



North Scituate Beach Nourishment Project

Public Meeting
January 18, 2024



Sustainable Coastal Solutions, Inc.

Existing Conditions

- 2013 South Shore Coastal Infrastructure Inventory found that the majority of the seawall and revetment is in Fair condition with evidence of wall cracking and spalling, loose and/or slumping stones, and undermined seawall footings at several locations
- Much of the revetment is below water at high tide
- While submerged, the revetment does not efficiently dissipate wave energy, therefore the seawall is the primary means of shore protection during storms



Evacuation Route



Historic Damages

- 75 homes behind seawall are considered repetitive loss properties
- Nearly \$11.4M in contents and structural damages have been claimed from 81 homes from 1978 to 2022

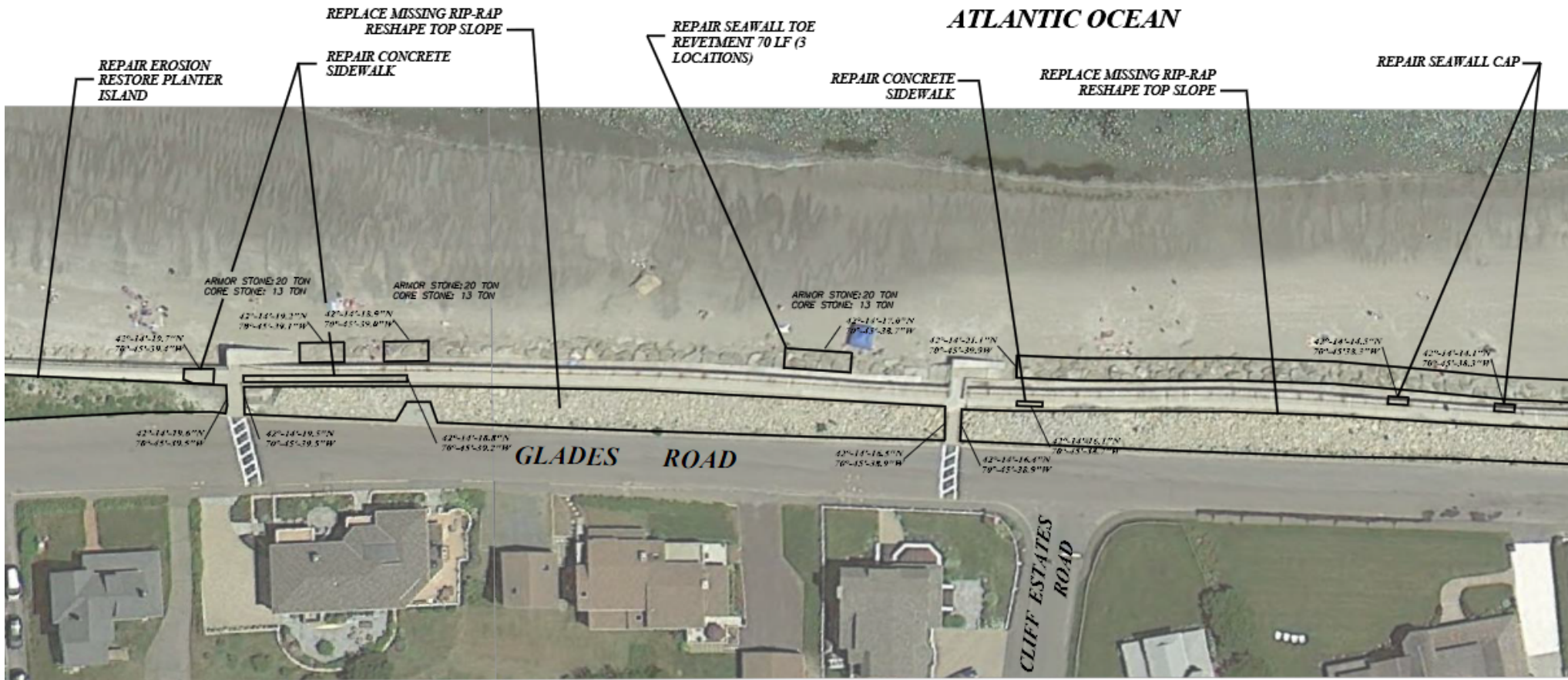


Winter Storm Juno 2015

Map from MCZM South Shore Coastal Hazards Characterization Atlas

Example of Public Infrastructure Damages

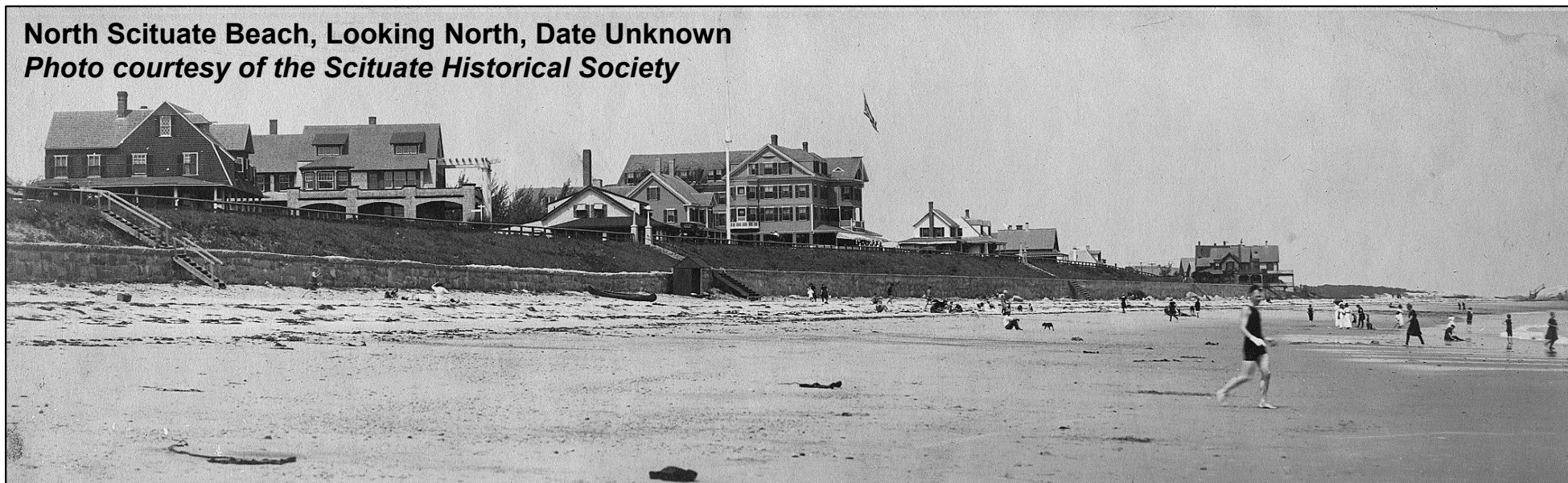
- 2013 Winter Storm Nemo damages
- Glades Road repairs: \$274,000
- Surfside Road repairs: \$632,000
- Egypt Beach repairs: \$1,166,000



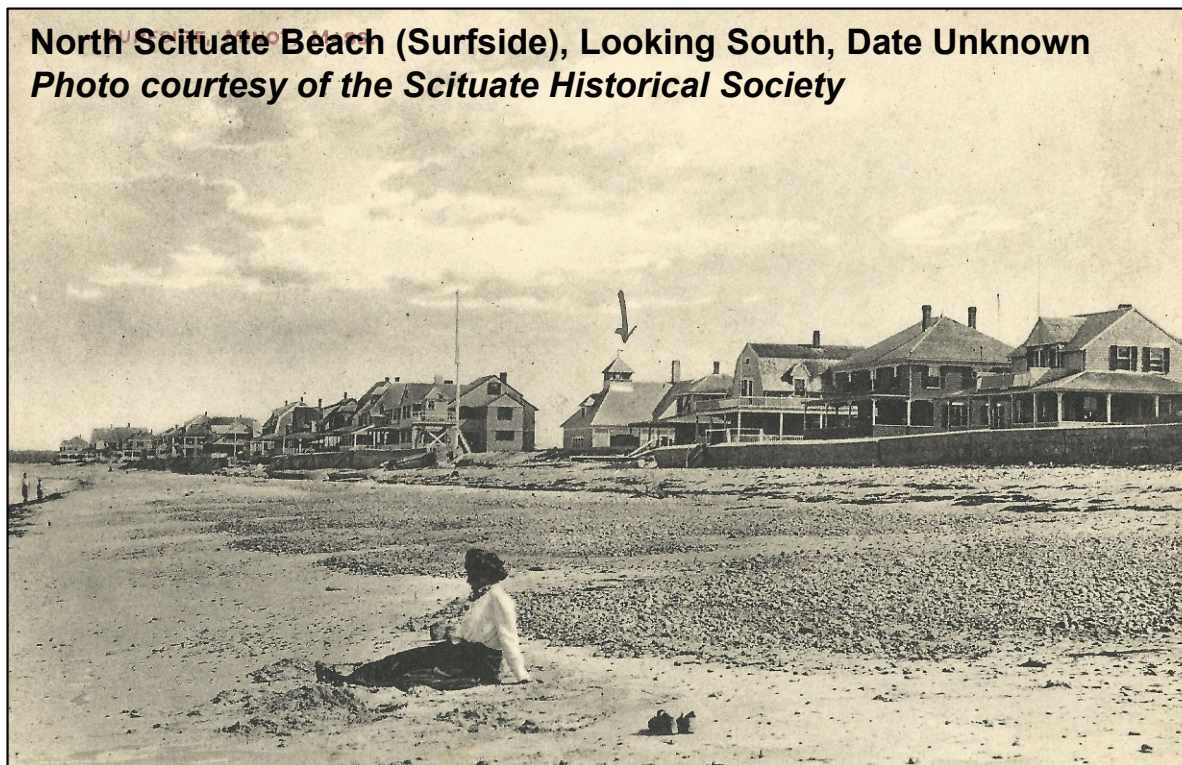
From the Town of Scituate

Historic Photos

North Scituate Beach, Looking North, Date Unknown
Photo courtesy of the Scituate Historical Society

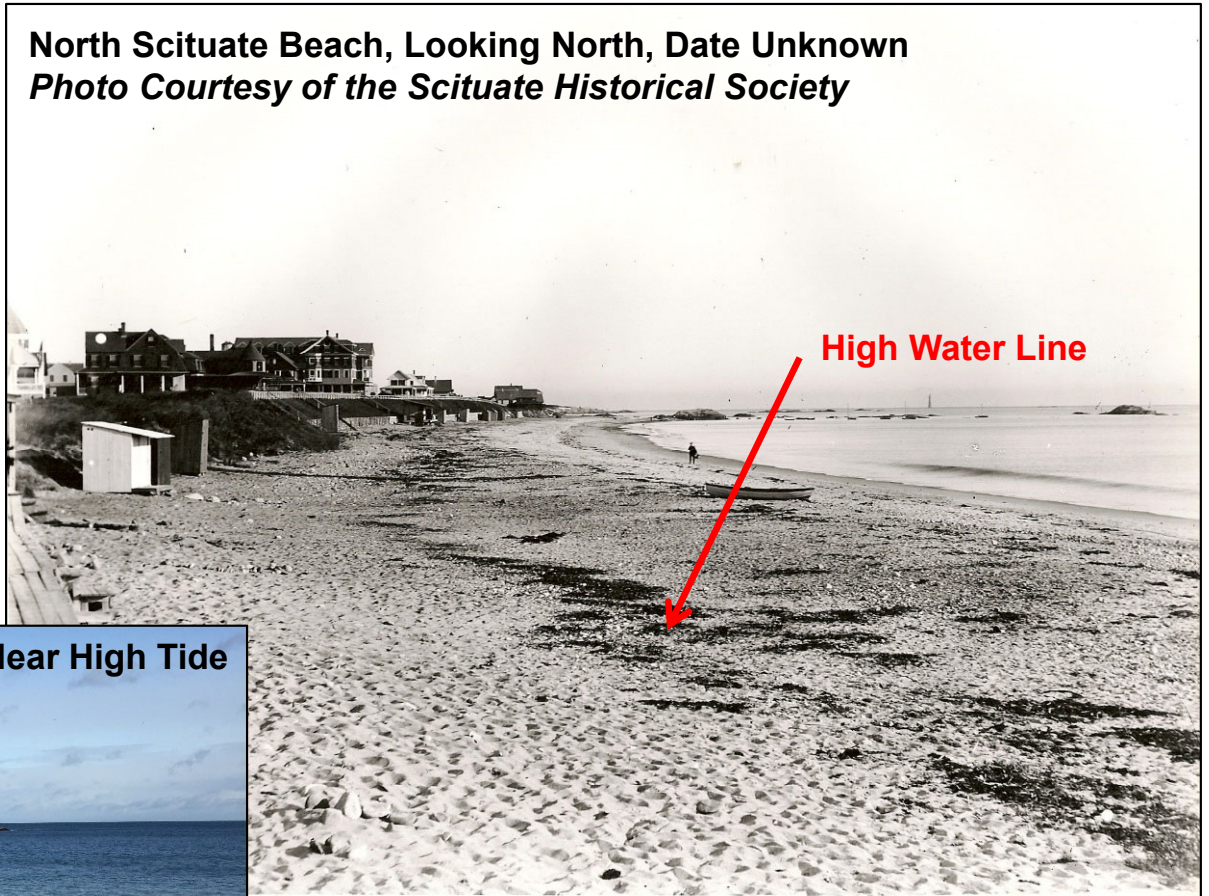


North Scituate Beach (Surfside), Looking South, Date Unknown
Photo courtesy of the Scituate Historical Society



Historic Photos

North Scituate Beach, Looking North, Date Unknown
Photo Courtesy of the Scituate Historical Society

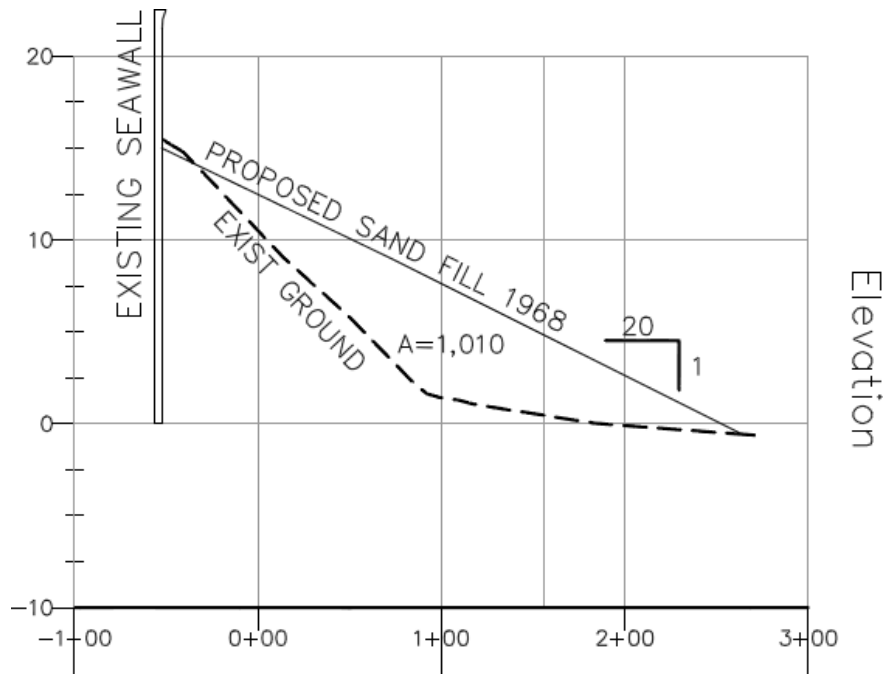


North Scituate Beach 2016, Looking North, Near High Tide



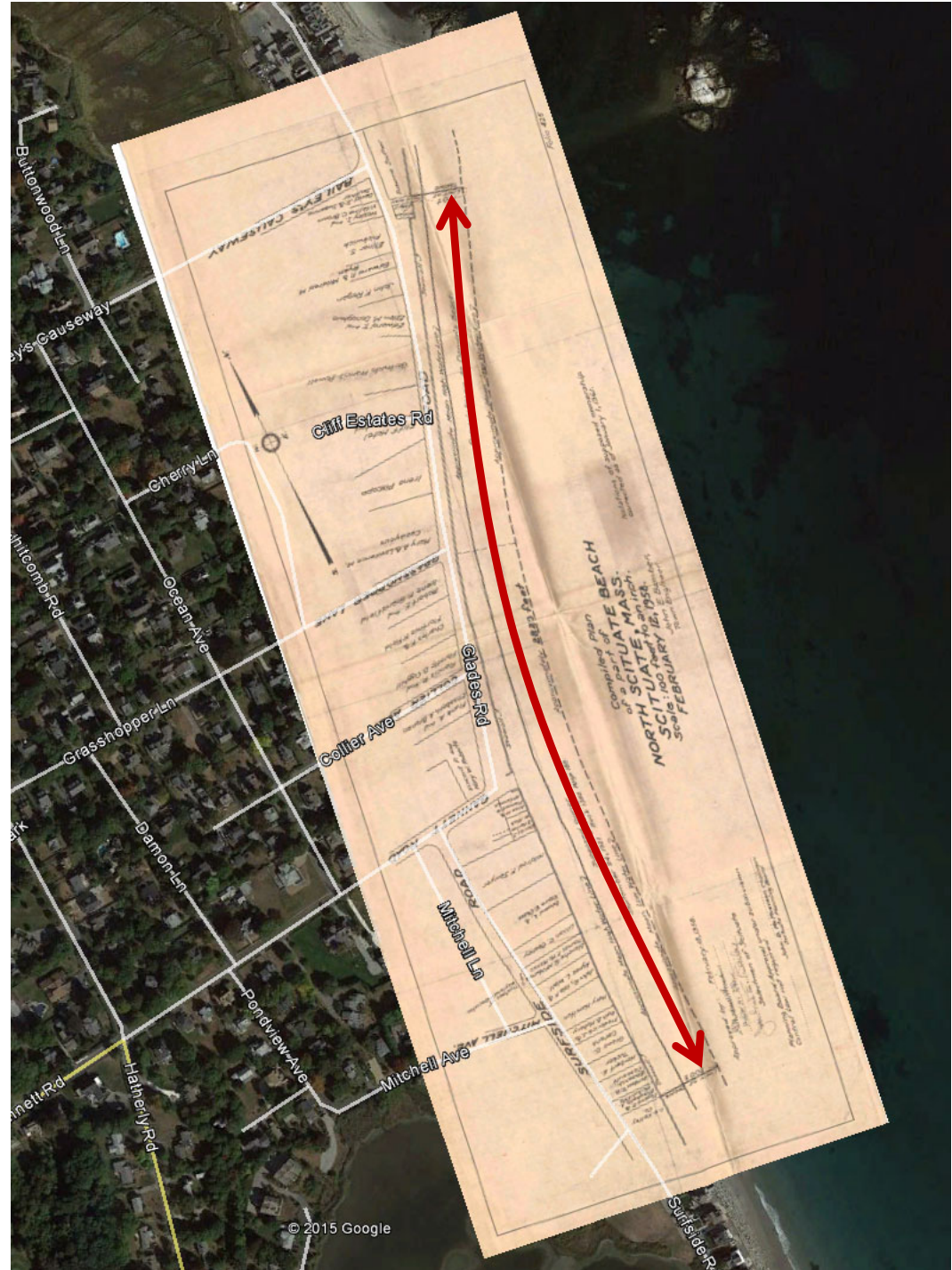
Project Area History

- A beach nourishment project was completed by USACE in 1967 with an approximate length of 2,500 feet and a total volume of 160,000 cubic yards (equal to ~7,000 truck loads)
- Seawall and revetment repair plans have been documented since the late 1940's



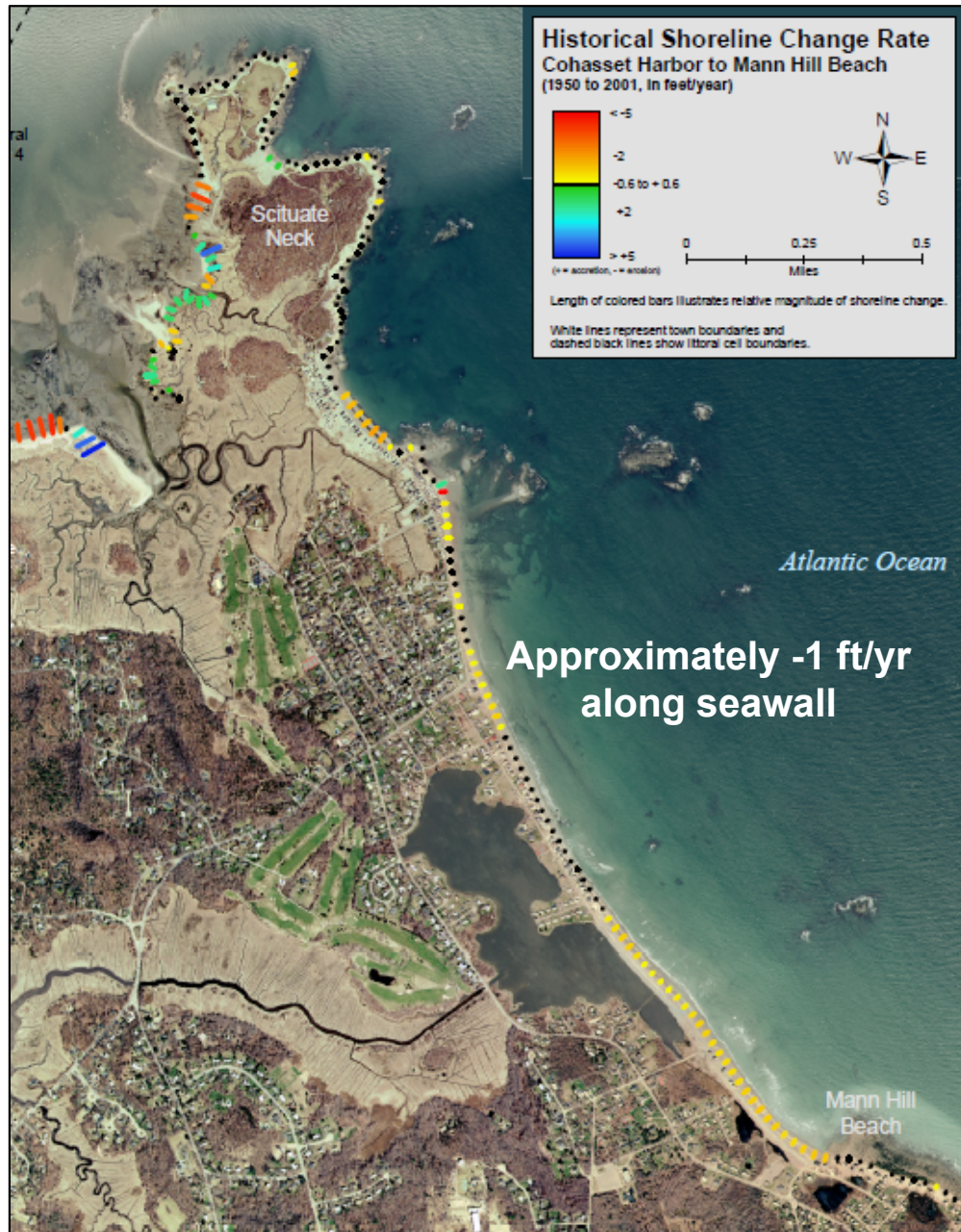
Existing Public Easement

- Approximate limits from the beach access parking lot south of Bailey's Causeway to 350 feet south of Mitchell Avenue



Plan from the Town of Scituate

Coastal Geology - Local Shoreline Change



1950-2001

- Armoring of the coast has “fixed” the position of the shoreline, but also eliminated natural sediment supply
- Natural coastal processes continue to erode the beach, leading to lower beach elevations along the shoreline
- This lowering of the beach is exacerbated by storm waves reflecting off the seawall
- The beach condition can only be mitigated by placement of additional beach material

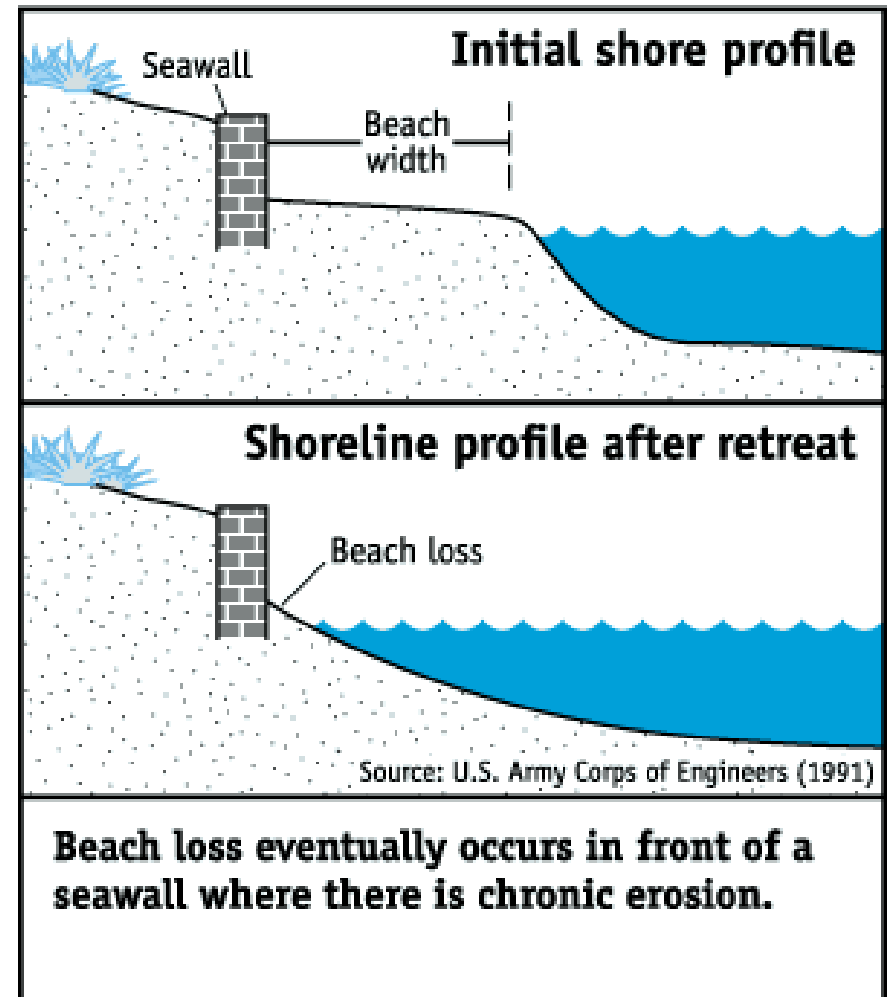
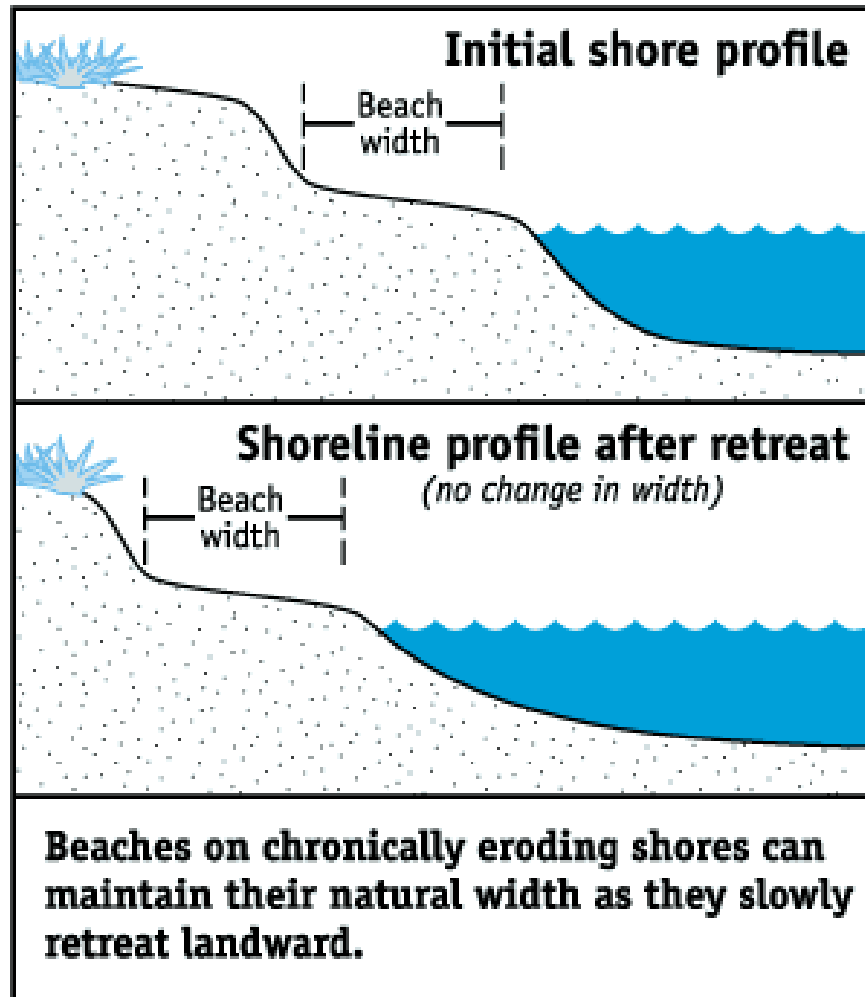
Wave Overtopping Example – Short Beach



Long Term Effects of Seawalls on Beaches

Over 4.5 miles of Scituate's shoreline is hardened by seawalls

Shoreline Hardening and Beach Loss



Shore Protection Project Purpose and Need

- Long-term shore protection
 - Reduce (or eliminate) damages to public infrastructure and residential property landward of seawall
 - Maintain emergency access during and after storm events
 - Extend life of existing seawall
- Coastal resiliency
 - Prevent further beach lowering and erosion (wider and higher elevation beach)
 - Restore regional sediment supply (improve sediment supply to downdrift beaches)
 - Plan for sea-level rise
 - Use of compatible sediment to ensure longevity

Proposed Project Permitted in 2016

Engineered Beach Nourishment for Shore Protection

Project Length

- 2,900 feet

Nourishment Material Required

- 240,000 cubic yards (12,000 truckloads at 80 trucks per day)

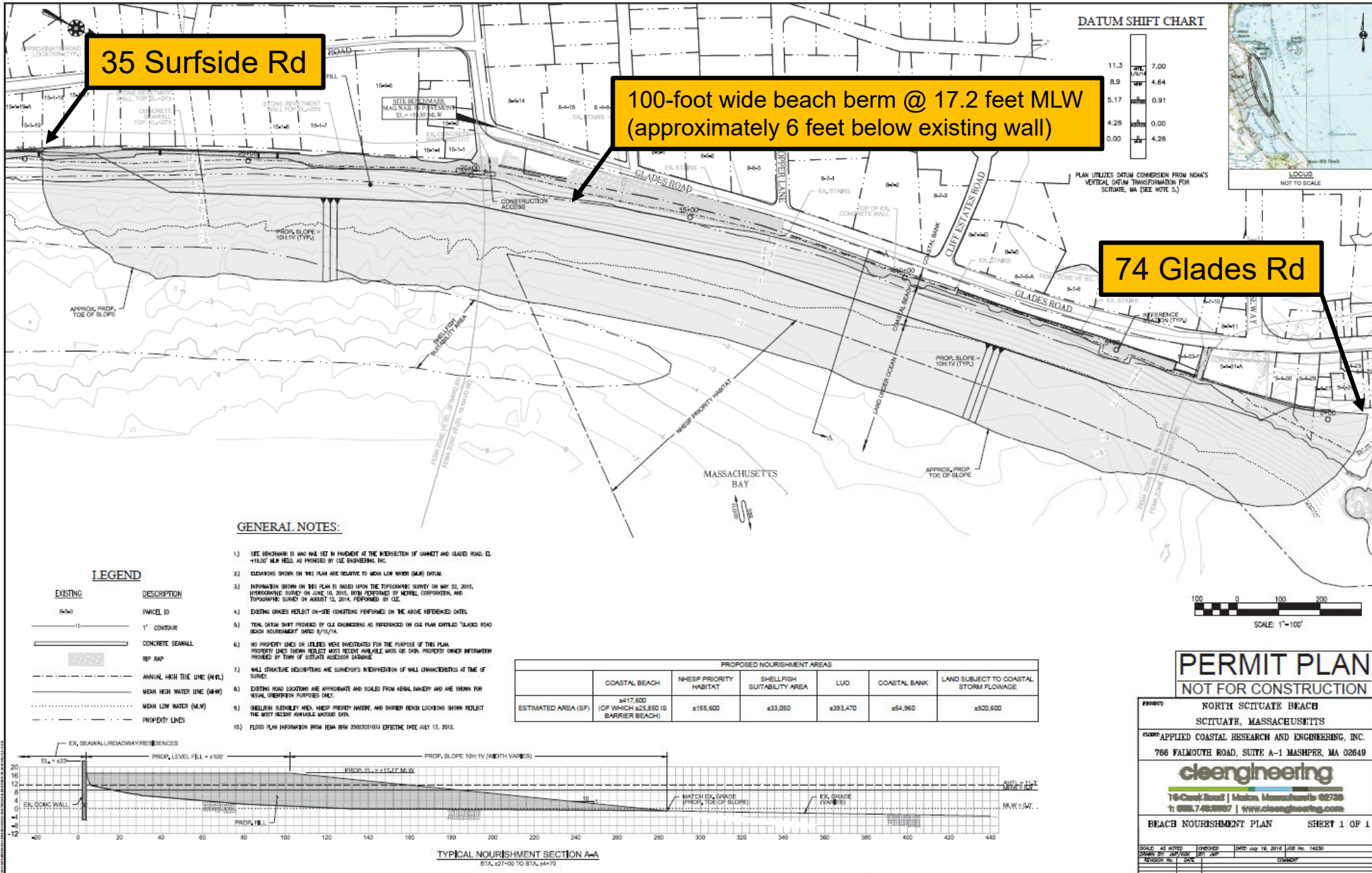
Construction Time

- Approximately 6 months (November 2 – April 30)

Renourishment Interval

- Approximately every 10 years (partial renourishment)

Full Project



PERMIT PLAN
NOT FOR CONSTRUCTION

PROJECT: NORTH SCITUATE BEACH
SCITUATE, MASSACHUSETTS

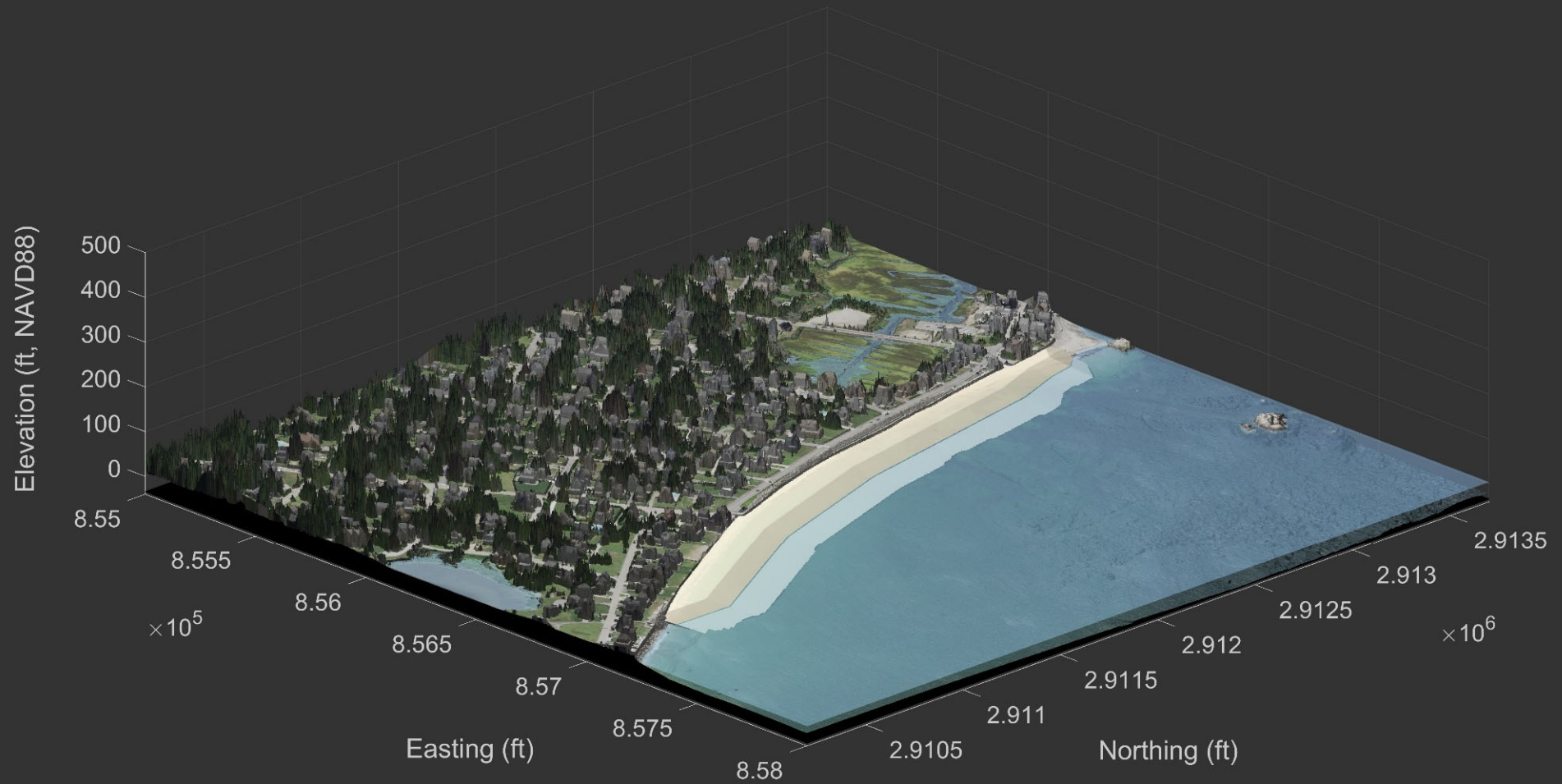
CLIENT: APPLIED COASTAL RESEARCH AND ENGINEERING, INC.
766 FALMOUTH ROAD, SUITE A-1 MASHPER, MA 02649

cleengineering
16-Cook Road | Mashpee, Massachusetts 02649
t 508.748.8907 | www.cleengineering.com

BEACH NOURISHMENT PLAN SHEET 1 OF 1

SCALE: AS NOTED
DRAWN BY: [NAME]
CHECKED BY: [NAME]
DATE: July 16, 2016
JOB NO. 14230

Nourishment Design – Oblique View of Full Project



Partial Project Based Upon Available Funding

Available Funding from '23/'24 MCZM Coastal Resilience Grant Program

- \$2 million '23/'24 MCZM Grant
- An additional \$2 million in '24 MCZM Grant

Project Length

- Approximately 1,000 feet

Volume of Nourishment Material

- 52,000 cubic yards (~2,600 truckloads likely at 50-to-60 trucks/day)

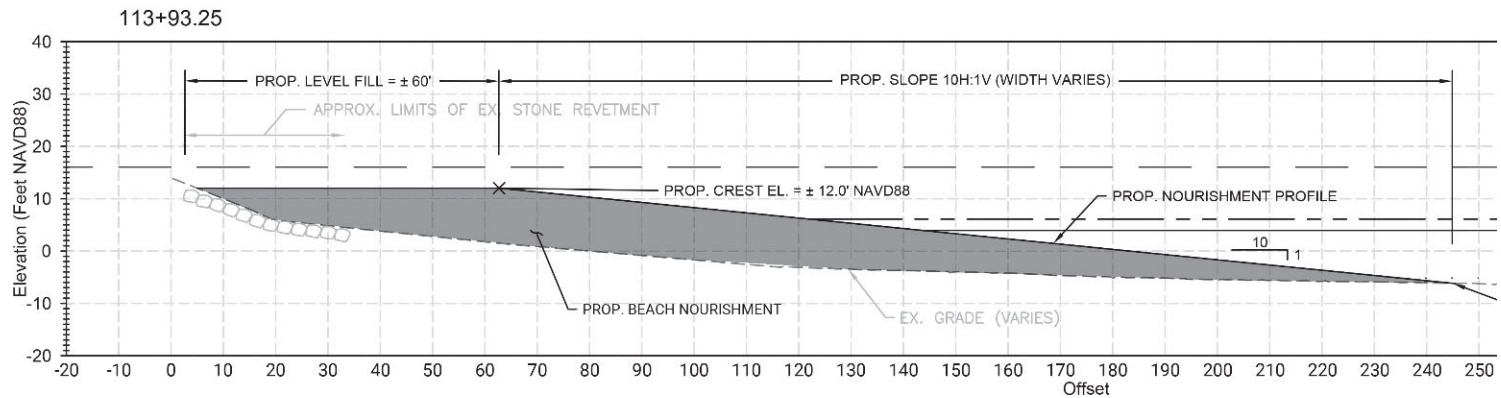
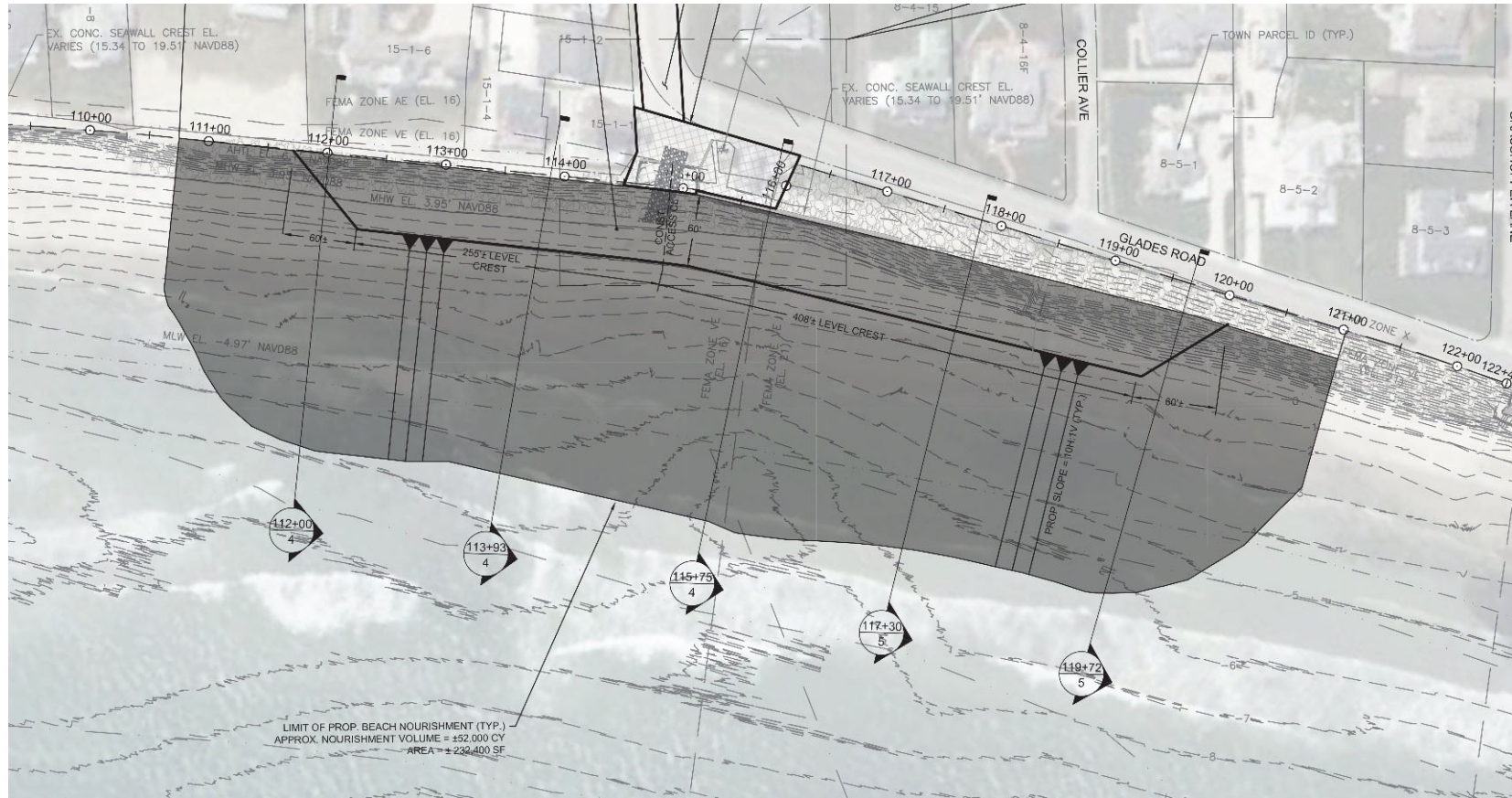
Construction Time

- Approximately 3 months (Late January to April, 2024)

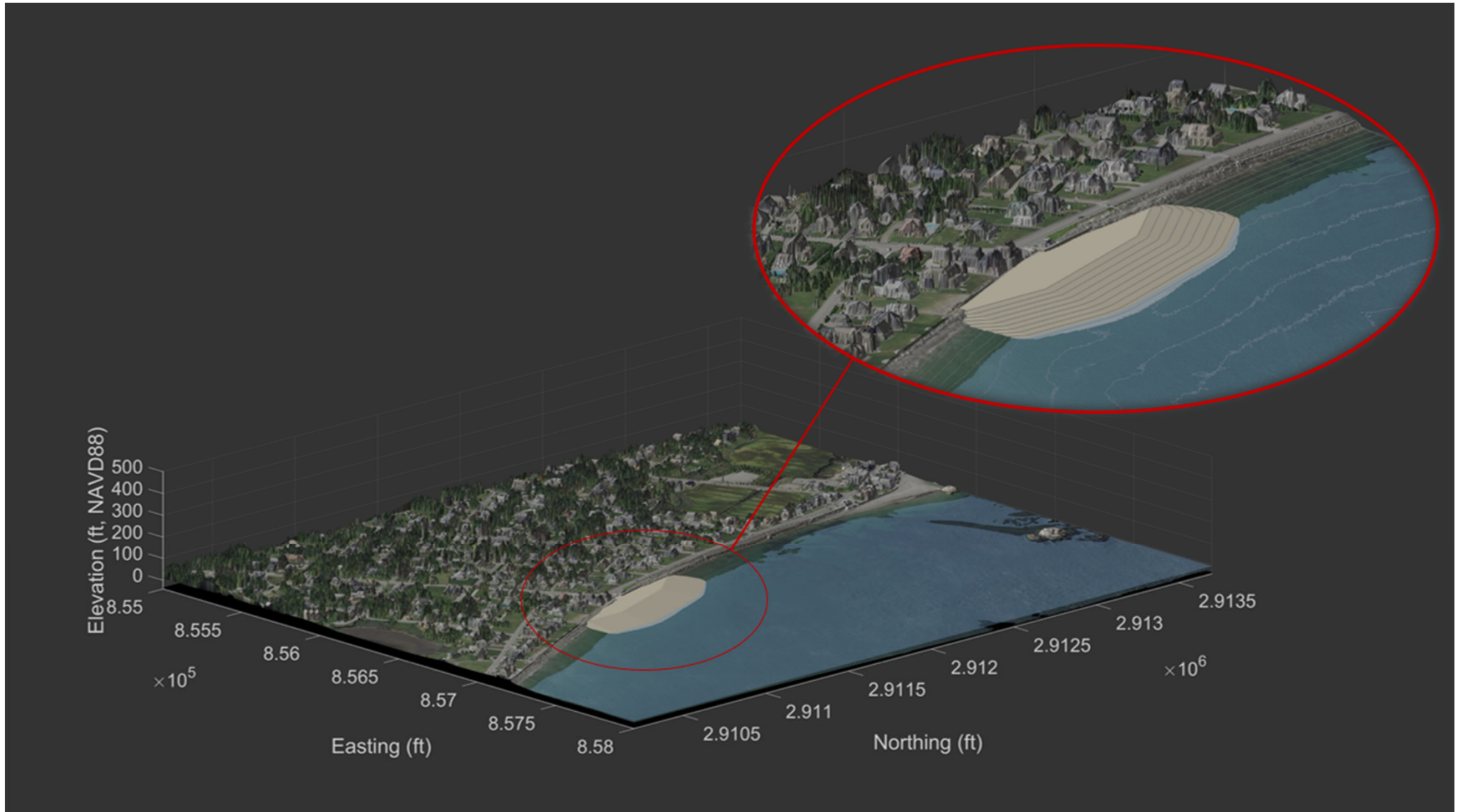
Nourishment Material

- 75% Sand and 25% rounded gravel (**no cobble**)

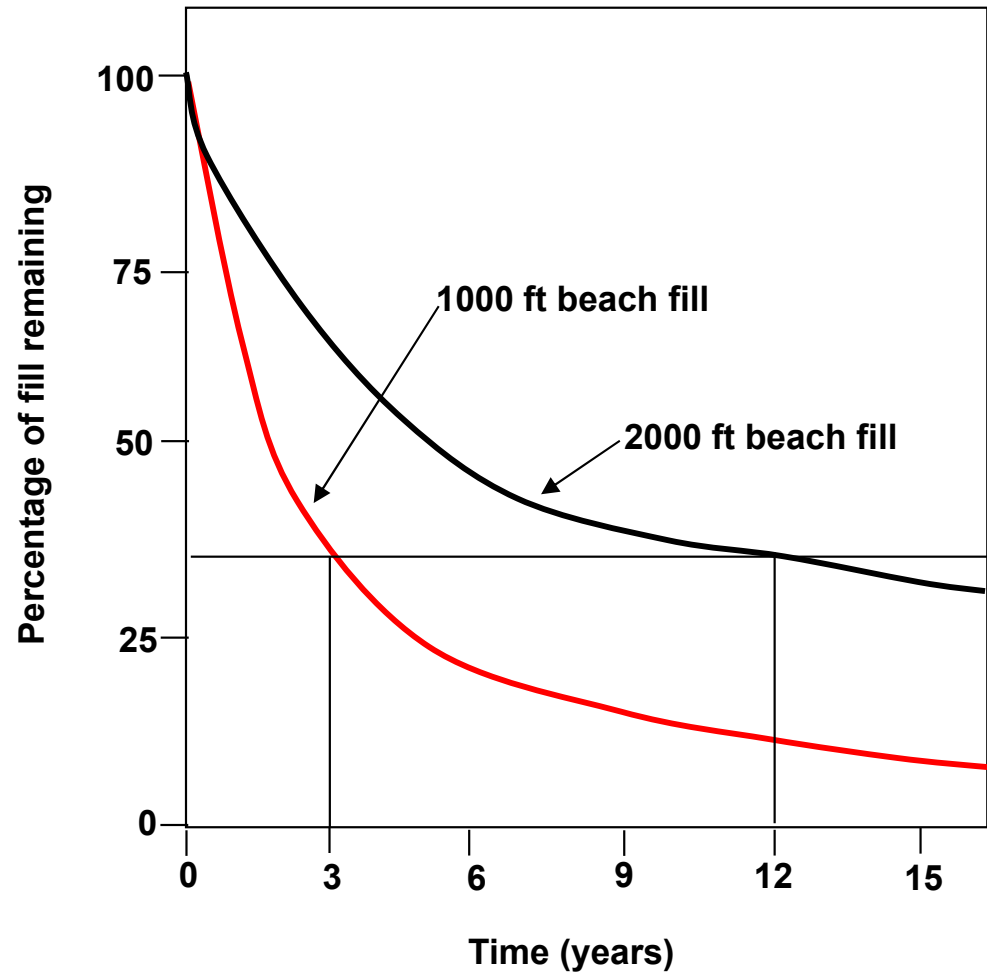
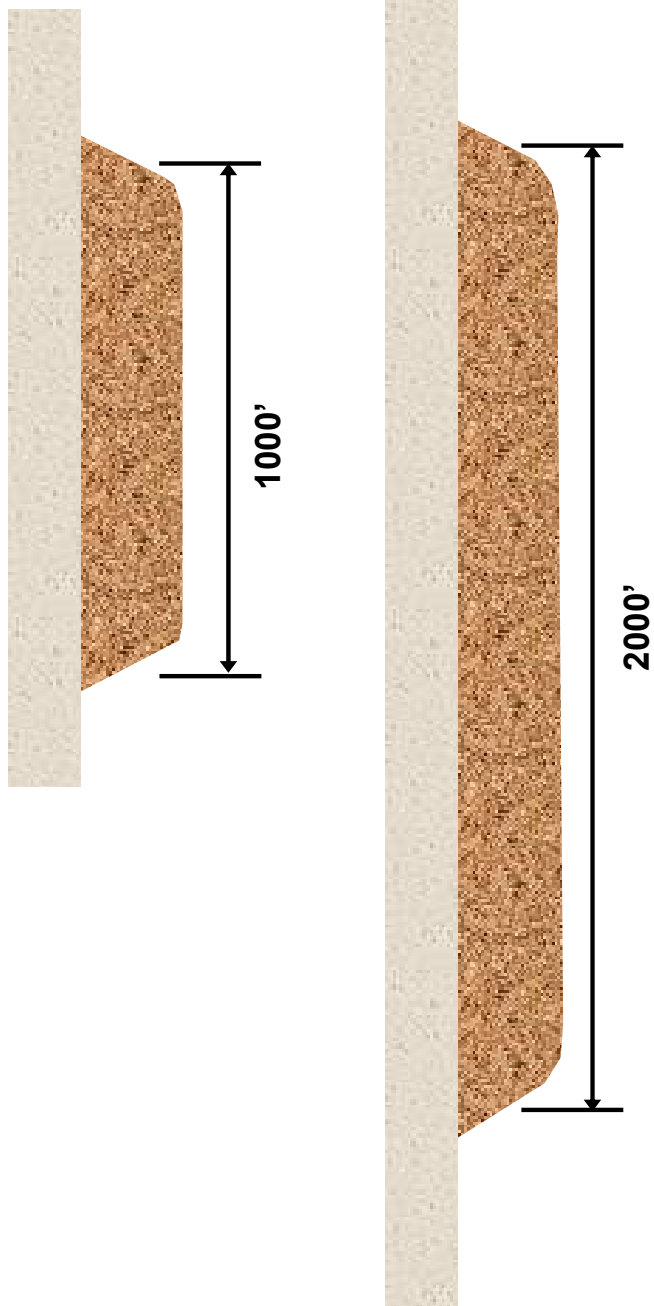
North Scituate Beach Nourishment Design



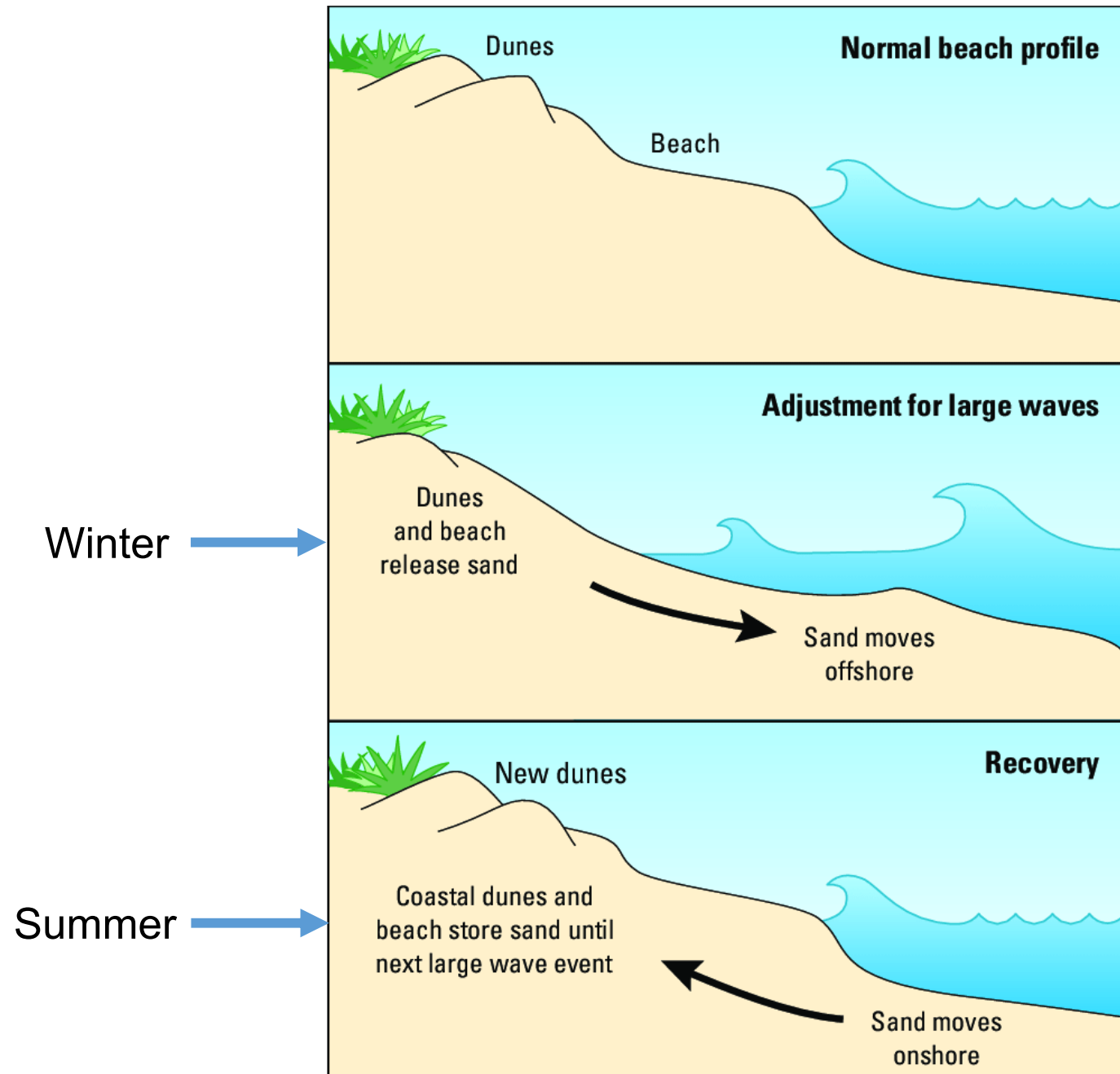
Nourishment Design – Oblique View of Partial Project



Nourishment Design – Influence of Project Length



Cross-Shore Processes – Beach “Seasons”

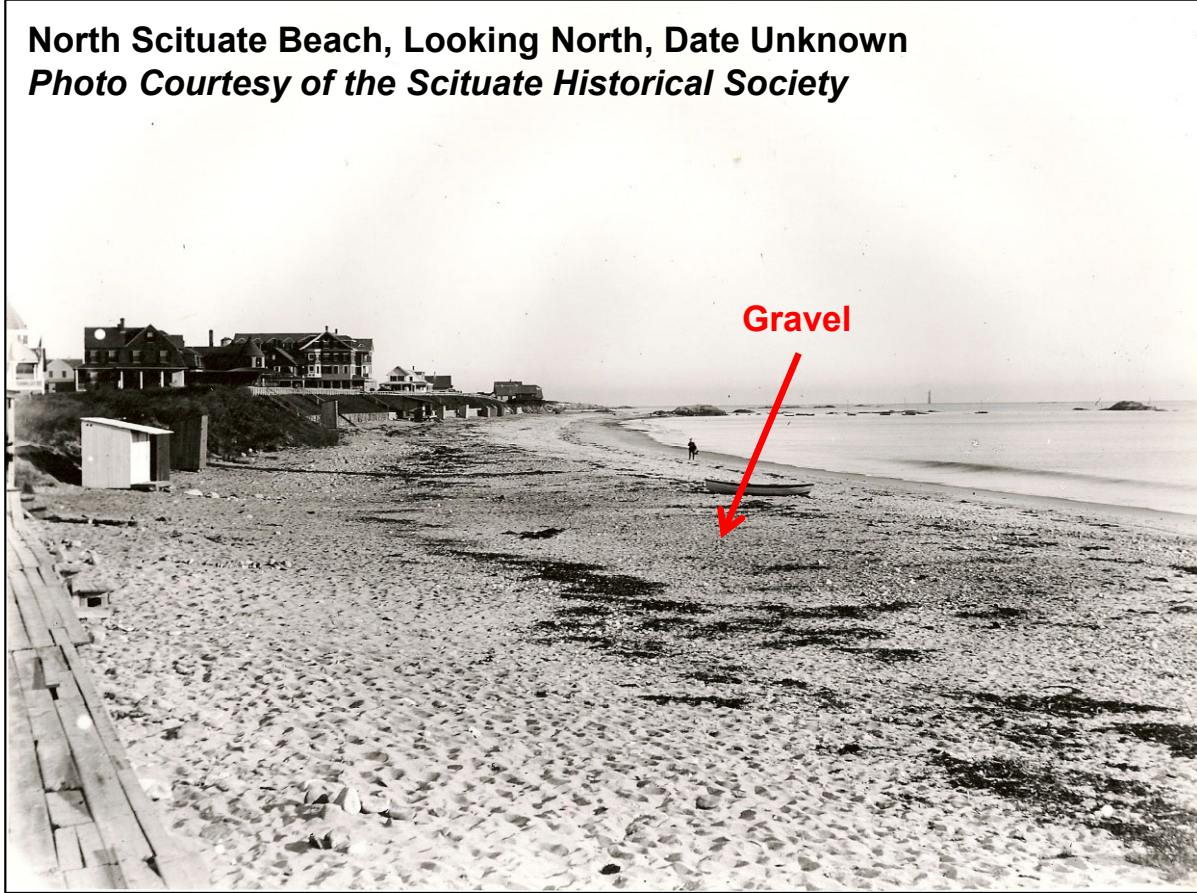


Beach Sediment



What is the Importance of “Compatible Material”?

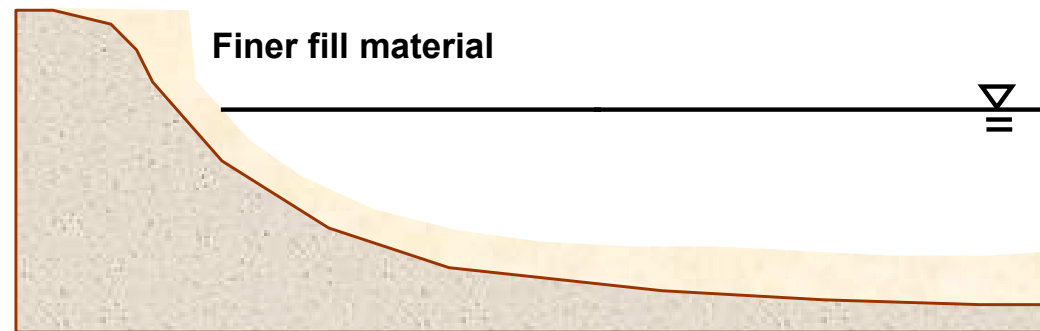
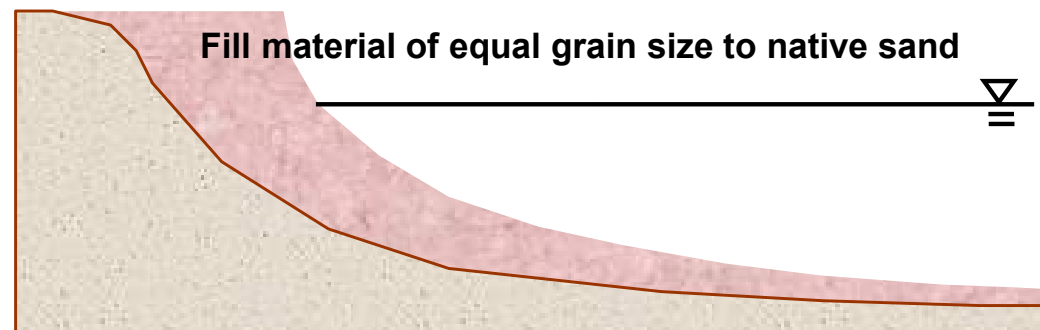
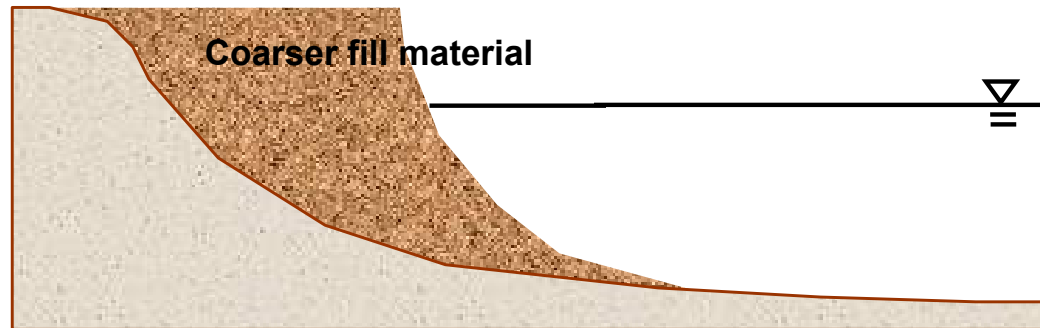
North Scituate Beach, Looking North, Date Unknown
Photo Courtesy of the Scituate Historical Society



What is the Importance of “Compatible Material”?



Nourishment Design – Influence of Grain Size



Beach Sediment

No Cobble

**Approximately 20%
Gravel**

Remainder Sand

- Nothing greater than 3"
- Less than 80% by weight passing the 1" (25 mm) sieve
- Less than 25% by weight passing the #35 sieve (0.50 mm)
- Less than 10% by weight passing the #60 sieve (0.25 mm)
- Less than 3% by weight passing the #200 sieve (0.075 mm)

Construction Access and Truck Route



Construction Impacts

Impact	Mitigation Measure	Description
Air Quality	Air pollution controls	Contractor will participate in DEP's Clean Air Construction Initiative (CACI) to retrofit all on-site diesel-powered equipment with after-engine emission controls and use of Low Sulfur Diesel Fuel.
	Dust control	Use of dust control during earthwork.
Noise	Noise control	Contractor shall modify heavy equipment "back-up alarms" to reduce noise impacts.
	Truck mufflers	Maintain mufflers on construction equipment.
	Minimize idling	Keep truck idling to a minimum.
Traffic	Optimize truck route	Restrict trucks to state highways and Town of Scituate roadways. All damage will be mitigated by the Town. Also, police details are included in project budget.
Hazardous Materials and Solid Waste	Special management procedures	Implement special management procedures for any hazardous, contaminated or special waters generated during construction.
	Health and Safety Plan	Prepare a site-specific Health and Safety Plan.
Fisheries	Seasonal limitations on placement at beach	No fill will be placed between May 1st and November 1st of any year to protect near shore fish habitat.



Expectations

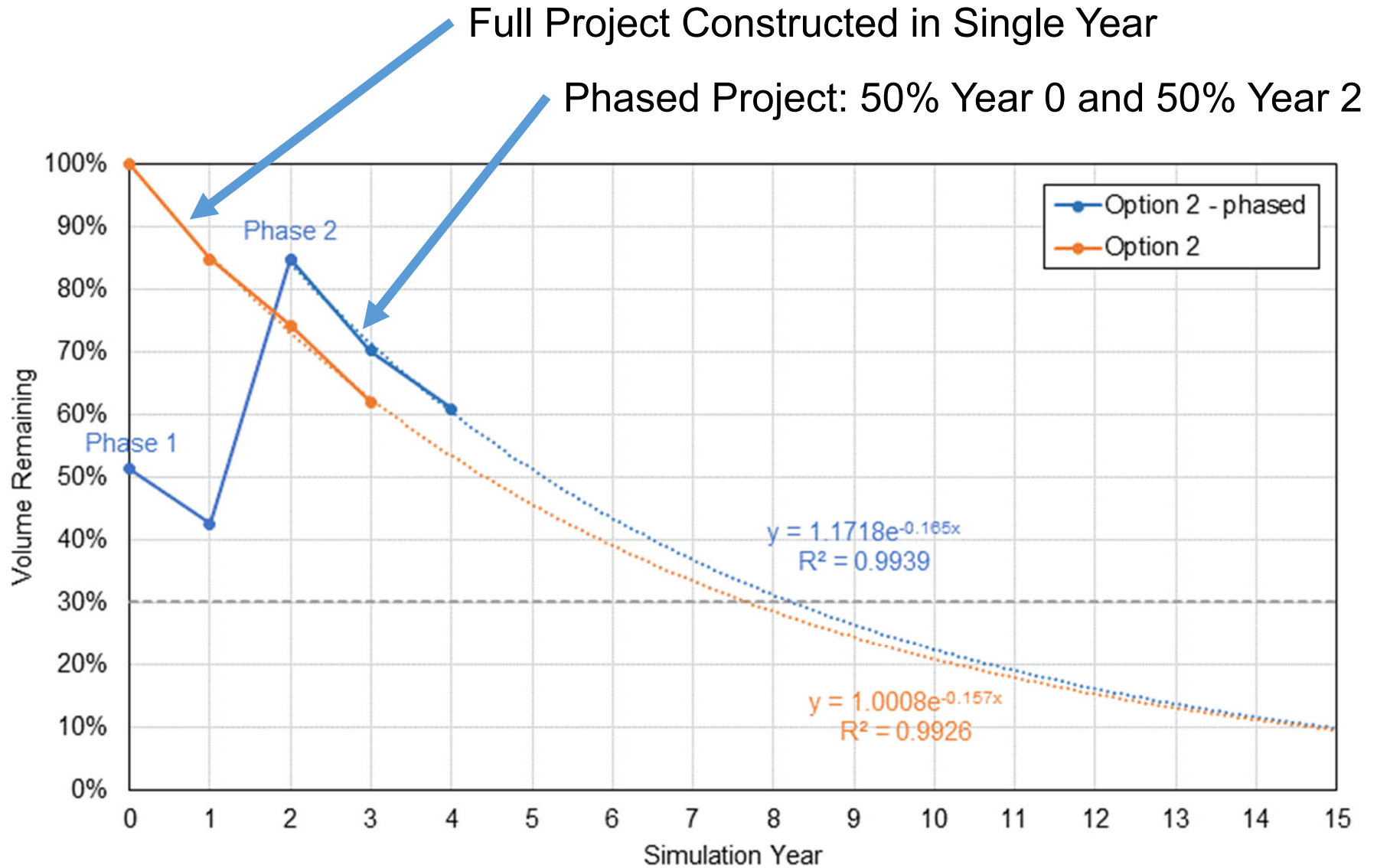
Project Performance

- Volume will be about 22% of full design
- The beach will rapidly ‘adjust’ or equilibrate to form a more natural slope, which appears to be a rapid ‘loss’ in dry beach width
- May be some “scarping” as nourishment initially adjusts
- Also, north and south ends of beach will erode more quickly as beach fill spreads in the alongshore direction
- Both alongshore spreading and cross-shore equilibration are expected – **THE BEACH MATERIAL IS STILL PROVIDING PROTECTION**

Future Nourishment Possibilities

- Future MCZM Resilience Grant funding may be available for future phases
- Original design assumed a “phased approach”

Phased Project Construction Example



Example of Beach Nourishment – Winthrop Beach



Example of Beach Nourishment – Winthrop Beach

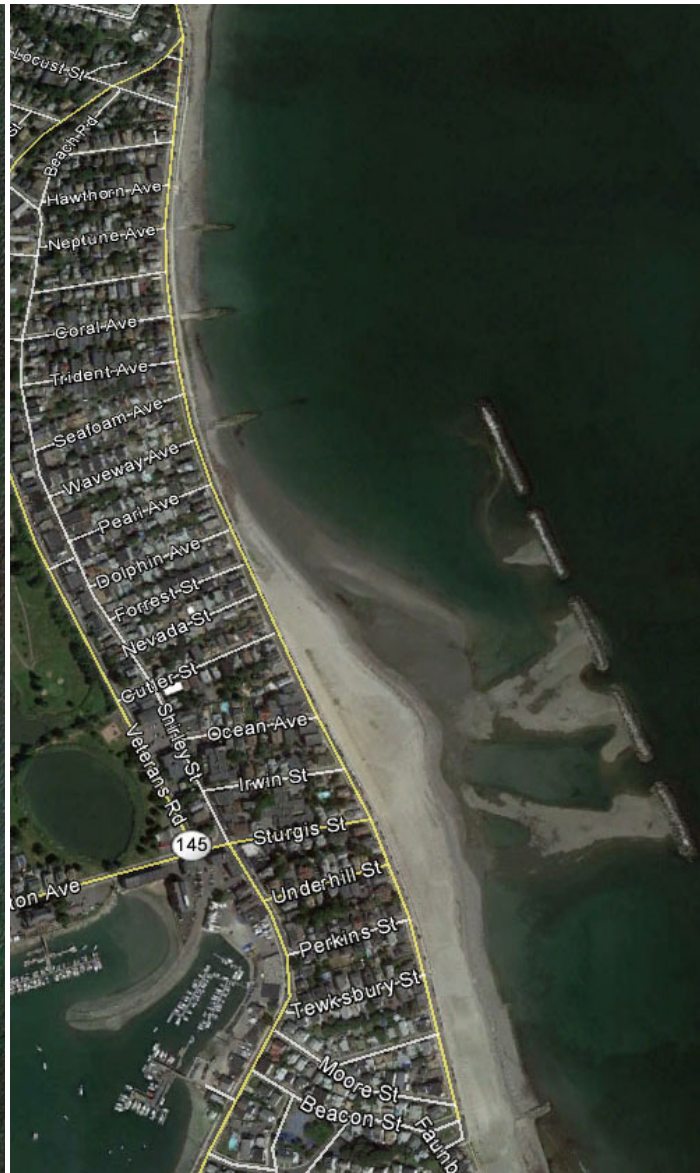


Example of Beach Nourishment – Winthrop Beach

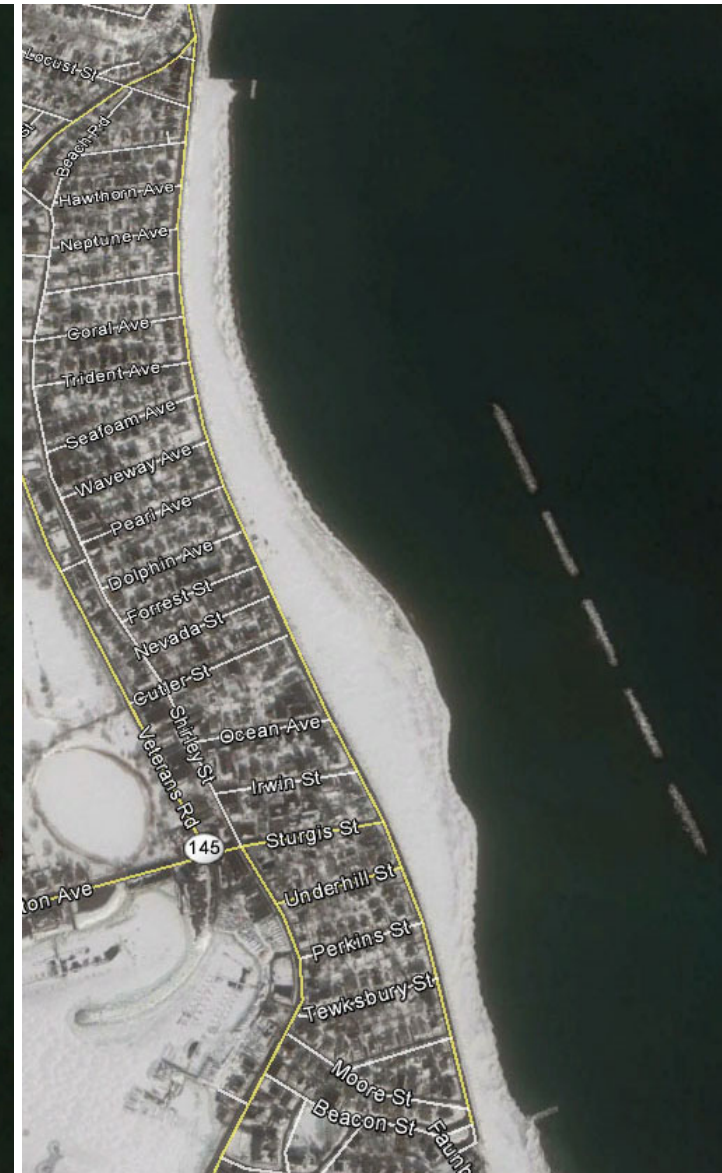
April 2008



August 2013



March 2015



Example of Beach Nourishment – Winthrop Beach



Before Nourishment



After Nourishment
Photo taken after Winter Storm Juno

North Scituate Beach Nourishment Project

QUESTIONS?

<https://www.scituatema.gov/coastal-management-and-flood-hazard-mitigation>

Town Contact Information:

Sean McCarthy: 781-545-8732

