

# Baxter Road and Sconset Bluff Storm Damage Prevention Project

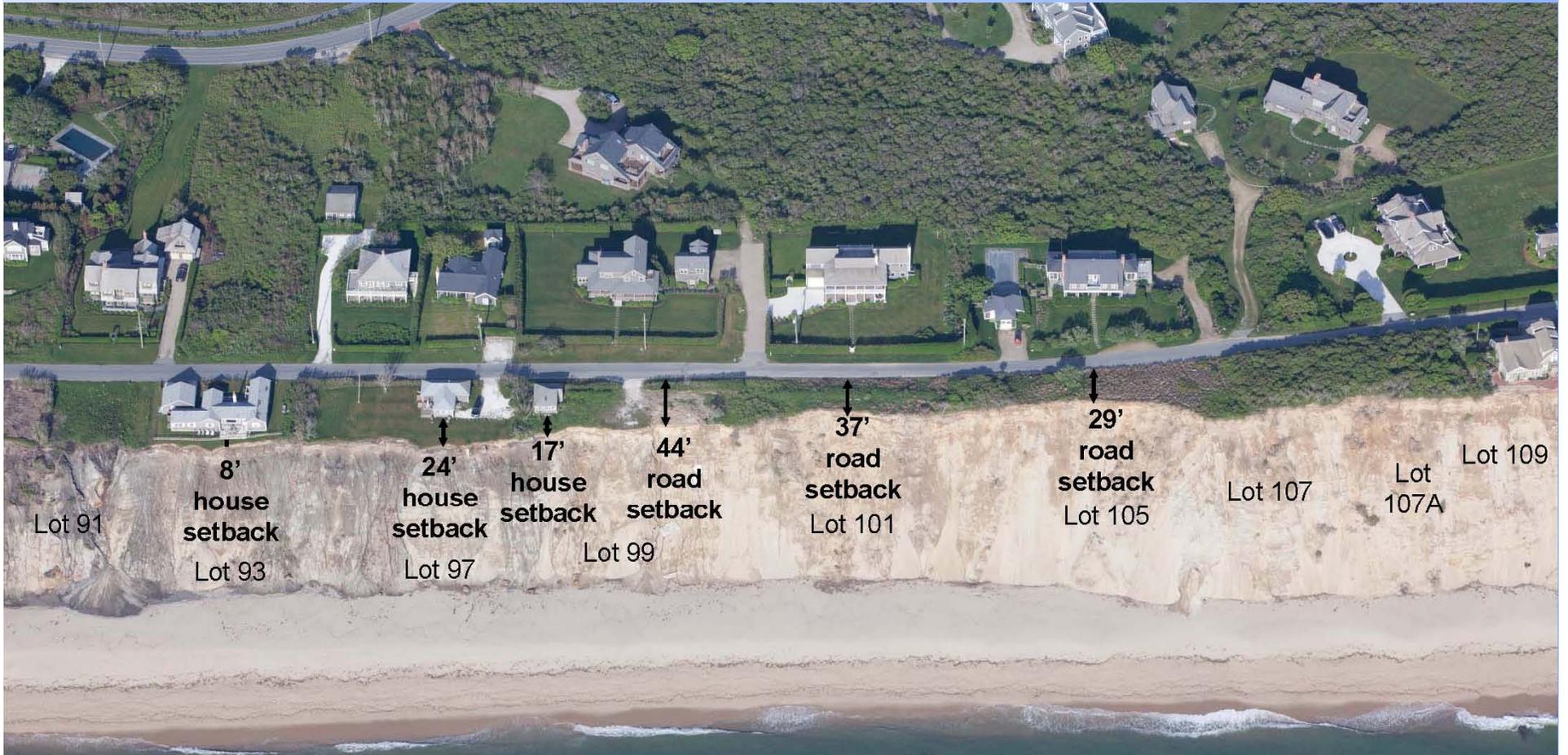
Nantucket, Massachusetts

*Siasconset Beach Preservation Fund*

# Existing Conditions



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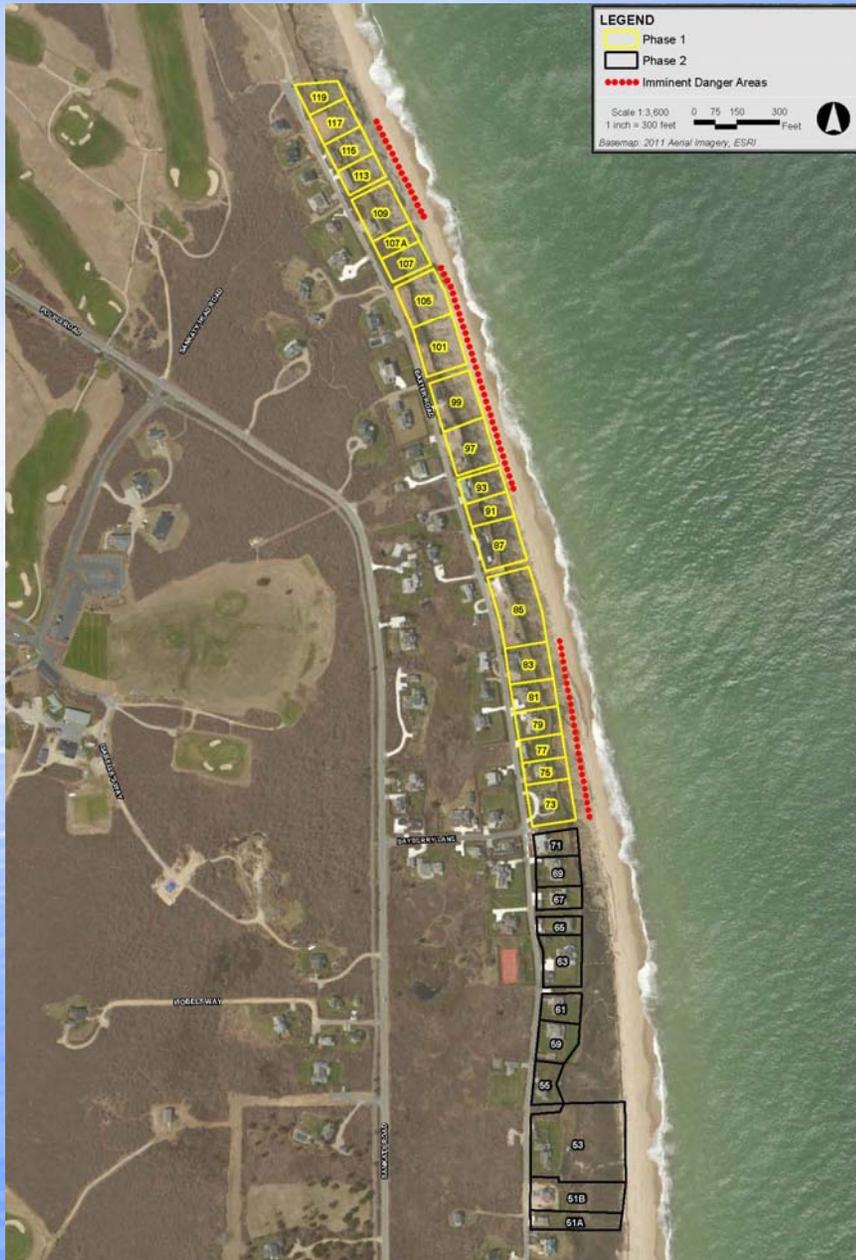
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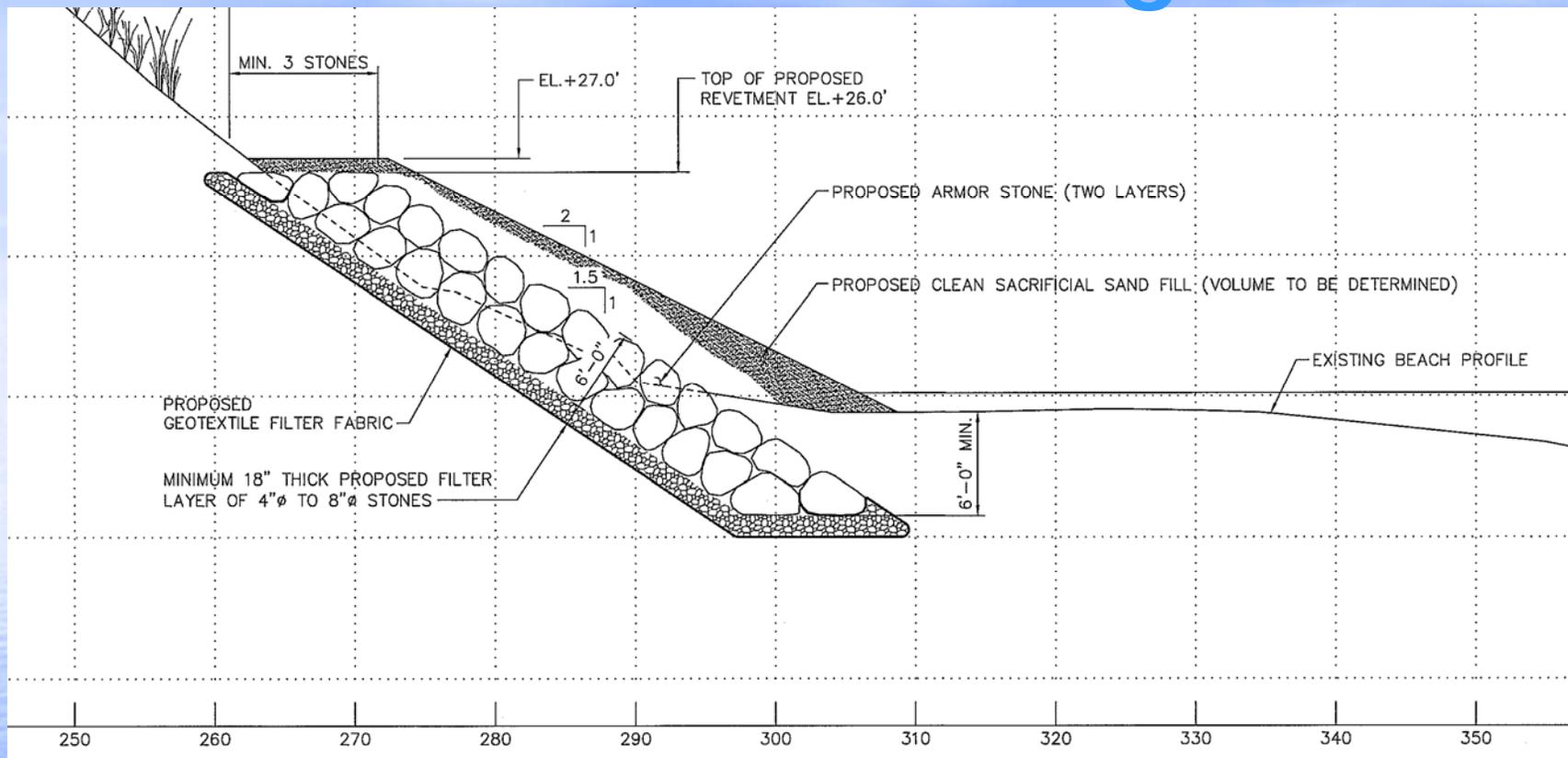


# Project Purpose and Regulatory Compliance

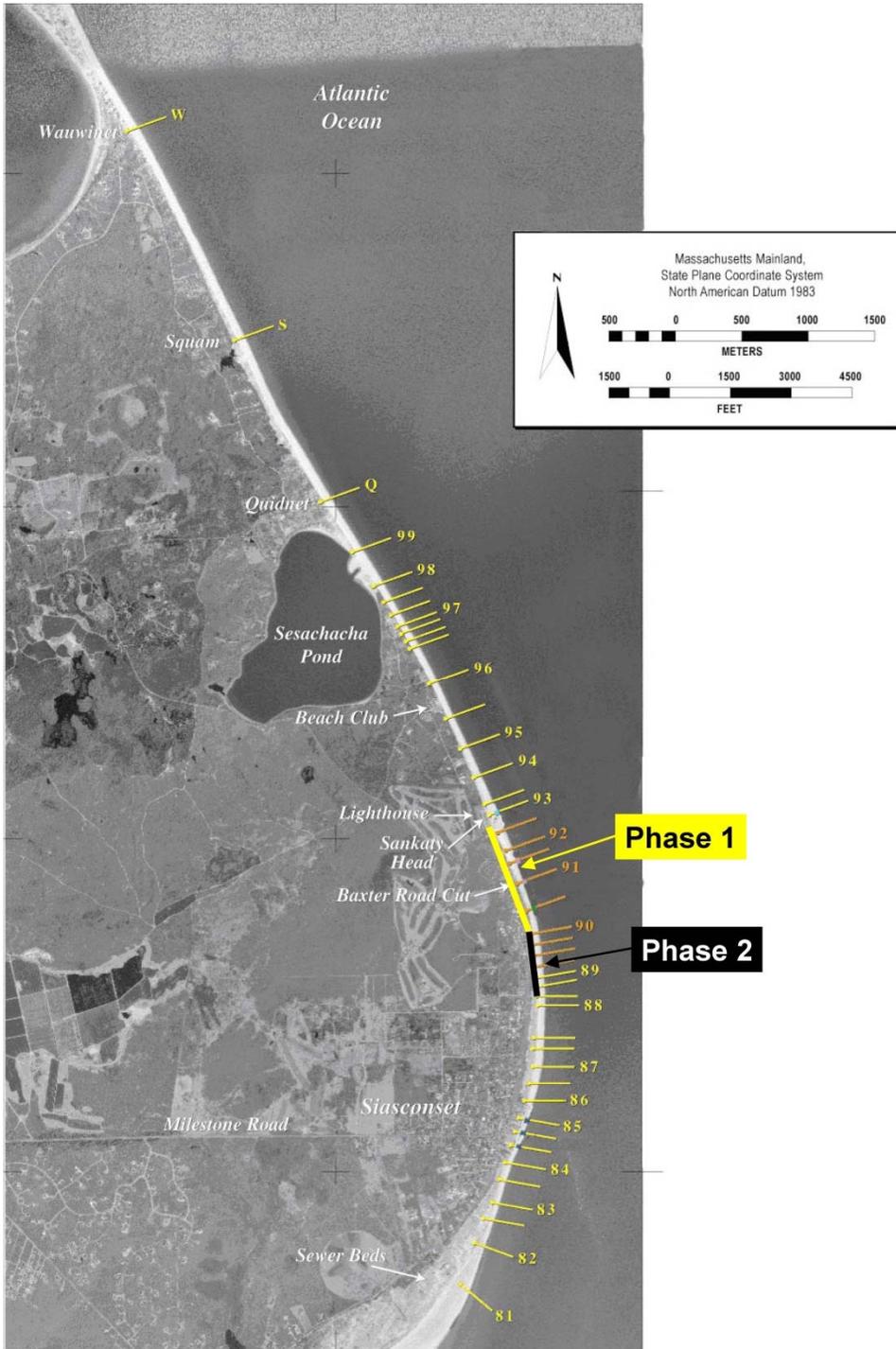


- Protect Baxter Road and other public infrastructure
- Protect the entire historic residential community along 'Sconset Bluff from storm damage

# Revetment Design

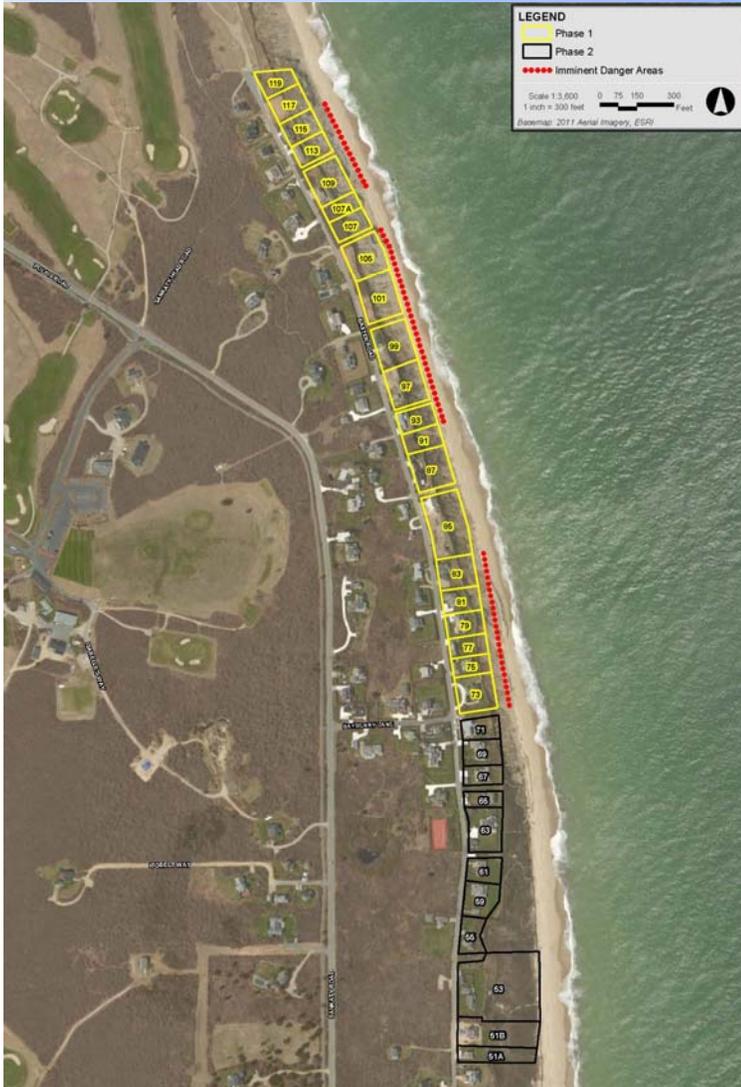


- Top at EL 26' MLW – includes wave run-up for 100-yr storm +1' sea level rise
- Toe set at EL 0.0' MLW based on scour from 100-yr storm
- Armor stone sized for 100-yr design storm
- Geotextile Filter Fabric lines the coastal bank
- Filter layer of 4-8" dia crushed stone
- 2 layers of armor stone
- Revetment sloped at 1.5:1



# Shoreline Monitoring Transects

# Construction Steps



## Phase One

- 8-10 weeks to install ~ 550-ft section where Baxter Rd is within 50 ft of bank edge.
- ~ 2 months to install ~1,300 ft section from 73 Baxter to Lighthouse. These segments would be installed to partial height to protect most severely threatened homes.
- Depending on storm conditions, installation would occur from AUG/SEP to DEC.

## Phase Two

- Partial Height Revetment would be constructed to full height in year two (2014) along with Phase Two.

# Construction Steps (continued)

## Construction Phasing

- Highly likely to be staged from the beach with barges bringing in rocks and supplies.
- Landing Barge will run up on beach at high tide.
- Ramp / gangway will extend from Landing Barge.
- Delivery Barge will moor at stern of Landing Barge.
- Front end loaders will move rocks and supplies from Delivery Barge to Beach, then to the toe of the Coastal Bank.
- An excavator will be used to excavate and place toe stones at bank / beach interface, then place stones to build up the revetment.
- Beach-compatible sand will be brought in via truck from an Island pit and would be conveyed down face of bank with a conveyor device or chute. Alternatively, the sand may be brought in by barge to the beach.
- Front end loaders will spread the sand on the face of the revetment and/or to adjacent downdrift areas.



# Revetments South Shore, Cape Cod & Islands

# Hull, Green Hill Revetment



- About 900 feet long
- No sand mitigation
- No obvious downdrift impacts

# Scituate, Fourth Cliff Revetment



- About 816 feet long
- No sand mitigation
- No apparent downdrift impacts

# Plymouth, Manomet Revetments



- Over 10,000 feet of several revetments
- Some isolated sand mitigation
- No significant downdrift impacts visible

# Plymouth, Cedarville Landing Revetments



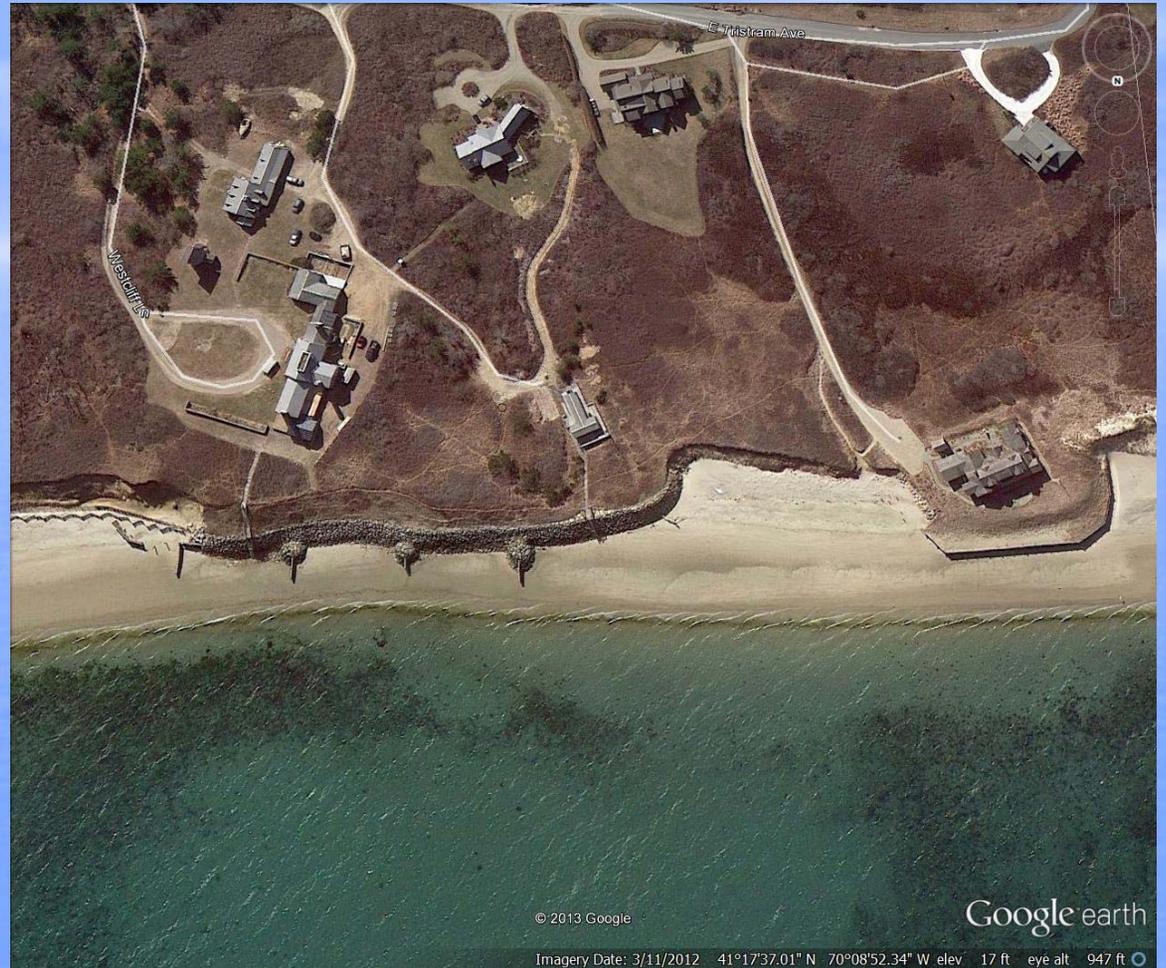
- About 1,375 feet long total for several revetments
- Initial sand mitigation
- Some minor downdrift impacts probably due to lack of sustained sand mitigation

# Mashpee Revetment



- About 2,700 feet long
- Protects Pre-1978 houses
- Sand mitigation required at bank retreat rate
- No significant downdrift impacts

# Nantucket, Westcliff Lane Revetment



- About 500 feet long
- Protects Pre-1978 houses
- Revetment was constructed in the 1990's to replace a vertical bulkhead
- No sand mitigation
- Some minor downdrift impacts probably due to no sand mitigation

# Nantucket, Capaum Pond Road Revetment



- About 700 feet long
- Protects Pre-1978 house
- No significant sand mitigation
- Some minor downdrift impacts probably due to lack of sand mitigation

# Wetlands Protection Regulations

- New CES “**shall be**” permitted (instead of “maybe be”) when required to prevent storm damage to buildings constructed prior to Aug.1978, including reconstructions of such buildings, if:
  - Designed and constructed, using **best available measures**, to **minimize** adverse effects on adjacent or nearby coastal beaches due to changes in wave action,
  - No other method of protecting building is feasible.
  - protective planting designed to reduce erosion may be permitted.

# Local Bylaw Regulations

- CES allowed to protect pre-78 structures and public infrastructure:
  - if no environmentally better way to **control an erosion problem**, including in appropriate cases moving threatened buildings or public infrastructure,
  - no other alternative exists to protect structure from imminent danger.
  - “unless substantially improved” is questionably valid and not relevant.



# Project Purpose and Regulatory Compliance

Protected homes are pre-1978 or gap lots necessary to protect pre-1978 homes.

# ALTERNATIVES ANALYSIS

- **Geotextile Tubes**
- **Beach Nourishment**
- **Dewatering**
- **Breakwater**
- **Groin**
- **Seawall**
- **Drift Fence**
- **Coastal Bank Terraces**
- **Marine Mattress & Gabions**
- **Revetment: Preferred Alternative**

# Demolition of Bluff House



- House was moved back twice before being demolished as a result of bank erosion due to Sandy

## Compliance with Rules for Coastal Beaches and Banks

- Sand is compatible with existing beach.
- Protects the bank, which is otherwise stable and preserves bank height.
- Is water dependent use.
- Minimizes harm to adjacent and down-drift beaches due to supplementing sediment.
- No adverse effects on marine fisheries or shellfish beds.
- Enhances storm damage prevention and flood control.
- Enhance the coastal bank's function of buffering inland areas and buildings from storm damage.
- Improve wildlife habitat.
- Enhance the wetland scenic view.
- Less construction, no debris, stable and green.
- Preserves and enhances recreational trails and public access.
- May loose beach at HT, but lost now to conditions.
- Save and expand Bluff walk.
- New stairs up/down and path across.

# Checklist

New CES **shall be** permitted under State and Local law:

- Y   Does it prevent storm damage to pre-78 structures, including reconstructions of such?
- Y   Does it protect pre-78 public infrastructure?
- Y   Does design use best available measures to minimize adverse effects on adjacent or nearby coastal beaches due to changes in wave action?
- N   Is another method of protecting buildings feasible?
- Y   Are the protective planting used to reduce erosion?
- N   Is there an environmentally better way to control erosion problem?
- N   Is it appropriate to move threatened buildings or public infrastructure?
- N   Is there an alternative to protect structure from imminent danger?
- Y   Is sand compatible with existing beach?

## Checklist (continued)

- Y   Are the bank and bank height being protected?
- Y   Is the revetment a water dependent use?
- N   Are there any adverse effects on marine fisheries or shellfish beds?
- Y   Does it enhance storm damage prevention and flood control?
- Y   Does it enhance the coastal bank's function of buffering inland areas and buildings from storm damage?
- N   Does it harm wildlife habitat?
- N   Does it harm the wetland scenic views?
- Y   Does it preserve and enhance recreational trails and public access?





**The End**