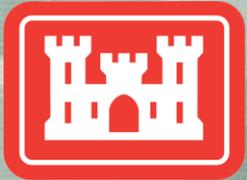


Atlantic Coast of New York East Rockaway Inlet to Rockaway Inlet and Jamaica Bay, NY

Public Meeting
NEPA Scoping
22 April 2015



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US Army Corps of Engineers
BUILDING STRONG®



Meeting Purpose

- Public Information Session & NEPA Scoping Meeting
- Provide an update on the Reformulation Study and alternatives under consideration
- Provide an opportunity for feedback on:
 - ▶ Alternatives being considered
 - ▶ Information or concerns that should be addressed



Project Partners

- ▶ NY State Department of Environmental Conservation (NYSDEC)
- ▶ New York City
 - Mayor's Office of Recovery and Resiliency
 - Department of Parks and Recreation
 - Department of Environmental Protection
- ▶ National Park Service (NPS)



Study Area



Risks

- Flooding (inundation) along Atlantic Ocean Coast and Jamaica Bay
- Wave damage
- Beach Erosion
- Effects of Sea Level Change



Reformulation Goals

- Recommend a long-term solution for Coastal Storm Risk Management for Rockaway and Jamaica Bay
- Evaluate Rockaway and Jamaica Bay as a complete system
 - ▶ The USACE must select the alternatives that have the most economic benefits with the most inexpensive lifecycle costs



Original Project (1970s)

- Project Authorized in 1965 as a Beach Erosion Control and Hurricane Protection Project

Beach Erosion Control Features:

- Beach Berm at +10 ft Mean Sea Level (MSL)
- 5M Cubic Yards of sand place for initial construction
- Renourishment for a period of 10 years

Hurricane Protection Features:

Never Constructed and Subsequently Deauthorized

- Hurricane Barrier w/ Navigation gate across Rockaway Inlet
- Floodwall at +18 ft MSL, for 7.7 miles along Rockaway

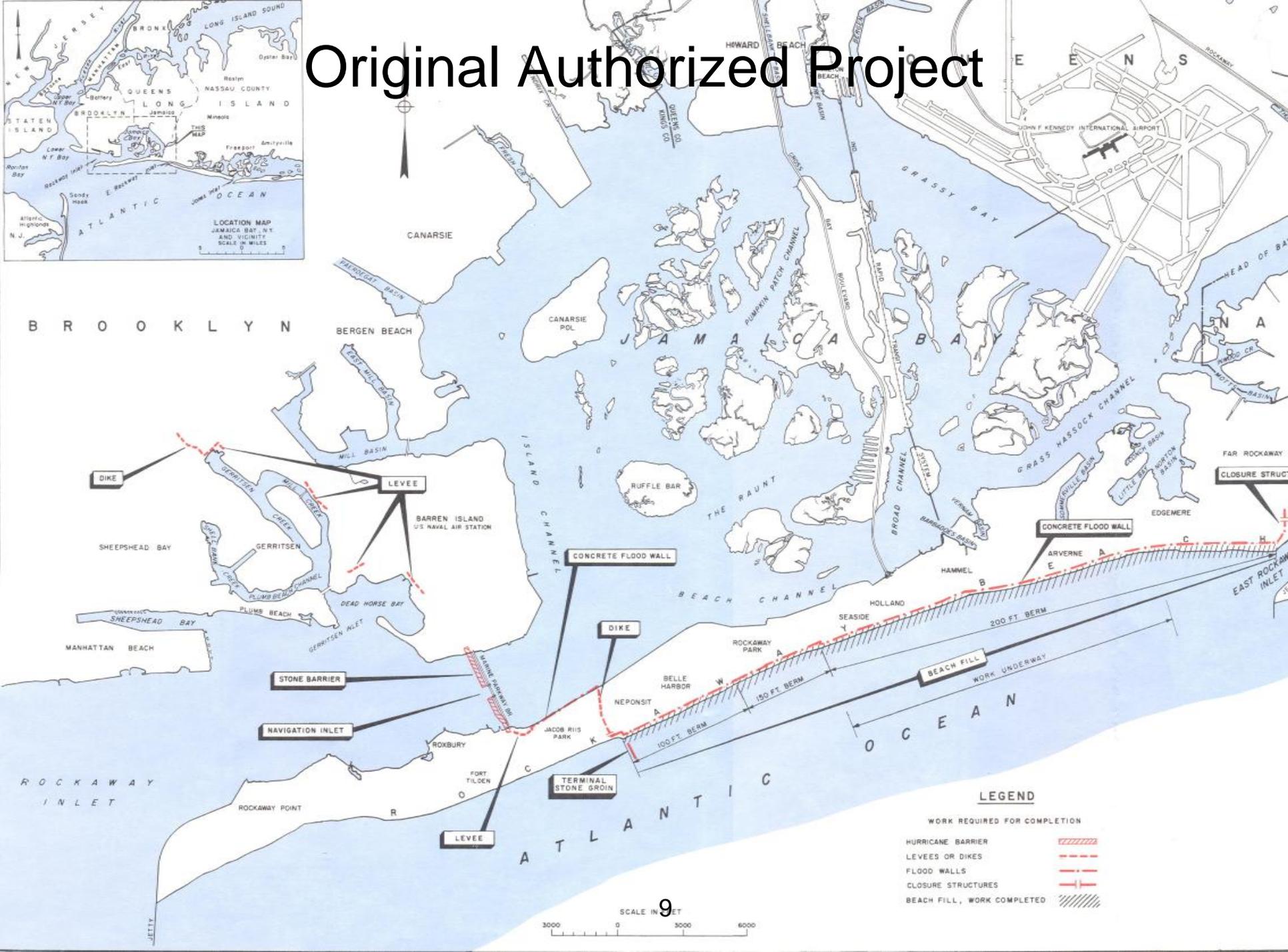


Original Project (1970s)

- 1974 authorization – authorized separate construction of “beach erosion control” portion plus 10-years of renourishment
- The “Hurricane Protection Features” were de-authorized by Congress
- Constructed in 1975-1977
- Terminal groin added at Beach 149th Street in 1979
- Project renourished regularly through 1987, and in 1996, 2000, and 2004
- Because of lack of renourishment, the beach was below design size when Sandy hit



Original Authorized Project



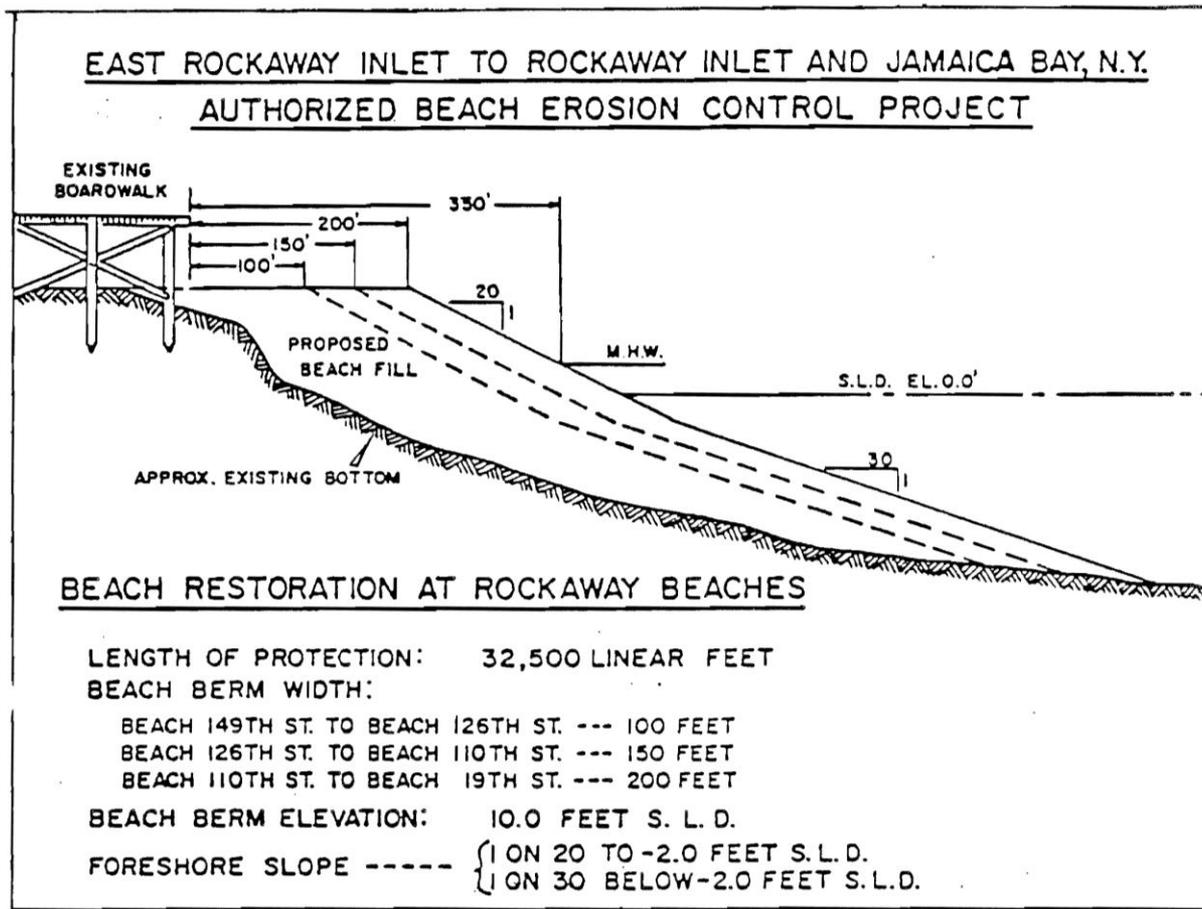
SCALE IN FEET
0 3000 6000

LEGEND

WORK REQUIRED FOR COMPLETION

HURRICANE BARRIER	
LEVEES OR DIKES	
FLOOD WALLS	
CLOSURE STRUCTURES	
BEACH FILL, WORK COMPLETED	

Original Authorized Project Cross-Section



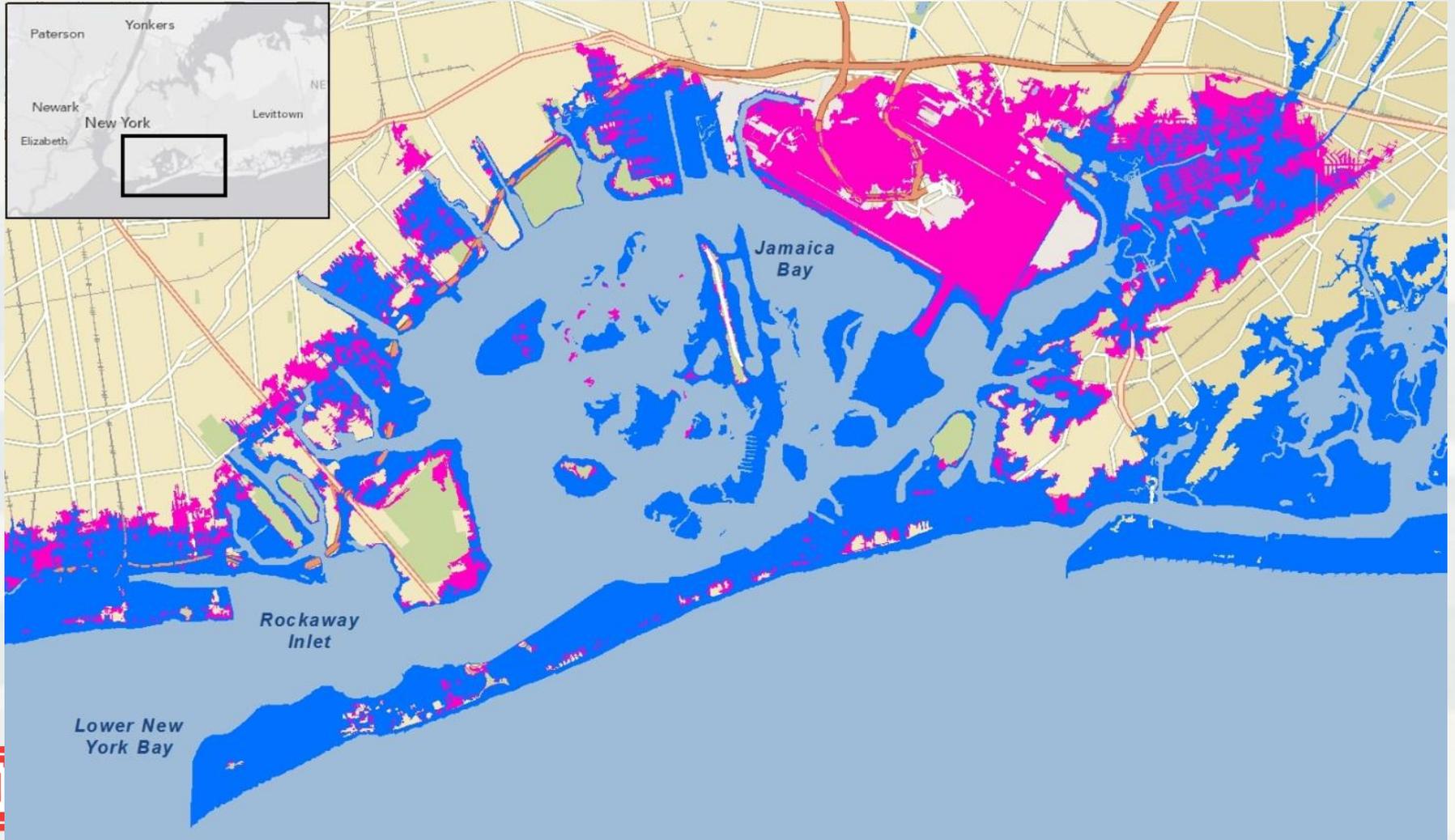
As a beach erosion control project – no dune feature or wall to offer protection against surge (flooding)



Scale of the Flooding Problem

Blue illustrates current 1% annual chance of flooding

Purple illustrates 1.3 feet of Relative Sea Level Change in 2070, (mid-range SLC) added to the 1% flooding

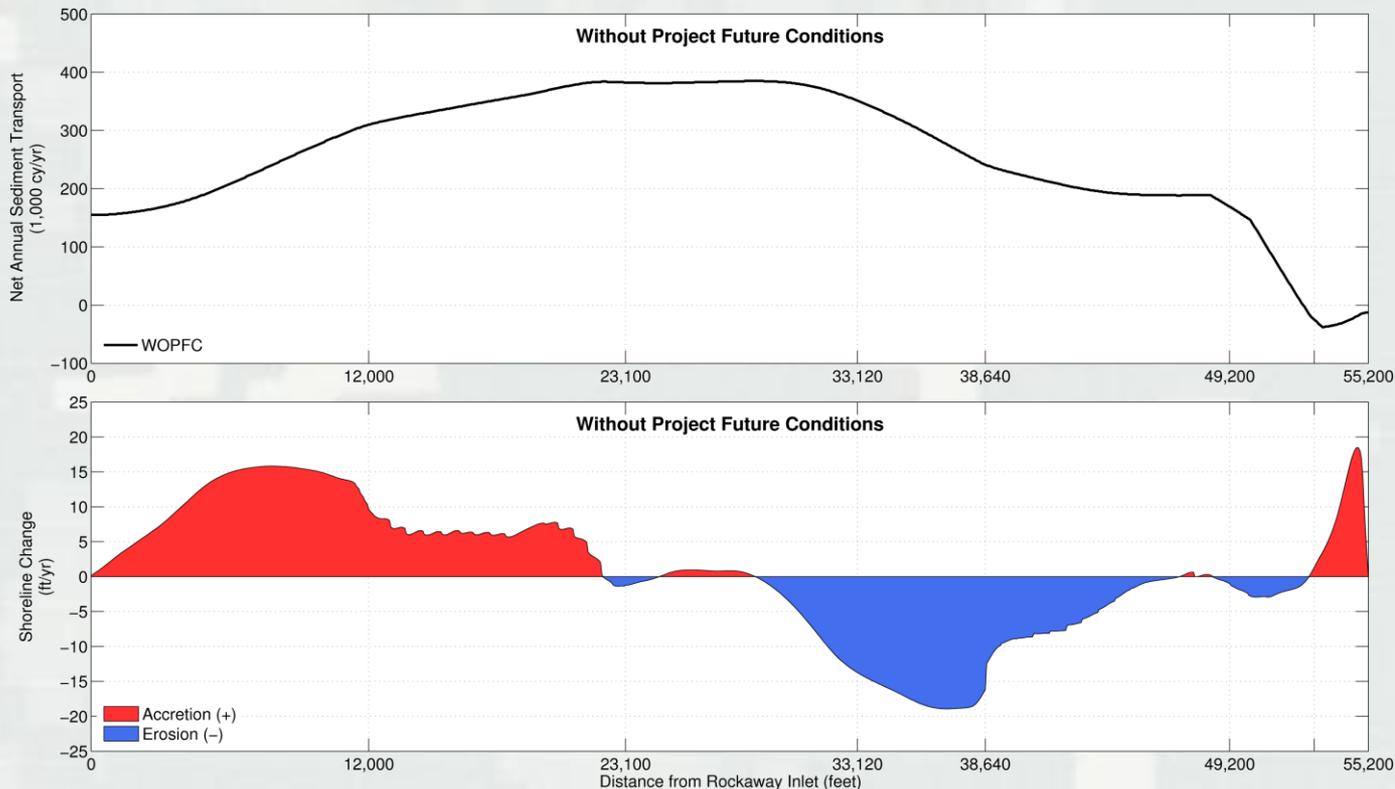
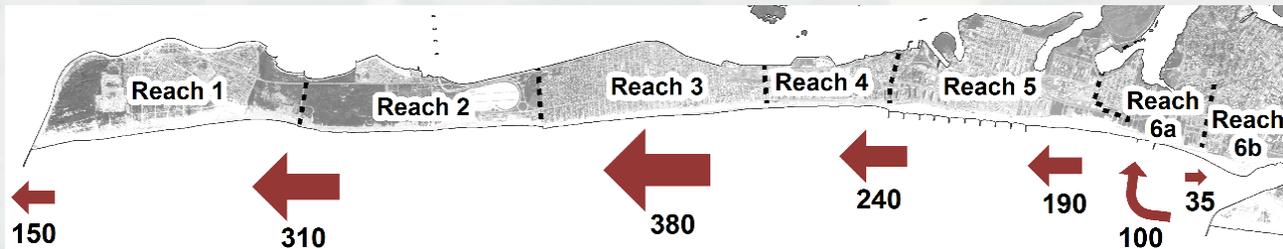


B  Current FEMA 1% Annual Chance Flood Hazard

 2070 1% Annual Chance Flood Hazard



Sand Movement and Erosion

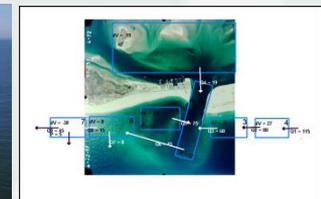


Simulation
+16 years



Storm Risk Management Measures

- The Corps provides coastal storm risk management through a variety of engineered features, designed as appropriate for each project area.
- Features can include
 - ▶ hurricane storm surge barriers
 - ▶ hurricane dunes and levees
 - ▶ seawalls
 - ▶ revetments
 - ▶ offshore breakwaters
 - ▶ beaches and dunes (beach nourishment)
 - ▶ bypassing and backpassing of sand
 - ▶ regional sediment management
 - ▶ non-structural measures such as house-raising, road raising, relocations and buyouts.



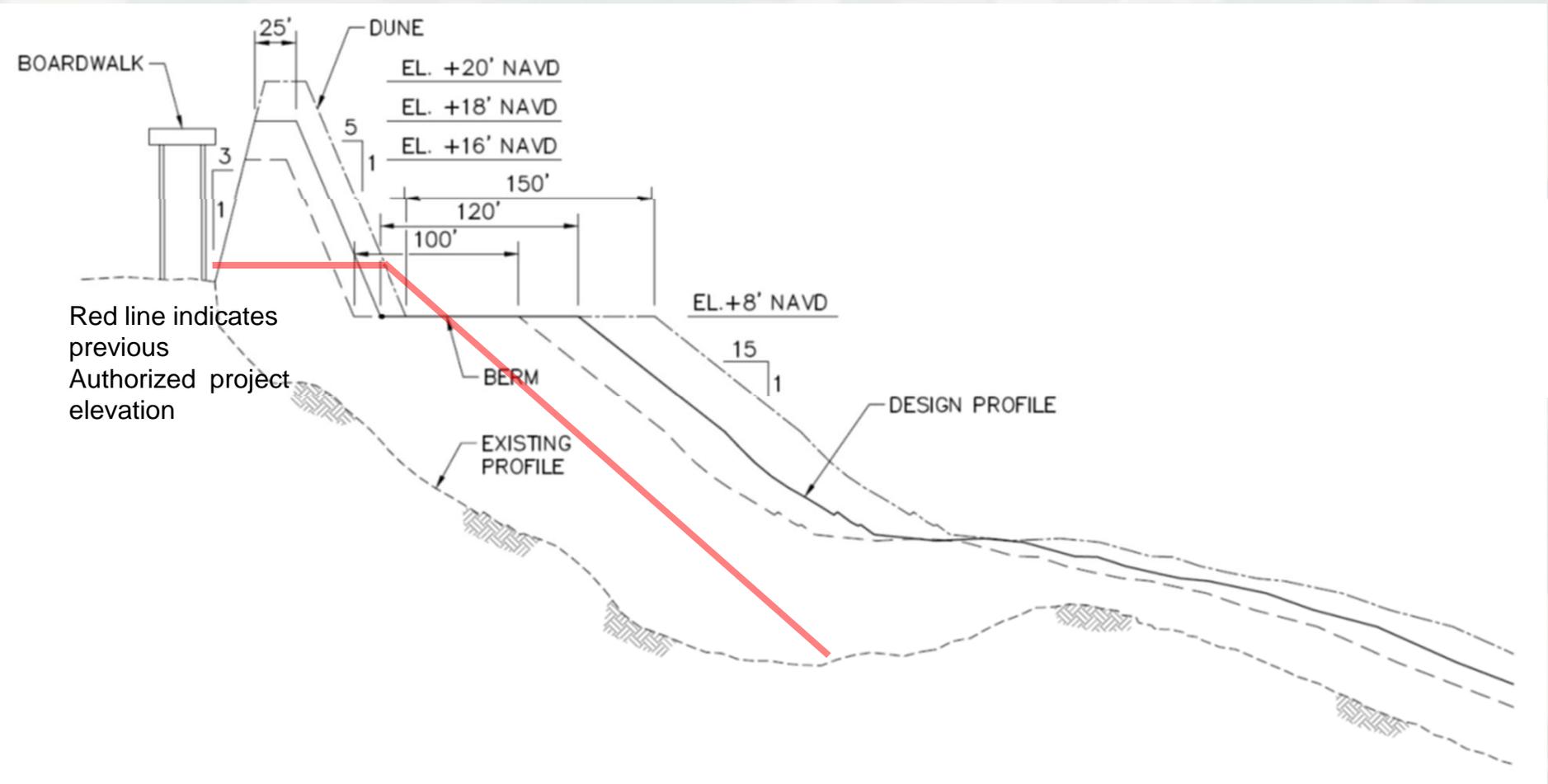
Short-Listed Alternatives

- Shoreline
 - ▶ Alt 0: No Action
 - ▶ Alt 1: Beach Restoration
 - ▶ Alt 2: Beach Restoration and Modified Erosion Control
 - ▶ Alt 3: Beach Restoration and Increased Erosion Control
(Reinforced Dune is being evaluated for Alt 1, 2, and 3)
- Bay
 - ▶ Alt A: No Action
 - ▶ Alt B: Non-Structural (including house raising or flood proofing)
 - ▶ Alt C: Hurricane Barrier in Rockaway Inlet
 - ▶ Alt D: Perimeter Protection by T-wall and/or Living Shoreline where appropriate

Selected Plan will combine elements from shoreline and bay.



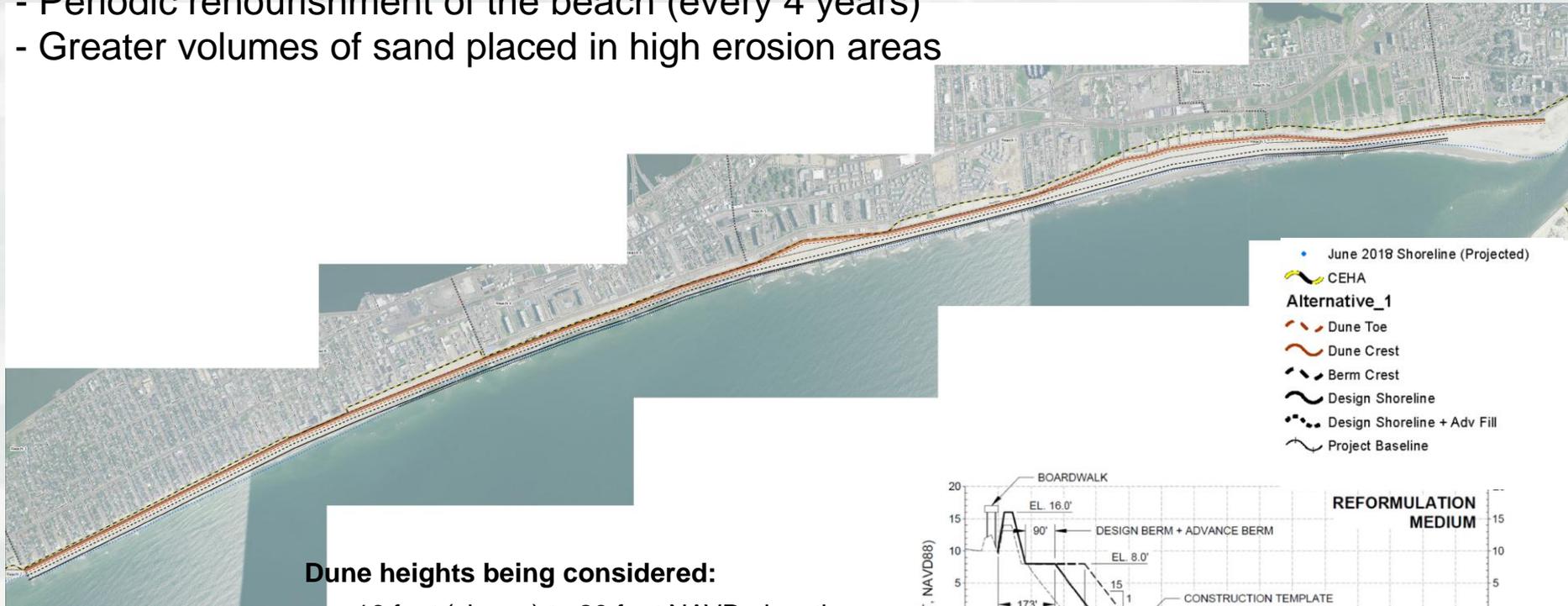
Initial sand placement and authorization for renourishment for the next 50 years is the largest cost on the Atlantic side of the project:



Atlantic Coast Alternative 1 (Beach Restoration)

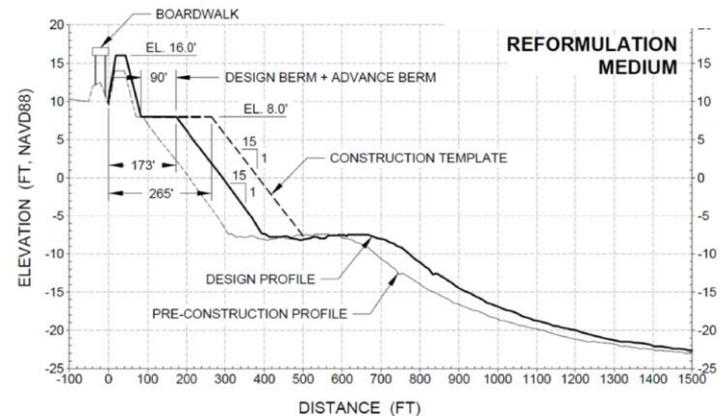
Beach Restoration Alternative

- Includes construction of beach and dune
- Periodic renourishment of the beach (every 4 years)
- Greater volumes of sand placed in high erosion areas



Dune heights being considered:
16 feet (shown) to 20 feet NAVD elevation

Design Berm being considered:
60 feet (shown) to 100 feet



Atlantic Coast Alternative 2 (Beach Restoration and Modified Erosion Control)

- All beach berm and dune elements of Alternative 1
- Shortening of 10 existing groins between Beach 60th to Beach 86th
- Relocation of existing boardwalk from Beach 28th to Beach 39th

Groin Shortening in Alt. 2

- 60th Street - Shorten 100 ft
- 62nd Street - Shorten 100 ft
- 65th Street - Shorten 100 ft
- 68th Street - Shorten 100 ft
- 71st Street - Shorten 100 ft
- 74th Street - Shorten 100 ft
- 77th Street - Shorten 100 ft
- 80th Street - Shorten 100 ft
- 83rd Street - Shorten 100 ft
- 86th Street - Shorten 100 ft



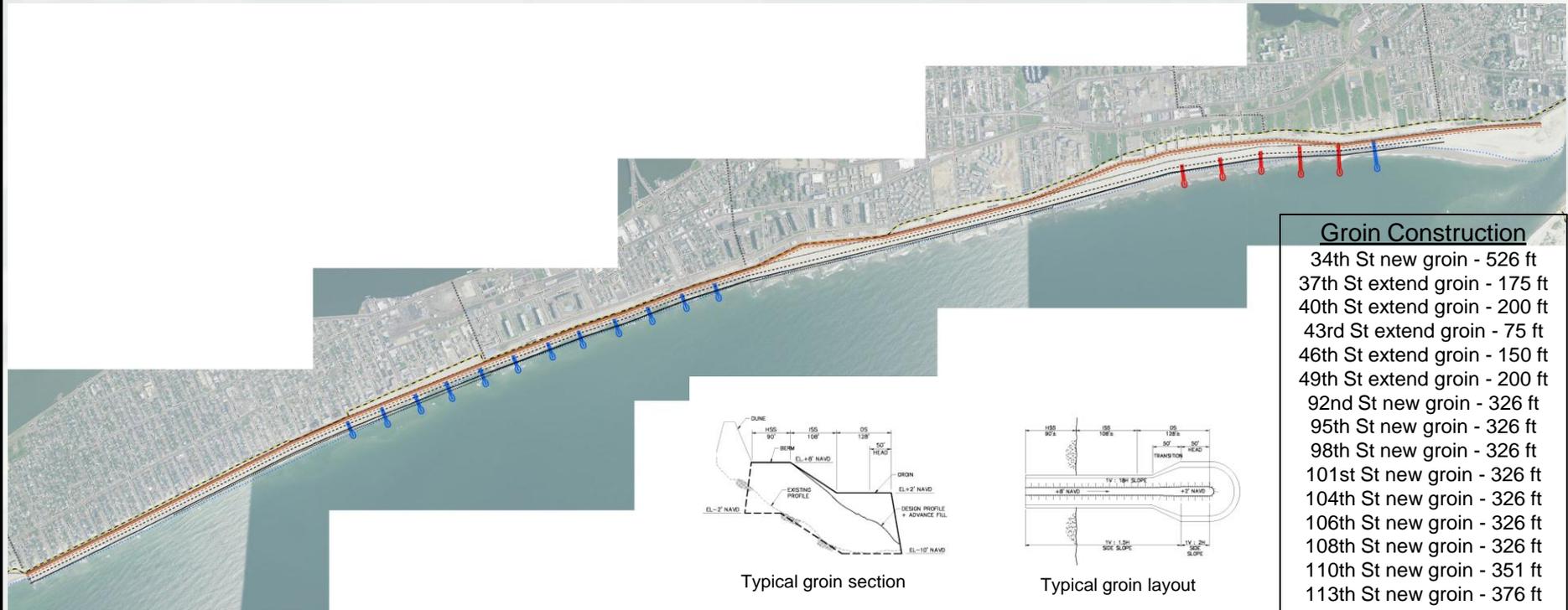
Boardwalk Relocation Detail



- June 2018 Shoreline (Projected)
- CEHA
- Alternative_2**
- Dune Toe
- Dune Crest
- Berm Crest
- Design Shoreline
- Design Shoreline + Adv Fill
- Project Baseline - Boardwalk Relocation
- Boardwalk Relocation
- Groin - New Construction
- Groin - Extension
- Groin - Shortening

Map of Atlantic Coast Alternative 3 (Beach Restoration and Increased Erosion Control)

- All beach berm and dune elements of Alternative 1
- Construction of 12 new groins between Beach 90th to Beach 122nd
- Enhancement of existing groin field from Beach 36th to Beach 49th (extending groins) and new groin at Beach 34th

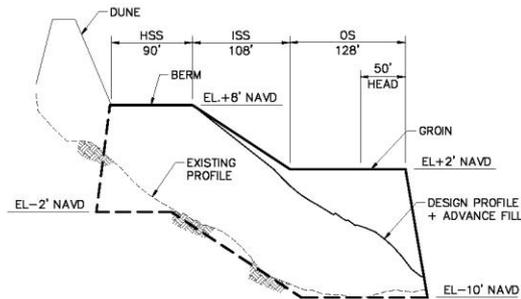
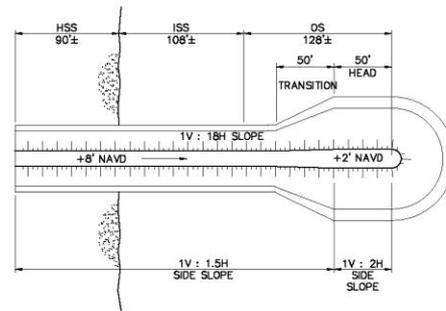
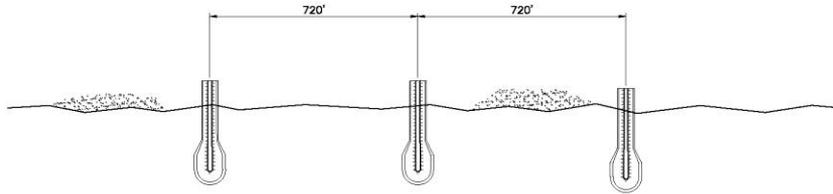


Hard Structure Considerations:

Considered for 2 reasons:

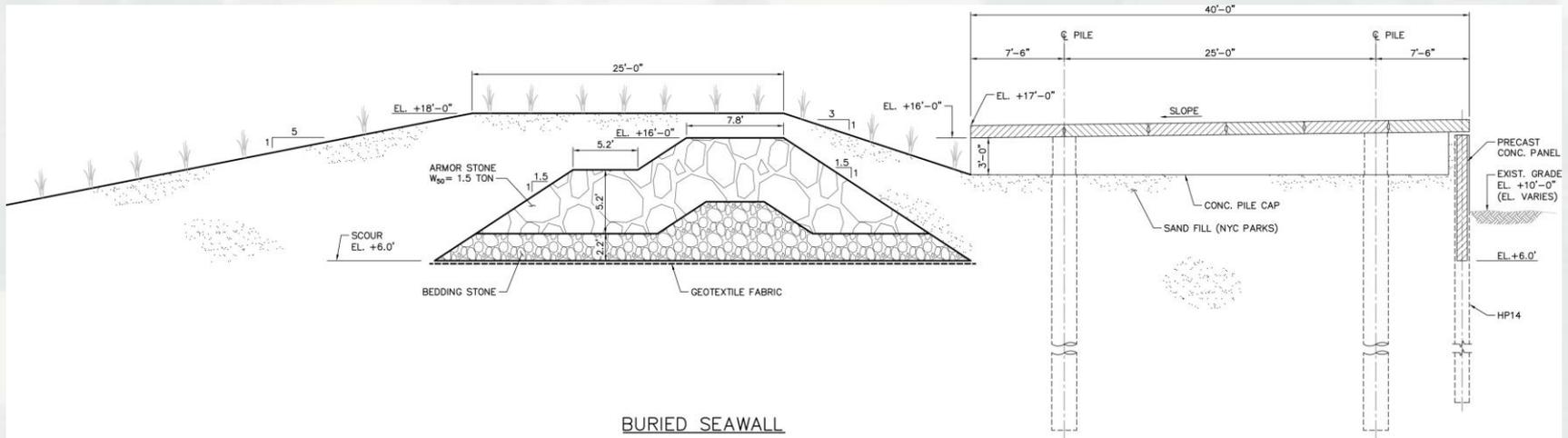
- Reduce the need for renourishment (quantity of sand & frequency of placement)
- As a protective measure (reinforced dune)



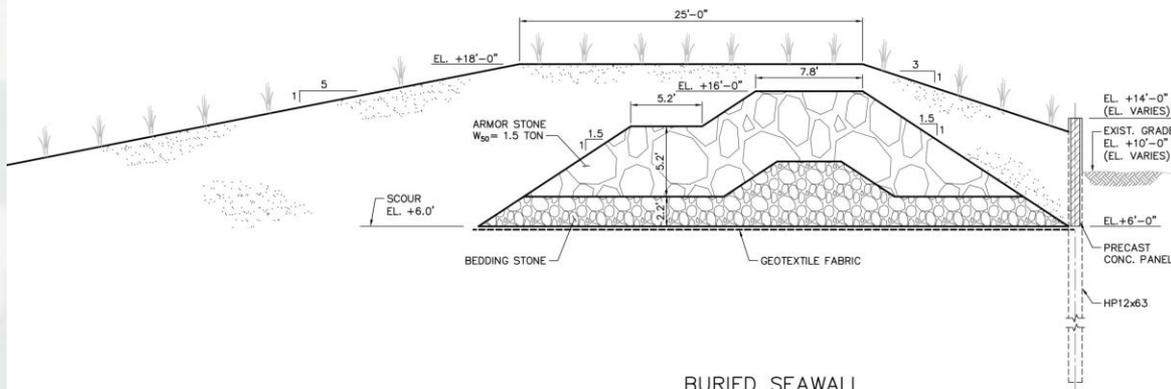


Typical Groin Drawing





BURIED SEAWALL
 BEACH 19th ST. TO BEACH 126th ST.
 0 8' 16'
 SCALE: 1/8"=1'-0"



BURIED SEAWALL
 BEACH 126th ST. TO BEACH 149th ST.
 0 8' 16'
 SCALE: 1/8"=1'-0"

Buried Seawall Concept A



Initial Findings

- Rockaway has a sand erosion problem, sediment budget confirms deficit
 - Natural shoreline has been artificially constrained by the boardwalk, roads, and buildings
 - No project would eliminate the need for renourishment without a radical change in the current use, function, and nature of the beach
 - The range of alternatives all recommend renourishment every 3 to 4 years
-
- Jamaica Bay communities impacted most dramatically by low frequency high impact events; comprised of broad low lying areas
 - Sea Level Rise impacts can be significant
 - Tie-in structures necessary to make system function, Atlantic shoreline solution must meet or exceed Jamaica Bay level of Protection



Jamaica Bay Measures

Nonstructural

Acquisition
Managed Retreat
Floodplain zoning
Floodproofing/raising
Flood warning system

Structural

Hurricane barrier
Local Tide Gates
Levee
Floodwall
Bulkhead/Seawall
Breakwater

Natural or Nature Based

Living shoreline
Coastal wetland
Maritime and coastal forest
Reef
Dune and Beach
Swale/Channel

Other

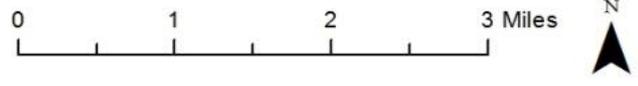
Bay shallowing
Stormwater improvement
Wastewater treatment
Park access and recreation
Evacuation routes



Jamaica Bay Economic Reaches



- Broad Channel
- Head of Bay
- Jamaica Bay West
- Canarsie
- Howard Beach
- Rockaway



Jamaica Bay Alternatives

- No Action Alternative
- Non-Structural Alternative (Can be combined with others)
- Rockaway Inlet Barrier
 - ▶ Three alignments
 - ▶ Opening Widths in 1,000-foot Increments
 - ▶ Provides Benefits to all Reaches
- Jamaica Bay Interior Barriers (Perimeter Plan)
 - ▶ Living Shoreline and/or T-Wall where appropriate
 - ▶ Smaller inlet closure gates to reduce wall length
 - ▶ Individual Plan Developed for each Economic Reach



Rockaway Inlet Barrier Alignments



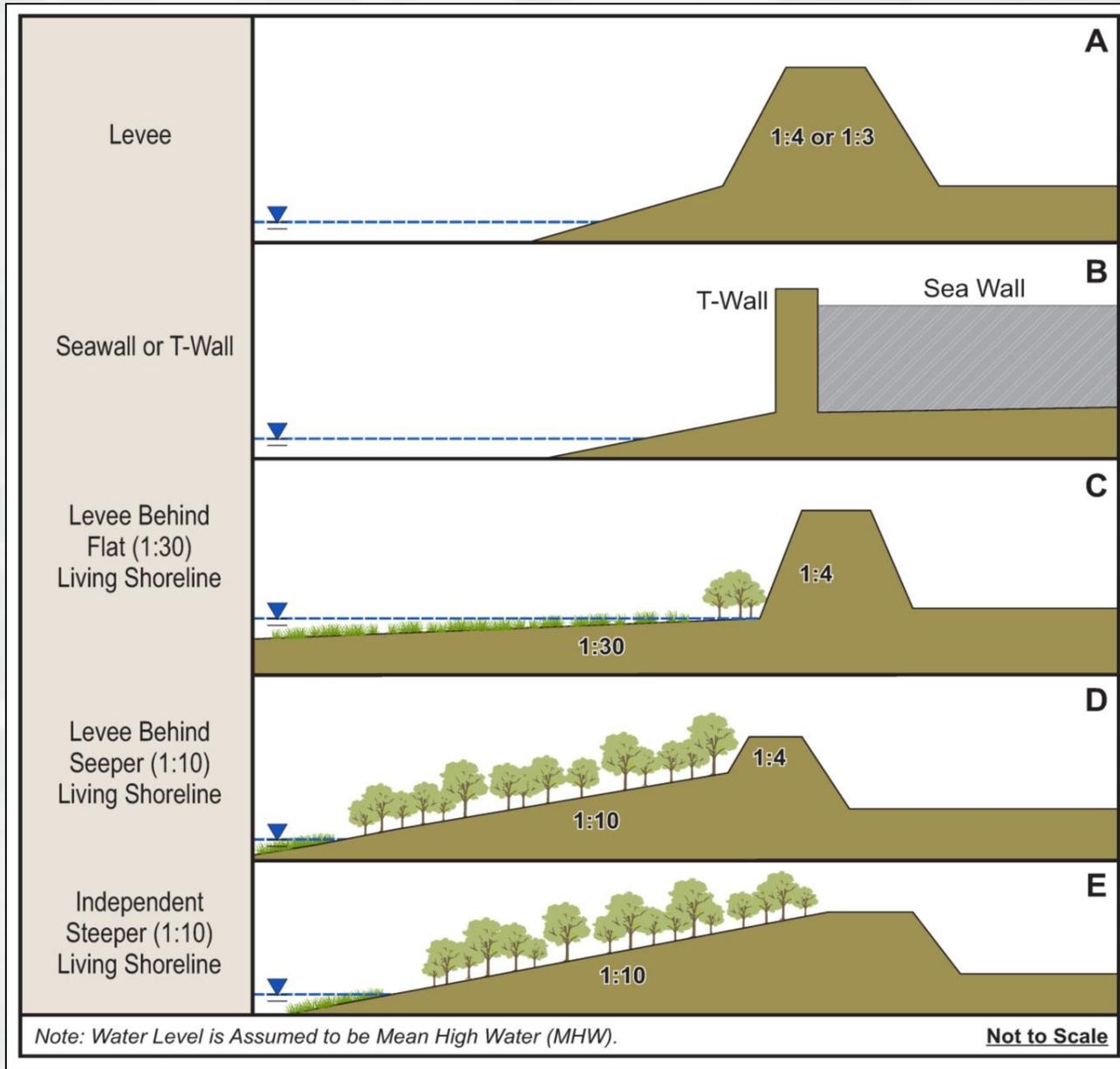


Easter Scheld Storm Surge Barrier, Netherlands (9km long)



Lake Borgne, New Orleans Surge Barrier
built by the USACE in 2011 (1.8 miles long)

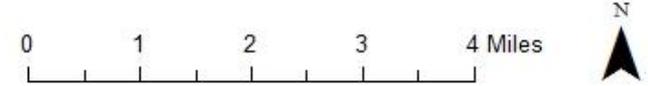




Jamaica Bay Focused Array of Alternatives



- C-2b (Inlet Barrier)
- D-7 (Jamaica Bay Northwest)
- Project tie-ins
- D-4 (Head of Bay)
- D-5 (Rockaway)



Next Steps

- Public input on plans to be developed further
- Further design and evaluation of specific plans
 - ▶ Identify and design “tie-ins” for line of protection
 - ▶ Optimization of Scale of Protection
- Identification of a “Tentatively Selected Plan”
- Release of a Draft Report and Environmental Impact Statement



Implementation

- Final Selected Plan will include both the Atlantic Shoreline and Jamaica Bay
- The Selected Plan will be built incrementally, Atlantic Shoreline will be in the first phase
- Significant Federal funding is available for construction (Sandy Funding to USACE for projects like this totals \$3.5B)



Schedule

- Assessing public support of alternatives: **Now**
- Tentatively selected complete plan: **September 2015**
- Draft Feasibility Report released for concurrent review by the public and other agencies: **December 2015**
- Final Report must be reviewed and approved both internally within the USACE and externally, including local, state, and other Federal oversight
- Construction start of first phase (**Targeted for 2018**) will depend on length of reviews and approvals, and relative complexity of design

