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of Engineers®
New York District

U.S. Army Corps of Engineers
&
New York State Department of Environmental Conservation

PUBLIC INFORMATION MEETING

—Coastal Storm Risk Management —

Lake Montauk Harbor Feasibility Study

March 22, 2016

1:00 – 1:30 Poster Session

1:30 – 3:00 Presentation, Question & Answers

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New York District

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&
New York State Department of Environmental Conservation

PUBLIC INFORMATION MEETING PURPOSE

Present Updated Study Results
Solicit Town's Input On the Current Findings

- Study was originally scoped for navigation and coastal storm risk management.
- Following Hurricane Sandy, Hurricane Sandy Relief Appropriation funds (PL 113-2) were provided to expedite the coastal storm risk management component of the study at 100% federal expense.
- Alternatives address coastal damages; they do not directly address navigation needs. A follow-up effort would be needed for navigation recommendations.
- Based on updated analyses, the Corps has identified a plan that best addresses coastal risk management needs:
    - <u>Alternative 2 beach fill with 10 ft wide berm and groins</u>
- *Local sponsor position is required to proceed to public review.*

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Lake Montauk Harbor Feasibility Study

Existing Authorized Navigation Project

Existing Federal Navigation Project:

- Channel authorized to a depth of -12 ft MLW
- Boat basin authorized to a depth of -10 ft MLW
- Channel, deposition basin, boat basin **shown in green**
- Location of -12 ft MLW contour **shown in orange**
  (Condition after the last dredge operation in 2015)

Dredging History Volume (cubic yards)		
Dates	**New Work**	**Maintenance**
Sep-Oct, 1942	19,381	
Dec, 1942 - Jan, 1943	57,020	
1945 (Navy funds)		14,900
Sep, 1949		41,818
Jul-Sep, 1955		34,546
Sep-Nov, 1958		45,433
Apr-May, 1962		36,205
Aug-Oct, 1965		28,541
15 Jul-4 Aug, 1969		41,874
5-21 Jun, 1972		36,219
Jun-27 Jul, 1976		25,933
9-17 Jan, 1984		32,236
1987		12,283
1991		15,307
1995		46,175
2000		50,221
2004		9,400
2008		3,695
2011		11,915
2015		20,000
TOTAL	76,401	506,701

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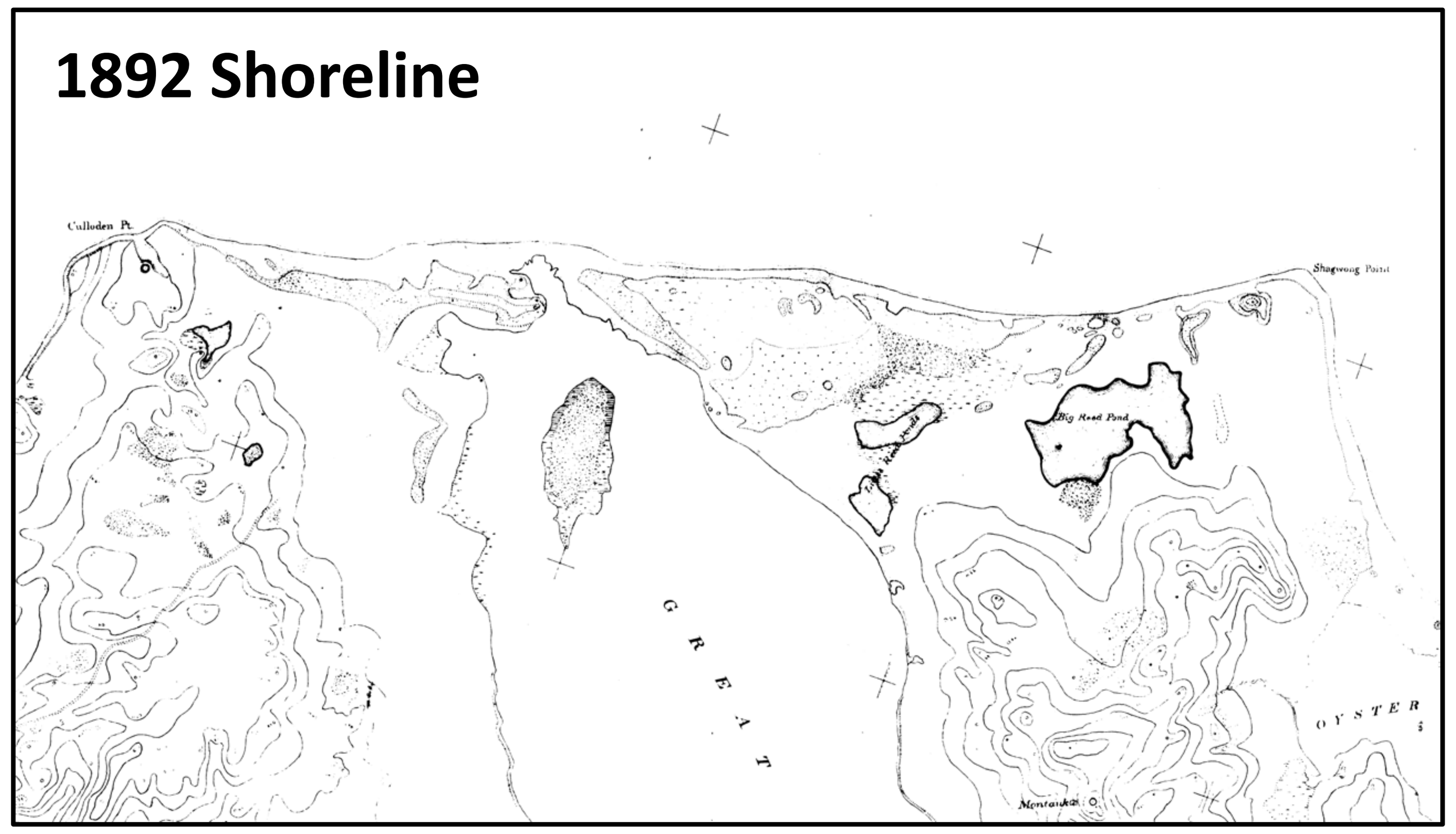
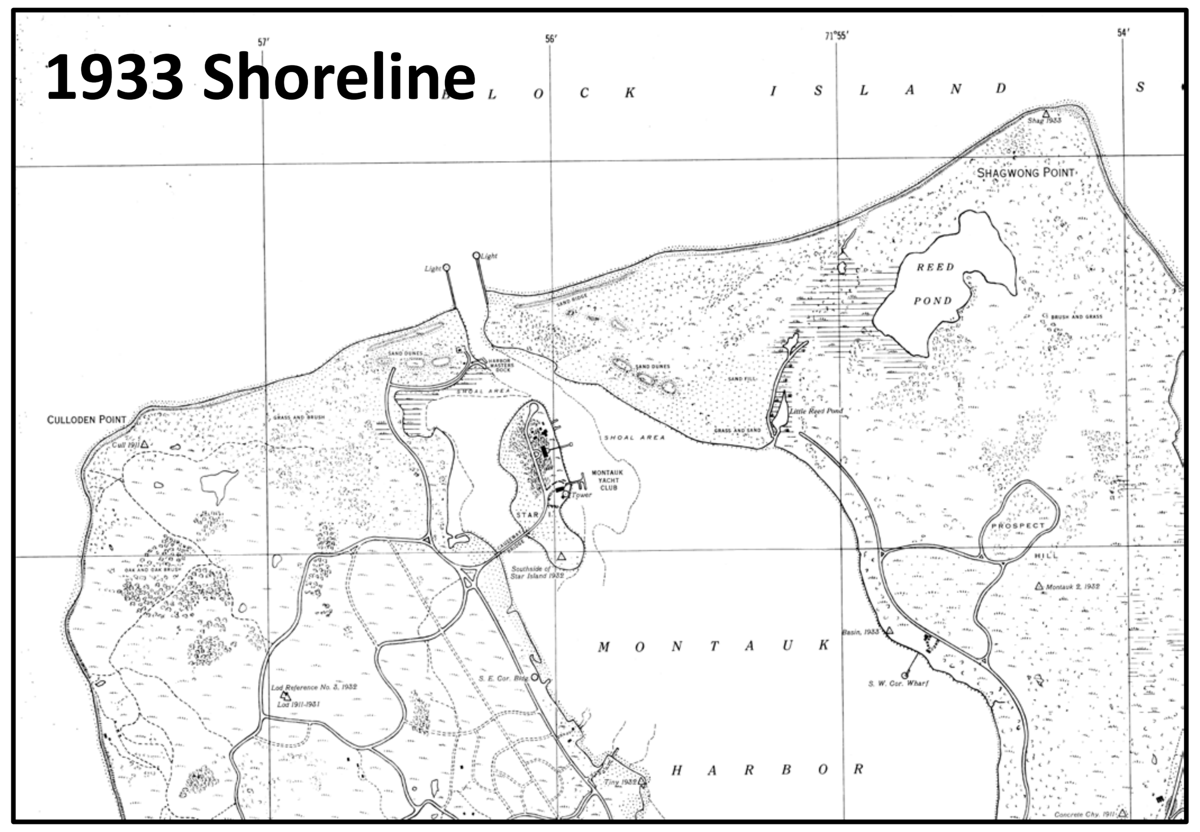
Historic Shorelines in the Vicinity of Lake Montauk

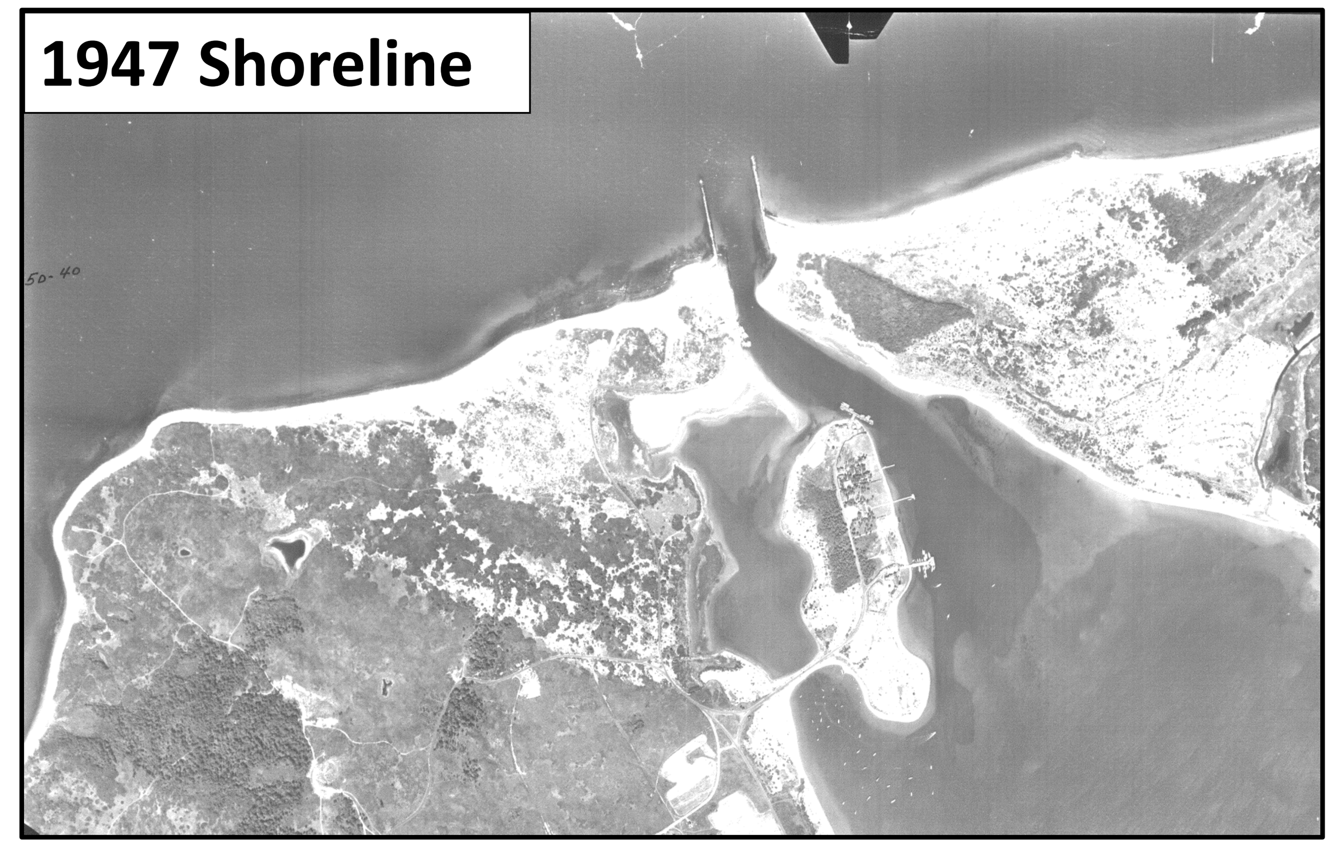
Department of Environmental Conservation • New York State •



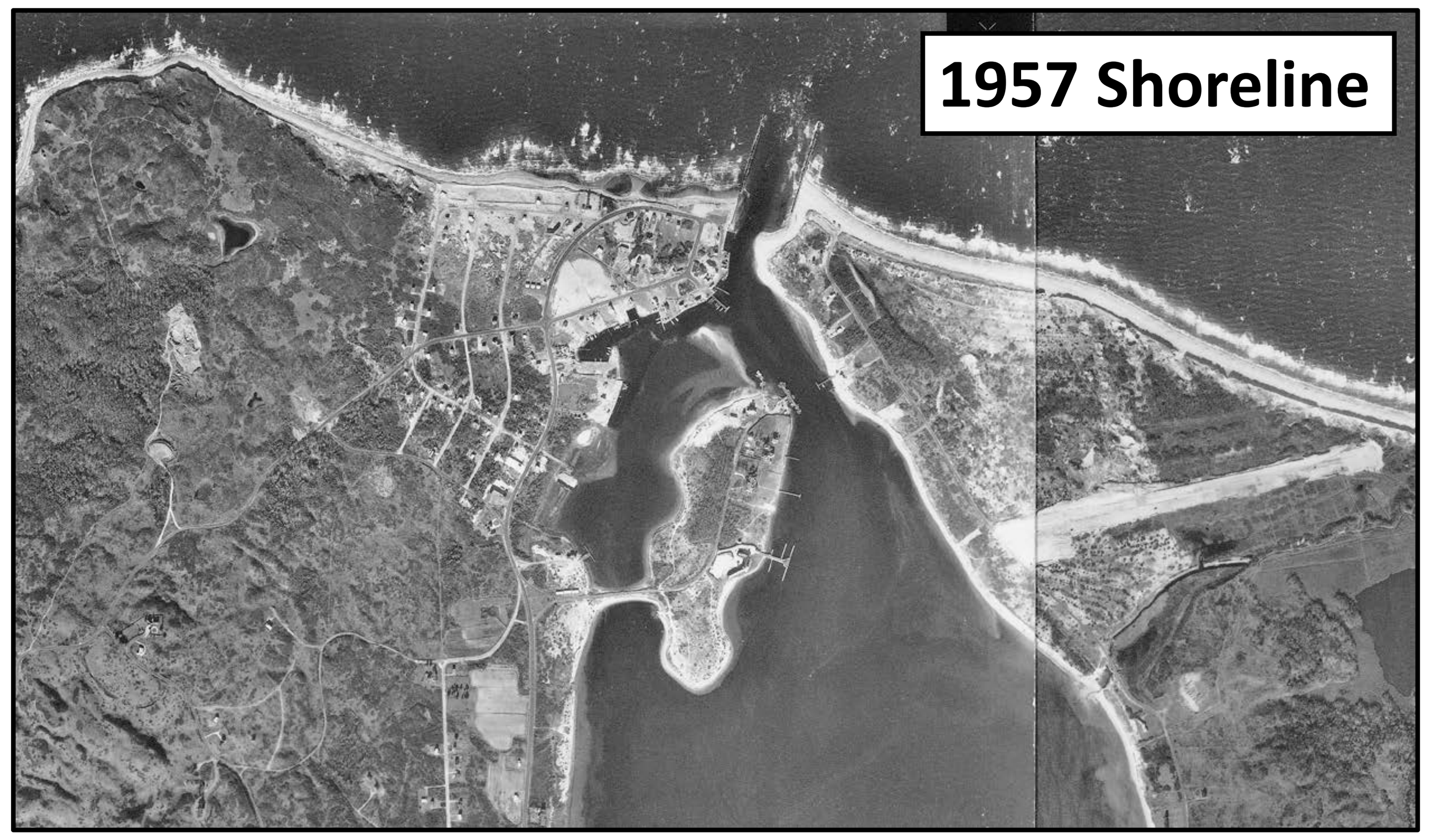
1892 Shoreline



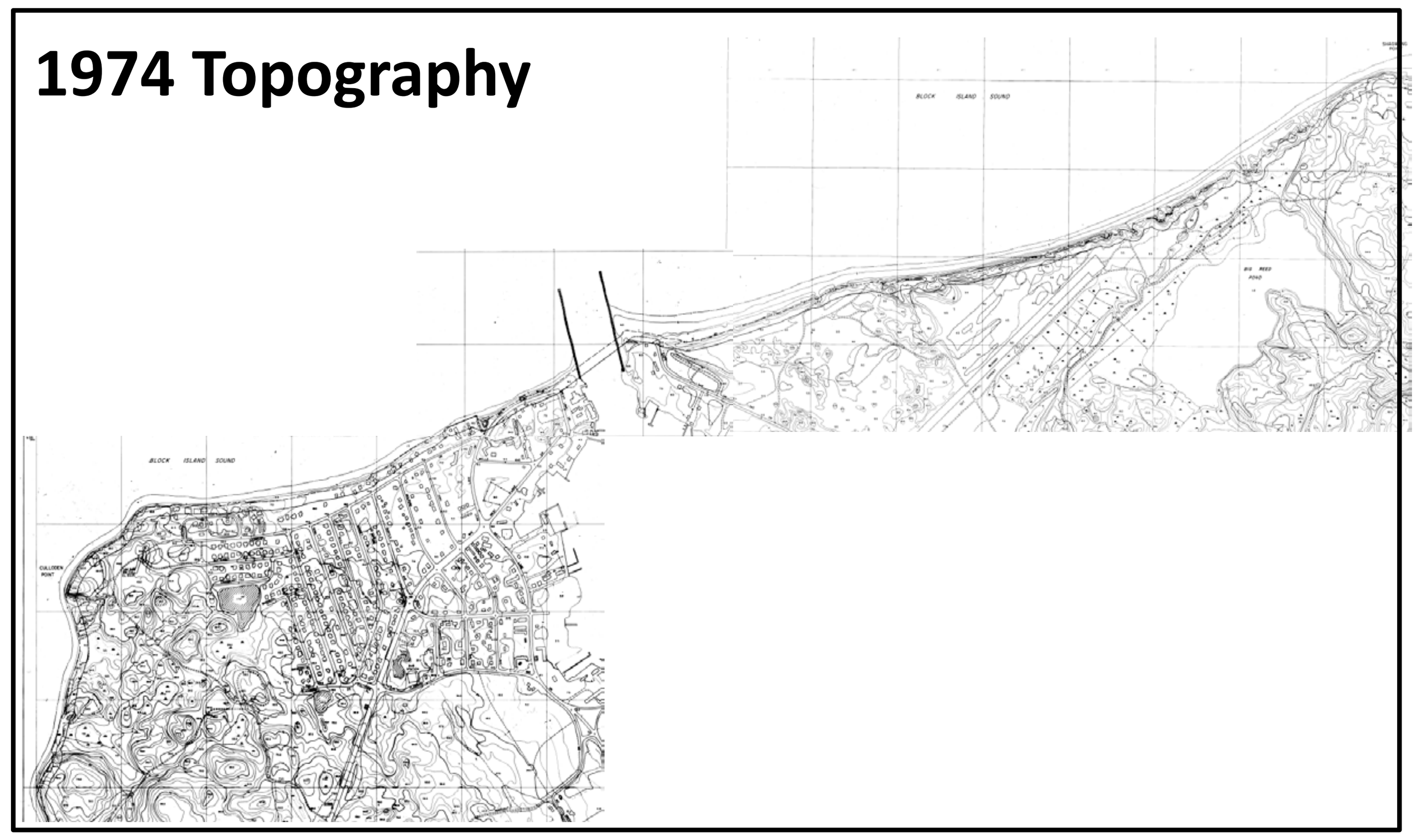
1933 Shoreline



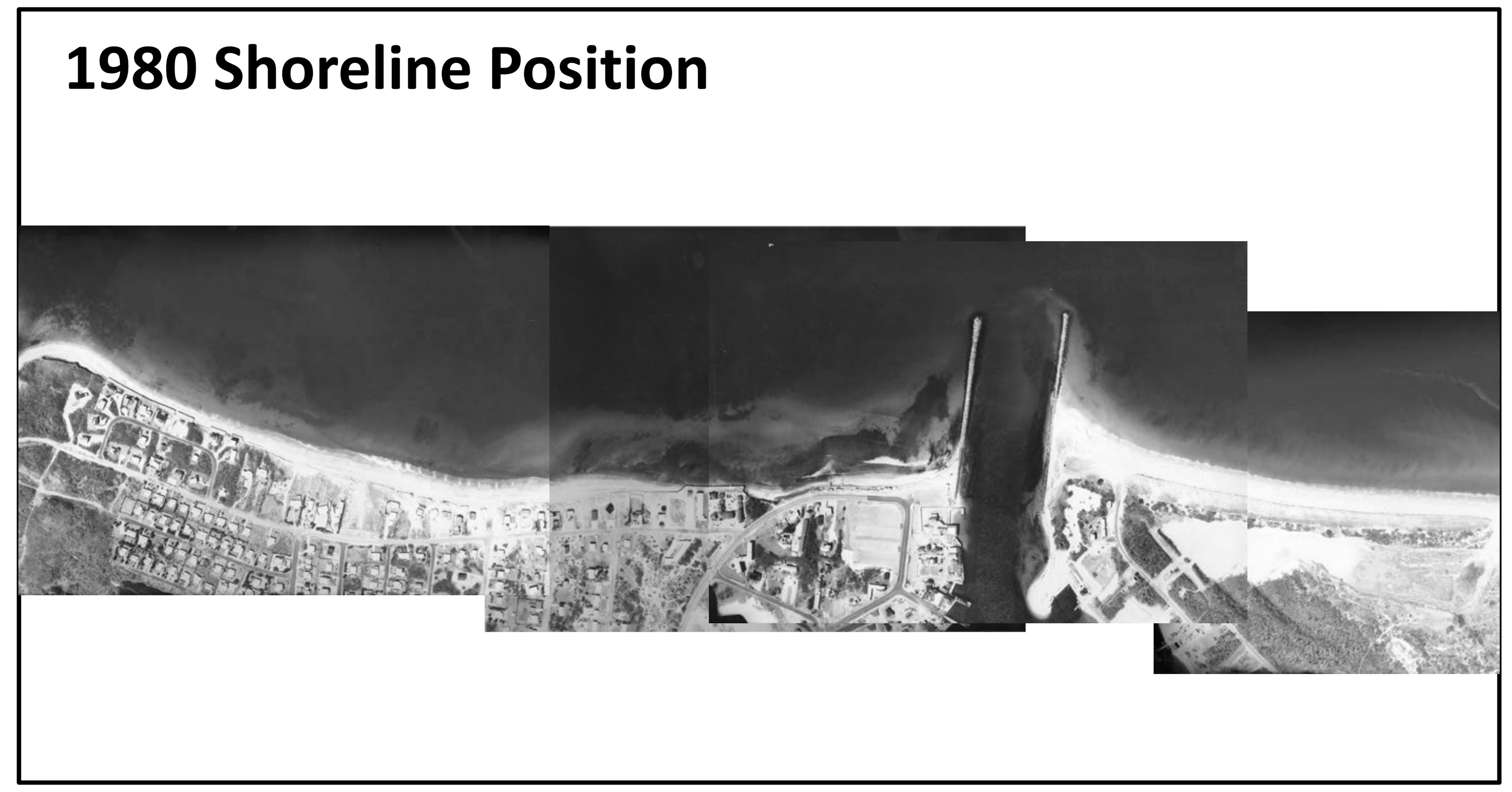
1947 Shoreline



1957 Shoreline



1974 Topography



1980 Shoreline Position

1993 Shoreline Conditions

2010 Shoreline Conditions

Date	Historical Item
1914	Private interest constructs a timber bulkhead across the inlet
1926	Two parallel stone jetties constructed by private interests. An approximately 700' long west jetty and a 750' long east jetty are separated by a distance of 500 feet.
1927	Dredging of the entrance channel and yacht basin by private interests.
1935	River and Harbor Act directed a survey investigation of Lake Montauk Harbor
1939	Report prepared recommending the following improvements: a channel 12 feet deep at MLW, 150 feet wide, a boat basin 10 feet deep at MLW and 400 by 900 feet, northwest of Star Island, and the repair and extension shoreward of the east and west jetties.
1942	Federal extension of west jetty shoreward. The work was accomplished at the request of the Navy with Navy funds. The Army Corps of Engineers supervised the work. The west jetty was extended 280 feet with crest elevation at +8 ft MLW. The total length is 981 feet.
1942-43	Entrance Channel dredged to -12 feet MLW, and to a width of 150 feet. The work was accomplished at the request of the Navy with Navy funds. The Army Corps of Engineers supervised the work.
1945	The River and Harbor Act of 2 March 1945 authorized the recommended Federal project.
1949	The first dredging project authorized by Congress began.
1967	General Design Memorandum prepared. Work remaining from the authorized project included: dredging of the boat basin, extension of the east jetty, and repairs to the east and west jetties.
1968	East jetty extended shoreward 350 feet with crest elevation to +8 feet MLW. Length becomes 750+350=1,100 ft., Initial dredging of boat basin to -10 feet MLW. Repair of the east and west jetties.
1995	Rehabilitation of East Jetty

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Sediment Movement

Sediment in the Study Area generally moves from East to West.

The area west of the Inlet was erosive before the inlet was opened and stabilized.

The area west of the inlet is erosive since the area is losing more sand than is entering the system.

The inlet has an effect on sediment transport. Sand deposited in the inlet is dredged and placed on the west beach, which minimizes the inlet effects. (**See blue arrow below**)

Although the inlet contributes to the problem, bypassing sand from the inlet will not completely address the erosion problem west of the inlet.

Because more sand is lost to the west than entering from the east, providing a stable beach west of the inlet requires one or more of the following:

1) The continual addition of extra sand from outside the system

2) Reducing the erosion rates west of the inlet (with structures)

3) Reusing sand that is available within the system

4) Placing additional material up-front to account for this loss

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Initial Screening of Measures

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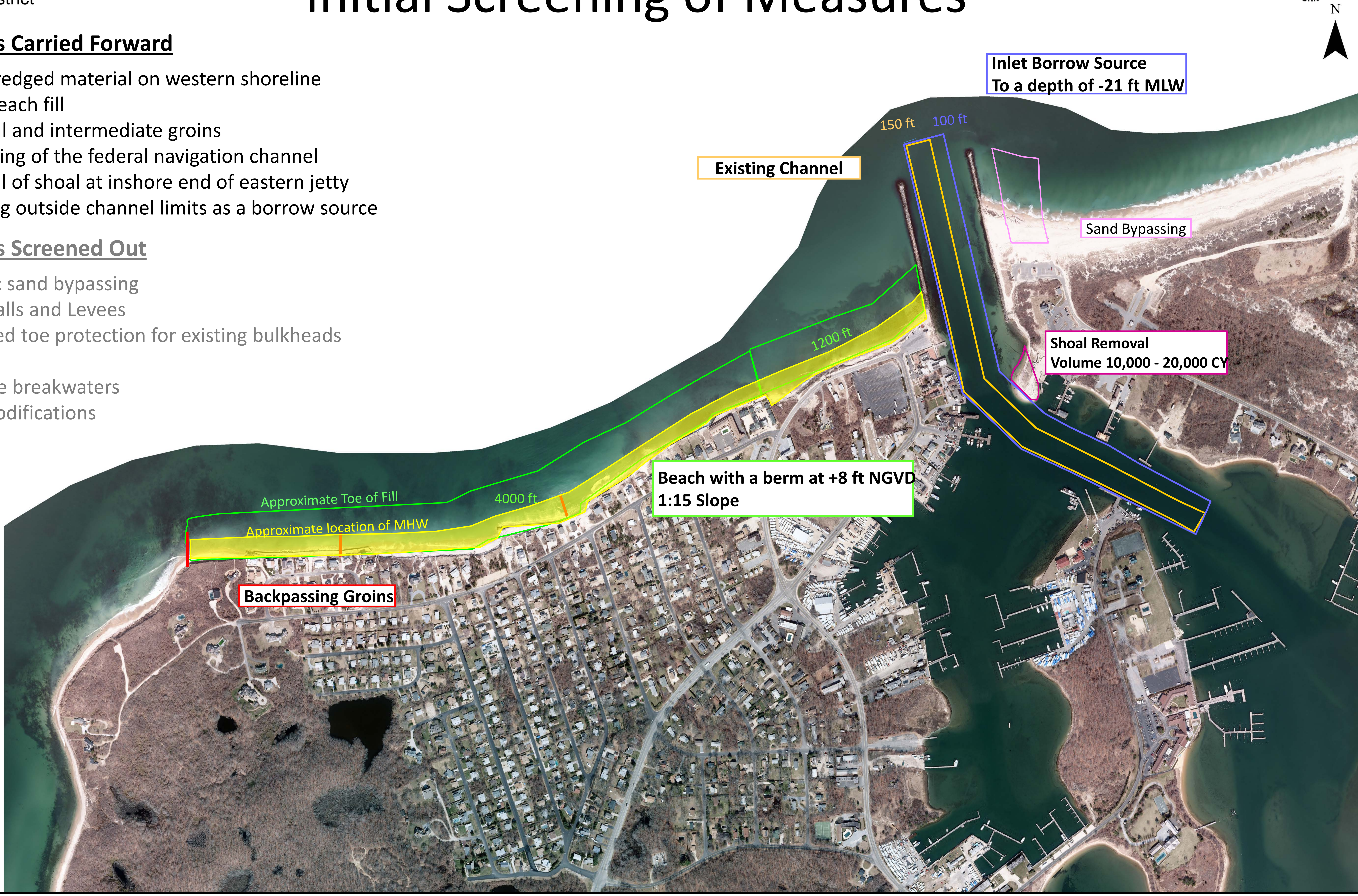
Measures Carried Forward

- ✓ Place dredged material on western shoreline
- ✓ Initial beach fill
- ✓ Terminal and intermediate groins
- ✓ Deepening of the federal navigation channel
- ✓ Removal of shoal at inshore end of eastern jetty
- ✓ Dredging outside channel limits as a borrow source

Measures Screened Out

- o Periodic sand bypassing
- o Floodwalls and Levees
- o Increased toe protection for existing bulkheads
- o Groins
- o Offshore breakwaters
- o Jetty modifications



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Sand Sources Considered

Multiple sand sources were considered in developing alternatives:

- The existing channel and adjacent areas were identified as a cost-effective borrow source (dredging to -21 ft MLW).
- The updrift fillet east of the channel was eliminated as not feasible based on cost.
- Trucking of material from upland quarries is identified as a viable borrow source for up to 200,000 CY of sand.
- An offshore borrow source was identified as a viable borrow source for quantities of sand greater than 200,000 CY.

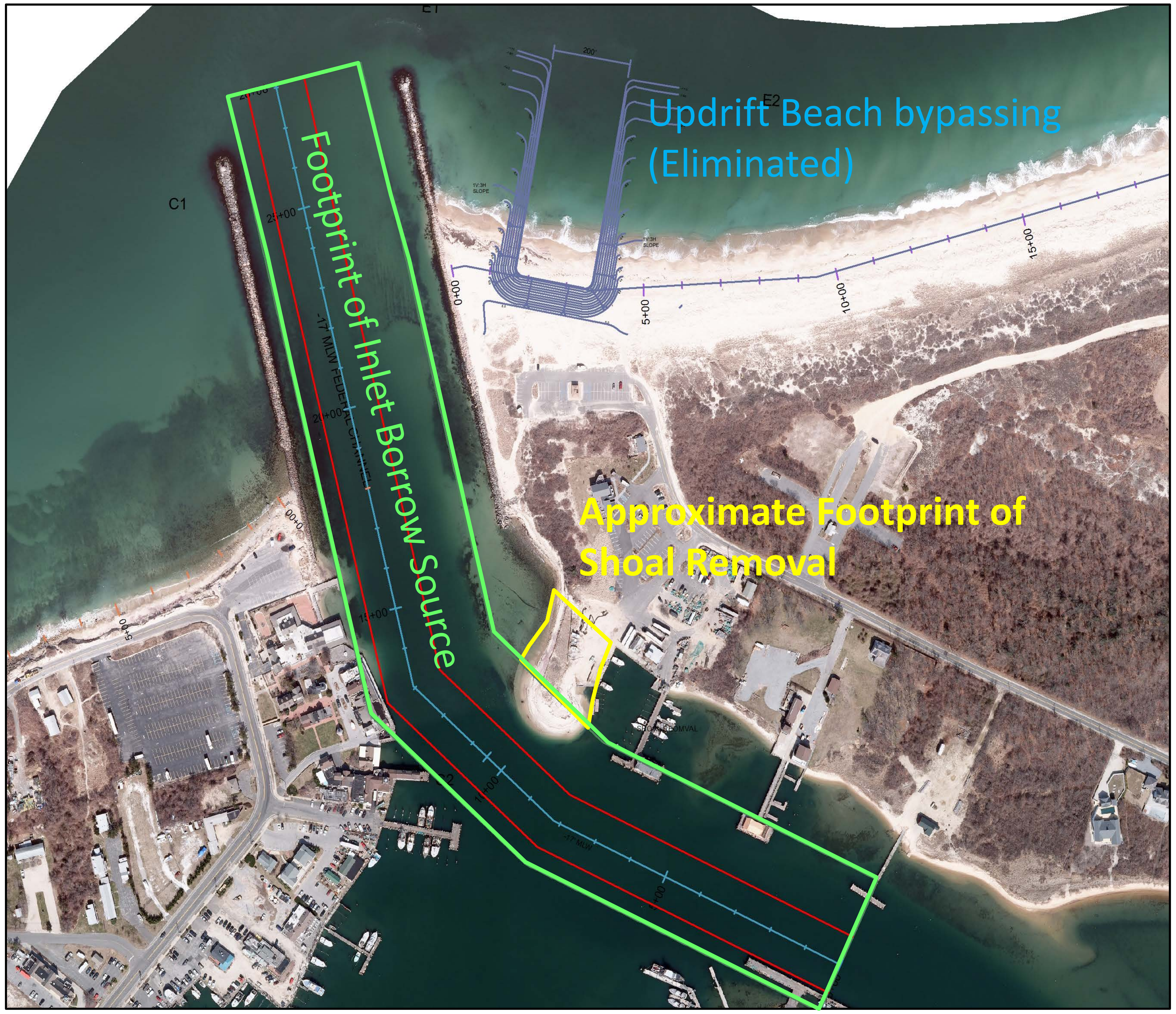

Figure shows the location of the Atlantic Ocean Borrow Area

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Alternative Development

The following alternatives were considered to identify the Proposed Tentatively Selected Plan:

	Alt 1	Alt 2	Alt 2A	Alt 3	Alt 3A	Alt 4	Alt 4A	Alt 5
Alternative Description	Feeder Beach – no design berm	10 ft. Design Berm Beachfill with Groins	10 ft. Design Berm Beachfill – no groins	20 ft. Design Berm Beachfill with Groin	20 ft. Design Berm Beachfill – no groins	50 ft. Design Berm Beachfill with Groin	50 ft. Design Berm Beachfill – no groins	Initial berm 70 ft., Narrowing to 10 ft. over the Project Life, Design Berm Beachfill – no groins
Nourishment Cycles								
Inlet Source				100,000 cy/10 years				
Back-passing	N/A	20,000 cy/2 years	N/A	20,000 cy/ 2 years	N/A	50,000 cy/ 5 years	N/A	N/A
Truck-in	N/A	0	50,000 cy/ 5 years	0	50,000 cy/5 years	0	50,000 cy/ 5 years	0
Total Volume in 50 yrs.	500,000 CY	1,000,000 CY	1,000,000 CY	1,000,000 CY	1,000,000 CY	1,000,000 CY	1,000,000 CY	500,000 CY
Initial Construction Cost	$8,990,000	$9,967,000	$9,283,000	$16,494,000	$15,813,000	$20,180,000	$19,328,000	$21,253,000
Annual Cost to Renourish	$392,000	$651,000	$1,019,000	$651,000	$1,019,000	$735,000	$1,019,000	$392,000
Total Annual Cost	$750,000	$1,049,200	$1,389,400	1,311,000	$1,652,000	$1,542,000	$1,791,200	$1,241,100
Annual Benefits	N/A	$1,722,800	$1,722,800	$1,740,500	$1,740,500	$1,783,900	$1,783,900	$1,753,300
Net Benefits	N/A	$673,600	$333,400	$429,500	$88,500	$242,900	-$7,300	$512,200
BCR	N/A	1.6	1.2	1.3	1.05	1.16	0.99	1.4

The evaluation of alternatives indicates that **Alternative 2 (outlined in green above)** is the most efficient solution:

- This Plan Maximizes Net Benefits
- Backpassing, with backpassing groins are more effective than trucking or a large initial berm
- Groins can be constructed in a fashion to be adaptable (geotextiles)
- Berm widths greater than 10 ft. do not significantly increase the functioning of the plan

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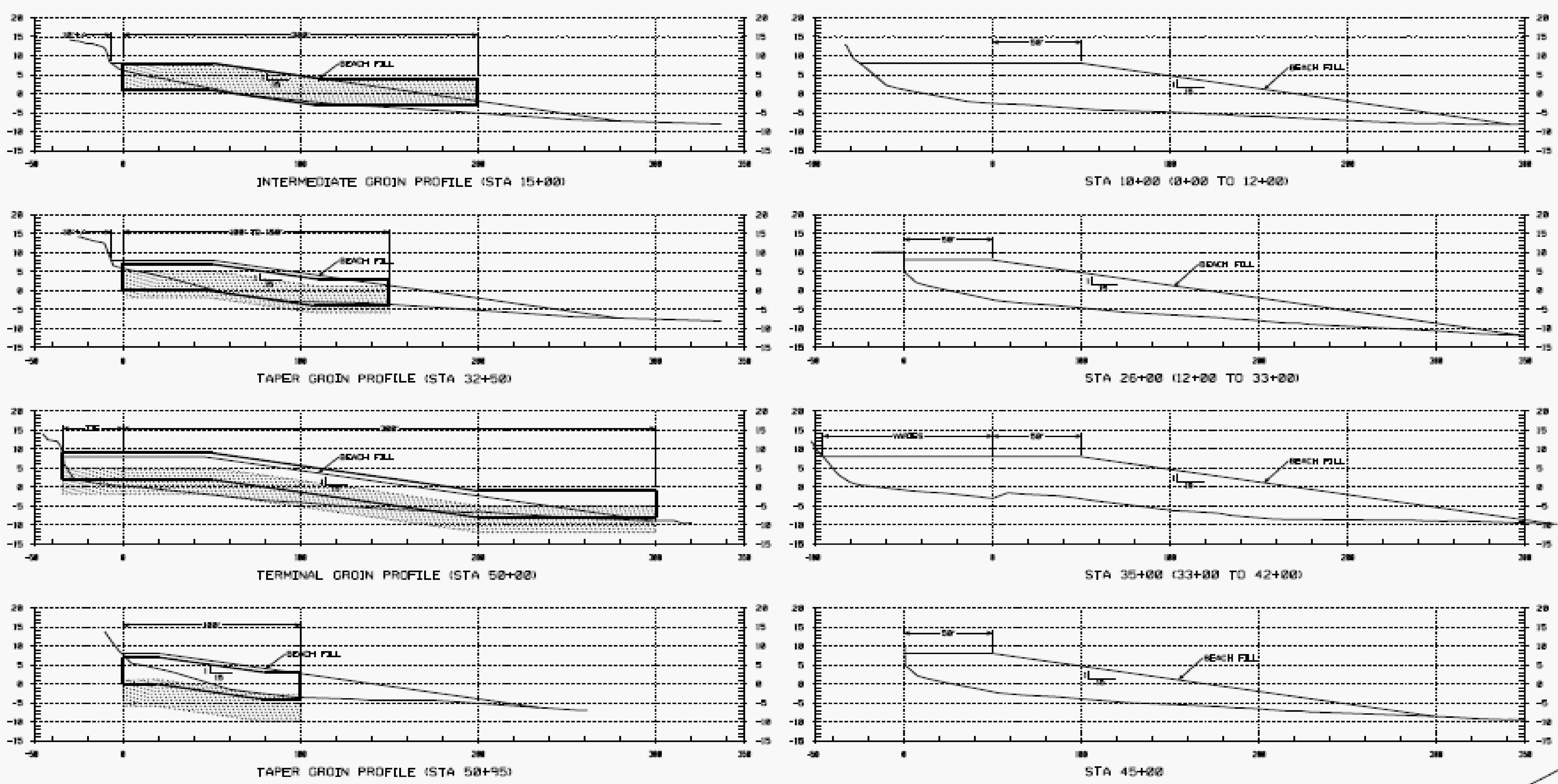
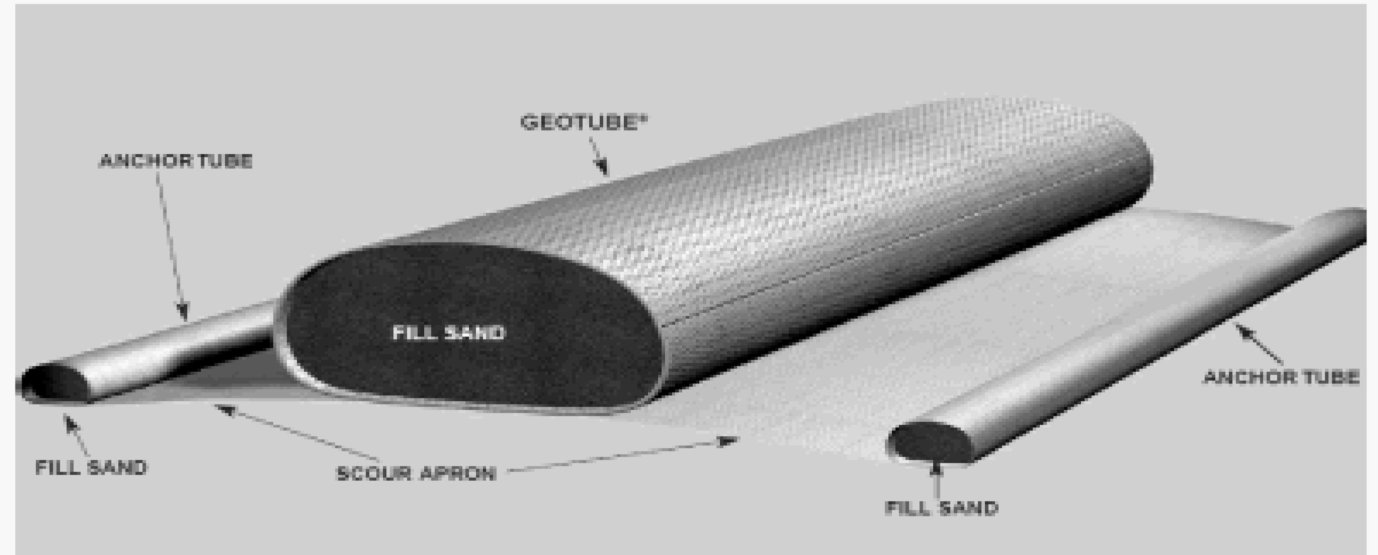
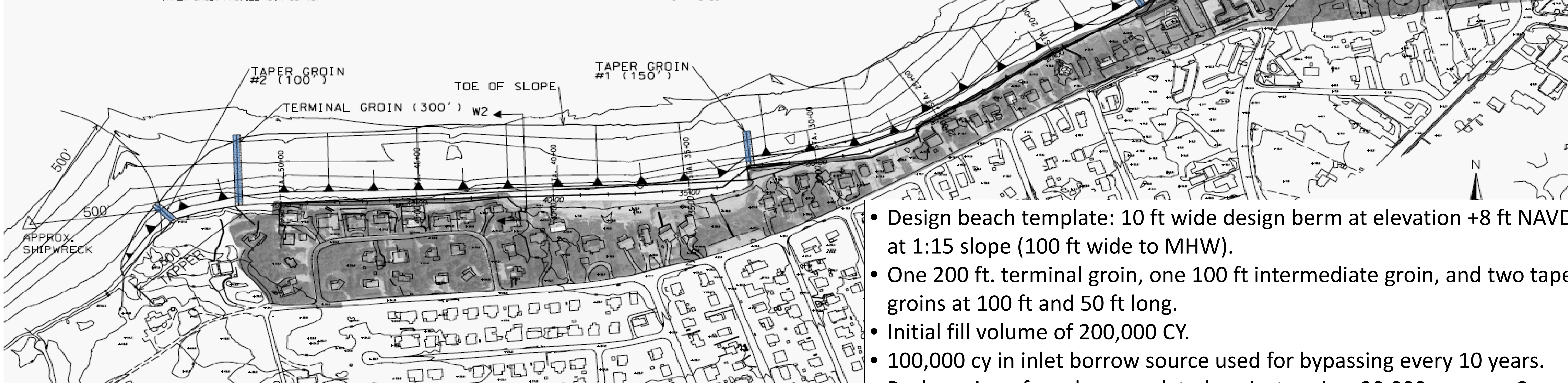
Alternative 2







- Design beach template: 10 ft wide design berm at elevation +8 ft NAVD88 at 1:15 slope (100 ft wide to MHW).
- One 200 ft. terminal groin, one 100 ft intermediate groin, and two taper groins at 100 ft and 50 ft long.
- Initial fill volume of 200,000 CY.
- 100,000 cy in inlet borrow source used for bypassing every 10 years.
- Backpassing of sand accumulated against groins, 20,000 cy every 2 years.

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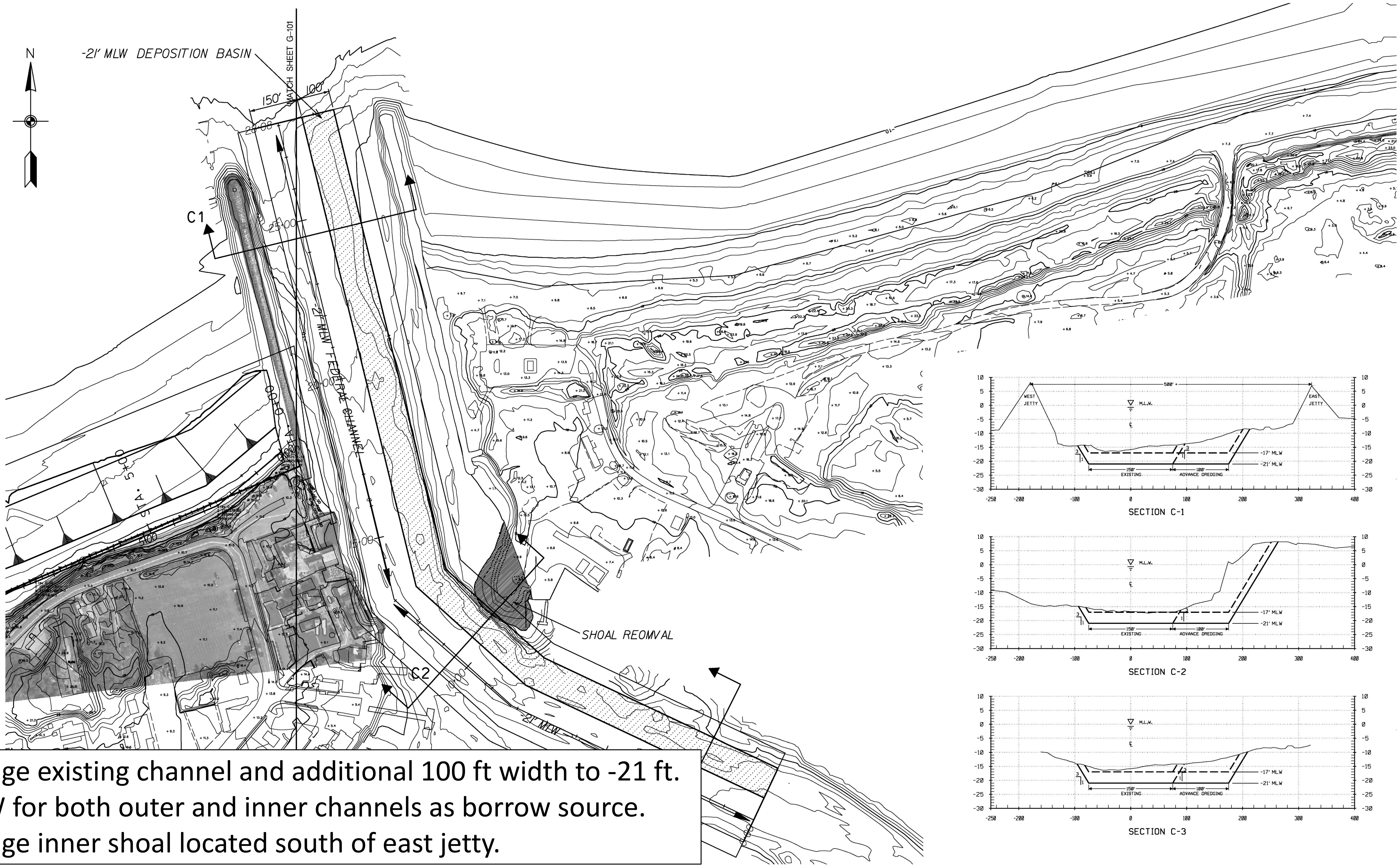
Alternative 2



- Dredge existing channel and additional 100 ft width to -21 ft. MLW for both outer and inner channels as borrow source.
- Dredge inner shoal located south of east jetty.

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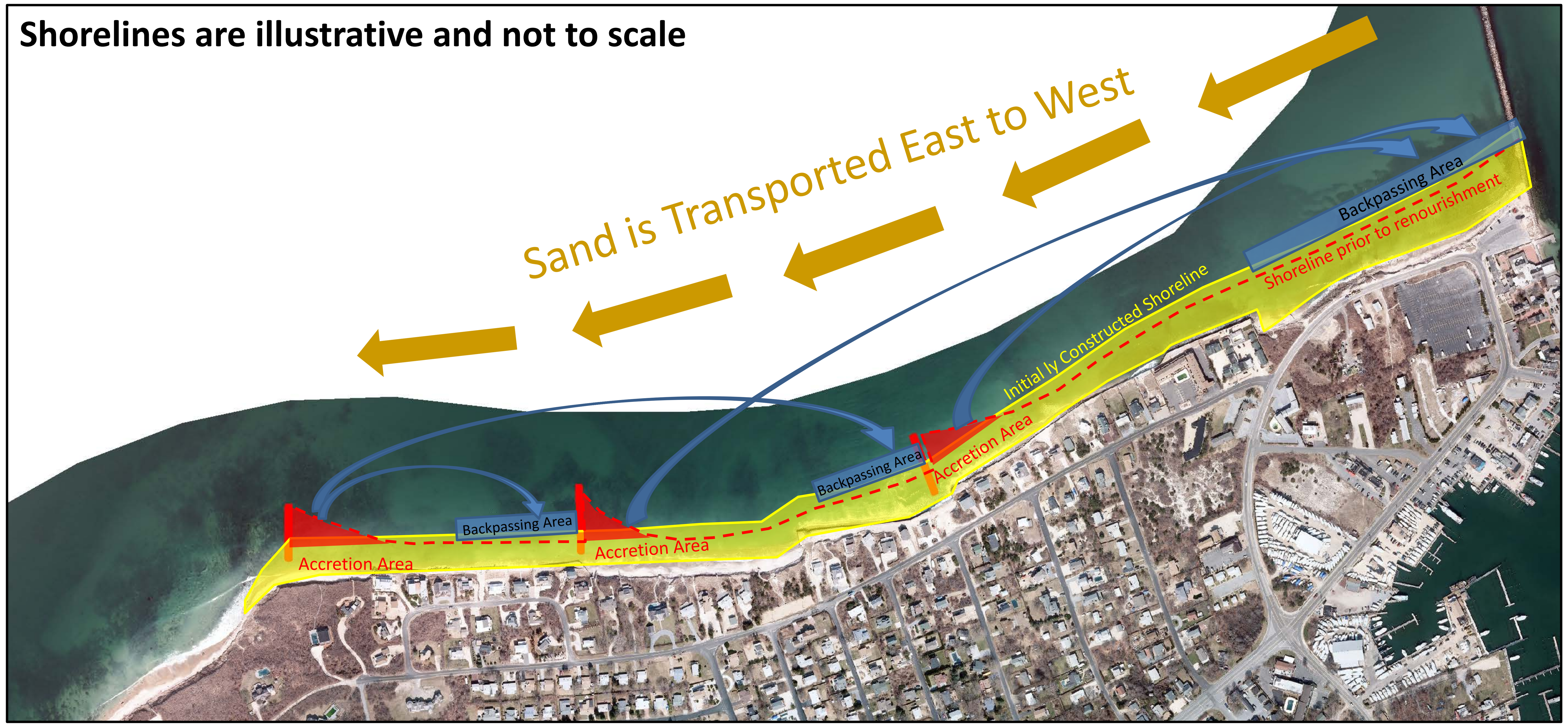
Alternative 2: Backpassing Groin Description

Why Sand Backpassing?

- Sand in the study area naturally moves from east to west.
- Each year, less sand comes in from the east than is lost to the west.
- To maintain a stable beach to the west of the inlet, extra sand is needed each year.
- Backpassing is designed to capture 10,000 CY of sand each year, and reuse it in the system.
- Sand backpassing increases the adaptability of the project.
- Sand backpassing is more cost-effective than trucking in sand from a quarry.

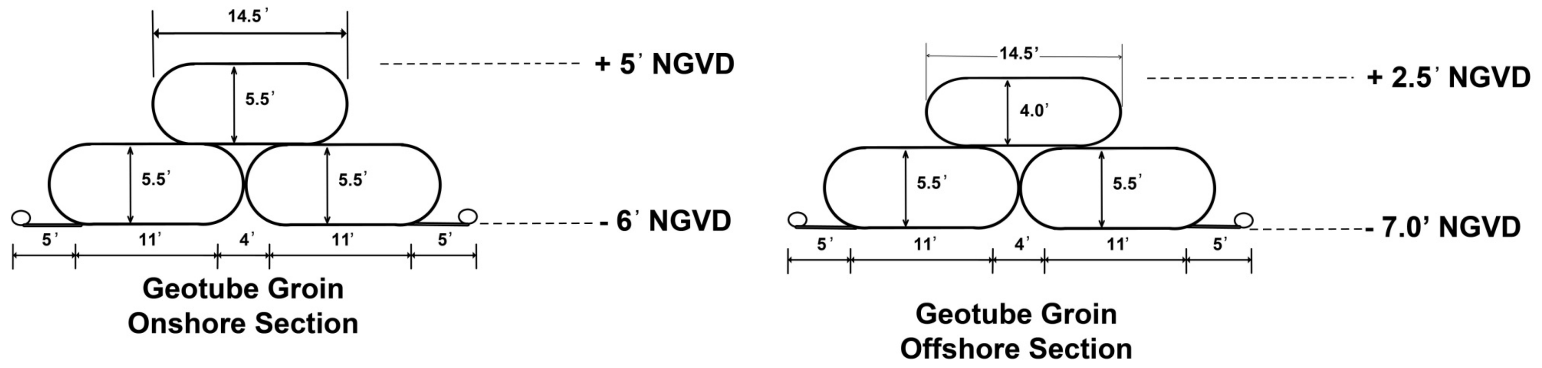
Example of a single tube, geotube groin

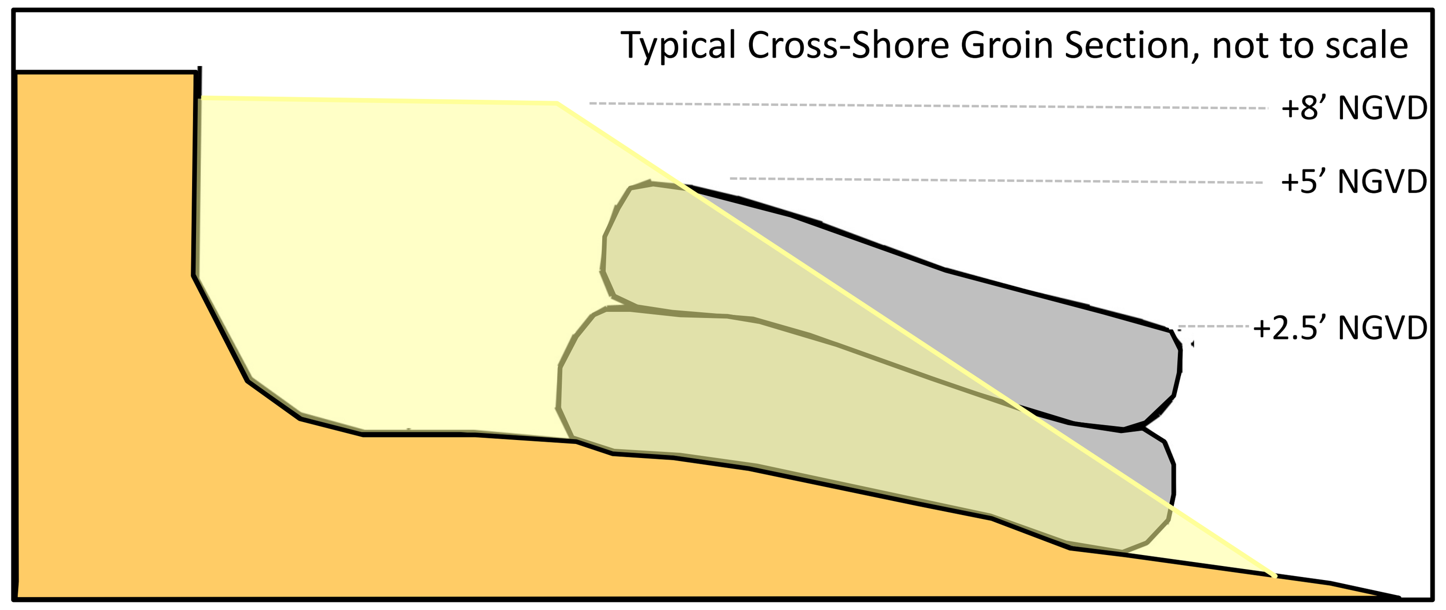


Low-Profile Backpassing Groins

The backpassing groins are not a typical design.
Grοins are designed to have minimal effect (short, low-profile).
Low profile means they are below the height of the beach.
Plan is to construct groins with geotubes and monitor for 10 yrs..
After 10 years, if performing satisfactorily, groins would be replaced with a hard structure.

Typical Geotube Groin Sections





Backpassing (Moving Sand Back from West to East)

- Sand will accrete on the updrift side of the groins, over a 2-year period.
- Sand that has accreted above the MHW Line will be transported east with land based equipment (front-end loader, and trucks).
- Backpassing can be done more frequently, if conditions warrant. (**Blue arrows**)
- Sand can be bypassed to the west over the groin, if conditions warrant.

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Environmental Considerations

Unavoidable, Permanent, Minimal & Temporary Impacts

Geology, Topography, Soils: @ +200 kcy of course sand will be dredged from the inlet channel and deposition basins, and placed on the beach, intertidal and nearshore. Beach berm elevation and width will be increased. Placement footprint seaward of MHW is @ 35.acres. Dredging/placement window October – mid-January. Four tapered, trapping groins will be installed to trap sand for backpassing. Sand backpassing cycle projected at 20kcy/2yrs. Periodic disturbance and insignificant impacts will occur at the projected backpassing cycles. A wider beach will add protection including reduction of fine sediments eroding into the near shore.

Land Use and Transportation: Project implementation will not change traditional accepted land use in or around the project site. Construction may temporarily increase traffic and possibly cause periodic congestion due to road closures or detours to accommodate project construction.

Fish and Benthic Invertebrates: Due to the nature of the inlet environment and repeated prior dredging events, no significant impacts to biological resources are expected in the inlet. Placement will cause temporary disturbance to fisheries resources from temporary increases in turbidity. Groin construction will also have turbidity effects and will eliminate small area of foraging habitat. Intertidal and nearshore areas in the sand placement footprint will be buried, benthic organisms that can't escape will be lost. Sandy beach and intertidal will reestablish transition habitat and be recolonized by those organisms that favor that habitat (12 – 18 months). Benefit of structures to fishery resources (refuge & 3-D structure) will greatly outweigh loss of common benthic area

Wildlife: Construction of the project will disturb some wildlife which will be displace to adjacent areas. Impacts to small mammals related to vehicle contact may increase due to the localized increase in vehicle and equipment movement. Completion of the project will benefit most wildlife utilizing the shoreline and vicinity. This includes protection land forms and vegetation used by local species of wildlife, including many species of birds and small mammals.

Vegetation: Movement and storage of equipment and placement of fill sand may eliminate some existing beach vegetation. Any significant loss of beach vegetation will be restored. Seaweeds in the nearshore that are buried by fill will be lost. Groins will serve as a substrate for several species of seaweed including kelp. Increased fill design will provide much higher level of shore protection. Dune will be anchored with beach grass.

Water Quality: No significant impacts to water quality are expected. Dredging and placement will create temporary localized increases in turbidity on the order of 100s out of meters from the work area for the duration of construction.

Noise and Air Quality: For the duration of project construction there will be an increase in ambient noise due to construction. No significant impacts to air quality are anticipated; however, certain construction activities are likely to raise dust levels during dry conditions.

Recreation – Areas of the beach and compatible uses will be temporarily unavailable around the area of active construction. A safety buffer will move along the beach as construction progresses. Boating traffic in the inlet my be congested during dredging. Dredging activity in the inlet will increase potential navigation hazards. Periodic by-passing my decrease recreation on the beach. In general the enlarged beach will greatly increase recreational opportunities

Wetlands, Threatened and Endangered Species, Socioeconomics Cultural Resources Hazardous, Toxic and Radioactive Material (HTRW): Significant impacts to these resources from implementation of the project are not anticipated.

Coastal Zone Management: Project is being coordinated with the State and Town. Provides for safe navigation, storm protection and recreation; does not significantly harden the shoreline.

Cultural and Historic Resources: A construction buffer will be established around the site of the Culloden to prevent any impact to this historical site. No impacts are anticipated.

Benefits and Adverse Impacts Avoided/Minimized

Land Use and Zoning: Project will not conflict with local zoning, displace existing uses, or result in new residential/commercial development. Groins will help stabilize the beach decreasing sand lost to erosional forces

Wildlife: Enhanced and enlarged beach habitat will benefit shore birds and waterfowl as well as small mammals. Beach fill and groins will protect landward habitats. Groins will become reef habitats providing structured substrate and increasing local diversity of marine fish and invertebrates. The timing of the dredging window and use of a pipeline cutter head dredge will minimize impacts to early life history stages of many important fish species. The dredge window and use of a cutter head dredge also help to avoid any impacts to state or federal listed species which include sea turtles, whales and sturgeon. The window will protect the Piping plover as construction is slated to be completed (March) prior to the birds return in April.

Vegetation (upland): Project protection levels will greatly decrease overwash protecting landward vegetation and prevent fine particles from eroding into the sound. The new beach will be planted with dune grass, greatly increasing wildlife habitat value and strengthening storm protection.

Recreation: The beach will be greatly enlarged providing much more area for typical beach activities. Groins will attract many species of finfish sought by recreational fishermen.

Cultural Resources: The project will not effect any cultural resources.

HTRW: The potential for the project to produce any hazardous material issues will be minimized by the adoption of and attention to the Standard Operating Procedures and the Health and Safety Plan.

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Lake Montauk Harbor Feasibility Study

Cost-Sharing & Schedule

The Recommended Plan would be cost-shared between the Corps of Engineers, NYSDEC, and Town

	Alternative 2			
	Total	Fed	State	Town
Initial Construction	$9,967,000	$7,873,900	$1,465,100	$628,000
Renourishment operation[1]	$4,176,000	$2,923,200	$877,000	$375,800
Backpassing operation[2]	$175,000	$122,500	$36,800	$15,700
Future Costs[3]	$28,194,000	$19,736,000	$5,920,700	$2,537,300
Total Lifecycle Costs*	$38,161,000	$27,609,900	$7,385,800	$3,165,300

1. Cost per renourishment operation, every 10 years.
2. Cost per backpassing operation every 2 years.
3. Future costs include groin replacement and monitoring in addition to renourishment and backpassing operations.

***Note:** *All above figures are preliminary costs subject to change based on additional investigations to complete the study.*

COST SHARING PERCENTAGES	**Federal**	**State**	**Town**
Initial Construction Costs*	79%	14.7%	6.3%
Future Costs*	70%	21%	9%

***Note**: Typical cost-sharing of 65% Federal for initial construction and 50% Federal for renourishment has been adjusted based upon Section 111 considerations. State and Town costs assume that public access is provided. Town costs would increase if the shoreline is not publicly accessible.

Schedule for Report Completion

Receipt of PL 113-2 funds	April	2014
Local Sponsor position on moving forward	April	2016
Tentatively Selected Plan Milestone	April	2016
Release Draft Report for public review	May	2016
Final Report submitted to USACE HQ	Oct.	2016
Chief's Report to Congress	Mar.	2017
Initiation of design	Sept.	2017
Initiation of construction	Sept.	2018