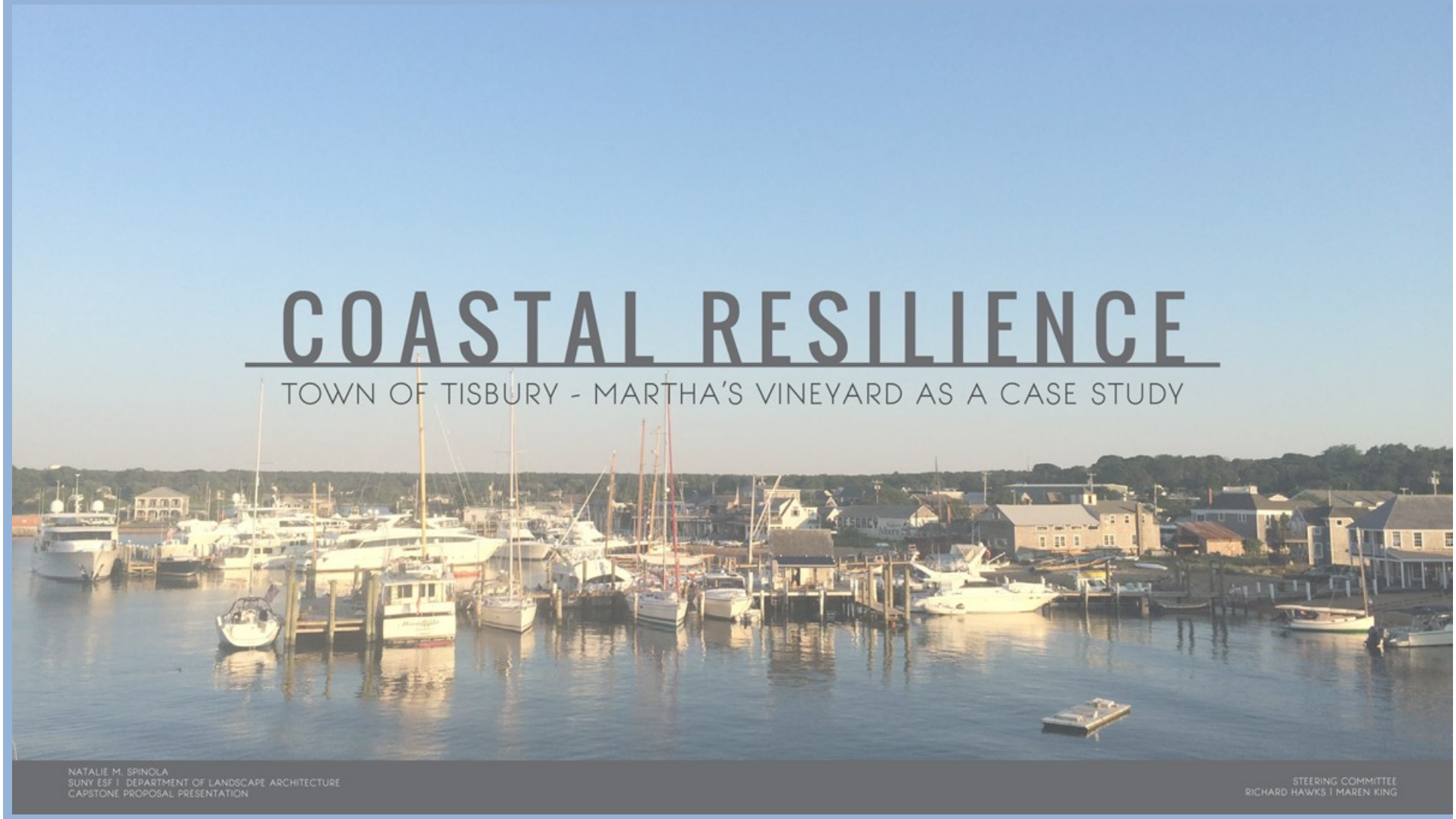
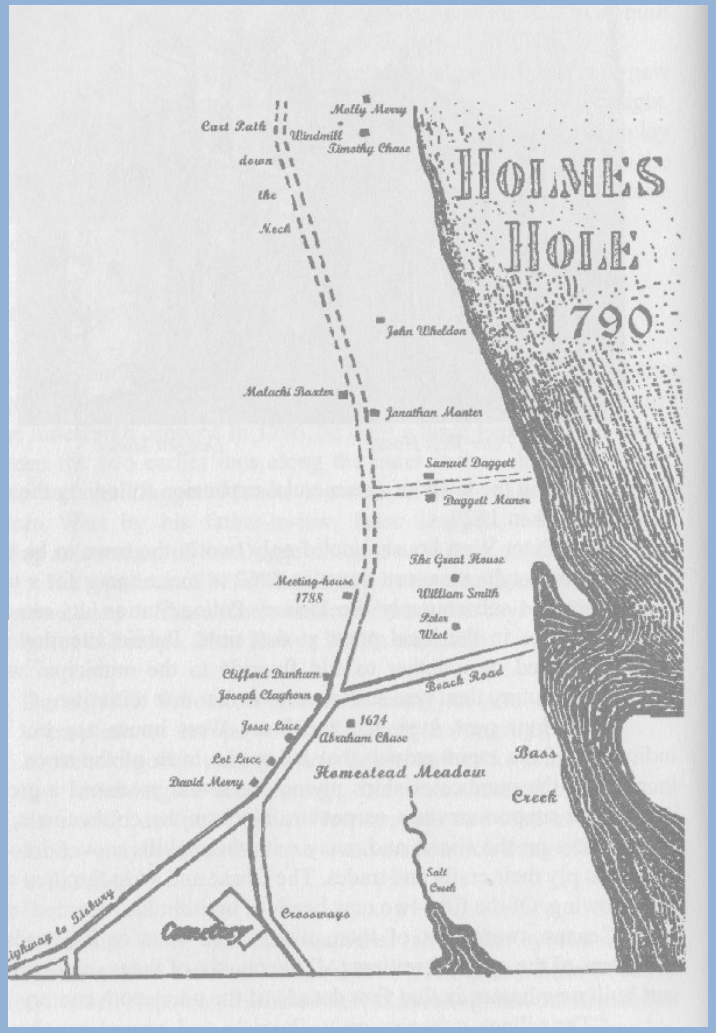
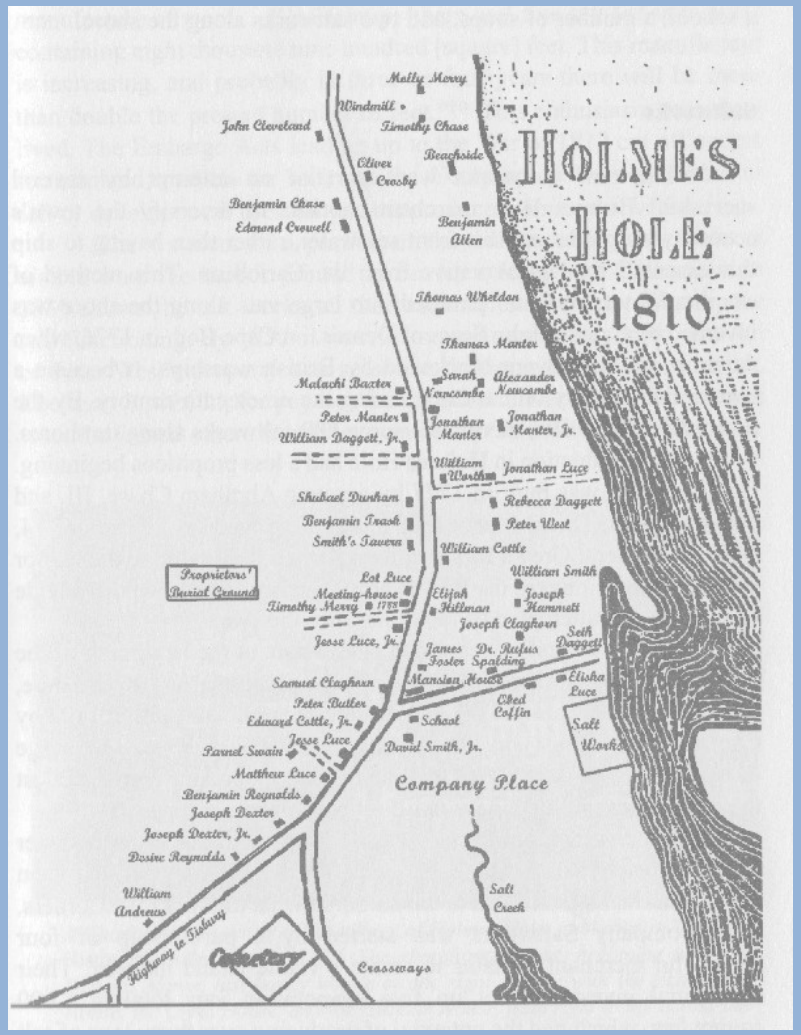


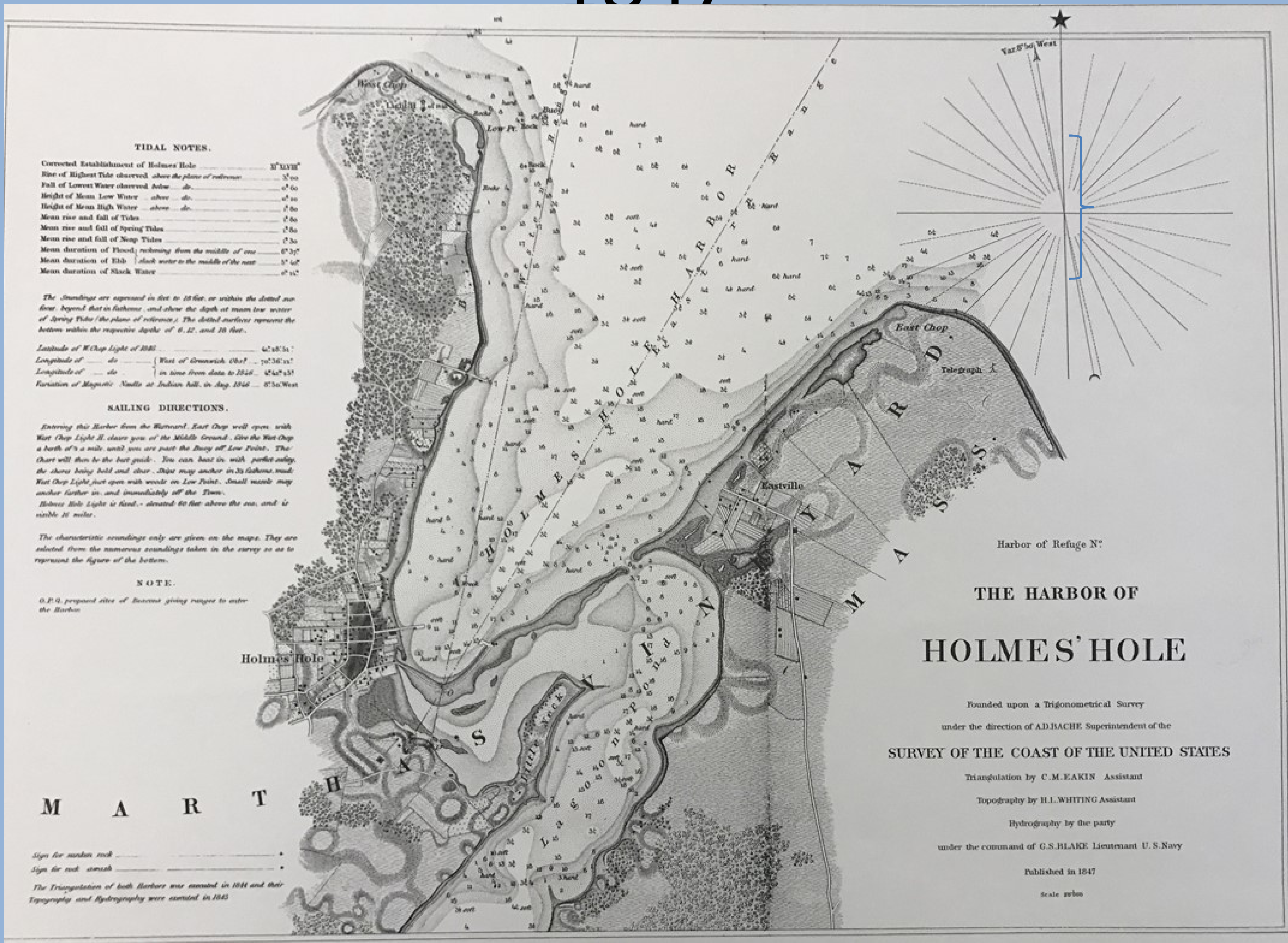
Maps and Historic Photos from the Martha's Vineyard Museum
Diagrams, maps and design studies related to Sea Level rise by Natalie Spinola





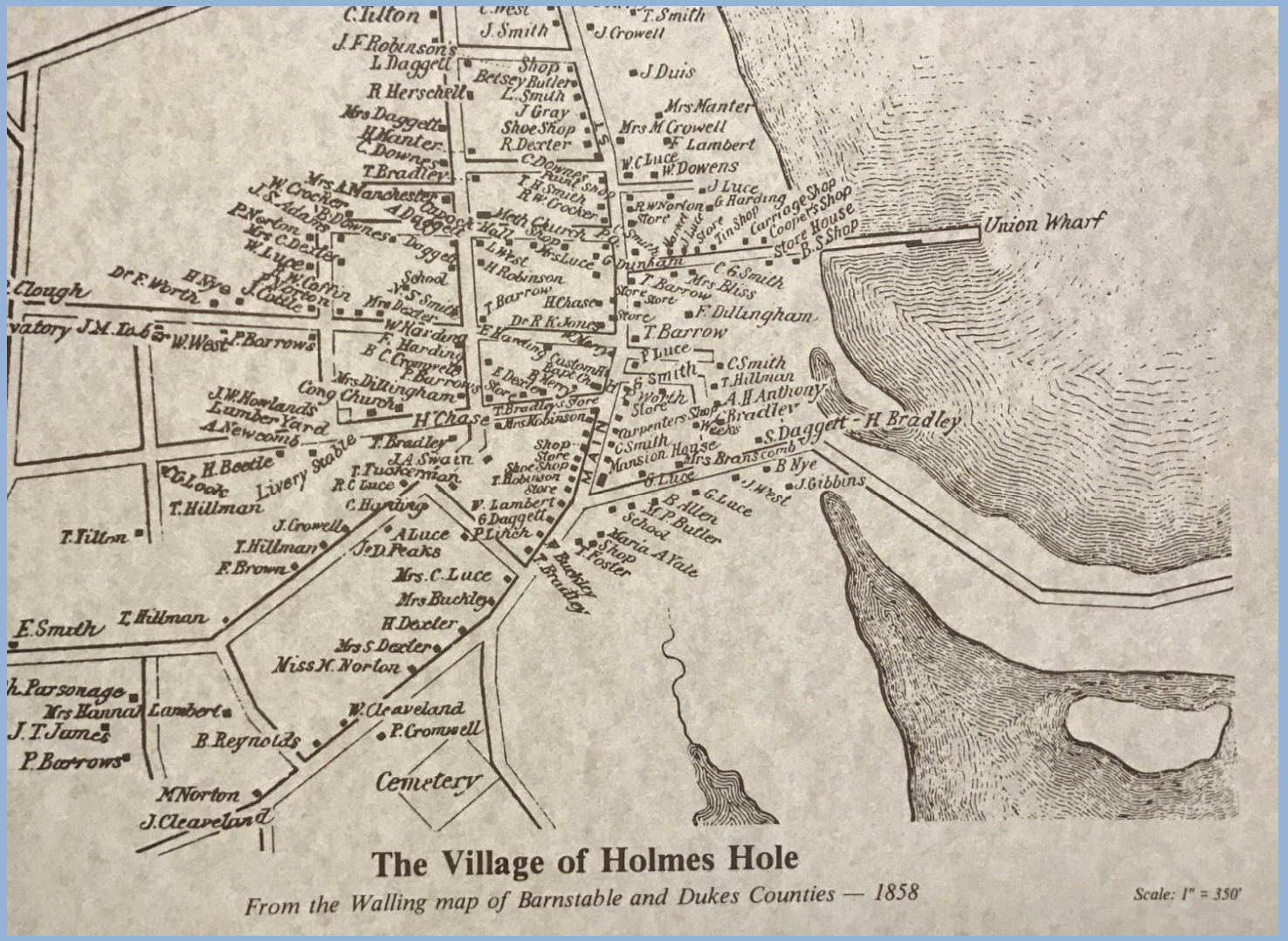
1835 November gale closed the opening

1847



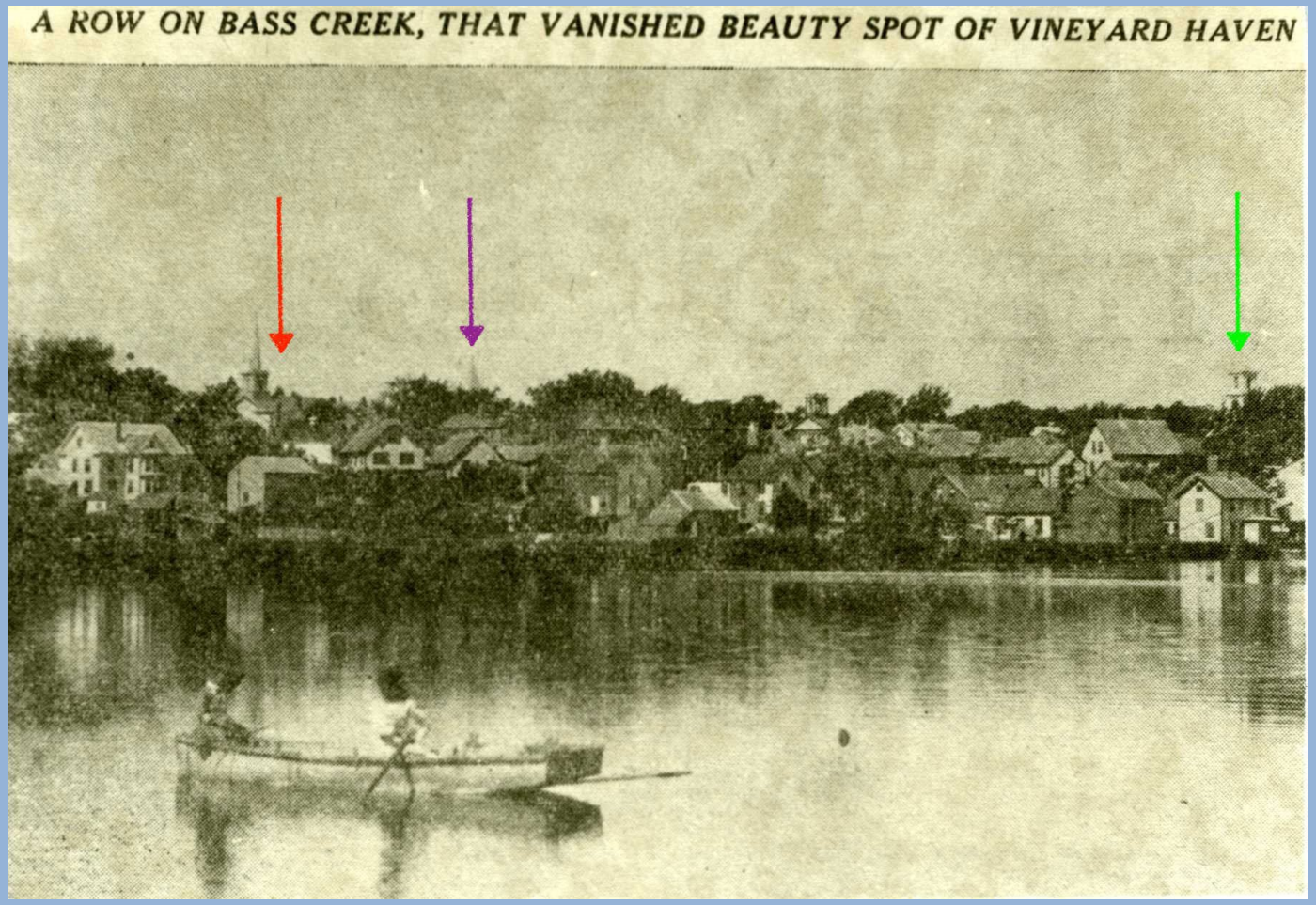
TIDAL NOTES.
Corrected Establishment of Holmes' Hole
Rise of Highest Tide observed
Fall of Lowest Water observed
Height of Mean Low Water
Height of Mean High Water
Mean rise and fall of Tides
Mean rise and fall of Spring Tides
Mean rise and fall of Neap Tides
Mean duration of Flood
Mean duration of Ebb
Mean duration of Slack Water
SAILING DIRECTIONS.
NOTE.
West Chop
Low Pt. Rock
East Chop
Telegraph
Eastville
Holmes Hole
Little Neck
HOLMES HOLE HARBOR
MARTHAS VINEYARD, MASS.
Harbor of Refuge N°.
THE HARBOR OF
HOLMES' HOLE
Founded upon a Trigonometrical Survey
under the direction of A.D.BACHE Superintendent of the
SURVEY OF THE COAST OF THE UNITED STATES
Triangulation by C.M.EAKIN Assistant
Topography by H.L.WHITING Assistant
Hydrography by the party
under the command of G.S.BLAKE Lieutenant U.S.Navy
Published in 1847

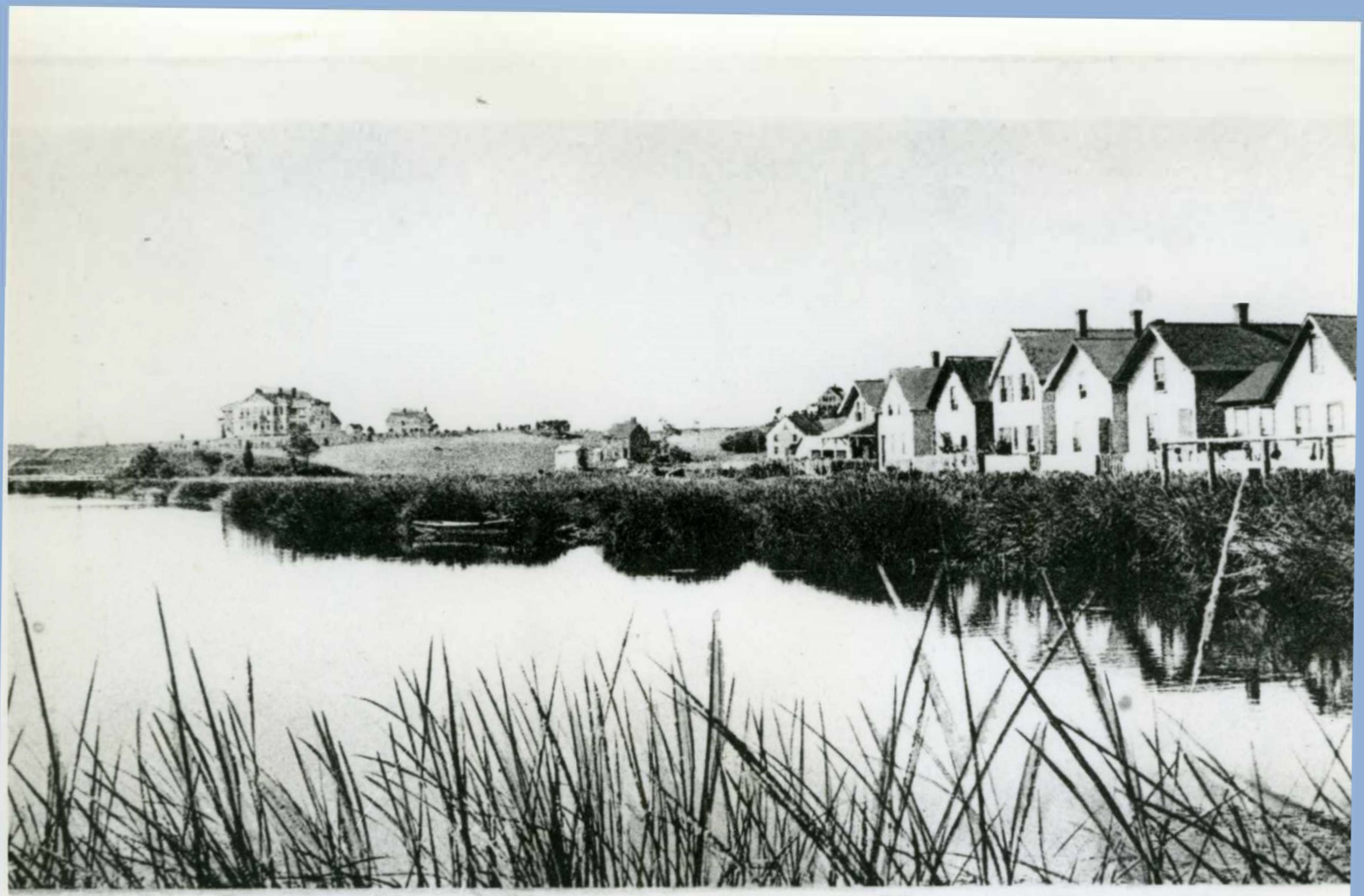
1858



1889 -7 Protection of the chops

A ROW ON BASS CREEK, THAT VANISHED BEAUTY SPOT OF VINEYARD HAVEN





The Lagoon (Marine Hospital in distance) Vineyard Haven, Mass.

1914

1905- 15 Construction of the inner harbor break wall

1918


Harbor view from Hospital,
Vineyard Haven, Mass.

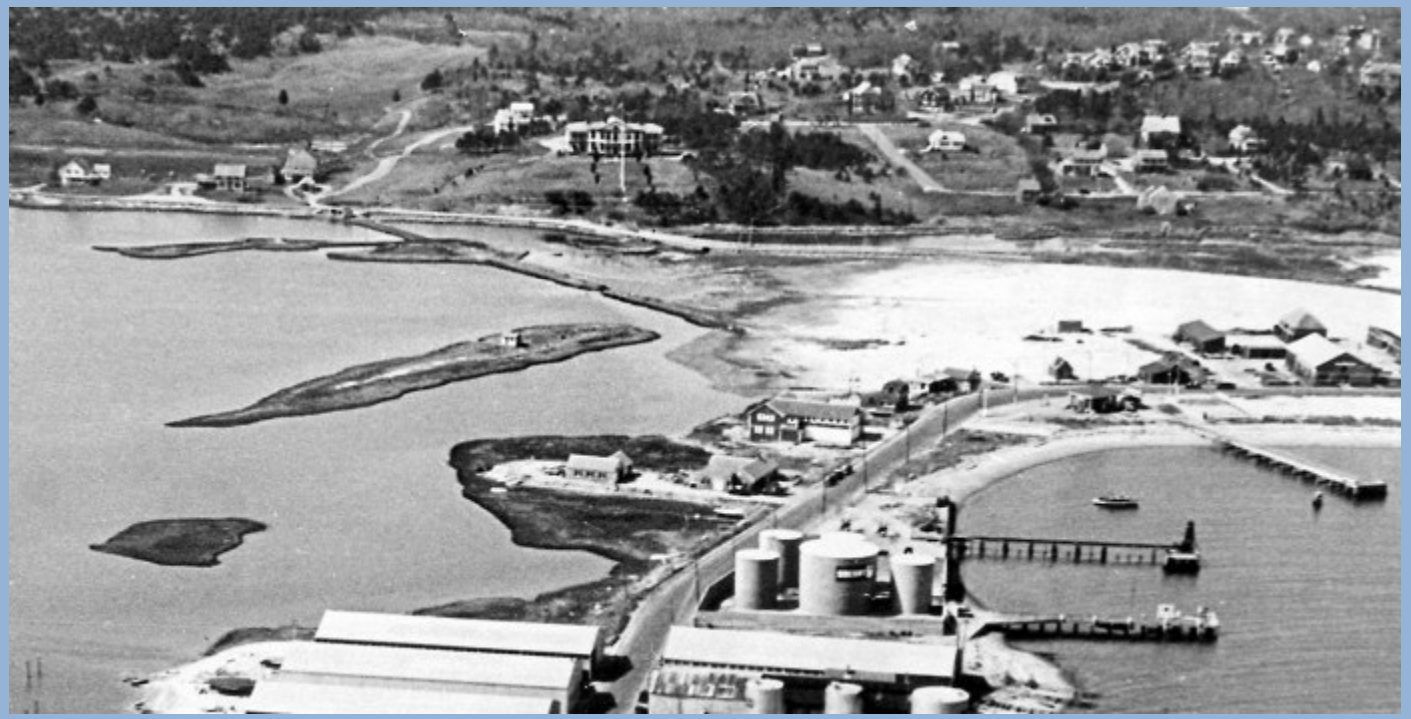
1920

1933 Construction of the first part of Eastville jetty

1934 30 ft drawbridge constructed

1930

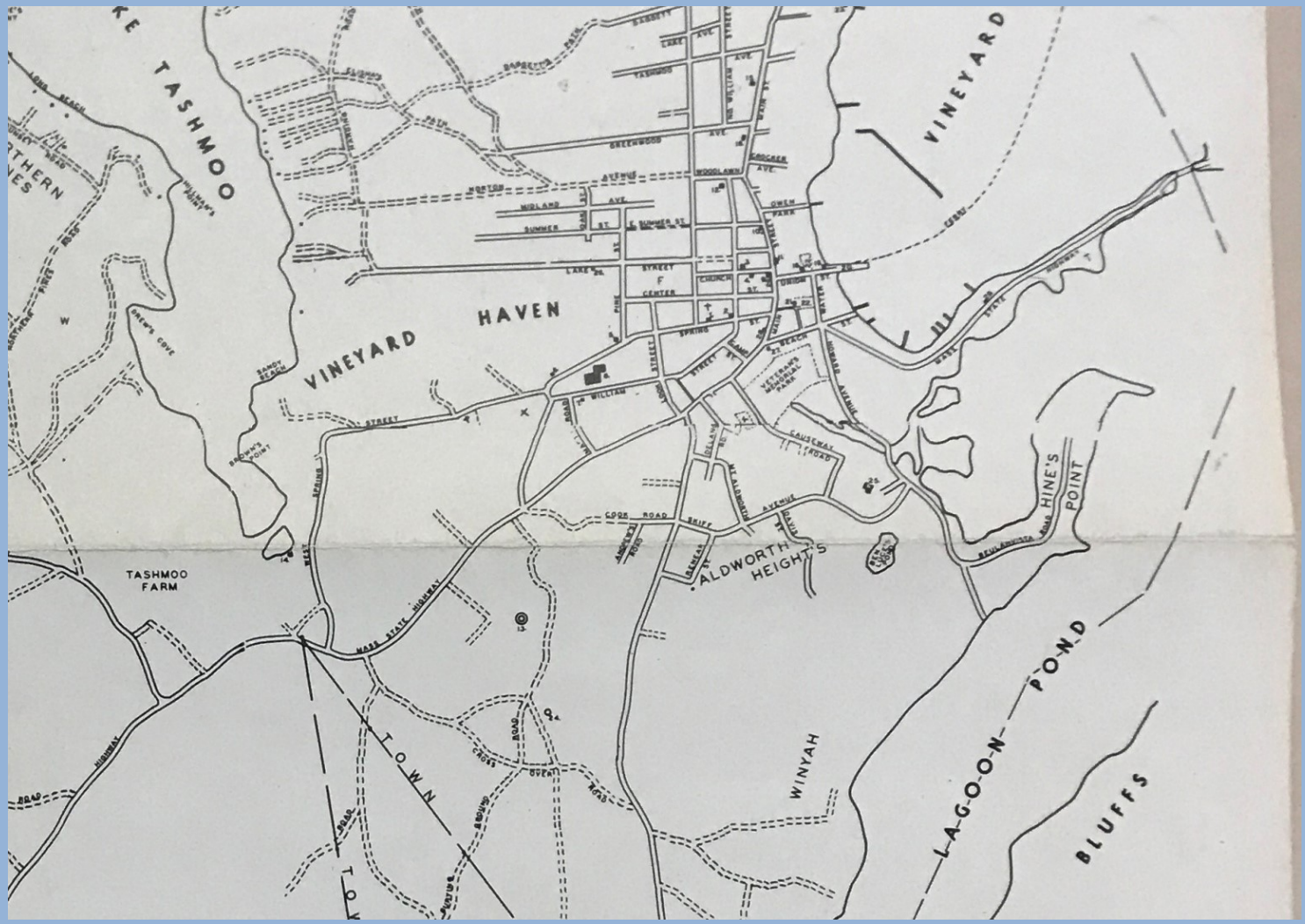
1930

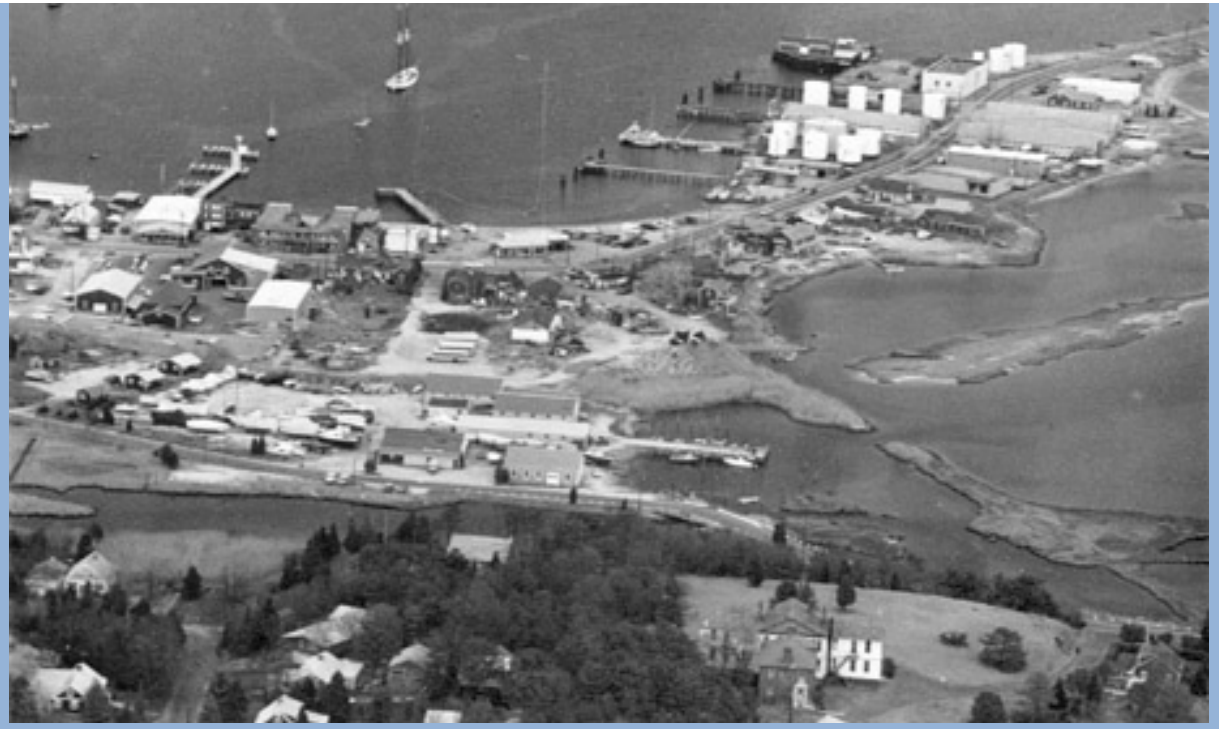


Beach Rd 1975

1973 Extension of Eastville jetty

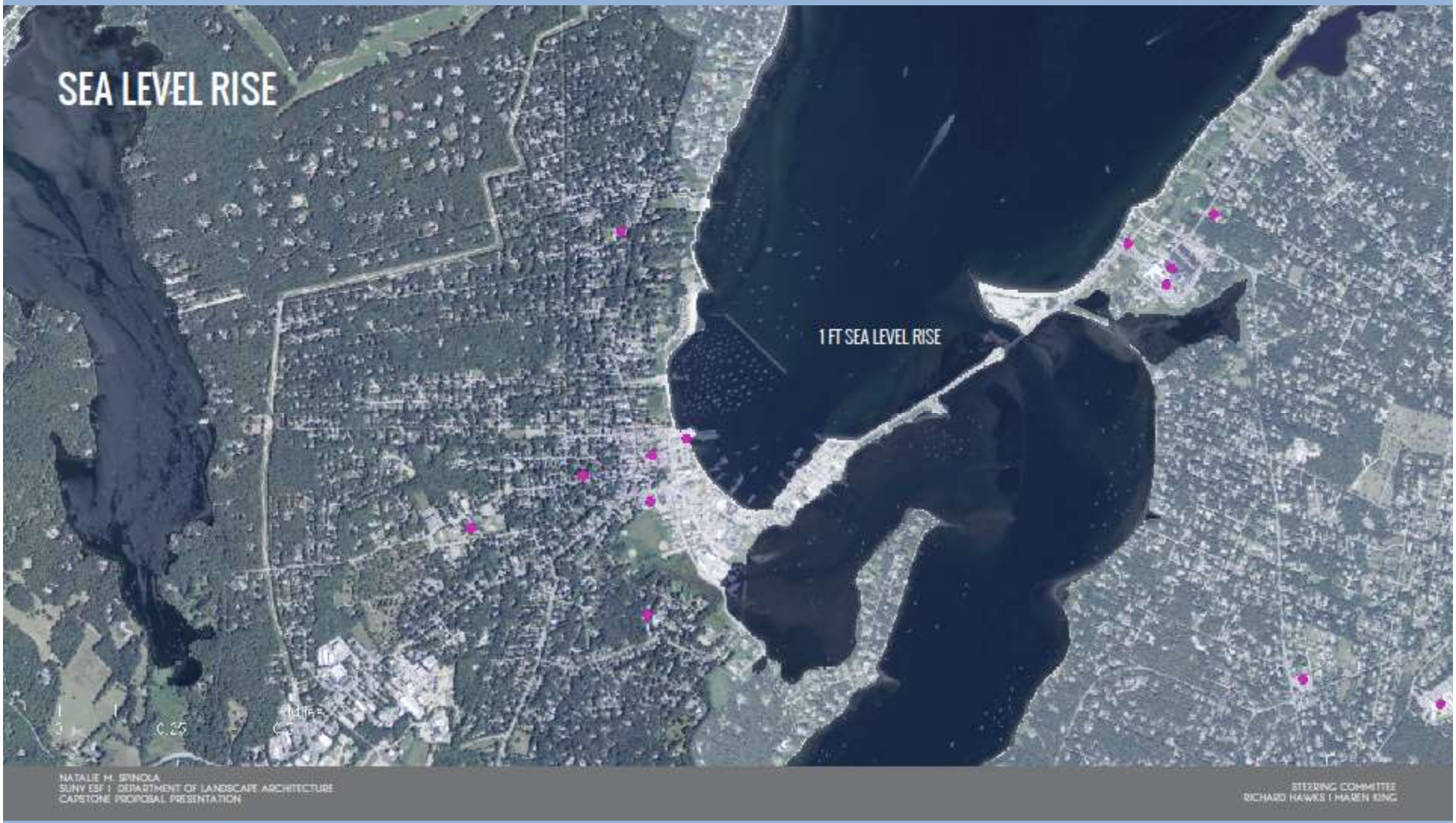
Post world war II





1979

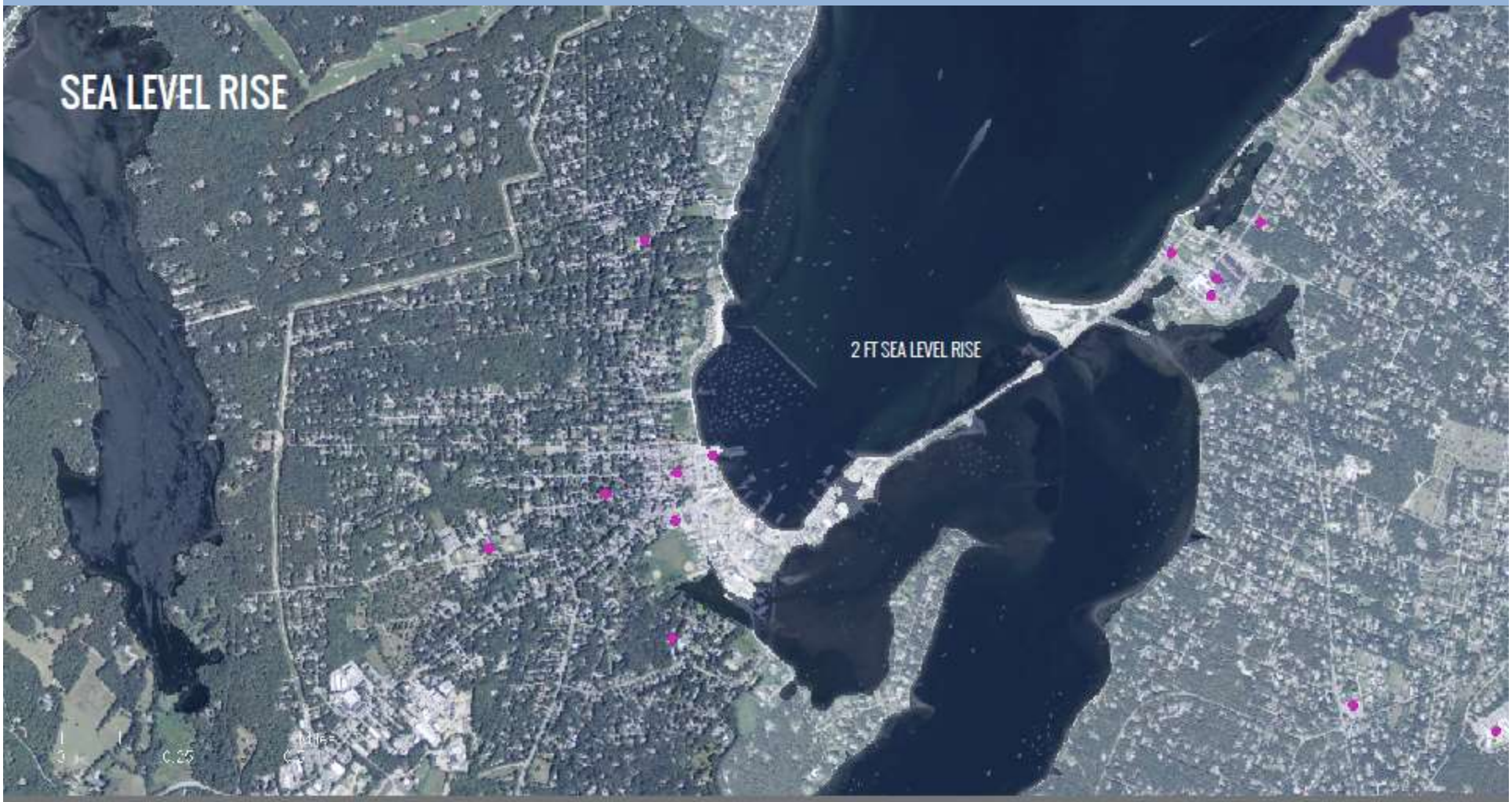

Veterans
Memorial Park
The Net Result
Art Cliff Diner
Ferry Boat
Island
The Black Dog Tavern
2D
Google
Imagery ©2017 Google, Map data ©2017 Google
Terms
Send feedback
100 ft



NATALIE M. SPINOLA
SUNY ESF | DEPARTMENT OF LANDSCAPE ARCHITECTURE
CAPSTONE PROPOSAL PRESENTATION

STEERING COMMITTEE
RICHARD HAWKS | MAREN KING

SEA LEVEL RISE



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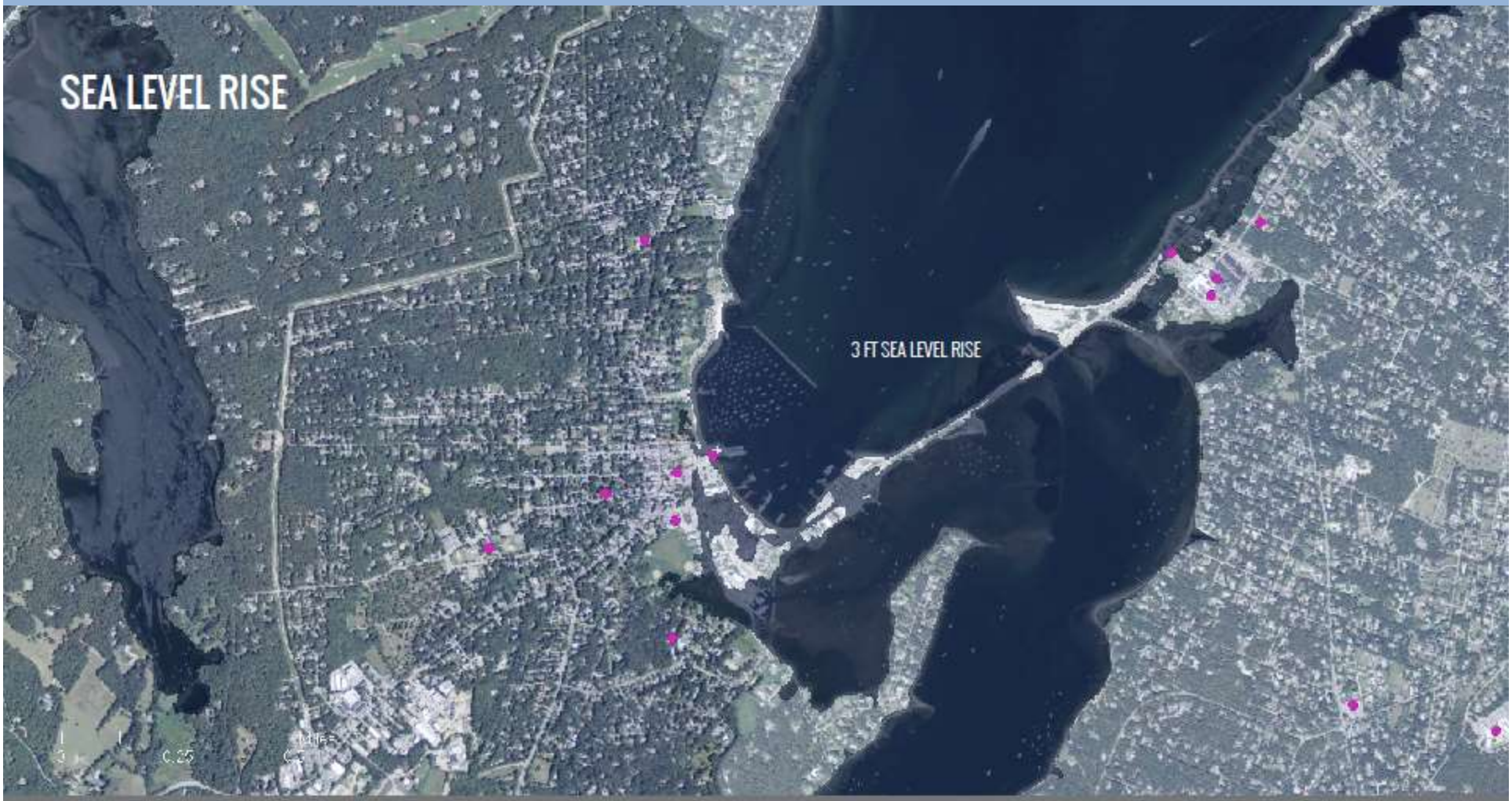

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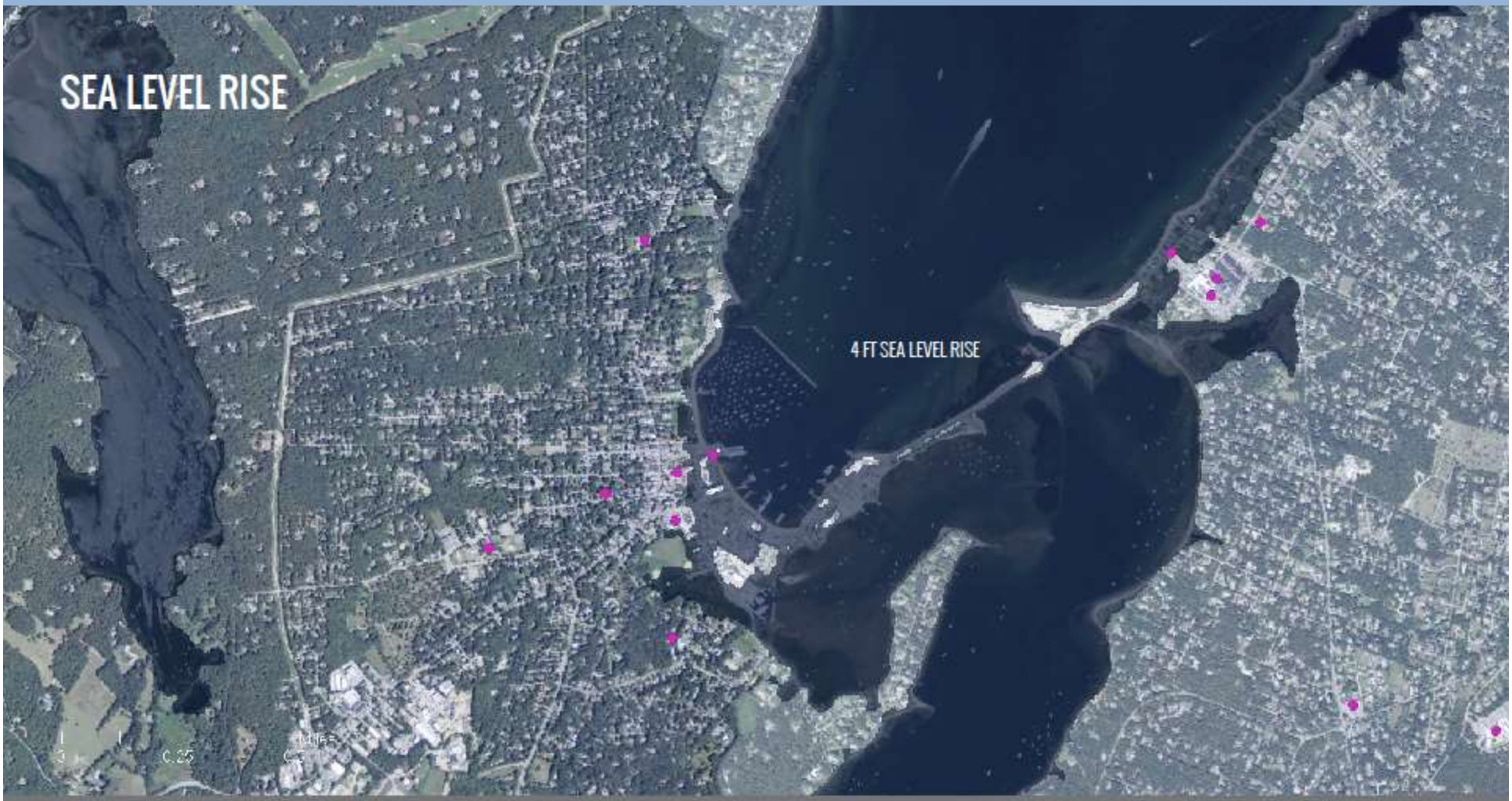

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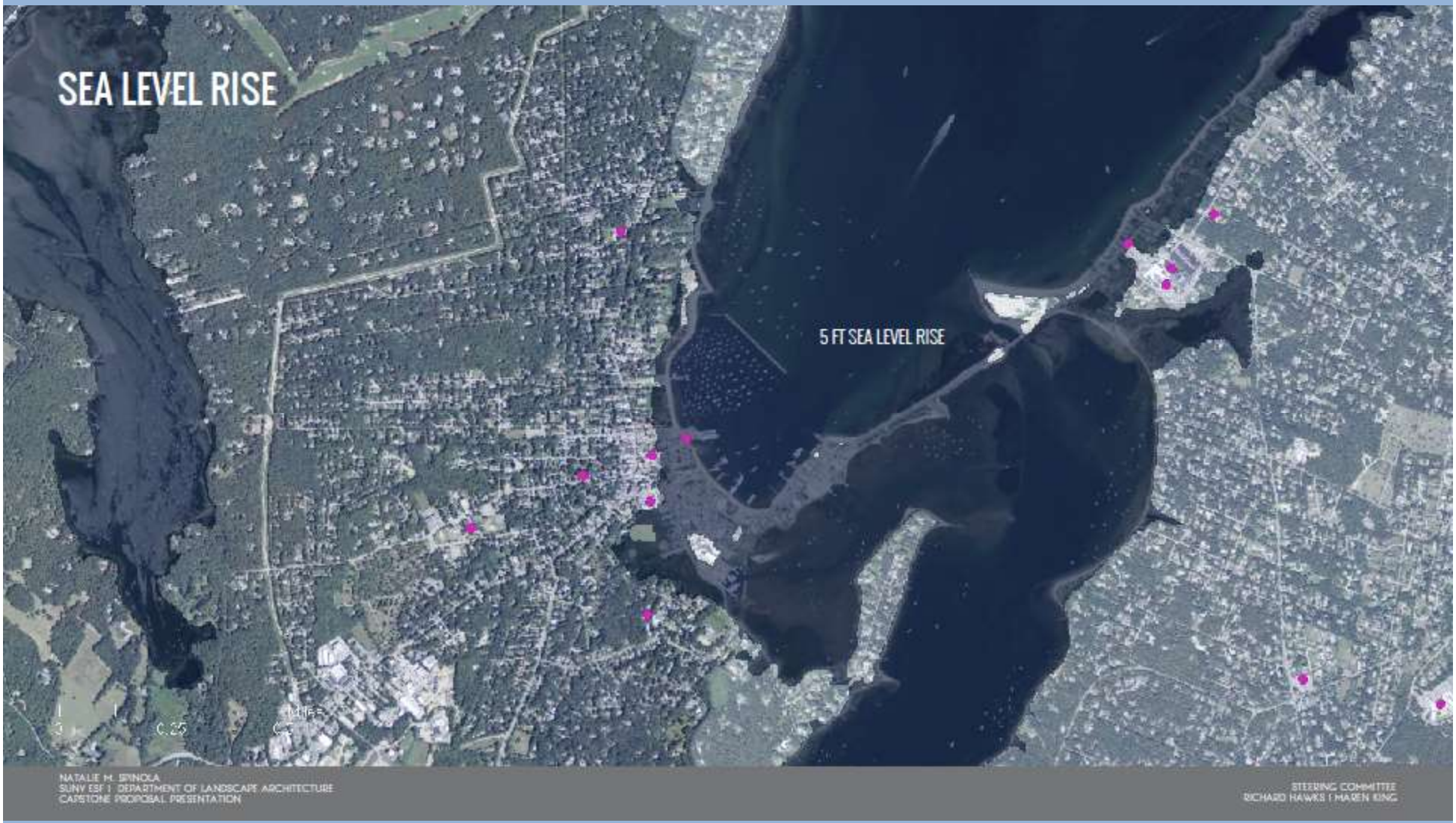

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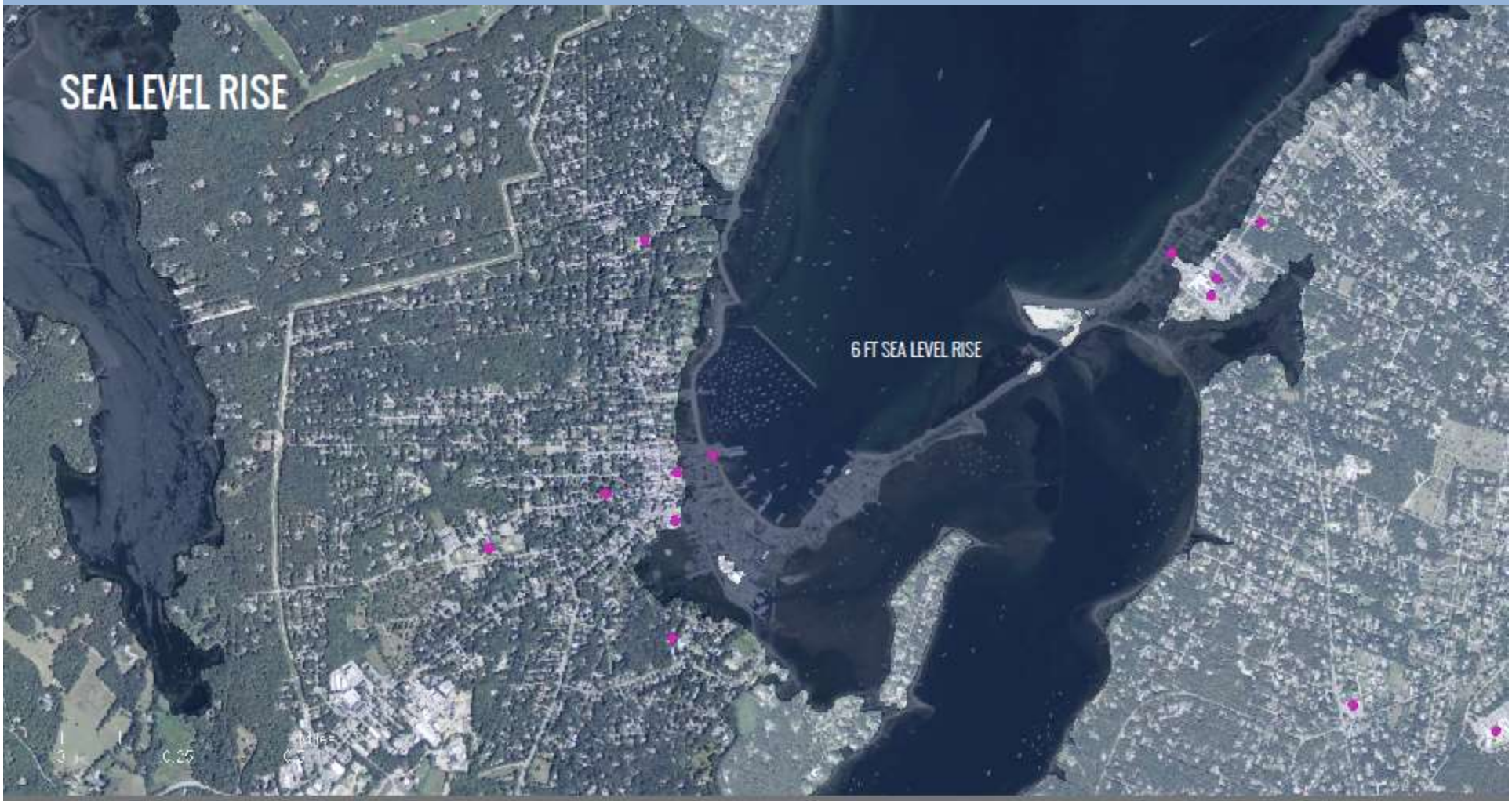
SEA LEVEL RISE



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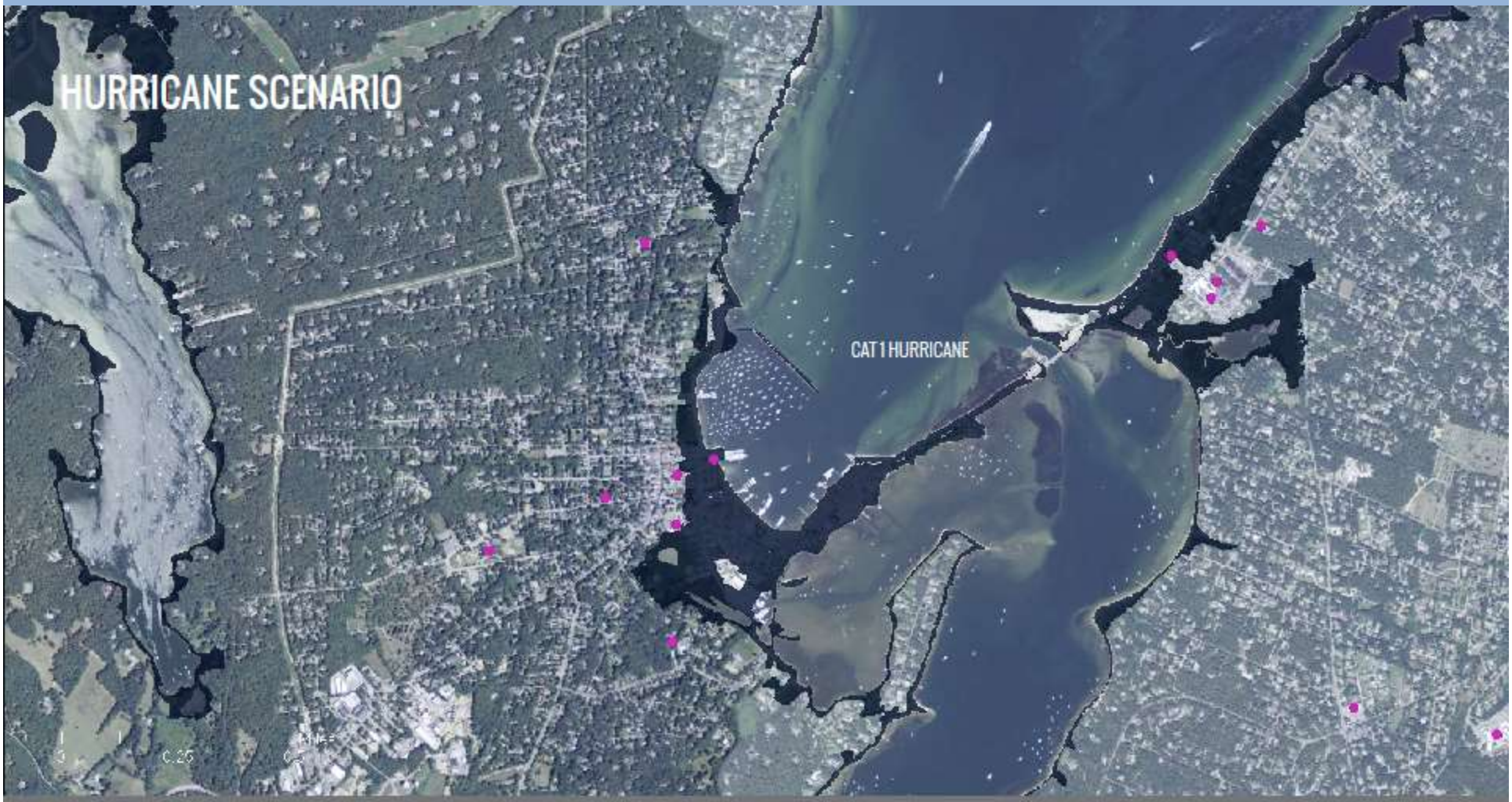
HURRICANE SCENARIO



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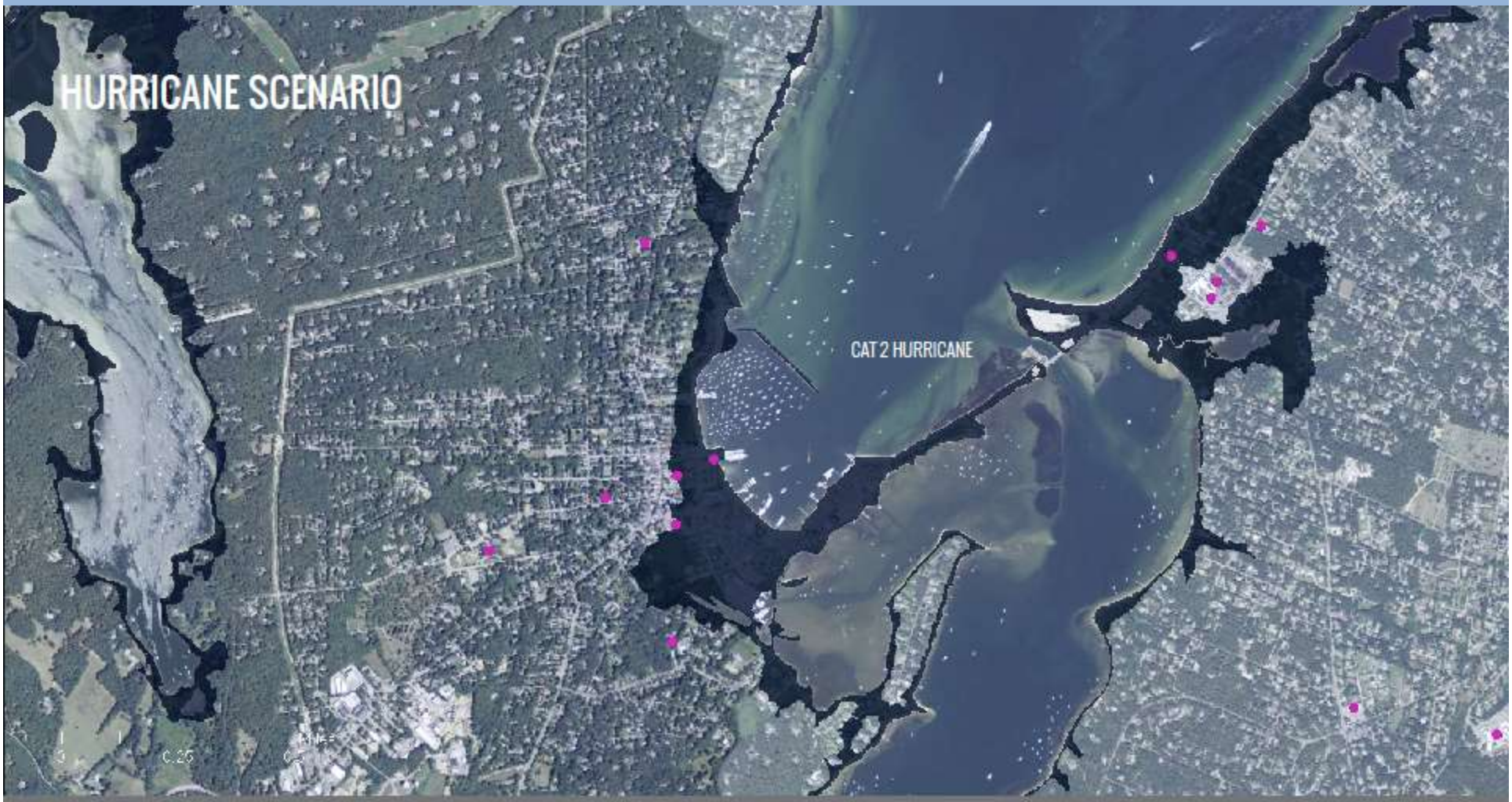

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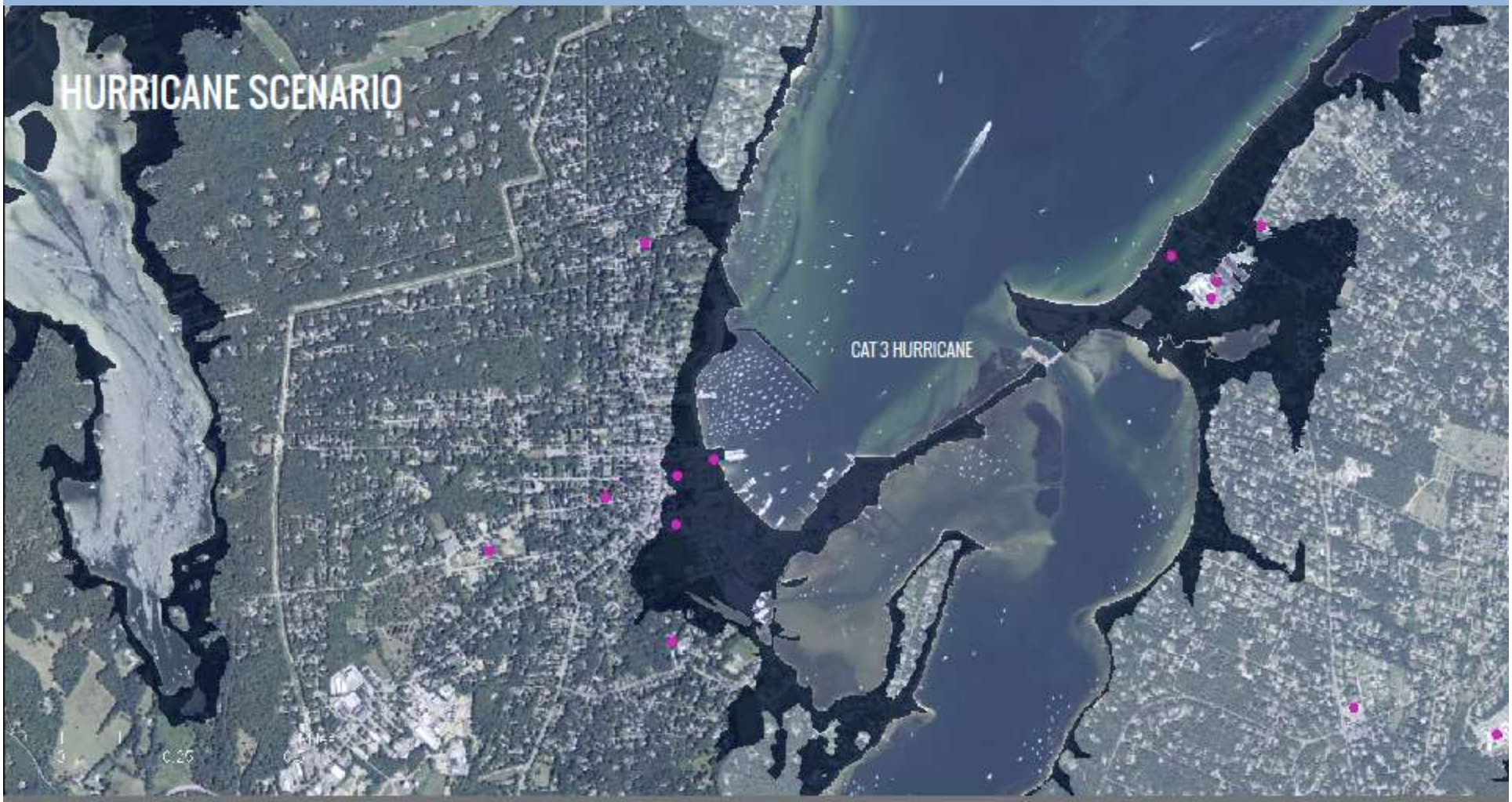

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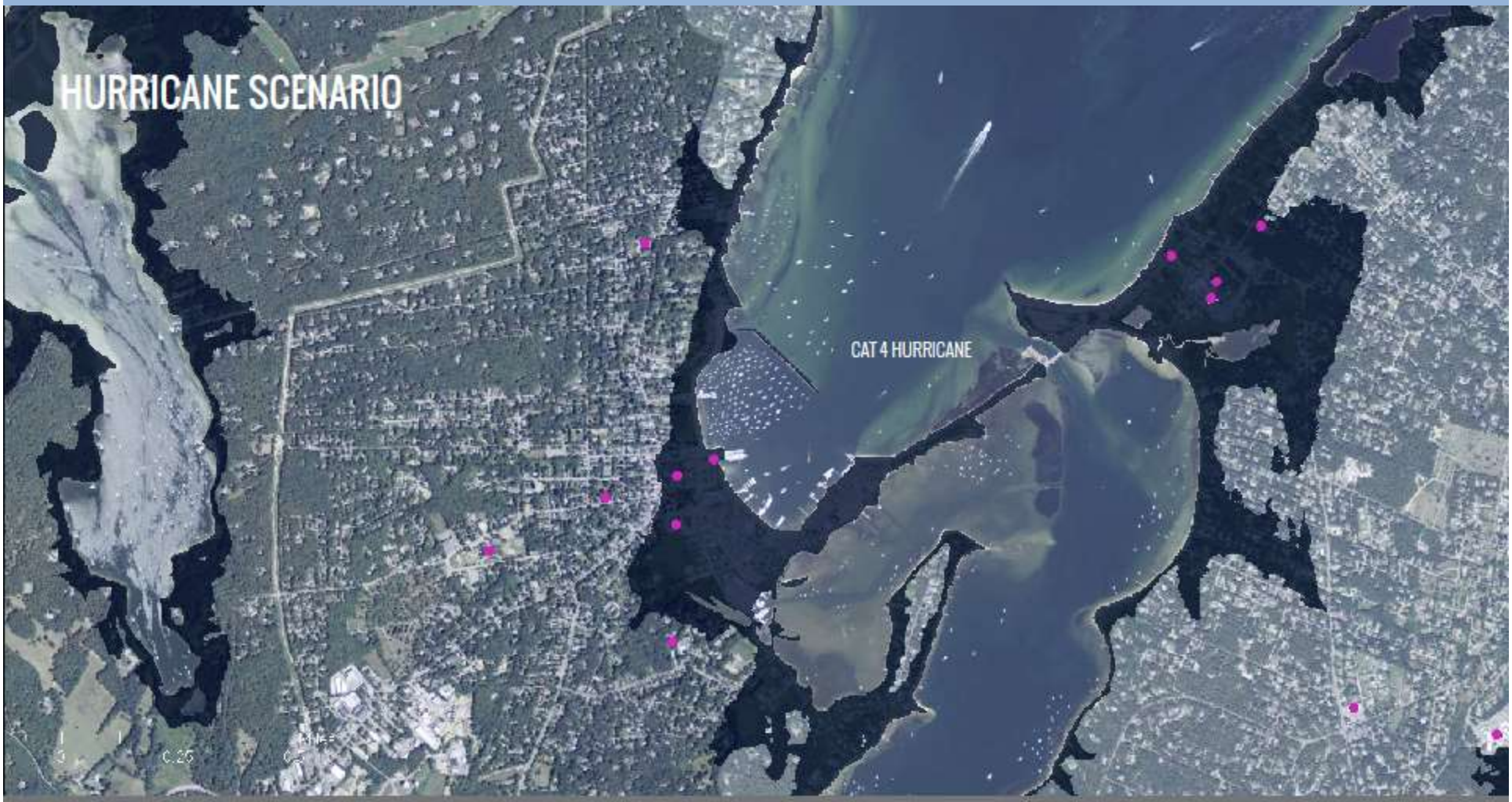

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DESIGNING A STORM SCENARIO

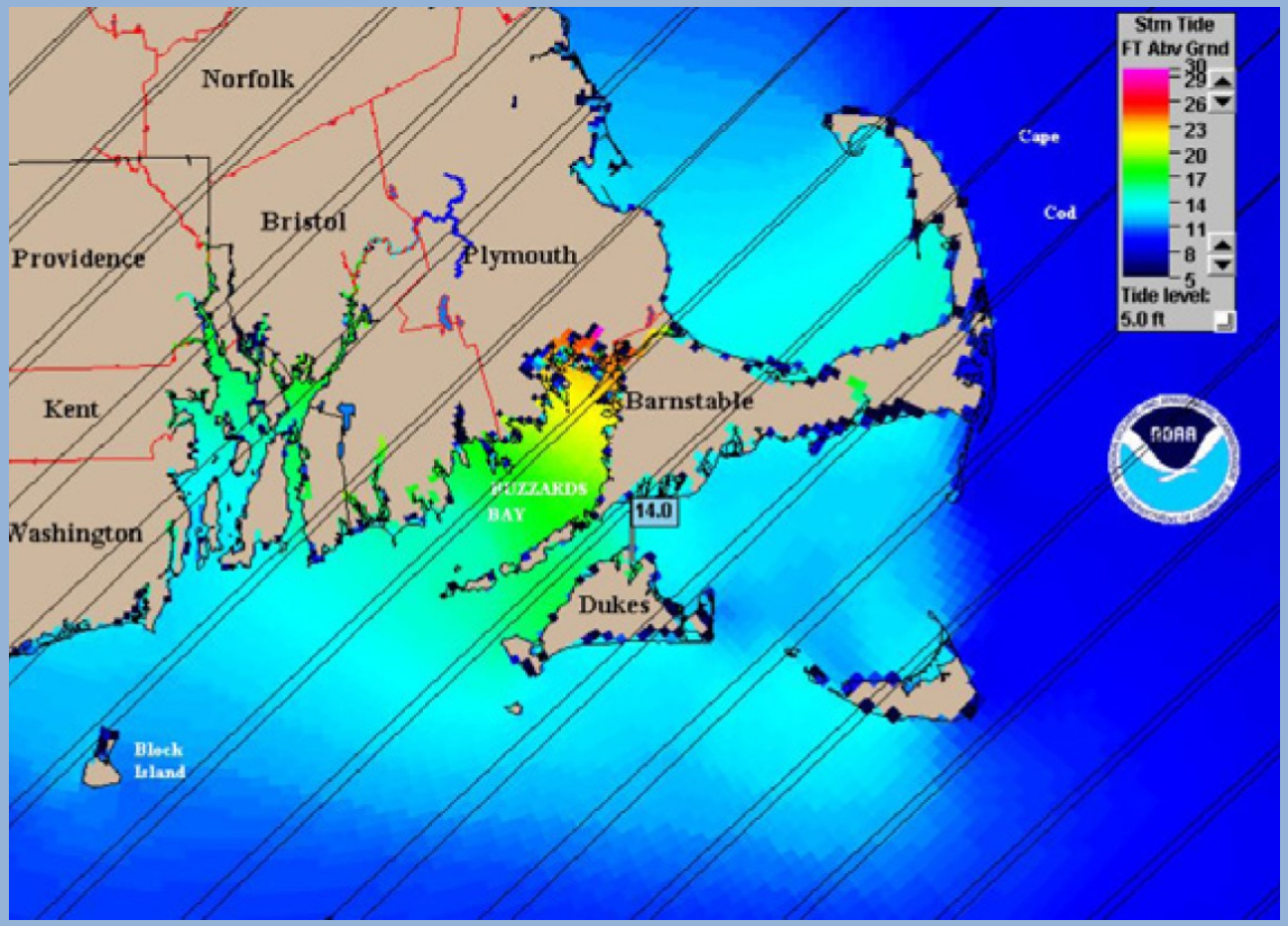
+

=

Data Source: NOAA Office of Coastal Management Sea Level Rise
MASS GIS - USGS Orthoimagery 2014

Data Source: NOAA National Hurricane Center Sea, Lake and Overland Surges from Hurricanes (SLOSH)],
MASS GIS - USGS Orthoimagery 2014

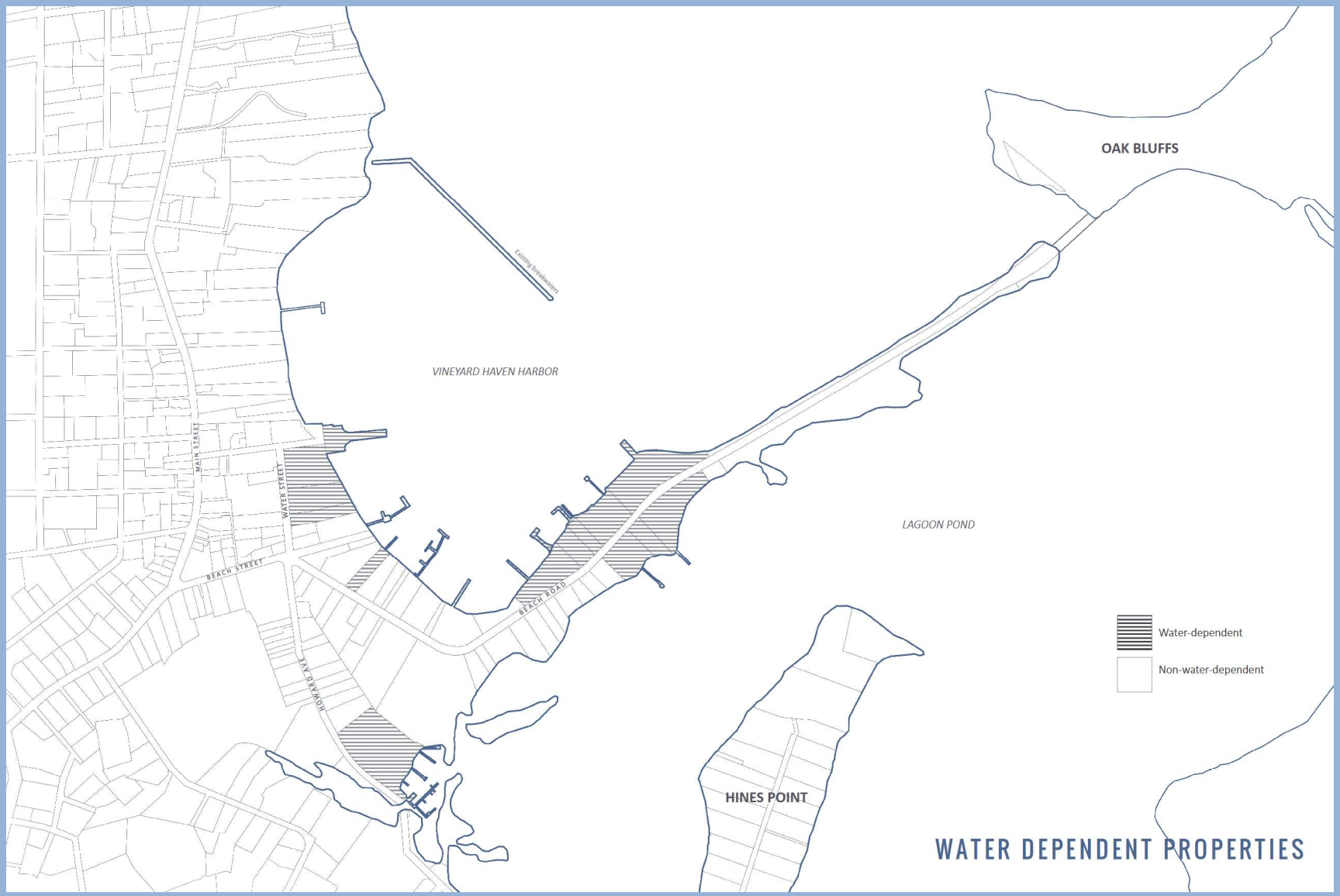
Vulnerability: storm surge prediction



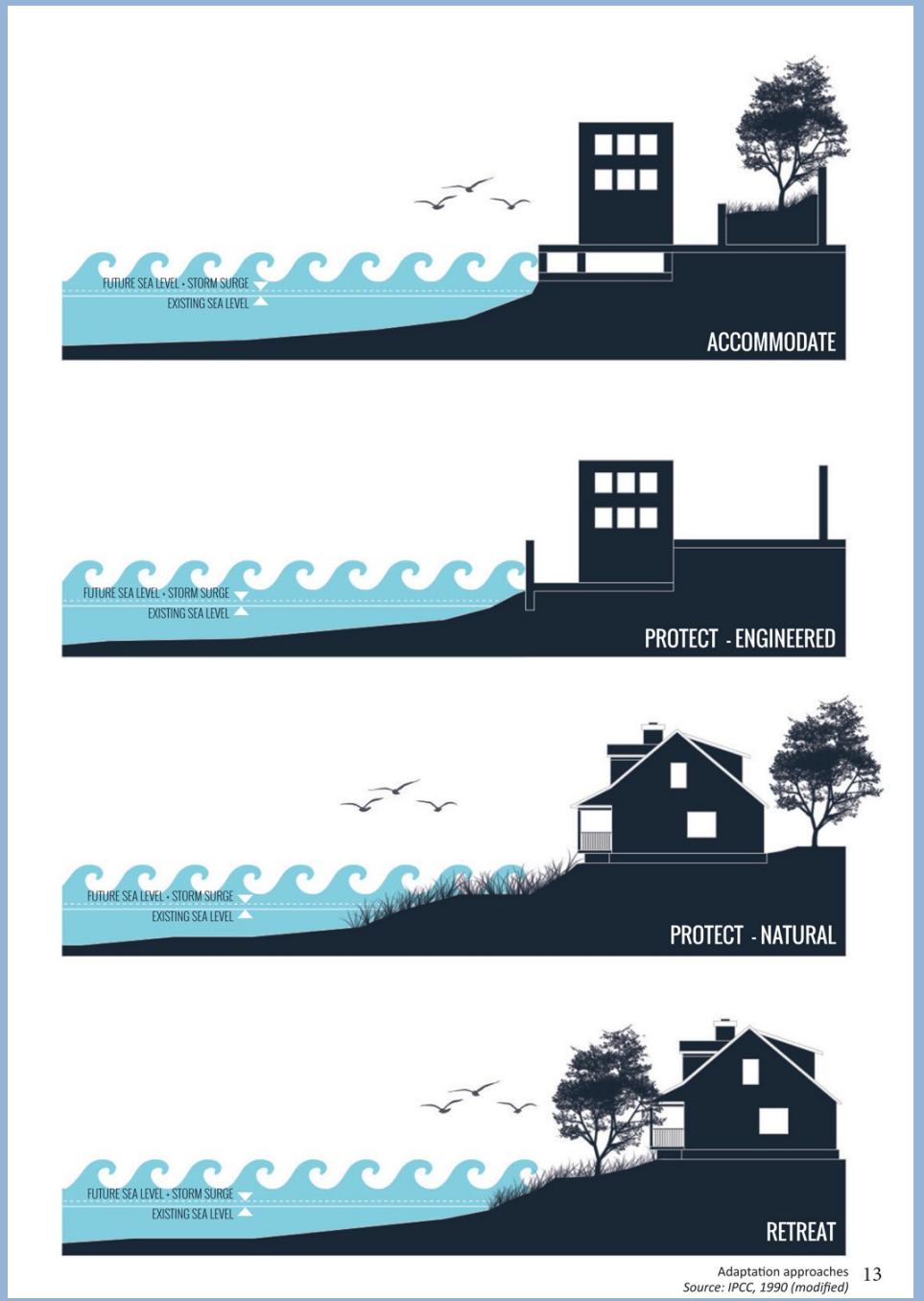
Category 1 - 8.1 ft
Category 2 - 10.9ft

Category 3: Vineyard Haven slosh - 14 ft.

Water dependent

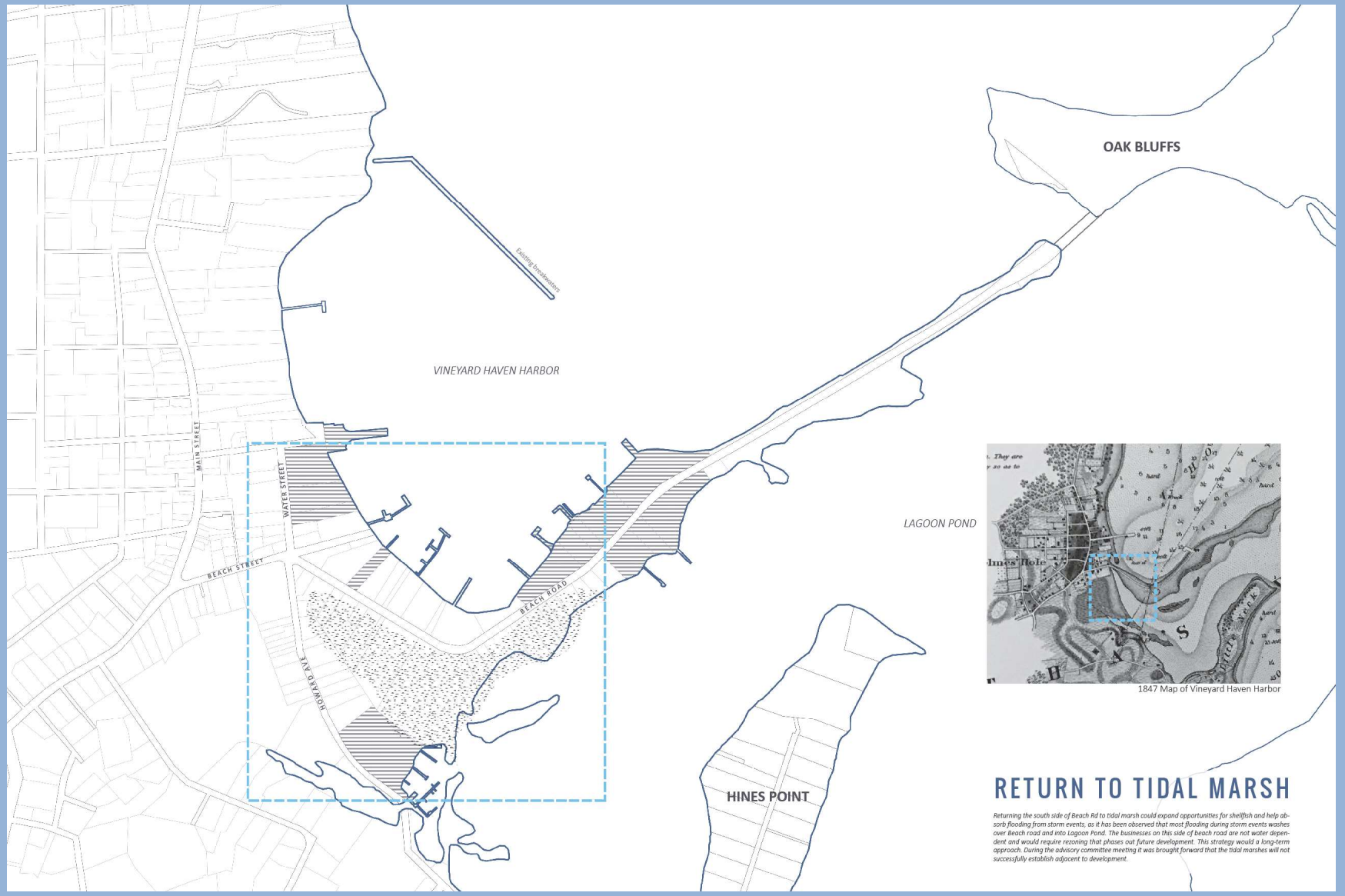


strategies



Adaptation approaches
Source: IPCC, 1990 (modified)

Accommodating: marsh

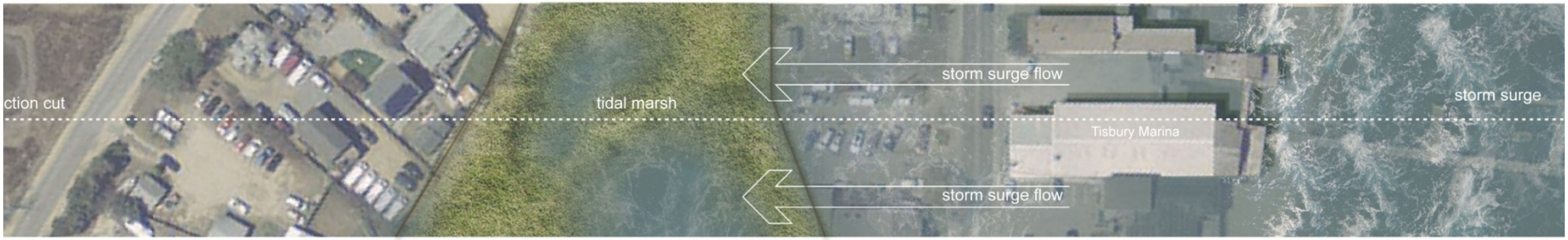


Accommodating: lifting buildings

Image: *Shipyard at 100 Lagoon Pond Road.* Some properties in the Village of Vineyard Haven have begun to elevate service building in the waterfront.

Context Map: Section cut at Tisbury Marina 52 Beach Road

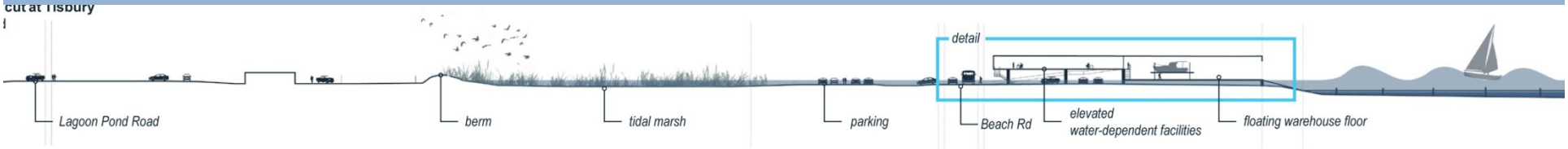
onditions

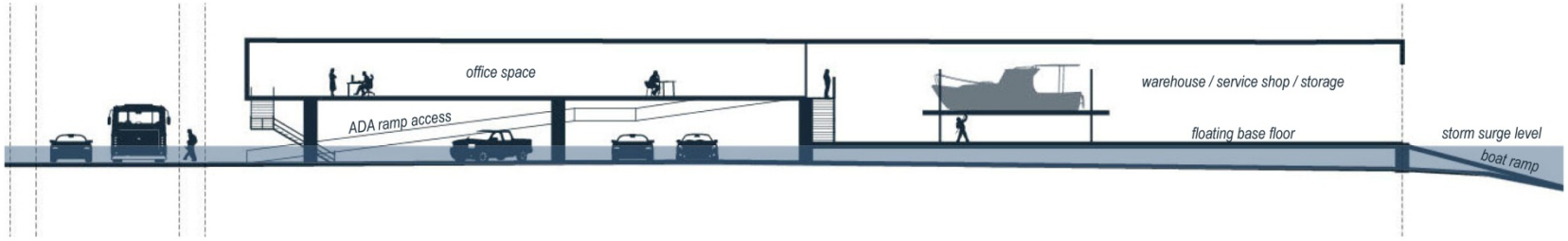


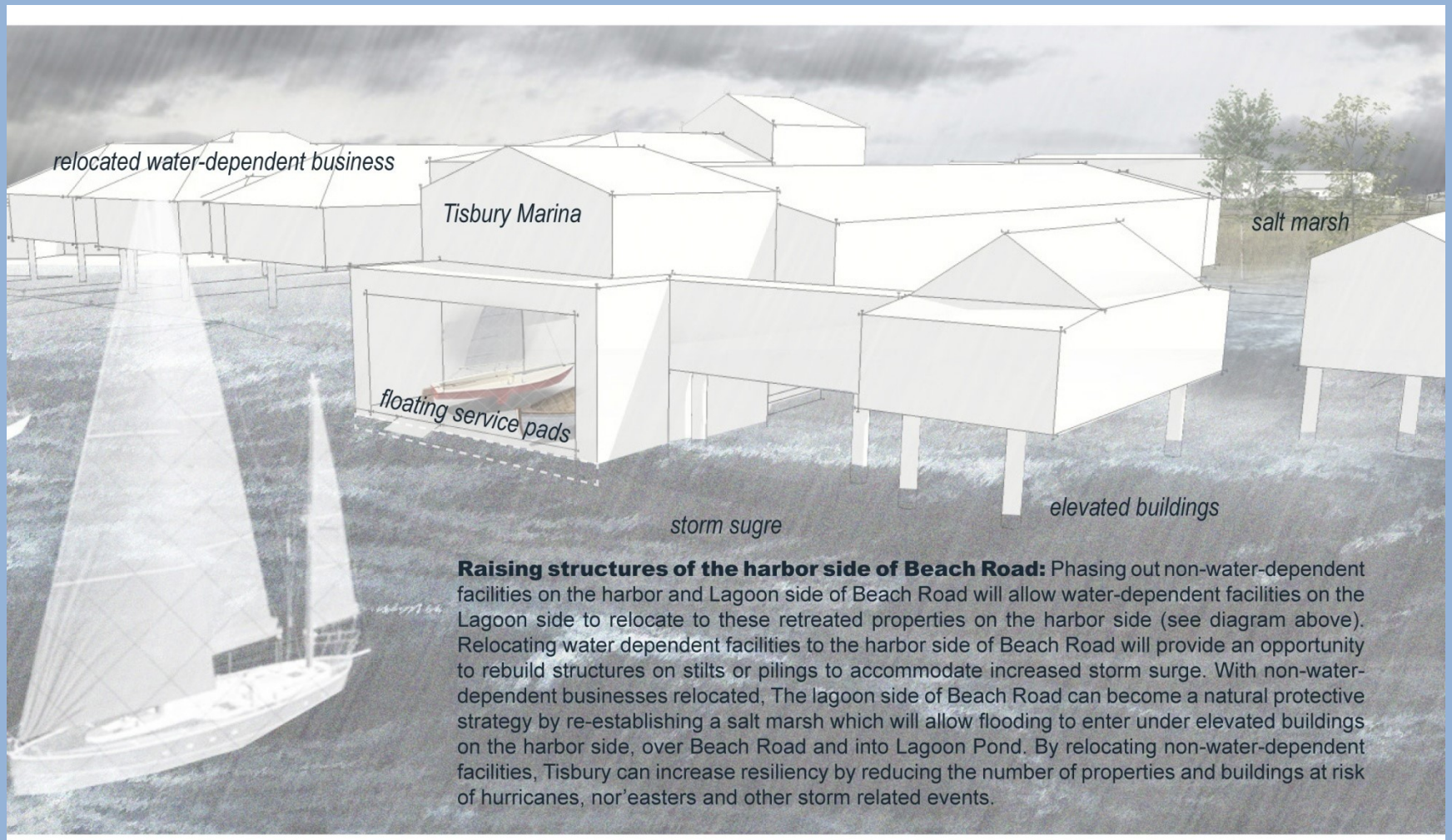
30-50 ESTABLISHING TIDAL MARSH

1-10 YEARS RAISING BUILDINGSS

cut at Tisbury

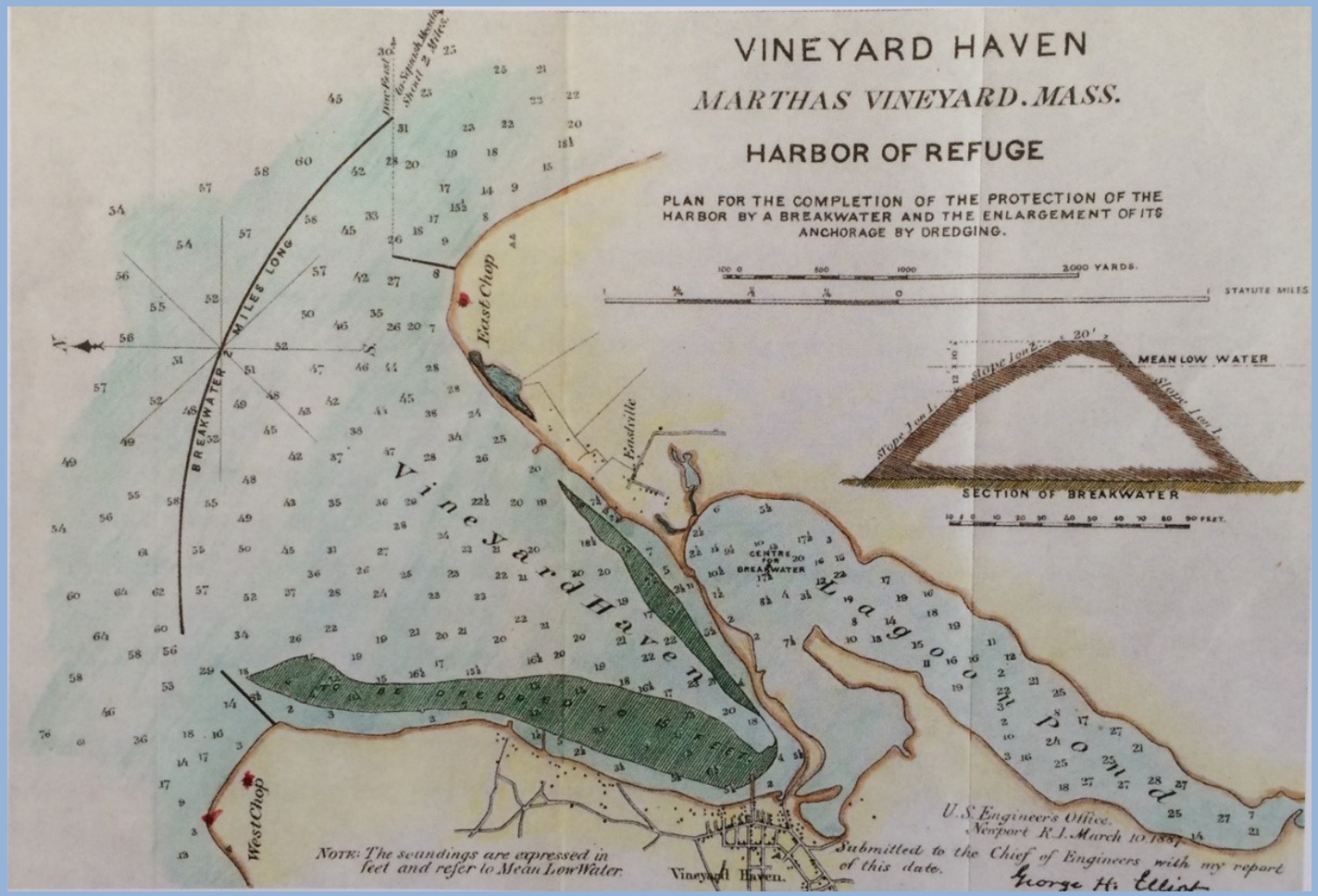




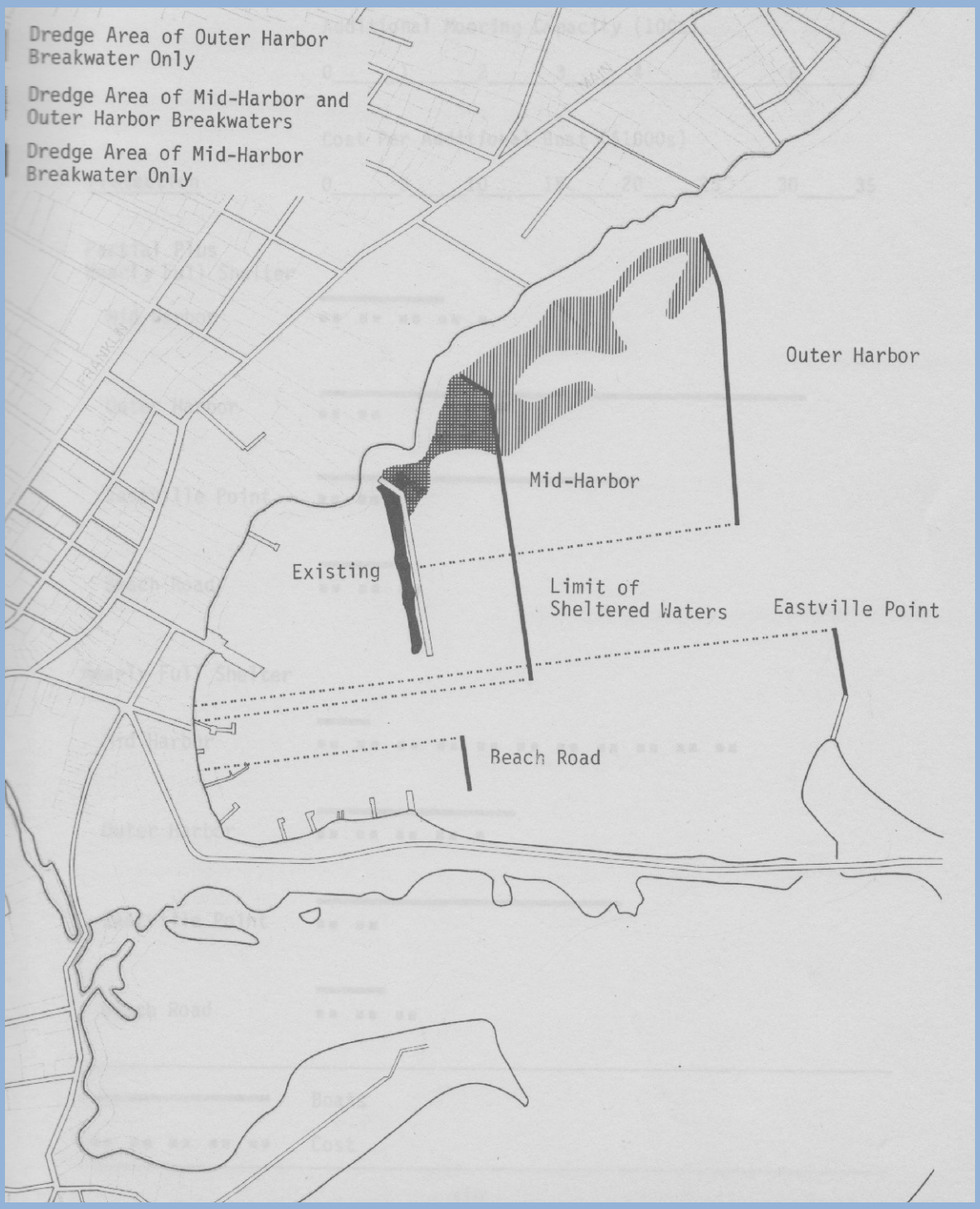


Raising structures of the harbor side of Beach Road: Phasing out non-water-dependent facilities on the harbor and Lagoon side of Beach Road will allow water-dependent facilities on the Lagoon side to relocate to these retreated properties on the harbor side (see diagram above). Relocating water dependent facilities to the harbor side of Beach Road will provide an opportunity to rebuild structures on stilts or pilings to accommodate increased storm surge. With non-water-dependent businesses relocated, The lagoon side of Beach Road can become a natural protective strategy by re-establishing a salt marsh which will allow flooding to enter under elevated buildings on the harbor side, over Beach Road and into Lagoon Pond. By relocating non-water-dependent facilities, Tisbury can increase resiliency by reducing the number of properties and buildings at risk of hurricanes, nor'easters and other storm related events.

Protect: break wall

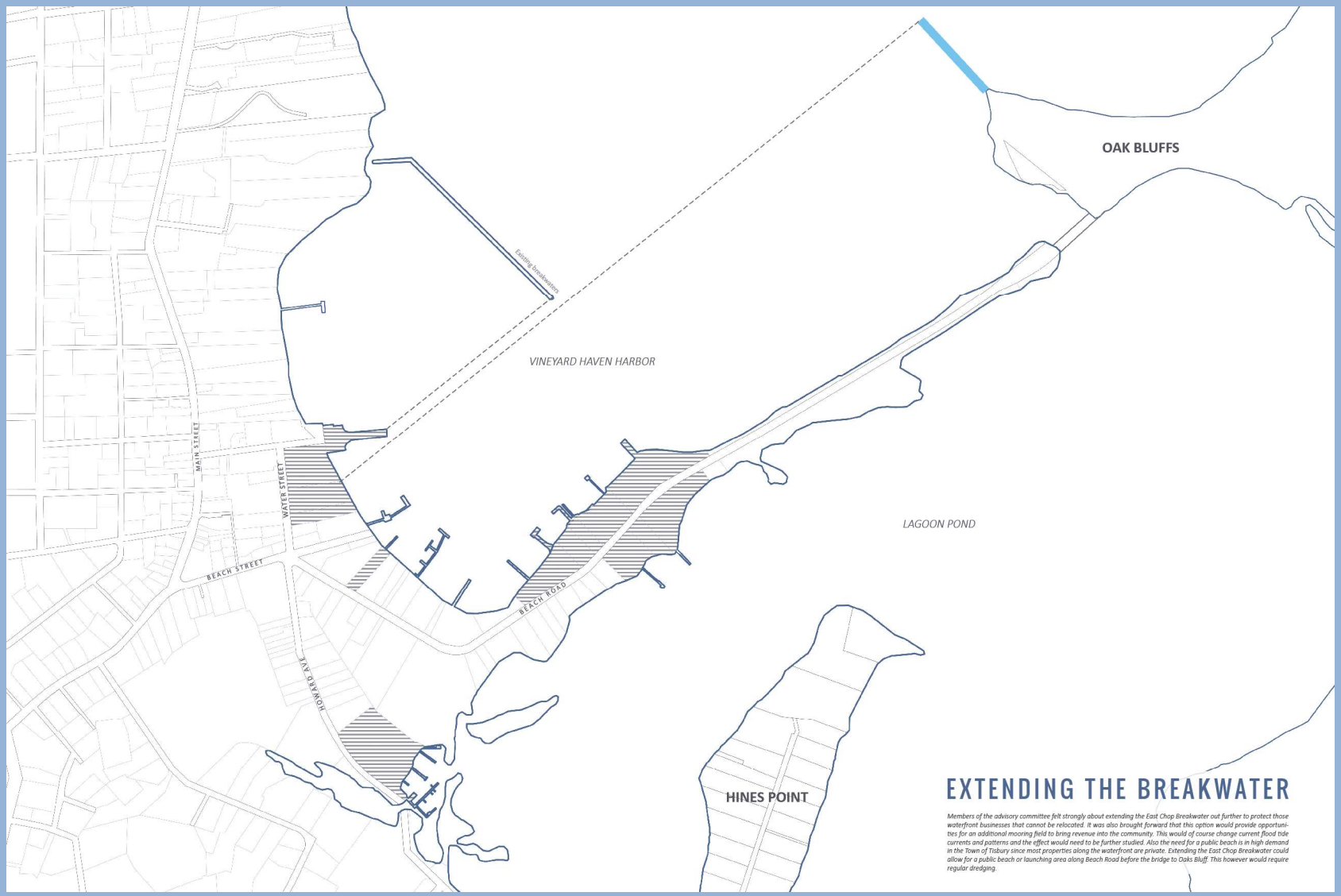


1887

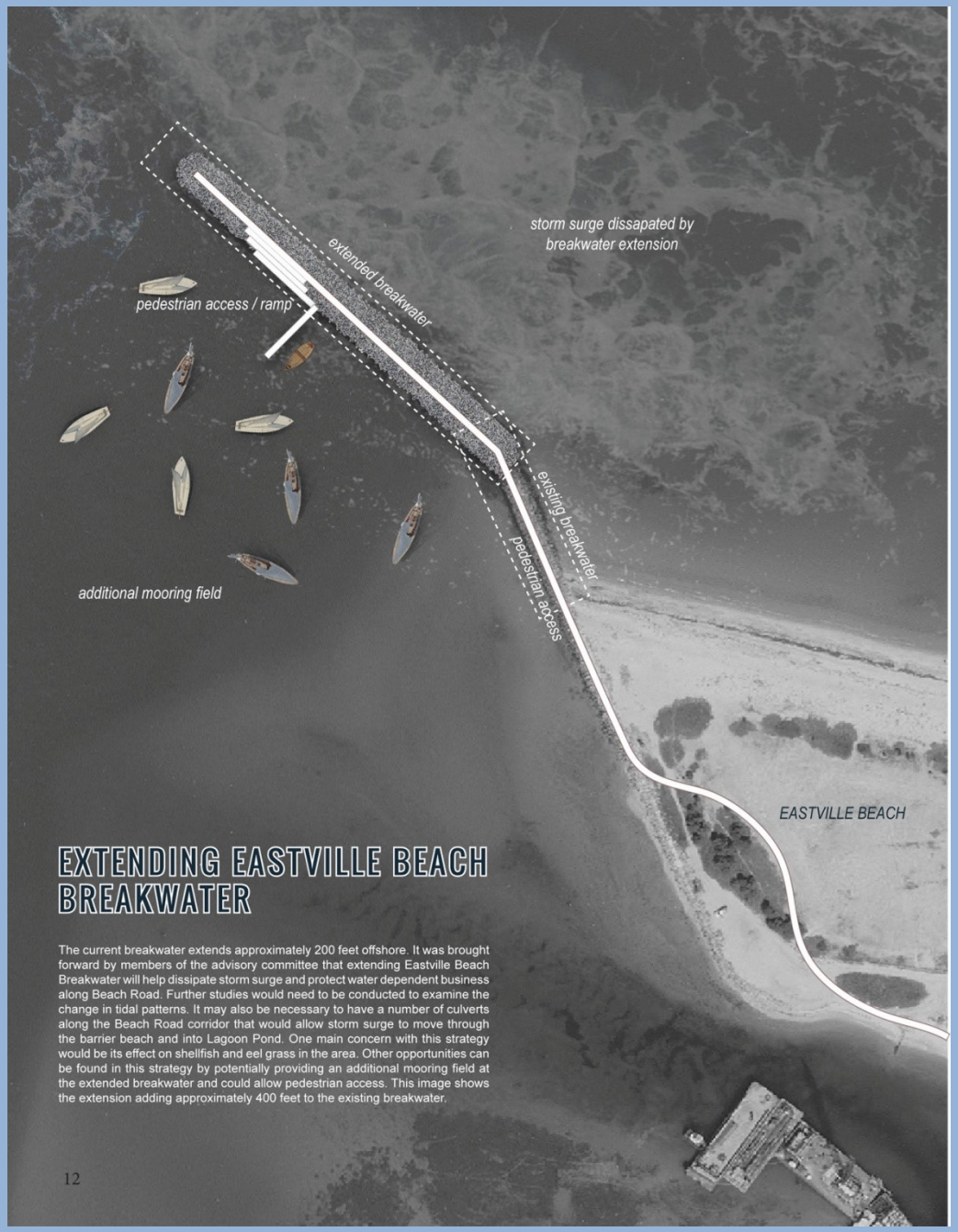

Dredge Area of Outer Harbor Breakwater Only
Dredge Area of Mid-Harbor and Outer Harbor Breakwaters
Dredge Area of Mid-Harbor Breakwater Only
Outer Harbor
Mid-Harbor
Existing
Limit of Sheltered Waters
Eastville Point
Beach Road

1980

Extend Eastville Breakwater




VINEYARD HAVEN HARBOR
extension protecting water-dependent business
extension
existing breakwater
existing breakwater
moorings
OAK BLUFFS
culverts
LAGOON POND
MAIN STREET
WATER STREET
BEACH STREET
BEACH ROAD
LAGOON POND RD
HINES POINT



EXTENDING EASTVILLE BEACH BREAKWATER

The current breakwater extends approximately 200 feet offshore. It was brought forward by members of the advisory committee that extending Eastville Beach Breakwater will help dissipate storm surge and protect water dependent business along Beach Road. Further studies would need to be conducted to examine the change in tidal patterns. It may also be necessary to have a number of culverts along the Beach Road corridor that would allow storm surge to move through the barrier beach and into Lagoon Pond. One main concern with this strategy would be its effect on shellfish and eel grass in the area. Other opportunities can be found in this strategy by potentially providing an additional mooring field at the extended breakwater and could allow pedestrian access. This image shows the extension adding approximately 400 feet to the existing breakwater.

ARMORING BEACH ROAD

Armoring Beach Road peninsula: Armoring the stretch of Beach Road creates an opportunity for pedestrian access and provides an amenity for the local community, seasonal visitors, and island travelers. As Tisbury's ferry terminal is the only year round port, this feature could receive a significant amount of use for those traveling by foot. Although this strategy would be addressing sea level rise, it may also have the capacity to protect Beach Road from intense storm surge. This strategy also eliminates phases of adaptation by constructing this pedestrian revetment feature in one phase to proactively address the global sea level prediction. Over time as facilities reach their life span and need to be reconstructed, second stories can be used for loading to allow easier transportation of materials from the docks to the facilities depending on the function and use.

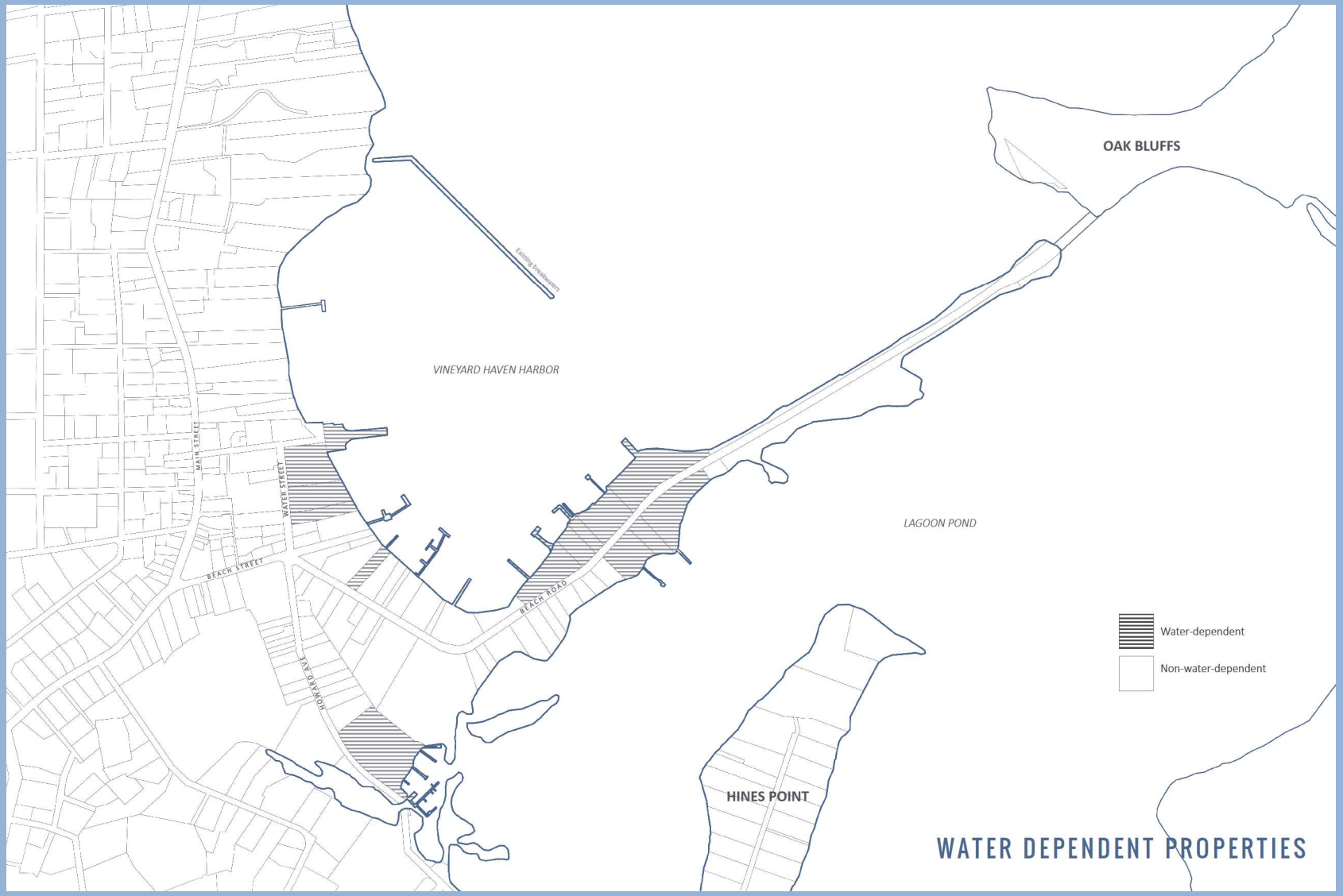
1-10 years: Construct Beach Road Causeway. As noted on the previous page, sea level rise will also occur in Lagoon Pond which will cause flooding to the properties south of Beach Road. In addition to raising Beach Road to a causeway, additional protection will need to be added along the shore of Lagoon Pond.

30-50 years: Fill adjacent land to meet causeway grade. In this location there is no property to raise on the north side of Beach Road. However there may be an opportunity to have some type of stair access off the causeway to allow public access to the water.


Service road between Beach Road and Lagoon Pond Road: If Beach Road were to be elevated as a 7ft causeway it would prohibit the direct access to business and facilities both north and south of the existing road. As most businesses on the south side of Beach Road are commercial retail, and office there is an opportunity to create a secondary access road between the parcels of Lagoon Pond Road and Beach Road. Since most of these buildings are surrounded by parking, the road would provide entry drives to the businesses and their existing parking lots. This would prevent a high number of ramps on Beach Road Causeway and would reduce the amount of ingress and egress on the elevated causeway to the commercial zone south of Beach Road. This does alter the interior building relationship to Beach Road as most entrances are orientated facing Beach Road, however some do have secondary access along the sides of the buildings which could work well for this service road strategy. Although this strategy is addressing access to the business and facilities south of Beach Road, it can be coupled ramps and series of ramps and a shared service road for the water-dependent facilities on the northside.
Beach Road Causeway
service road
ramp
ramp
ramp
service road
indirect access off existing beach road / sufficient amount of space between causeway and building entrance
direct access off existing beach road
access drives off service road to existing parking lots
0
300
600
Feet

Fill Calculations

Retreat


OAK BLUFFS
existing breakwaters
VINEYARD HAVEN HARBOR
MAIN STREET
WATER STREET
BEACH STREET
BEACH ROAD
HOWARD AVE
LAGOON POND
HINES POINT
Water-dependent
Non-water-dependent
WATER DEPENDENT PROPERTIES

Strategies

	Stategy	Near-Term (1-10 years)*	Mid-range (10-30 years)*	Long-term (30-50 years)*
PROTECT	***Vineyard Harbor Pedestrian Boardwalk and Revetment***	Observe local sea level rise (slr) rates	Construct boardwalk feature and with access ramps	Build adjacent buildings with second store loading
	Extending Eastville Beach Breakwater	Constuct Eastville Beach Break water extension	Provide pedestrian access	
ACCOMODATE	***Elevate water-dependent business***	construct buildings on pilings	relocate water-dependent business from the lagoon side of Beach Road to the harbor side	re-establish tidal marsh on lagoon side of Beach Road
	Beach Road Causeway	Construct Beach Road Causeway Construct service road between existing Beach Road and Lagoon Pond Road for temporary access to business	Raise adjacent land on the harbor side of Beach Road to meet grade of the causeway	Raise adjacent land on the lagoon side of Beach Road to meet grade of causeway
	Culverts under Beach Road	Envoronmental Impact study of impacts to Lagoon Pond and hydrologic engineering studies	Construct x number of culverts along beach road	
RETREAT	***Phasing out nonwater dependent***	Map low flood lands Zoning amendments	Begin to develop conservation easements and land purchase strategies with landbank Phase out existing non-water-dependent business and facilities	Restablish former tidal marsh