LIVING BREAKWATERS & TOTTENVILLE SHORELINE PROTECTION PROJECT

CAC MEETING #04

PS 6 Corporal Allan F. Kivlehan School

5/25/16

NYC Parks

NY RISING

SCAPE TEAM

SCAPE / LANDSCAPE ARCHITECTURE
OCEAN AND COASTAL CONSULTANTS
PARSONS BRINCKERHOFF
ARCADIS
SEARC ECOLOGICAL MARINE CONSULTING
NEW YORK HARBOR FOUNDATION
LOT-EK ARCHITECTURE
MFS CONSULTING ENGINEERS
PRUDENT ENGINEERING

Stantec

RACE

DASNY
DORMITORY AUTHORITY STATE OF NEW YORK

AGENDA

#01 WELCOME & INTRODUCTION

#02 BILLION OYSTER PROJECT

#03 RECAP FROM FEBRUARY'S CAC MEETING

#04 PROGRESS UPDATES:

- **EIS**
- **FIELD SURVEYS & SITE WALKS**
- **LIVING BREAKWATERS**
- **TOTTENVILLE SHORELINE PROTECTION**

#05 Q & A

#06 BREAKOUT TABLES & INFO SESSION

#07 RECAP

WELCOME & INTRODUCTION

INTRODUCTIONS

COMMUNITY ADVISORY COMMITTEE

- James Pistilli (Co-Chair)
- Victoria Cerullo (Co-Chair)
- Debra Amoroso
- Phyllis Broughton
- Edward Canlon
- Catherine Cramer
- Kerry Halvorsen
- Albert Klingele
- Michael Kress
- Gloria Maldonado
- John Malizia
- Nicole Nigro
- Pamela Pettyjohn
- Anthony Reinhart
- Frank Santarpia
- Bill Shadel
- Diane Silverman
- Veronica Petersen
- Michele Moore
- Lauren Cosgrove

INTRODUCTIONS
PROJECT TEAMS

Government Partners

NY RISING

NYC Parks

DASNY

Environmental Review Team

AKRF

Living Breakwaters Design Team

SCAPE / LANDSCAPE ARCHITECTURE PLLC

COWI

ARCADIS

LOT-EK

PARSONS BRINCKERHOFF

SeArc

PRUDENT ENGINEERING

MES

BILLION OYSTER PROJECT

New York HARBOR FOUNDATION

Peer Review

TETRA TECH

Tottenville Shoreline Protection Design Team

Stantec

RACE

Naik GROUP

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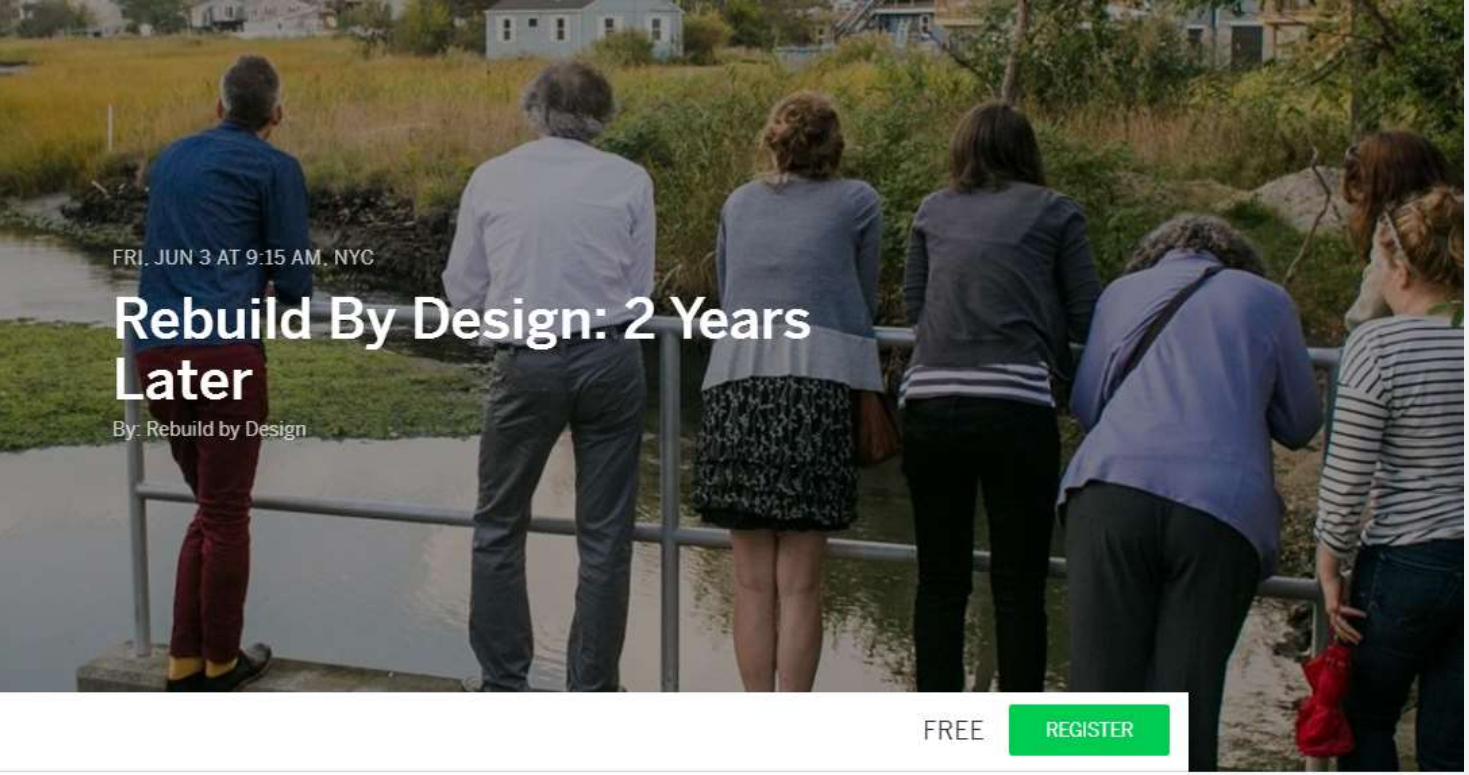
REBUILD BY DESIGN



FREE REGISTER

Join us for a full day of programming to celebrate our collective accomplishments as we look to build resilient communities in the Sandy-affected region and elsewhere, in the years ahead.

20 Cooper Square, NYC
9:15AM - 5:30PM
Reception to follow

http://www.rebuildbydesign.org/

To register

https://www.eventbrite.com/e/rebuild-by-design-2-years-later-tickets-25178780410

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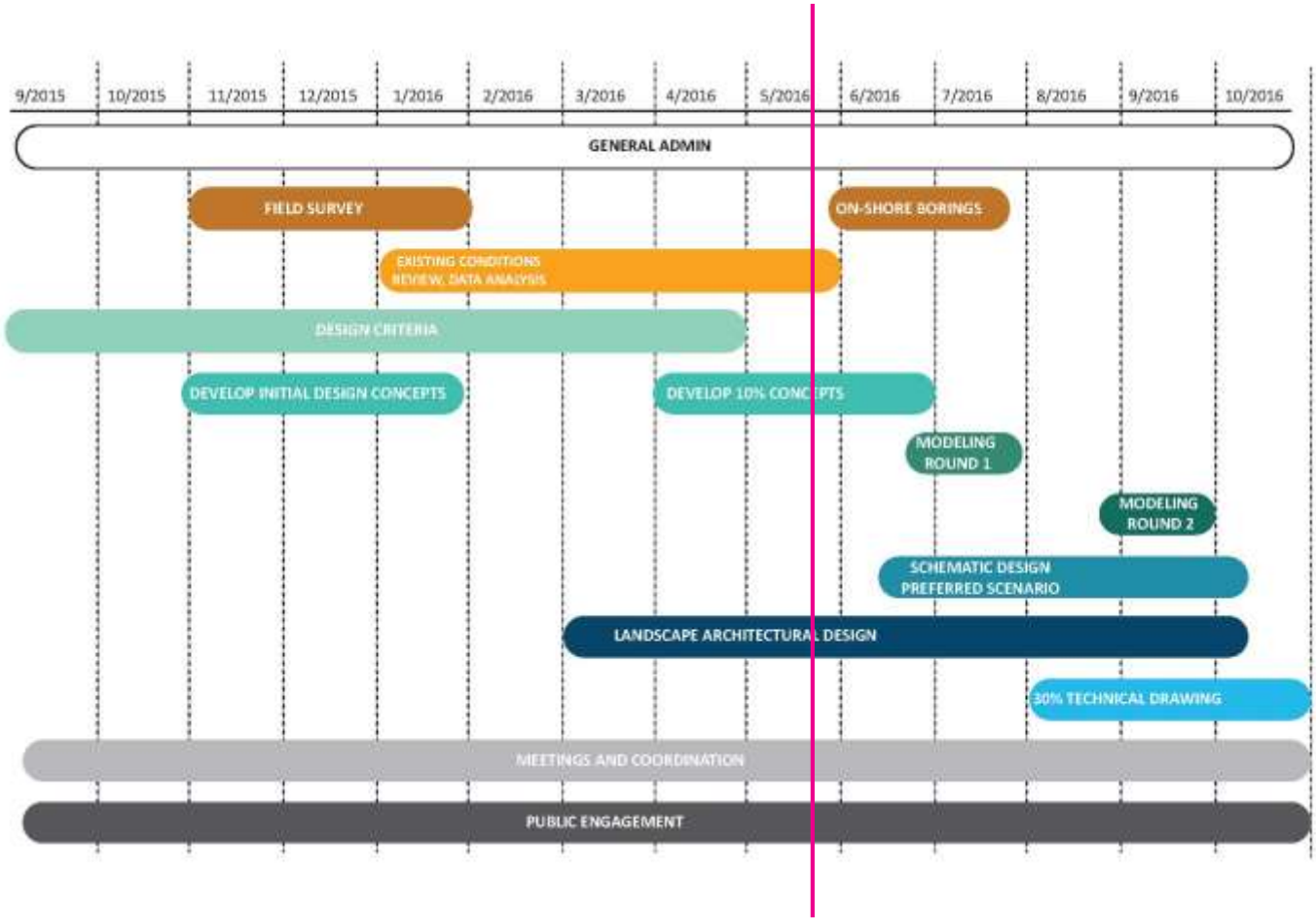
PROGRESS TOWARDS 30% DESIGN!

TOTTENVILLE DUNE SCHEDULE

WE ARE HERE!



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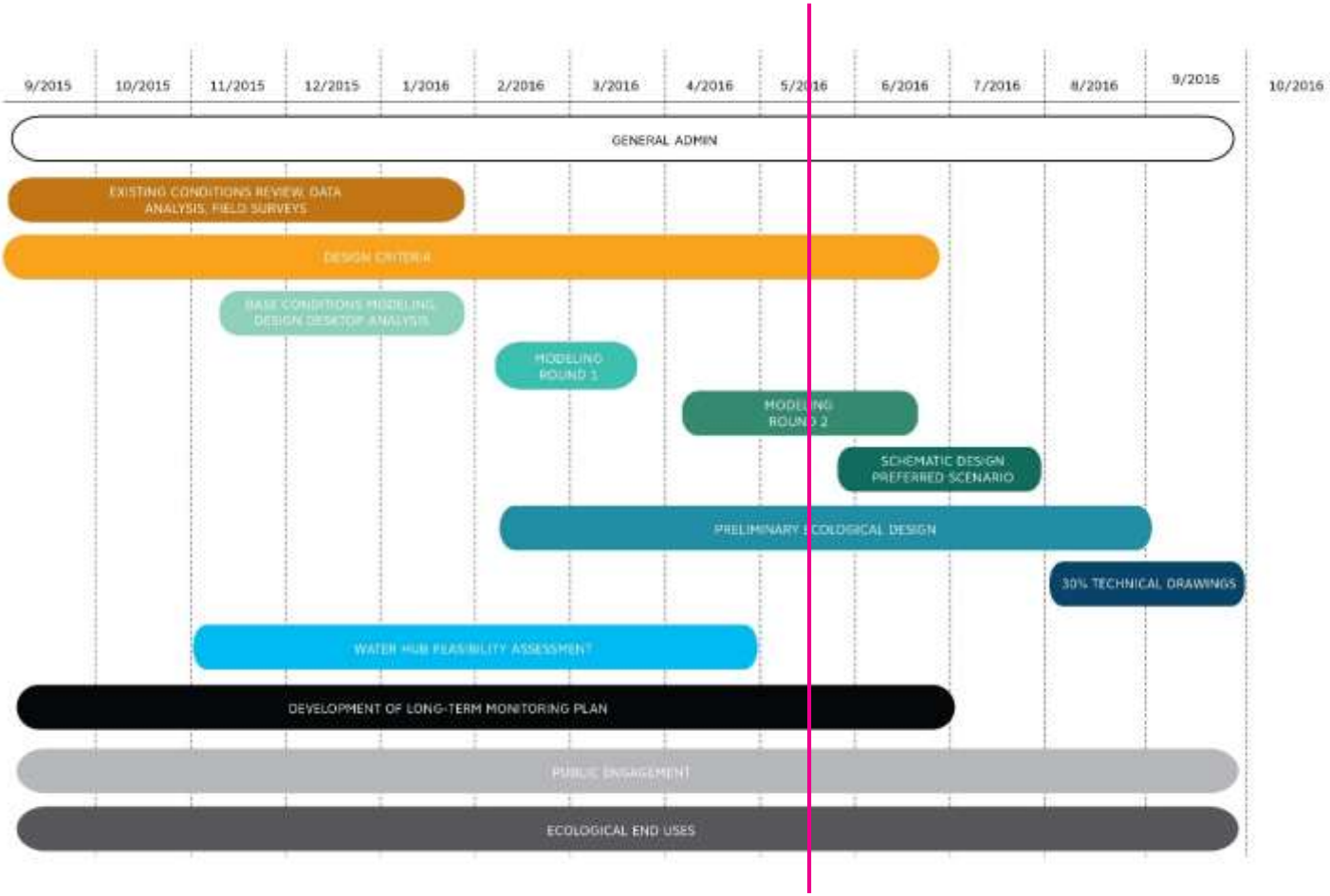
WE ARE HERE!



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THE BILLION OYSTER PROJECT

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- SCP Passes 200,000 pounds of reclaimed oyster shell
- Operating at 46 restaurants in Brooklyn and Manhattan
- On Pace to pass 500 cubic yards by October

- Schools:
  - IS 24 Myra Barnes
  - Tottenville High School
  - St. Clare's School
  - Marsh Ave EL
- New Restoration Station Site at the Lighthouse Museum

BILLION OYSTER PROJECT

- **Shell Collection Program**
- **Schools and Citizen Science**
- **Nursery Site under development at RCYC**

FEBRUARY'S CAC MEETING

CAC REPORT BACK

- **Shoreline experience and activities**
- **Breakwaters: modeling & visualization**
- **Water hub location and programs**
- **Ecological Design**

Shoreline Experience

- Dune should provide risk reduction

Breakwaters

- Reduce risk to homes
- Consider Sea Level Rise
- Be sure they are visible and safe

Water Hub

- Preferred locations at Page Ave. or near Conference House
- Build on Parks programs and engage students
- Respect neighborhoods

Ecological Design

- Preference for non-motorize water activities within breakwaters

Thank you for your feedback!

UPDATE:
EIS & PERMITTING

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EIS & PERMITTING UPDATE

- **Scoping document finalized on 4/1/2016**

Coastal and Social Resiliency Initiatives for Tottenville Shoreline, Staten Island, NY
Environmental Impact Statement Final Scope of Work

A. INTRODUCTION

On behalf of Grantee the State of New York, the Governor's Office of Storm Recovery (GOSR), serving under the auspices of the New York State Homes and Community Renewal's Housing Trust Fund Corporation, and acting under authority of the U.S. Department of Housing and Urban Development's (HUD) regulations at 24 CFR Part 58, and in cooperation with other involved, cooperating, interested agencies, will prepare an environmental impact statement (EIS) to analyze potential impacts of one or more proposed initiatives (Proposed Actions) intended to enhance coastal and social resiliency along the Tottenville shoreline of the South Shore of Staten Island, NY. These initiatives include the Living Breakwaters Project (Breakwaters Project) and Tottenville Shoreline Protection Project (Shoreline Project). While the Living Breakwaters and Tottenville Shoreline Projects each have independent utility, both projects would be funded through New York State's Community Development Block Grant-Disaster Recovery (CDBG-DR) grant (and will be leveraged—as required by the HUD-sponsored Rebuild By Design (RBD) process—through additional funding sources) and would be located in the same geographic region. Additionally, the projects share certain synergies in terms of design, as well as purpose and need, and combine to create a layered approach to shoreline resilience within the study area. Thus, there is strong rationale for designing and implementing the Breakwaters and Shoreline Projects through one integrated planning process to improve coastal resiliency along Staten Island's south shoreline. To facilitate a thorough examination of cumulative effects and synergies between the projects, GOSR has determined that they should be analyzed as part of the same environmental review. Additionally, in the EIS, the Breakwaters and Shoreline Projects will be weighed against other alternative actions that may also advance some of the same coastal resiliency goals and objectives. This analysis will ensure that the actions undertaken will minimize the potential for adverse environmental impacts, to the extent practicable.

The Draft Scope of Work (Draft Scope) for this project was issued on April 1, 2015. Oral and written comments were received during the public scoping session held on April 30, 2015. Written comments were accepted from issuance of the Draft Scope through the public comment period which ended June 15, 2015. This Final Scope of Work (Final Scope) reflects modifications due to certain design advancements since the issuance of the Draft Scope as well as changes made in response to relevant public comments on the Draft Scope (see attached Response to Comments).

B. PROJECT PURPOSE AND NEED

BACKGROUND

On October 29, 2012, Superstorm Sandy approached New York City with tropical-storm-force winds. The resultant waves and storm surge battered the city's coastline, causing 44 deaths in New York City—23 of which occurred in Staten Island—the destruction of homes and other

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UPDATE:
FIELD WORK AND SITE VISITS

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SINCE WE MET LAST…

- **Beach Profile Surveys performed on- and off-shore**

SINCE WE MET LAST…

- **CAC Beach Walk 4/29**
- **DPR Beach Clean Up 5/15**

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SINCE WE MET LAST…

- **Timelapse camera up and running!**

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LIVING BREAKWATERS

SHORELINE TIME LAPSE
04/29/2016 TO 05/15/2016

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UPDATE:
LIVING BREAKWATERS DESIGN PROGRESS

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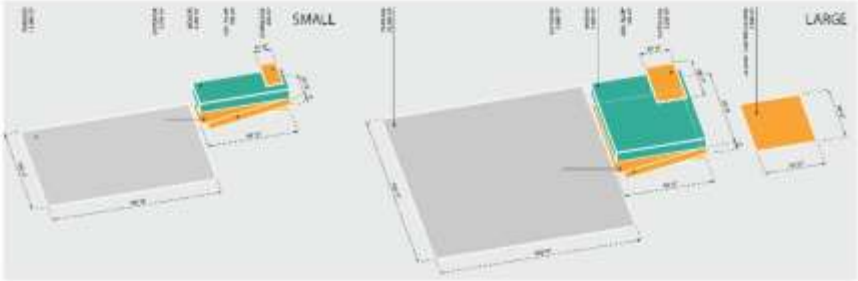
Design Progress Update

- Water Hub
- Breakwater Segment Design
- Modeling

WATER HUB

		SMALL			LARGE	
	PROGRAM	SF	NOTES		SF	NOTES
INDOOR	MULTIPURPOSE	2,000	classroom for 40 people exhibition space event space library weather station *flexible, divisible, views of water		2,000	event space larger meeting area *flexible, divisible, views of water
	CLASSROOM				1,000	50 people / divisible in 2, 25 people ea
	EXHIBITION SPACE				1,000	exhibition library weather station
	WETLAB WITH EQUIPMENT				1,000	25 people + tanks and equipment
	LOCKERS				100	kayak users and staff
	STORAGE				200	tools and supplies for restoration station
	CAFÉ				500	prepared food counter + seating area
	RESTROOMS	200	2 ADA restrooms		800	14 restrooms (including 2 ADA)
	TOTAL INDOOR	2,200			7,400	
OUTDOOR	OUTDOOR FLEX SHADED AREA	1,500	outdoor classroom exhibition space		5,000	outdoor classroom exhibition space picnic area
	OVERLOOK/TERRACE	400	max 80 people standing		1,200	max 240 people standing
	KAYAK STORAGE	600	approx 20 kayaks		1,500	approx 50 kayaks
	LAUNCH / WATER ACCESS	n/a	kayak / beach launch		2,500	launch w/ street access
	ADA ACCESSIBILITY	700	ramp from ground level		700	ramp from ground level
	SOLAR/WIND/SUSTAINABLE ENERGY	600	roof area for solar panels		1,200	roof area for solar panels
	TOTAL OUTDOOR	3,800			12,100	
	TOTAL INDOOR AND OUTDOOR	6,000			19,500	
	PARKING	15,000	1 bus 10 cars bike rack for 20		33,000	2 bus 40 cars bike rack for 40
	TOTAL SITE FOOTPRINT	17,900			43,600	



- **Water Hub program confirmed!**

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WATER HUB

- **Possible Water Hub locations identified**

WATER HUB

- **Page Avenue West**
- **Page Avenue East**

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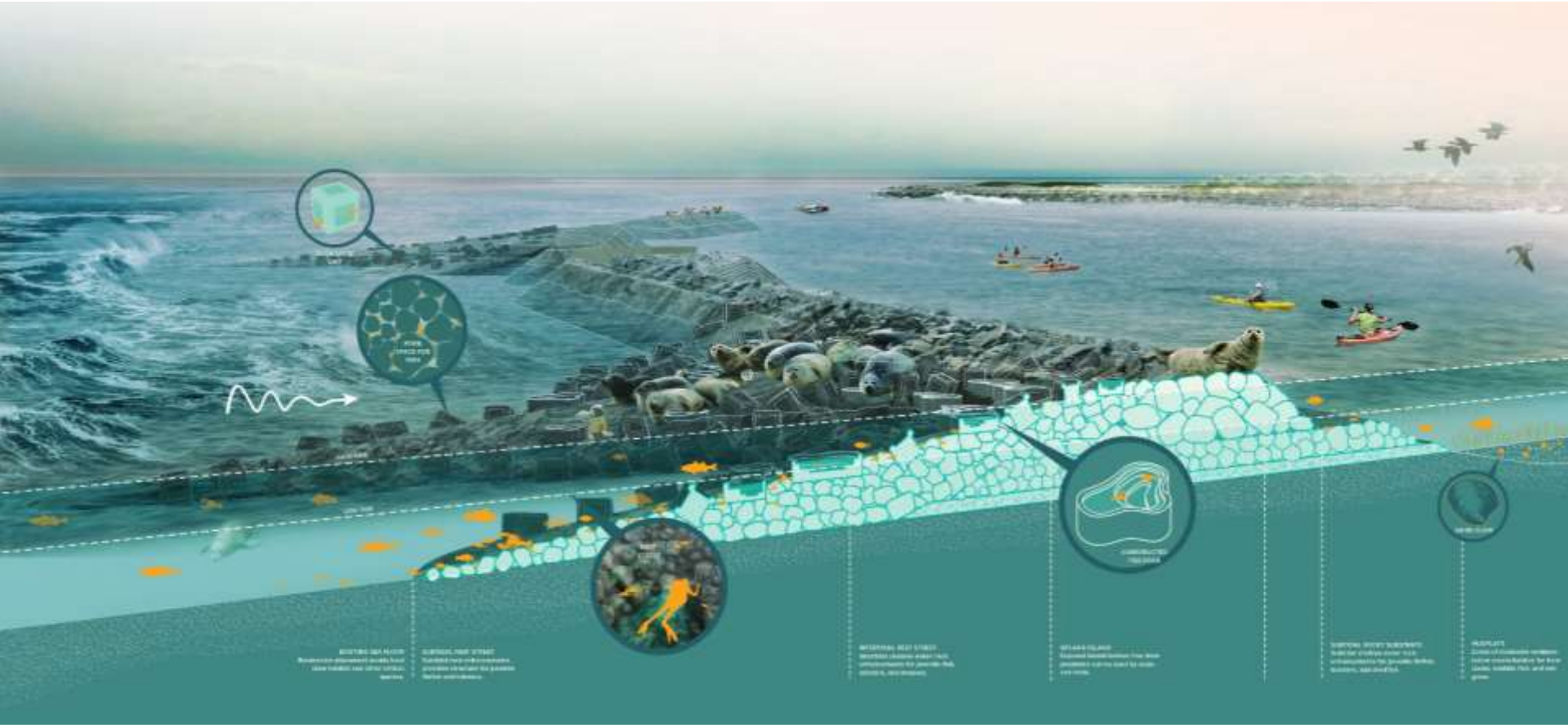
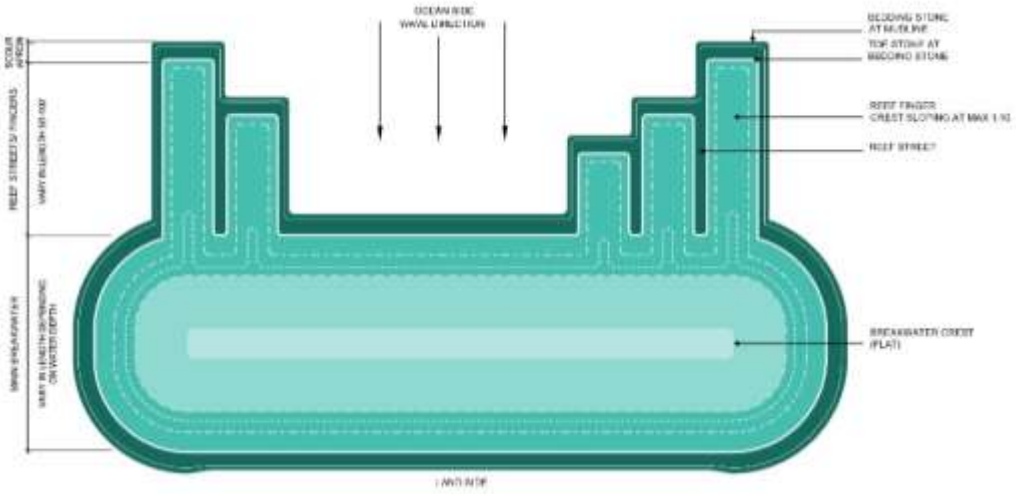
Living Breakwaters attenuate waves & create habitat!

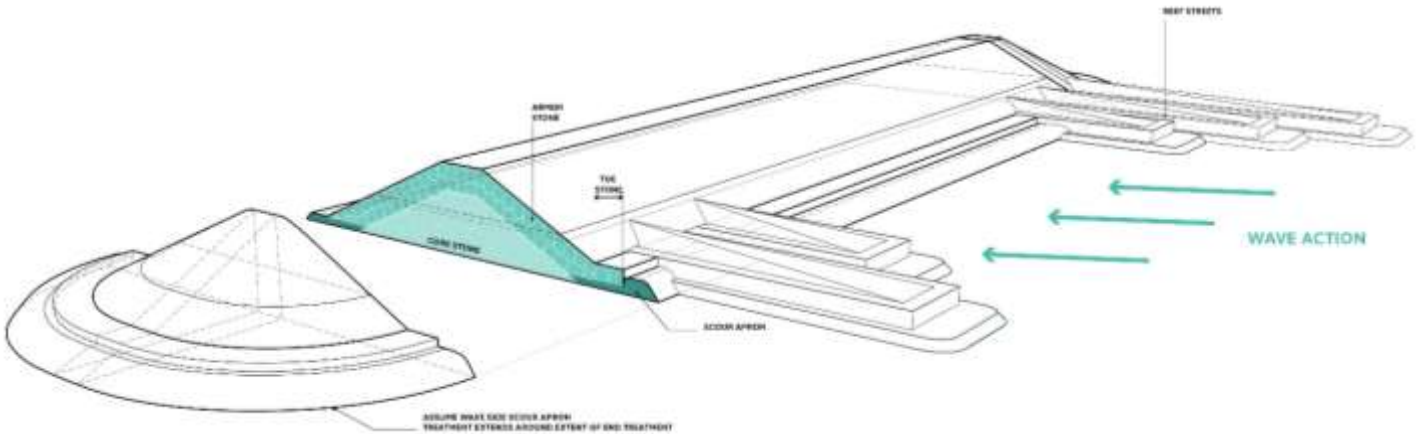


BREAKWATER DESIGN

- **Breakwater segment design is advancing**



CONCEPTUAL PLAN



AXONOMETRIC & SECTION

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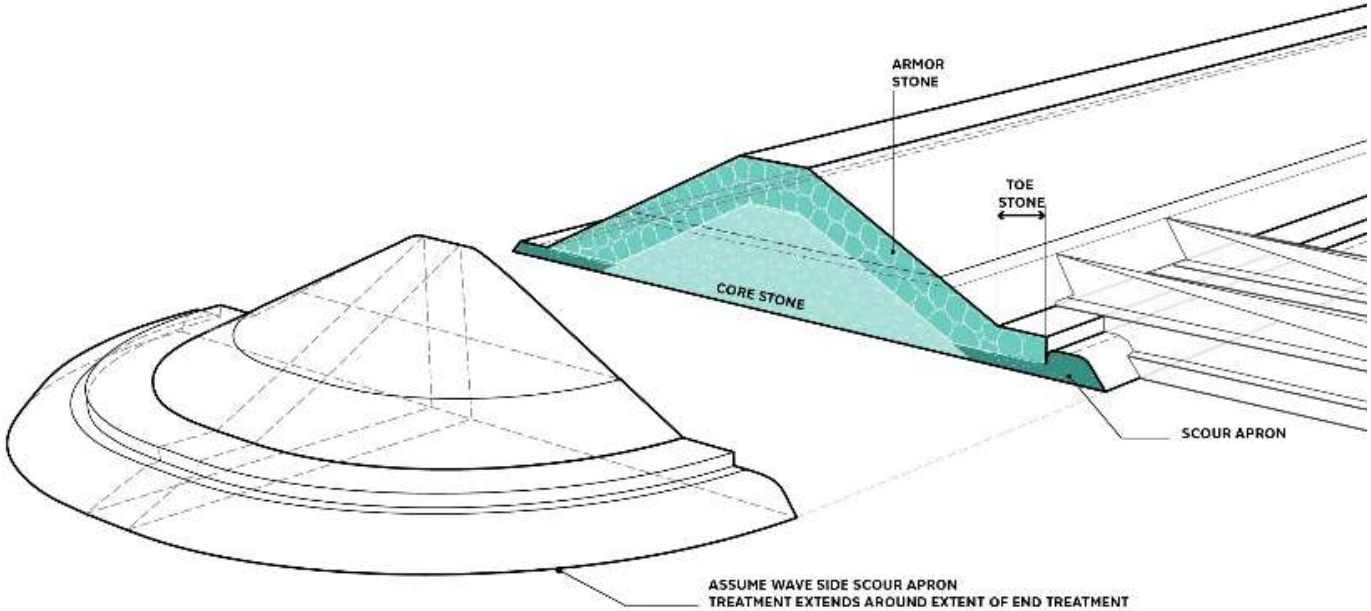
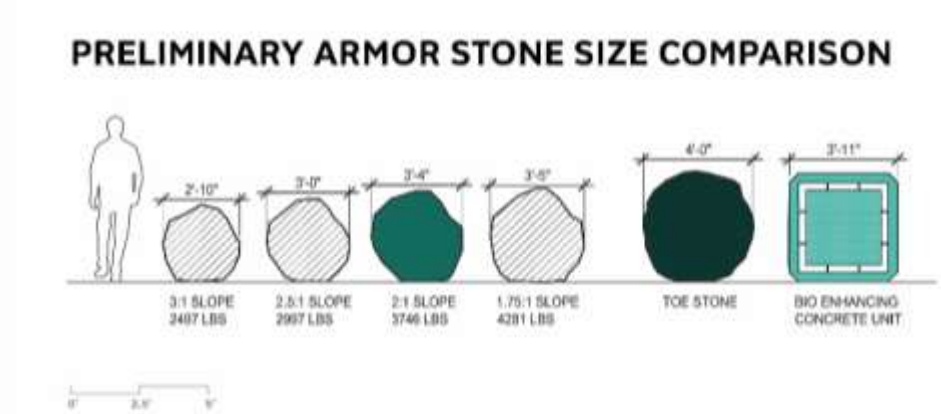
BREAKWATER DESIGN

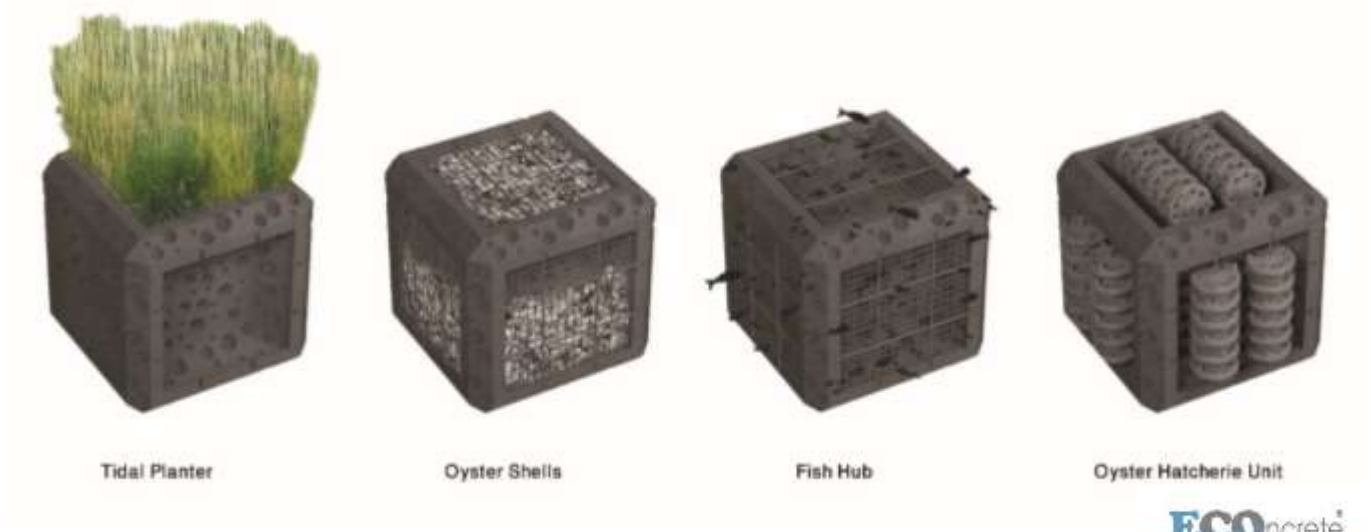


Likely breakwater Materials:

- **Stone**
- **Bio-enhancing concrete units**



DESIGN UPDATE



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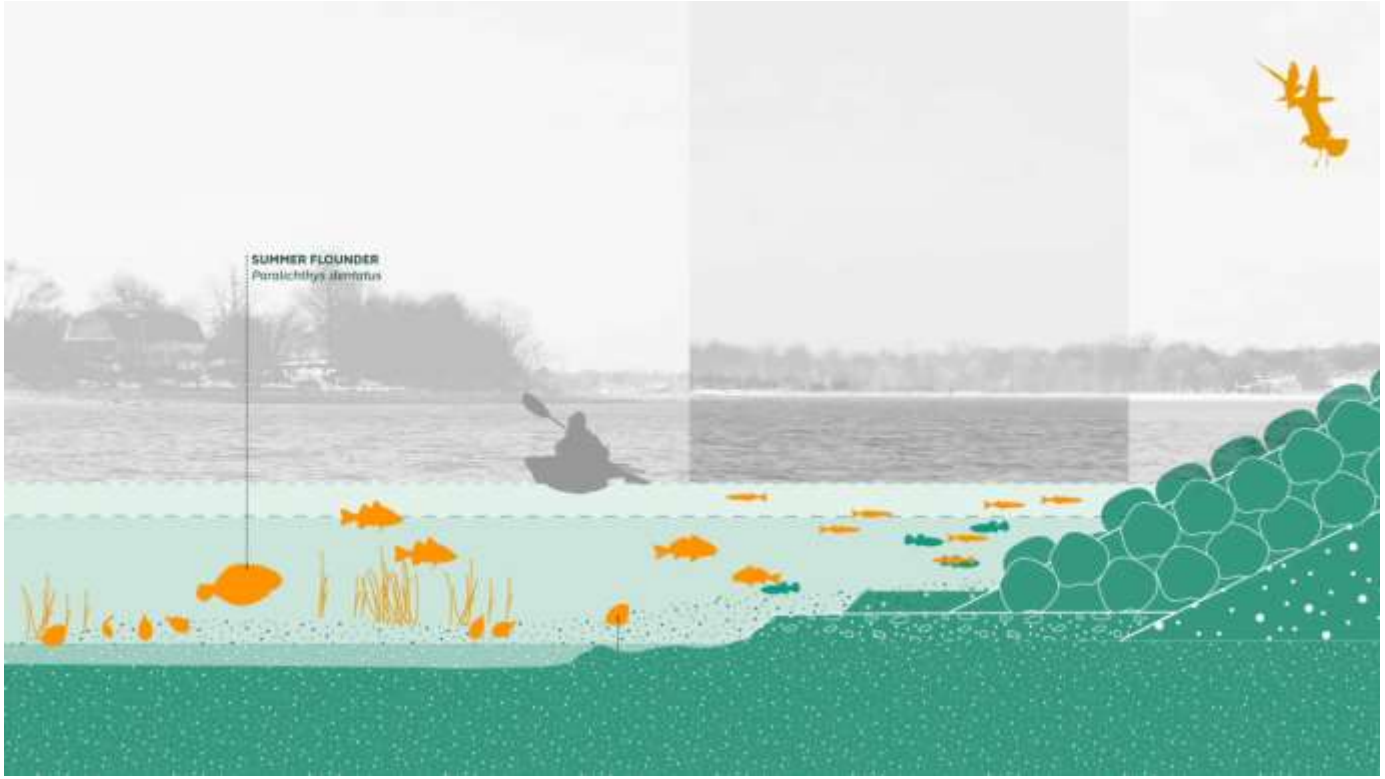
Living Breakwaters create habitat!



DESIGN UPDATE

- **Ecological Design considerations are integrated into the breakwater design**

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BREAKWATER MODELING ITERATIONS

Parametric breakwater design

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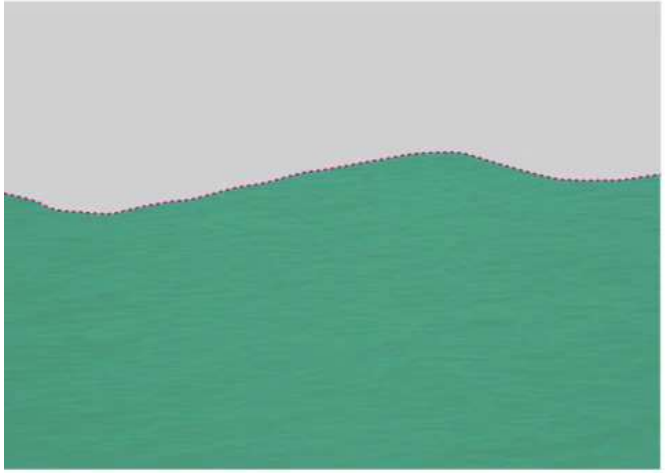
BREAKWATER MODELING METHODOLOGY

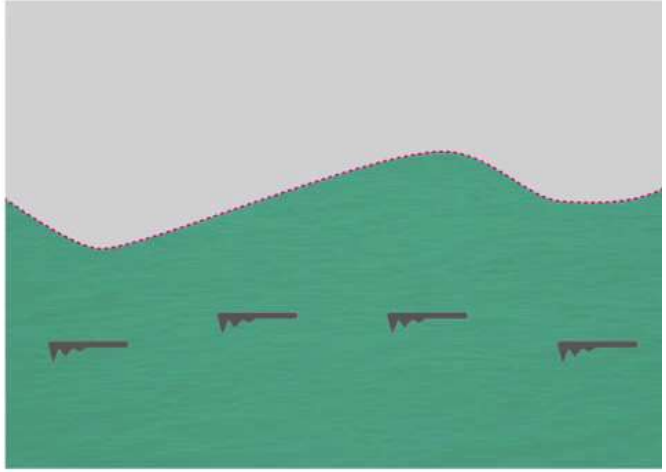
Four computer models to look at:

- **Shoreline Change**
- **Beach Profile Change**
- **Wave Transformation**
- **Water Circulation**

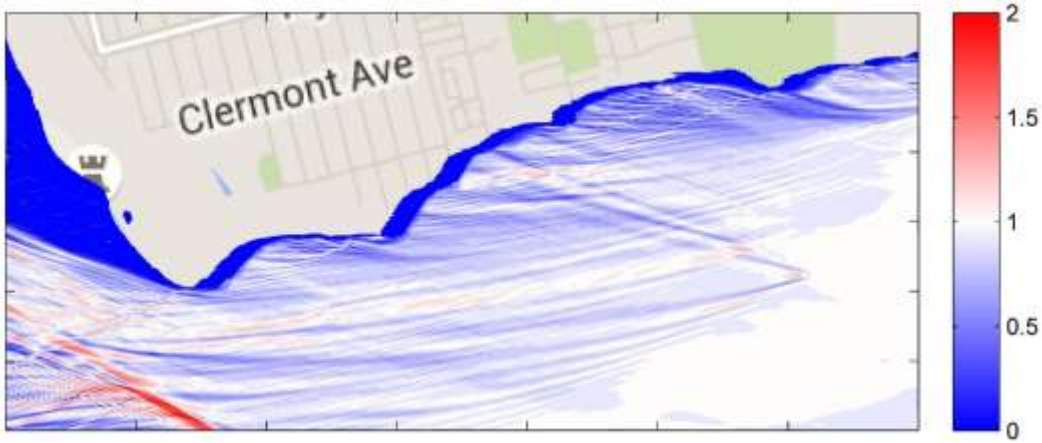
SHORELINE CHANGE MODELING (GENESIS)



WAVE CLIMATE – WAVE TRANSFORMATION (REF-DIF)



Perpendicular waves



Waves from the east

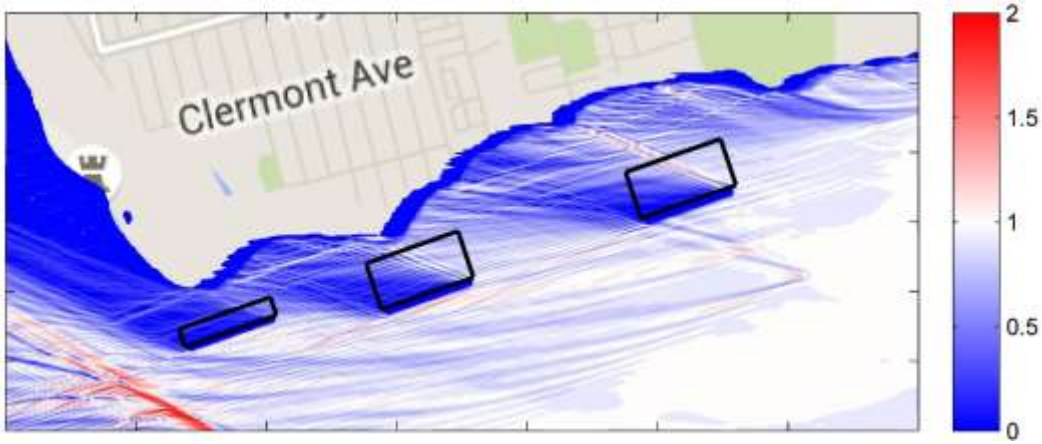
Waves from the southwest

BREAKWATER MODELING ITERATIONS

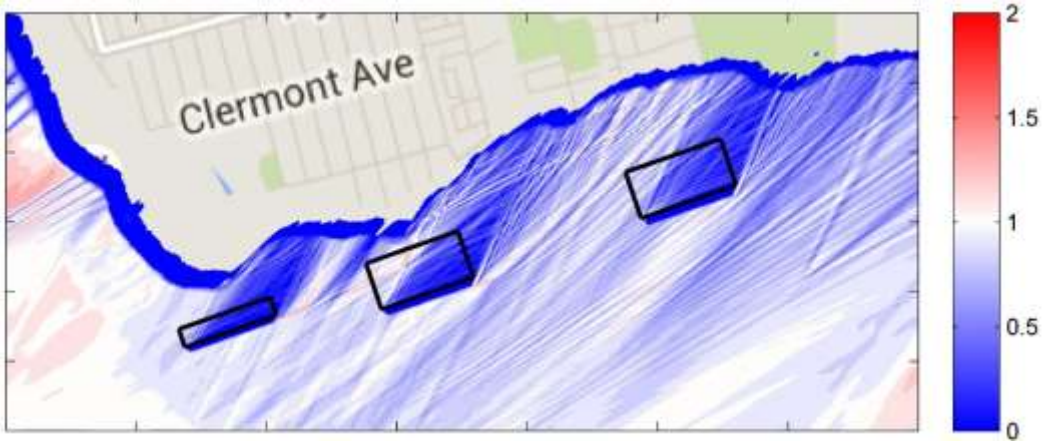
Wave attenuation (REFDIF)

- **Baseline Modeling results**

Perpendicular waves



Waves from the East



Waves from the southwest

BREAKWATER MODELING ITERATIONS

Wave attenuation (REFDIF)

- **Modeling results with test breakwaters**

BREAKWATER MODELING ITERATIONS

Shoreline change (GENESIS)

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LIVING BREAKWATERS

EDGE OF FEDERAL CHANNEL (USACE COORDS)
FEDERAL NAVIGATION CHANNEL (NOAA)
NYC PARCEL BOUNDARIES (NYC DCP)
SI PARCELS (MapPLUTO 15v1)
STATEN ISLAND BUILDING FOOTPRINTS
OUTFALL LOCATIONS (NYC DEP)
SHORELINE STRUCTURES

ELEVATION (NAVD 88)

- > MHW (2.08)
- MHW TO MLW (-2.62)
- MLW TO -6 MHW (-3.92)
- -6 MHW TO -2 MLW (-4.62)
- -2 MLW TO -4 MLW (-6.62)
- -4 MLW TO -6 MLW (-8.62)
- -6 MLW TO -8 MLW (-10.62)
- -8 MLW TO -20 MLW (-22.62)
- < -20 MLW

RISK

WAVE HAZARD ZONES

LIMIT OF V ZONE (WAVE HEIGHT ≥ 3FT)-(pFIRM 2013)
LIMIT OF MODERATE WAVE ACTION (LIMWA) (WAVE HEIGHT ≥ 1.5FT)(pFIRM 2013)
POTENTIAL FUTURE 2-3 FT WAVE ZONE (100 YR STORM WITH 30" SLR)

HISTORIC SHORELINE CHANGE 1978-2012

MHW 2012
MHW 1978
ACCRETION
EROSION

ECOLOGY

FRESH WATER WETLAND
WETLAND CHECK ZONE
GRAVEL
MUD
OTHER
SAND
ROCK PILES

CULTURE

SCHOOLS & PUBLIC FACILITY
BUS STOP
BUS ROUTE
PARK OR OPEN SPACE

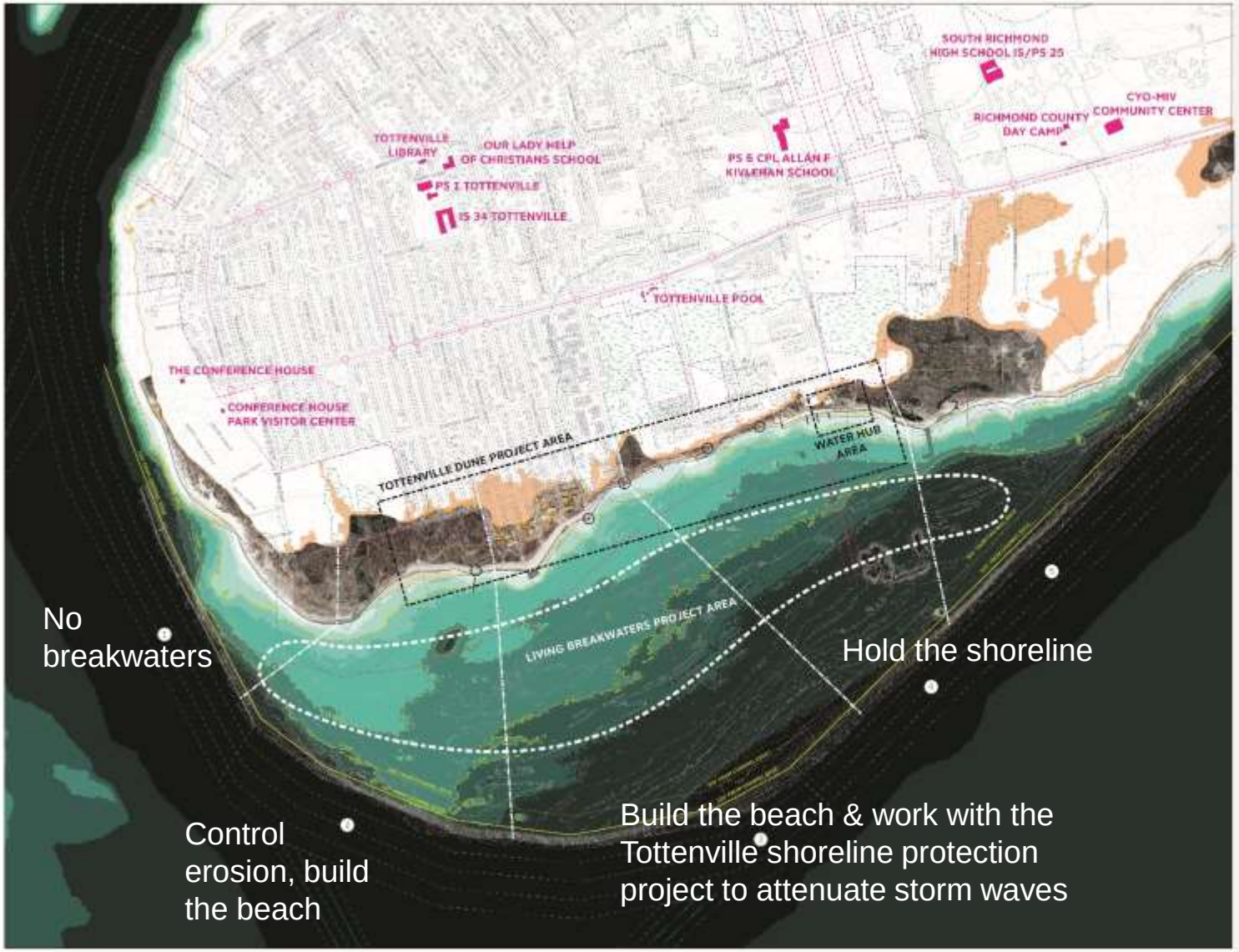
PROJECT AREA / STUDY AREA ZONES

1. CONFERENCE HOUSE PARK WEST
2. CONFERENCE HOUSE PARK EAST
3. NEIGHBORHOOD SOUTH
4. NEIGHBORHOOD NORTH
5. MOUNT LORETTO

ZONE BOUNDARY

0' 500' 1000' 2000'

Living Breakwaters and Tottenville Shoreline Protection Project Site Map



DESIGN PROGRESS UPDATE: TOTTENVILLE SHORELINE PROTECTION PROJECT

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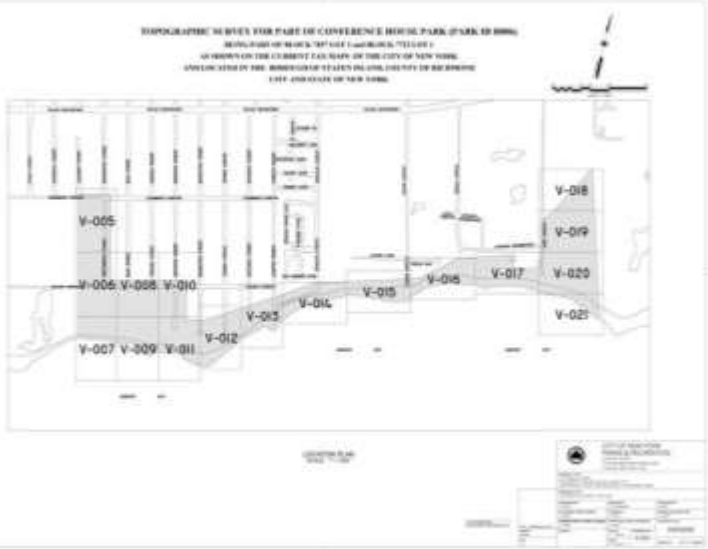
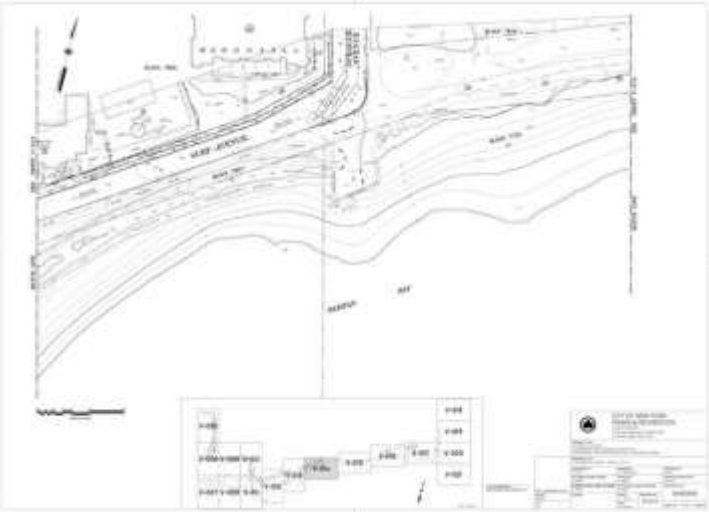
ONSHORE PROJECT GOALS

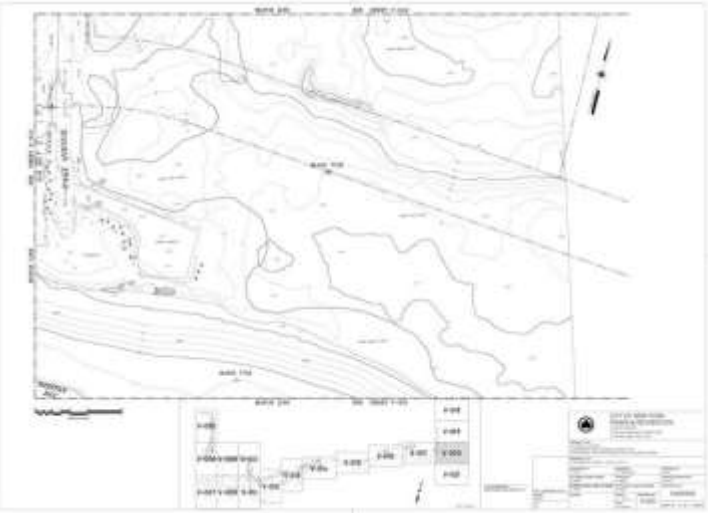
- **RISK REDUCTION**
  Attenuate Wave Energy
  Address Shoreline Erosion
  Address Impacts of Coastal Flooding
  HOW? Raise Shorelines

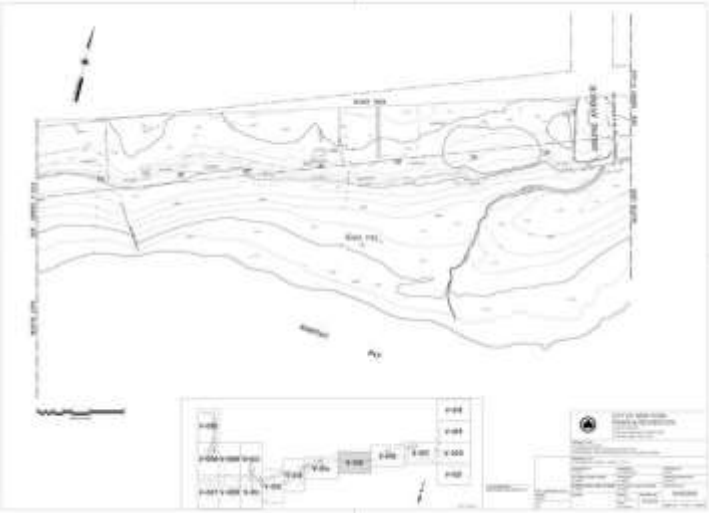
- **ECOLOGICAL ENHANCEMENT**
  Habitat Enhancement
  Green Infrastructure
  HOW? Wetland Restoration. Shoreline Plantings

- **SOCIAL RESILIENCY**
  Increase Physical and Visual Access to the Water's Edge
  Enhance Community Stewardship
  Increase Access
  HOW? Continuous Trail Systems. ADA Compliant Designs.









ON-SHORE SURVEY COMPLETED

- **Landside Topographic Survey (complete)**
- **Geotechnical Borings (out for bid)**

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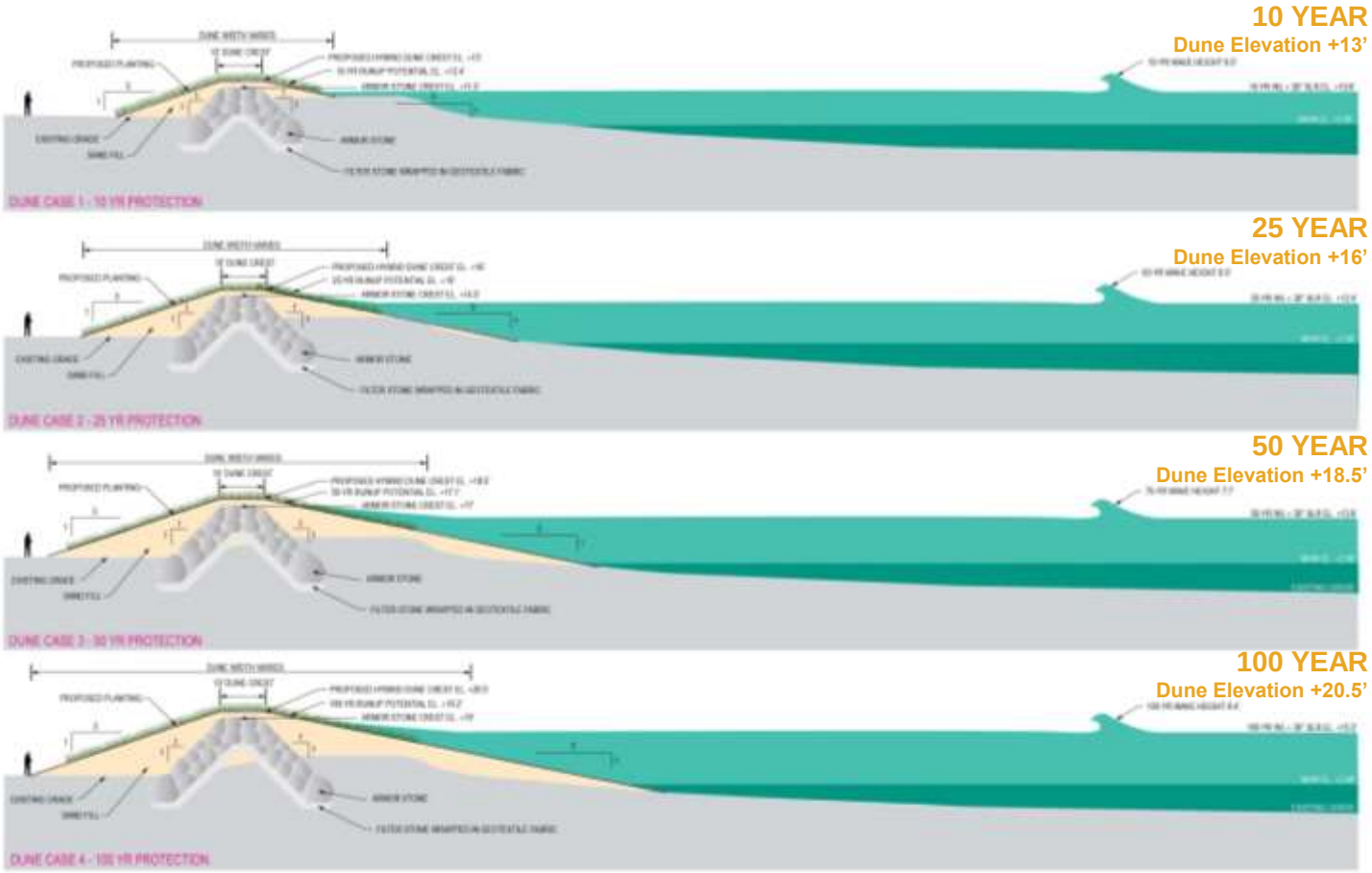
EXISTING CONDITIONS

- **Existing Systems**
- **Site Opportunities**
- **Site Constraints**

EXISTING DUNE ELEVATION: from +9.4’ to +12.5’ NAVD88



PRELIMINARY PREFERED DUNE ELEVATION:

+/- 15 Dune Crest Elevation

+/- 13.5 Stone Core Crest Elevation

+/- 25 YEAR PROTECTION

LEVELS OF PROTECTION

- **How High?**
- **How Wide?**
- **Levels of Protection**

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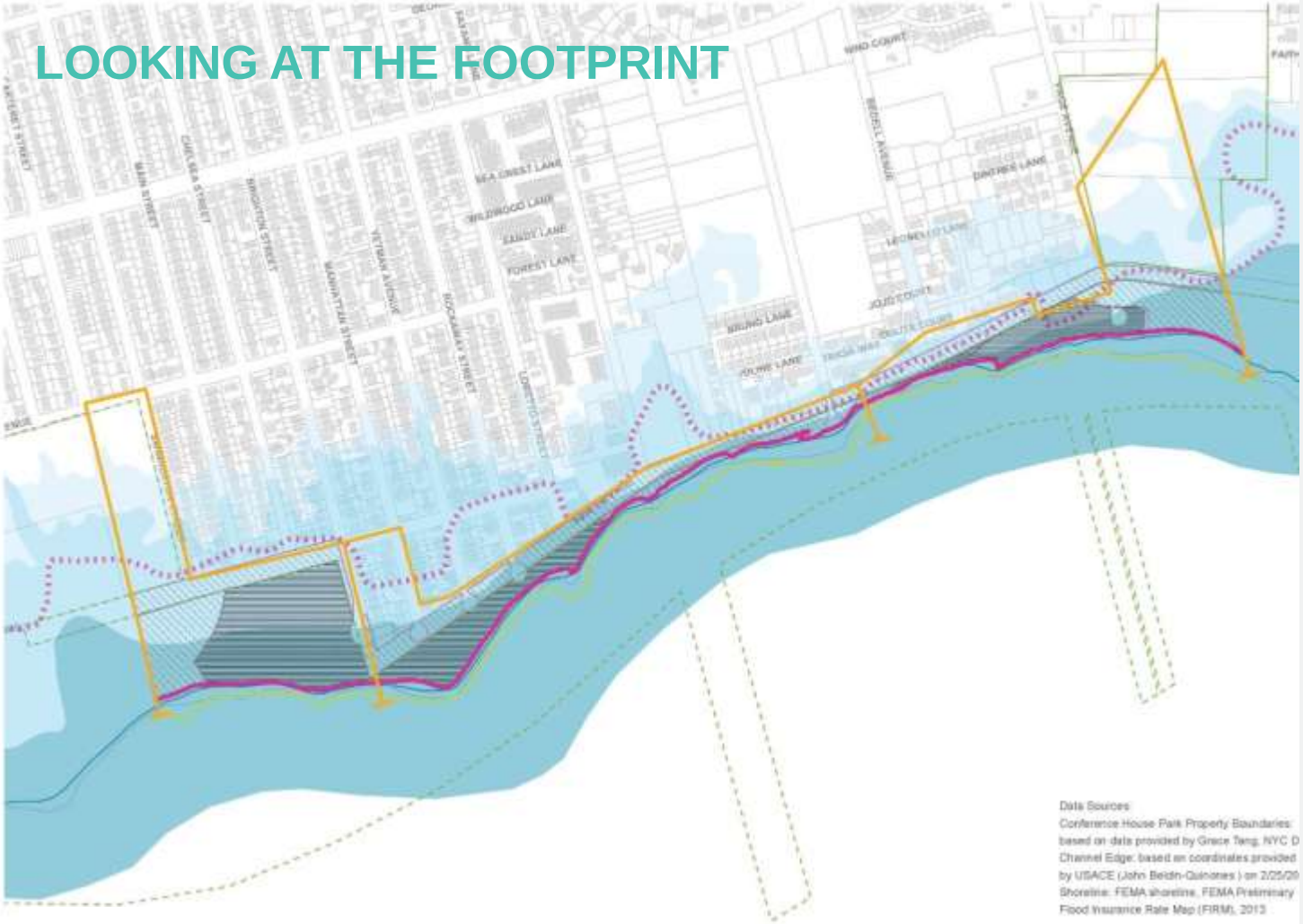
PROJECT NAME CHANGE

- Does a Dune work everywhere for Tottenville?
- Space Constraints
- Access Constraints

TOTTENVILLE DUNE PROJECT
BECAME
TOTTENVILLE SHORELINE PROTECTION PROJECT

LOOKING AT THE FOOTPRINT



Data Sources:
Conference House Park Property Boundaries: based on data provided by Grace Tang, NYC D
Channel Edge: based on coordinates provided by USACE (John Beldin-Quinones) on 2/25/20
Shoreline: FEMA shoreline, FEMA Preliminary Flood Insurance Rate Map (FIRM), 2013

DESIGN ENVELOPE

PRIMARY BOUNDARIES

- Mean High Water Line
- NYC DPR Property Line
- FDNY Turn Around Requirements

SECONDARY BOUNDARIES

- Tidal Wetlands
- DEC Wetland Checkzone
- DOT Right-of-Way

LEGEND

- Staten Island Building Footprints
- NY Parcel Boundaries
- Conference House Park Property Boundary
- Dune Project Area Boundary
- Mean Low Water
- Mean High Water
- FEMA Shoreline
- Primary Design Envelope
- Secondary Design Envelope

FEMA Hazard Zones
- 0.2% Annual Change Flood Hazard
- A, AE, AO Zone
- VE Zone
- Limit of Moderate Wave Action (LiMWA) (pFIRM 2013)

DESIGN ENVELOPE

- **Where can we design?**
- **Site Constraints**
- **Primary and Secondary Design Envelope**

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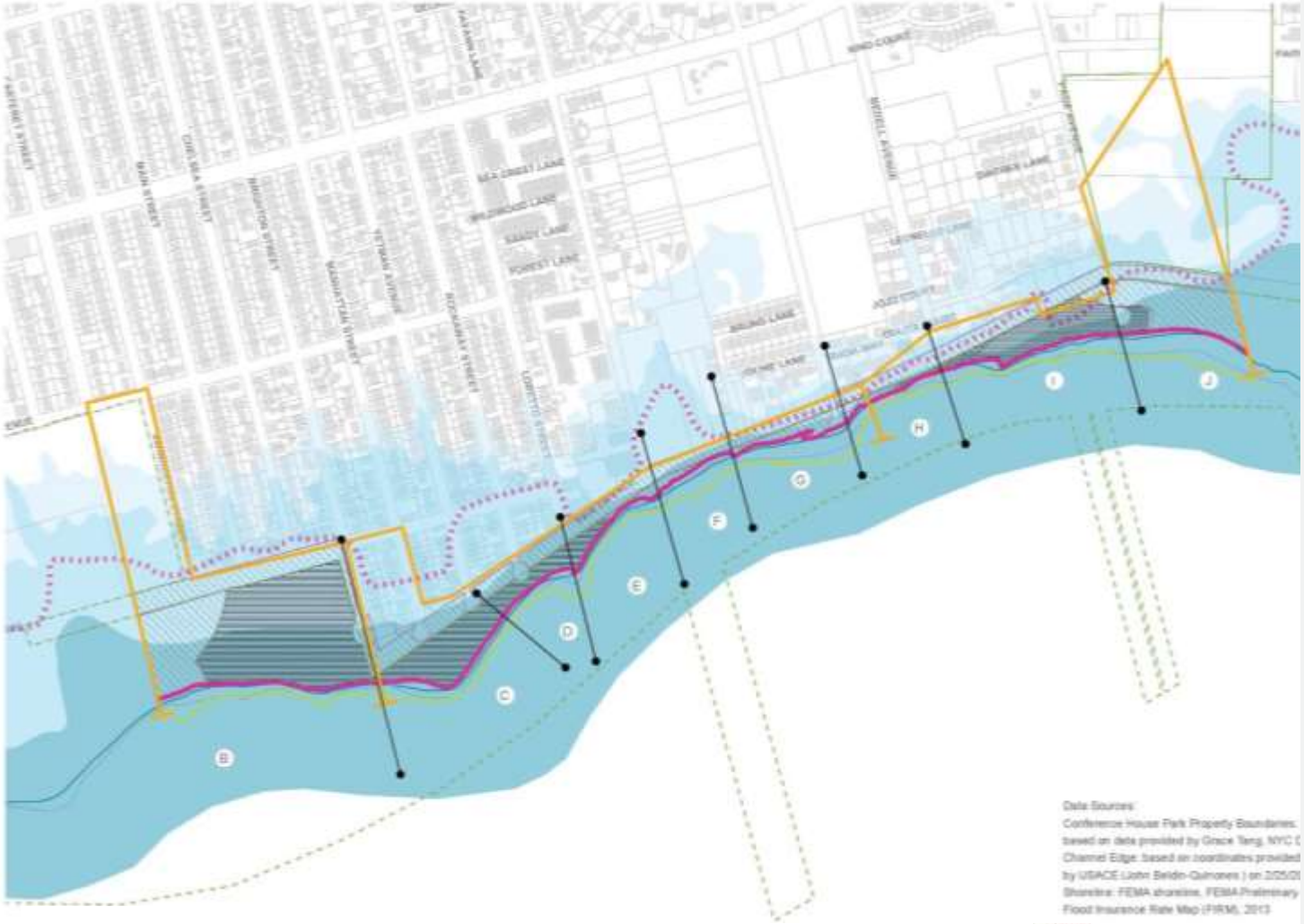
SHORELINE REACHES



Data Sources:
Conference House Park Property Boundaries: based on data provided by Grace Tang, NYC
Channel Edge: based on coordinates provided by USACE (John Seldin-Quinones) on 2/25/2
Shoreline: FEMA shoreline, FEMA Preliminary Flood Insurance Rate Map (FIRM), 2013

DESIGN ENVELOPE

PRIMARY BOUNDARIES

- Mean High Water Line
- NYC DPR Property Line
- FDNY Turn Around Requirements

SECONDARY BOUNDARIES

- Tidal Wetlands
- DEC Wetland Checkzone
- DOT Right-of-Way

LEGEND

- Staten Island Building Footprints
- NY Parcel Boundaries
- Conference House Park Property Boundary
- Dune Project Area Boundary
- Mean Low Water
- Mean High Water
- FEMA Shoreline
- Primary Design Envelope
- Secondary Design Envelope

FEMA Hazard Zones
- 0.2% Annual Change Flood Hazard
- A, AE, AO Zone
- VE Zone
- Limit of Moderate Wave Action (LiMWA) (pFIRM 2013)

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OPPORTUNITIES AND CONSTRAINTS

- **A Closer Look**
- **Program Elements**
- **Design precedents**

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PRECEDENTS: DESIGN TYPOLOGIES

CONTINUED PARK TRAIL SYSTEM

WETLAND ENHANCEMENT

POTENTIAL BERM TIE-IN

DUNE SYSTEM WITH BEACH

MARITIME FOREST RESTORATION

ECO-REVETMENT ALTERNATIVE

SHORELINE LPANTINGS

DEVELOPING DESIGN TYPOLOGIES

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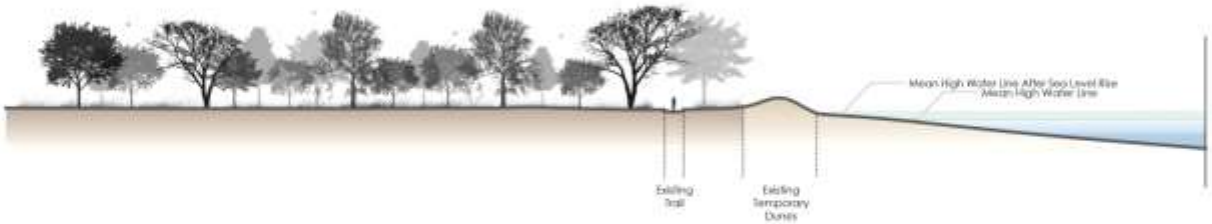
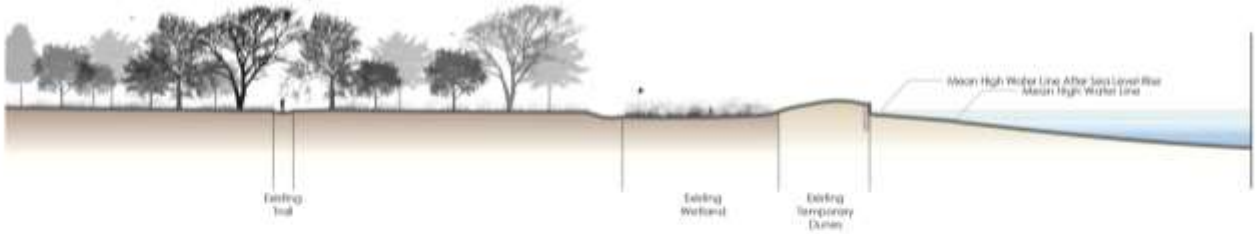
SECTION A & B
ERATHEN BERM

EXISTING A - A'



PROPOSED A - A'

EXISTING B - B'



PROPOSED B - B'

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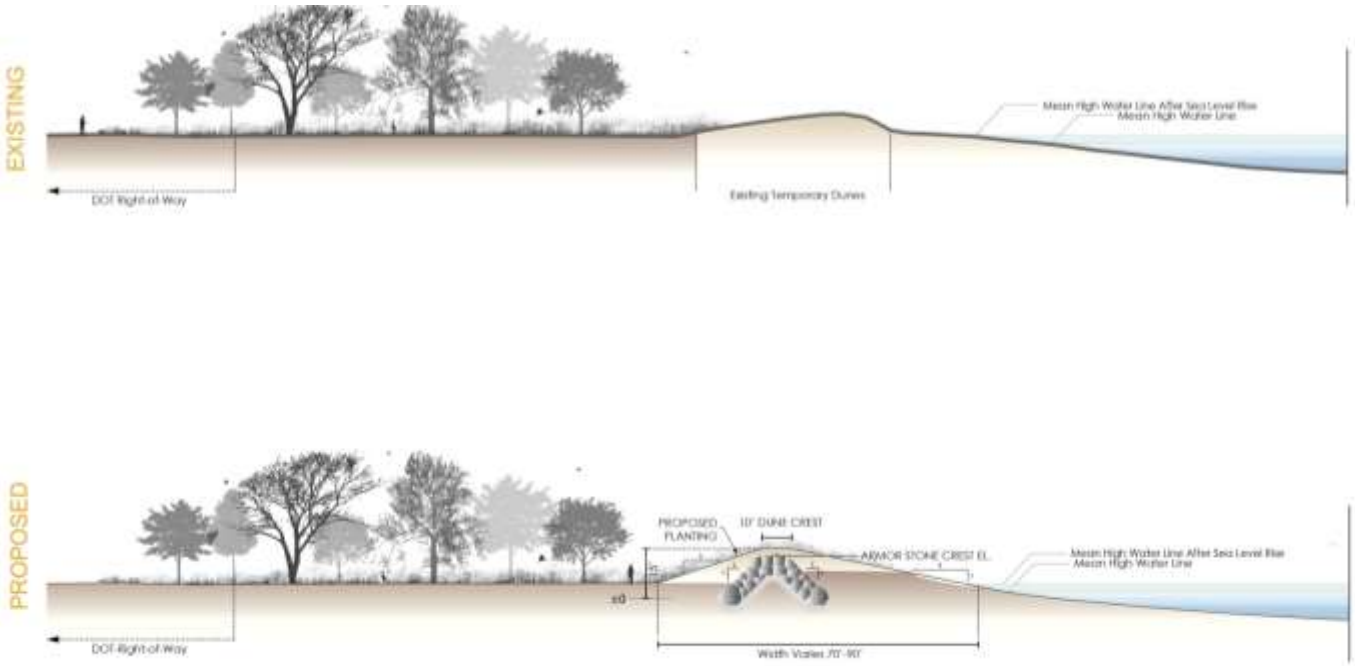
SECTION C - DUNE TYPOLOGY

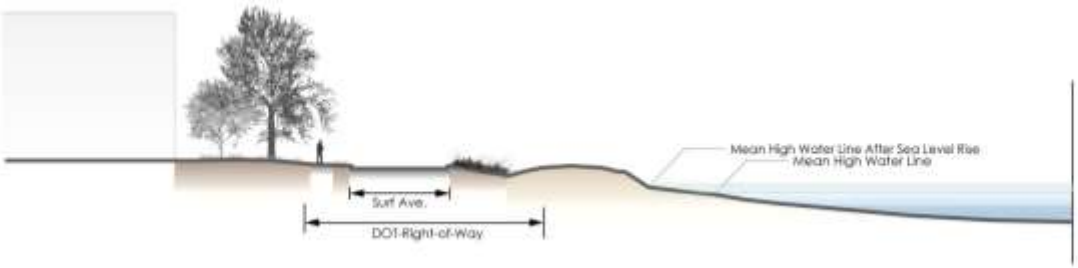


EARTHEN BERM TYPOLOGY

- **Integrated into park landscape**
- **Flexible and adaptive to existing conditions**

SECTION D
ECO-REVETMENT TYPOLOGY

EXISTING

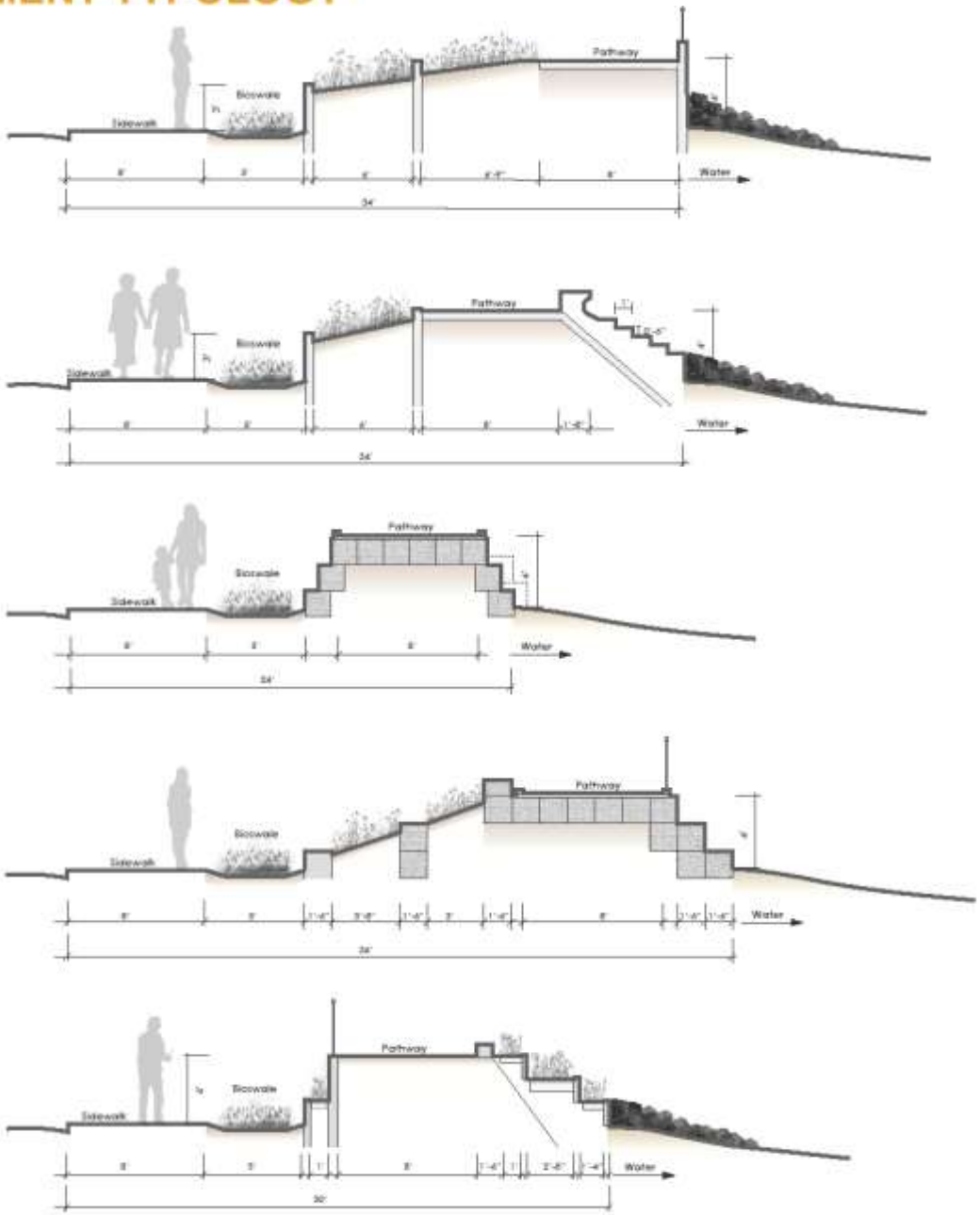


PROPOSED

ECO-REVETMENT TYPOLOGY

- **Small footprint**
- **Community Amenity**
- **Adaptable for ADA access**

SECTION D
ECO-REVETMENT TYPOLOGY



ECO-REVETMENT TYPOLOGY

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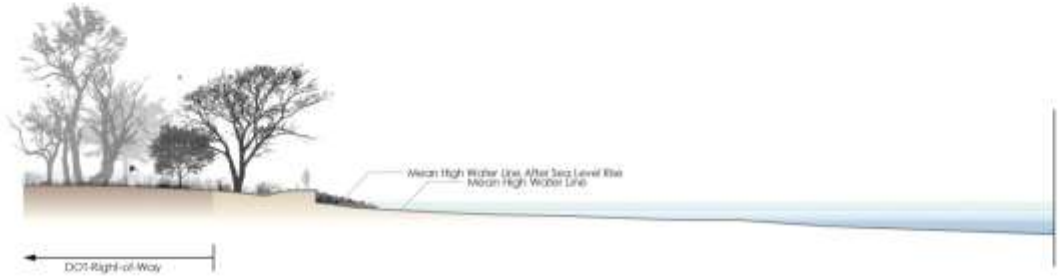
SECTION E & F
RAISED SHORELINE - PATHWAY

EXISTING E - E'

PROPOSED E - E'



EXISTING F - F'

PROPOSED F - F'

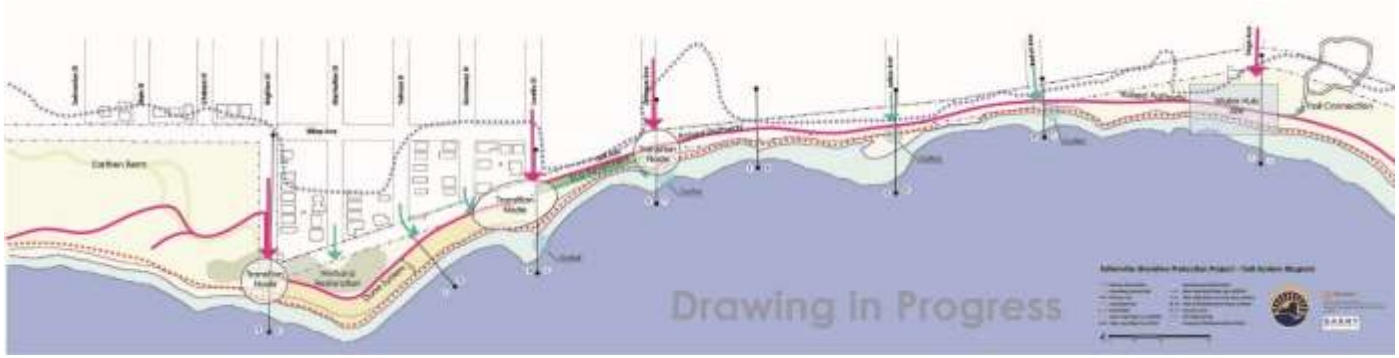
RAISED PATHWAY TYPOLOGY

- **Small footprint**
- **Protection as Community Access**
- **Enhanced maintenance access**

SHORELINE PLAN

PRELIMINARY CONCEPTUAL PLAN

PRELIMINARY CIRCULATION DIAGRAM



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QUESTIONS?

BREAK OUT TABLES & INFO SESSION

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TABLES

1. SHORELINE DESIGN
   - Preliminary Concept Plan
   - Preliminary Circulation Plan
   - Breakdown of Design Typologies
   - Design Precedents
   - Preliminary Materials

2. PROJECT OVERVIEW

Thank you !

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SCAPE TEAM

SCAPE / LANDSCAPE ARCHITECTURE
OCEAN AND COASTAL CONSULTANTS
PARSONS BRINCKERHOFF
ARCADIS
SEARC ECOLOGICAL MARINE CONSULTING
NEW YORK HARBOR FOUNDATION
LOT-EK ARCHITECTURE
MFS CONSULTING ENGINEERS
PRUDENT ENGINEERING