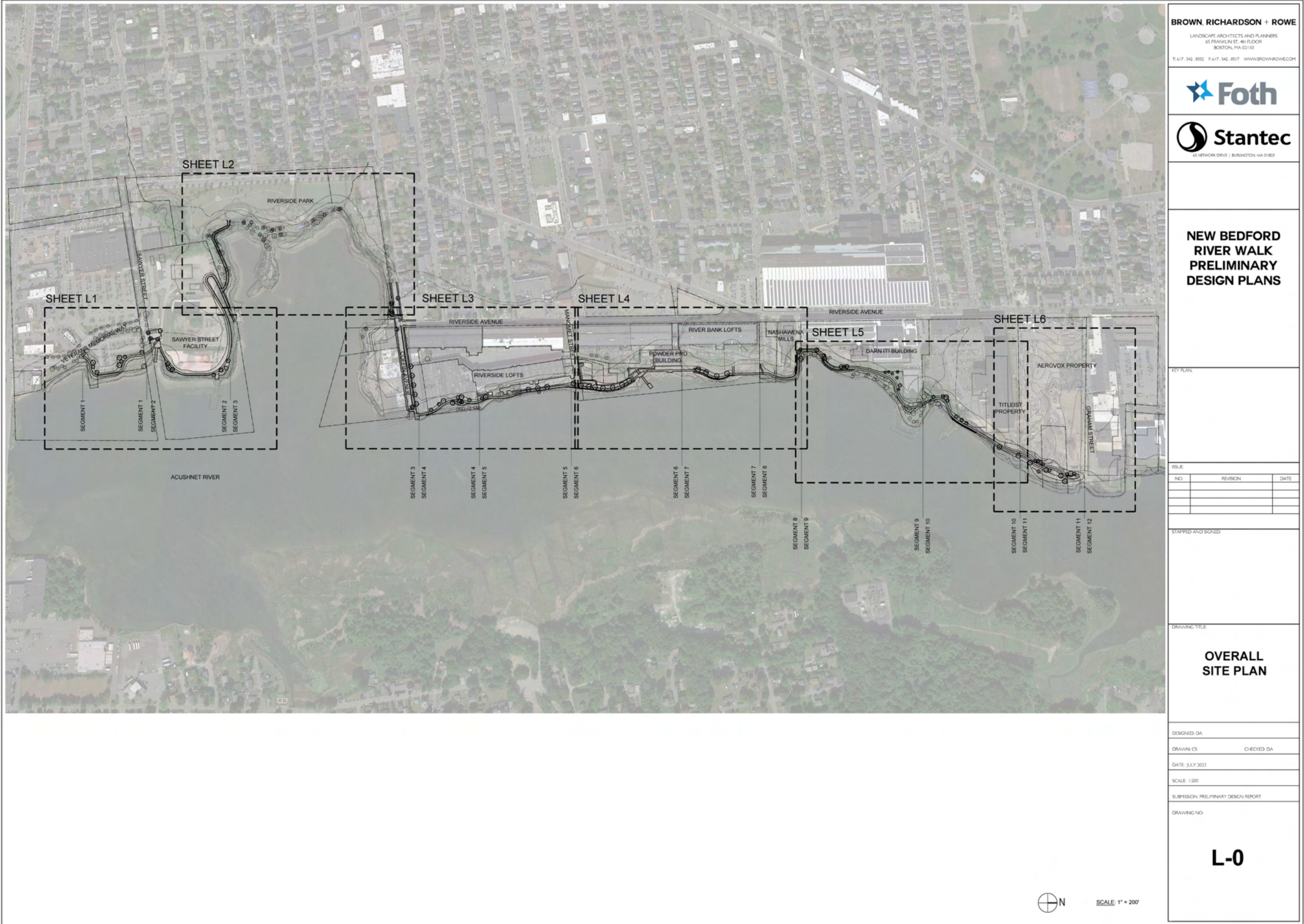
Appendix F

Preliminary Design Plans

Brown, Richardson + Rowe, Inc.

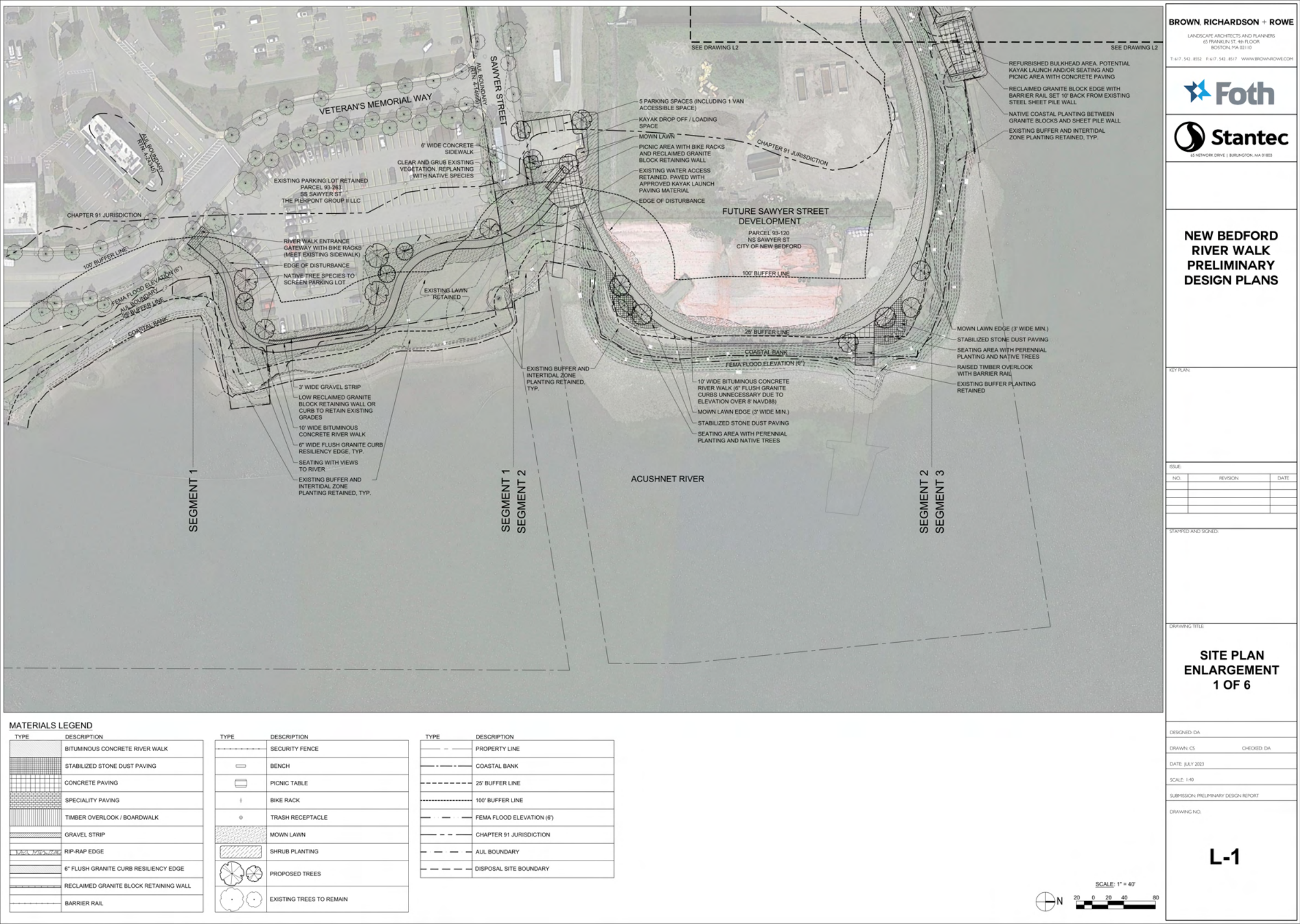
PRELIMINARY DESIGN PLANS - OVERALL

Full-sized plans available seperately



PRELIMINARY DESIGN PLANS - SEGMENTS 1 & 2

Full-sized plans available seperately

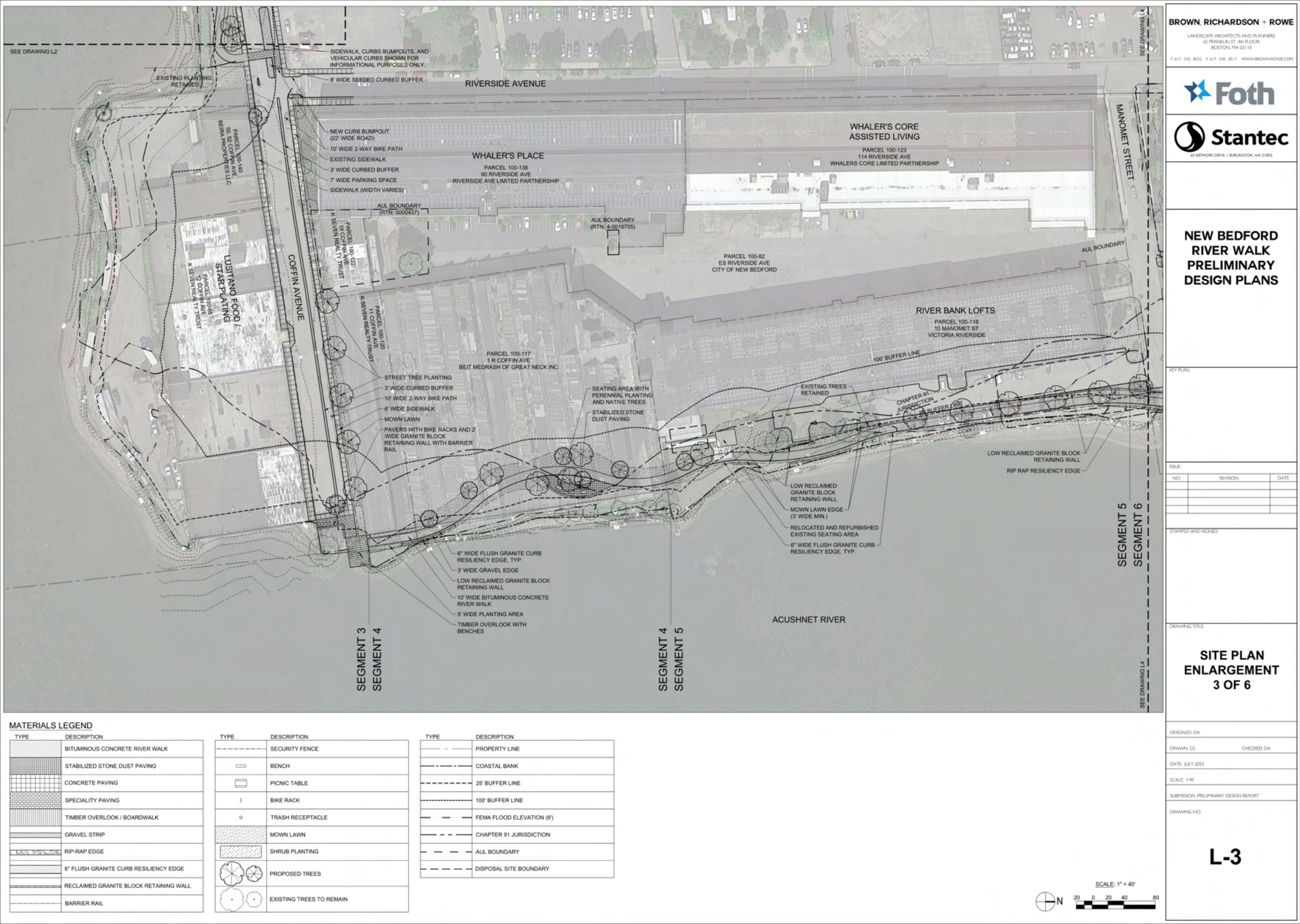


Full-sized plans available seperately



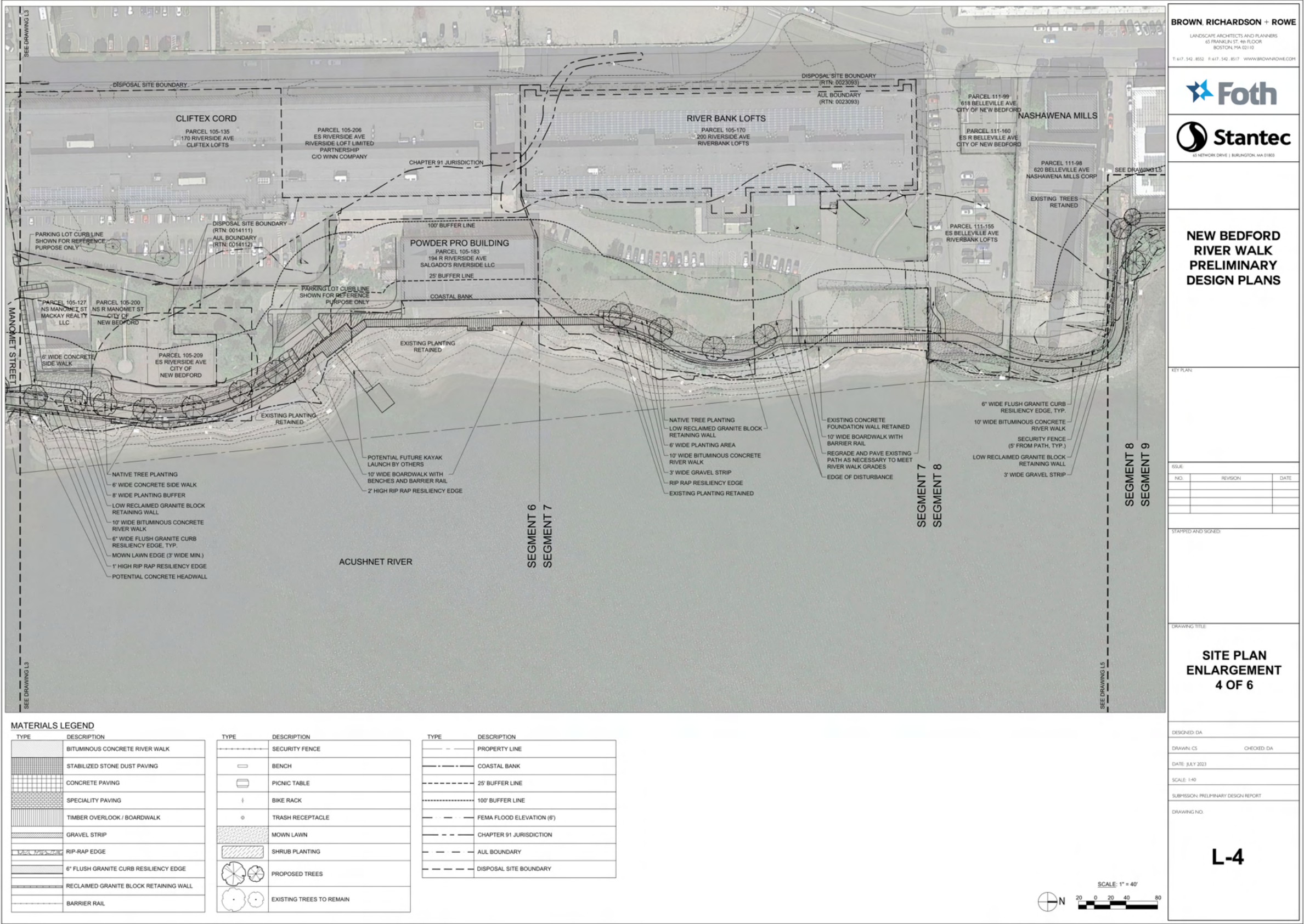
PRELIMINARY DESIGN PLANS - SEGMENTS 3, 4, & 5

Full-sized plans available seperately



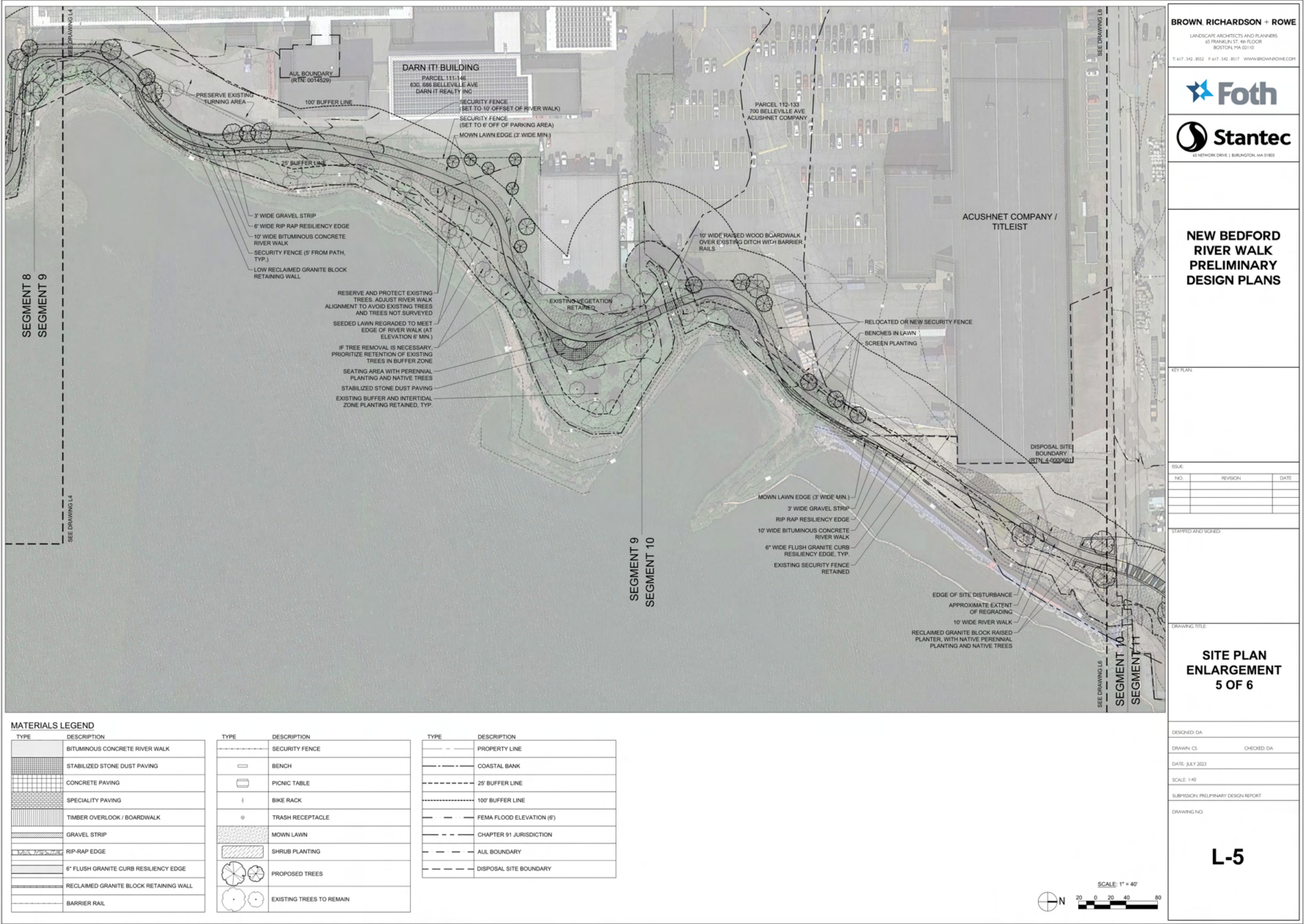
PRELIMINARY DESIGN PLANS - SEGMENTS 6, 7, & 8

Full-sized plans available seperately



PRELIMINARY DESIGN PLANS - SEGMENTS 9 & 10

Full-sized plans available seperately



PRELIMINARY DESIGN PLANS - SEGMENTS 11 & 12

Full-sized plans available seperately

