Nature-Based Solutions in Planning and Practice

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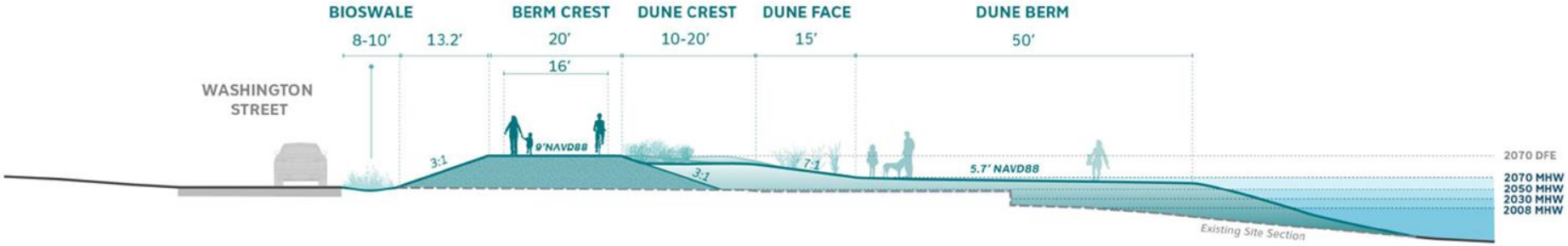
Nantucket Islands Land Bank

NANTUCKET LAND BANK

Green Infrastructure as a Near-Term & Flexible Adaptation Strategy

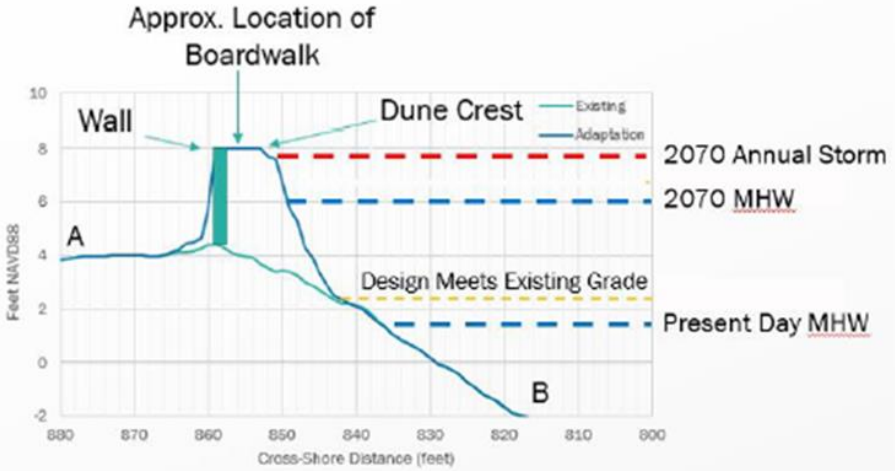
Floodable, Public, Open Spaces

A Resilient Washington Street



LEGEND

DFE for Floodable Areas - Design Flood Elevation **(9' NAVD88)**
2070 MHW - Mean High Water in 2070 **(+ 6.0' NAVD88)**
2050 MHW - Mean High Water in 2050 **(+ 4.2' NAVD88)**
2030 MHW - Mean High Water in 2030 **(+ 2.9' NAVD88)**
Present MHW - Mean High Water in 2008 **(+ 1.6' NAVD88)**
Present MLW - Mean Low Water in 2008 **(-1.6' NAVD88)**



WOODS HOLE GROUP
A CLS COMPANY

SCAPE


2050 PROJECTED MEAN HIGH WATER WITHOUT PROJECT
WASHINGTON STREET INUNDATED AT HIGH TIDE
EXISTING BEACH INUNDATED AT HIGH TIDE
LOT PARTIALLY INUNDATED AT HIGH TIDE


2050 PROJECTED MEAN HIGH WATER WITH PROJECT*
*Preventing tidal flooding on Washington Street requires similar interventions at other tidal inundation pathways.
ROADSIDE BIOSWALE
ELEVATED MULTI-USE PATH ON BERM
EXPANDED WETLANDS
DUNE-LIKE LANDSCAPE
BEACH NOURISHMENT

What do we know? Probabilities from the MC-FRM

Table 1. Peak water levels utilized for the performance modeling.

Event Case (Annual Exceedance)	Year	Peak Water Level (ft, NAVD88)
10% (10 year) storm	Present Day	6.0
10% (10 year) storm	2030	6.9
50% (2 year) storm	Present Day	3.9
50% (2 year) storm	2030	4.9
Spring Tide	2030	4.3
Spring Tide	2050	6.5

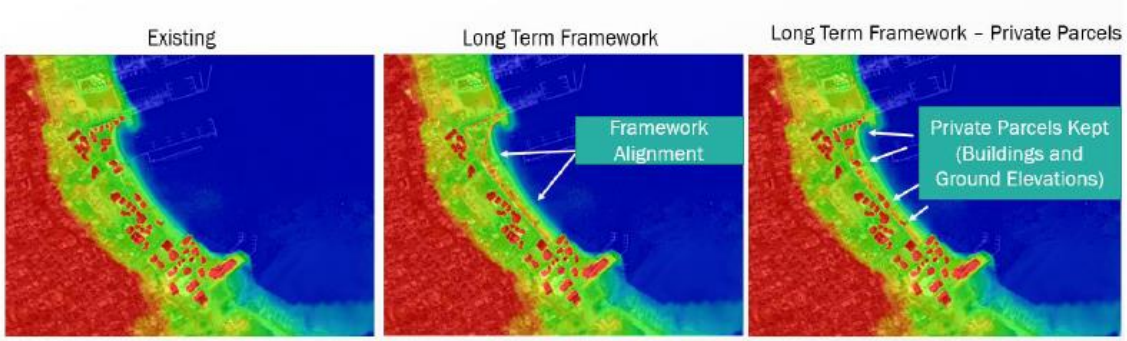


Figure 1: Proposed design contours applied to the modeling grid. The left panel presents the existing contours, while the middle and right panels present the implementation of the Framework Plan, and partial implementation of the Framework Plan.

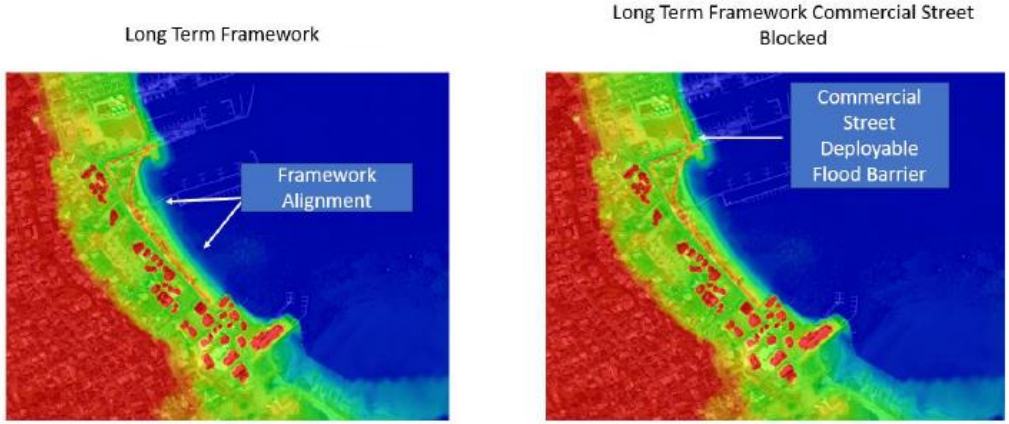


Figure 2: Proposed design contours applied to the modeling grid – Long Term Framework with Deployable Flood Barrier on Commercial Street

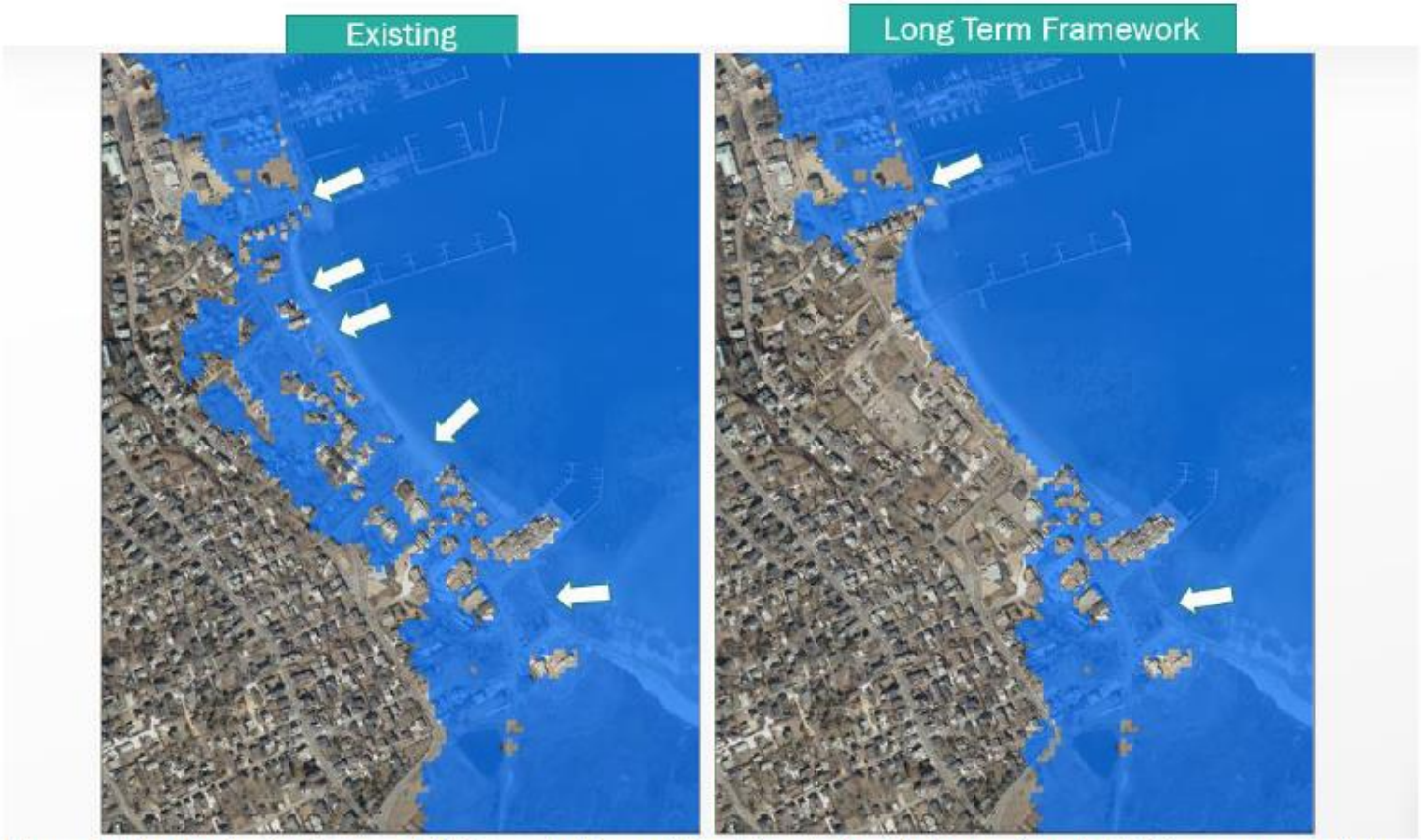
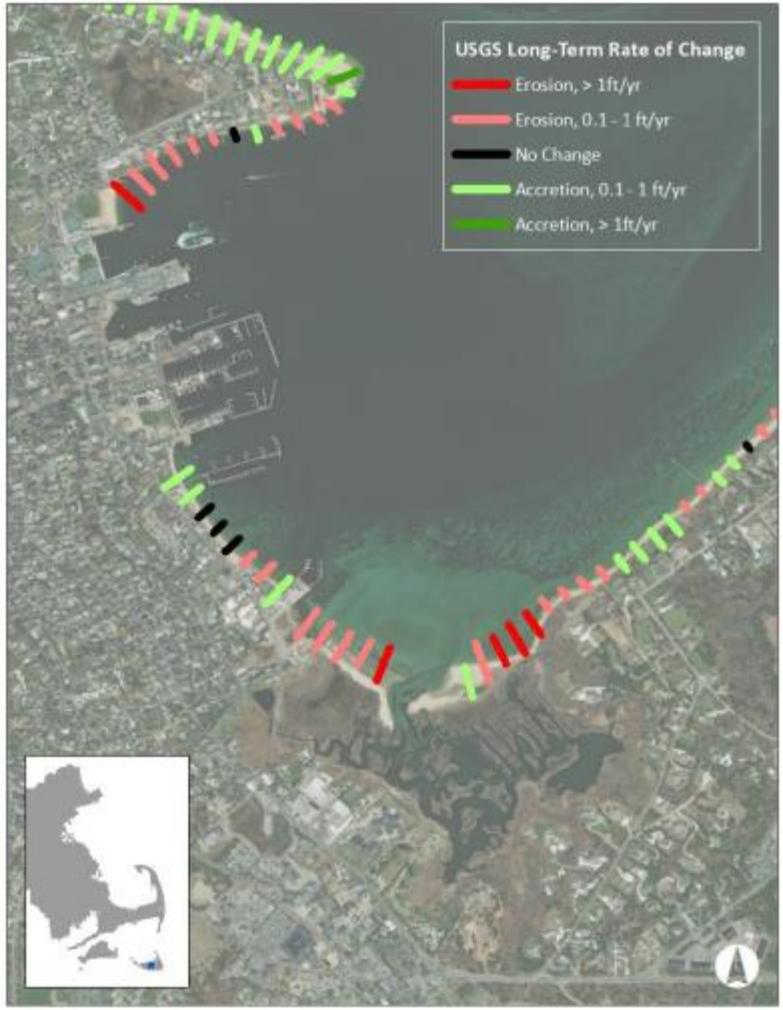


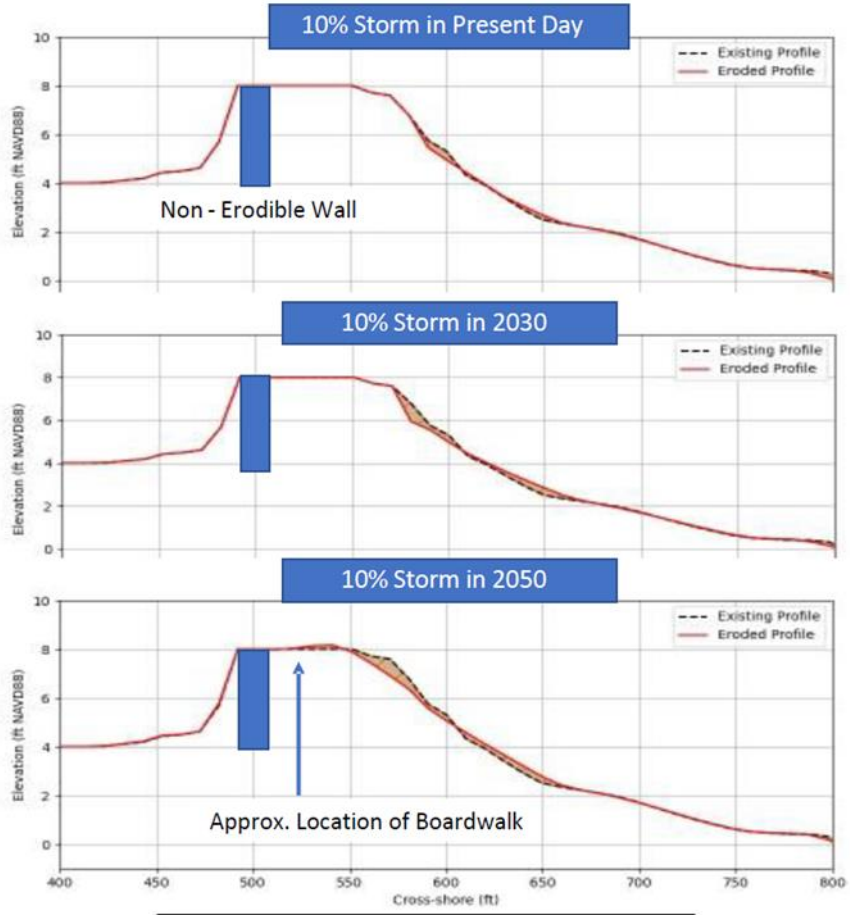
Figure 3: Flood extents during a 10% storm in Present Day, for existing (left panel) and with the proposed design (right panel)

Figure 4: Flood extents during a 10% storm in Present Day, for existing (left panel) and with the proposed design (right panel) Alternate Grids

Figure 5: Flood extents during a 50% Storm in 2030, for existing (left panel) and with the proposed design (right panel)

Figure 7: Flood extents for 2050 tides for proposed design (left panel) and with the proposed design (right panel) adding a flood barrier at Commercial Street


USGS Long-Term Rate of Change
Erosion, > 1ft/yr
Erosion, 0.1 - 1 ft/yr
No Change
Accretion, 0.1 - 1 ft/yr
Accretion, > 1ft/yr


10% Storm in Present Day
Existing Profile
Eroded Profile
Elevation (ft NAVD88)
Non - Erodible Wall
10% Storm in 2030
Existing Profile
Eroded Profile
Elevation (ft NAVD88)
10% Storm in 2050
Existing Profile
Eroded Profile
Elevation (ft NAVD88)
Approx. Location of Boardwalk
0
2
4
6
8
10
400
450
500
550
600
650
700
750
800
Cross-shore (ft)

Washington St & Francis St

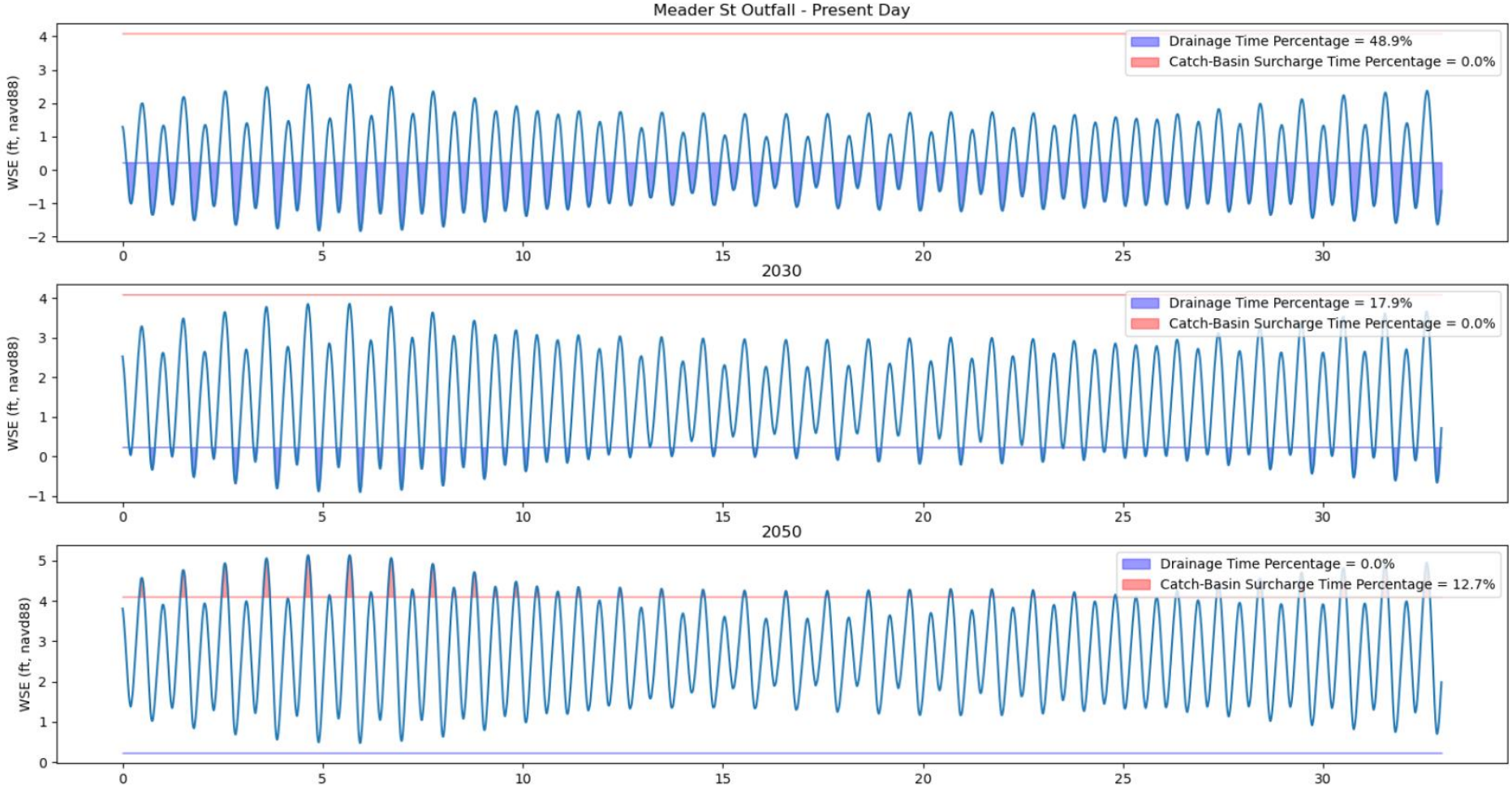
Washington St & Francis St

Table 1. Modeled ground water levels under current and future conditions.

Scenario	Present	2030	2050	2070
	Elevation (ft, NAVD88)			
Long-term influence on groundwater level				
Mean Groundwater Level	1.4	2.7	4.0	5.8

Figure 1: 2050 Groundwater breakout areas (blue polygons) and upland limit of short-term episodic tidal forcing of groundwater levels (yellow line).

Figure 5: Map showing location of catch basin and outfall used in Meader Street outfall analysis (Figure 6).


Meader St Outfall - Present Day
Drainage Time Percentage = 48.9%
Catch-Basin Surcharge Time Percentage = 0.0%
WSE (ft, navd88)
2030
Drainage Time Percentage = 17.9%
Catch-Basin Surcharge Time Percentage = 0.0%
WSE (ft, navd88)
2050
Drainage Time Percentage = 0.0%
Catch-Basin Surcharge Time Percentage = 12.7%
WSE (ft, navd88)

Washington St & Francis St

Coastal Resilience at Work on Nantucket

Mass Audubon

COASTAL RESILIENCE ADVISORY COMMITTEE

Town of Nantucket, Mass. · Incorporated 1671 ·

Nantucket Land Council, Inc. · Est. 1974 ·

#ACKLOCAL COASTAL RESILIENCE

Linda Loring Nature Foundation

LAND BANK

Nantucket Conservation Foundation

NANTUCKET PRESERVATION TRUST

Nantucket Historical Association · 1659 · Incorporated July 9, 1894 ·

Nantucket Shellfish Association

ACKlimate Nantucket
Promoting Climate Action Through Community Engagement

5PIN
Preservation Institute Nantucket
1972-2022

Maria Mitchell Association

re Main NANTUCKET
ideas • investments • initiatives

...and so many more!