

Municipal Vulnerability Preparedness Program Action Grant Case Study

Municipality: City of Chelsea & City of Everett

Project Title: Island End River Flood Resilience Project

Award Year (FY): 20-21

Grant Award: \$ 454,555.00

Match: \$ 152,245.62

Match Source: CIP Cash (50k) & In Kind

One or Two Year Project: Two Years

Municipal Department Leading Project: City of Chelsea, Department of Housing & Community Development

Project Website URL: <https://tinyurl.com/resilientislandend> ; <https://tinyurl.com/resilientislandendES>

Community Overview:

Chelsea and Everett have partnered to comprehensively advance the design of protective coastal infrastructure, salt marsh restoration, and enhancements to open space at the Island End Park and Island End River flood pathway.

Situated north of Boston, Chelsea and Everett are both densely settled urban communities and home to expansively designated Environmental Justice Communities. As of 2017, the official population of Chelsea was 39,272 (ACS 5-Year Estimate). In actuality, the population is closer to 50,000 due to low Census response rates and undocumented community members. In total, approximately 45,324 (ACS 5-Year Estimate) people reside in the City of Everett. Both communities experience an influx of people destined for a variety of employment centers and housing every year.

All of Chelsea, and extensive portions of Everett, are designated as Environmental Justice communities. The average household income in Chelsea and Everett is \$49,614 and \$52,457, respectively. Additionally, Chelsea's entire population comprises 74.8% minority groups and 42% foreign born citizens. In Everett, 46.4% of residents are minorities and 44% are foreign born citizens. According to 2016 ACS 5-Year estimates, 69.1% of Chelsea residents speak a language other than English within their homes. In Everett, residents speaking a language other than English within their homes is 56.2%.

In addition to a composition of a diverse, multicultural populations that reside in a dense housing stock, the cities of Chelsea and Everett host a myriad of critical facilities and infrastructure of paramount importance to the region's economy and security. Principally, these assets are confined to the Island End River District and Chelsea and Everett's adjacent industrial and commercial centers. Due to the impacted area's existing support of local employment, generating local economic activity, and ensuring the continuity of vital commodities, such as energy and fresh produce, this district is precariously vulnerable. These assets, as well as peripheral residential and mixed use areas, are enveloped by existing (100-yr

FEMA) floodplains. These economically critical businesses have long, rich histories, such as the New England Produce Center, which replaced the former produce distribution center at Faneuil Hall. Interspersed with cold-storage facilities, logistics operations, recycling centers, and energy distributors, this district is an important lynchpin of the regional economy and national security. A major regional electrical power plant, the Mystic Generating Station that is located in Everett, also falls within the projected floodplain. Districgas, the Boston region's main Liquefied Natural Gas import facility, accompany this station. Many of these businesses, such as Districgas, are encapsulated within a Designated Port Area, which seeks to preserve maritime access and commerce. Relying on maritime, rail and roadway infrastructure to operate, businesses in this district are regularly served by ship, truck, and freight rail, thus highlighting the importance of protecting and preserving these critical transportation assets from flooding impacts, coastal inundation, and extreme precipitation events.

Project Description and Goals:

The Island End River Flood Resilience Project is located at the district surrounding the origination of the Island End River at the Beacham Street and Williams Street industrial and commercial centers of Chelsea and Everett. The project area includes Island End Park, alignments to the east and west of the Island End Park along Chelsea and Everett's coastal areas, as well as the immediate utility, culvert, and outfalls that make up the intricate sewer, water, and drainage infrastructure feeding into the Island End River.

This project addresses climate change impacts related to coastal flooding, tidal inundation, ecological deterioration, extreme heat, and stormwater management. Therefore, the City of Chelsea and Everett have enjoyed a highly interdisciplinary project, which, at its completion, will address a myriad of climate concerns vocalized by residents of Chelsea and Everett, and understood to be of paramount importance by the municipal staff and stakeholders of our municipalities.

The goals and tasks of the Island End River Flood Resilience Project included engineering design of Chelsea's coastal barrier, design of open spaces, and ecological restoration footprints. The project also called for deep community engagement and regional coordination to highlight the importance of this project and broader climate impacts, easements and land acquisitions associated with impacts of such coastal barrier and alignment, and a rigorous overview of permitting strategies, procedures, and execution. Our project has begun the momentous work of putting together a full construction package to implement the Island End River Coastal Barrier & Open Space project. This project, at its eventual completion, will deploy nature-based solutions through the provision of green infrastructure within freshly landscaped and improved open space and ecological restoration of salt marshes. Additionally, the project will aid in the improvement of equitable outcomes and will foster strong partnerships with EJ and Climate Vulnerable Populations in the City of Chelsea and the City of Everett. Moreover, through the creation of our Equitable Climate Resilient Framework (ECRF) and continued partnership with non-profits like GreenRoots, the project will provide regional benefits to community engagement models in the context of climate change. Additionally, the project will work

towards the preservation of a key economic sector through the protection of jobs, food and energy distribution sectors, and commercial/residential properties. Our project team has implemented public involvement and community engagement in thoughtful and comprehensive matters through engagement events, surveys, and the ECRF, and the project has completed all of these goals in a successful and timely fashion.

Results and Deliverables:

The City of Chelsea and the City of Everett, in partnership with Weston & Sampson, One Architecture & Urbanism, Mystic River Watershed Association, and GreenRoots, were successful in completing all deliverables associated with the FY21 program for the Island End River Flood Resilience Project. Below are the descriptions, quantifications, and additional links and evidence of completion of these deliverables. These deliverables are available at :

FY20

Task 1: Program Management & Financial Planning

Sub-task 1.1 Project Reporting, monthly progress meetings, executive and interdepartmental coordination

The City of Chelsea and the City of Everett coordinated with their respective consultant teams to ensure all project reporting, monthly progress meeting, and executive and interdepartmental coordination occurred for this project. Detailed in our monthly reports, we share the dates of these meetings and their contents.

Task 3: Engineering Design

Sub-Task 3.1 Subsurface Exploration

The project team worked to create a memorandum detailing the coordination and planning for geotechnical and hazardous materials investigation of the project area. This memorandum was transmitted to EEA for review and was utilized as a template to support the FY21 task in performing the actual geotechnical and hazardous materials investigation.

Sub-Task 3.2 Drawings and Specification

The project team committed intensive coordination teams both internally and externally with all necessary municipal, local, state, and federal agencies to understand the required efforts and attributes of a full drawing and specifications package for this project. This deliverable was utilized to support the roadmap to the creation of a full construction documents and specifications package for this project.

Sub-Task 3.3 Coordination with other Projects

The project team support a summary of related project coordination through the provision of monthly reports, memorandum, and detailed reporting to EEA regarding the coordination of project teams across Chelsea and Everett's myriad of open space, engineering, and planning projects which impacted the scope and efforts around the Island End River Coastal Barrier & Open Space project.

FY21

Task 1: Program Management & Financial Planning

Sub-task 1.1: Project reporting, monthly progress meeting, executive and interdepartmental coordination

The City of Chelsea and the City of Everett coordinated with their respective consultant teams to ensure all project reporting, monthly progress meeting, and executive and interdepartmental coordination occurred for this project. Detailed in our monthly reports, we share the dates of these meetings and their contents.

Sub-task 1.2 Planning construction program finance

The City of Chelsea and the City of Everett coordinated to create a Construction Finance Plan and Application for Finance. This deliverable illuminated the myriad of funding opportunities available to each municipality on an individual and regional basis. The City of Chelsea and the City of Everett have since used these deliverables to guide applications for additional design financing to complete the coastal barrier, open space, and restoration projects. Moreover, the City of Chelsea and the City of Everett intend to apply for the FEMA BRIC program this December.

Sub-task 1.3 Closeout Documentation

This Case Study, along with the close out documentation submitted to EEA justifies completion of this deliverable.

Sub-task 1.4 Cost Benefit Analysis

The City of Chelsea has worked with its consultant, Weston & Sampson, to create a memorandum codifying the approaches to a Cost Benefit Analysis under the FEMA BRIC application process. The FEMA BRIC Benefit Cost Analysis (BCA) tool, created by the federal government, externalizes the present costs of construction and compares these costs against the benefits to property damage mitigation and the preservation of key energy and food distribution activities within the projected flood plain of Island End River. This process allows for the City of Chelsea and the City of Everett to utilize this framework in our eventual application for the FEMA BRIC application.

Task 2: Community Engagement and Regional Coordination

Sub-task 2.1 Equitable Climate Resilient Framework

The project team worked closely with community leaders and community members to create the Equitable Climate Resilient Framework (ECRF). The ECRF is a resource to practitioners, City staff, and community organizations working on climate adaptation in Chelsea. The guide works within the context of Equitable Climate Resilience Planning Principles, which included: (1) Develop Pathways for Collaboration, (2) Community and Locally Grounded Solutions, (3) Collaborative & Dynamic Learning Environment, (4) Allow Equal Voice and Address Barriers for Participation, (5) Include Internationality in Problem Definition, and (6) Capacity Building. The project team coordinated with EEA and other organizations to vet the contents of the ECRF, and we believe it will serve as a useful reference document for future climate adaptation and resilience measures by the City of Chelsea and other practitioner based organizations and entities.

Sub-task 2.2 On the Ground Engagement & Sub-task 2.3 Regional Coordination

The project team worked within the confines of the Covid-19 pandemic to meet the on the ground engagement scope outlined within this project. The following outline, submitted as justification to the State of Massachusetts's Congresswoman Ayanna Pressley's Office walks through our community engagement efforts within this project and under the auspices of the MVP grant.

1. Letters of Support
 - a. Resilient Mystic Collaborative
 - i. Signed by 14 neighboring municipalities and seven non-governmental organizations in support of Chelsea and Everett's request for a Community Projects grant
 - b. Municipal Vulnerability Grant; FY20-21 Letters of Support
 - i. Chelsea Collaborative
 - ii. Marina at Admirals Hill
 - iii. The Nature Conservancy
 - iv. New England Produce Center
 - v. MassDOT
2. News & Media Sources
 - a. NBC10 Interview
 - i. <https://www.nbcboston.com/news/local/map-the-massachusetts-toxic-waste-sites-in-flood-zones/2307636/>
 - b. WGBH
 - i. <https://www.wgbh.org/news/local-news/2019/12/17/its-not-just-the-flooding-its-what-might-be-in-the-water>
 - c. Chelsea Record

- i. January 20, 2018: High Water: Recent Blizzard Storm Surge Forces Tidal Flooding to the Forefront
 - 1. <https://chelsearecord.com/2018/01/20/high-waterrecent-blizzard-storm-surge-forces-tidal-flooding-to-the-forefront/>
 - ii. March 10, 2018: Flooding Issues Must Be Solved with Regional Efforts
 - 1. <http://chelsearecord.com/2018/03/10/flooding-issues-must-be-solved-with-regional-efforts/>
 - iii. July 5th, 2019: Island End River in the Midst of Major Flood Protection Project
 - 1. <https://chelsearecord.com/2019/07/05/island-end-river-in-the-midst-of-major-flood-protection-project/>
 - iv. February 14th, 2020: Massachusetts MVP Funding A Major Boon to Mystic Communities
 - 1. <https://chelsearecord.com/2020/02/14/massachusetts-mvp-funding-a-major-boon-to-mystic-communities/>
 - v. August 20th, 2020: Island End River Work by Everett, Chelsea Gets Glowing Reviews
 - 1. <https://chelsearecord.com/2020/08/20/island-end-river-work-by-everett-chelsea-gets-glowing-reviews/>
 - vi. October 1st, 2020: City, GreenRoots join with MRWA for coastal cleanup at Island End Park
 - 1. <http://chelsearecord.com/2020/10/01/city-greenroots-join-with-mrwa-for-coastal-cleanup-at-island-end-park/>
 - vii. April 1st, 2021: Metro Mayors Mark Five Years of Climate Action, Discuss Plans for Resilient, Green and Just Recovery
 - 1. <https://chelsearecord.com/2021/04/01/metro-mayors-mark-five-years-of-climate-action-discuss-plans-for-resilient-green-and-just-recovery/>
- d. Everett Independent
 - i. September 20th, 2018: A Possible Harbinger
 - 1. <https://everettindependent.com/2018/09/20/a-possible-harbinger/>
 - ii. March 22nd, 2019: Another Sign of Climate Change
 - 1. <https://everettindependent.com/2019/03/22/another-sign-of-climate-change/>
 - iii. April 27th, 2019: Earth Day
 - 1. <https://everettindependent.com/2019/04/27/earth-day/>
- 3. Island End Park Coastal Cleanup; September 26th, 2020
 - a. Over 30 attendees were present at the Island End Park Coastal Cleanup
 - i. Participants picked up trash and debris within the coastal salt marsh area adjacent to the Island End Park open space and the Island End River waterway.
- 4. Island End Park Virtual Open House; October 21, 2020
 - a. Over 15 attendees were present at the Island End Park Virtual Open House

- i. The virtual forum walked through design alternatives and the mitigation of flooding projected within the Island End River Coastal Barrier & Open Space effort
 - ii. Community members were asked to comment and were surveyed regarding elements within landscape architecture features and overall use of the proposed new open and green space as a part of this project
- 5. Island End Park Virtual Forum, Chelsea High School; October 23rd, 2020
 - a. Over 75 students attended a forum where project team members showcased the Island End River Coastal Barrier & Open Space project and collaborated with students to discuss climate change, flooding in Chelsea, and the prospect of new open space for residents and visitors
- 6. Public Survey, Workshop #1
 - a. Over 70 Respondents to two (2) community surveys which requested information regarding the current and future use of the Island End Park Open Space and allowed for selection of design elements within the newly developed Island End Park area
 - i. Main Takeaways:
 - 1. Community members noted that access and maintenance are a main priority and issue concerning park spaces
 - 2. Connections to the surrounding streets and improvements of the current access points have been noted across outreach formats
 - 3. Surveyors recognized the need for open space in the city and are interested in protecting the park from flooding and improving it
 - 4. Among design features and programming – community members would like to see more spaces for passive recreation (benches, shade structures) and features to accommodate after sunset use (emphasis on well it and clean park spaces)
- 7. Island End Park Spring Clean Up; May 22nd, 2021
 - a. The City of Chelsea and the City of Everett, in collaboration with their project teams including GreenRoots, Mystic River Watershed Association, Weston & Sampson, and One Architecture will hold another Clean Up event in May of 2021 for residents to learn more about the project status and to bring attention to the coastal salt marsh area

Sub-task 2.4 Graphics

The project team developed a series of presentation ready graphics, which included renderings of the proposed strategies to capture the public's imagination and communicated the intent of our design. These are included in the attachment to this case study report, which also includes photos of our engagement events.

Sub-task 2.5 Coordination

The above graphics and outline of community engagement provides evidence of coordination of engagement with regional and multi-disciplinary teams.

Task 3: Engineering Design

Sub-task 3.1 Subsurface Exploration

The project team produced a memorandum codifying the subsurface exploration at the Island End Park Coastal Barrier and Resiliency Project Area. This report has been transmitted to EEA for review. The program included approximately 14 borings to assess the geotechnical and environmental conditions of the project area. The findings of this exploration are included in Weston & Sampson's memorandum.

Sub-task 3.2 Drawings and Specifications

The project team created design drawings, specifications, and a cost estimate for the coastal barrier, open space, and salt marsh restoration projects at the Island End River. The construction package was reviewed by state agencies and other permitting entities; as well as EEA and internal and external city staff and agencies.

Sub-task 3.4 Modeling

The project team provided stormwater modeling parameters to Chelsea's Department of Public Works for the use in their collated Chelsea & Everett stormwater model to assess inundation via over-land flows for current future conditions.

Sub-task 3.5 Elevated Market Street

The project team with the City of Chelsea worked with the City of Everett's project team to create conceptual designs for the design of the elevation of Market Street. The design is a crucial first step in understanding the engineering required to continue the Everett alignment and to complete the entirety of the coastal barrier.

Task 4: Easements & Land Acquisition

Sub-task 4.1 Property research, plot existing layout lines, easement plans, legal descriptions

The project team produced five documents codifying the necessary temporary, permanent, and historical easements within the project area. Easements helped to facilitate conversations with property owners, which led to considerations of the impacted area, the necessity of the coastal barrier to protect their assets, and their appetite to donate such land areas to the City of Chelsea's efforts. Base maps were updated with monuments, layout lines, and the proposed easement areas for the Bank Property, 357 Beacham Street, 145 Market Street, 359 Beacham Street, 100 Justin Drive, and 305 Commandants Way.

Sub-task 4.2 Appraisals

Preliminary work within the survey and codification of easements has enabled the City of Chelsea to continue with conversations regarding property acquisition and to assign legitimate values of appraised properties to help in facilitating the legal mechanisms through which permanent and temporary easements may be acquired for this project.

Task 5: Permits

Sub-task 5.1 Prepare permit documents, attend meetings, and coordinate draft/final submittals

The project team created and vetted permit packages with the appropriate agencies, including 1) Federal Consistency Review (CZM), 2) WPA Notice of Intent (Concom), 3) Chapter 91 License (MassDEP), 4) Section 106 PNF (MHC), 5) 404 Pre-Construction Notification (USACE), 6) 401 Water Quality Certification (MassDEP), and 7) MEPA ENF (EOEEA). To date, MEPA has moved our project from an Environmental Notification Form process to a Special Review Committee Procedure. Throughout the summer, and up to the completion of Everett's design, our municipalities will continue to lobby and move through the permitting process to make this project eligible for FEMA BRIC funds.

Lessons Learned:

As the Island End River Coastal Barrier & Open Space project evolves, the coordination of its features becomes increasingly complex. The City of Chelsea and the City of Everett have also experienced an influx and outflow of participants within the project space, consisting of an ever-changing consultant team and municipal leadership landscape. In order to maintain such roles and responsibilities within the project area, the City of Chelsea and the City of Everett are collaborating on the creation of a Memorandum of Understanding (MOU). The MOU will serve as a guidebook for the regional participation of both municipalities, with clearly defined roles and responsibilities, as well as clearly defined engineering, permitting, and stakeholder coordination necessary to ensure the proper financing and execution of the project overall. We felt that the creation of such a document is a lesson learned in the early codification of roles and responsibilities, especially in the context of complex, climate resilient infrastructure projects.

Moreover, the creation of the Equitable Climate Resilient Framework (ECRF) was a major milestone in cultivating deep and meaningful community engagement from municipal, non-profit, and stakeholder groups. We are excited to continue evolving this document as we learn more about what works, and what does not, when communicating with our community on climate change impacts. Overall, community engagement appears to work best when child care, food, entertainment, and respected community figures are incorporated within the process. Our Island End River Clean Up Event, underpinned by the installation of a public art sculpture, was a great success – and attracted a diverse cross section of community members. Moreover, we felt that simple “public meetings” transpiring maybe twice of three times over

the course of a year were simply not enough, and not exciting enough to draw the attention of the public. Rather, publicizing, and leveraging media and social media channels helped to spread the word, and attract interest from a myriad of residents and stakeholders.

Partners and Other Support:

Partners and Other Support

- City of Chelsea
 - Project Management of Grant Requirements and Project Goals
- City of Everett
 - Project Management of Grant Requirements and Project Goals
- Weston & Sampson
 - Engineering Consultant
- Dewberry
 - Engineering Consultant
- Woods Hole Group
 - Coastal Data and Analysis
- GreenRoots
 - Community Outreach and Stakeholder Engagement
- Mystic River Watershed Association
 - Community Outreach and Stakeholder Engagement
- Tetra Tech
 - Engineering Consultant
- One Architecture
 - Urban Design and Architectural Consultant

Project Photos: See Below



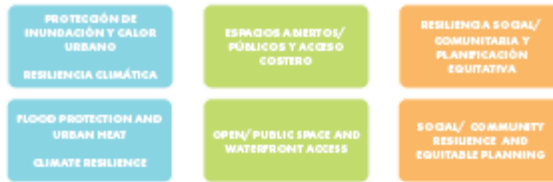
EQUITABLE CLIMATE RESILIENCY

CHELSEA & EVERETT ISLAND END RIVER RESILIENCY STUDY

ESTUDIO DE RESILIENCIA DEL RÍO ISLAND END EN CHELSEA Y EVERETT

The City of Chelsea has made planning and community development a priority. The City spearheaded the Equitable Climate Resiliency Framework to provide coordinated direction and a cohesive vision for carrying out engagement and outreach efforts for its projects. This process is closely developed with two local community and advocacy groups: GreenRoots and the Mystic River Watershed Association (MyRWA).

La Ciudad de Chelsea a hecho una prioridad la planificación y desarrollo comunitario. La Ciudad encabezó el Marco de Resiliencia Climática Equitativa para proveer dirección y una visión cohesiva para llevar a cabo esfuerzos de participación para sus proyectos. Este proceso es desarrollado cercanamente con dos grupos comunitarios y de abogacía: GreenRoots y el Mystic River Watershed Association (MyRWA).



- Long-term initiative aimed to expand the voices heard by the City
- Empower community participation
- Identify the vulnerabilities and envision goals for social and climate resilience
- Address diverse community concerns and priorities as they relate to health, climate, and livelihood

- Esta iniciativa a largo plazo pretende a expandir las voces escuchadas por la Ciudad
- Empoderar la participación comunitaria
- Identificar vulnerabilidades y visualizar metas para resiliencia climática y social
- Abordar las diversas preocupaciones y prioridades de la comunidad en lo que respecta a la salud, el clima y los medios de vida.

WHAT'S IN THE PROCESS GUIDE? ¿QUÉ HAY EN LA GUÍA DE PROCESO?

- Guiding principles for public participation in the City's climate action work.
- Ways to streamline and increase the focus and efficacy of community participation, decision-making and planning process for climate projects within the city.
- Suggested best practices to structure equitable collaboration and engagement.
- List of resource documents and recommended strategies for communication and evaluation.
- Guide to how to leverage local community organizations to create a network for outreach.



ENVIRONMENTAL JUSTICE JUSTICIA AMBIENTAL

Environmental justice communities are more vulnerable to climate change because of current inequities and societal barriers such as low-income, language barriers, health conditions, access to affordable housing, which makes them unable to bounce back from an extreme weather event, such as flood, compared to affluent communities.

Comunidades de justicia ambiental son más vulnerables al cambio climático por sus inequidades actuales y barreras sociales como ingresos bajos, barreras lingüísticas, condiciones de salud, acceso a vivienda asequible, lo que las hace incapaces de recuperarse de eventos climáticos extremos, como inundaciones, comparado a comunidades afluente.

Resilience and vulnerability are inter-connected - as resilience (capacity to bounce back after a shock) is a characteristic of a community or a system with a certain level of vulnerability. We have to study and address climate challenges holistically with social and economic inequities.

La resiliencia y vulnerabilidad están interconectadas - el resiliencia (capacidad de recuperación luego de un golpe) es una característica comunitaria o de un sistema con cierto nivel de vulnerabilidad. Nosotros tenemos que estudiar y atender los retos climáticos holísticamente con inequidades sociales y económicas.



The graphic above is adapted from Made in our World Goals: Community Resilience, Resilient & Inclusive Community Partners

CLIMATE IMPACTS - SEA LEVEL RISE AND URBAN HEAT

CHELSEA & EVERETT ISLAND END RIVER RESILIENCY STUDY

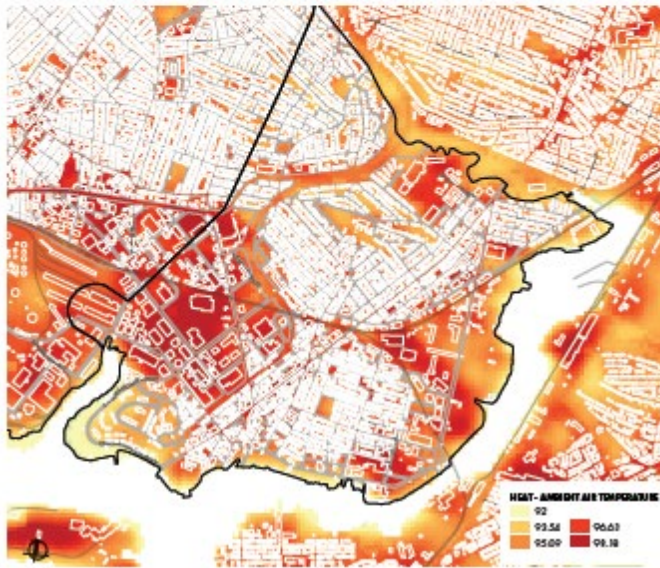
ESTUDIO DE RESILIENCIA DEL RÍO ISLAND END EN CHELSEA Y EVERETT

URBAN HEAT

AVERAGE AMBIENT AIR TEMPERATURE AT 95°F

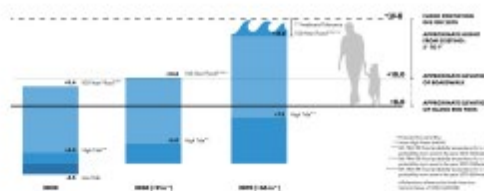
CALOR URBANO

TEMPERATURA AMBIENTE PROMEDIO DEL AIRE A 95°F



DESIGN FLOOD ELEVATION |

DISEÑO DE ELEVACIÓN DE INUNDACIÓN



2070 FLOOD PROGRESSION 1% PROBABILITY STORM |

PROGRESIÓN DE INUNDACIÓN POR TORMENTA DE 1% PROBABILIDAD EN EL 2070



C- HEAT

CITY HEAT PLANS: URBAN HEAT ISLAND MITIGATION AND ADAPTATION

ESTUDIO DE CALOR EN CHELSEA Y EAST BOSTON

Due to climate change, extreme temperatures are increasing, with a greater number of hot days in the summer (Climate Ready Boston, 2016). Extreme heat can cause heat exhaustion, cramps, stroke and even death in people of all ages, and is especially harmful to people with respiratory and cardiovascular disease (Wingard et al., 2016).

The Chelsea and East Boston Heat (C-HEAT) Study is a collaborative research project led by Boston University School of Public Health and Greenleafs. The goal of the project is to build the capacity for these communities to respond to extreme heat events with engagement of multiple stakeholders including the cities and other organizations concerned with heat in vulnerable populations.

In summer 2020 we monitored temperatures in Chelsea & East Boston outdoors and in 22 homes. We will continue this work in summer 2021 including a participatory action research project with residents on how people cope with heat. We also plan to test and evaluate solutions to help reduce heat exposure.

Debido al cambio climático, temperaturas extremas están aumentando, con un mayor número de días calurosos en el verano (Climate Ready Boston, 2016). El exceso de calor se asocia con resultados negativos a la salud, incluyendo enfermedades relacionadas al calor que resultan en visitas a la sala de emergencias para personas tanto jóvenes como mayores de edad (Wingard et al., 2016).

El Estudio Chelsea and East Boston Heat (C-HEAT) es un proyecto de investigación colaborativa dirigido por investigadores en la Escuela de Salud Pública de Boston (University) y Greenleafs. El objetivo del proyecto es crear la capacidad de estas comunidades para responder a eventos de calor extremo con implementación de varias acciones, incluyendo las ciudades y otras organizaciones interesadas con el calor y poblaciones vulnerables.

En el verano del 2020 monitoreamos temperaturas exteriores y dentro de 22 hogares en Chelsea y East Boston. Continuaremos trabajando este verano 2021 incluyendo un proyecto investigativo de participación con residentes en cómo las personas manejan el calor, también planeamos probar y evaluar soluciones para ayudar reducir exposición al calor.

WWW.C-HEATPROJECT.ORG

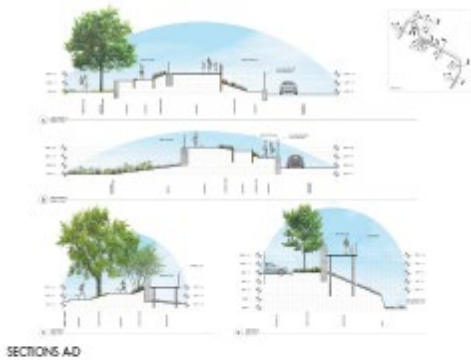
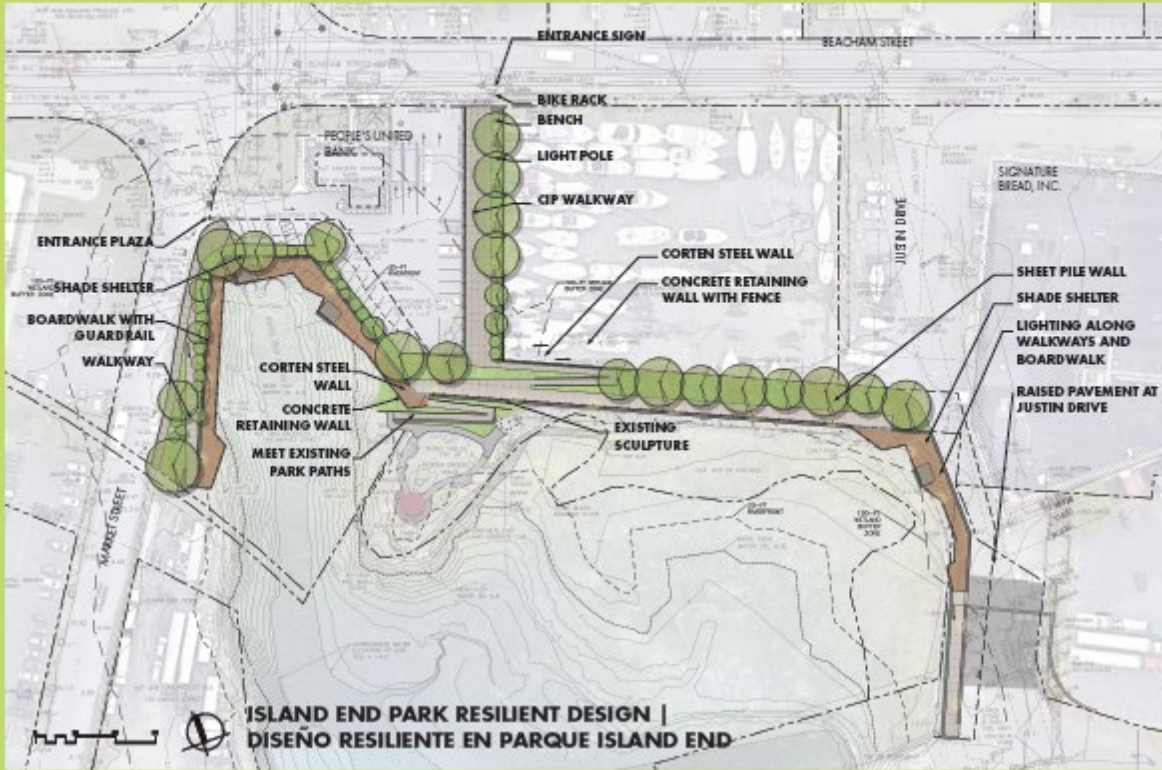
DESIGN FLOOD ELEVATION WITH SEA LEVEL RISE IN 2070 DURING 1% PROBABILITY STORM EVENT



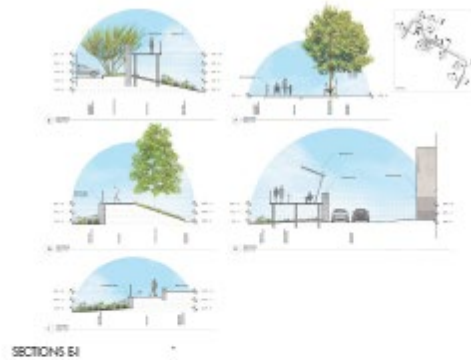
ISLAND END PARK COASTAL BARRIER

CHELSEA & EVERETT ISLAND END RIVER RESILIENCY STUDY

ESTUDIO DE RESILIENCIA DEL RÍO ISLAND END EN CHELSEA Y EVERETT



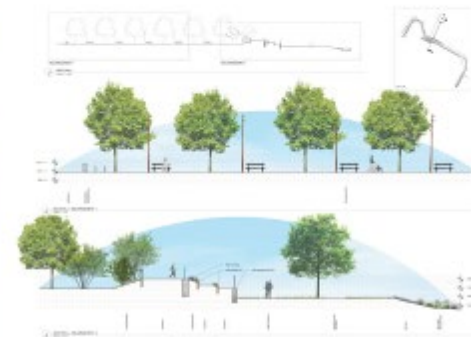
SECTIONS A-D



SECTIONS E-I



EXISTING CONDITIONS AT THE ISLAND END PARK



SECTIONS J-L

ISLAND END PARK COASTAL BARRIER

CHELSEA & EVERETT ISLAND END RIVER RESILIENCY STUDY

ESTUDIO DE RESILIENCIA DEL RÍO ISLAND END EN CHELSEA Y EVERETT



WHAT WE HEARD FROM YOU | LO QUE ESCUCHAMOS DE TI

¿Qué características le gustaría ver en el paseo?
Which features would you like to see on the boardwalk?



Interests de recreación



¿Qué le haría sentir más seguro?



¿Qué experiencia y sentido de lugar le gustaría ver?
What experience and sense of place would you like to see?



¿Le gustaría ver el parque luego del atardecer?
How should design address lighting?



¿Le gustaría ver el parque luego del atardecer?
Would you like to use the park after sunset?



¿Qué tipo de materiales de construcción para el diseño?
What type of materials should be used in the design?



¿Cuál sería la forma más cómoda de cruzar las barreras de inundación para alcanzar el agua?
What would be the most comfortable way to cross flood prevention barriers to reach the water?



Landscape design is a critical part of any resiliency, open space, or waterfront project. This study seeks to design an enduring flood protection system that integrates landscape features specific to Chelsea and Everett's conditions. The following categories provide examples of landscape-related considerations, from vegetated slopes and wetland restoration, to rain gardens and phragmites removal.

Design principles are critical to any project of resiliency, open space, or waterfront. This study seeks to design an enduring flood protection system that integrates landscape features specific to Chelsea and Everett's conditions. The following categories provide examples of landscape-related considerations, from vegetated slopes and wetland restoration, to rain gardens and phragmites removal.

BOARDWALK PRECEDENTS | PRECEDENTES DEL MALECÓN



This project not only envisions a barrier, it envisions a place. This can be a place of access and inclusion that celebrates an evolving waterfront in Chelsea and Everett. The societal goals of value creation, recreation, and safety are as central to the design process as the creation of resilient and adaptable barriers.

Este proyecto no sólo prevé una barrera, prevé un lugar. Esto puede ser un lugar de acceso e inclusión que celebre una costa cambiante en Chelsea y Everett. Los mismos objetivos de creación de valores, recreación, y seguridad son tan centrales al proceso de diseño como la creación de barreras adaptables y resilientes.

PERMATRAK BOARDWALK SYSTEM | SISTEMA PERMATRAK DEL MALECÓN



LIGHTING | ILUMINACIÓN



PLANTING PALETTE | PALETA DE PLANTACIÓN



WALLS | PAREDES



ENTRANCE SIGNS | SEÑALES DE ENTRADA



BIKE RACKS & BOLLARDS | GUARDABICICLETAS Y NORAY



SHADE STRUCTURES | ESTRUCTURAS DE SOMBRA



BENCHES | BANCOS

