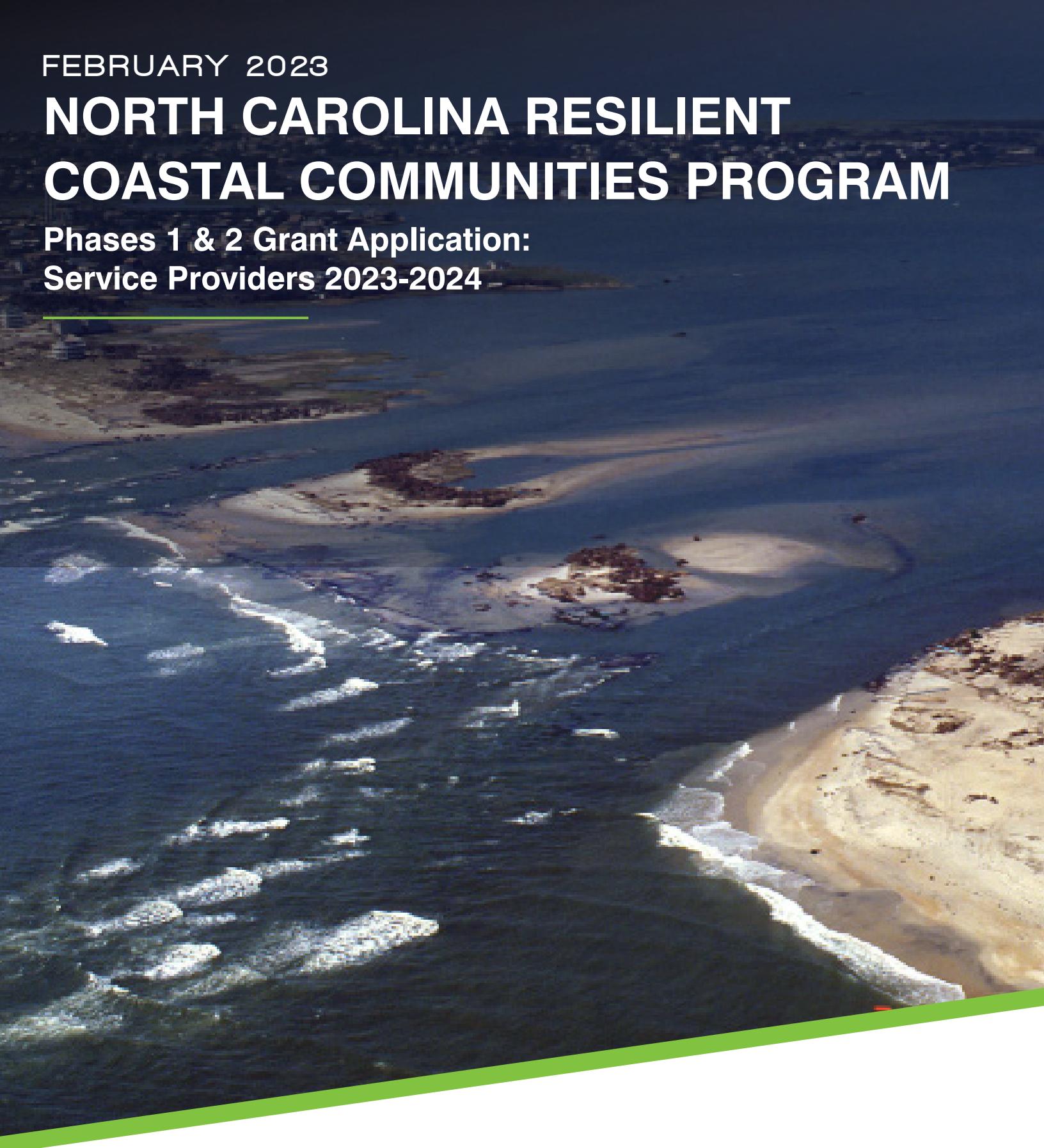


FEBRUARY 2023

NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Phases 1 & 2 Grant Application:
Service Providers 2023-2024



Weston & SampsonSM

westonandsampson.com

Apex, North Carolina | North Charleston, South Carolina | Reading, Massachusetts



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NC RESILIENT COASTAL COMMUNITIES PROGRAM

SERVICE PROVIDER APPLICATION RESPONSES

NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Phases 1 & 2 Grant Application: Service Providers 2022-2023

Weston & SampsonSM

VISION STATEMENT

Our team envisions a future where land, water, and wildlife exist in harmony, and where our communities are resilient, sustainable, and thriving. Through innovative planning and collaborative partnerships, we will work towards creating a healthier and more beautiful world for everyone.

QUESTION 1

Describe your organization's experience in resilience planning and identify which of the following, if any, your team has developed: Local Resilience Plans, Regional Hazard Mitigation Plans, CAMA Land Use Plans, Watershed Restoration / Management Plans, Stormwater Plans, Resilience Plans, and Floodplain Management Plans. Web links to examples may be provided.

Weston & Sampson has robust technical knowledge in **actionable climate resilience, municipal vulnerability assessments, equitable engagement practices, infrastructure adaptation, and climate resilient design and engineering**. Weston & Sampson, with our teaming partners the Berkley Group, have an interdisciplinary team of urban planners, architectural designers, climate and resiliency specialists, engineers, landscape architects, GIS technicians, community engagement leaders, and scientists who work collaboratively on climate resilience plans and adaptation projects. Our team has worked with many communities along the east coast to develop their plans. On the following pages, there are descriptions of our team's experience with these plans and links to prior projects that our team has completed.

+30
Local Resilience Plans

14
Resilient Stormwater Plans

25
Hazard Mitigation Plan

50
Watershed Management
Plans

10
Master Plans

11
Floodplain Management
Plans

QUESTION 1

Describe your organization's experience in resilience planning...

Local Resilience Plans

Our team regularly supports communities across the East Coast in creating their resilience plans.

- Our team is currently working on the Central Virginia Planning District Commission's Resilience Plan through Virginia Department of Conservation and Recreation's Community Flood Preparedness Program. Berkley Group is also supporting **4 other localities in Virginia with their Resilience Plans**.
- Weston & Sampson has provided support to Massachusetts communities as they complete their [Municipal Vulnerability Preparedness \(MVP\)](#) Plans through the Massachusetts Executive Office of Energy and Environmental Affairs. Our team has supported over **30 resilience plans or projects** through this program.
- Weston & Sampson supported resilience planning in Lynn, Chelsea, Everett, Boston, and Hingham through the **MA Coastal Zone Management Program**.
- Weston & Sampson is currently working on a vulnerability assessment and **resilience plan for Lee County, Florida** through the Resilient Florida Program.
- Weston & Sampson was the technical advisor for the **City of Cambridge's Resilience Plan**. This plan included a vulnerability assessment and focus on equity and community connection.

The Resilience Plans our team develops focus on the following core principles:



A focus on nature-based solutions



Support for vulnerable populations & Innovative and equitable community engagement



Assessment of vulnerabilities based on the best-available data



Emphasis on prioritized actions that can be implemented during subsequent phases of funding and



Images from various community engagement events

QUESTION 1

Describe your organization's experience in resilience planning...

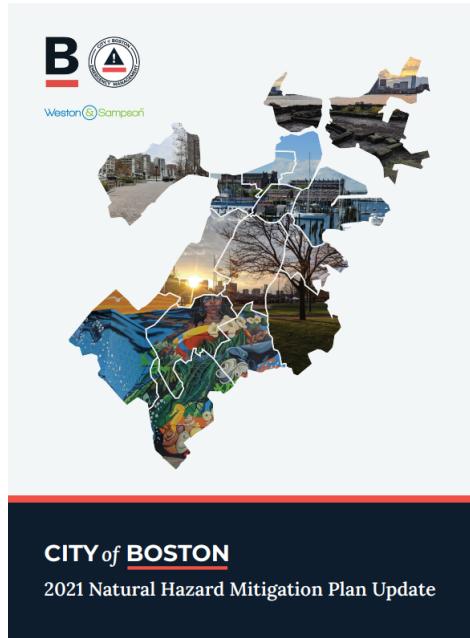
Hazard Mitigation Plans

Our team has completed over **25 Hazard Mitigation Plans (HMPs) or HMP updates**. Our staff is trained in Hazard Mitigation Planning, including development of hazard profiles, risk mapping and assessment, stakeholder engagement, and development of prioritized actions. The HMP provides an opportunity to work across-sectors to integrate hazard mitigation and climate resilience into all facets of a municipalities facilities, services, and systems. Weston & Sampson is skilled at facilitating stakeholder working groups and community outreach to support an implementable plan. **Our team focuses on developing prioritized action lists that account for support for climate vulnerable populations or environmental justice communities, opinion of cost, coordination with existing plans or projects, lead stakeholders, effectiveness at reducing hazard impacts, and co-benefits such as greening of the public realm.** Our clients appreciate the innovative methods we employ to build a plan that coordinated across the community, robust, organized, and based on the best available science.

The list to the left indicates communities that Weston & Sampson or the Berkley Group has supported with Hazard Mitigation Plans.



Images from City of Boston Natural Hazard Mitigation Plan



Click on plan hyperlinks!

1. [Accomack Northampton Planning District Commission, VA](#)
2. [Ashby, MA](#)
3. [Attleboro, MA](#)
4. [Avon, MA](#)
5. [Belmont, MA](#)
6. [Boston, MA](#)
7. [Commonwealth Regional Council, VA](#)
8. [Effingham County, GA](#)
9. [George Washington Regional Commission, VA](#)
10. [Fitchburg, MA](#)
11. [Egremont, MA](#)
12. [Granville, MA](#)
13. [Groton, MA](#)
14. [Hopkinton, MA](#)
15. [Lowell, MA](#)
16. [Middleton, MA](#)
17. [Rappahannock-Rapidan Regional Commission, VA](#)
18. [Richmond, MA](#)
19. [Stoneham, MA](#)
20. [Tewksbury, MA](#)
21. [Townsend, MA](#)
22. [Tyngsborough, MA](#)
23. [Waltham, MA](#)
24. [Wenham, MA](#)
25. [Wilbraham, MA](#)
26. [Winchester, MA](#)

QUESTION 1

Describe your organization's experience in resilience planning...

CAMA Land Use Plans

Weston & Sampson is experienced in developing comprehensive land use plans that address the complex and interconnected issues of coastal development and resource management. Plans developed for coastal communities in Massachusetts and Rhode Island reflect both community character and coastal zone management's unique responsibility to employ a comprehensive approach and framework to managing coastal areas, balancing economic and development interests with environmental protection and preservation, and ensuring a sustainable future for the coastal zone.

These plans include, as a requirement, an analysis of land past, current, and future land use. Our team evaluates the ideal development pattern and land uses based on both land use designations and land cover using Lidar data.

Similar to CAMA Land Use Plans, innovative land use related projects at Weston & Sampson include:

- [Scituate, Rhode Island Comprehensive Plan](#)
- [City of Cambridge Resilient Zoning and Cool Factor Ordinance](#)
- [Low Impact Development Guidelines for Brookline, Massachusetts](#)
- [Sustainability Site Plan Review Requirements and Regulatory Audit for Chelmsford, Massachusetts](#)
- Climate Resilience Regulatory Audit and Update and Design Guidelines for Marlborough, Massachusetts

Watershed Restoration or Management Plans

Weston & Sampson has developed and implemented watershed restoration and management plans with local, state, and federal partners for decades. Nonpoint source pollution remains the largest threat to our water quality today. We identify critical water resources and develop strategies to reduce pollutant loading, conserve wetlands and habitats and promote sustainable land use practices.

Our efforts are designed to:

- Promote the health and sustainability of our communities
- Ensure the long-term health of the land and receiving waters of the coastal environment and the species that depend on it
- Maintain the benefits that our residents and visitors derive from these resources, such as clean drinking water, recreational opportunities, and productive commercial and recreational fisheries.

Our team has developed several watershed restoration and management plans. Some example projects include: Charles River Watershed Regional Flood Model, MA; Lake Washakum, Framingham, MA; Lake Ellis, Athol, MA; Captain's Pond, Salem, NH (project currently underway); Lake Cochicowich, North Andover, MA.

QUESTION 1

Describe your organization's experience in resilience planning...

Project Spotlight:

Charles River Watershed Flood Model, 14 municipalities, MA

The Charles River watershed is experiencing climate change impacts, such as heavy precipitation and flooding, which can create significant damage. Weston & Sampson, worked with the Charles River Watershed Association, was selected to develop the Charles River Flood Model (CRFM) to **evaluate flooding scenarios and test watershed scale adaptation strategies for 14 communities** in the 270-square-mile portion of the Charles River watershed that drains to the Watertown Dam. Weston & Sampson modeled 10 different 24-hour duration rainstorms in the watershed.

The team also assessed the impact of six different flood mitigation strategies employing **green, nature-based solutions**. These include adaptation measures such as onsite storage, raingardens, bioretention basins, reduction in impervious surfaces, and others that focus on the protection, restoration, or management of ecological systems.

The CRFM represents the impacts of flooding across the watershed from various types and sizes of rainstorms under both present and future climate scenarios and can be used to test the efficacy of various flood mitigation measures. It is augmented by the online Flood Model Results Viewer, an [interactive web-based GIS application](#) to view present and future flood risks in the watershed that allows the user to see the flood mitigation benefits from an array of green infrastructure strategies. [Click here to see the online flood viewer!](#)

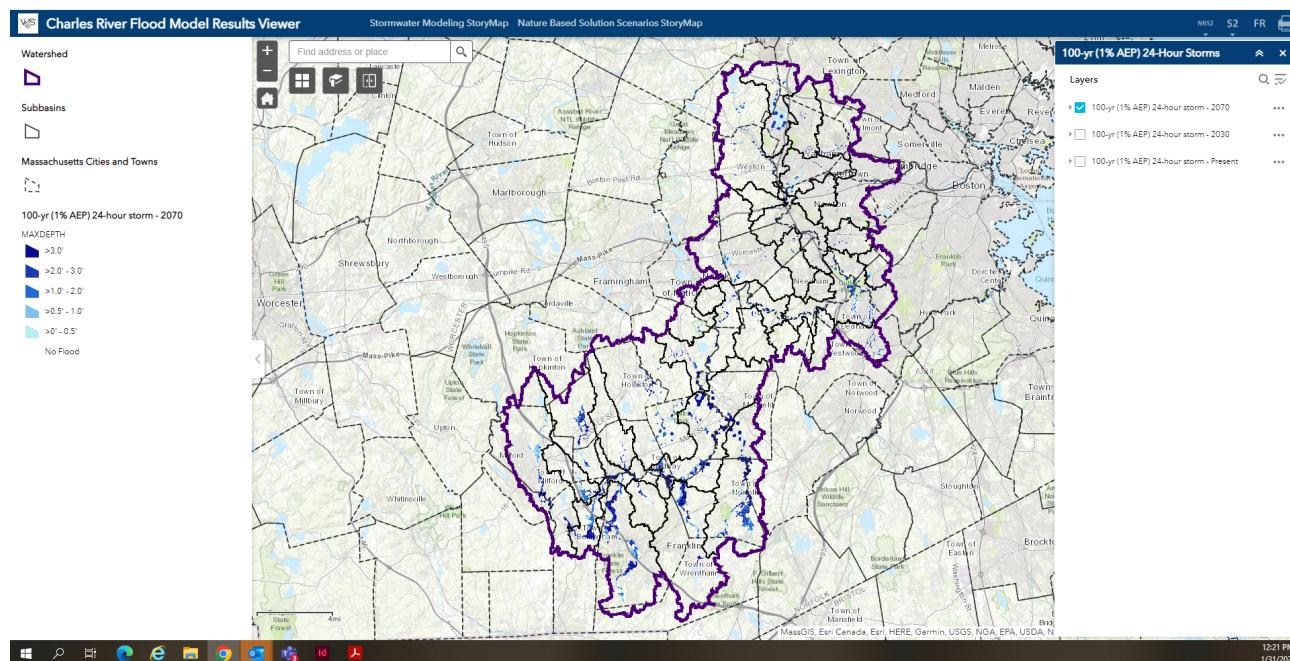


Image of Charles River Watershed Flood Model Interactive Dashboard

QUESTION 1

Describe your organization's experience in resilience planning...

Resilient Stormwater Management Plans

Our team develops Resilient Stormwater Plans to enhance the resilience of our communities to the impacts of extreme weather events, such as heavy rainfall and flooding. Our plans create a more sustainable, efficient, and effective system for managing stormwater that can help protect people, property, and the environment from the impacts of storms. We conduct a comprehensive analysis of current stormwater management practices, evaluate the community's vulnerability to stormwater-related hazards, and develop strategies to improve the resilience of the stormwater management system. The strategy may include recommendations for upgrading or replacing existing stormwater management infrastructure, improving the design and operation of new stormwater management systems, and increasing public education and outreach about the importance of stormwater management. Our Resilient Stormwater Plans include the following methods:



- 1** Review historic stormwater and flooding data and information



- 2** Field conditions and stream assessment



- 3** Hydraulic & hydrologic model of current and future flood conditions



- 4** Identification and prioritization of green and grey infrastructure opportunities



- 5** Complete an urban heat island assessment



- 6** Create a stormwater infrastructure maintenance tracking form



- 7** Virtual community and stakeholder engagement



- 8** Review regulations to incorporate climate resiliency



- 9** Develop a capital improvement plan



- 10** Apply for grants to implement solutions

Click below to learn more about the Waltham Resilient Stormwater Action Plan!

www.city.waltham.ma.us/engineering/pages/waltham-resilient-storm-water-action-implementation-plan

Floodplain Management Plans

Climate change is causing sea levels to rise and the frequency and severity of extreme weather events to increase. Changes in land use, such as urbanization and deforestation, have altered the natural hydrology of our landscape, leading to increased flood risk. As our populations grow, more people are living and working in flood-prone areas. Weston & Sampson's floodplain management strategies help protect communities from the impacts of floods and reduce the risk of loss of life, property damage, and help protect and preserve important habitats.

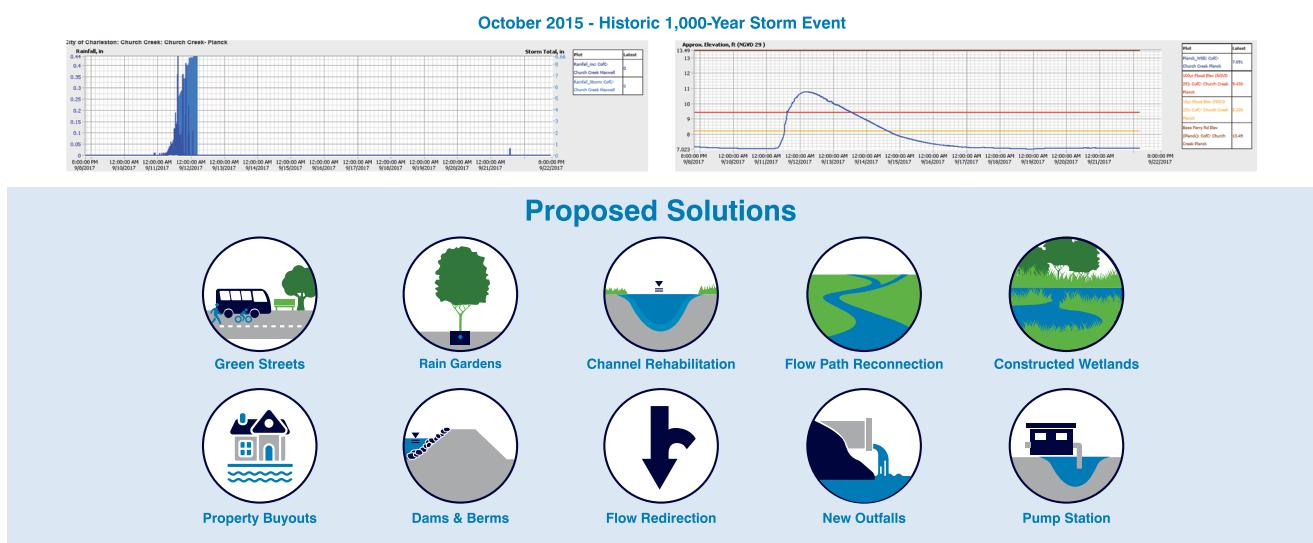
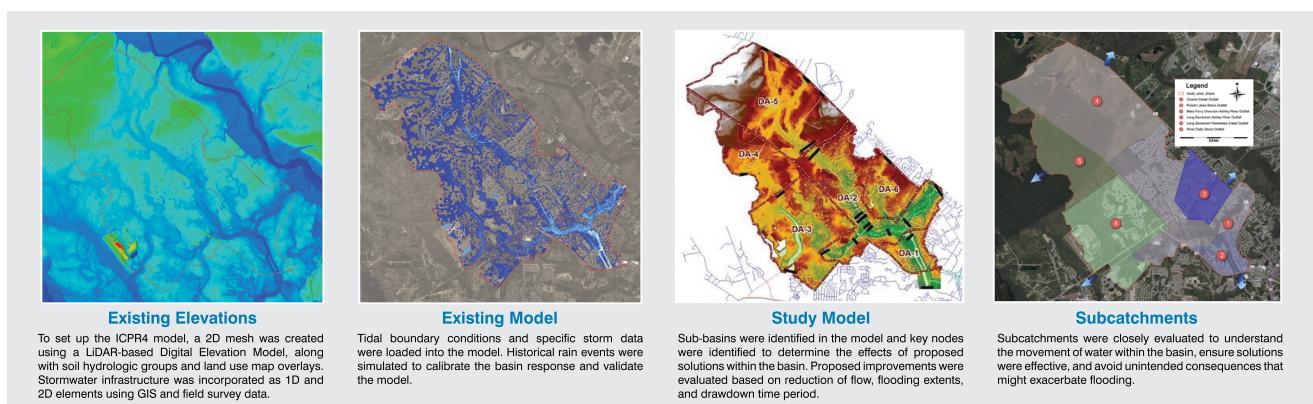
QUESTION 1

Describe your organization's experience in resilience planning...

Project Spotlight:

Church Creek Drainage Basin Flood Reduction Study, City of Charleston, South Carolina.

Weston & Sampson performed the Church Creek Drainage Basin and Flood Reduction Study, which includes over 10,000 acres residential and commercial developments. This basin has experienced tidal and stormwater flooding in the past, increasing in severity and frequency over the last several years. We evaluated past study recommendations, upgraded the hydraulic model to ICPR4, facilitated over 14 outreach meetings, and developed seven initiatives that would reduce flooding issues if implemented. The recommendation included tidal surge protection at key locations, stormwater diversions, channel maintenance, and protection of the floodplain via solutions such as constructed wetlands, green streets, channel rehabilitation, and property buyouts (in the graphic below).



QUESTION 2

Describe your organization's experience with identifying and mapping critical assets (i.e., roads, hospitals, schools) natural infrastructure (i.e., rivers, wetlands, streams) and socially vulnerable populations (People who are considered socially vulnerable to climate impacts can include communities of color, children and seniors, low-income communities, people with disabilities, pregnant people, people with Limited English Proficiency (LEP), other historically disadvantaged people, people impacted by the social determinants of health, and populations identified by the American Public Health Association)

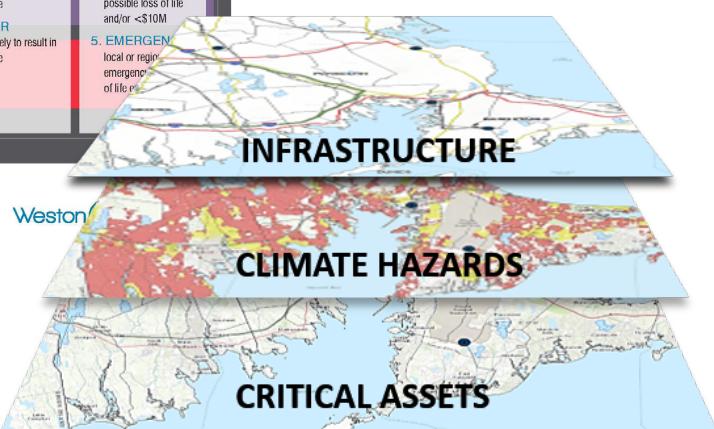
Weston & Sampson has set standards for defining, mapping, and evaluating the criticality and vulnerability of assets for several Massachusetts state agencies such as DCR, DCAMM, MBTA, and EEA. Through past project experience, we developed an approach (based on the Department of Homeland Security's functional criticality framework) that identifies critical assets based on scope, time, and severity of impact as a result of inoperability or loss. This approach was piloted for building assets as part of the DCAMM Statewide Climate Resilience Master Plan in 2017, and later adapted to assess infrastructure assets through the Resilient MA Action Team (RMAT) Climate Resilience Design Standards and Guidelines (2021). Weston & Sampson served as the prime consultant for both projects.

Weston & Sampson's GIS specialists map these assets and frequently overlay climate hazard layers to conduct municipal vulnerability assessments. Our team's vulnerability assessments include an analysis of demographic information to determine the presence of socially vulnerable populations. We have used the American Public Health Association social vulnerability indicators in the Resilient Cambridge Plan. This type of assessment should inform the identification of actions that will directly benefit more vulnerable populations, and even the location of community engagement events.

FACILITY CHECKLIST

Features	Observations (Pre-existing Problems)	Climate Parameters (Tier 1)		Facility Manager Input
		Adaptive Capacity	Consequence Rating	
PAGE 4 EXTERIOR AND GROUNDS (vegetation, drainage, slopes)	evidence of pooling, erosion, trees	FLOOD	EXTREME PRECIPITATION	Rate the site feature's ability to withstand the climate parameter
PAGE 5 ARCHITECTURAL (windows, doors, louvers)	glazing type, operability, impact resistant	HEAT		1. EXCELLENT very unlikely to result in damage
PAGE 6 STRUCTURAL (roofs, foundations)	skylights, snow drift areas, drainage, cracking, mold	WINTER STORM		2. GOOD unlikely to result in damage
PAGE 7 BUILDING SYSTEMS (mechanical, electrical, HVAC)	location, utility ports, temperature control, redundancy	WIND		3. SATISFACTORY may result in damage
PAGE 8+ OTHER (generators, server rooms, user groups, etc.)	location, fuel type, vulnerable populations	DROUGHT	FIRE	4. FAIR likely to result in damage
		LANDSLIDE		5. POOR very likely to result in damage

Layered map from DCAMM shows how infrastructure and critical assets were evaluated based on vulnerability to climate hazards.



Facility Checklist from DCAMM describes how criticality was defined and ranked.

QUESTION 2

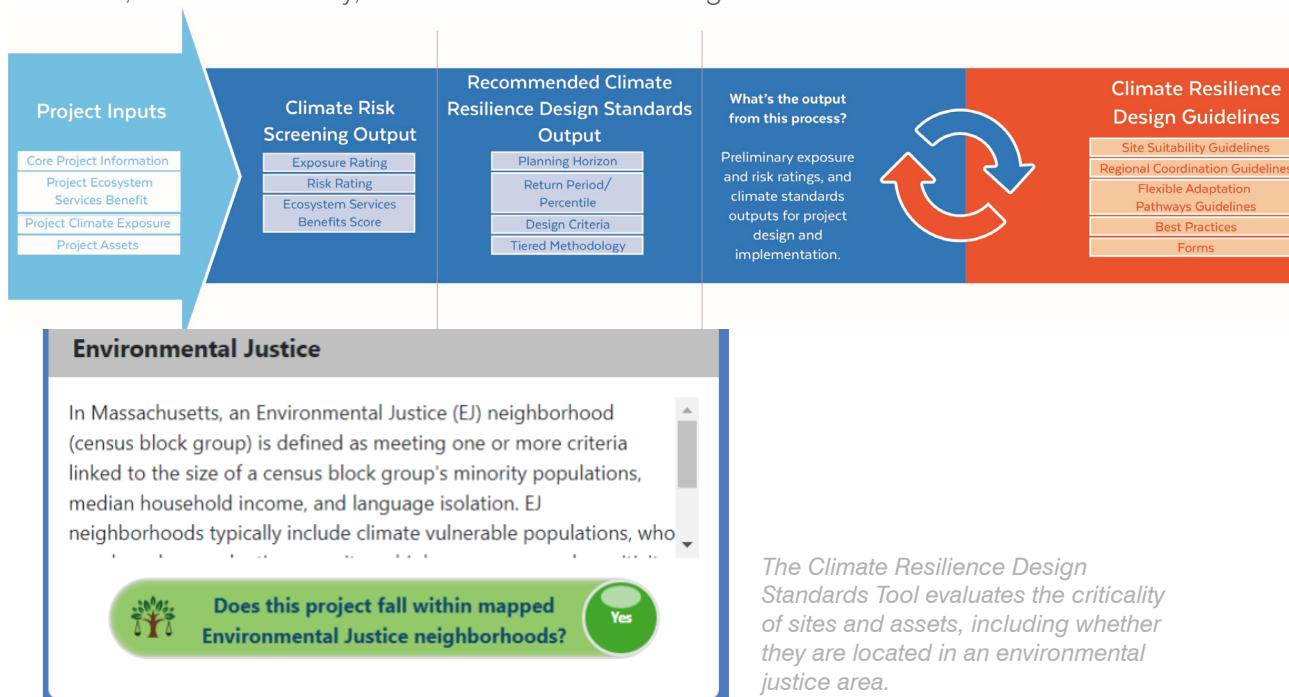
Describe your organization's experience with identifying and mapping critical assets...

Project Spotlight:

Climate Resilience Design Standards Tool, MA Executive Office of Energy and Environmental Affairs

Weston & Sampson led the RMAT Technical Support project for the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) and the Massachusetts Emergency Management Agency (MEMA). The first of its kind, this project's goals included monitoring and tracking the 2018 State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) implementation process and advancing its priorities. Weston & Sampson served as lead technical consultant in the development of statewide climate resilience standards and guidelines that integrate specific climate resilience actions into state and municipal capital planning efforts through a web-based tool. This free, interactive GIS-based application enables users to create a project online and receive data-driven output within 15 minutes. After users outline their project location on a map and answer questions related to the overall project, the web-based tool outputs a preliminary climate exposure and ecosystem services benefits score for the overall project and identifies preliminary climate risk ratings and recommended design standards for each asset.

The [Climate Resilience Design Standards & Guidelines](#) are grounded in scientific methodology and best available data; they integrate existing practices/procedures, establish clear guidance that can be applied across project types, and develop adaptable deliverables for a range of users and climate hazards. In addition, since the RMAT's web-based tool uses global climate models, many of these methodologies can also be applied in other states; with this flexibility, the benefits are far-reaching.



QUESTION 3

Describe your organization's experience in community outreach and engagement. What engagement techniques have you used to reach socially vulnerable and underrepresented populations? Provide examples of the successful application of these engagement techniques

Weston & Sampson believes in meeting people where they are and reducing barriers to participating in community engagement. We are life-long learners and explore innovative methods for engagement in our monthly public engagement collaborative. Our team frequently supports projects that serve climate vulnerable populations and environmental justice communities. We are committed to providing translation services as needed, accessible language, and multiple-touch points for engagement. We have trained facilitators on our team, and frequently lead workshops and working groups on sensitive topics related to climate resilience trade-offs. Our North Carolina staff regularly support engagement work to identify key input from residents.

Project Spotlight:

Waltham Resilient Stormwater Plan

Weston & Sampson conducted [youth-focused STEM engagement](#) for Waltham. Our team developed an educational video on climate change and climate-related careers, developed a web-page with youth-focused resources, and a informative fact sheet.

Project Spotlight:

Hull Climate Adaptation Roadmap

Weston & Sampson is supporting the Town of Hull in developing a climate adaptation roadmap that includes planned retreat as one of the options. Residents in the image below are raising "stop light" cards, that indicate how they are feeling or responding to information shared, as a discovery exercise to gauge the energy of the room.



Our team provides “high-tech” as well as “high-touch” engagement methods, and have used the following methods to help reach underrepresented populations:

- **Educational videos** that are posted and shared on social media
- **Youth and family-oriented engagement events** that use demonstrations and hands-on projects
- Have **translators** on-site at events
- [**Create online surveys or ArcGIS Storymaps**](#) so that residents can access information on their own time
- **Created multi-lingual materials**
- **Partnered with community organizations** to help build trust with residents
- **Identified “neighborhood captains”** so that residents can interact directly with other residents
- **Provide childcare, food, or compensation for participating in a workshop**

QUESTION 4

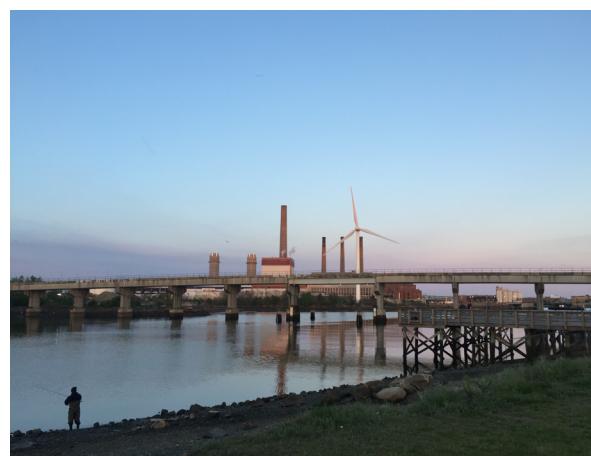
What is your experience in identifying and utilizing nature-based solutions to address coastal resilience challenges?

The inclusion of nature-based solutions is a priority of many of our climate resilience and stormwater management projects. When possible, our team integrates nature-based solutions, rather than hard infrastructure solutions because they provide many benefits such as water quality management, flood mitigation, cleaner air, habitat, reduction in heat and stormwater impacts, and greening of the public realm. Our team has landscape architects, certified arborists, civil engineers, and other staff who work on both assessments to determine where these solutions are possible and where they will have the most impact and the design and implementation of NBS. Types of NBS our team has identified, assessed, or designed include: bioswales, tree-box filters, coastal parks, living shorelines, bioretention ponds, and urban forest management plans. Select example projects include the Lowell Urban Forest Master Plan, Moakley Park in Boston, and Draw Seven Park in Somerville.

Project Spotlight:

Draw 7 Park, Somerville, MA

Weston & Sampson led the DCR Draw 7 Park revitalization design process, which explored flood protection and a living shoreline to mitigate sea level rise/storm surge impacts restoring freshwater bank vegetation to mitigate riverine flooding impacts vegetated landscapes to mitigate stormwater volume and improve water quality. Weston & Sampson used projected tidal datums to inform the current and future extents for living shoreline. The grading along the waterfront is designed to allow the living shoreline to migrate into the park as sea level rises, as well as reduces wave heights within the park. The design of the living shoreline stabilizes the shorelines and reduces erosion and storm damage. In addition to the living shoreline, the project features manage stormwater flows through vegetated landscape features, support biodiversity through planting, improve water quality, and create new passive open space park with increased tree canopy.



QUESTION 4

What is your experience in identifying and utilizing nature-based solutions to address coastal resilience challenges?

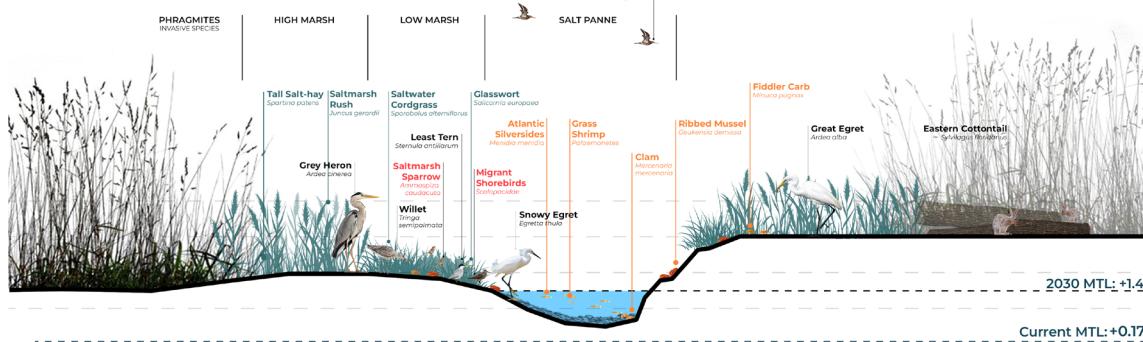
Project Spotlight:

Massachusetts Department of Conservation and Recreation Climate Vulnerability Assessment

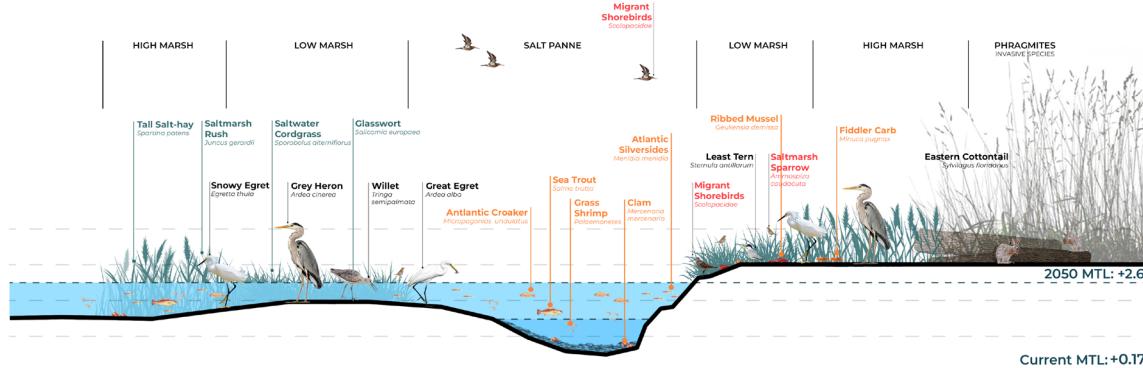
Weston & Sampson led the second phase of DCR's climate change vulnerability assessment which involved developing interactive engagement tools, adaptive nature-based design solutions, and integration with the state's ongoing initiatives.

Weston & Sampson refined the methodology for assessing the exposure, sensitivity, and adaptive capacity of DCR's properties. The map above shows exposure to sea level rise/storm surge. The map below is an output from an online ArcGIS portal that shows automated maps and evaluations. Nearly 500 DCR facilities exist in both coastal and non-coastal environments.

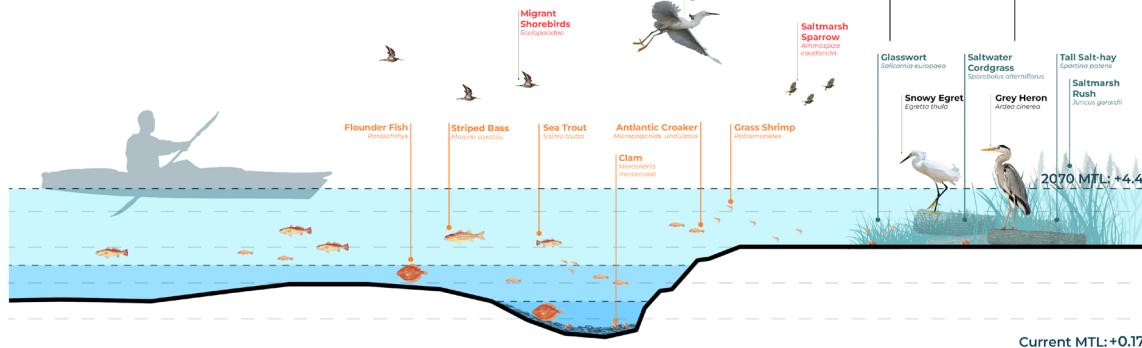
SPECIES MIGRATION 2030



SPECIES MIGRATION 2050



SPECIES MIGRATION 2070



QUESTION 5

What is your organization's experience in assessing the future impacts of coastal hazards? For example, the impacts of sea level rise to a community.

We have a dedicated, interdisciplinary team with extensive knowledge and experience identify and utilizing nature-based solutions to address both coastal and inland resilience challenges. Our work incorporates relevant climate models and data into the design of our projects. Weston & Sampson understands the compounding vulnerability that comes from multiple climate change impacts and looks at holistic solutions that can mitigate these potential impacts. Our assessment approach includes:

- Evaluating current and future climate risks.
- Conducting a regulatory review.
- Establishing a basis of design for climate resilience.
- Proposing actionable design recommendations.

Our team has extensive experience working with climate projections using global climate models (GCMs) and coastal modeling using sea level rise (SLR) projections. Our specialist not only understand and interpret this data, but also know how to apply this data to an assessment of vulnerability. Please find project descriptions for example projects below.

Project Spotlight:

Resilient Design and Construction of Transportation Infrastructure, North Carolina Department of Transportation

Following recent devastating effects from hurricanes and extreme weather events, the North Carolina Department of Transportation (NCDOT) contracted Weston & Sampson to assist in looking at ways to design and build more resilient infrastructure that is better able to withstand extreme weather events that are likely to be more frequent in the future. Weston & Sampson is assisting NCDOT by advising on climate change vulnerability and resiliency-related projects, along with any projects in which climate resiliency consideration needs to be addressed in both coastal and non-coastal locations. Our team is reviewing design criteria being used for proposed and upcoming projects across the State, developing resiliency design criteria and guidelines for transportation on projects, and assisting in updating relevant design standards and criteria that are futuristic and based on the most recent climate change projections from the state.

Project Spotlight:

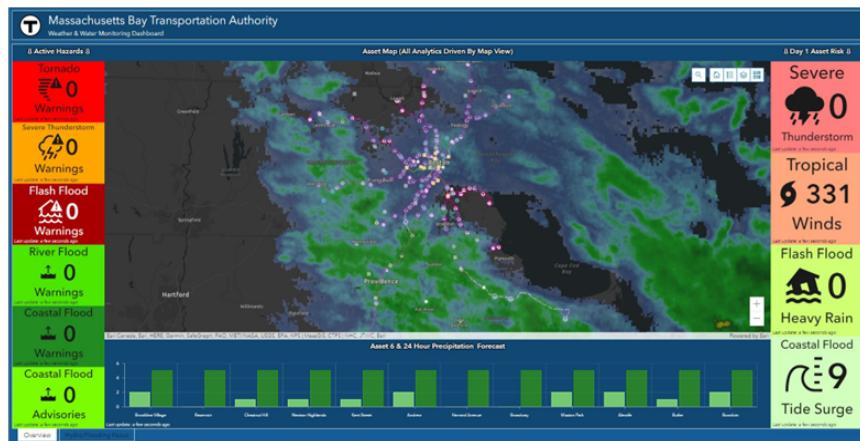
Island End River CZM Coastal Zone Resiliency, Cities of Chelsea and Everett, Massachusetts

Weston & Sampson, along with our partnering team, worked with neighboring gateway cities Chelsea and Everett to build resilience through modeling, planning, and the design of flood protection measures in the Island End River area, a substantial area of filled tidal zone and wetland tributary to the Mystic River. Our team modeled projected inundation and evaluated flood pathways, considered land use and infrastructure, evaluated mitigation option and prospective location/alignment of protective measures, and developed a draft design for a flood barrier section in Chelsea.

QUESTION 6

What techniques have you used to communicate climate hazard data to the general public, including socially vulnerable communities? Please provide examples.

Providing the right balance of information is very important to the success of community engagement. Climate hazard data needs to be accessible, while also accurate, robust, and informative. Our team never wants to overwhelm residents or stakeholders, but we also do not want to underestimate them. This data is critical to a community's understanding of risk, vulnerability, and empowerment to act. To achieve this balance, our team creates highly graphical, rather than text heavy presentations, using infographics, images, and maps to display climate hazard information. We provide ample opportunities for questions and feedback.



Interactive storm-tracking dashboard developed by Weston & Sampson for MBTA.

Rendering of future flood inundation for the coastal community of Lynn.

Our team uses a variety of methods to convey information about climate hazards;

- ***Infographics that simplify complex data***
- ***Visual Storymaps using ArcGIS online***
- ***Interactive dashboards***
- ***Videos***
- ***Graphic-heavy slides***
- ***Simplified language***



QUESTION 7

Describe your experience facilitating stakeholder groups at the local level, particularly for the purpose of helping communities to identify solutions to reduce their exposure to coastal hazards. Please provide examples.

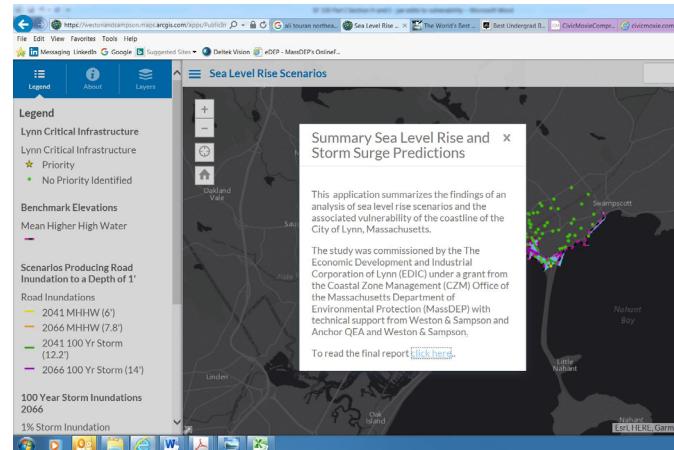
Most of our projects involve stakeholder involvement from start to finish. At Weston & Sampson, our team provides expert opinions about adapting to climate change impactfully. However, for our recommendations to be meaningful and successful, continuous and coordinated engagement is needed with local departments, agencies, experts, and leaders. These individuals know the locality and its needs, and our team provides the climate hazard analysis and a recommended response based on these needs. Stakeholder groups that Weston & Sampson has worked with include: [Hazard Mitigation Plan Stakeholder Committees](#), Comprehensive Plan Working Groups, the [Cambridge Resilient Zoning Task Force](#), [Chelmsford Climate Energy and Sustainability Committee](#).

When we staff our projects, we make sure that there is both a technical expert that has a robust understanding of the climate hazard data and a communication and engagement lead that helps bring that information to stakeholders in a meaningful way. When developing potential solutions, we first interview these stakeholders and gather a list of ongoing initiatives related to climate resilience, hazard mitigation, or sustainability. Our team then adds its ideas for additional, future resilience solutions and solicits feedback from the stakeholder group. With a more finalized list developed, our team prioritizes these actions based on the needs of the locality, the impact of the action on addressing climate vulnerabilities, co-benefits, opinions of cost, and lead stakeholders.

Project Spotlight:

Lynn Coastal Vulnerability Assessment

The City of Lynn EDIC used a Coastal Community Resilience Grant to fund a community-based process to assess coastal vulnerability and plan for climate change adaptation, specifically along the City's waterfront and Saugus River areas. This process included identifying management measures that can be integrated into ongoing hazard mitigation efforts and waterfront development plans, as well as prioritizing new infrastructure projects and retrofits. We worked with City departments and stakeholders to discuss trade-offs, benefits, and impact on flood reduction.



Weston & Sampson developed the interactive dashboard above to convey coastal vulnerabilities to key stakeholders in Lynn.



Photos above show the Boston HMP Stakeholder Working Group (far left); Mystic River Watershed Working Group (middle), and Municipal Vulnerability Preparedness Stakeholder Visioning Session

QUESTION 8

What methods do you use to analyze alternatives and prioritize solutions? Please provide examples.

Our team is well versed at developing and assessing design and planning alternatives to help communities adapt to climate change. Our process often involved assessing climate vulnerabilities, conducting community outreach to develop a vision for the future, creating adaptation alternatives, and evaluating the feasibility of these alternatives. The feasibility assessment and prioritization process takes into account the following parameters:

- Community perception and buy-in
- Protection of critical habitats
- Alignment with ongoing municipal efforts
- Available funding
- Ability to mitigate climate impacts
- Co-benefits such as greening of the public realm, place-making, or community connection
- Benefit socially vulnerable populations
- Opinion of probable cost

Weston & Sampson works closely with stakeholders and municipal leaders to ensure that the evaluation criteria are adapted to the goals of the project. We have comprehensive spreadsheets that we use to prioritize or rank adaptation actions or projects. Our team has also developed monitoring and tracking tools, so that localities can keep track of their progress towards implementation.

CHELSEA & EVERETT ISLAND END RIVER RESILIENCY STUDY

COMPARATIVE COSTS



The multiple options for flood protection may be implemented through various funding mechanisms. The array of funding sources includes state and federal grants, city capital improvement budgets, and leveraging urban renewal and new development plans. Contributions from residents and developments should be fair, transparent, and invested in public space.

The following categories provide examples of comparative cost ranges for systems that may be applicable to the project site. These ranges are only comparative within their category, which include options for public space and value creation, wall systems, and boardwalk support structures. The systems included in each category range from wetland restoration, to sheet pile walls, to timber piles. Actual costs for these systems can vary significantly based on subsurface and environmental conditions encountered at the site.

PUBLIC SPACE AND VALUE CREATION OPTIONS



Natural steps and pavers can provide waterfront access and placemaking opportunities.
Photo by Daniel Doherty.



Bio-stabilization systems like Flex MSE provide erosion control without the need for formwork.
Image credit: Arie BIEG Vegetated Wall System.



Vegetated slopes can create accessible and resilient public open spaces.
A vegetated slope image by Weston & Sampson.



Wetland restoration may require more upfront cost but may lead to more funding opportunities.
The "Vell-Mor" living wetlands in Oregon. Photo by ASCE.

WALL OPTIONS



SHEET PILE WALL



SECANT PILE WALL



MODULAR, PRECAST CONCRETE GRAVITY WALL



CAST-IN-PLACE CONCRETE WALL

PRIORITIZATION CRITERIA CO-BENEFITS & WEIGHTS - 1 (No Impact) to 5 (High Impact)							Average Flood Mitigation	Co-Benefit Factor	Prioritization	Rank
Weight	Weight	Weight	Weight	Weight	Weight	Weight				
10.0	5.0	10.0	3.0	5.0	20.0	10.0				
Environmental Justice Neighborhood	Reduction of Urban Heat	Ease of Implementation	Pedestrian Improvements	Biodiversity / Habitat	Opinion of Cost	Public Preferences				
5	1	5	5	5	5	4	3.11	30.00	933.1	3
5	1	5	5	5	5	4	3.11	30.00	933.1	3
5	2	2.5	5	5	4	4	2.99	27.50	823.0	7
5	2	5	5	5	4	4	9.91	30.00	2972.3	2
5	2	2.5	1	1	2	1	0.00	14.50	0.0	18
5	3	1	2	2	1.5	2	0.00	16.50	0.0	18
5	5	5	3	2	2	5	3.07	27.00	828.5	6
5	1	2.5	4	4	2	1	0.81	19.50	158.8	11
5	3	5	5	5	4	4	0.93	31.00	288.8	10
5	1	2.5	1	1	5	1	0.93	16.50	153.7	12
5	1	2.5	1	1	5	1	0.16	16.50	25.6	17
5	1	2.5	1	1	5	1	0.93	16.50	153.7	12
5	3	5	5	5	4	4	0.29	31.00	89.8	14
5	3	5	5	5	4	4	0.29	31.00	89.8	14
5	4	5	5	5	4	4	9.91	32.00	3170.4	1
5	3	5	5	5	4	4	1.69	31.00	525.3	9
5	2	5	1	1	2	1	3.61	17.00	614.5	8
5	2	5	1	1	2	1	5.37	17.00	913.3	5
5	3	5	5	5	4	4	0.29	31.00	89.8	14

QUESTION 9

Applicants may be asked to assist more than one community. If selected, what is the maximum number of communities you could assist? Do you have any experience assisting multiple communities at once?

The Weston & Sampson and Berkley Group team is prepared to support 3-5 communities.

With over 700 professional and technical staff, Weston & Sampson is well-positioned to provide professional services for this contract. More than 200 of our staff hold licenses, registration, and specialized training in their respective fields of expertise. Our teaming partners, the Berkley Group, have 15 planners on staff.

- 4 Certified Planners, WSE; 4 Certified Planners, BG
- 142 Professional Engineers
- 11 Professional/Certified Geologists
- 14 LEED® Accredited Professionals
- 4 Certified Energy Managers
- 7 Licensed Site Professionals
- 3 Licensed Construction Supervisors
- 3 Licensed Environmental Professionals
- 14 Registered Landscape Architects
- 7 Registered Architects
- 6 Registered/Professional Land Surveyors
- 2 Certified Project Management Professionals
- 2 Licensed Master Electricians
- 1 Journeyman Electrician
- 2 Licensed Plumbers
- 1 Licensed HVAC Technician
- 1 Professional Hydrologist
- 2 Professional Traffic Operations Engineers
- 1 Traffic Control Supervisor
- 1 Professional Wetland Scientist/1 Certified Wetland Scientist
- 3 Certified Arborists
- 1 Certified Ecological Restoration Practitioner
- 13 Cross Connection Control Surveyors
- 16 Water Treatment Plant Operators
- 44 Wastewater Treatment Plant Operators
- 2 Geographic Information Systems Professionals
- 4 Certified Playground Safety Inspectors
- 2 Certified Floodplain Managers

Our team is open to partnering with other service providers, institutions, or community partners to bring the best experience to NC's Coastal Communities.

Weston & Sampson has been working in North Carolina since 1992 and is very familiar with the state's design procedures, policies, standards, and guidelines. Our North Carolina office, located in Apex, offers roadway design, hydraulic design, utility design, utility coordination, and environmental planning. Our many east coast offices compliment these services by offering traffic engineering, structural design, resiliency, and landscape architectural design services. We feel incredibly fortunate to have collaborated with municipalities, state agencies and private sector clients throughout North Carolina on a range of notable projects and on-call contracts, including:

- East End Connector in Durham County
- A-11C (Appalachian Development Highway System) in Clay County
- NCDOT Hydraulics Unit Owner's Rep for Resiliency Services
- Division 12 Low Impact Bridge Replacement program

QUESTION 10

How does your team prioritize and ensure cost-effectiveness? Please provide examples.

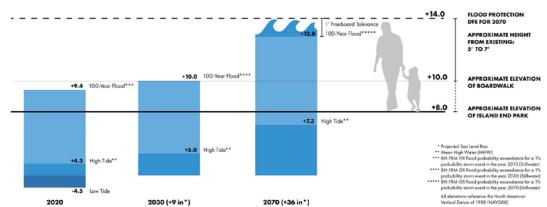
Cost-effectiveness in Solutions Development

- Weston & Sampson and the Berkley Group can provide North Carolina Coastal Resilience Program with a multi-disciplinary team of experts who provide services from assessment, planning, to design and implementation. We pride ourselves in being a “full service” team, with an understanding of how to develop implementable actions, based on cost-effectiveness and identified future funding sources. Additionally, we have trained cost-estimators at our firm. We also will work closely with the municipalities to understand priorities, funding available, capital improvement planning and synergies with other ongoing initiatives.

Cost-effectiveness in Project Management

- Our team believes that communication, transparency, and clear work planning lead to cost-effectiveness in project delivery. We are committed to regularly meeting with the communities we work with to provide status updates on tasks and receive feedback so that we can course-correct in a timely manner, if needed. We value an open dialogue with clients to develop a collaborative process that works best for the team.

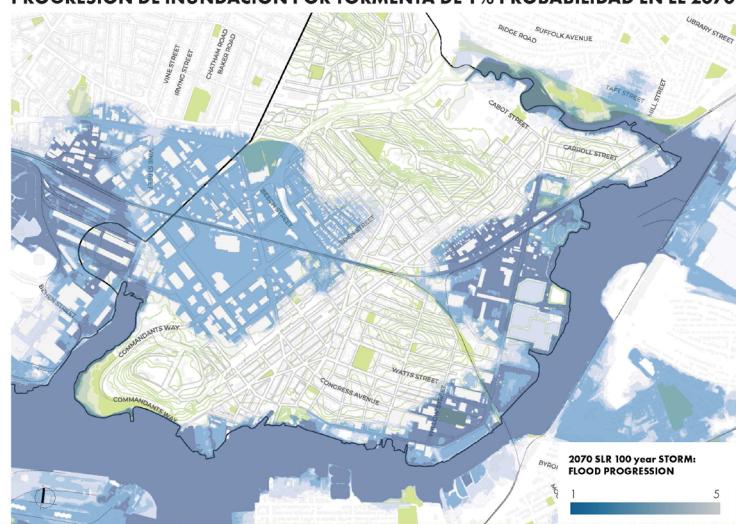
**DESIGN FLOOD ELEVATION |
DISEÑO DE ELEVACIÓN DE INUNDACIÓN**



DESIGN FLOOD ELEVATION WITH SEA LEVEL RISE IN 2070 DURING 1% PROBABILITY STORM EVENT



**2070 FLOOD PROGRESSION 1% PROBABILITY STORM |
PROGRESIÓN DE INUNDACIÓN POR TORMENTA DE 1% PROBABILIDAD EN EL 2070**



NC RESILIENT COASTAL COMMUNITIES PROGRAM

SERVICE PROVIDER SUPPLEMENTAL PACKAGE

NORTH CAROLINA RESILIENT COASTAL COMMUNITIES PROGRAM

Phases 1 & 2 Grant Application: Service Providers 2023-2024

Weston & SampsonSM

FIRM OVERVIEW

Weston & Sampson

Established in 1899, Weston & Sampson has been providing our municipal, public agency, and private sector clients with cost-effective, innovative solutions to their environmental and infrastructure challenges for well over a century. A privately held, employee-owned company, we offer capabilities ranging from project development, assessment, and planning through permitting, design, construction, and long-term operation and maintenance.

We are a full-service multi-disciplined consulting firm with more than 750 professionals, including designers, architects, landscape architects, engineers, planners, environmental professionals, and construction specialists. Our areas of expertise include landscape architecture and architecture design; climate resilience; civil engineering; environmental science/permitting; stormwater design and drainage; water/wastewater utility design/treatment; bridge/roadway design; aquatic facility design; electrical/mechanical/structural/geotechnical/traffic engineering; hydraulic modeling; solid waste services; and construction administration. With offices throughout the Eastern United States, including our local office in Apex, North Carolina, we pride ourselves on being responsive to the needs of our clients by staying at the forefront of emerging issues.

Weston & Sampson has been working in North Carolina since 1992 and is very familiar with the state's design procedures, policies, standards, and guidelines. We feel incredibly fortunate to have collaborated with municipalities, state agencies and private sector clients throughout North Carolina on a range of notable projects and on-call contracts, including: On-call planning with Greensboro, NC DOT Resilience Study (Owner's rep), Durham Planning On-Call Contract; Community and stakeholder meetings with transportation projects.

More information about our firm's resiliency capabilities can be found on the following pages.

The Berkley Group

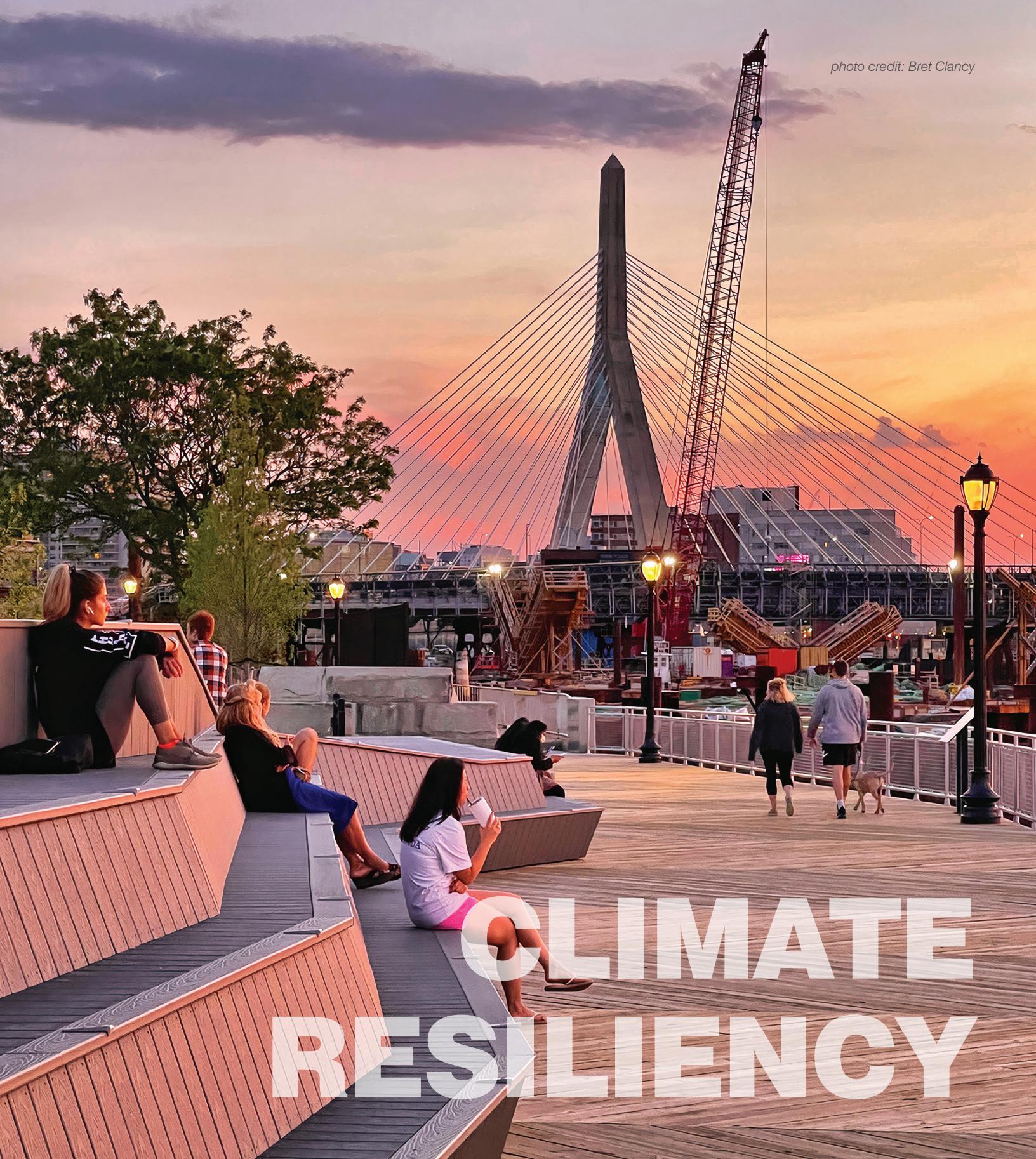
The Berkley Group is a local government consulting firm with over 50 employees and remote offices across Virginia. Formed by Andrew Williams and Darren Coffey in 2010, the Berkley Group specializes in providing direct services such as land use and environmental planning, capital project management, communications, community engagement, and group facilitation. While 100% of our work is dedicated to serving local governments, land use planning and ordinance development are our firm's primary strengths. The Berkley Group understands local governments because we have worked in local government and continue to serve them proudly.

Services Offered

To meet the diverse needs of our clients, Weston & Sampson offers extensive in-house capabilities in dozens of areas, including many that are crucial to this project:

- Infrastructure Design & Construction
- Climate Resilience
- Landscape Architecture, Architecture, Master Planning
- Watershed & Stormwater Management
- Landscape Planning & Restoration
- Aquatics Design & Engineering
- Geotechnical & Structural Engineering
- Transportation & Traffic Engineering
- Wastewater Collection & Treatment
- Wetlands Replication & Restoration
- Peer Review
- GIS & Digital Mapping
- Stormwater Management & Green Infrastructure
- Sustainable Design/Renewable Energy
- Hydrology & Hydraulics
- Environmental Compliance/Permitting
- Public Facilities Planning & Design
- Recreational Facility and Athletic Field/Complex Design
- Site/Civil Development
- Environmental Site Assessment/Demolition/Remediation
- Regulatory & Enforcement Assistance
- Solid Waste Planning, Design & Management
- Water Supply Development, Treatment, Pumping, Distribution
- Construction Inspection, Oversight & Management
- Operation, Maintenance, Repair of Water & Wastewater Systems

photo credit: Bret Clancy



CLIMATE RESILIENCY

transform your environment

Weston & SampsonSM



climate modeling

risk & vulnerability assessments

planning

design guidelines

public engagement

design & adaptation

mitigation & sustainability

ADAPT. SURVIVE. THRIVE.

Weston & Sampson's climate resiliency services support creating designs that adapt, survive, and thrive both chronic and catastrophic changes in the natural environment. Since 1899, Weston & Sampson has been providing municipalities, public agencies, and private sector clients along the East Coast with cost-effective and innovative solutions to their infrastructure and environmental challenges.

Our climate resilience practice provides several interdependent services, including: Climate Modeling, Risk and Vulnerability Assessments, Planning, Design Guidelines, Public Engagement, Design and Adaptation, and Mitigation and Sustainability.

Weston & Sampson's interdisciplinary team of engineers, scientists, climate specialists, architects, landscape architects, designers, and planners incorporate relevant climate models and data into the design of our infrastructure and facility projects. We work with our governmental (municipal and state) clients to study, plan, and implement resilient and cost-effective strategies for their infrastructure, buildings, and natural resources.

What is climate resiliency in practice

- Model climate scenarios, assess risk, and develop plans and strategies
- Design projects to adapt to new design criteria and manage uncertainty
- Emphasize natural systems to mitigate climate impacts and create value

Our design approach

- Evaluate current and future climate risk
- Conduct a regulatory review
- Establish basis of design for climate resilience
- Propose actionable design recommendations



climate modeling

- Climate projections using global climate models (GCMs)
- Coastal modeling using sea level rise (SLR) projections
- Cumulative probability/risk analyses with climate projections
- Estimating climate impacts to water quality
- Estimating impacts of extreme precipitation and/or SLR on groundwater
- Extreme precipitation analyses (H&H modeling)
- Future & extreme wind analyses
- Future drought analyses & impacts to water supply
- Heat analyses (UHI modeling)
- Visualization and analysis of climate projections



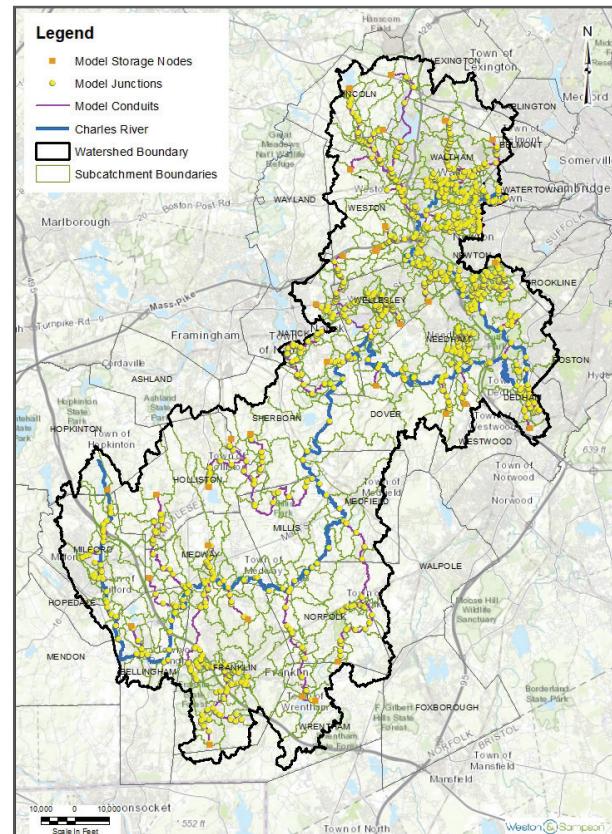
A field team member measuring the diameter of a culvert

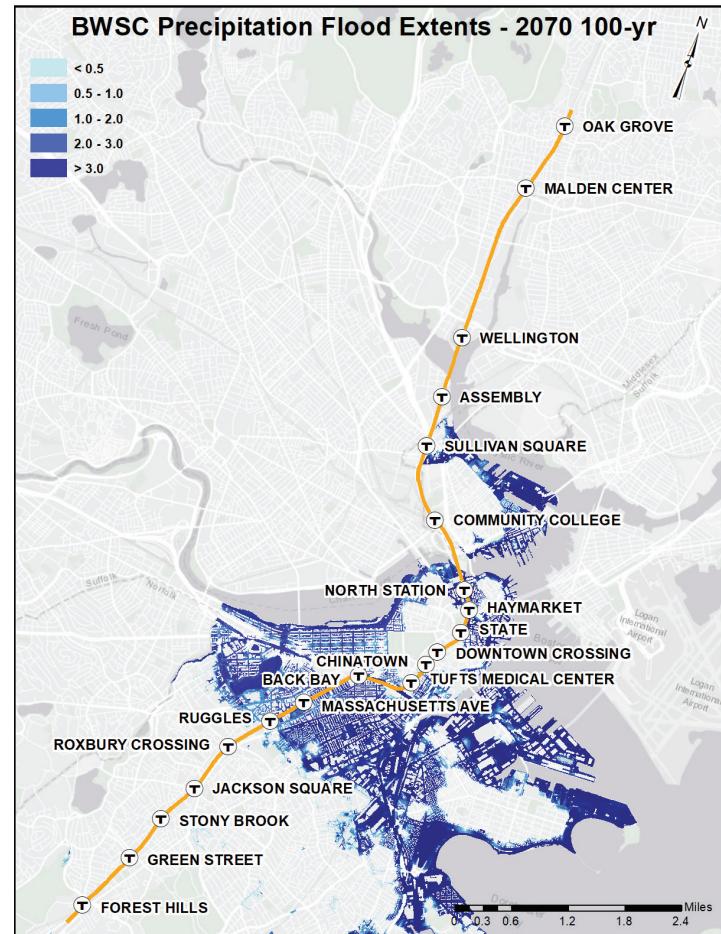
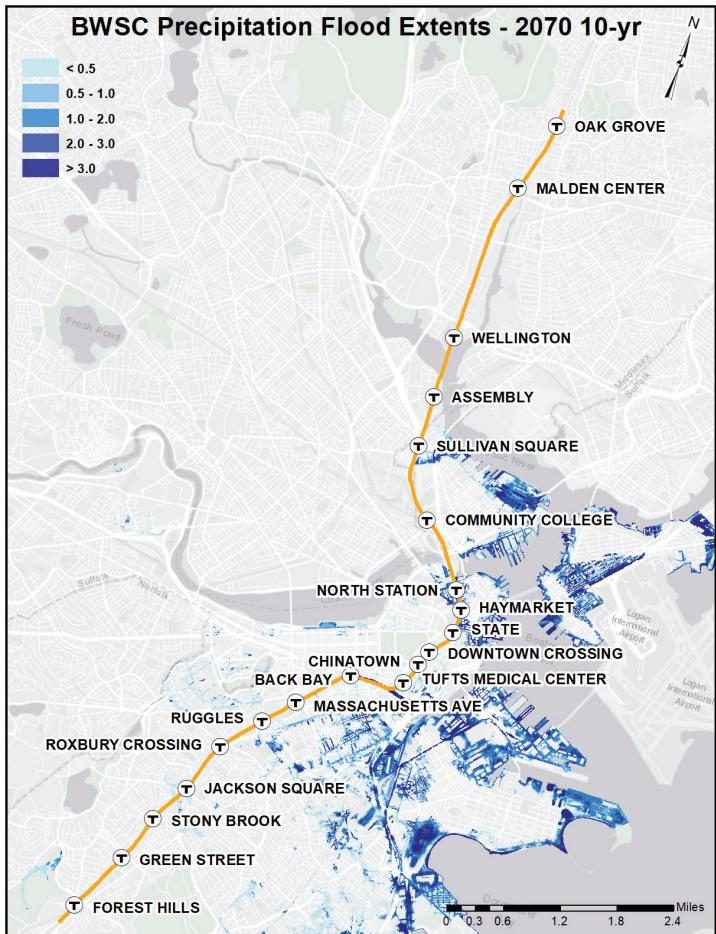
Urban Heat Island Mitigation | City of Chelsea, MA
Transportation . Resiliency . Planning . Architecture

Charles River Watershed Flood Model | MA

Water . Resiliency . Planning

View the ArcGIS StoryMap [here](#),
Green Infrastructure StoryMap [here](#),
and the Charles River Flood Model Viewer [here](#).





MBTA Orange Line Vulnerability Assessment | City of Boston, MA
Planning . Resiliency



risk & vulnerability assessments

- Adaptive capacity and sensitivity assessments - buildings, natural resources, infrastructure, or community
- Applying ICLEI framework
- Applying ISO 31000 framework
- Applying transportation vulnerability assessment tool (VAST) framework
- Applying water and wastewater risk assessment tool (VSAT) framework
- AWIA risk and resilience assessments
- Consequence evaluation criteria
- Criticality analyses
- Installation Energy and Water Plans (IEWP) - military installation assessments
- Risk assessment (probability/consequence - different levels)



Church Creek Drainage | Charleston, SC
Water . Planning . Public Engagement . Resiliency



planning

- AWIA emergency response plan updates
- Capital improvement plans/asset management
- Cost-benefit analyses (FEMA or otherwise)
- Economic impact analyses (using economic models, such as IMPLAN)
- Establishing alternative governance structures for implementing resilience
- Financial capability analyses
- Grant applications
- Hazard mitigation planning
- Implementation roadmaps using climate projections/tipping points
- Integrating resilience and sustainability into master plans
- Local food systems analysis
- Municipal vulnerability preparedness (MVP) planning
- Open space planning
- Resilience funding/financing analyses
- Zoning/by-laws/regulations update recommendations



Strawberry Brook Resilient Stormwater Management & Implementation Plan | City of Lynn, MA

Water . Planning . Resiliency

View the ArcGIS StoryMap [here](#).



ONE: INTRODUCTION

The City of Boston through the Office of Emergency Management (OEM) prepared a Natural Hazard Mitigation Plan (NHMP) to create an action roadmap to reduce the impacts of natural hazards and climate change within the community and the region. This project is funded by a Federal Emergency Management Agency (FEMA) grant.

What are...?



Natural hazards can include flooding, extreme wind events, winter weather, earthquakes, fires, extreme temperatures, drought, and more.



Hazard Mitigation is the effort to reduce impacts from natural hazards through planning, policy, education, infrastructure projects, and more.



A Natural Hazard Mitigation Plan (NHMP) is a document that reduces risks and vulnerabilities associated with natural hazards and climate change to protect homes, businesses, and the critical infrastructure that keeps our City running.



Resilience is the ability to withstand and recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.

1.1 What is a Natural Hazard Mitigation Plan?

Natural hazards, such as earthquakes, hurricanes, flooding, and flooding can result in loss of life, disruptions to everyday life, and property damage. Hazard mitigation is the effort to reduce these impacts through community planning, policy changes, education programs, infrastructure projects, and other activities (FEMA, 2021). Natural hazard mitigation planning uses a stepped process with the participation of a wide range of stakeholders:

1. define local hazards
2. assess vulnerabilities and risks
3. review current mitigation measures
4. develop priority action items

The resulting plan and implementation of action items saves lives and money. For every dollar spent on federal hazard mitigation grants, an average of six dollars are saved (NIBS, 2019).

EVERY \$1 SPENT ON MITIGATION



SAVES \$6 ON DISASTER RECOVERY



Benefits of Natural Hazard Mitigation Planning

Increases public awareness of natural hazards that may affect the community

Allows state, local, and tribal governments to work together and combine hazard risk reduction with other community goals and plans

Focuses resources and attention on the community's greatest vulnerabilities

What is...?

Climate change

According to the 2016 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan (SHMCAP), climate change is "a change in the state of the climate that can be identified by statistical changes of its properties that persist for an extended period, whether due to natural variability or as a result of human activity." Climate change is a consideration for the NHMP development process, making it necessary to consider climate change predictions even for a five-year plan.

Climate adaptation

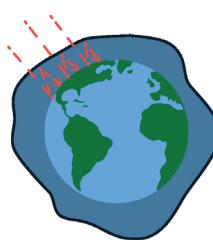
An action that seeks to reduce vulnerability to risk from anticipated climate impact. This may include flood barriers, living shorelines, elevated buildings, and increased tree canopy.

Wondering what's in the plan?
See page 14!



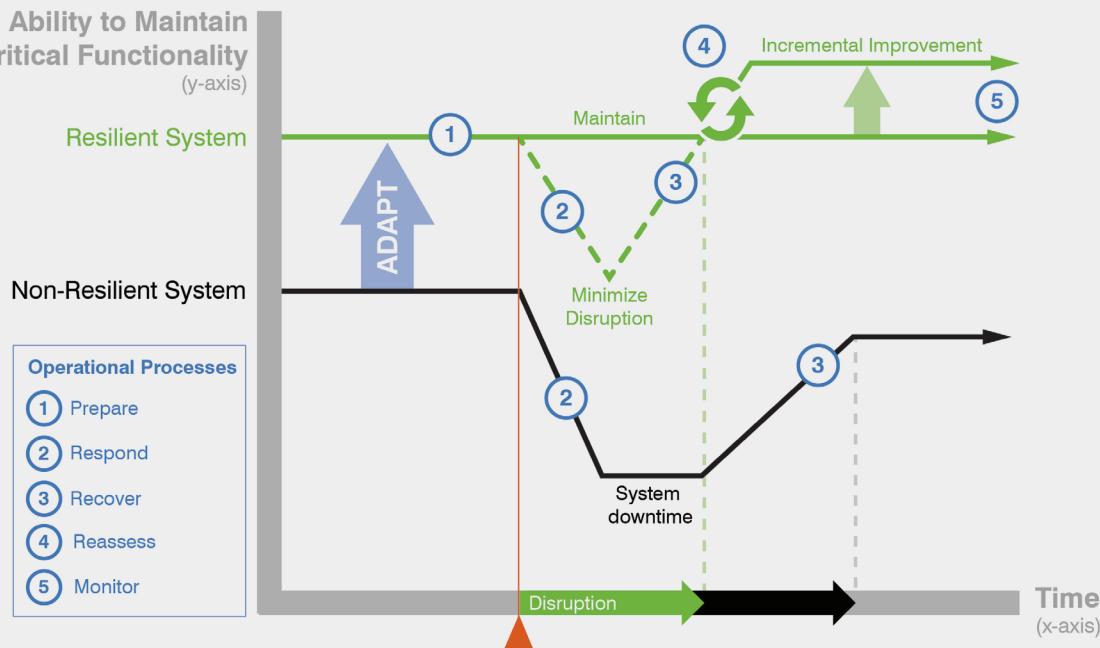
By completing an NHMP, municipalities also become eligible for specific federal funding which allows the use of potential funding sources to reflect a community's priorities (FEMA, 2020). Hazard mitigation funding is available through the Federal Emergency Management Agency (FEMA). To be eligible for FEMA Grants, local governments are required to prepare an NHMP meeting the requirements established in the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000. Please refer to Chapter 7 for more information on FEMA grants and other potential funding sources.

Many of the hazards that Boston commonly experiences are projected to worsen due to climate change. Climate change refers to changes in regular patterns of weather that are attributed to warming of the Earth's atmosphere as a result of both human activity and natural fluctuations. The Earth's atmosphere has naturally occurring greenhouse gases (GHGs) like carbon dioxide (CO₂) that capture heat and contribute to the regulation of the Earth's climate. When fossil fuels (including oil, coal and gas) are burned, GHGs are released into the atmosphere and the Earth's temperature tends to increase. The global temperature increase affects the jet stream and climate patterns.



A diagram of the greenhouse gas effect

City of Boston Natural Hazard Mitigation Plan | Page 17



MBTA Bus Maintenance Facilities Design Guidelines

Resilience Section | Boston, MA

Resiliency . Planning . O&M . Transportation . Facilities . Architectural . Civil . MEP . Structural



design guidelines

- Applying existing design guidelines credits (WEDG, LEED, ENVISION, STARS, etc.)
- Case study development
- Climate adjustments/design standards recommendations
- Developing evaluation criteria
- Discipline-specific considerations
- Existing best practices/literature review
- Flexible adaptation pathways considerations
- Flowchart or process graphics development
- Forms or templates development
- O&M considerations
- Policy recommendations
- Regional coordination considerations
- Site suitability considerations
- Translating climate projections into design criteria



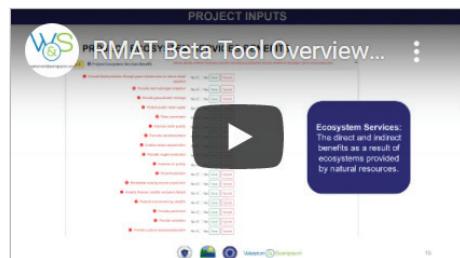
A berm rendering



Boston Public Works Guidelines
City of Boston, MA

Resiliency . Planning . O&M . Water . Transportation Infrastructure . Geotechnical . Structural . Landscape Architecture

View the guidelines [here](#)



Resilient Massachusetts Action Team Technical Support
MA Executive Office of Energy and Environmental Affairs
Resiliency . Applied Technology



public engagement

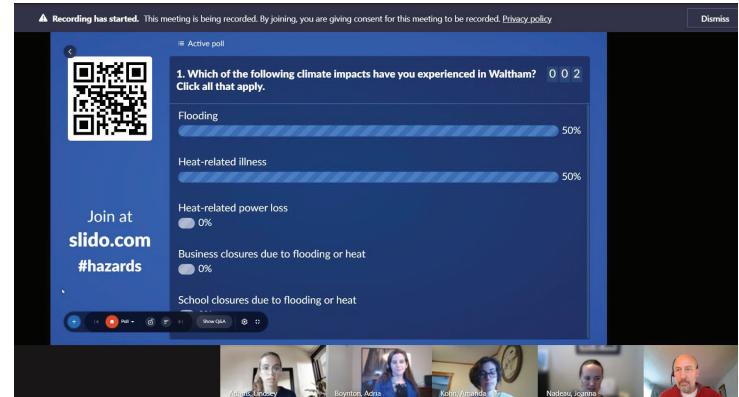
- Commitment to inclusion, diversity, equity, and access
- Data visualization and fact sheets
- Dynamic multimedia formats including videos, social media, mapping, and webpage content
- Focus groups and interviews
- Hosting site walks/tours
- Identifying stakeholders and building partnerships
- In-person workshops and open houses
- Interactive engagement games and coloring pages
- Online and in-person polling and surveys
- Print media
- Synthesizing stakeholder feedback
- Translation, interpretation, and captioning support
- Virtual workshops, open houses, webinars, and related technical support



Flood Reduction Program | City of Charleston, SC
Planning . Resiliency . Water



Interactive engagement pinwheels



A virtual workshop

CAMBIO CLIMÁTICO EN FITCHBURG

¿Qué es el Cambio Climático?

Definición
El clima es el patrón de eventos climáticos observados a lo largo del tiempo.

El cambio climático es un fenómeno causado por el aumento de gases de efecto invernadero en la atmósfera de la tierra, lo que resulta en una temperatura global más alta. Las temperaturas globales afectan a corrientes de aire y patrones climáticos.

¿Cómo se refleja esto en Fitchburg?

Fitchburg experimenta connociones tanto como tensiones.

Las connociones son eventos repentinos de corto plazo que causan el mayor daño a los sistemas y poblaciones vulnerables.

Las tensiones son tendencias de largo plazo que aumentan la vulnerabilidad de la ciudad y sus residentes.

Ejemplos de connociones incluyen:

	Fitchburg experimentó olas de calor en los veranos del 2018 y '19		La temperatura promedio podría aumentar 10 °F para el 2100
	Fitchburg resistió cinco tormentas de nieve en los primeros tres meses del 2018		La tormenta de nieve del 2013 dejó a casi 400,000 residentes de Massachusetts sin electricidad
	Las fuertes lluvias en el Noreste aumentaron más de un 70% entre 1958-2010		Las sequías podrían aumentar un 75% para el 2100. Fitchburg tuvo una sequía en el 2016

¿Cómo me puedo preparar?

seguir el sitio web y redes sociales de Fitchburg

identificar el refugio más cercano

preparar kit de suministros de emergencia

reducir el consumo de energía y agua

Compartir la información con amigos y familiares

Ejemplos de estrés incluyen:

	Fitchburg tiene una importante población de justicia ambiental		Más del 12% de los residentes de Fitchburg tienen una discapacidad
	El ingreso familiar promedio es de \$ 51,412, más bajo que el promedio estatal		Casi el 18% de los residentes de Fitchburg viven en la pobreza

A fact sheet in Spanish visualizing the potential local impacts of climate change

HMP & MVP | City Fitchburg, MA
Planning . Resiliency . Water



design & adaptation

- Stormwater and green infrastructure strategies
- Conceptual adaptation strategies - cost estimation
- Conceptual adaptation strategies - visualization
- Deployable flood barriers evaluation
- Ecological restoration
- FEMA levee certification compliance evaluation
- Flood protection strategies (inland or coastal)
- Invasive species management
- Life cycle/adaptability assessment
- Living shoreline and climate migration design
- Permitting matrix and timelines
- Resilient building strategies
- Resilient infrastructure strategies
- Resilient natural resource strategies
- Resilient parks/open space strategies

Pump Station Resiliency Implementation

City of New Haven, CT

Wastewater . Resiliency . Construction



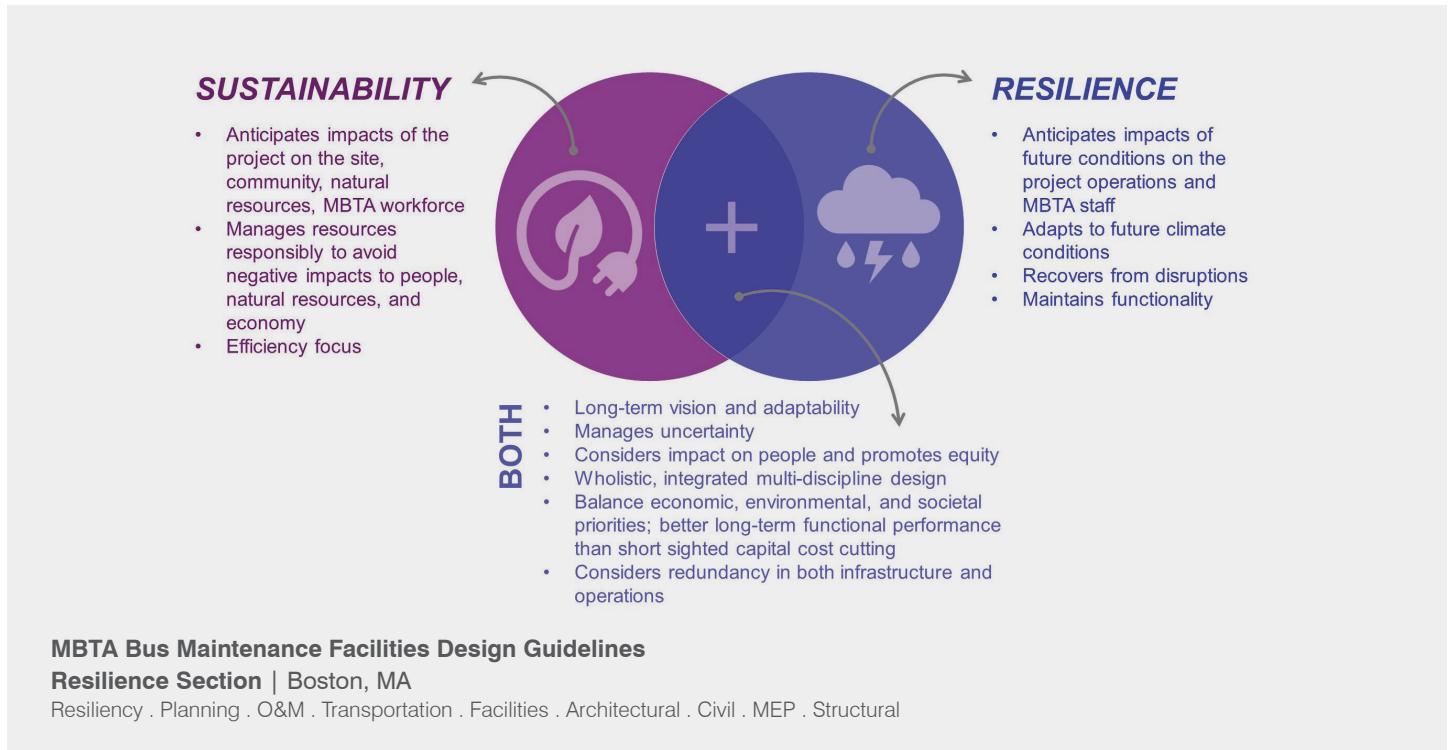
Langone Park & Puopolo Playground | City of Boston, MA

Landscape Architecture . Water . Geotechnical . Environmental . Planning . Permitting . Resiliency



mitigation & sustainability

- Carbon sequestration strategies
- Energy efficiency strategies
- Greenhouse gas/carbon emissions analyses
- Renewable energy projects
- Sustainable materials selection
- Water use reduction strategies
- Climate action planning



MBTA Bus Maintenance Facilities Design Guidelines

Resilience Section | Boston, MA

Resiliency . Planning . O&M . Transportation . Facilities . Architectural . Civil . MEP . Structural



Solar Energy Facility at a Former Coal-Fired Power Plant
City of Orlando, FL

Resiliency . Energy . Environmental . Permitting . Civil/Site



Babson College Electric Vehicle Charging Station
Town of Wellesley, MA
Water . Resiliency . Energy

REPRESENTATIVE PROJECTS

[Click here for project summaries](#)

	Climate Vulnerability Assessment	Critical Asset Mapping	Community or Stakeholder Outreach	Included Nature-Based Solutions	Action Identification and Prioritization	Supported Design or Implementation
MA DCR Vulnerability Assessment	●	●	●	●	●	●
MBTA Orange Line Vulnerability Assessment	●	●	●	●	●	●
Boston Hazard Mitigation Plan	●	●	●	●	●	
NH DES Vulnerability Assessment	●	●	●	●	●	
Resilient Cambridge Plan	●	●	●	●	●	●
MA DCAMM Statewide Resiliency Masterplan			●			
Seabrook NH Climate Vulnerability Assessment	●	●	●	●	●	
Fitchburg Flood Vulnerability Assessment	●	●	●	●	●	●
Lee County, Florida Vulnerability Assessment	●		●			
Chelmsford Sustainability Action Plan			●	●	●	●
Waltham Stormwater Resilience Master Plan	●	●	●	●	●	●
Lowell Stormwater Resilience Master Plan	●	●	●	●	●	●
Church Creek Drainage Study, Charleston, SC	●	●	●	●	●	●
NCDOT Building Resilience into the Design and Construction of Transportation Infrastructure	●			●	●	●

RESUMES



CHIP HUTCHENS, PE

Civil Engineering Coursework, NC State University
 Professional Engineer: North Carolina # 039283
 33 years of experience (4 years with firm)
 Location: Apex, NC



Kevin (Chip) has 33 years of design experience, including work in both NCDOT and private consulting firms. His experience includes work in all phases of roadway and drainage design: design of public hearing maps; and permit drawings. Chip is also a Certified Level III A&B Designer of E&S.

Key Projects:

Building Resilience into the Design and Construction of Transportation Infrastructure, North Carolina Department of Transportation (NCDOT). Advise NCDOT on integrating resilience into ongoing planning and design projects, especially regarding frequent hurricane and coastal storm events. As owner's representative, reviewing design criteria for proposed/upcoming projects across the state, developing resiliency design criteria and guidelines for transportation projects, and assisting in updating relevant standards and criteria based on most recent climate change projections.

Wastewater Treatment Plant Access Road, City of Columbia, South Carolina. Developing concept plans to maintain and improve access to the WWTP as part of a plan to improve the levee system that was breached during recent hurricane events. The overall goal of the access plan is to provide access when the surrounding area is inundated during flood events.

Preliminary FEMA Reports for Earth Roads, Charleston County, South Carolina. Assisted in the preparation of the FEMA damage assessment reports for various soil roads in the Charleston area that were damaged by widespread flooding in the Fall of 2015. Reports included damage description, cost estimate, and mitigation measures.



JEANNIE LEWIS

Graduate Studies, Environmental Science; BA, University of Virginia
 33 years of experience (2 years with firm)
 Location: North Charleston, SC



Jeannie is a coastal resources expert and innovator with 30+ years of experience in the Southeast. She has in-depth knowledge of and practice in regulatory permitting and compliance, sustainable and resilient design, environmental policy, community development, green infrastructure, wildlife and water quality protection strategies, stormwater management, habitat restoration, estuarine and freshwater wetlands, cultural and historic resources, and associated legal and regulatory frameworks.

Key Projects:

SC Department of Health and Environmental Control – Ocean and Coastal Resource Management, Charleston, South Carolina. As Coastal Zone Consistency Project Manager, implemented Federal and State Coastal Zone Consistency for the South Carolina Coastal Zone Management Program as authorized under the Federal Coastal Zone Management Act of 1972, the SC Coastal Tidelands and Wetlands Act of 1977 and the SC Coastal Program Final EIS (aka Coastal Program Document) and associated regulations. Presented recommendations on technical, legal, and policy interpretations of applicable policies, statutes, and regulations.

SC Office of Resilience – Mitigate Strategies and Design of Critical Stormwater Infrastructure, City of Dillon and Dillon County, South Carolina. Currently assisting the State of South Carolina's Office of Resilience with design and engineering of a series of critical stormwater infrastructure projects to relieve flooding in the County and City of Dillon.

Stormwater Master Planning and Modeling for Resiliency, Fripp Island, South Carolina. Currently working with a team to develop a comprehensive stormwater master plan to guide drainage and flood control improvements for the next two decades on Fripp Island.

Department of Environmental Quality (DEQ), Richmond, Virginia. As Senior Program Coordinator, planned, coordinated, and monitored coastal resource management policies, programs and activities of the Commonwealth to meet lead agency responsibilities of the Virginia Coastal Program. Managed \$6M+ in coastal grant projects annually.

RESUMES



BELLA PURDY

MS, City Planning, Housing, Community and Economic Development; BS, Architecture
8 years of experience (2 years with firm)
Location: Richmond, VA



Bella is a climate resiliency specialist and urban planner with eight years of professional experience. She works with institutions, government agencies, and municipalities to address their environmental and climate concerns through adapted design, land use, and policy. Bella is passionate about community resilience and is skilled in urban design, graphic communication, spatial analysis, research, and innovative outreach. She uses these skills to convey climate change as an opportunity to create more just and equitable urban environments.

Key Projects:

Climate Adaptation Roadmap, Hull, Massachusetts. Serving as project manager in supporting the Town of Hull in developing a climate adaptation roadmap that explores design alternatives for the area to reduce the impacts of sea-level-rise, storm surge, and precipitation based flooding. Design alternatives may include physical interventions such as raising roadways or extending sea walls or residential property changes through home elevations or managed retreat.

Long Beach Island Resilience Plan. Led a regional social vulnerability assessment for the Long Beach Island area as a component of their resilience plan. In addition, developed innovative community outreach strategies to be used during the COVID-19 pandemic. The Long Beach Island plan is a comprehensive climate resilience effort evaluating multiple scenarios for protecting the barrier beach communities of Long Beach Island. (with former employer)

Citywide Climate Resilience and Preparedness Plan, Cambridge, Massachusetts. Led the development of the 'Prepared Communities' and 'Greener City' portions of Cambridge's citywide climate plan. These plans included policy, program, and project recommendations for enhancing the resilience of Cambridge residents and increasing the amount of tree canopy cover and green infrastructure in the city. Led workshops with municipal staff and stakeholders to gather input. In addition, conducted a social vulnerability assessment of Cambridge residents and mapped community organizations and resources citywide and evaluated their flood risk. (with former employer)



ANNA KIMBELBLATT, CFM

MS, Environmental and Sustainability Studies; BA, Biology
ASFPM Certified Floodplain Manager
7 years of experience 1 year with firm



Anna is a Resiliency Planner and Certified Floodplain Manager with over three years of experience in resilience planning and floodplain management. Her expertise includes hazard mitigation planning, Community Rating System administration, National Flood Insurance Program administration, flood mitigation, retrofitting, resilience integration via regulatory tools, sustainable and resilient design, smart growth initiatives, and low impact development. She also has experience with public outreach, community engagement, and grant administration.

Key Projects:

Resilience Planning, Charleston County, South Carolina. Floodplain Management Coordinator participating as a member of the Charleston County Resilience Committee. Attended all monthly Committee meetings. Extensively researched possible strategies and initiatives that would increase the resilience of Charleston County. Worked in conjunction with other committee members to comprehensively review the County's building, floodplain, and development ordinances for opportunities to integrate resilient strategies and initiatives. These opportunities were then presented to Charleston County Council and new ordinance language to include resilience strategies and initiatives was drafted. Met with stakeholders to discuss potential changes to the ordinances. Addressed questions and concerns from both stakeholders and Charleston County Council members. (With previous employer)

Sea-level Rise Mitigation and Adaptation Planning, Charleston, South Carolina. Graduate Assistant conducting a study on sea-level rise mitigation planning in South Carolina. Compiled and reviewed all available comprehensive plans from the coastal counties of South Carolina. The plans were analyzed quantitatively for the presence of regulatory tools or development standards that would contribute to sea-level rise mitigation or adaptation. Planners and other relevant stakeholders across the coastal counties of South Carolina were interviewed for their experience with sea-level rise planning. The analysis contributed to her master's thesis, Sea-level Rise Mitigation and Adaptation Planning in South Carolina Using Regulatory Tools and Land-use Optimization. (With previous employer)

RESUMES



LUCAS HERNANDEZ

MS, Environmental and Sustainability Studies; BS, Environmental Technology & Management
5 years of experience (1 year with firm)
Location: North Charleston, SC



Lucas is a Climate Adaptation and Resilience Specialist with over five years of experience in resilience planning. His expertise includes raster-based flood modeling, sustainable and resilient design, environmental monitoring, community development, green infrastructure, wildlife and water quality protection strategies, stormwater management, cultural and historic resources, and associated legal and regulatory frameworks. In addition, he has experience with public outreach, community engagement, and grant administration. Lucas has worked with diverse stakeholders across numerous projects throughout the Southeast.

Key Projects:

Resilience Planning, Kiawah Island, South Carolina. Resilience Specialist responsible for chairing the Adaptive Management Plan Task Force, coordinating stakeholder engagement, and developing Kiawah Island's Resilience Plan.

Understanding Coastal Resilience and Natural Disaster Preparedness Through Raster-based Flood Modeling, Kiawah Island, South Carolina. Responsible for developing high-resolution flood models using GIS and LiDAR data for various storm surge, sea level rise and designed rainfall scenarios. This grant came as an extension to an existing College of Charleston Grant from NOAA to create flood models and public engagement sessions for the City of Charleston, Folly Beach, North Charleston, and Mt. Pleasant.

Church Creek Flood Storage and Resiliency Project, Charleston, South Carolina. Climate Adaptation and Resilience Specialist, helping to implement flood storage and resiliency measures in the Church Creek Basin to mitigate flooding in the surrounding community.

Flood Mitigation Stormwater Projects, Kiawah Island, South Carolina. Resilience Specialist responsible for mapping drainage infrastructure and modeling flood scenarios for various sea level rise and designed storms for the Kiawah Island Community Association's Water Management Task Force.

Community Flood Modeling Exposition, Mt. Pleasant, South Carolina. Responsible for developing high-resolution flood models and participating in community outreach and engagement. This effort was funded by a National Oceanic and Atmospheric Administration Regional Coastal Resilience Grant obtained through the S.C. Sea Grant Consortium on behalf of the Charleston Resilience Network.



RAED EL-FARHAN, PHD

PhD, Environmental Engineering; MS, Environmental Engineering; BS, Civil Engineering
28 years of experience (3 years with firm)
Location: Virginia Beach, VA



Raed is a seasoned expert in water resource management and engineering with specific expertise in civil works planning. He has worked for more than 28 years in roles of increasing responsibility as a consultant, professor, and researcher. His areas of in-depth professional interest are ecosystem restoration; water resources; stormwater management; water and wastewater treatment systems; water quality permitting and compliance; aquatic chemistry, and the fate and transport of contaminants in the environment.

Key Projects:

National Model for Resiliency and Innovation, Newport, Rhode Island. Served as primary advisor and one of the architects for an alternative project delivery approach for a redevelopment project in Newport, one of America's most important coastal hubs. Addressed environmental challenges, as well as the challenge of revamping local infrastructure to support markets that new technology has introduced.

Marsh Island Restoration, National Oceanic and Atmospheric Administration (NOAA), Fairhaven, Massachusetts. Served as the principal-in-charge for QA/QC on the Marsh Island restoration project in Fairhaven under a NOAA DARRP IDIQ contract focused on environmental restoration.

Climate Change Impact on Hydrology and Nutrient Transport, Lake Simcoe Watershed, Lake Simcoe Region Conservation Authority, Ontario, Canada. Program manager for a study to model the impacts of climate change on the total phosphorus loading in Lake Simcoe. Work consisted of selecting the climate change models and scenarios, developing future local climates (downscaling), and implementing the calibrated model to assess the impacts of climate change on the hydrology and total phosphorus transport.

RESUMES



LINDSEY ADAMS, EIT, CESSWI

BS, Civil Engineering

7 years of experience (4 years with firm)

Location: North Charleston, SC



Lindsey is a Resiliency Engineer with Weston & Sampson working on interdisciplinary climate adaptation projects. Lindsey's background includes environmental engineering, conservation, and sustainability. She has seven years of experience in resiliency engineering, environmental permitting, and wetland delineating. Her expertise includes CAD design, GIS mapping, stormwater modeling, wetland delineations, stream assessments, hazard mitigation planning, municipal vulnerability preparedness planning, and stormwater pollution prevention planning.

Key Projects:

Resilient Massachusetts Action Team (RMAT): Technical Support, Executive Office of Energy and Environmental Affairs (EOEEA), Massachusetts. Resiliency engineer for the RMAT Technical Support project for the Massachusetts EOEEA, which will advance priority actions from the State Hazard Mitigation and Climate Adaptation Plan for climate resilient projects throughout the Commonwealth. Work includes developing consistent standards for using climate projection data, guidelines, and best practices for implementing the climate resilient standards, and a resilient benefit evaluation web-based tool for use in capital planning.

Building Resilience Across the Charles River Watershed, Massachusetts. Resiliency engineer assessing climate resilient strategies across the watershed. The scope of work included modeling present and future rain events in the watershed, and developing green infrastructure to mitigate the current and future flooding. Also assisted in developing public engagement materials and final project deliverables.

East Boston Technical Analysis and Resilient Design, Boston, Massachusetts. Developed public-facing engagement materials to present flood mitigation solutions in East Boston. The project scope involved the development strategies to mitigate flooding from storm surge, sea level rise, and increased precipitation in Boston Harbor, while maintaining a publicly accessible waterfront.

Claypit Brook Climate Resilient Stormwater Management Capital Improvement Plan, Lowell, Massachusetts. Aided in the development of an H&H model to better understand the flow in the Claypit Brook during current and future climate conditions. Developed solutions to provide flood reduction through nature-based solutions.



ROBIN SEIDEL

MS, Architecture; BA, Communication, Law, Economics, and Government

13 years of experience (3 years with firm)

Location: Reading, MA



Over the past 13 years, Robin has been at the forefront of integrating resilience into design and planning. She focuses on not only addressing climate change but also ensuring that her projects benefit environmentally disenfranchised populations. She has technical expertise in city resilience, building and infrastructure adaptation, vulnerability assessments, sustainable design and mitigation strategy, transportation, and stakeholder engagement. Robin has led several vulnerability assessments and community engagement projects focused on climate resiliency, including environmental justice initiatives.

Key Projects:

Charles River Regional Watershed H/H Model, Charles River Watershed Association (CRWA), Massachusetts. Worked with 15 communities to develop a regional watershed model to provide technical information about where and when precipitation driven flood-risk in the watershed will be expected to be exacerbated by climate change. Provided engagement support to develop a comprehensive and synergistic approach to preparing and adapting to climate change.

Resiliency Study for the Department of Public Works, Salem, Massachusetts. Performed a vulnerability assessment of the existing Department of Public Works facility to determine if this existing site could be modified and maintained. This study included a gap analysis of the MC-FRM and existing FEMA floodplain inconsistencies, an analysis of total storm depths by recurrence interval for present and calculated future projections, existing conditions assessment and alternatives analysis. Adaptation strategy recommendations and costs were provided to help inform future decision making.

Coastal Resilience Solutions for East Boston and Charlestown, Downtown and North End, Boston, Massachusetts. Provided design assistance for the City of Boston's climate change adaptation project. The goal of the project was to design coastal flood protection systems that also provide social, economic, and environmental benefits for four high-risk neighborhoods.

Assisted in resilient design and cost estimation for coastal flood protection systems, including berms, deployable flood walls, and elevated parks, presented and prepared graphics for public workshops. (with former employer)

RESUMES



STEVEN ROY, LEED AP

MS, Water Resources; BS, Forest Hydrology
 Municipal Vulnerability Preparedness (MVP) Certified Provider
 42 years of experience (5 years with firm)
 Location: Portsmouth, NH



Steven has more than 40 years of professional experience in environmental program management and administration, specializing in water resources management, stormwater management, water conservation, and environmental impact assessment. His work focuses on the assessment of water resource impacts from land use activities. He has conducted policy analyses and regulatory program reviews for state and local governments.

Key Projects:

East Boston Climate Resilient Waterfront Design and Feasibility Study, Boston, Massachusetts. Technical reviewer for the development of preliminary design plans and alternatives to two identified coastal flood pathways in East Boston. Participated in client meetings and presentations and conducted technical reviews of work products and flood adaptation concept designs.

Resilient Massachusetts Action Team (RMAT): Technical Support, Executive Office of Energy and Environmental Affairs (EOEEA), Massachusetts. Green Infrastructure & Climate Adaptation Technical Leader for the RMAT Technical Support project for the Massachusetts EOEEA, which will advance priority actions from the State Hazard Mitigation and Climate Adaptation Plan for climate resilient projects throughout the Commonwealth. Work includes developing consistent standards for using climate projection data, guidelines and best practices for implementing the climate resilient standards, and a resilient benefit evaluation web-based tool for use in capital planning.

Development of Climate-Resilient Design Standards and Guidelines, Boston, Massachusetts. Technical Lead responsible for assisting the Boston Public Works Department in their efforts to establish climate-resilient design standards guidelines for managing segmental adaptation projects to achieve approximately four feet of flood protection by 2070, with the option to add an additional two feet in the future.



JULIE EATON ERNST, PE

ME, Geotechnical Engineering; BS, Civil and Environmental Engineering
 Municipal Vulnerability Preparedness (MVP) Certified Provider; Professional Engineer
 10 years of experience (10 years with firm)
 Location: Reading, MA



Julie is a Resilience Team Leader at Weston & Sampson and is the champion of the firm's internal Climate Resilience Strategic Initiative. For more than a decade, her professional and academic experience has included exploring climate change resiliency and adaptation from the dual perspective of policy/planning and design/ engineering. Julie specializes in using a risk-based approach to assess, identify, and prioritize adaptation strategies. A Professional Engineer and MVP Certified Provider, she is responsible for providing targeted engineering services related to resiliency, including the identification of flexible, engineered adaptation strategies, preparing multi-hazard vulnerability and risk assessments, and developing climate resilience guidelines.

Key Projects:

Climate Change Vulnerability Assessment & Adaptation Planning, Lynn Economic Development and Industrial Corporation, Massachusetts. Lead engineer for this resilience planning project, funded through a Coastal Zone Management Grant, which involved identifying and prioritizing projects and regulatory/policy changes that will provide long-term increases in coastal resiliency. Developed a plan to minimize current and future risks; provide a mechanism to guide future planning efforts; identify climate change vulnerability and risk; increase public support for allocating resources for smart planning and development; evaluate specific measures to improve coastal resilience; and support development of sustainable elements of the city's waterfront plan.

Resilient Design for Langone Park & Puopolo Playground, Boston, Massachusetts. Resilient design lead responsible for working with the Boston Parks and Recreation Department to provide climate-resilient and/or sustainable designs as part of the complete refurbishment of this signature waterfront park in Boston's historic North End. Design efforts include lighting, benches, interpretive signage conveying the unique historical and environmental heritage of this site, and coastal resilient strategies.

East Boston Resilience Technical Analysis, Boston Planning & Development Agency (BPDA), East Boston, Massachusetts. Served as the lead resiliency engineer and assistant project manager with the design team and City of Boston to identify practicable solutions at two vulnerable locations along Easton Boston's waterfront: Carlton Wharf and Lewis Mall.

RESUMES



INDRANI GHOSH, PHD

PhD, Environmental Engineering; MS, Environmental Engineering; BS, Materials & Metallurgical Engineering
Municipal Vulnerability Preparedness (MVP) Certified Provider
18 years of experience (4 years with firm)
Location: Boston, MA



Indrani has 18 years of experience in climate change resiliency projects, specializing in leading interdisciplinary teams and stakeholders through risk-based prioritization of adaptation solutions. She has industry-leading experience in translating climate change projections to engineering design criteria for new and existing infrastructure and modeling climate impacts for the purposes of vulnerability assessment and adaptation planning. She has worked with numerous municipalities and public agencies to model their exposure to coastal and stormwater flooding, using the best available and most appropriate sea level rise, storm surge, and rainfall projections.

Key Projects:

Building Resilience into the Design and Construction of Transportation Infrastructure, North Carolina Department of Transportation (NCDOT). Advising NCDOT on integrating resilience into ongoing planning and design projects statewide, especially regarding frequent hurricane and coastal storm events. As owner's representative, reviewing design criteria for proposed/upcoming projects across the state, developing resiliency design criteria and guidelines for transportation projects, and assisting in updating relevant standards and criteria based on most recent climate change projections.

Coastal Climate Change Vulnerability Assessments and Adaption Plans, Various Locations, Massachusetts and Connecticut. Served as technical lead for projects in Duxbury, Gloucester, Hingham, Hull, Marshfield, Oak Bluffs, Scituate, and Swampscott, Massachusetts, and Waterford, Connecticut. Led coastal flood modeling and mapping tasks, including the development of appropriate sea level rise and storm surge scenarios for present, medium-, and long-term time horizons. The resulting models and maps were used to assess the vulnerability of public infrastructure and natural resources and prioritize adaptation planning efforts. (with former employer)

East Boston Resilience Technical Analysis, Boston Planning & Development Agency (BPDA), East Boston, Massachusetts. Provided climate/coastal resiliency support, working in collaboration with the design team and the City of Boston to identify practicable solutions at two vulnerable locations along East Boston's waterfront: Carlton Wharf and Lewis Mall.



JOHN FREY

MA, Landscape Architecture; BA, Studio Art
11 years of experience (3 years with firm)
Location: Boston, MA



John is a project landscape architect with 11 years of experience. He specializes in drainage, flood protection and resilient infrastructure planning and design for clients throughout the United States, Australia, Denmark, Germany, Norway, and Sweden.

Key Projects:

East Boston Resilient Waterfront Design and Feasibility Study, Boston, Massachusetts. Resiliency design lead for developing coastal protection concepts for two waterfront sites in East Boston. The project through Boston Planning and Development Agency (BPDA) used the most recent Flood Risk Models to define design flood elevations as a basis for design. Coastal protection was integrated into newly envisioned waterfront urban spaces and involved community engagement to create needed programming with public consensus. The project included 60% Design with estimates of probable costs and provided guidance on implementation and funding sources.

Watts Branch Flood Protection and Resilient Infrastructure Planning; Client: DOEE, USACE, Silver Jackets; Washington, District Columbia. Project Manager, Landscape and Urban Designer, Climate Adaptation Specialist. Assisted in the Watts Branch Catchment utilizing his technical expertise in resilience, green infrastructure and advanced flooding calculation and flood risk assessment. The project also included the conceptual design of pilot projects. (with former employer)

Burrabogie Island Climate Adaptation and Coastal Protection, Victoria, Australia. Landscape Designer and Climate Adaptation Specialist. Developed concept coastal flooding adaptation designs for Burrabogie Island, located in the Gippsland Lakes, Victoria, Australia. The project involved identifying possible adaptation options, assessing flood risks to the island, developing selection process methodologies to determine a preferred adaptation options, running community engagement workshops and preparing concept design drawings of the preferred adaptation option. (with former employer)

RESUMES



JOANNA NADEAU, AICP

MS, Planning; BA, Biology

Certified Planner with the American Institute of Certified Planners (AICP)

20 years of experience (3 years with firm)

Location: Reading, MA



Joanna is an environmental planner and sustainability/resiliency specialist with experience in community planning, technical assistance, policy analysis, program development, environmental education, and public engagement. She routinely works with engineers and technical experts, government officials, non-governmental organizations, resource managers, and the public to develop and implement resiliency and sustainability plans and projects.

Key Projects:

Sustainable Community Action Plan, Hilton Head, South Carolina. Developed community sustainability assessment, assessed existing plans, and reviewed community input to assist the town in developing a Green Blueprint, a holistic plan for community sustainability actions. Conducted briefings and workshops for town staff and local residents on community natural resource and sustainability assessments and to incorporate stakeholder input into plan priorities. Developed implementation and monitoring plan for the Green Blueprint, including creation of community-specific sustainability metrics. (with former employer)

Community Comprehensive Plan and Zoning Update, North Providence, Rhode Island. Project Planner for update of the local plan of development. Revisions involve a full update of the town's current plan, approval through the Rhode Island Division of Statewide Planning and significant public involvement. This project also includes a comprehensive update of the Town's Zoning Ordinance and Development Regulations.

Comprehensive Master Plan Update, Westfield, Massachusetts. Project Planner for update of the local plan of development. The City of Westfield had not updated their master plan in over 50 years. Revisions involve a full update of the city's current plan. This project will add sections for energy, climate change, and water supply among others. It also includes a significant public engagement element.

Resilient Master Plan and Open Space and Recreation Plan, Westhampton, Massachusetts. Project Planner for preparation of a resilient local plan of development as well as an open space and recreation plan. This is the Town of Westhampton's first-ever master plan. Development of the plan includes sections on agriculture, forestry, mining, climate change, economic development, energy, facilities and services, historic and cultural resources, housing, natural resources, open space, recreation, and transportation.



MICHAEL ZEHNER, AICP

Civil Engineering Coursework

Certifications: American Institute of Certified Planners, Environmental Sustainability Professional

23 years of experience (2 years with firm)

Location: Kitty Hawk, NC



Michael has led planning activities in North Carolina, Georgia, Massachusetts, and Virginia. Prior to joining the Berkley Group, Michael served as Director of Planning and Development for the Town of Nags Head, North Carolina, managing the Town's current development and long-range planning activities, as well as working to implement hazard mitigation and resiliency goals.

Key Projects:

- Outer Banks Regional Hazard Mitigation Plan, Nags Head, NC
- Decentralized Wastewater Management Plan Update, Nags Head, NC
- Estuarine Shoreline Management Plan, Nags Head, NC
- CAMA Land Use Plan Update and Permit Administration, Nags Head, NC
- Floodplain Administration and Ordinance Development, Nags Head, NC
- Disaster Preliminary Damage Assessment, Hurricane Dorian, Nags Head, NC
- Downtown Enhancement Plan, City of Lexington, VA
- Resilience Plan Development, Colonial Beach, VA
- Hazard Mitigation Plan, George Washington Regional Commission, VA
- HIRA, Commonwealth Regional Council, VA
- Utility-Scale Solar Land Use Tool Updates, Pueblo County, CO
- Third-Party Application Review Services, Pueblo County, CO
- "40R" Smart Growth Overlay District Bylaw, Town of Wellesley, MA
- Large-Scale Solar Overlay Bylaw, Town of Wellesley, MA
- Housing Production Plan, Town of Wellesley, MA
- Unified (Comprehensive) Plan, Town of Wellesley, MA