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

6 March 2014

US Army Corps of Engineers
BUILDING STRONG®
Outline

- Study Location
- Study Partners
- Historical Storm Impacts and Water Levels
- Study Chronology
- Problem Identification
- Project Purpose
- Project Updates
- Plan Components, Layout and Cross Sections
- Consideration of Environmental Impacts
- General Description of Economic Analysis
- Estimated Project Cost-Sharing and non-Federal/Local Responsibilities
- General Schedule
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

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

HWM-NY-NAS-707
High water mark
10.7 ft NAVD88

HWM-NY-NAS-223
High water mark
9.3 ft NAVD88

HWM-NY-NAS-711
High water mark
9.7 ft NAVD88

HWM-NY-QUE 732
High water mark
9.0 ft NAVD88

HWM-NY-NAS-220
High water mark
12.7 ft NAVD88

HWM-NY-NAS-710
High water mark
11.6 ft NAVD88

SSS-NY-NAS-004WL
Peak Total Water Level
17.48 ft NAVD88

SSS-NY-NAS-004WH
Peak Total Water Level
16.54 ft NAVD88

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)

- Design Dune (+14 ft)
- Existing Boardwalk (approx. +16 ft)
- Design Berm (+9 ft)
- Design Berm (+7 ft)
- Existing Groin
- Advanced Nourishment

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.)

- **1985 Hurricane Gloria** +5.8 ft
- **2011 Trop. Storm Irene** +7.8 ft
- **2012 Hurricane Sandy (still water level)** +11.2 ft
- **2012 Hurricane Sandy (peak measured water level with wave effects)** +17.5 ft
- **1962 Northeaster** +8 ft
- **1992 Northeaster** +7.3 ft
- **1985 Hurricane Gloria** +5.8 ft
- **High Tide** +1.5 ft

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
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
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

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.

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

Long Beach Borrow Area

Atlantic Ocean

Long Beach

Jones Inlet

Proposed Area

Proposed Area

INSET MAP

AREA MAP

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## 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

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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 1st Contract
  New Groins – Town of Hempstead (2) & Groin Rehabs - Long Beach (4) & Town of Hempstead (3)
  28 month duration

January 2015: Initiate Construction for 2nd Contract
  New Groins – Town of Hempstead (2)
  Groin Rehabs - Long Beach (11)
  18 month duration

December 2015: Initiate Construction of 3rd Contract
  Dune, Berm and Crossover Construction for entire project length
  24 month duration
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