Acknowledgements

This study was a collaborative effort by CBT and Perkins&Will to synthesize stakeholder concerns, and analyze the environmental and climate change impacts along the diverse riverfront edge conditions. The process involved stakeholder input from a diverse group of advocacy, neighborhood and community groups. Charles River Conservancy, Charles River Watershed Association, Conservation Law Foundation, and A Better City provided critical input, data and support in developing a series of strategies that outlines a regenerative approach to creating a resilient riverfront.

We thank our stakeholders for their valuable input, advocacy and support.

- Allston Civic Association
- Boston Cyclists Union
- Boston Society for Architecture
- Charles River Conservancy
- Conservation Law Foundation
- A Better City
- Livable Streets
- MassBike
- Walk Boston
- Weston & Sampson
- Allston Brighton Community Development Corporation
- Allston Village Main Streets
- Boston Society of Landscape Architects
- Charles River Watershed Association
- 495/MetroWest Corridor Partnership
Building on years of great advocacy...

**BSA Beacon Yards Charette** | Sep 2014

**A Better City At-Grade** | Dec 2014
(see attached), renderings by NBBJ (early 2018)

**Beacon Yards: DeNovo Urbanism** | Dec 2014
By Northeastern School of Architecture / Tim Love

**Elevated Grand Junction by Ari Ofsevit** | Jul 2015

**I90 Allston Placemaking Study** | Dec 2015 - Oct 2016
By The Cecil Group/Harriman with Nelson Nygaard and Stantec
(funded by MassDOT with oversight by MassDOT/Harvard/BPDA)

**River Remarkable Work Group** | starting in 2016
John Shields, Skip Burck, Frank M. Costantino, etc

**Unchoke the Throat design** | Feb 2018
work by Sasaki for WalkBoston and Charles River Conservancy

**BSA Allston Esplanade charette** | Apr 2019

**Riverfront Analysis + Design Exploration** | Sep 2020
By CBT / Perkins + Will
Goals

Establish a cohesive, pragmatic and variable strategy that responds to challenge along the length of the corridor

Effectively connect PDW to the urban system and neighborhoods
BU Bridge/Aggannis/
Grand Junction/
Cambridge - N/Harvard Street

Balance the transportation needs with multiple variables including pedestrian, bicycles, river users, ecology and aquatic life
Baseline for this study

MassDOT Option + All At-grade Option
AGGANIS FOOTBRIDGE UNDER I-90
WIDEN PDW PATH TO SEPARATE PED AND BIKE
GRAND JUNCTION UNDER ELEVATED I-90

Baseline
MassDOT Option
The Concern

Existing Conditions

**PDW Path Adjacent to SFR**
Narrow path (no separation of peds and cyclists) with inadequate buffer from the road

**Hard Edge Close to Western Ave**
River edge becomes quay walls as it gets closer to Western Ave

**Disconnected from the city**
Bike and ped cannot connect back to the city through BU Bridge

**Multi-model Transportation**
BU Bridge, Grand junction and the PDW path stack each other

**Lookout**
There are scattered lookout where people can stop
Nature of Opportunity
Nature of Opportunity

Complete the challenging link along Charles River
Nature of Opportunity

Restore the Rivers’s Edge Ecology
Nature of Opportunity

Connect to the City
Nature of Opportunity

Build 21st Century Infrastructure

Liberty Bridge
Greenville, SC

Broad Canal Walk
Cambridge, MA

Lakefront Trail
Chicago, IL

East Bank Esplanade
Portland, OR

East River Greenway Proposal
New York, NY
Transportation and Ecology can co-exist
Restoring River’s Edge Ecology

**Analysis**
- Evaluate existing natural systems
- Challenges of existing infrastructure systems
- Impacts of climate change
- Diverse edge conditions

**Strategies**
- Tool kit of natural strategies
- Case studies

**Exploration**
- Framework of guiding principles
- Propose natural strategies for diverse edge conditions
- Framework for connectivity
- Establish ecosystems that promote biodiversity and enhance ecology
Analysis

Plans

• Understand environmental issues and evaluate existing natural systems
• Challenges and opportunities to enhance ecology and establish aquatic habitat
• Understand the limitations and challenges of existing infrastructure
• Evaluate the impact of climate change
• Analyze the diverse edge conditions and experential qualities
• Identify shallow areas in the river bed to establish aquatic habitats
• Understand natural topography and drainage patterns
• Identify areas with steep slopes that cause erosion and sedimentation in the river bed

Challenges + Opportunities

Isobaths (f)

1 3 6 9 12 15
Topography

Challenges + Opportunities

• Identify ideal locations to propose BMPS to mitigate stormwater and flooding issues

• The low-lying areas of Allston Landing and the Enterprise Research Campus are vulnerable to flooding

• Identify areas that are vulnerable to flooding and projected flood elevations

Elevation (f)

0 6 12 18 24 30 36 42
Analysis

Infrastructure

Challenges + Opportunities

• Improve overall water quality to support aquatic habitat & biodiversity

• Collect and treat discharge from CSO and remove pollutants prior to entering the Charles River

• Introduce BMPS to treat stormwater runoff from roadways and reduce pollution discharge into the river

Key

- BWSC Outfalls
- CSO Outfalls
- DCR Outfalls
- Monitoring Station
- Sub-watersheds
- Underground Culverts
- Pollution + Sediment
1% Annual Flooding

Challenges + Opportunities

• Limited storage capacity to capture and treat 1”-5” storm events

• Inland flood issues anticipated due to climate change impacts

• Address the impacts of climate change and make the river resilient by increasing flood storage along riverbanks

2070 0.1% Inundation Depth

<table>
<thead>
<tr>
<th>Depth Range</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 - 1 ft</td>
<td>light blue</td>
</tr>
<tr>
<td>1 - 2 ft</td>
<td>blue</td>
</tr>
<tr>
<td>2 - 3 ft</td>
<td>dark blue</td>
</tr>
<tr>
<td>3 - 4 ft</td>
<td>light blue</td>
</tr>
<tr>
<td>4 - 5 ft</td>
<td>blue</td>
</tr>
<tr>
<td>5 - 10 ft</td>
<td>dark blue</td>
</tr>
</tbody>
</table>

Stormwater Flooding
Ecology & Habitat

Challenges + Opportunities

• Limited width for trees and shrubs that prevent erosion along steep slopes

• Invasive and nuisance species such as Japanese knotweed that do not enable biodiversity

• Historically important fish habitat has been drastically reduced

• Richness of species is constrained by compacted, barren soils

• Promote a stable tree canopy to provide shade and mitigate the heat island effect

Key

- Developed Open Space
- Tree Cover
- Shrub Cover
Surface Temperature

Challenges + Opportunities

• Roadways immediately adjacent to river intensify the heat island effect

• Additional pavement, hardscape, and buildings developed for Allston Landing will exacerbate temperatures

• Higher river temperatures can stress the ecosystem, resulting in toxic algal blooms and fish die-off

Modeled Air Temperature°F

July / August 2019

91 90 89 88 87 92 93 94 95 +95
Analysis

Edge Conditions

Challenges + Opportunities

• Significant erosion issues along rip rap edge, mixed in with asphalt pavement

• Steep riverbanks & lack of plants with strong roots increase erosion issues

• Limited width to incorporate multi-modal pathways and stormwater treatment strategies

• High volumes of untreated pollution discharge directly into the river bed

Key

- Orange: Granite Retaining Wall
- Green: Eroded Naturalized Edge
- Red: Road Immediately Adjacent
- Yellow: BSWC Outfalls
Analysis

Section A

- Insufficient width to accommodate shared-use path and trees
- Steep slopes with high erosion
- CSO discharges directly into the river

Section B

- CSO discharges directly into the river
- Steep slopes with high erosion
Analysis

Opportunities for pretreatment and floor storage for resiliency

Shallow river depth presents opportunities for habitat creation
Analysis

Stormwater discharges from roadways directly into the river

Lack of armored edge to prevent erosion and stabilize slope
Analysis

Open Space is isolated between vehicular and rail infrastructure.

The PDW Path, Grand Junction Path, & BU Bridge are all at different heights.
Strategies

Tool Kit

• Create a toolkit of landscape strategies to create a living shoreline
• Understand the comparative benefits and impacts of each intervention
• Draw upon knowledge gained from preexisting examples and precedents
Naturalized Edges

- Living Shoreline
- Living Shoreline with Edge
- Floating Wetland
- Habitat Bench
- Stabilized Shoreline
- Earth Berm
Tool Kit

Constructed Edges

- Retaining Wall with Stabilization
- Green Retaining Wall
- Planted Steps
- Cantilevered Boardwalk
- Floating Boardwalk
- Suspended Boardwalk
Exploration

Sections

• Propose a series of landscape systems that mitigate the impacts of pollution discharge and improve environmental conditions
• Address the impacts of climate change to create a resilient riverfront
• Re-imagine the river’s edge as a natural living shoreline of rich and diverse ecosystems
• Introduce robust circulation systems and open spaces connecting surrounding communities to the riverfront
Exploration

Section A

Cantilevered path allows adequate room for pedestrians and cyclists

Tree verge separates PDW Path from Soldiers Field Road

Retaining Wall with Stabilization

Key
Exploration

Section B

- Living Shoreline to reduce erosion
- Stormwater management facilities and storage for storm events
- Linear open spaces and circulation systems

Strategies

Stabilized Shoreline

Planted Terraces

Key
Exploration

Section C

- Shallow shelf creates enhanced aquatic habitat
- Constructed wetlands to treat outfall discharge and improve water quality
- Fully separated pedestrian and cycling paths where width allows

Key

- Constructed wetlands to treat outfall discharge and improve water quality
- Shallow shelf creates enhanced aquatic habitat
- Fully separated pedestrian and cycling paths where width allows

Strategies

- Stabilized Shoreline
- Cantilevered Boardwalk
Exploration

Section D

- Restored natural systems to create aquatic habitats
- Flood storage capacity and stormwater filtration
- Raised berms shield riverfront from roadways

Key

- Living Shoreline
- Elevated Boardwalk

Strategies
Exploration

Section E

- Mitigate erosion and sediment loading
- Reduce nitrogen and phosphorus loading by treating stormwater runoff

Strategies

Living Shoreline

Green Retaining Wall + Bioswale

Key
Exploration

Section F

Habitat bench protects aquatic microhabitat

Stormwater treatment structures to collect runoff from roadways

Key

Habitat Bench

Cantilevered Boardwalk

Strategies
Exploration

Section G

Elevated Boardwalk provides pedestrians with water intimacy

Vegetated fencing shields riverfront from roadway

Key

Strategies

Elevated Boardwalk

Green Retaining Wall
Exploration

Section H

Bioswale filters stormwater runoff from roadways

Vegetated fencing shields riverfront from roadway

Strategies

Green Retaining Wall

Cantilevered Boardwalk

Key
Section I

Floating wetlands improve aquatic habitat and water quality

Berm shields river from roadway and provides connections to BU Bridge and Grand Junction Path

Key
Connectivity Framework
GRAND JUNCTION TO PDW PATH
RIVERBANK RESTORATION
BUFFER BETWEEN PATH AND ROAD
CONNECTION TO WEST STATION
BU BRIDGE TO PDW PATH
EXPANDED OPEN SPACE
CONNECT NORTH HARVARD STREET TO RIVER
BRIDGE OVER PDW PATH AND COMMUNITY
AVOID STREET WALL; MITIGATE NOISE
AIR-RIGHT PARCEL

Framework

Design Considerations
Framework

Existing Riverfront
Framework

Proposed Riverfront
Framework

Throat Condition | Alternative 1A
Framework

Throat Condition | Alternative 1A
Throat Condition | Alternative 2
Agganis Connection | All At-Grade Option
Next Steps

- **Transparency in process**: put all the variables, constraints, details on the table
- **Trans-disciplinary approach**: Instead of a siloed approach, holistic approach of a systems approach for a shared benefit
- **Ownership**: Amongst all stakeholders, City agencies have the opportunity to champion and create a unifying platform
- **Advocacy and Funding**: Allocating a committee and funds to support stakeholder groups to participate in the planning process