

Atlantic Coast of Long Island, Jones Inlet to East Rockaway Inlet, Long Beach Island, NY Hurricane Sandy Limited Reevaluation Report (HSLRR) for Coastal Storm Risk Management

6 March 2014



®



US Army Corps of Engineers
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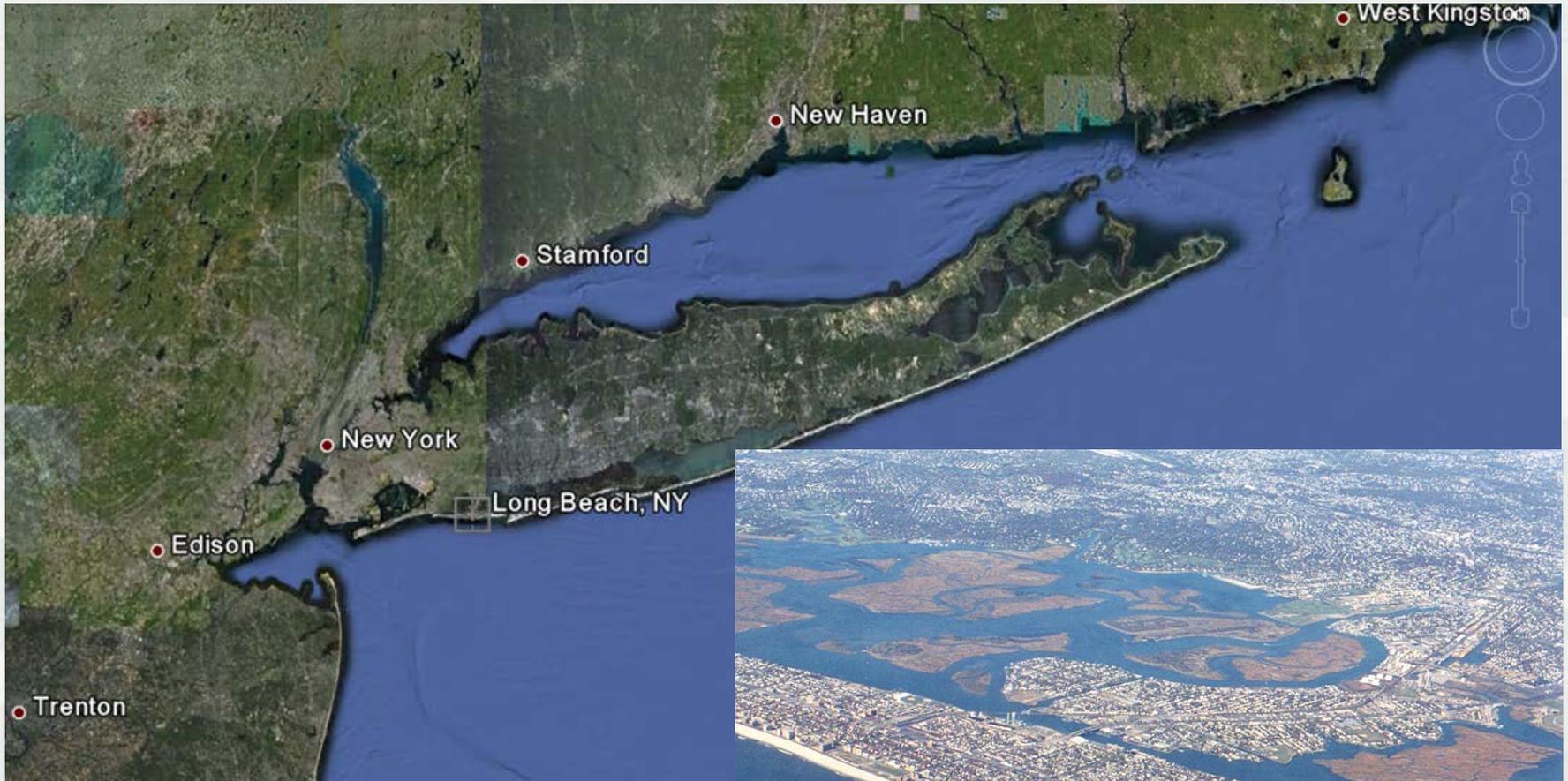


Outline

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Study Location



*** Approximately 6.4 miles of shoreline that includes the City of Long Beach, Town of Hempstead and Nassau County**

Study Partners

- US Army Corps of Engineers
- New York State Department of Environmental Conservation
- City of Long Beach
- Town of Hempstead
- Nassau County



Historical Storm Impacts



U. S. Coast Guard photo from Herald Tribune—UPI
FLOODED BY STORM—This was Long Beach, N. Y., yesterday as storm-tossed waves inundated homes. Scores of houses were reported to have been washed away by the storm.



Photos from Upper Left (clockwise):
 1938 Hurricane, 1962 Northeaster,
 Tropical Storm Irene - September 2011



Historical Storm Impacts



Between Maryland Avenue to Indiana Avenue



Damage to Long Beach Boardwalk



Damage to Long Beach Boardwalk

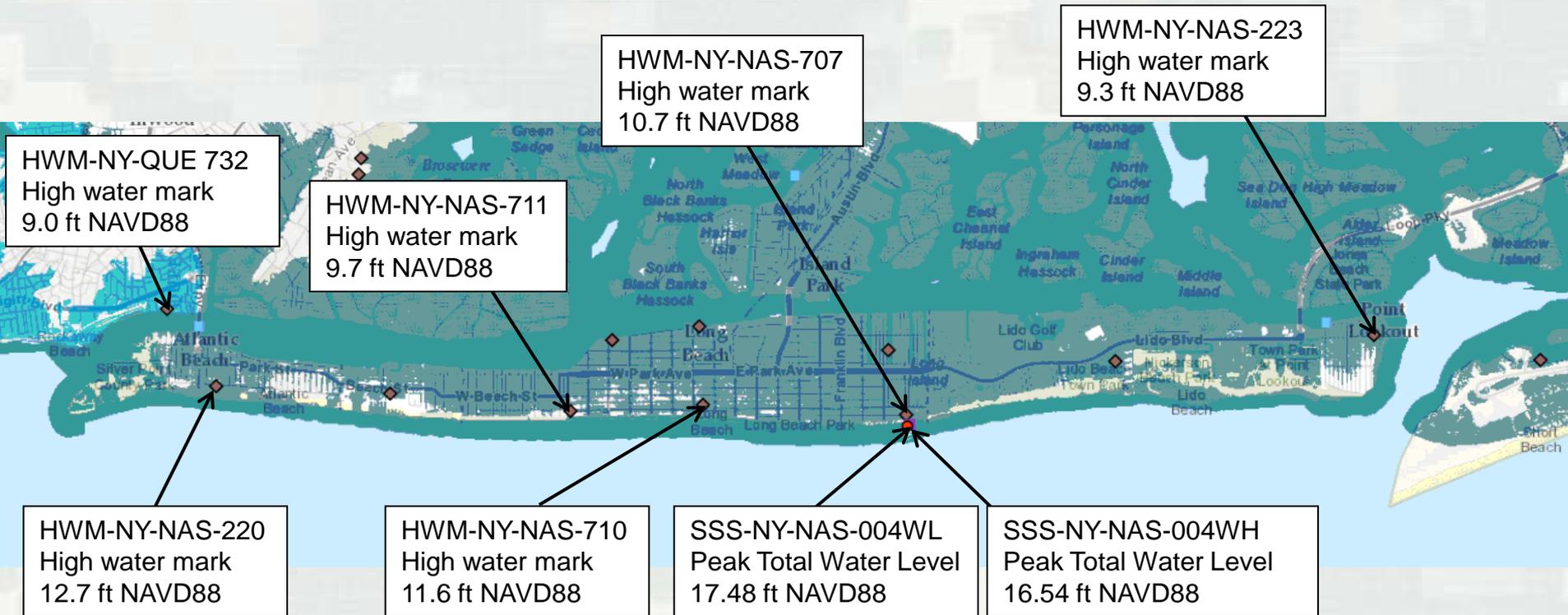


Riverside Boulevard and East Broadway

Photos from Upper Left (clockwise): September 16, 1944
Hurricane and Hurricane Sandy October 29, 2012



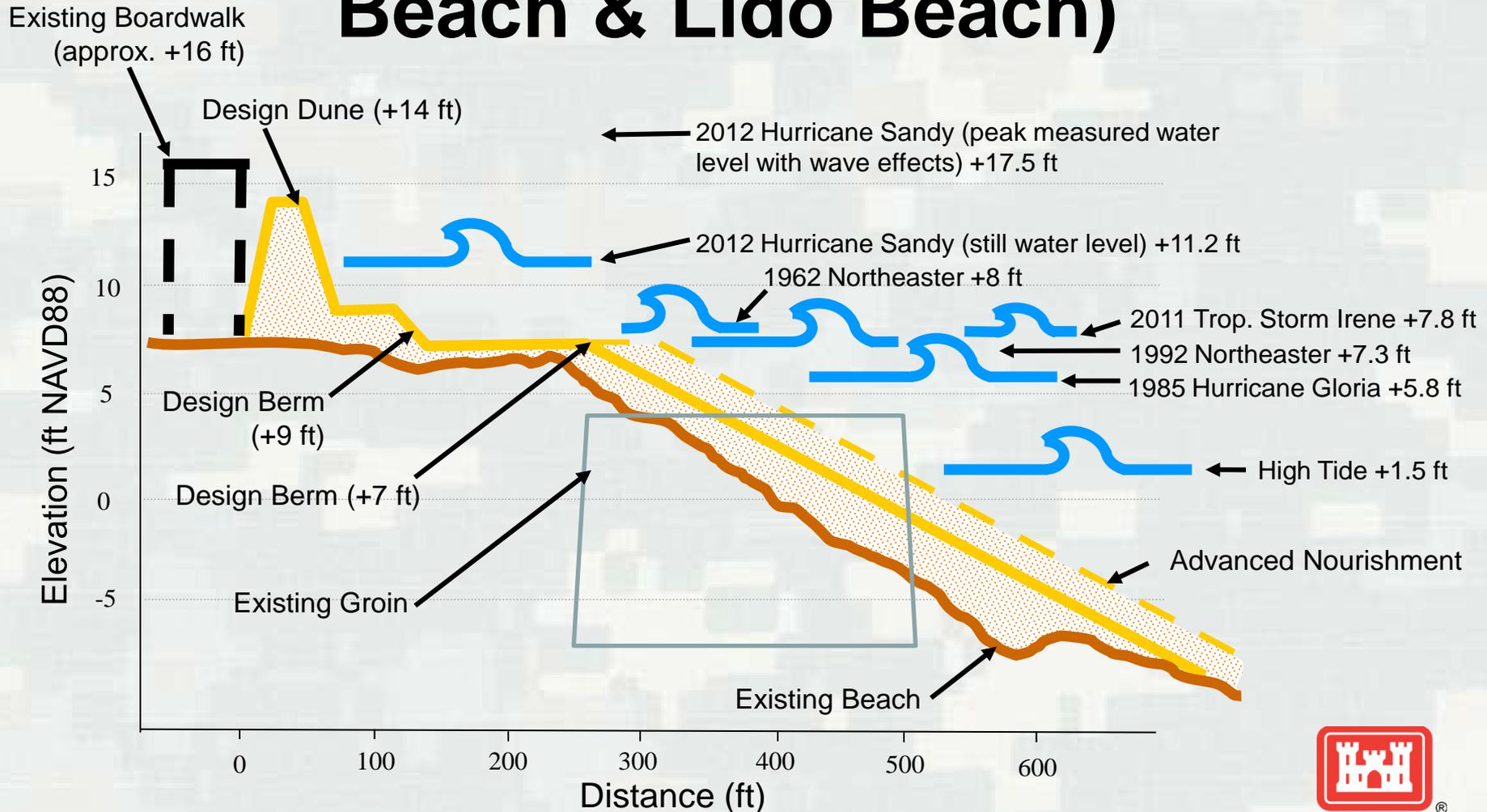
Hurricane Sandy High Water Marks and Inundation Limits



Hurricane Sandy USGS Peak Elevations, High Water Marks, and FEMA modeled surge extent (blue area)

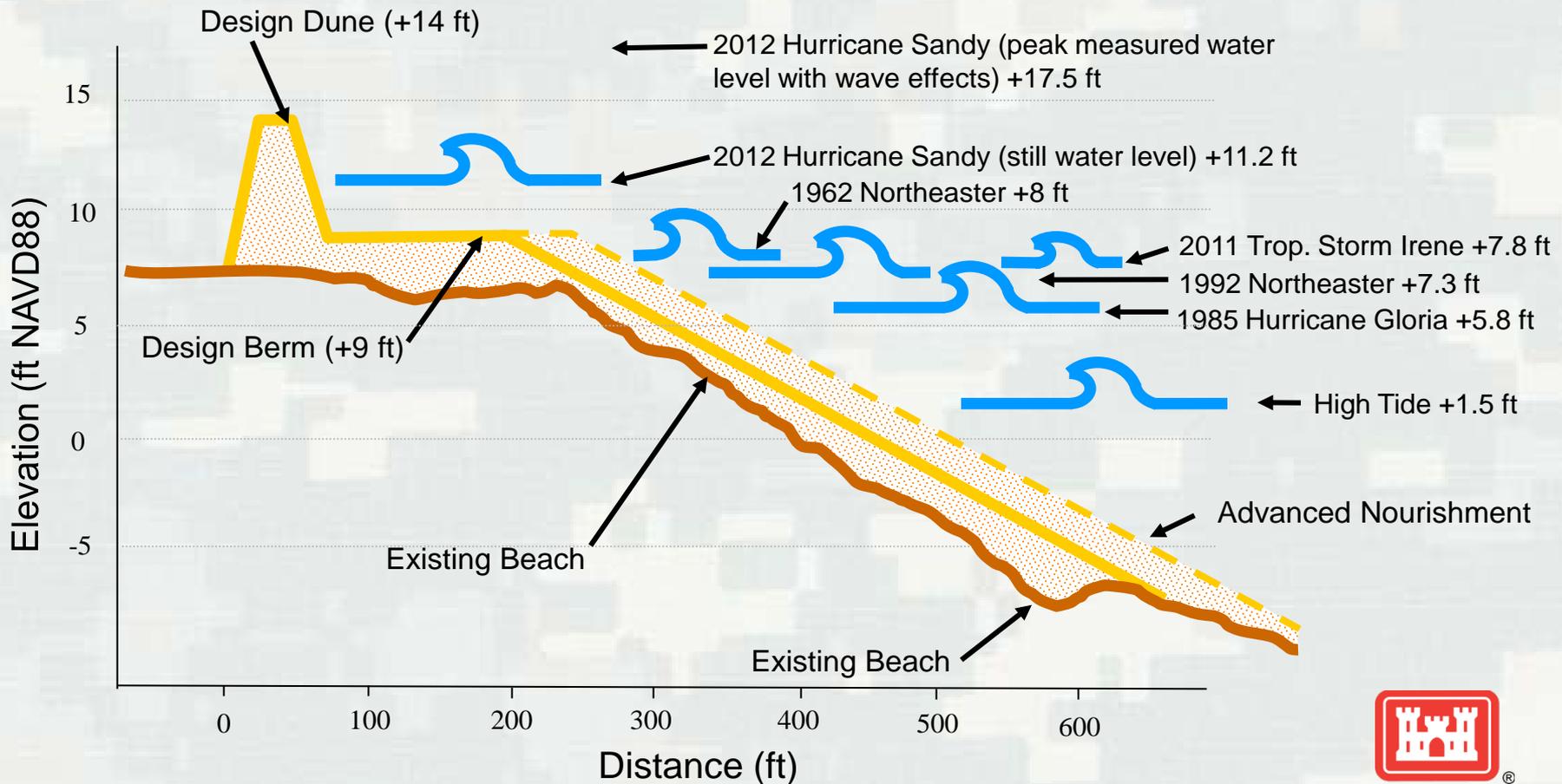


Historical Storm Water Levels with Stepped Fill Cross-Section (Long Beach & Lido Beach)



Note: Wave heights not drawn to scale. Hurricane Sandy water levels are average of USGS gage readings.

Historical Storm Water Levels Compared with Fill Cross-Section (Town of Hempstead & Nassau Co.)



Note: Wave heights not drawn to scale. Hurricane Sandy water levels are average of USGS gage readings.



Study Chronology

- 1960 Hurricane Donna – September 12
- 1962 Northeaster – March 6-8
- 1965 Corps prepared study report on multi-purpose plan of improvement
- 1971 Corps study terminated. Local interests objected to dune
- 1985 Hurricane Gloria – September 27, local request for assistance followed.
- 1986 Congress authorized new study for storm damage protection works at Long Beach.
- 1989 Favorable Reconnaissance report completed
- 1991 Feasibility Study initiated with appropriation of Fed and non-Fed funds
- 1995 Long Beach Island Final Feasibility report and EIS completed
- 1996 Congress authorized project for construction
- 1999 Technical Reanalysis of Terminal Groin Rehabilitation and Extension at Jones Inlet, Long Beach Island, NY
- 2000 Technical Reanalysis report on shoreline stabilization measures, evaluated groins at Lido Beach and Point Lookout
- 2003-06 Drafting Limited Reevaluation Report, performing necessary analysis to formulate a plan that could be supported by the non-Federal sponsors
- 2006 Draft LRR completed and turned down by the City of Long Beach
- 2009 USACE received letter of interest in project from City of Long Beach to NYSDEC
- 2011 Tropical Storm Irene – August 28, 2011
- 2012 Hurricane Sandy – October 29, 2012
- 2014 Draft Hurricane Sandy Limited Reevaluation Report



Problem Identification

Physical Setting:

- Continuous strip of a low-lying flat land mass
- Existing low beach berms with intermittent dunes provide minimal barrier to reduce overtopping and inundation

Storms have caused:

- Reduction in beach height/width
- Accelerated deterioration of constructed stone groins
- Most severe erosion at the eastern end
- Decreased risk management capability of the beach
- Increased storm damage vulnerability of communities

Deterioration of existing coastal storm risk management structures:

- Groins severely battered by storms
- No repair/maintenance since 1950's (initial construction date)

Hurricane Sandy Effects:

- Dune and beach erosion
- ~294,000 cy of sand lost from beach
- Overwash
- Long Beach Island subjected to wave attack and inundated by storm surge
- Flooding caused by storm surge from both ocean and bay to the point where the two water bodies met
- Extensive damage from inundation to residential and commercial structures



Project Purpose

Three specific damage mechanisms of coastal storms were considered

Inundation



Erosion



Waves



The recommended project will manage risk against inundation, erosion and waves, reducing the potential for storm induced damages along the Atlantic Ocean coastline.

- Federal coastal storm risk management projects are typically formulated and designed to maximize net benefits, optimizing at more frequent events, i.e. 50-100 yr storms.
- The level of coastal storm risk management provided by the recommended project is equivalent to a 100-yr storm, or a storm that has a 1% chance of occurring in any given year.
- Hurricane Sandy was approximately a 180-yr storm. The recommended project would have been overtopped, but would have reduced the damages experienced.
- The project will not address coastal storm risks from the bayside of the Island.
- The project would work as part of a larger coastal storm risk management system if risk management measures are implemented along the bayside in the future.



Project Updates

Since 2006:

- Further borrow area analysis was performed
- Updated beach surveys
- Updated coastal modeling to refine beach template to incorporate input from the local sponsors

2014 HSLRR

- Considered and incorporated post-Hurricane Sandy existing conditions
- Updated Environmental Assessment (EA)
- Updated Costs and Benefits
- Considered recent Sea Level Change scenarios
- Verified Real Estate Conditions and Requirements



Plan Components

Length of Beachfill

35,000 linear feet (LF), extends from east end of Point Lookout to west boundary of the City of Long Beach at Nevada Avenue, with an incidental taper into East Atlantic Beach

Point Lookout & Lido Beach (east of Nickerson)

- 110 ft berm from seaward toe of dune; elevation +9 ft NAVD88
- 1V:20H slope to existing bathymetry
- Dune with crest width of 25 ft; top elevation +14 ft NAVD88 with 1V:5H landward and seaward slopes

City of Long Beach & Lido Beach (west of Nickerson)

- 190 ft stepped berm from seaward toe of dune
 - 40 ft flat berm; elevation +9 ft NAVD88
 - 20 ft berm at 1V:10H slope to +7 ft NAVD88
 - 130 ft flat berm; elevation +7 ft NAVD88
 - 1V:30H slope to existing bathymetry
- Dune with crest width of 25 ft; top elevation +14 ft NAVD88 with 1V:5H landward and seaward slopes (1V:3H landward slope fronting the boardwalk in Long Beach)

Nassau County (Nickerson Beach)

- ~5,000 LF, existing berm provides equivalent coastal storm risk management
- Berm area undisturbed to allow for bird nesting and foraging
- Dune with crest width of 25 ft; top elevation +14 ft NAVD88 with 1V:5H landward and seaward slopes
- Incorporates existing dunes into construction of HSLRR Plan

Beachfill, Dune Grass, and Sand Fence Quantities

- initial fill placement: 4,720,000 cy
- renourishment:
 - 1,770,000 cy fill
 - 5-yr intervals for 50-yr period of analysis
- planting dune grass: 34 acres
- sand fence: 75,000 LF

Offshore borrow area

- Contains ~36 million cy of beachfill
- located ~one mile offshore of the barrier island of Long Beach

Groins

- Existing groins
 - 17 total rehabilitation
 - rehabilitation/100 ft extension of Point Lookout terminal groin
- Newly constructed groins
 - 4 total at eastern end of island

Access for Pedestrians and Vehicles (Dune Crossovers)

- City of Long Beach: 31 total
- Town of Hempstead: 20 total
- Nassau County: 6 total



Project Layout



US Army Corps of Engineers
New York District



Typical Section of Beachfill with Step

Typical Section of Beachfill without Step

Atlantic Coast of Long Island, Jones Inlet to East Rocaway Inlet,
Long Beach Island, New York Coastal Storm Risk Management Project

Scale: NTS

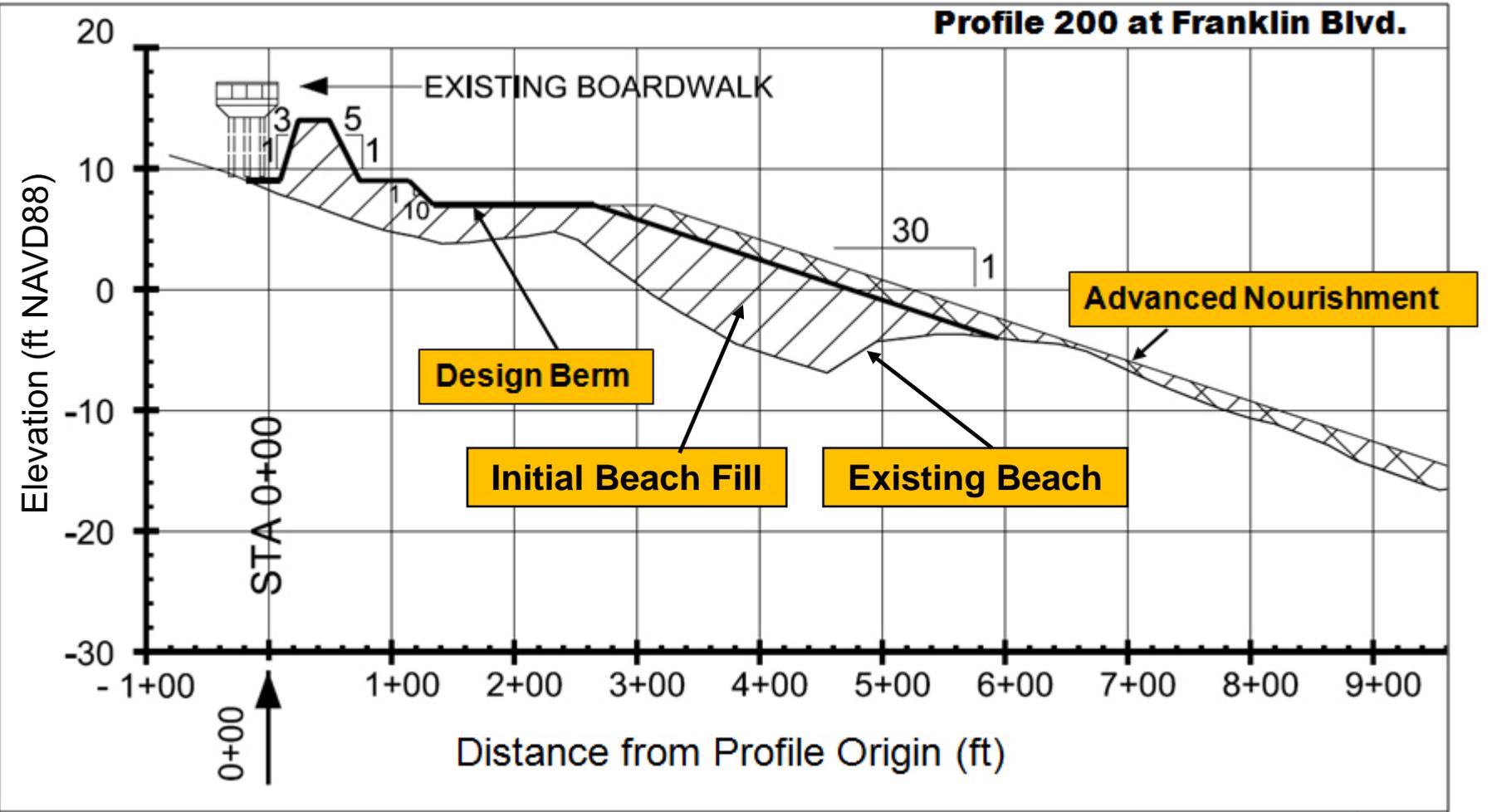


Legend

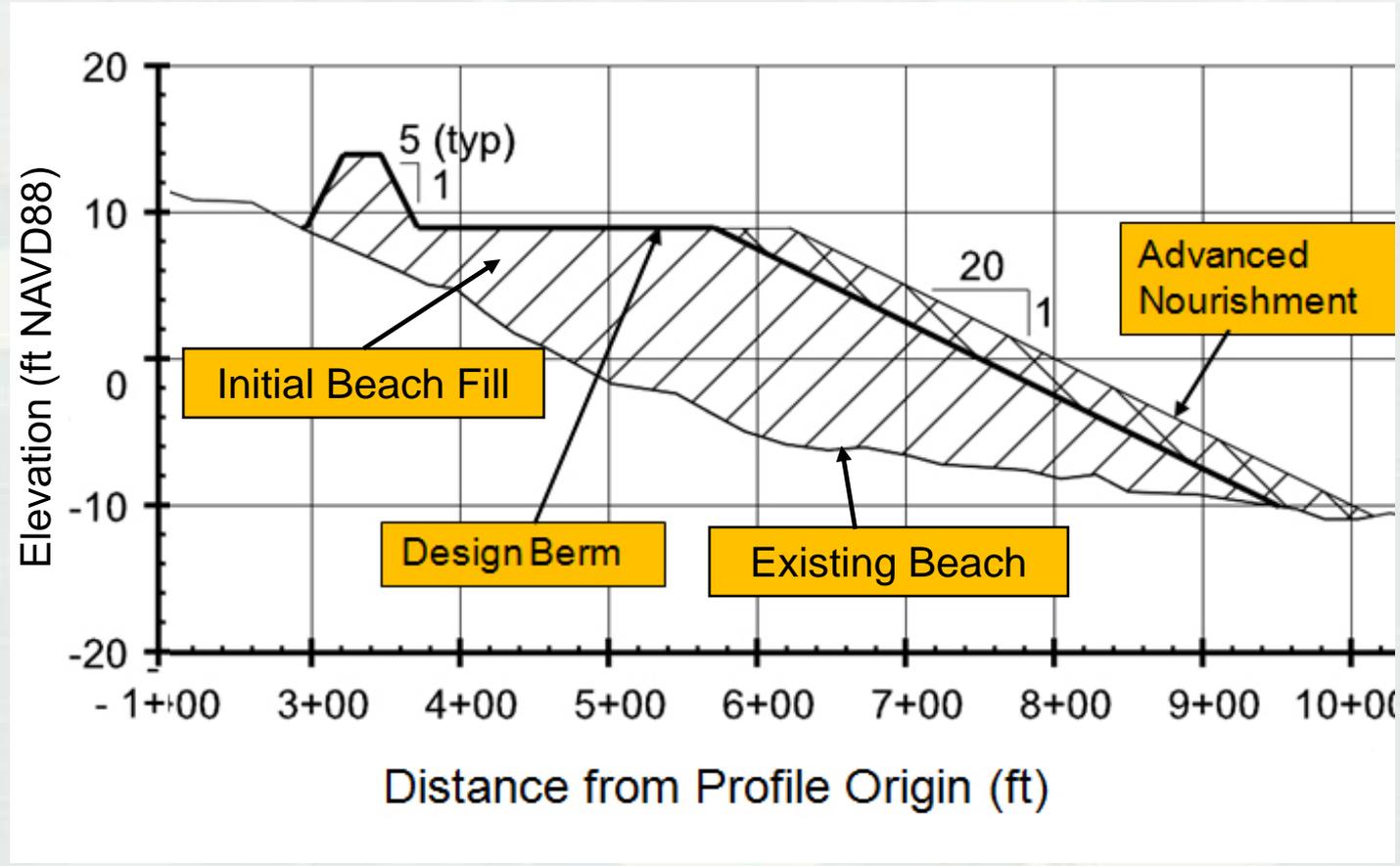
- Crossovers
- Groins-New
- Groins-Existing-Rehab
- Groins-Existing-NoRehab
- Historical Shorebird Nesting Area
- Dune
- Ephemeral Ponds
- Beach Berm with Step
- Beach Berm Without Step
- Slope 1V:30H
- Slope 1V:20H
- Sand placed below elevation 0 NAVD will be submerged



Typical Beachfill Cross Section with Step



Typical Beachfill Cross Section without Step



Note: In Nassau County/Nickerson Beach dune construction only. Existing berm remains undisturbed for bird nesting and foraging.



Bird Nesting and Foraging Area Incorporated into Project Design



Legend

- | | | |
|---|--|--|
|  Crossovers |  Post-Hurricane Sandy Ephemeral Ponds |  Slope 1V:30H |
|  Groins-New |  Ephemeral Ponding Area |  Slope 1V:20H |
|  Groins-Existing-Rehab |  Historical Shorebird Nesting Area | Sand placed below elevation 0 NAVD will be submerged |
|  Groins-Existing-NoRehab |  Beach Berm with Step | |
|  Dune |  Beach Berm Without Step | |

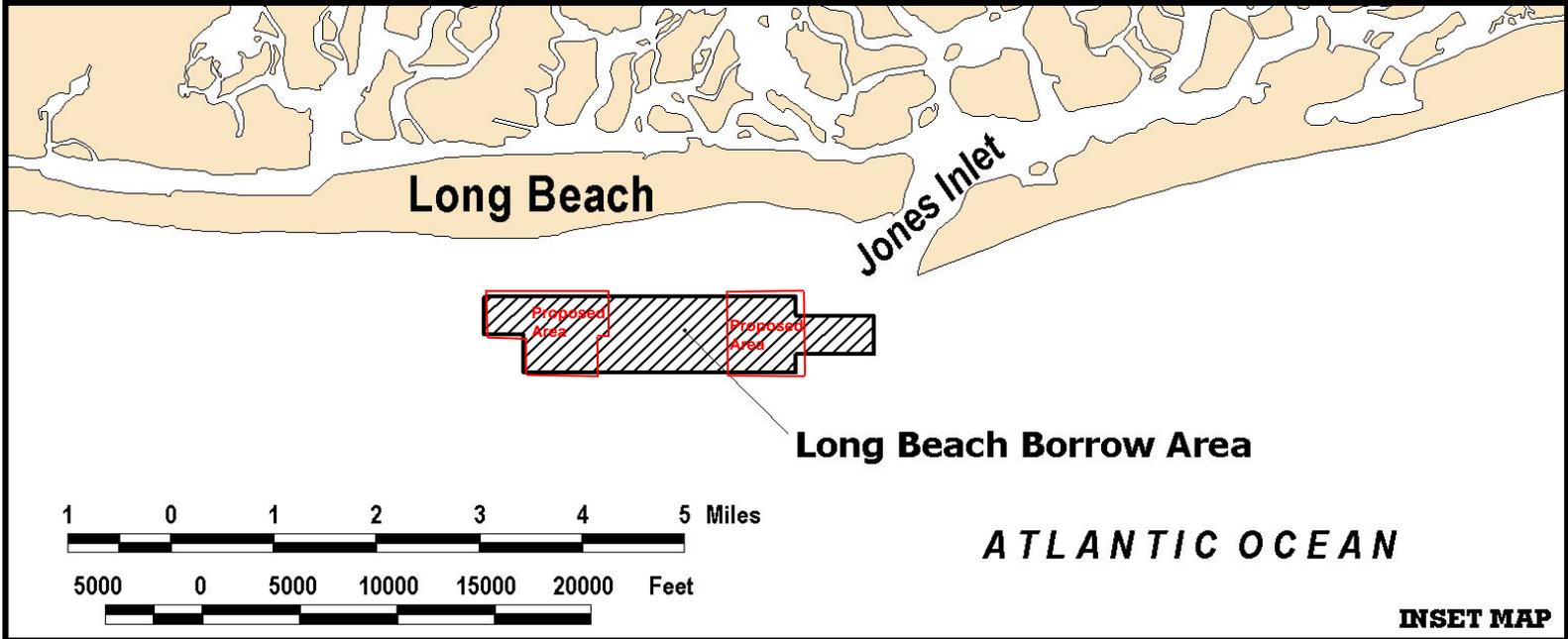
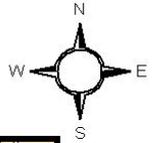
Note: Bird nesting area location is approximate and will continue to be coordinated with resource agencies. HSLRR incorporates the existing dune into the construction of project dune. The area shown in blue is the location where the existing berm height and width are sufficient and no beachfill is needed.



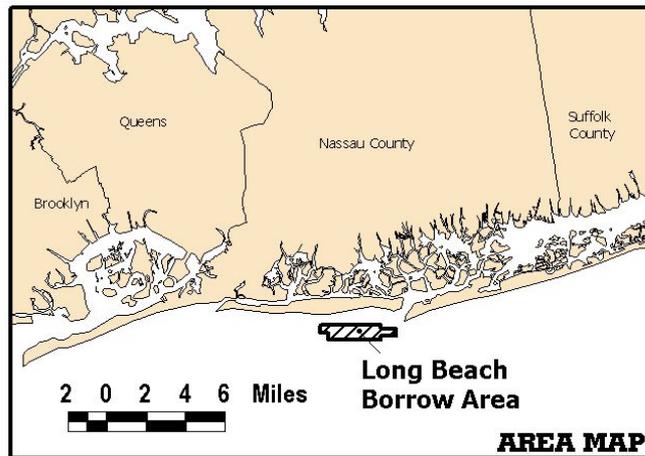
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Where Will the Sand Come From?

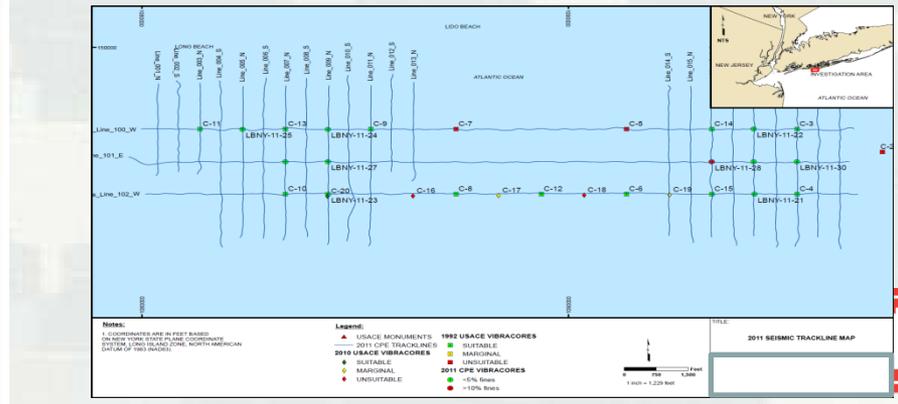
Long Beach Borrow Area



INSET MAP



AREA MAP



Consideration of Environmental Impacts

Impacts Considered: Benthic Communities, Fisheries, Shorebirds, Water Quality, Air Quality and Noise, Cultural Resources, Aesthetics, Surfing, Fishing, Beach Usage, Boardwalk Usage

Impacts Avoided or Minimized

Benthic:

Short term, recovery expected within 2-6.5 months nearshore and 1.5 to 2.5 years offshore following construction

Fisheries:

No long-term impacts expected, will generally avoid construction area

Shorebirds/Endangered Species:

No construction during breeding season
Avoidance and enhancement of existing foraging/nesting habitats

Water Quality:

Short term turbidity (including impacts to dissolved oxygen), ends as soon as each element is constructed

Air Quality and Noise:

Temporary impacts, during 24-7 construction only

Cultural Resources:

Coordinated with New York State Historic Preservation Office
– No Significant Impact

Aesthetics:

New sand similar to the existing beach and rehabilitated groins

Unavoidable, Minimal & Temporary Recreational Impacts

Beach Access:

Access no longer available from under boardwalk. Access will occur off boardwalk via walkovers over the dune

Aesthetics:

Potential impacts to view of beach from boardwalk

Surfing and Fishing:

Will be temporary and will dissipate as the beach returns to equilibrium

Beach Usage:

Impacts end as construction moves along beach

Boardwalk Usage:

Impacts end as construction moves along boardwalk



General Description of Economic Analysis

- Computer simulations of random storms estimate damages to property and contents over a 50-year period of analysis.
- Benefits compare “without project” damages to “with project” damages to estimate ‘damages avoided’.
- Project features are combined to maximize net benefits.
- Cost Benefit Analysis compares costs to benefits to determine if a project is economically justified.
- No project eliminates all damages from all storms. Coastal areas remain highly vulnerable to major storms – residual risk always remains.
- Coastal storm risk management for structures and recreational benefits are considered to be the “primary” benefits.



Estimated Project Cost-Sharing and non-Federal/Local Sponsor Responsibilities

Cost Apportionment*

*all costs based on October 2013 Price Level

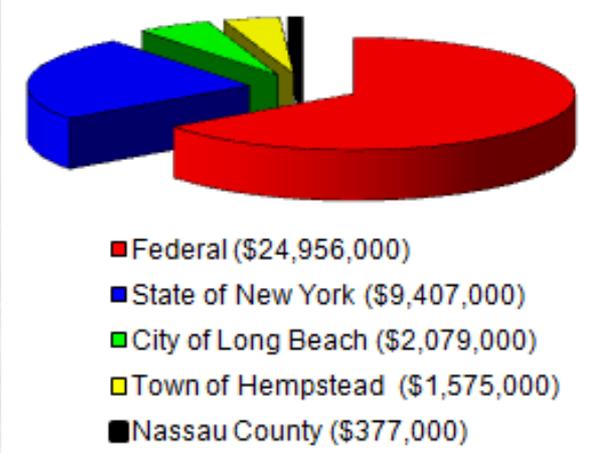
- **Project First Cost - \$177,876,000 @ 100 % Federal cost**
- Continuing Construction Costs (9 Renourishment Operations and Monitoring):
 - \$38,394,000/renourishment operation
 - \$345,545,000 for the 50-year period of analysis
 - Cost shared 65% Federal/35% non-Federal

Local Cooperation**

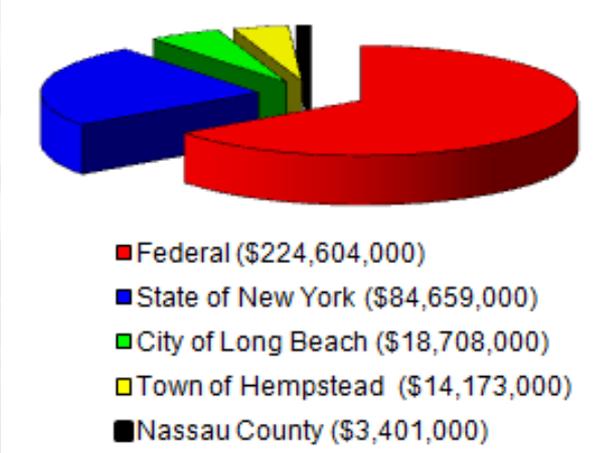
**see HSLRR for complete list of responsibilities

- Provide non-Federal costs assigned to coastal storm risk management
- Operate, maintain, and repair the completed project at no cost to the Federal Government
- Provide necessary real estate and maintain public access
- Total Annual O&M Cost - \$453,000 (Annual Beach and Groin Maintenance Cost) at 100% non-Federal cost

Estimated Breakout of Costs for Renourishment to be Performed Every Five Years



Estimated Breakout of Total Costs for Remaining 50-year Period of Analysis after Initial Construction



Note: Local cost share estimated based on approximate length of project in each jurisdiction. Actual cost share will be refined when local cost-share agreements are signed with State and will be dependent upon actual need on a jurisdiction by jurisdiction basis.



General Schedule

On-going:	Draft HSLRR/EA for Public Comment
Early Summer 2014:	Final HSLRR/EA
Late Summer 2014:	Execute Project Partnership Agreement
October 2014:	Initiate Construction for 1 st Contract New Groins – Town of Hempstead (2) & Groin Rehabs - Long Beach (4) & Town of Hempstead (3) 28 month duration
January 2015:	Initiate Construction for 2 nd Contract New Groins – Town of Hempstead (2) Groin Rehabs - Long Beach (11) 18 month duration
December 2015:	Initiate Construction of 3 rd Contract Dune, Berm and Crossover Construction for entire project length 24 month duration



For More Information, Contact:

**Donald E. Cresitello
Project Planner
Planning Division**

917-790-8608

donald.e.cresitello@usace.army.mil

**Ronald Pinzon
Project Manager
Programs & Project Management Division**

917-790-8627

ronald.r.pinzon@usace.army.mil

