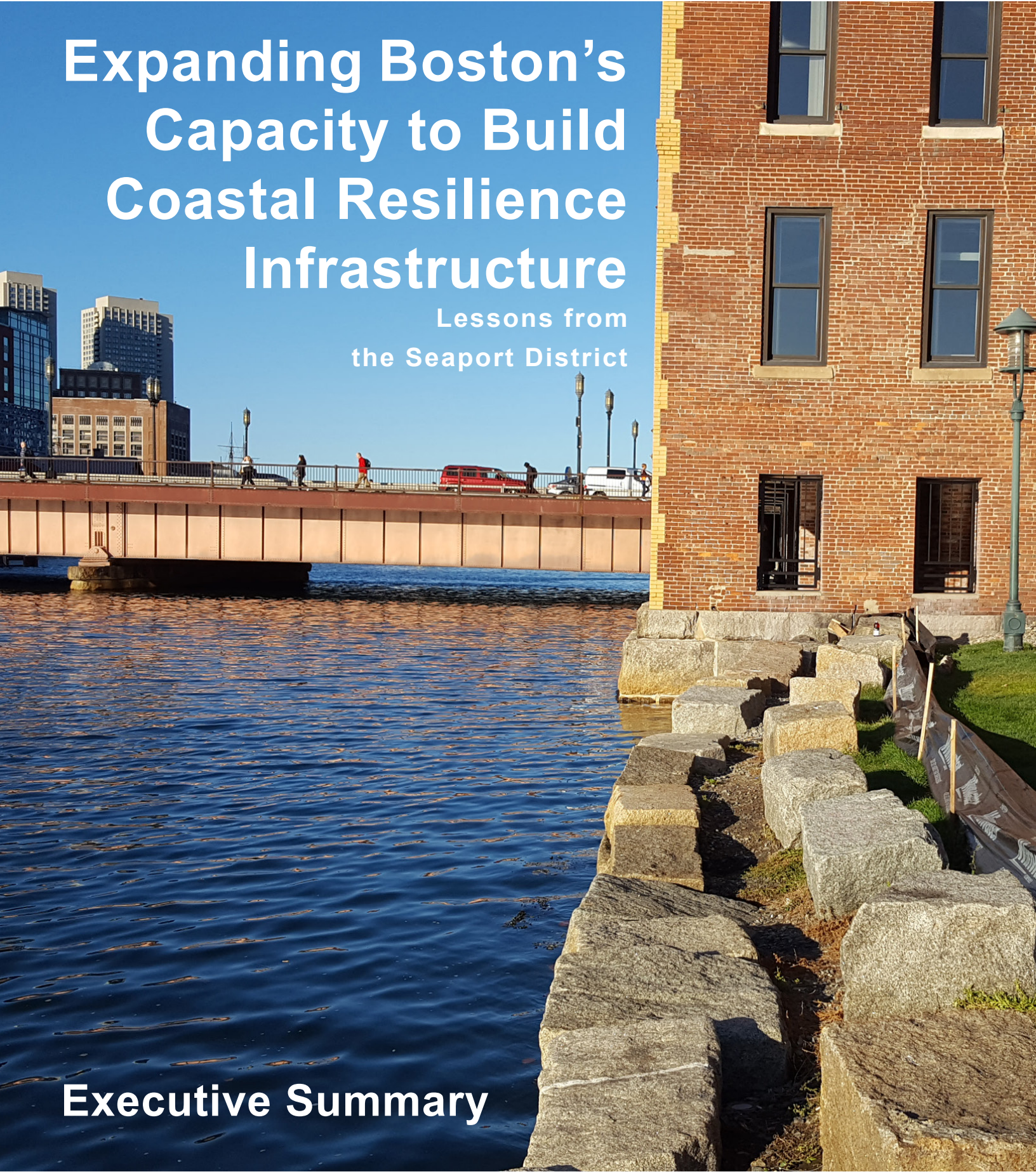
Expanding Boston's Capacity to Build Coastal Resilience Infrastructure

Lessons from the Seaport District



Executive Summary

BOSTON Green Ribbon COMMISSION

ARCADIS Design & Consultancy for natural and built assets

EXPANDING BOSTON'S CAPACITY TO BUILD COASTAL RESILIENCE INFRASTRUCTURE

LESSONS FROM THE SEAPORT DISTRICT

Report prepared by:

Carly A. Foster, AICP, CFM
Project Manager
Arcadis U.S.

Trevor Johnson, AICP
Senior Resilience Planner
Arcadis U.S.

With support from:

John Cleveland
Executive Director
Boston Green Ribbon Commission

Bud Ris
Senior Advisor
Boston Green Ribbon Commission

Project sponsored by:

Boston Green Ribbon Commission

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EXECUTIVE SUMMARY

Climate Ready Boston, completed in 2016, demonstrated that Boston is facing serious threats from sea level rise and climate-related hazards. In the face of these challenges, the City is taking proactive steps to adapt the city's buildings, infrastructure, and neighborhoods to the impacts of climate change.

As part of these efforts, the Boston Green Ribbon Commission (GRC), a group of business, institutional, and civic leaders in Boston working to develop shared strategies for fighting climate change, commissioned a project to study and refine implementation pathways for coastal resilience with a focus on the Seaport District in South Boston. This Project, *Expanding Boston's Capacity to Build Coastal Resilience Infrastructure, Lessons from the Seaport District*, builds on strategies devised and recommended though *Coastal Resilience Solutions for South Boston*, published in October 2018. The focus of the analysis is on areas along Fort Point Channel and Seaport Boulevard where action is required either by 2025 or 2030. Nevertheless, the study has been conducted, and several recommendations developed, with the broader South Boston strategy in mind, as well as other waterfront districts in Boston. The Project was undertaken in close consultation with the GRC's partners at the City of Boston.

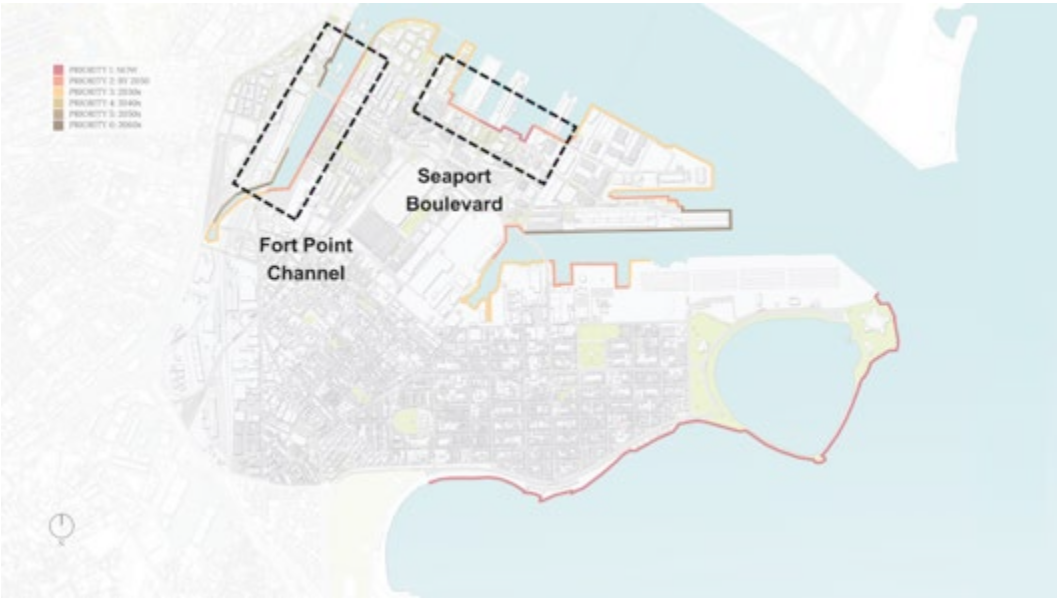

Figure 1 Project study area (South Boston) and key focus areas (Fort Point Channel and Seaport Boulevard)

This study emerges from the recognition that the need to adapt Boston's coastline to rising seas and extreme storms is both extremely urgent and challenging. The urgency results from flooding that already occurs today and from the accelerating pace of sea level rise, which will increase the reach of high tides and storm surges further inland over the coming decades (See Table 3 in Chapter 1 and Appendix D for the target flood elevations in these areas). The challenges are related in part to the lack of clear and proven governance frameworks for implementing solutions at the scale and speed necessary to mitigate risk of significant damage and disruption. The City has been a leader in the process of planning for climate change and its impacts, but now must grapple with the range of governance, funding, and

regulatory challenges raised by the process of designing, permitting, constructing, operating and maintaining, and ultimately adapting flood mitigation investments. Table 1 outlines initial questions that prompted the GRC to initiate the Project.

Table 1 Initial questions that prompted this Project

Guiding question	Why this is important
What actions are already underway by individual property owners and the City of Boston in the study area?	The real estate market in the study area is highly dynamic, and some property owners are working to make climate adaption investments at the site- and building-scale. Understanding ongoing work is a necessary starting point for how implementation of coastal flood mitigation can be further accelerated. It will also be important to understand to what extent these actions are being taken in alignment with City's goals and direction to date, and drivers for such.
What governance, funding, and regulatory changes are needed to help advance individual and/or collective actions toward implementation of planned coastal flood risk projects?	Numerous studies demonstrate that governance, funding, and regulatory frameworks for proactively investing in major flood mitigation infrastructure (without the availability of major federal expenditure) still need development, particularly for district-scale solutions that span multiple public and private property owners.[1] Public and private stakeholders must work collaboratively to leverage existing frameworks, as well as devise new and evolved approaches for effectively and efficiently delivering flood mitigation projects.
What incentives or approaches would help create a coalition of South Boston stakeholders committed to moving forward with the most urgent projects?	Implementation of district-scale flood protection in South Boston and across the city will require significant participation and contributions by stakeholders, such as private property owners, and State and Federal entities whose responsibilities may lie outside of the City's sphere of control. Successful implementation will require these stakeholders to work in partnership with the City.

The initial goals included: update progress on implementation; build support for action among key stakeholders; and provide recommendations to the City for funding, governance, and regulatory approaches for urgent actions South Boston. The views expressed in this report are solely those of the Boston Green Ribbon Commission and the report authors.

Boston's Resilience Roadmap

Since the release of *Climate Ready Boston* in late 2016, the City has been aggressively analyzing potential impacts and planning for climate change. This Project was not completed in a vacuum and builds on studies in progress and recently completed, as described in Figure 2.

[1] Refer to Bibliography for related studies that were reviewed for this Project.

Climate Ready Downtown and North End
(target release early 2020)

Climate Ready Dorchester*
(target release late 2020)

Greater Boston Research Advisory Group & Climate Ready Boston

Comprehensive citywide vulnerability assessment and climate adaptation plan

Coastal Resilience Solutions for East Boston and Charlestown

First neighborhood scale flood vulnerability study and proposal for conceptual floor mitigation solutions

UMASS Boston Sustainable Solutions Lab Studies

Detailed evaluation of governance and funding approaches for coastal resilience solutions. Created robust set of options drawn on to inform this study

Resilient Boston Harbor Vision

Mayor Walsh's comprehensive vision for coastal resilience, knitting together long-term approaches to provide flood protection through a network of new waterfront open space

Coastal Resilience Solutions for South Boston

Second neighborhood scale vulnerability study and proposal for conceptual flood mitigation solutions. Explored funding, governance, and regulatory options. The proposed coastal resilience solutions and implementation tracks are foundation for this study

Coastal Resilient Design Standards & Guidelines

Provides guidance on and standards coastal flood risk mitigation measures in the city's public rights of way

Implementing District-Scale Solutions for the Border Street Area of East Boston

Study commissioned by City to study financing and funding options for implementation of coastal resilience solutions in East Boston. Provides detailed analysis of funding and financing approaches the City might use to advance project delivery.

Coastal Flood Resilience Design Guidelines

Provides design guidance and best practices for flood risk mitigation improvements to new and existing buildings

*Study is ongoing; recommendations have not been reviewed for this Project

Figure 2 Summary of studies that have formed the starting place for and informed this Project

Study Process

The Project began in April 2019 and concluded in February 2020. The process involved background analysis and research on nationwide governance and funding models for resilience project implementation, engagement with property owners, the Green Ribbon Commission, and City of Boston officials, and development and refinement of a series of hypotheses designed to generate final recommendations. Figure 3 outlines the steps involved in the study.

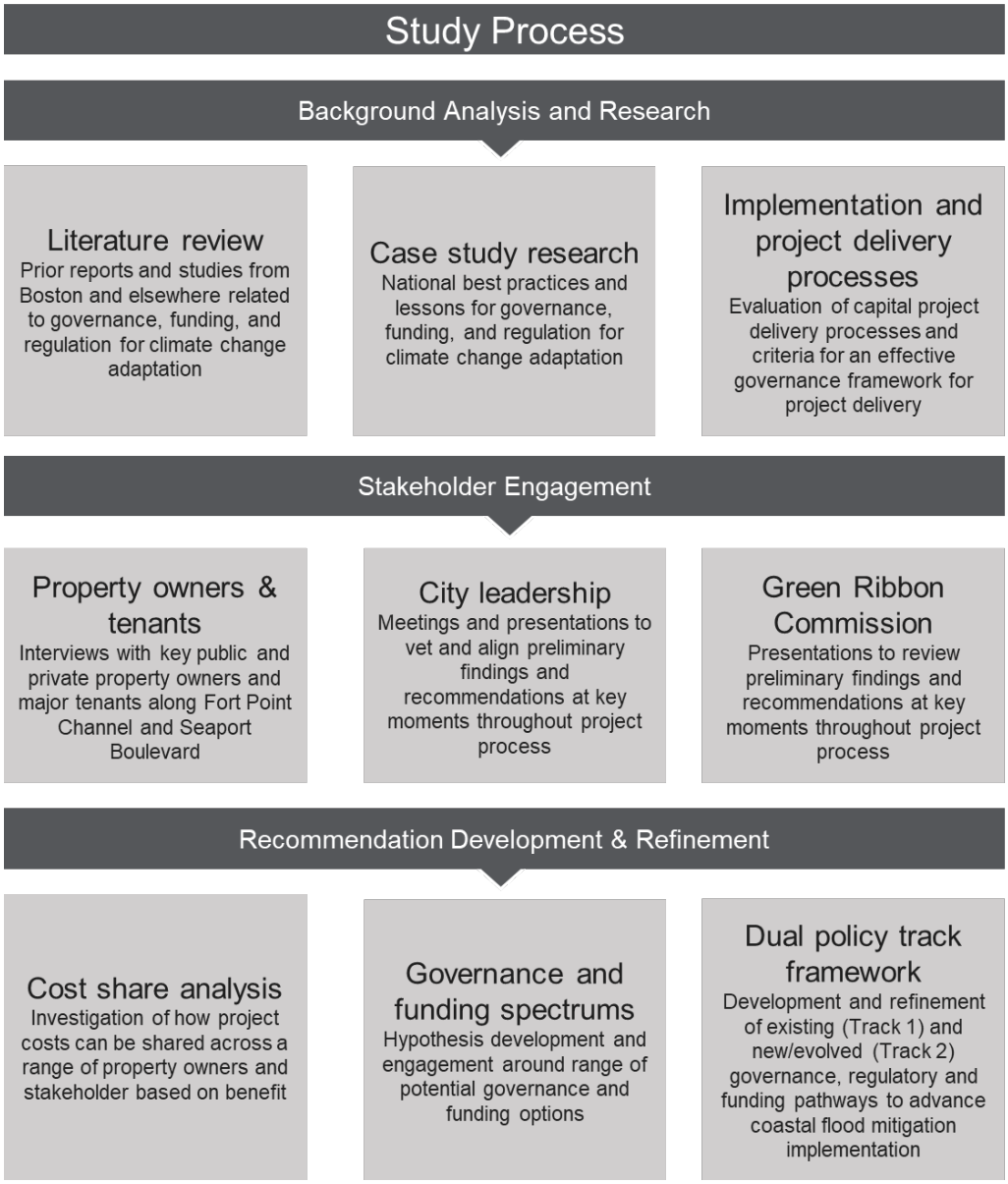

Figure 3 Summary of process and steps followed during this Project

Key Insights

The analysis, engagement, and refinement of hypotheses through this Project led to several key insights related to how the City can best advance project delivery along Fort Point Channel and Seaport Boulevard. In many cases, these insights relate to needs that likely exist on a citywide scale and thus have broader applicability beyond the specific study area that was the focus of this Project.[2] These findings were based both on interviews with property owners, particularly those with properties located on the waterfront who would need to directly contribute to district-scale flood mitigation solutions with capital investments, and on other research, analysis, and meetings conducted for the Project.

Property owners and tenants are aware of increasing flood risk in the Seaport District but are not always sure how best to respond

While some property owners are moving forward to implement site-specific solutions and/or undertake exploration of their options, others expressed some confusion and/or lack of awareness about target elevations and other design or engineering standards for flood protection, both in the short-term and the long-term. This confusion may be a barrier to unlocking investments needed for flood mitigation. Some property owners also expressed a desire to know more about the plans of various City and State agencies and were hesitant to make investments without confirmation of those plans. Given that the Seaport District has some of the highest rates of development and investment capacity in Boston, this concern will likely apply to areas with less development activity in other parts of the city.

There is broad consensus among stakeholders engaged for this Project on the need for a collective governance and funding solution that is both fair and equitable

Some property owners in the Seaport District appear eager to learn what options are available for protecting their assets and expressed a willingness to contribute to such a solution, but articulated concerns over how investments across contiguous properties and district-wide will be coordinated. Most property owners interviewed would prefer a funding approach that is fair, where property owners contribute to shoreline investments proportional to the benefits they receive. Nevertheless, there was also recognition from the majority of those interviewed of the need to account for equity and ability to pay. It is unclear the extent to which this finding will apply citywide, again given the scale of development and investment taking place within this part of the city.

It is likely possible to deliver urgent projects (those planned for completion by 2025) along Fort Point Channel by maximizing the effectiveness of existing governance, regulatory, and funding approaches – although increased coordination will be essential

Established policy frameworks can fulfill most basic needs of site-by-site project delivery and some cross-property coordination for the most urgent projects (based on the delivery schedule outlined in *Coastal*

[2] While feedback the Project team received from interviews cannot be assumed to be applicable citywide due to the uniqueness of the study area and relatively small number of very specific stakeholders engaged (major tenants and property owners who would have flood protection infrastructure installed across their properties per current City plans), parts of the research and key findings may be transferable to other parts of the city, and this is identified where appropriate within this report.

Resilience Solutions for South Boston), such as is occurring on the 100 Acres area along Fort Point Channel. Progress on these projects could be enhanced, however, by increasing internal City coordination and ongoing communication with stakeholders, as well as development of more detailed design and performance standards for coastal flood mitigation. This finding is expected to apply citywide; it's likely impractical to expect new governance and regulatory approaches to be available before construction on the most urgent projects must begin, forcing reliance on current available processes. Costs associated with planned urgent projects in other districts are expected to further stress current funding and financing approaches, also pointing to a need to evolve, refine, or expand those approaches, as described below.

New or evolved governance, funding, and regulatory approaches will need to be developed over the next three-to-four years to advance project delivery and district-scale coordination to stay on the desired implementation schedule for South Boston projects planned beyond 2025. This need will only deepen with consideration of the citywide coastal resilience strategy.

Starting in approximately 2023,[3] the funding need and necessity for large scale coordination of projects and stakeholders in South Boston will require an intentional framework to coordinate, raise, and distribute funds and build, manage, and operate a network of flood mitigation investments across the district. Such a network of flood protection will be most successful[4] with a governance structure that extends beyond the limits of specific electoral and programmatic cycles and that can effectively manage and coordinate planning, funding collection and distribution, engagement, project delivery, operations and maintenance, and future adaption across the city.

A preliminary analysis conducted as part of the Project indicates the possibility that cost share for flood mitigation approaches may be broadly and sustainably distributed across a range of public and private stakeholders using a model that assesses accrued benefits from flood protection over time. Expansion of such a model citywide could also support equity and affordability for individual payers.

In addition, the Project concludes that while current environmental and land-use regulations do not pose a substantial hinderance to flood mitigation investments in the near-term –primarily because near-term investments do not necessitate fill in waterways— in the longer-term regulatory reforms will be needed to advance, guide, and enforce delivery of district-scale protection that is consistent with established concept plans, Mayor Walsh's Resilient Boston Harbor Vision, and performance-based design standards.

Continuous, focused engagement with stakeholders with the ability to help facilitate or curtail implementation is needed to maximize available resources and collective action

Regardless of how the City proceeds with its governance, funding, and regulatory approaches, there remains an overarching need for consistent and ongoing engagement with property owners and other entities that may have a role in implementation at any scale, including State and Federal agencies and

[3] Based on a schedule of expenditure developed based on the *Coastal Resilience Solutions for South Boston* implementation roadmap described in subsequent sections of the report

[4] Success as defined by flood infrastructure project implementation in alignment with *Coastal Resilience Solutions for South Boston* implementation roadmap and Section 3.4 Criteria used to guide recommendation development.

authorities, such as Massport and the MBTA. The necessarily rapid pace of implementation being pursued by the City combined with the diversity of public and private property ownership along the coastal edge means that implementation will ultimately hinge on collaboration and even partnership between the public and private sectors. In addition, it will be important for the public and private sectors to stay coordinated to assure integration of recommended community benefits (also called co-benefits) with investment in coastal flood risk mitigation infrastructure. While flood risk mitigation may be the primary goal of such investment, the process should also aspire to create a more inviting, equitable, and inclusive waterfront for all Bostonians, which will in turn help generate support for implementation of flood protection. Accomplishing this will require close coordination with property owners, designers and engineers, and continuous feedback loops as plans are refined and implemented over time.

The City needs additional human and financial resources to manage implementation of the City's coastal resilience strategy

Implementation of coastal resilience infrastructure will require the City government to take on a new set of projects and challenges that are not easily absorbed within existing departments and functions given current resource availability. These needs relate to planned investment in South Boston but also to plans for similar investment citywide, starting today and continuing through the 2050s and beyond. The City will need to increase overall capacity and resources within to support project implementation without inadvertently cannibalizing existing resources and capacity from other needs.

Summary of Recommendations

The Project's key findings, case studies, and coordination efforts yielded recommendations along two parallel tracks of action, the first focused on leveraging existing frameworks to complete initial urgent actions and the second to identify opportunities for transformative measures needed to support district-wide, and even citywide, implementation. These recommendations fall within various governance, regulatory, and funding categories of action, and are interdependent in nature. Work on both tracks should begin today so that as funding and coordination needs increase over time, work along the first track can evolve into the second track of necessary actions. Recommendations associated with each track are summarized in Figure 4 and Table 2.

Track 1 recommendations maximize public private collaboration and coordinated action across properties through a site-by-site approach and clear communication of needs and expectations through the adoption of plans and performance-based design criteria. These actions are expected to have benefits beyond the most urgent action areas in South Boston and may help catalyze activity across those who are financially able in other parts of the City. The focus here is largely on waterfront property owners; these stakeholders serve as the linchpin in implementing the most urgent actions in certain parts of South Boston, and also have the capability to take independent action that could align with city needs, reducing the burden on the City to drive implementation alone.

Many of the findings and recommendations from this Project, while based on engagement with a relatively limited number of specific stakeholders and tailored to the unique development market and land-use conditions of the Seaport District, could apply to other areas of the city where coastal flood risk mitigation is planned. The central goal of this study was to examine pathways toward implementation for the most urgent projects along Fort Point Channel and Seaport Boulevard but during the course of the

study it became clear that the approaches with the most potential impact in the study area would be those that also advance implementation across the city. For example, a new senior level cabinet chief focused on climate resilience implementation would necessarily have citywide purview and help lead and coordinate project implementation beyond the Seaport District. This role would also have cascading positive effects in helping shape and refine project implementation policies moving forward over time on a citywide scale. Similarly, the establishment of coastal protection performance standards would be most effective if produced for all flood prone areas of the city's waterfront, though they could be developed over time with the highest priority areas published first. Nevertheless, as part of any effort to pursue the recommendations in this report on broader basis, it is recommended that the City conduct ongoing outreach to a variety of stakeholders to ensure alignment with needs and perspectives that may not have been captured within the scope of this Project.

The key actions recommended under Track 1 include:

- Establish a new senior level cabinet chief focused on climate resilience implementation with resources and capacity sufficient to support a large portfolio of complex projects and programs
- Publicize and adopt Climate Ready Boston district coastal resilience plans (i.e., *Coastal Resilience Solutions for South Boston,* the upcoming *Coastal Resilience Solutions for Downtown and the North End,* the upcoming *Coastal Resilience Solutions for Dorchester,* design criteria from *Coastal Resilience Solutions for East Boston and Charlestown,* and future reports planned for East Boston*)*
- Establish performance and design standards for district-scale coastal protection investments on private property and mandate project consistency with these standards through existing regulations, such as Article 80 Development Review
- Launch the Infrastructure Coordination Committee recommended by Climate Ready Boston. This may be accomplished through a citywide scale focus or through smaller, district or individual project area scale focuses
- Clarify expectations around public-private cost share for coastal flood mitigation projects, especially regarding which elements of the project delivery cycle the City intends to fund and which it anticipates the private sector will need to fund, and to what extent. This same approach may apply to coordination with State and federal investment entities.
- Launch a joint planning process with Massport to refine conceptual flood protection approaches and alignments along Seaport Boulevard
- Pursue agreement (MoUs) with key property owners, including State agencies, to establish and codify roles and responsibilities around cost share, design standards, and operations and maintenance
- Continue to pursue State and Federal funding opportunities, such as the upcoming FEMA Building Resilience Infrastructure and Communities program, to leverage both public and private sources of funding available at the local level
- Ensure the Flood Resilience Zoning Overlay District under development by the BPDA helps promote and is consistent with plans for district-scale flood risk mitigation, and supports implementation across both new construction and substantially improved property

Track 2 recommendations emerged from an appreciation of the scale of investment and action required to complete the district-level strategy on schedule, as well as ensure the system is appropriately maintained into the future. Such a scale requires governance, funding, and regulatory frameworks designed specifically to support and facilitate building, maintaining, and adapting coastal infrastructure within a changing risk context. Execution on key Track 1 recommendations can serve as the necessary foundation to advance Track 2 recommendations. For example, the senior level cabinet chief focused on climate resilience implementation would help lead development and refinement of Track 2 policies and approaches.

The key actions recommended under Track 2 include:

- Use Flood Resilience Zoning Overlay District in concert with established coastal protection performance standards to guide and enforce delivery of district flood risk mitigation with new development. Explore legal viability of Chapter 91 as enforcement mechanism to compel property owner action where no new development is planned and the owner is uncooperative or unwilling to allow flood protection infrastructure across their property.
- Expand the pilot cost share analysis undertaken for this Project to examine the merits of funding implementation using a system based on annualized benefits of flood protection. The citywide pilot evaluation should include a refinement of payers and payment mechanisms considered in this Project. The pilot evaluation should review multiple possible uses for the cost share analysis depending on need and stakeholder input, ranging from simply informing City policy on public vs private cost share responsibilities to potentially serving as the basis for a new risk-based utility fee structure. See **Section 5.5 Track 2 funding and cost** share considerations for additional details.
- Evaluate the potential for a Community-Based Public Private Partnership model to finance and deliver flood mitigation projects. This could be reviewed both as a standalone delivery approach in the near- to mid-term, as well as part of a broader district-scale governance approach, as described below.
- Vet and further develop the District for Resilience Improvements (DRI) framework and cost share approach with a coalition of local and state stakeholders. The DRI would be a new governance entity, similar in structure and role to an Authority, responsible to champion and manage a district-wide plan for coastal flood resilience project funding, financing, and implementation. Key functions could include: coordinating property owners, taking on debt, negotiating and establishing public-private partnerships, pursuing grants, procuring contractors and consultants, planning capital improvements, and operating and maintaining the solutions. DRI geographic extents may correlate with future coastal floodplains with the opportunity for (or mandated) periodic re-evaluation based on actual progression of sea level rise, as well as evolving time horizons of interest. The City may apply the concept of the DRI at the individual district or sub-district level or apply a single DRI across the city based on criteria such as floodplain extent. A variety of funding sources could be assembled and distributed by the DRI, including but not limited to federal and state grants, city capital allocations, and potentially risk-based utilities fees based on a cost share approach as outlined above. See **Section 5.3 Governance approach: District for Resilience Improvements (DRI)** for additional details.

Figure 4 Summary of key recommendations along Policy Tracks 1 and 2

Table 2 Summary of Recommendations

Policy Track 1 (today through 2023)	Governance	Regulatory	Funding
First moves	Establish a new senior level cabinet chief focused on climate resilience implementation with resources and capacity sufficient to support a large portfolio of complex projects and programs	Adopt and publicize the alignment, design elevations, and key findings of Coastal Resilience Solutions for South Boston to ensure broad awareness of conceptual plans for coastal flood mitigation	Review project designs in the Capital Improvements Program
Second moves	Launch joint planning process with Massport to further develop coastal resilience solutions for Seaport Boulevard. In conjunction, create the Infrastructure Coordination Committee recommended by *Climate Ready Boston* to support planning in urgent action areas Pursue agreements (MoUs) with each and every property owner in urgent action areas along Fort Point Channel to ensure conformance with coastal flood mitigation performance standards and other project parameters, such as cost share and O&M responsibilities	Develop and adopt coastal flood mitigation performance-based design standards Ensure the Flood Resilience Zoning Overlay District under development by the BPDA helps promote and is consistent with plans for district-scale flood risk mitigation	Clarify City view on public-private cost share, including expected property owner investment in flood risk mitigation infrastructure
Ongoing	Continue and strengthen engagement with Massport and its tenants around implementation of urgent action areas along Seaport Boulevard, and later, the Marine Industrial Park	Use existing regulatory vehicles to guide and enforce implementation of conceptual plans with new development in accordance with coastal flood mitigation performance standards	Continue engagement with public and private property owners in urgent action areas to co-develop and refine opportunities for coastal mitigation investment
Ongoing	Continue and strengthen engagement with MBTA around implementation of district-scale flood mitigation actions at the base of Fort Point Channel	Commence work with State and other partners to provide regulatory clarity for the circumstances under which fill may be introduced to waterways as a basis for longer-term flood mitigation projects	Leverage range of public and private funding sources by continuing to apply for grants, engaging Federal and State funding gate keepers, and developing MOUs with private property owners. Continue to apply for available grants, including the upcoming FEMA BRIC funding program

Policy Track 2 (today through 2030 and beyond)	Governance	Regulatory	Funding
First moves	Further evaluate a Community-Based Public-Private Partnership approach as an option to expedite project delivery (approach can become part of governance recommendation 2 over time)	Use Flood Resilience Zoning Overlay District in concert with established coastal protection performance standards to guide and enforce delivery of district flood risk mitigation with new development.	Refine, advance, and further evaluate the benefits and cost share analysis completed for this study for citywide application
Second moves	Develop a district or citywide governance entity dedicated to implementing coastal resilience projects, such as the District for Resilience Improvements	Explore potential for Chapter 91 enforcement authority to incentivize property owner participation in flood mitigation	Explore feasibility of cost share analysis approach and related funding mechanisms citywide

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Joe Christo

Property owners and tenants along Fort Point Channel and Seaport Boulevard

The Green Ribbon Commission Climate Preparedness Working Group

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