



Regional Planning for Local Action

CHLOE SCHAEFER, CHIEF PLANNER

CAPE COD COMMISSION

MAY 21, 2024 | SOUTHERN VERMONT ECONOMY SUMMIT




CAPE COD
COMMISSION

VERMONT

NEW HAMPSHIRE

MASSACHUSETTS

 BOSTON

RHODE
ISLAND

CONNECTICUT

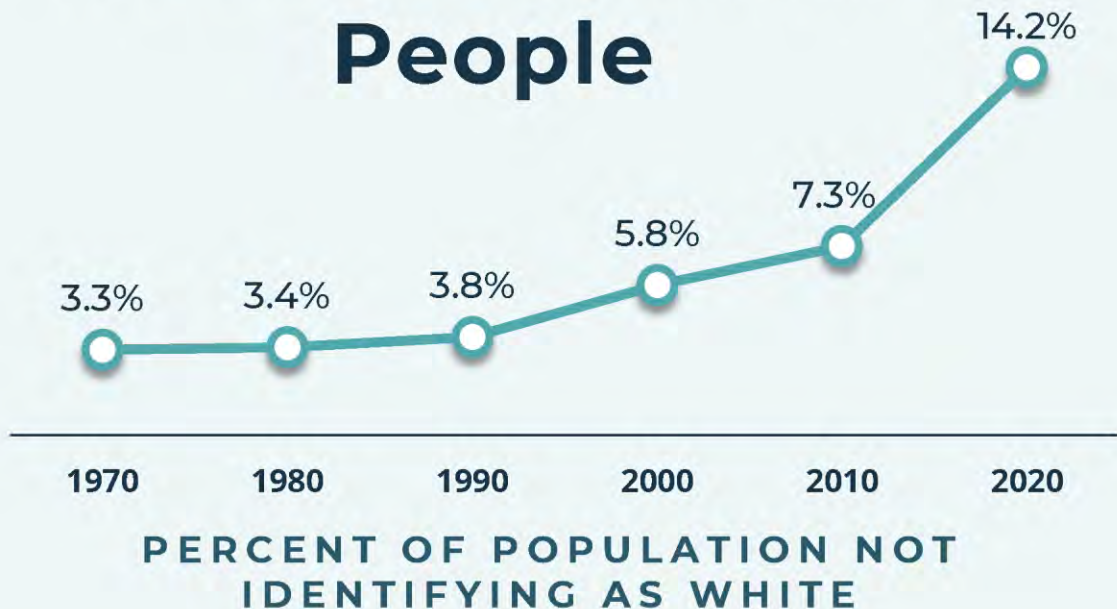
CAPE COD

ATLANTIC OCEAN



THE CAPE COD CONTEXT

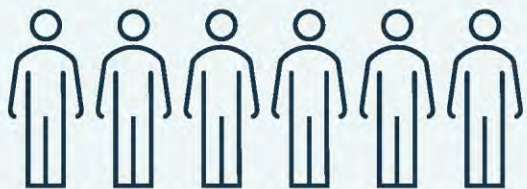
People



FEDERALLY
RECOGNIZED
MASHPEE
WAMPANOAG
TRIBE

229,000

Year-round Residents



6% increase from 2010 to 2020

MEDIAN AGE

55.7

40.3

39.0



CAPE COD



MA



UNITED STATES

34%



of the population
is 65 years or older
compared to 18% statewide

13%



DECREASE IN
PUBLIC SCHOOL
ENROLLMENT
FROM 2013-14
TO 2023-24


THE CAPE COD CONTEXT

Places

80% 
of homes are detached
single-family homes

OVER 
500 MILES OF COASTLINE

More than
44,000
ACRES IN
CAPE COD
NATIONAL
SEASHORE 

 **86%**
of Cape Cod
is already
protected or
developed

36% 
of homes are used seasonally
compared to 4% statewide

 **8**
DESIGNATED
CULTURAL DISTRICTS

THE CAPE COD CONTEXT

Economy

On average, employment in the region increases by over 33% between the winter and summer months



Over **5 Million** Visitors Annually

LABOR FORCE PARTICIPATION RATE

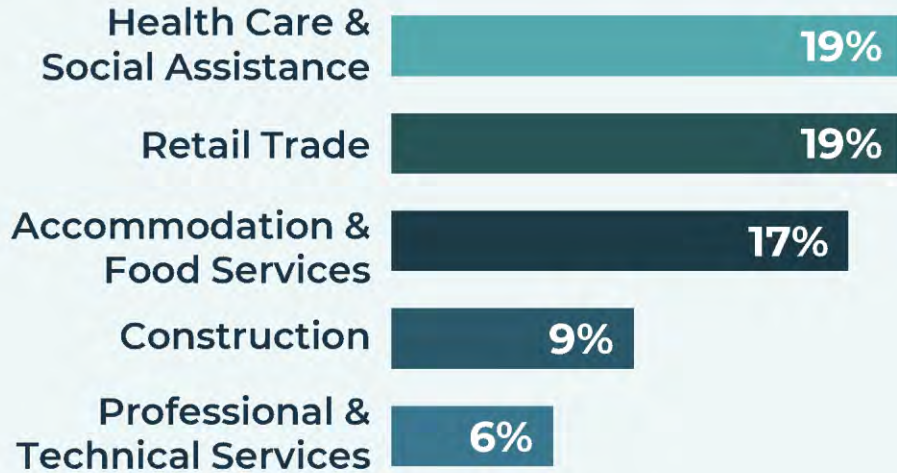
59% **67%**



CAPE COD



MA



TOP INDUSTRIES BY EMPLOYMENT

MEDIAN ANNUAL EARNINGS



CAPE COD

MA

Data Sources: 5-year Average of Massachusetts Department of Economic Research ES-202 Data (not seasonally adjusted) for 2017, 2018, 2019, 2021, 2022; Cape Cod Commission Analysis; 2022 American Community Survey 1-year Estimates Tables DP03 and S2001; UMDI analysis of 2022 Seasonally Adjusted ES-202 Data



**CAPE COD
COMMISSION**

The Cape Cod Commission

...is the regional land use planning,
economic development, and
regulatory agency created in 1990
to serve the citizens and 15 towns
of Barnstable County,
Massachusetts



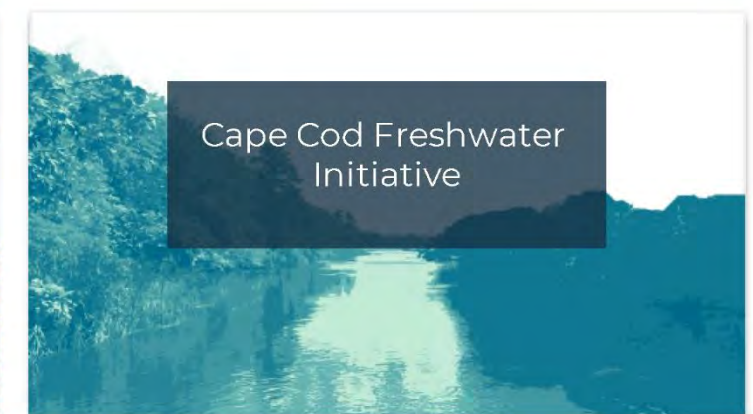
MISSION

...To protect the unique values and quality of life on Cape Cod by coordinating a balanced relationship between environmental protection and economic progress.

CAPE COD REGIONAL POLICY PLAN

FRAMING THE FUTURE

CAPE COD COMMISSION | 2018





WARMING OCEANS



The Northwest Atlantic waters are warming at 3 times the global average rate



SUMMER 2020
The waters on the continental shelf were 2 to 5°F warmer than usual



TEMPERATURES

ANNUAL AVERAGE TEMPERATURE FOR CAPE COD



SEA LEVEL RISE AND COASTAL FLOODING AND EROSION

PROJECTED SEA LEVEL RISE FOR CAPE COD



Cost of Doing Nothing

DAMAGE AND LOSSES DUE TO SEA LEVEL RISE

AND STORM SURGE COULD EXCEED

\$50 BILLION THROUGH 2100

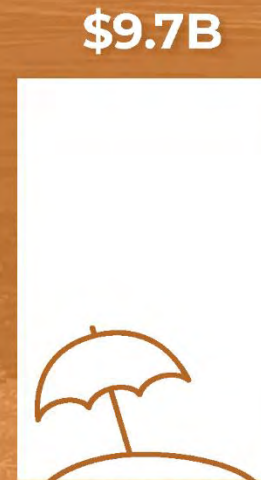
\$50
BILLION



ROAD
DAMAGE



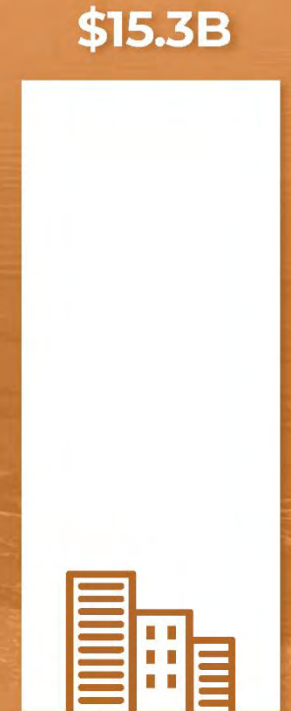
TAX
REVENUE
LOST



BEACH
TOURISM
REDUCED



LAND
VALUE
DECREASED



BUILDING
DAMAGE

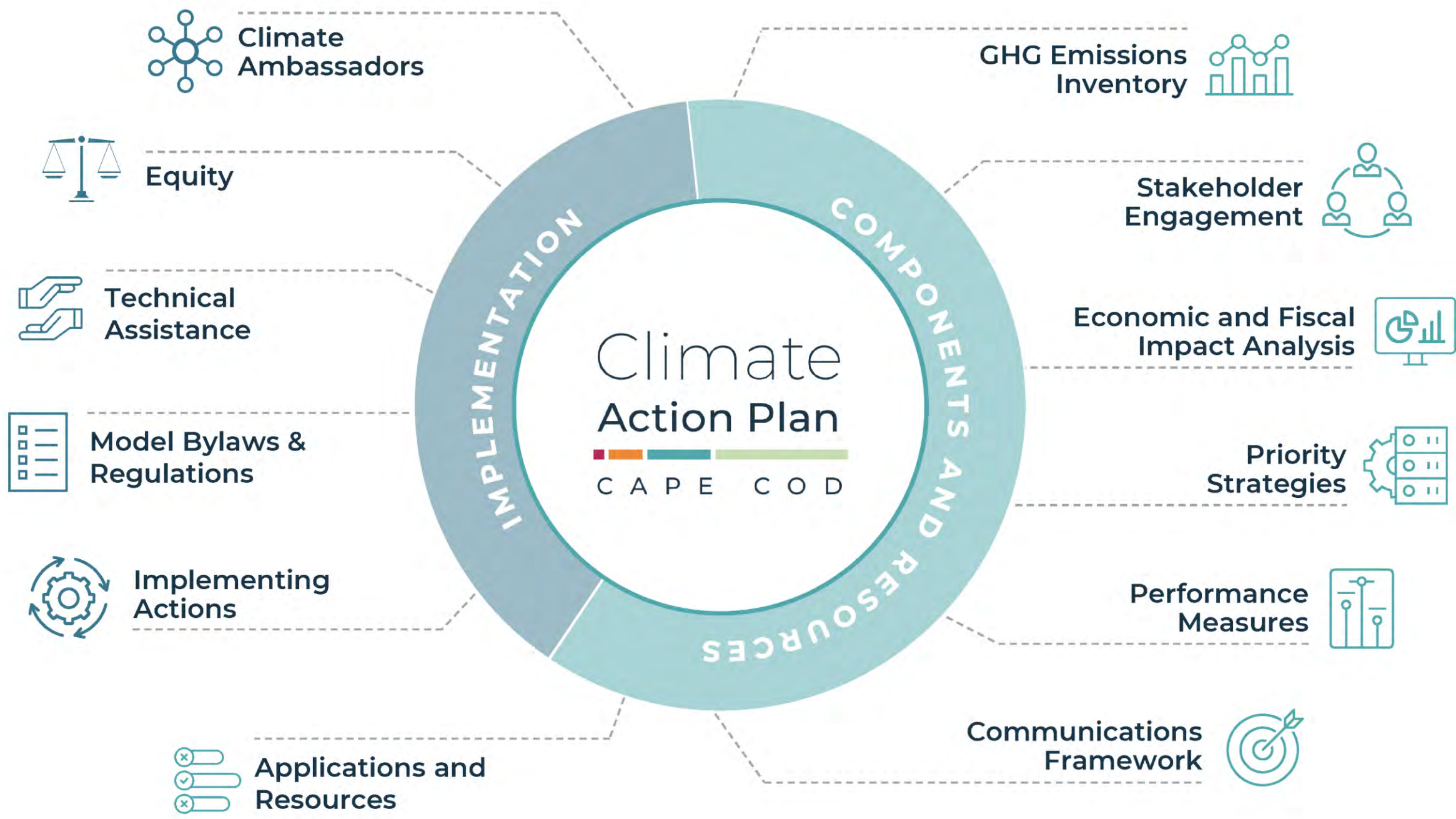
Climate Action Plan



C A P E C O D



CAPE COD
COMMISSION



Municipal Climate Action Toolkit

SUPPORT FOR LOCAL CLIMATE ACTION IMPLEMENTATION

15 CLIMATE
ACTION
STRATEGIES
IDENTIFIED
IN THE
TOOLKIT

STRATEGY ELEMENTS



Key findings

Cost benefit analysis



Equity review



State of practice

Implementation



Case studies

Key Findings Matrix



↶ RESET

Strategy	Equity	Financial Benefits	Non-Market Benefits	GHG Reductions	Implementation	Download
Net zero new non-municipal buildings	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Net zero existing non-municipal buildings	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Net-zero municipal buildings	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Waste diversion	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Address vulnerable structures	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Clean electricity	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Complete Streets	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Municipal EVs	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Infrastructure resilience	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Reduce vehicles miles traveled (VMT)	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Residential EV adoption	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Stewarding open space	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Supporting coastal wetlands	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Agricultural Practices	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄
Public awareness of climate change	4 scales	3 dollars	3 gears	3 CO2	3 gears	📄

Use download links for full analysis and fact sheets.

The number of icons for each key finding indicates how the strategy rates (low, medium, high) compared to other strategies considered. Equity and Financial rankings are based more on absolute criteria while non-market benefits, GHG reductions, and ease of implementation are based on relative scales to the other 15 strategies. Click matrix headers to sort by column.

About

Benefits and Costs Matrix



← RESET

STRATEGY	BENEFITS										COSTS				DOWNLOAD
	GHG REDUCTIONS	IMPROVED HEALTH	IMPROVED RECREATION	LOWER COSTS	IMPROVED ENVIRONMENT	LESS INFRASTRUCTURE DAMAGE	IMPROVED PROPERTY VALUES	IMPROVED RESILIENCE	JOBS & ECONOMIC GROWTH	HIGHER CAPITAL COSTS	HIGHER MAINTENANCE COSTS	HIGHER OPERATIONAL COSTS	INCREASED STAFF TIME		
Net zero new non-municipal buildings	✓	✓	✗	✓	✗	✗	✓	✓	✓	✓	✗	✗	✓	🔗	
Net zero existing non-municipal buildings	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✗	✗	✓	🔗	
Net-zero municipal buildings	✓	✓	✗	✓	✗	✗	✓	✓	✓	✓	✗	✗	✓	🔗	
Waste diversion	✓	✓	✗	✓	✓	✗	✓	✗	✓	✓	✗	✓	✓	🔗	
Address vulnerable structures	✗	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	🔗	
Clean electricity	✓	✓	✗	✓	✗	✗	✗	✓	✓	✓	✗	✗	✓	🔗	
Complete Streets	✓	✓	✓	✗	✗	✗	✓	✗	✓	✗	✗	✗	✓	🔗	
Municipal EVs	✓	✓	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	🔗	
Infrastructure resilience	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✗	✗	✓	🔗	
Reduce vehicles miles traveled (VMT)	✓	✓	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	✓	🔗	
Residential EV adoption	✓	✓	✗	✓	✗	✗	✗	✗	✗	✓	✗	✗	✗	🔗	
Stewarding open space	✓	✓	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗	✗	🔗	
Supporting coastal wetlands	✓	✗	✓	✗	✓	✓	✗	✓	✓	✓	✓	✗	✓	🔗	
Agricultural Practices	✓	✓	✗	✗	✗	✗	✓	✓	✓	✓	✗	✗	✓	🔗	
Public awareness of climate change	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	🔗	

Use download links for full analysis and fact sheets.

Municipal Climate Action Toolkit

Home > Work > Municipal Climate Action Toolkit

About

Government entities at all levels play significant roles in implementing greenhouse gas (GHG) emissions reductions and climate hazard adaptations. While the framework for climate action is set at the federal and state levels, it remains important for Cape Cod's municipal and regional governments to pursue locally appropriate actions.

A number of strategies and actions for all types of actors (government, business, individual) were identified in the [Climate Actions Database](#), developed as part of the [2021 Cape Cod Climate Action Plan](#).

The Cape Cod Commission developed a Local Climate Action Toolkit to support municipal climate action planning and assist towns with implementation of climate mitigation and adaptation actions. This toolkit provides information on specific actions municipalities can take to decrease



Fact Sheets

[Complete Set](#)

[Fact Sheet Primer](#)

Buildings

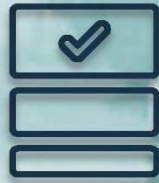
- [Net Zero Existing Non-Municipal Buildings](#)
- [Net Zero New Non-Municipal Buildings](#)
- [Net-Zero Municipal Buildings](#)
- [Waste Diversion](#)
- [Address Vulnerable Structures](#)

Energy

Cape Cod Low Lying Roads



**Vulnerability
Assessment**



**Roadway
Prioritization**



**Conceptual
Designs**



**Mapping
Application**



MASSACHUSETTS COAST FLOOD RISK MODEL



Model indicates likelihood of future flooding

Uses SLR projections, historic and modeled storm data, landscape, other

Provides flood extents and heights, among other outputs

INPUTS


SEA LEVEL
RISE


TROPICAL
STORMS


LANDSCAPE


ELEVATION


CHANGING
CLIMATE



Massachusetts Coast Flood Risk Model (MC-FRM)



PROBABILISTIC HYDRODYNAMIC MODEL

Includes relevant physical processes:
sea level rise, tides, storm surge,
wind, wave setup / run-up /
overtopping, future climate scenarios



OUTPUTS


FLOOD
PROBABILITY


FLOOD
DURATION


FLOOD
VOLUMES


WAVES


WINDS


FLOOD
PATHWAYS


FLOOD
DEPTH


CURRENTS

Find address or place

Map navigation controls: Zoom in (+), Zoom out (-), Home, Refresh



Layer List

Layers

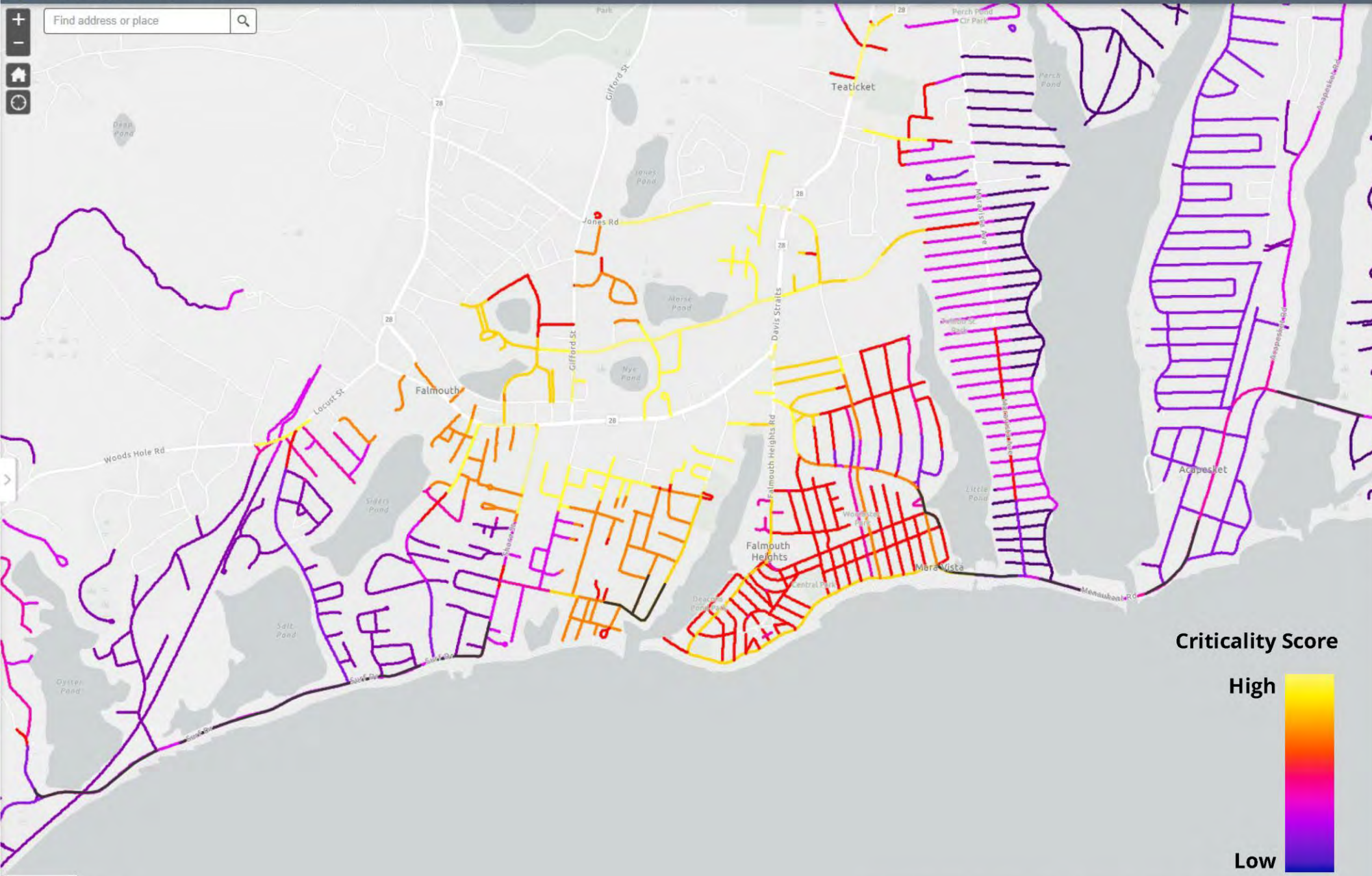
- Falmouth Top Vulnerable Roads
- Coastal Erosion Comments
- Coastal Flooding Comments
- Town mask
- Falmouth Road Points at MHW
- Falmouth 2070 Risk
- Falmouth 2050 Risk
- Falmouth 2030 Risk
- Falmouth Criticality Score
- Falmouth 2070 Inundation Probability
- Falmouth 2050 Inundation Probability
- Falmouth 2030 Inundation Probability
- Community and Emergency Critical Facilities
- MassDOT Roads: Functional Class
- MassDOT Roads: Average Daily Traffic
- Bus Routes
- Business Activity Density (vector)
- CDC Social Vulnerability Index 2018 - USA - Housing/Transportation Theme - Tracts

MC-FRM Inundation Probability



0.2mi
-70.640 41.556 Degrees

Find address or place



- Layer List**
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Criticality Score



0.2mi
-70.638 41.551 Degrees

Find address or place

Map navigation controls: Zoom in (+), Zoom out (-), Home, Refresh



Layer List

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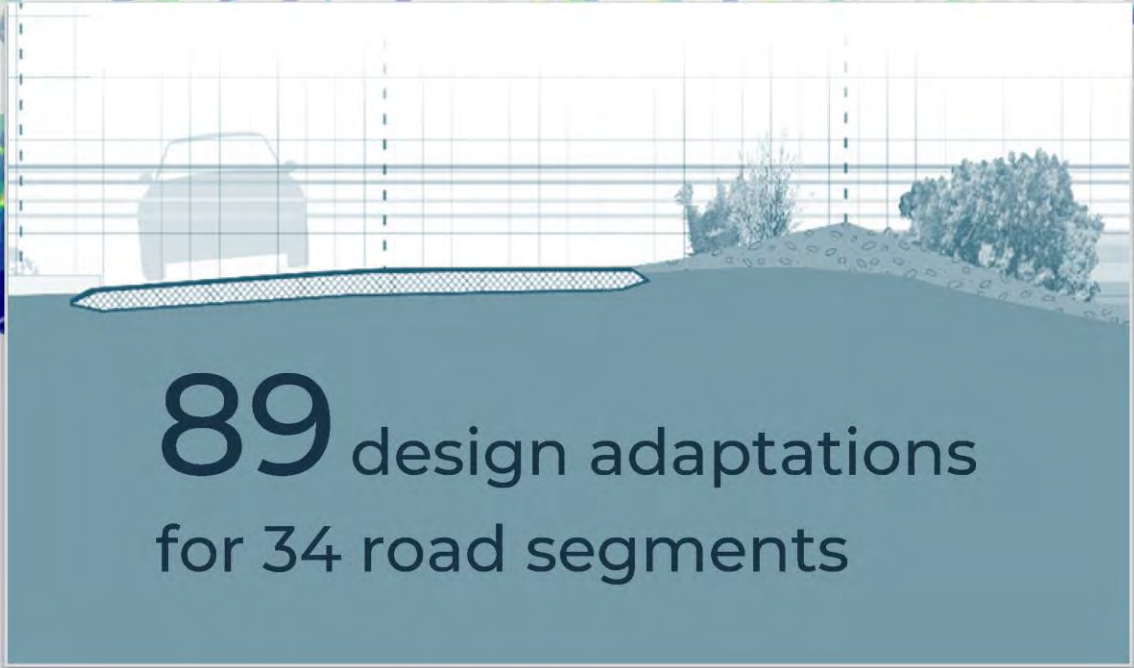
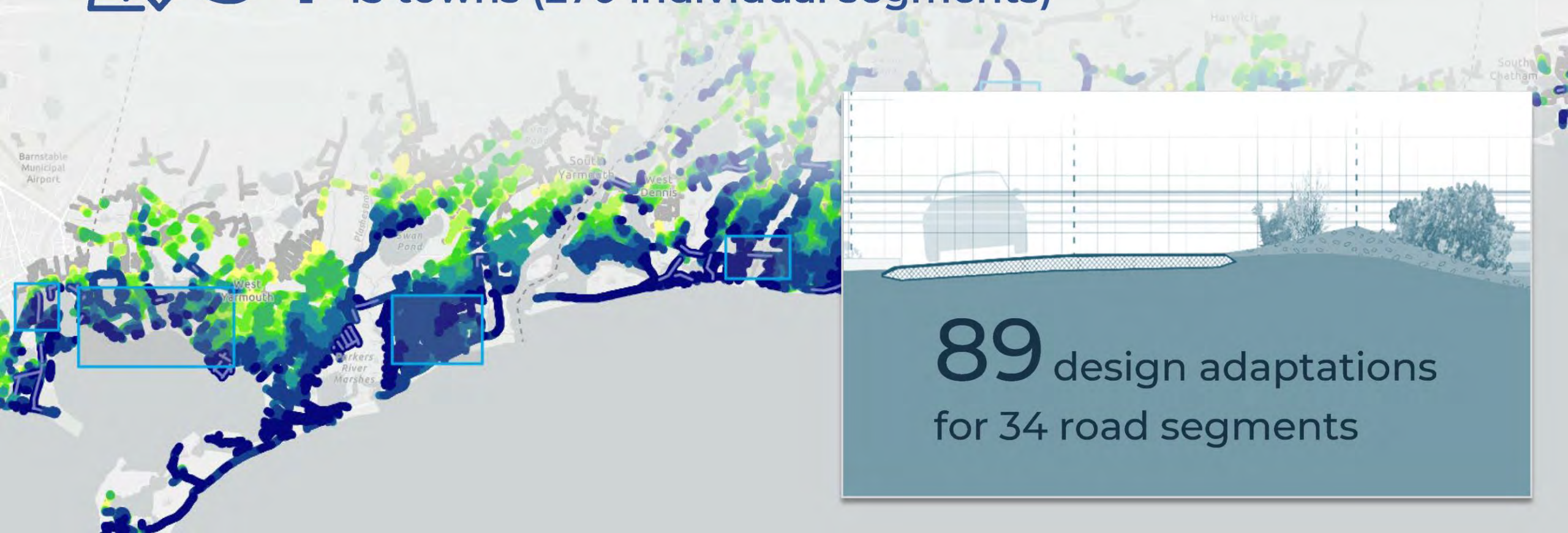
SUPPORTING LOCAL CLIMATE ACTION

Cape Cod Low Lying Roads



54

miles of roadways identified and prioritized across all 15 towns (270 individual segments)



89 design adaptations
for 34 road segments



Low Lying Roads Project

Home > Work > Low Lying Roads Project

Start Date: 2021

Overview

Português

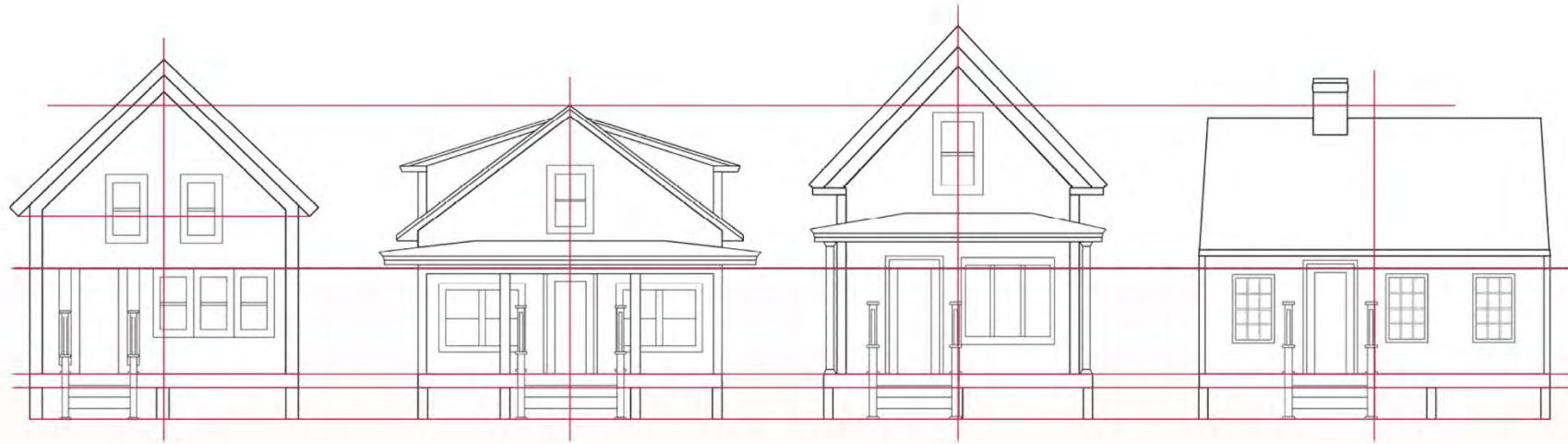
Overview

Cape Cod Commission staff are working with all 15 towns to examine vulnerabilities in the roadway network and identify adaptation alternatives. With funding support from the U.S. Economic Development Administration and the Massachusetts Municipal Vulnerability Preparedness program, the Commission has contracted with the Woods Hole Group to

Resources



<https://capecodcommission.org/our-work/low-lying-roads-project/>



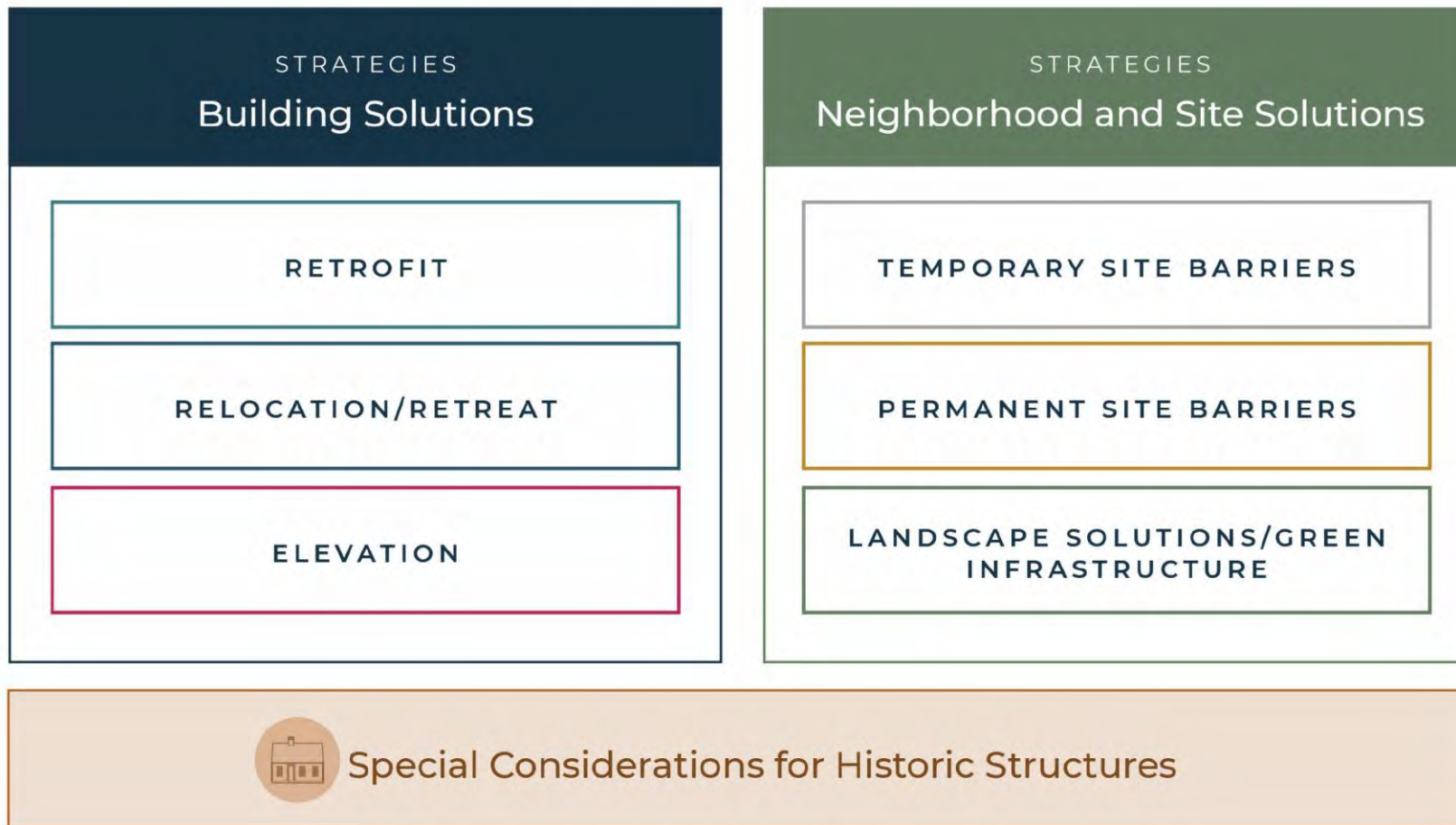
FLOOD AREA DESIGN GUIDELINES

for CAPE COD



CAPE COD
COMMISSION

Range of Possible Adaptation Strategies



ELEVATING 4-6 FEET



Elevate buildings in a neighborhood to a consistent base elevation height. Neighborhoods or blocks can best preserve their character if buildings are elevated to a similar height, preserving their relationships to one another. Consistent skirting designs and streetscape treatments will also help protect an area's distinctive character. The same is true if buildings are set back from the street to accommodate access or soften the change in building height.

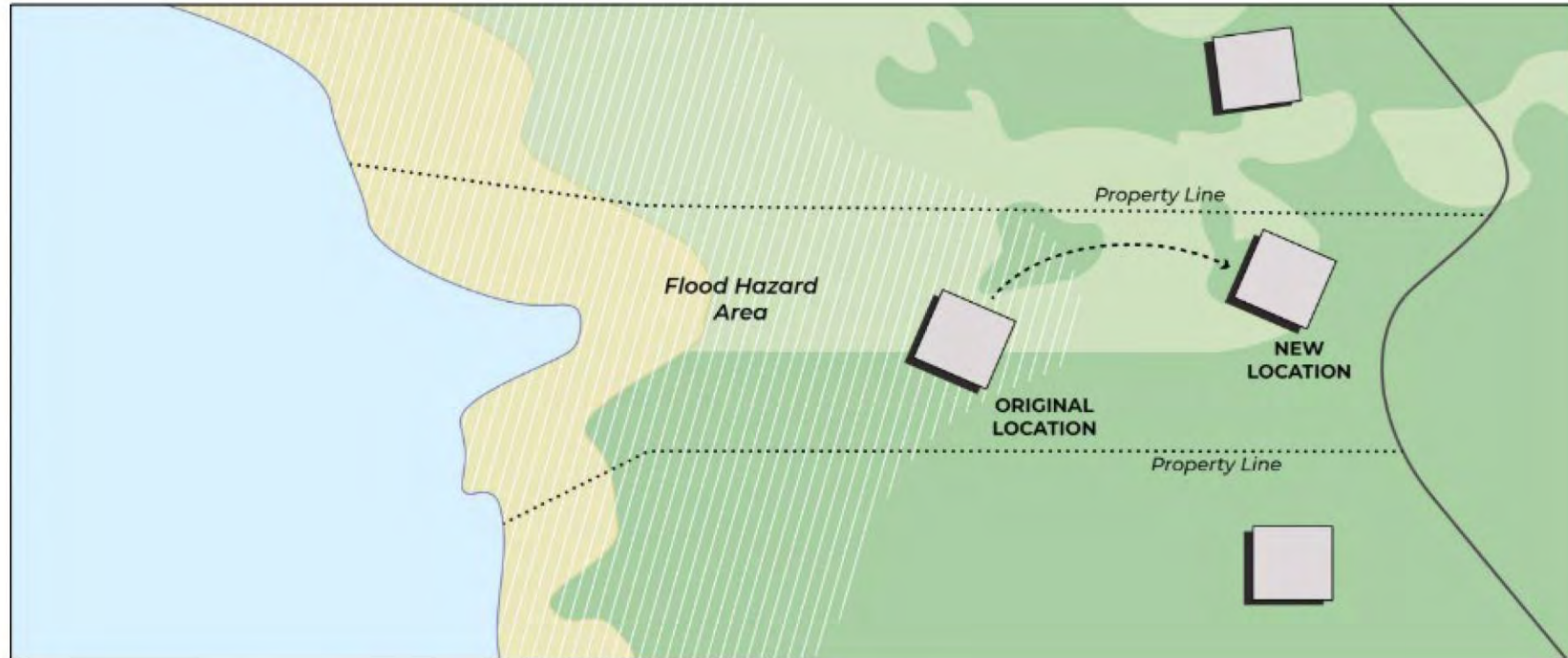
STRATEGIES

Neighborhood and Site Solutions

This section addresses adaptation strategies for the land around buildings, whether individual sites or entire neighborhoods. Temporary and permanent landscape changes play an important role in addressing flood risk and in some cases may alleviate or eliminate the need to make significant changes to buildings.



ALTERNATIVE 1: RELOCATE BUILDING

LOW DENSITY NEIGHBORHOOD/
LARGE LOTS

- ① Relocate building outside flood hazard area.

Flood Area Design Guidelines

for Cape Cod

Home > Work > Flood Area Design Guidelines

Cape Cod has a history of moving or modifying buildings to adapt to its changing coastline, especially those buildings designed to be close to the water's edge. However, rising flood waters and sea level rise are impacting increasing numbers of properties on Cape Cod. As the pace of change increases and more buildings are impacted, the need for guidance that is specific to the character of Cape Cod's communities has grown.

Supported by funding from the US Economic Development Administration, these guidelines were developed to review the main strategies available for reducing or eliminating hazards from sea level rise and storm surge to life and the built environment while also protecting the region's distinctive character and historic resources, both in the short



<https://www.capecodcommission.org/our-work/flood-area-design-guidelines/>

Model Bylaws & Regulations

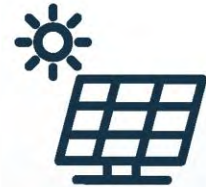
FOR LOCAL IMPLEMENTATION



**Coastal Resiliency
Model Bylaw and
Regulations**



**Floodplain Model
Zoning Bylaw**



**Model
Large-Scale
Solar Bylaw**



Thank you!

www.capecodcommission.org

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