RESILENT MYSTIC

Adaptation Strategies for Downtown Mystic

CIRCA WEBINAR

APRIL 8, 2025





FUSS & O'NEILL



PROJECT TEAM

CIRCA

- John Truscinski CIRCA Project Lead
- Nicole Govert CIRCA Community Resilience Planner
- Mary Buchanan CIRCA Community Resilience Planner
- Yaprak Onat Modeling support

Town of Stonington

- Danielle Chesebrough First Selectperson
- Deborah Downie Selectperson
- Clifton Iler Town Planner
- Molly Evak Town Grant Administrator

<u>Citizen + Technical Advisory Committee (CTAC)</u> Consultant Team - Fuss & O'Neill

- Erik Mas
- Beth Kirmmse
- Sara Morrison
- Andrew Bohne
- Lara Sup
- Arnold Robinson
- Peyton Debowsky
- Ian Concannon



Beth Kirmmse, RLA, WEDG Project Manager



Andy Bohne, RLA

Design Lead



Sara Morrison, MLA Climate Adaptation Design



Ian Concannon Environmental Planning



Michael Frederick Climate Adaptation Design



Erik Mas, PE Project Principal



Arnold Robinson, AICP
Historical Preservation
Specialist



Lara Sup, PE
Water Resources Engineering



Peyton Debowsky
GIS Analysis + Planning



Greg Wilson
Climate Adaptation Design



RELATED PROJECTS

CIRCA: Resilient Mystic project contributes to a growing body of work studying climate adaptation in the surrounding area!

Past and present studies and reports reviewed by the project team include:

- Vulnerability Assessments
- Hazard Mitigation Plans
- Comprehensive Plans

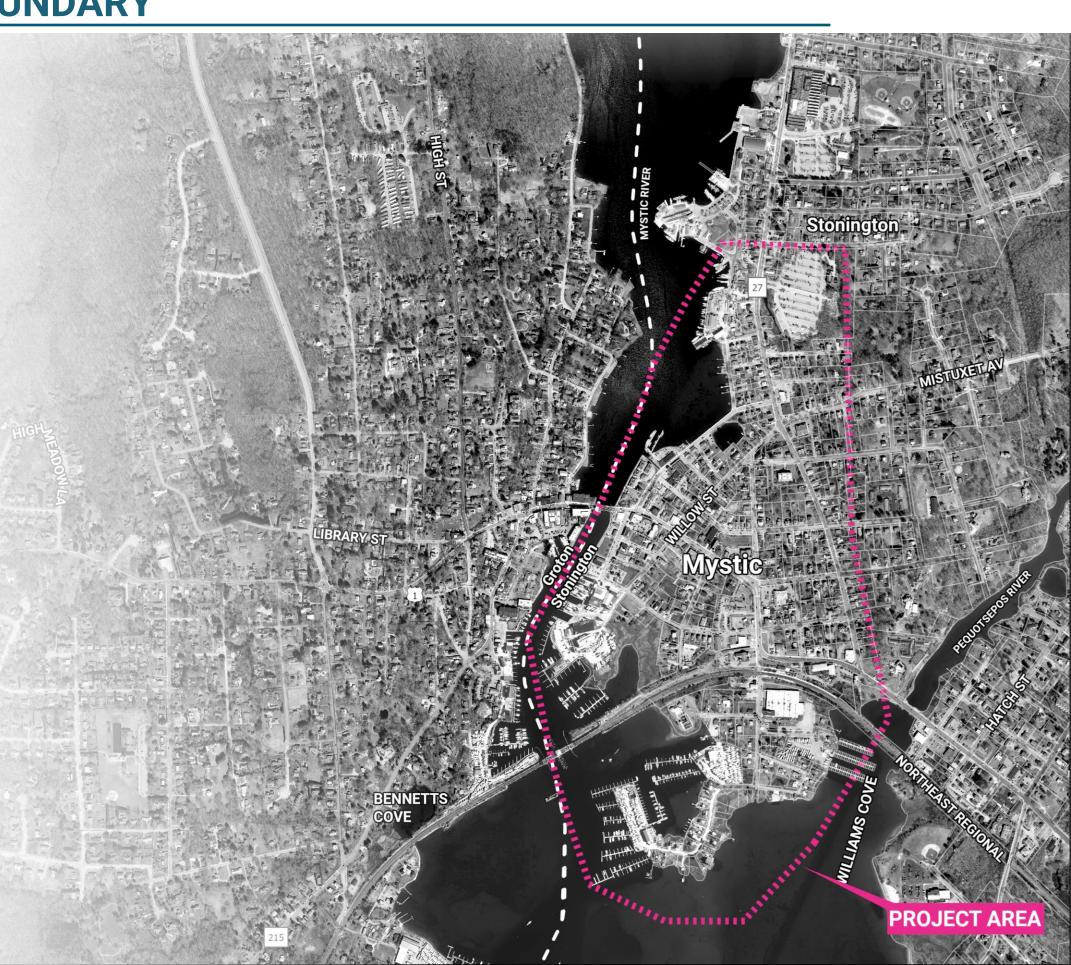






PROJECT BOUNDARY

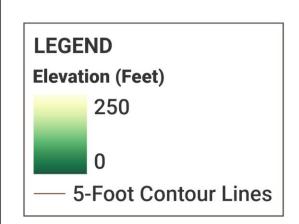
- Boundary follows a natural floodplain on the Stonington side of Downtown Mystic, surrounded by tidal waters
 - Due to topography and orientation, the Stonington side is more flood-prone than the Groton side
- Many critical facilities in the project area along with regional transportation infrastructure and historic + cultural resources

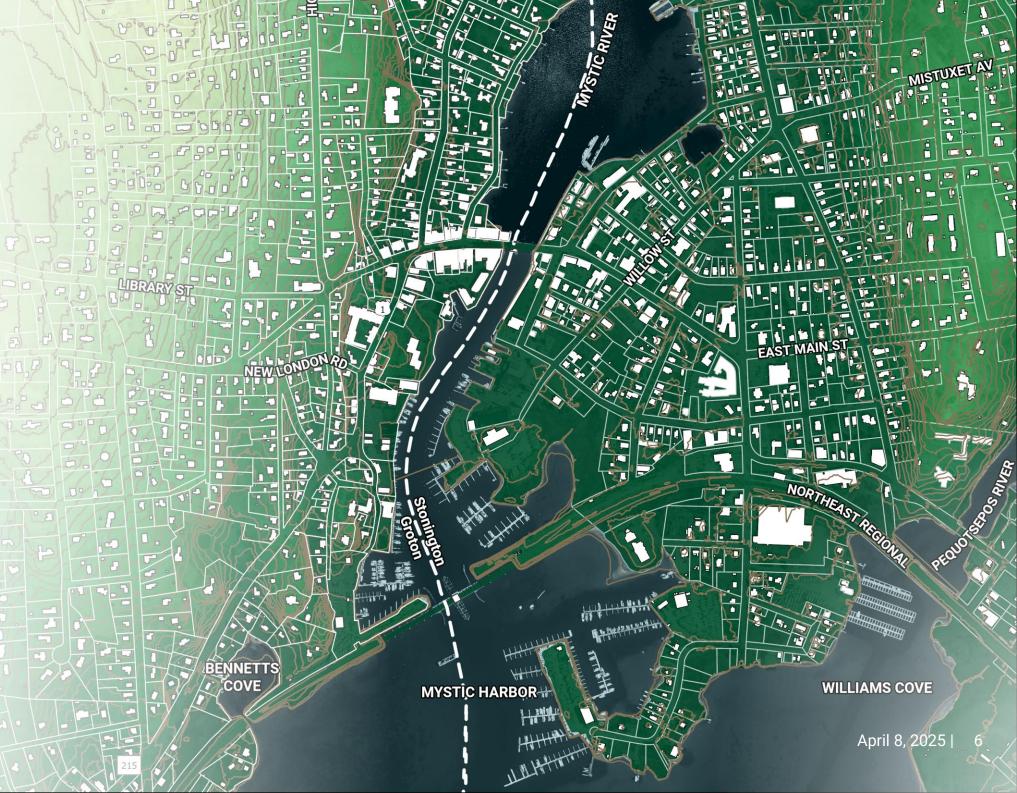




TOPOGRAPHY

- Much of the project area is at elevations of 10 feet above sea level (NAVD88) or lower, with a steep hill rising to the east
- This topography of this area is shaped by a long history of coastal geologic processes, such as glaciation, erosion, and tectonic activity

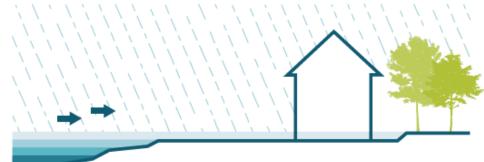






COASTAL FLOOD CONCEPTS





TIDAL FLOODING

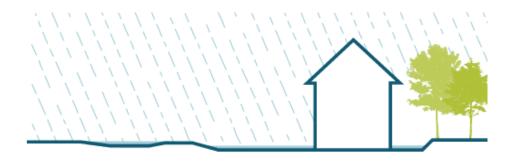


SEA LEVEL RISE & TIDAL FLOODING (Chronic/Nuisance Flooding) **COASTAL STORMS**

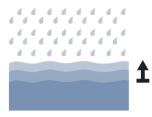


STORM SURGE FLOODING (Periodic Flooding)

This project used modeled coastal flood data provided by CIRCA to evaluate where and under what conditions flood vulnerability is highest in Downtown Mystic



RAINFALL FLOODING

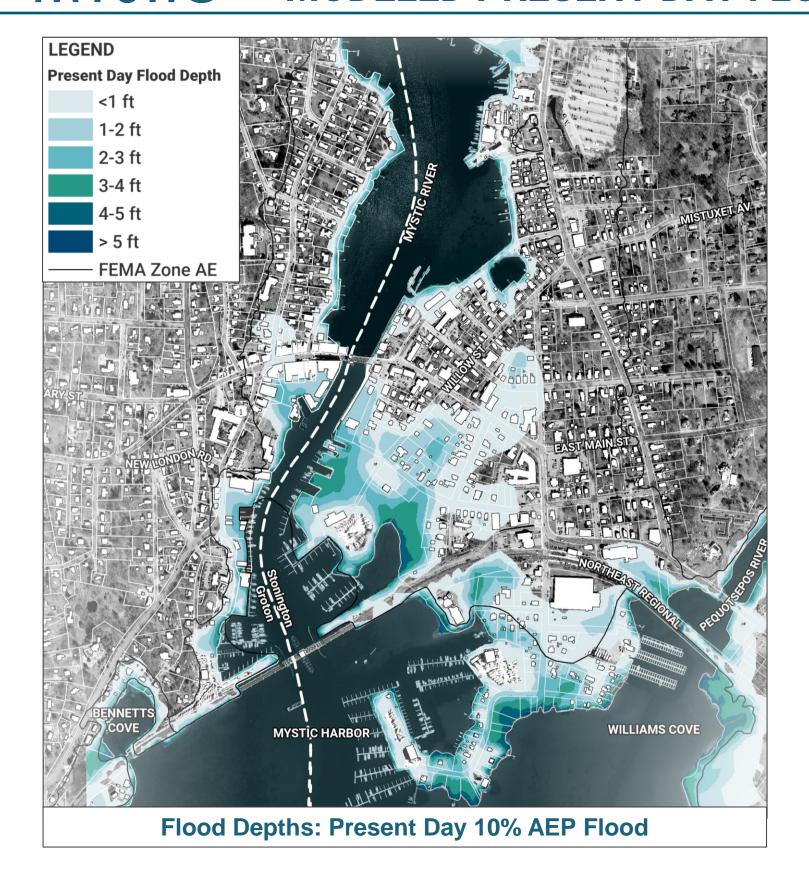


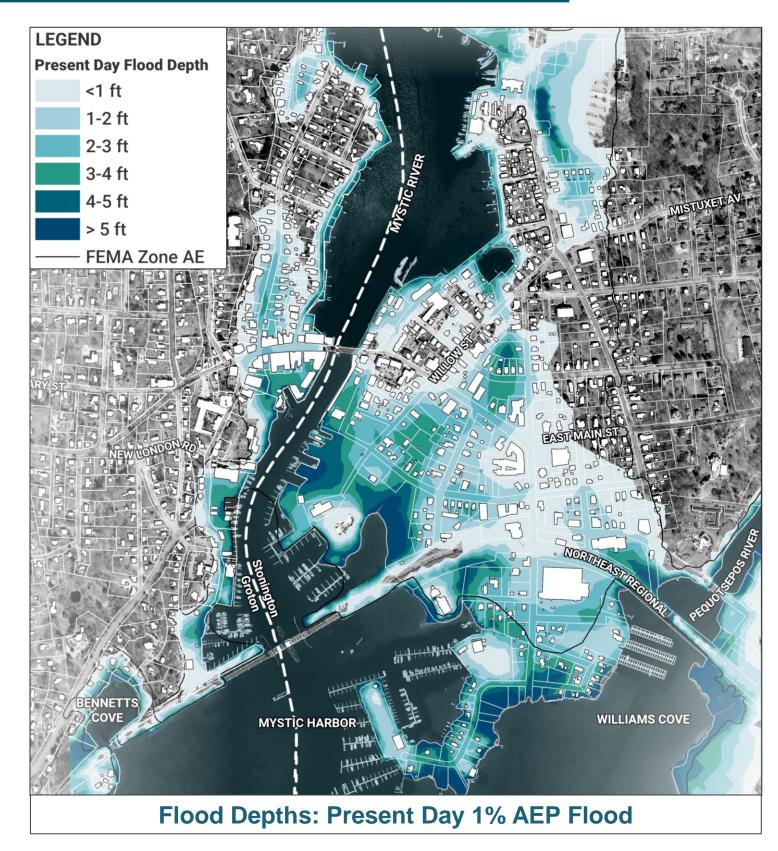
PRECIPITATION AND DRAINAGE FLOODING

HOW LIKELY IS FLOODING?

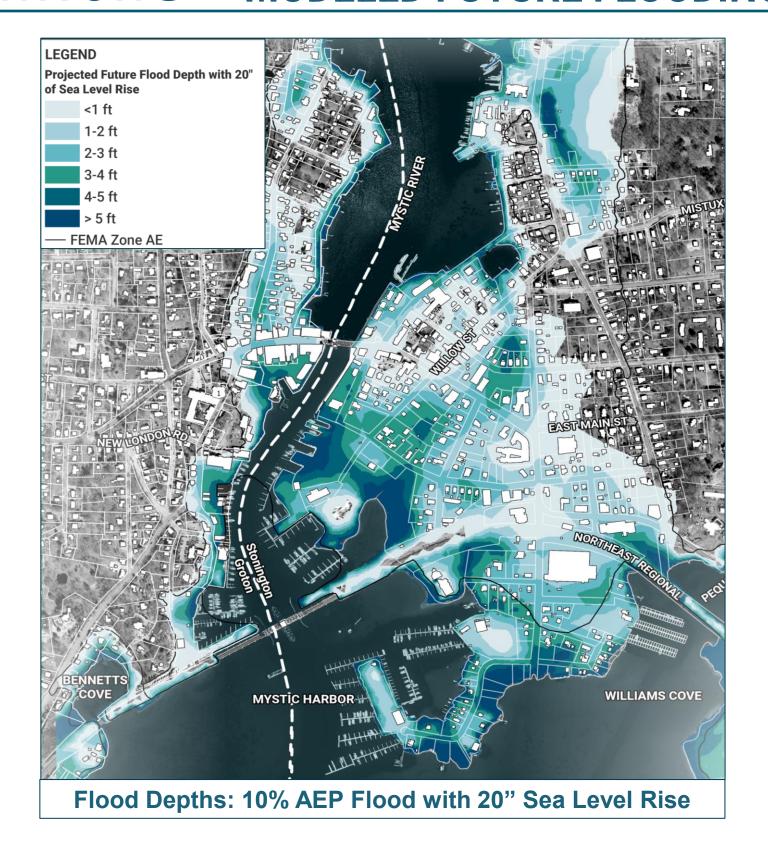
- G The 10% annual exceedance probability (AEP) flood is a flood event that has a 10% probability of being equaled or exceeded each year.
- The 1% annual exceedance probability (AEP) flood is a flood event that has a 1% probability of being equaled or exceeded each year.

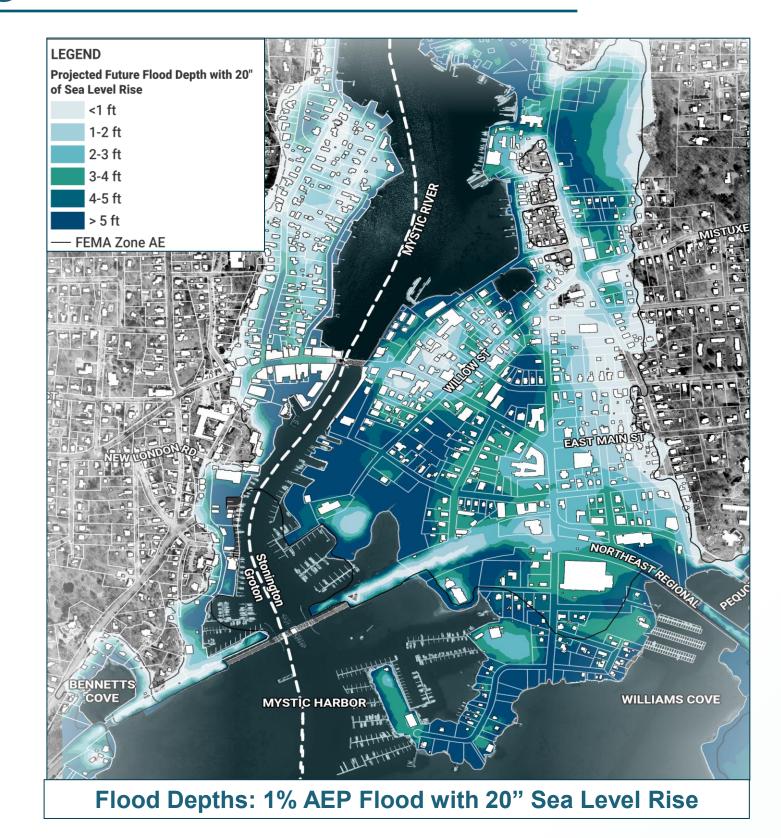




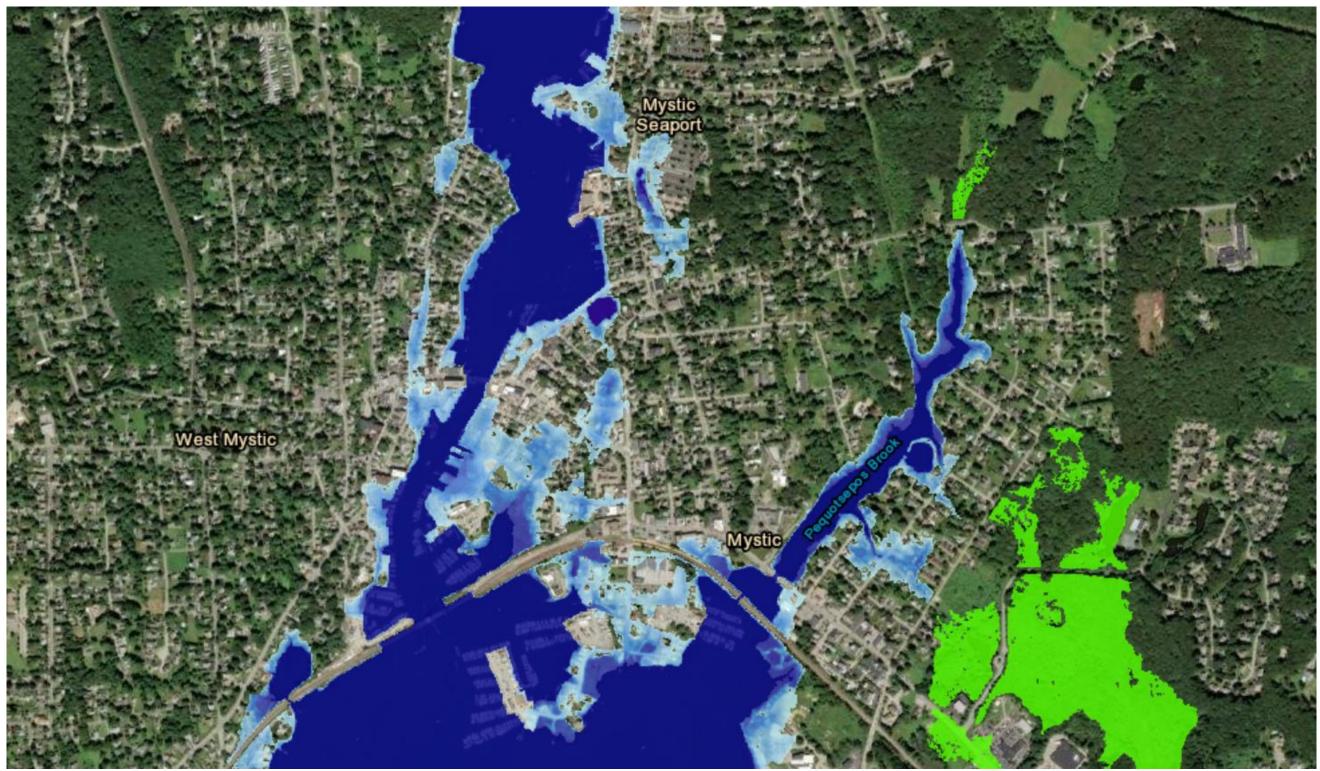












Mean Higher High Water (MHHW) with 1 m (3.3 ft.) of Sea Level Rise in 2100. This represents the upper bound (95% confidence interval) of the likely range of sea level rise in 2100 for the Long Island Sound.

RESILIENT MYSTIC

HEAT RISK FACTORS

- Downtown Mystic is heavily urbanized, with over half of the project area covered in concrete or asphalt
- Heat waves can cause health issues and compound the hazards of coastal flooding
- Climate change is expected to increase the frequency and duration of heat waves



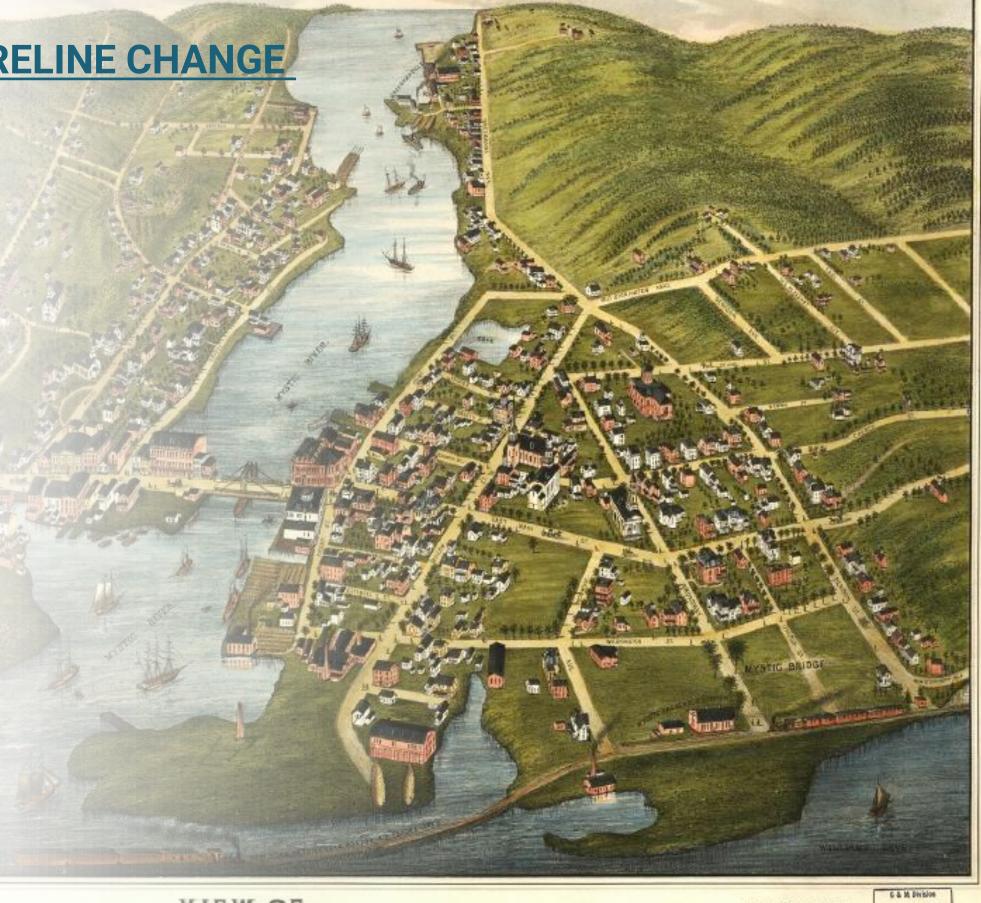






HISTORIC SHORELINE CHANGE

- Human intervention has also shaped Downtown Mystic's current and future flood vulnerability, with access to the water critical to Mystic's identity and economic prosperity
- Shoreline armoring and coastal fill have been used to expand the developable area and reduce erosion
- Historic reinvention of the community to adapt to changing risks and land use



YSTIC BRIDGE, CONN.



BUILDINGS IMPACTED BY FUTURE FLOODING

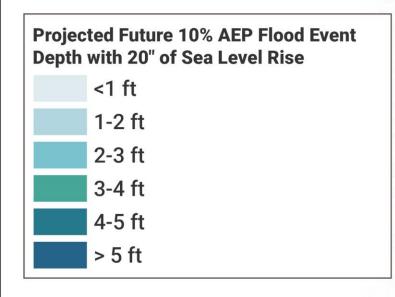
 Hundreds of buildings could be affected by coastal flooding in the future with sea level rise, bringing direct and indirect impacts such as residential displacement, business closures, or lost access to critical facilities

BUILDINGS IMPACTED 23 INDUSTRIAL

201 COMMERCIAL

390 RESIDENTIAL

LEGEND Buildings Impacted By Future Flooding Residential Industrial Commercial / Mixed Use



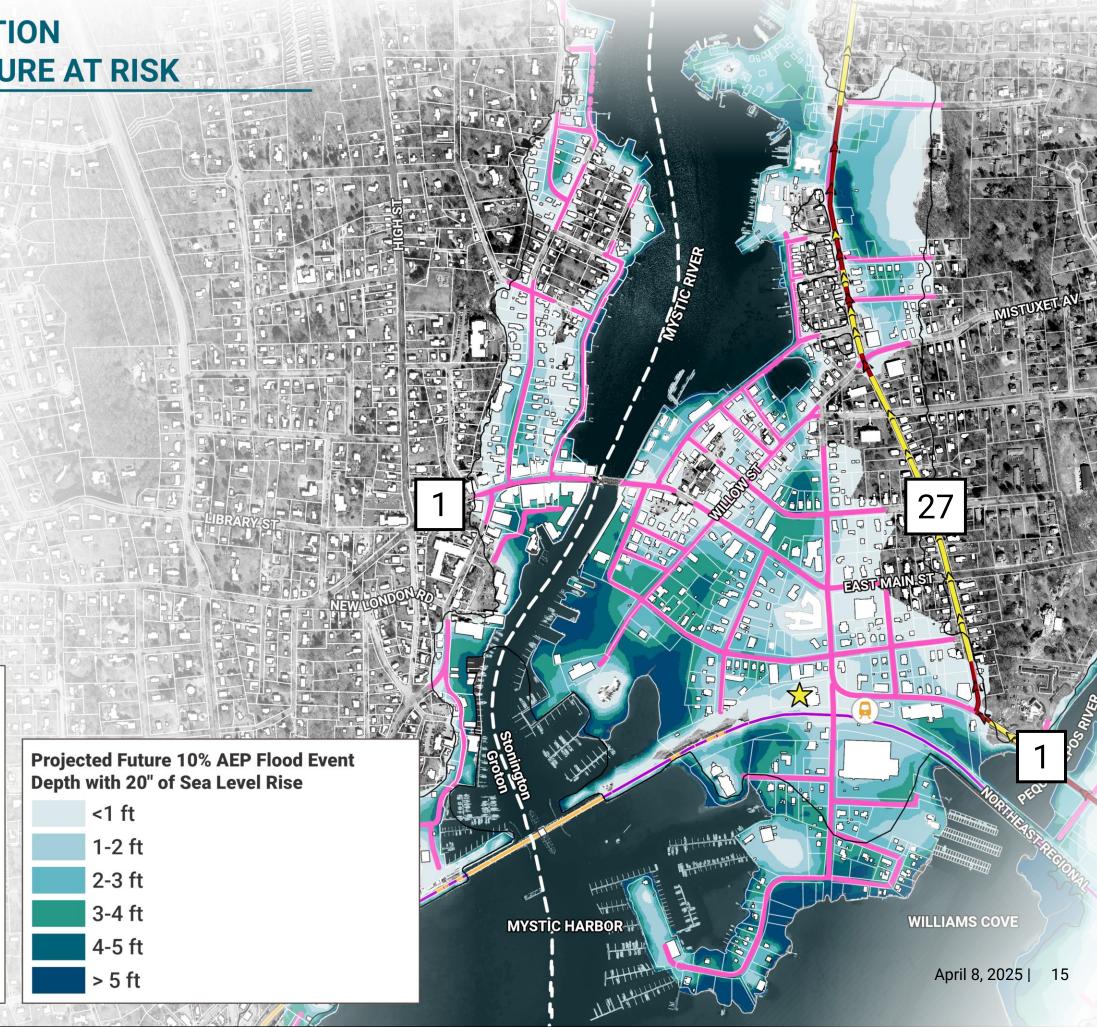




TRANSPORTATION INFRASTRUCTURE AT RISK

- Coastal flooding in Downtown Mystic is expected to bring widespread impacts to local and state roads, with automobile travel not advised at depths greater than 6"
- Flooding along Routes 1 and 27 would require advanced evacuation notice
- Impacts to the train station, tracks, and related equipment

LEGEND Emergency Response (Police, Fire Department, EMS) Railroad Station Street - Flood Impacted Evacuation Route - Non-Flood Impacted Evacuation Route - Flood Impacted Railroad - Non-Flood Impacted Railroad - Flood Impacted Railroad - Flood Impacted FEMA Zone AE





REGULATORY AREAS

Hundreds of buildings could be affected by coastal flooding in the future with sea level rise, bringing direct and indirect impacts such as residential displacement, business closures, or lost access to critical facilities

LEGEND

- **US Highway**
- State Highway
- **Local Road**
- Railroad
- **FEMA Zone AE**
- Area Outside of The Coastal Resource **Boundary**
- Town Managed Shellfish Bed
- **Federal Navigational Channel**
- **National Wetlands Inventory (NWI)** Wetlands



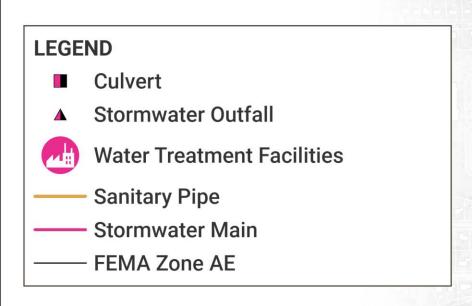
MYSTIC HARBOI

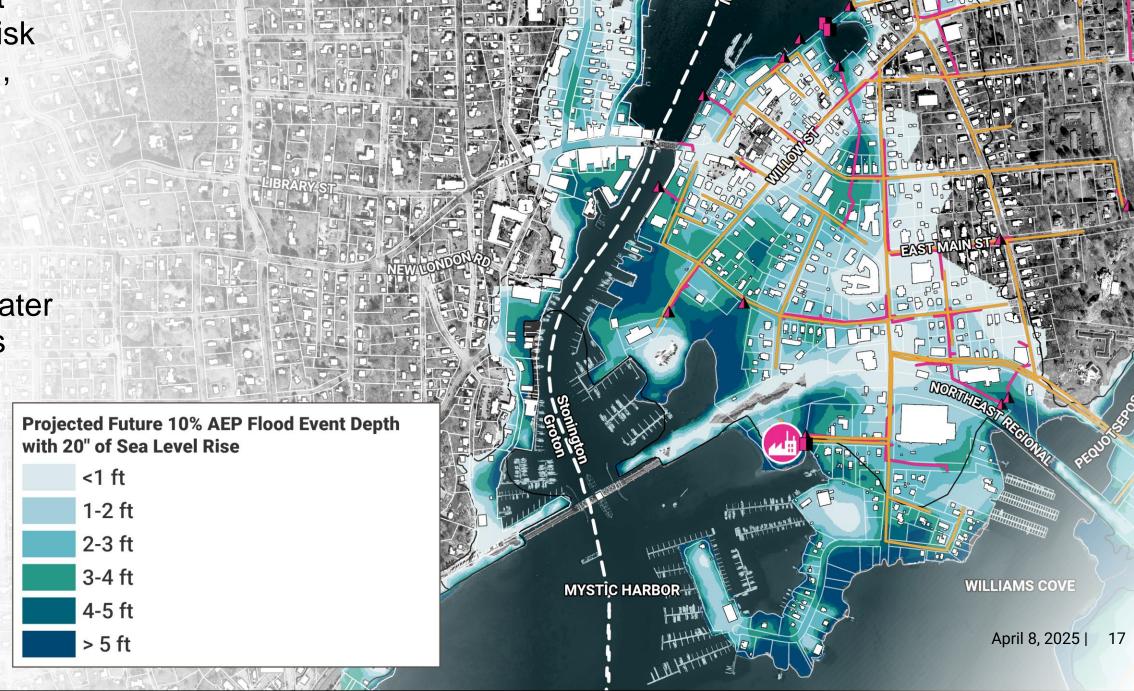
WILLIAMS COVE

April 8, 2025 | 16

WATER INFRASTRUCTURE AT RISK

- Coastal flooding and sea level rise can overwhelm the sanitary sewer system and wastewater treatment plant
- Wastewater treatment plant located in potentially high-risk flood zone with deep (3+ ft), fast-moving water
- Elevated water levels from flooding can prevent stormwater systems from draining and send ocean water into streets via storm drains





CRITICAL COMMUNITY ASSETS AT RISK

MYSTIC RIVER

WILLIAMS

COVE

April 8, 2025 | 18

- Critical community assets (public resources improve the health or general quality of life for Mystic's residents) and tourism/recreation assets
- Municipal assets directly impacted by the 10-year
 + 20" SLR flood extent include the post office,
 wastewater treatment plant, and fire department

Library/Post Office/ Community Center

- 1 MYSTIC POST OFFICE
- 2 FOURTH DISTRIC VOTING CENTER

Emergency Response

MYSTIC FIRE DEPARTMENT B. F. HOXIE ENGINE COMPANY

Water Treatment Facilities

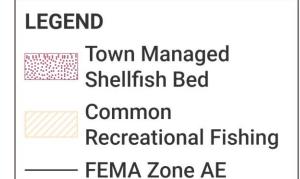
4 MYSTIC WASTEWATER TREATMENT FACILITY

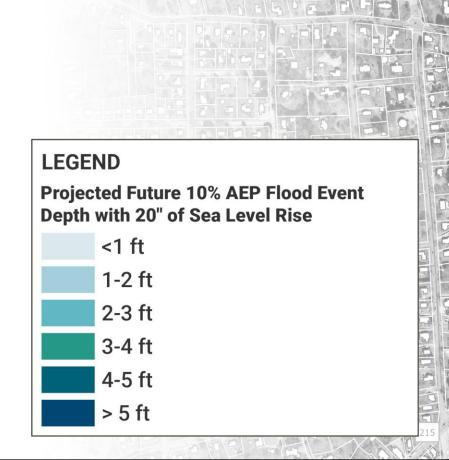
Health Care Facilities

- 5 APPLE REHAB
- 6 MYSTIC CVS PHARMACY

Religious Centers

- FIRST UNITED METHODIST
- 8 MYSTIC CONGREGATIONAL CHURCH
- 9 SAINT PATRICK CHURCH

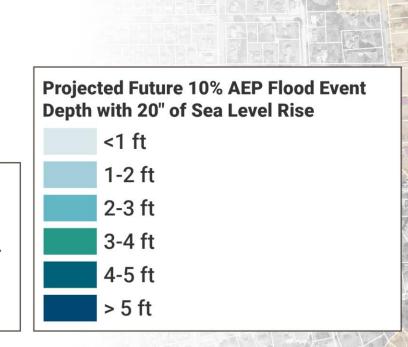




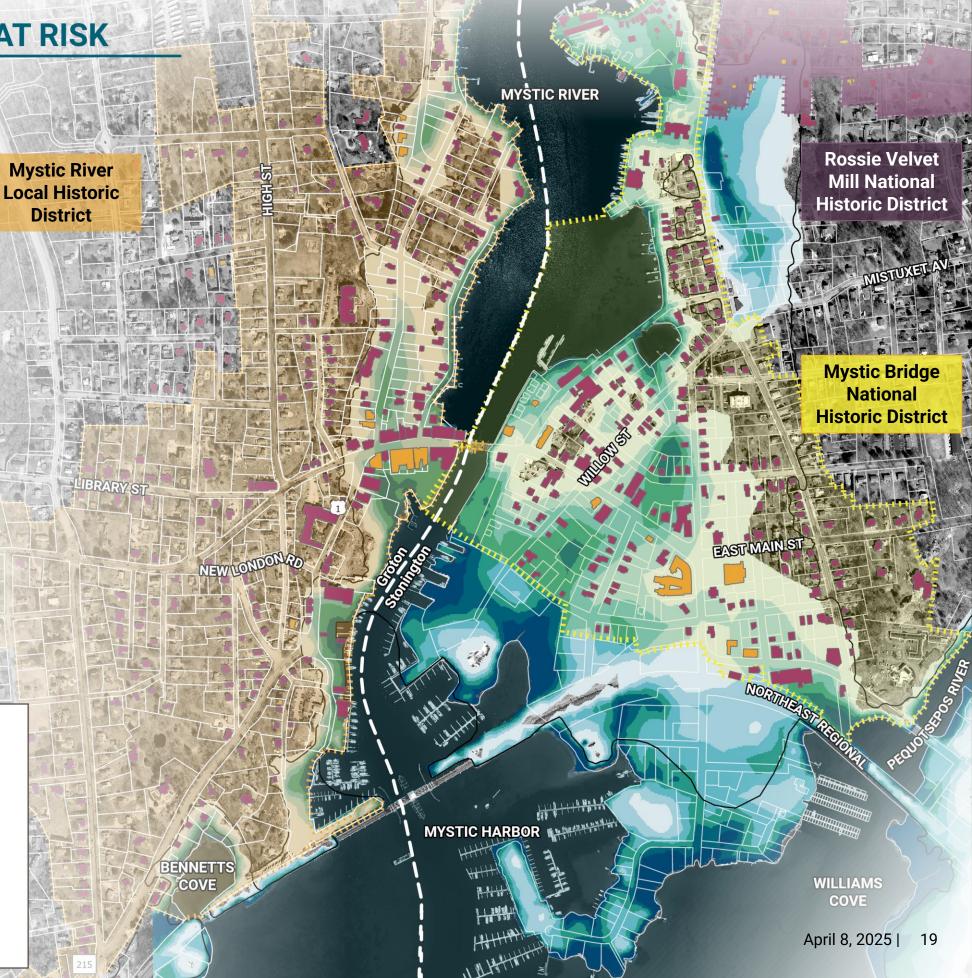
RESILIENT MYSTIC

HISTORIC RESOURCES AT RISK

- Mystic Bridge Historic District contains hundreds of historic properties in Stonington at risk of flooding
- Special considerations apply to mitigating coastal flood damage to historic structures
- Maintaining Mystic's historic character will need to be balanced with the need to make changes to structures and the landscape to address flood risk











PROJECT PROCESS

PRIORITIES

- Address critical transportation and resilience corridors
- Address shoreline/waterfront challenges: flood risk reduction, historic preservation, support tourism
- Reduce the impacts of extreme heat
- **Integrate** nature-based solutions + green stormwater infrastructure to realize multiple benefits

PROCESS

- **Understand** and **communicate** relative risks
- Engage the community to create the vision
- **Develop alternatives** based on risk mitigation and cost
- **Position** projects for implementation using identified state and federal funding











WORKSHOP SUMMARY- PUBLIC EVENTS

SUNDAY, FEBRUARY

23

MONDAY, FEBRUARY

24

TUESDAY, FEBRUARY

25

WEDNESDAY, FEBRUARY

26

WORKSHOP KICKOFF (VIRTUAL)

 $3^{PM} - 4^{PM}$

MICROSOFT TEAMS LINK AVAILABLE ON THE RESILIENT MYSTIC

WEBSITE: https://shorturl.at/KleO0

WORKSHOP KICKOFF AND WALKSHOP

 $10^{AM} - 12^{PM}$

JAMES T. CARLTON SCIENCE CENTER CLASSROOM AT WILLIAMS-MYSTIC

50 GREENMANVILLE AVE

PROJECT VISIONING

 $6^{PM} - 8^{PM}$

ST. PATRICK'S CATHOLIC CENTER 32 E MAIN ST

PROJECT OPEN HOUSE

 $4^{PM} - 6^{PM}$

JAMES T. CARLTON SCIENCE CENTER CLASSROOM AT WILLIAMS-

MYSTIC

50 GREENMANVILLE AVE.

FINAL WORKSHOP PRESENTATION

 $5:30^{PM} - 7^{PM}$

B.F. HOXIE FIRE STATION 34 BROADWAY AVE.

OTHER EVENTS:

- PRESENTATIONS TO CLIMATE CHANGE TASK FORCE & FLOOD, EROSION **CONTROL & CLIMATE CHANGE BOARD**
- TABLES AT PUBLIC EVENTS
- DEBRIEFS FOR ELECTED **OFFICIALS**
- MEETINGS WITH KEY TOWN **DEPARTMENTS**
- MULTIPLE FOCUS GROUP **CONVERSATIONS**

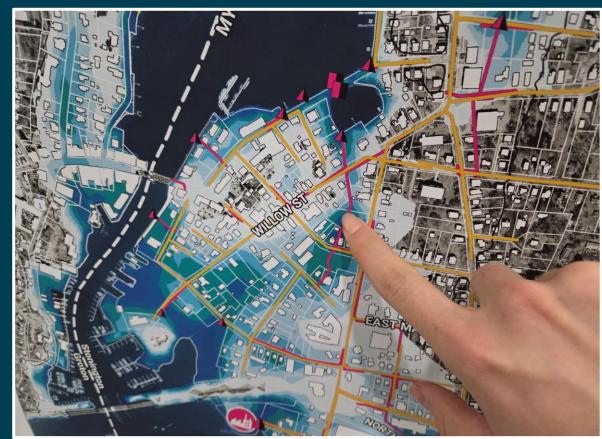


WORKSHOPS AND FOCUS GROUPS











WORKSHOPS AND FOCUS GROUPS













COMMUNITY WORKSHOP AND FOCUS GROUP MEETING

- Listened to your suggestions
- Met with community-based focus groups and members of community resources
 - Town Selectpeople
 - Senator Heather Somers
 - Representative Aundré Bumgardner
 - Religious Group Leaders
 - Leaders of the Town Departments and Boards
 - Water Pollution Control Authority
 - Public Safety
 - Climate Change Task Force
 - Mystic Seaport
 - Mystic Aquarium
 - •Flood Erosion Control Climate Change Board
 - Community Technical Advisory Committee
 - Denison Pequotsepos Nature Center
 - Business Owners
 - Tribal Representatives
 - Youth Climate Summit









RESILIENT MYSTIC

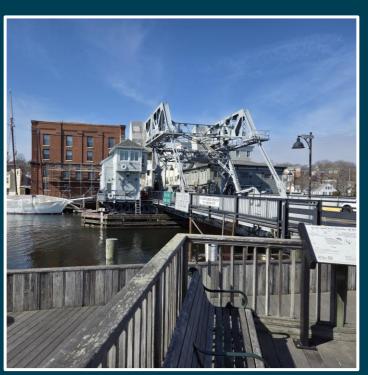
WHAT DO YOU LOVE ABOUT MYSTIC?







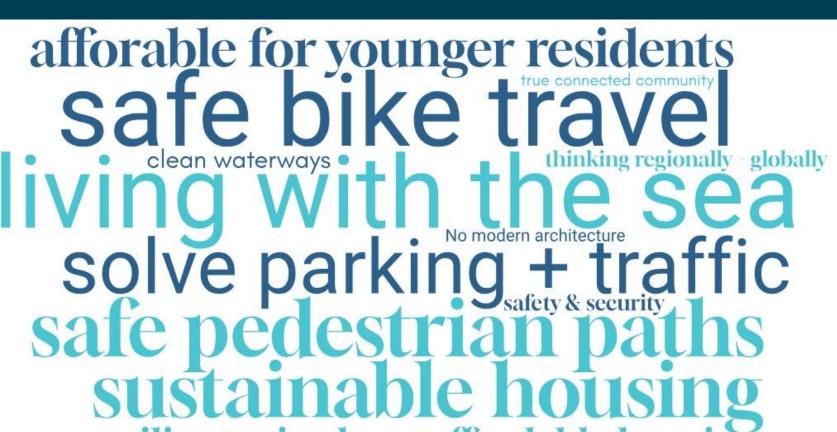


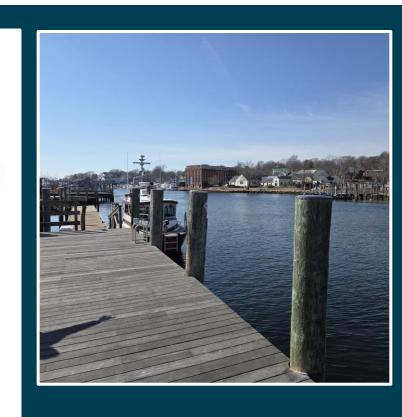




WHAT ARE YOUR HOPES FOR THE NEXT GENERATION IN MYSTIC?











learning, planning, action-oriented community resource preservation + conservation more trees dreaming and working together live & work



CASE STUDIES

VILLAGE OF MYSTIC, STONINGTON, CT





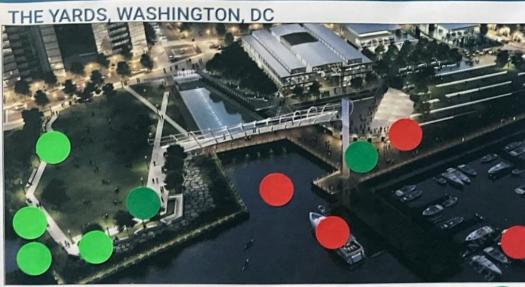
















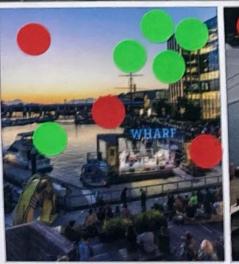


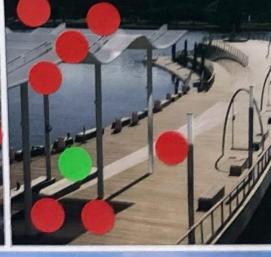


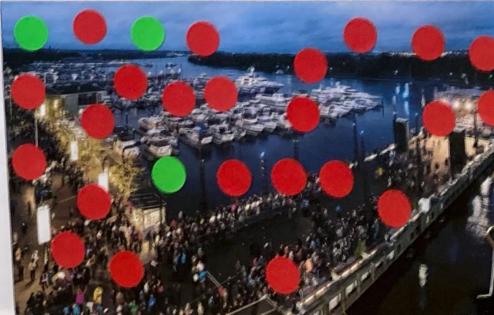








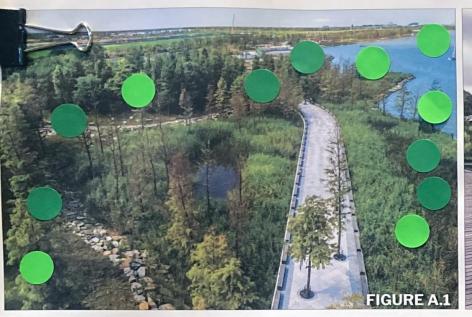




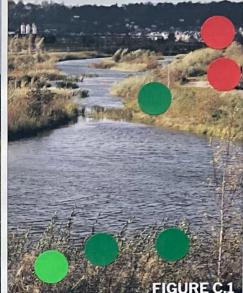
VISUAL PREFERENCE BOARDS VILLAGE OF MYSTIC, STONINGTON, CT

CIRCA FUSS&O'NEILL

FLOODABLE PARKS



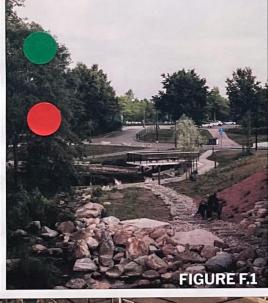


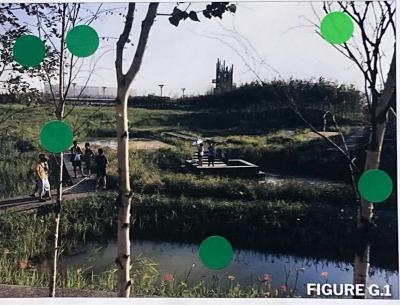






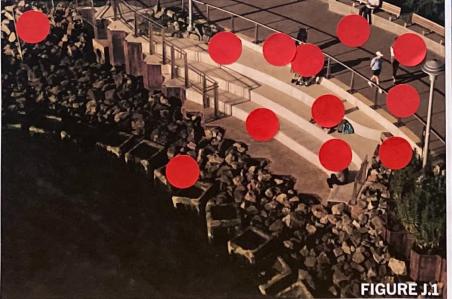
















CIRCA FUSS&O'NE

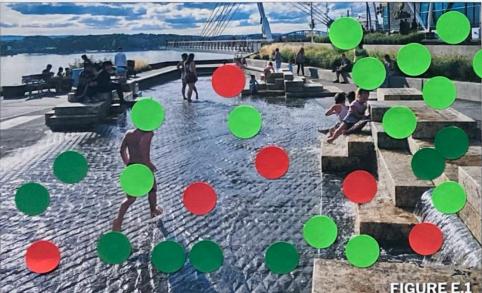
NATURALIZED SOLUTIONS FOR PASSIVE RECREATION

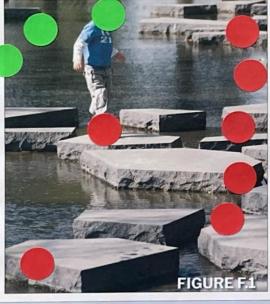


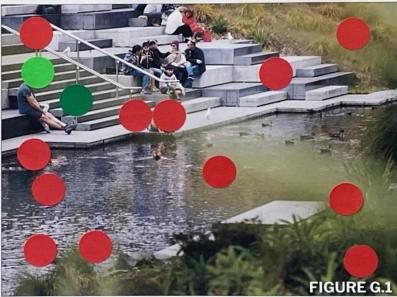










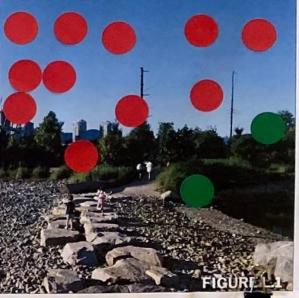












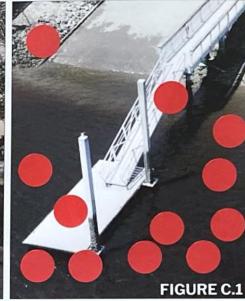
VILLAGE OF MYSTIC, STONINGTON, CT



WATERFRONT ACCESS & SHARED-USE PATH NETWORK

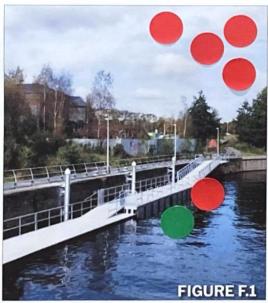




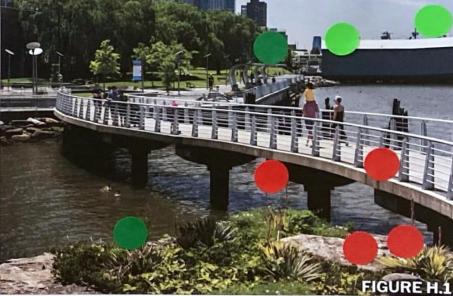






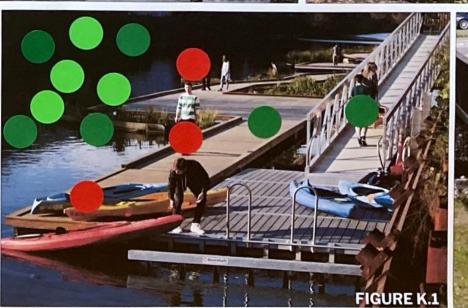














VISUAL PREFERENCE BOARDS VILLAGE OF MYSTIC, STONINGTON, CT

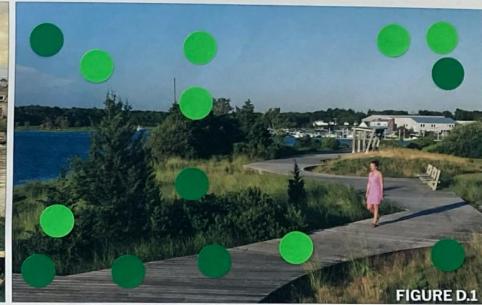


GATHERING SPACES & OVERLOOK FEATURES



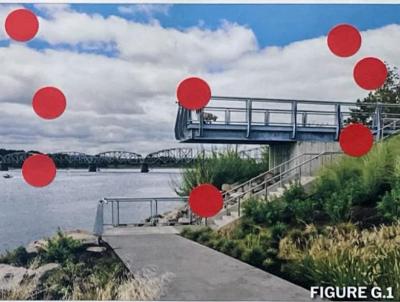






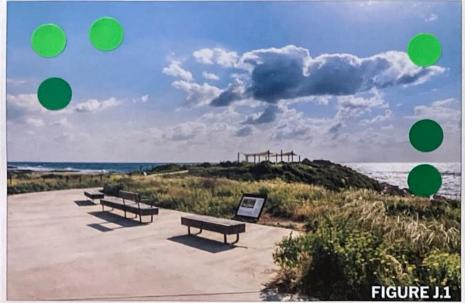




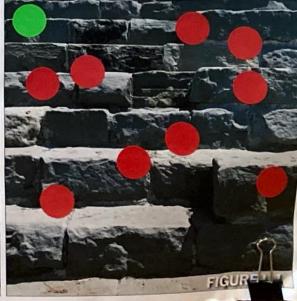


















HISTORIC RESOURCES PLANNING - THE PAST



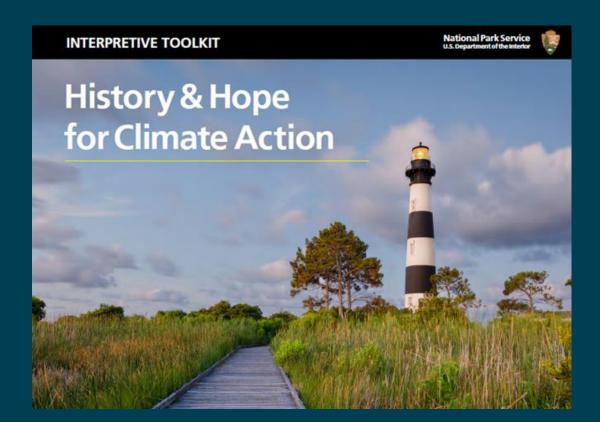
- Downtown Mystic's National Register listings – 1979
- Community has NOT wanted Historic District Zoning
- Established the Architectural Review Standards Board
- CT SHPO and NPS with Federal \$/permits



HISTORIC RESOURCES PLANNING - THE FUTURE

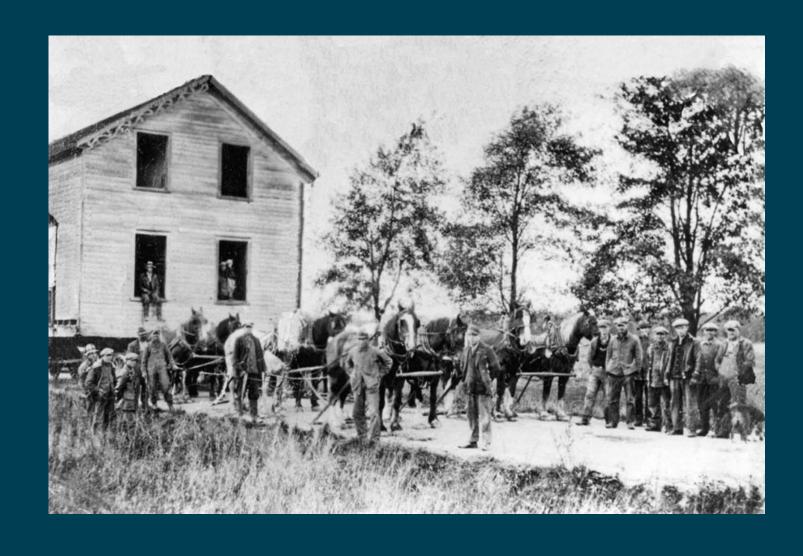


- Manage change rather than fighting it
- Adaptation as the norm, not exception
- Encourage small scale adaptation of individual historic buildings over time:
 - Avoid catastrophic loss in the future.
- Required at all levels:
 - Stonington
 - CT State environmental permitting
 - CT State Historic Preservation Office
 - National Park Service

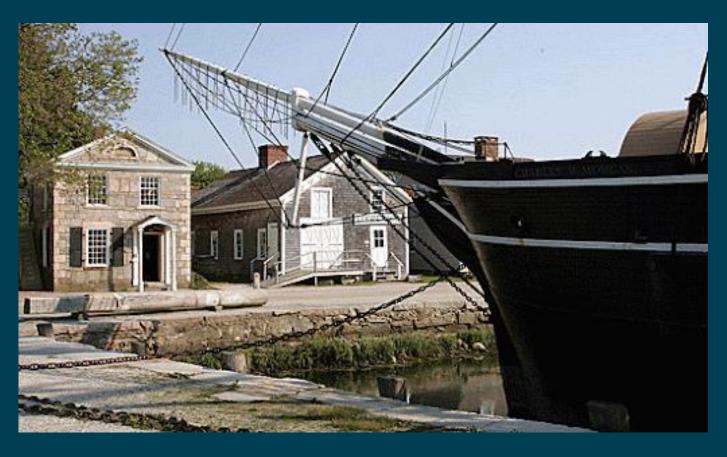




HISTORIC RESOURCE ADAPTATION HISTORY



- New England coastal communities have tradition of changing:
- Elevating buildings
 - Moving buildings
 - (Mystic Seaport Museum is largely moved structures)
 - Elevating roadways





HISTORIC RESOURCES ADAPTATION - BEST PRACTICES

Charleston, SC





City of Charleston Board of Architectural Review

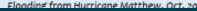
Design Guidelines for Elevating Historic Buildings

Adopted: July 24, 2019

Charleston has historically been plagued by significant flooding issues, due to its low-lying nature and the development on infilled land where marshes once stood. However, in recent years there has been an intensification of flooding due to hurricanes, severe rainstorms, and high tides. The City concluded the best policy for the long-term preservation of historic structures was to support their need to elevate to the necessary FEMA

requirement. In an effort to be proactive, two workshops were held in November 2017 and March 2018 with the public, architects, engineers, contractors, and preservationists to develop a set of guidelines to ensure elevations were done as sensitively and appropriately as possible. This resulting document focuses on four key areas to guide elevation projects for historic buildings: considerations for streetscape/context, site design, foundation design, and architecture/preservation.







Halsev Map (1949) - historic high tide water line showr



HISTORIC RESOURCES ADAPTATION - BEST PRACTICES

Newport, RI



Elevating History

The City of Newport is proud to be one of the first communities in the country to adopt standards designed to help protect some of its most historic neighborhoods from the threat posed by rising sea levels. These guidelines are intended to help guide homeowners through the process of elevating historic buildings as we seek to strike a balance between the preservation of our historic neighborhoods and the need to face the present—day realities posed by climate change.

Resources

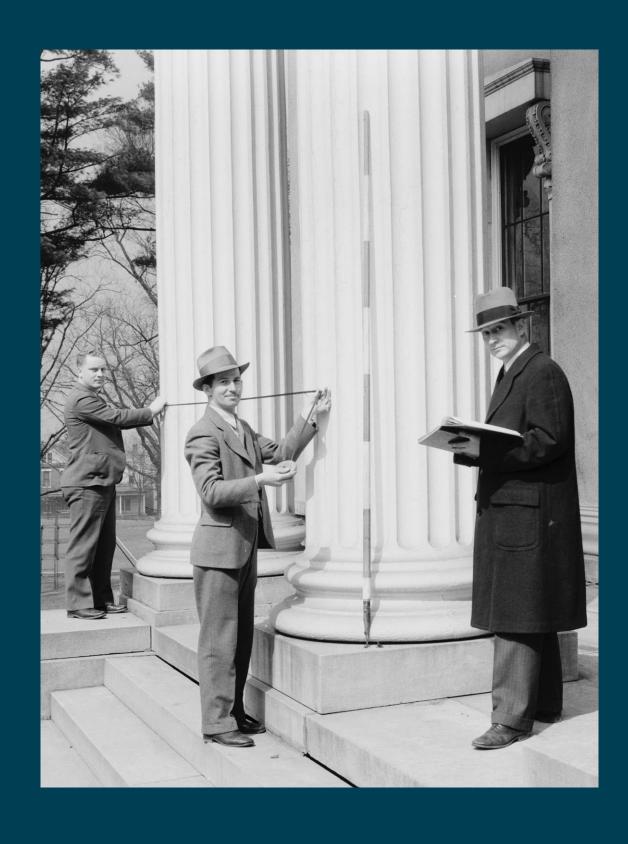
- . Design Guidelines for Elevating Historic Buildings (pdf)
- · Flood Map (GIS Portal)
- Historic District Map (GIS Portal)
- · Certificate of Appropriateness Application (pdf)

Links

Historic District Commission Preservation Officer



HISTORIC RESOURCES - DISASTER PLANNING AND RECOVERY



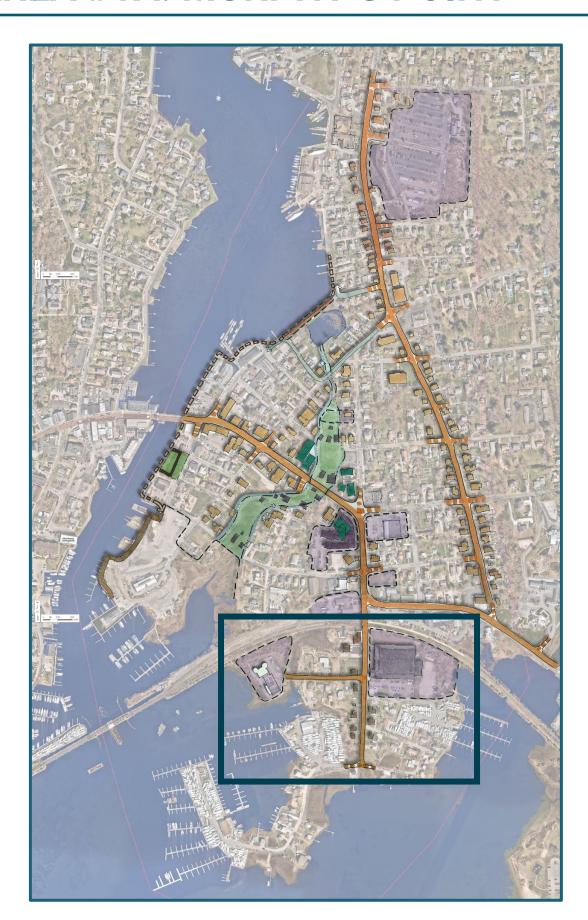
- Document historic buildings
- Upgrade Zoning and Planning regulations and processes to support historic rehabilitation
- Train municipal officials in responding to postdisaster conditions for historic buildings
 - Pre-identify support resources



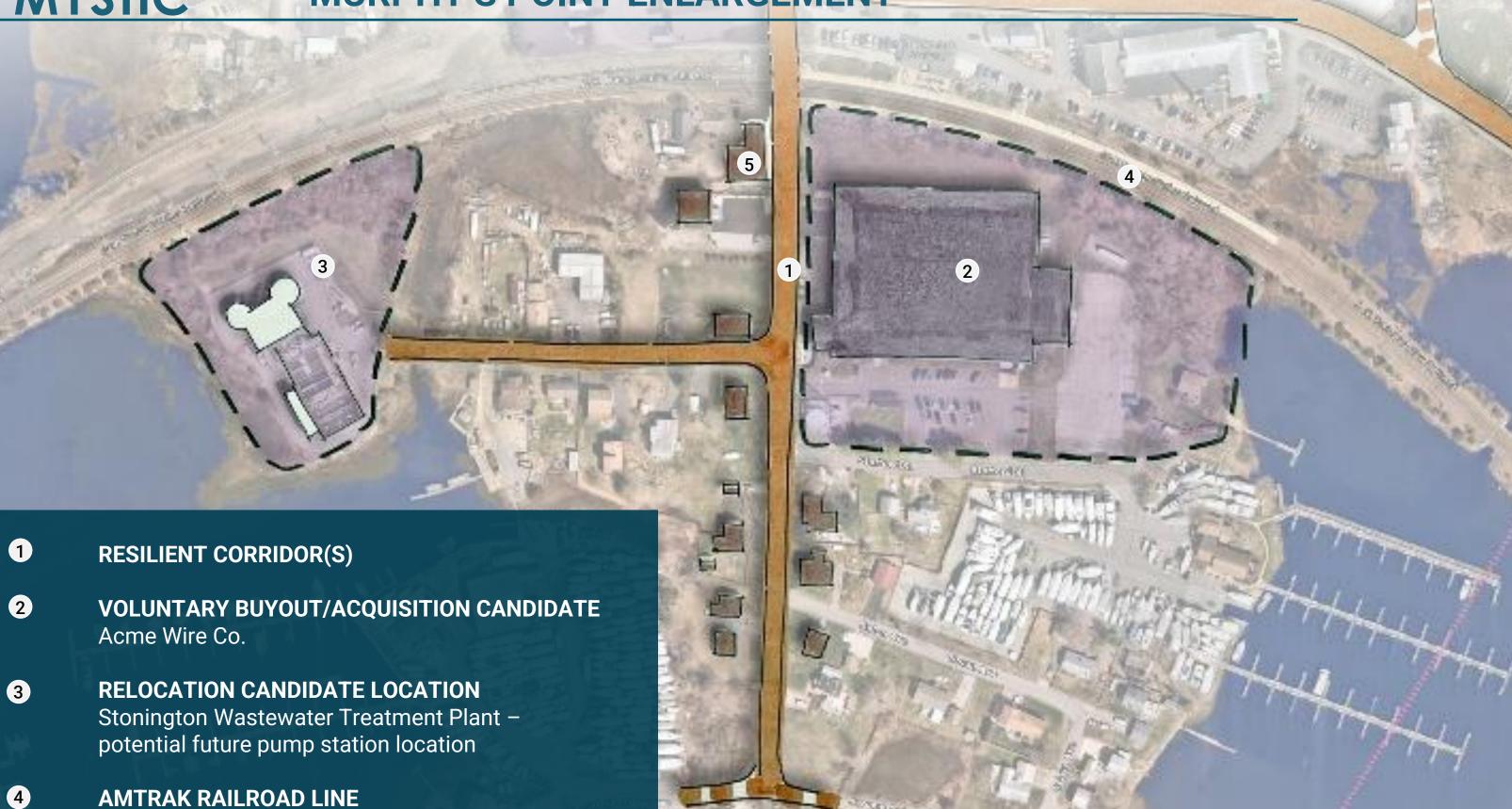


PRIORITY AREA #1A: MURPHY'S POINT

- · Partners needed
 - Town owns the roads
 - Property owners abutting the road will be directly affected
- Elevate Broadway Ave. Extension and Edgemont St to maintain access and functionality to the wastewater treatment facility.
- Provide access to water-dependent businesses that are themselves implementing adaptations to stay open during high tide flooding.

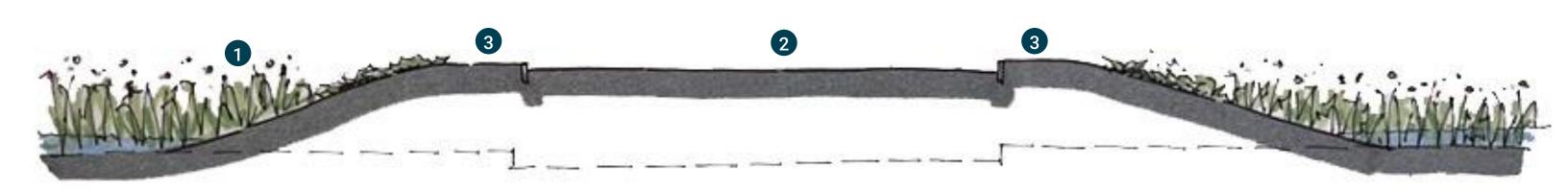


MURPHY'S POINT ENLARGEMENT





BROADWAY AVENUE EXTENSION



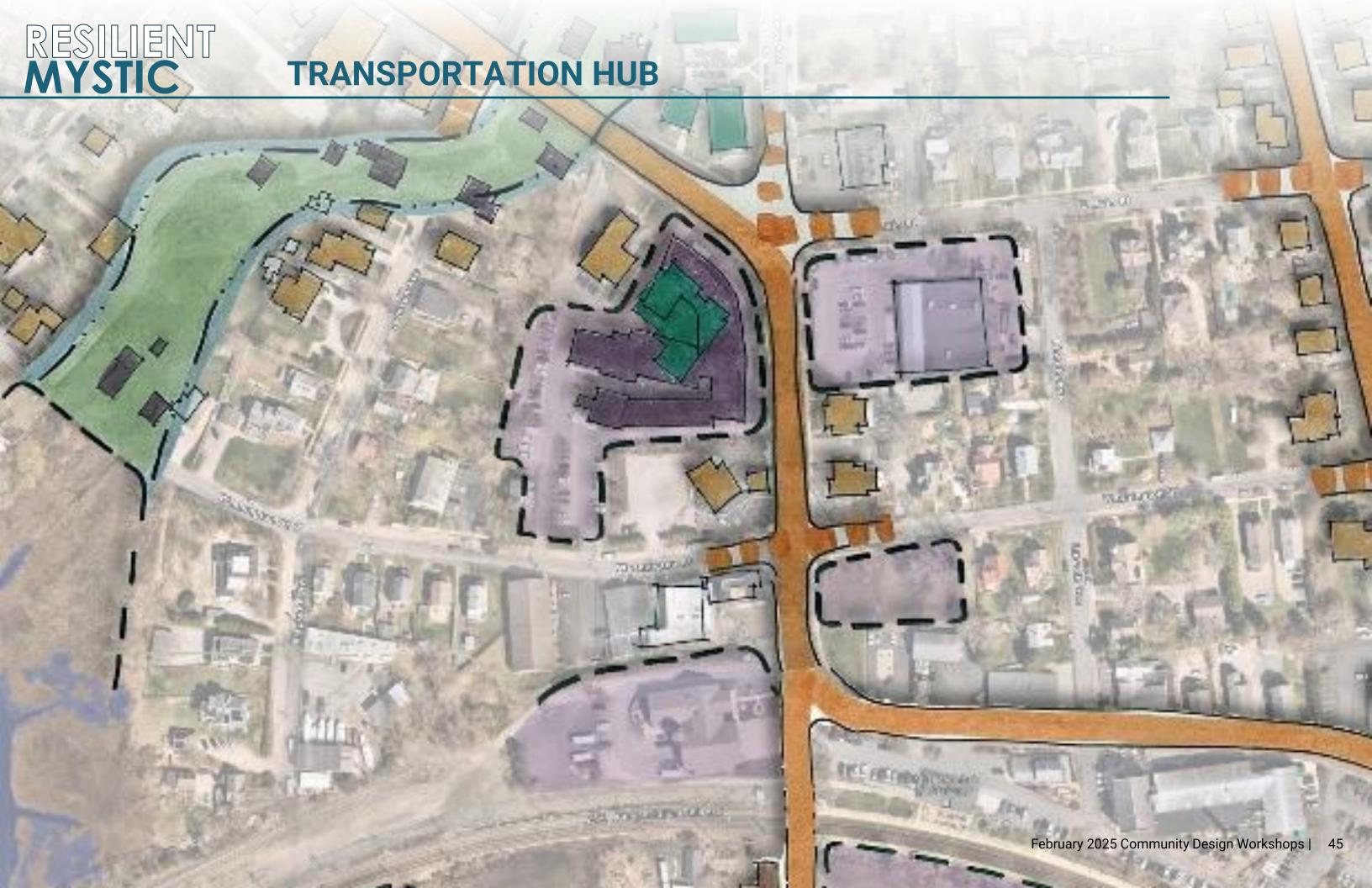
- 1 SALT MARSH
- 2 RAISE ROAD OUT OF THE FLOODPLAIN
- 3 LANDSCAPE BUFFERS

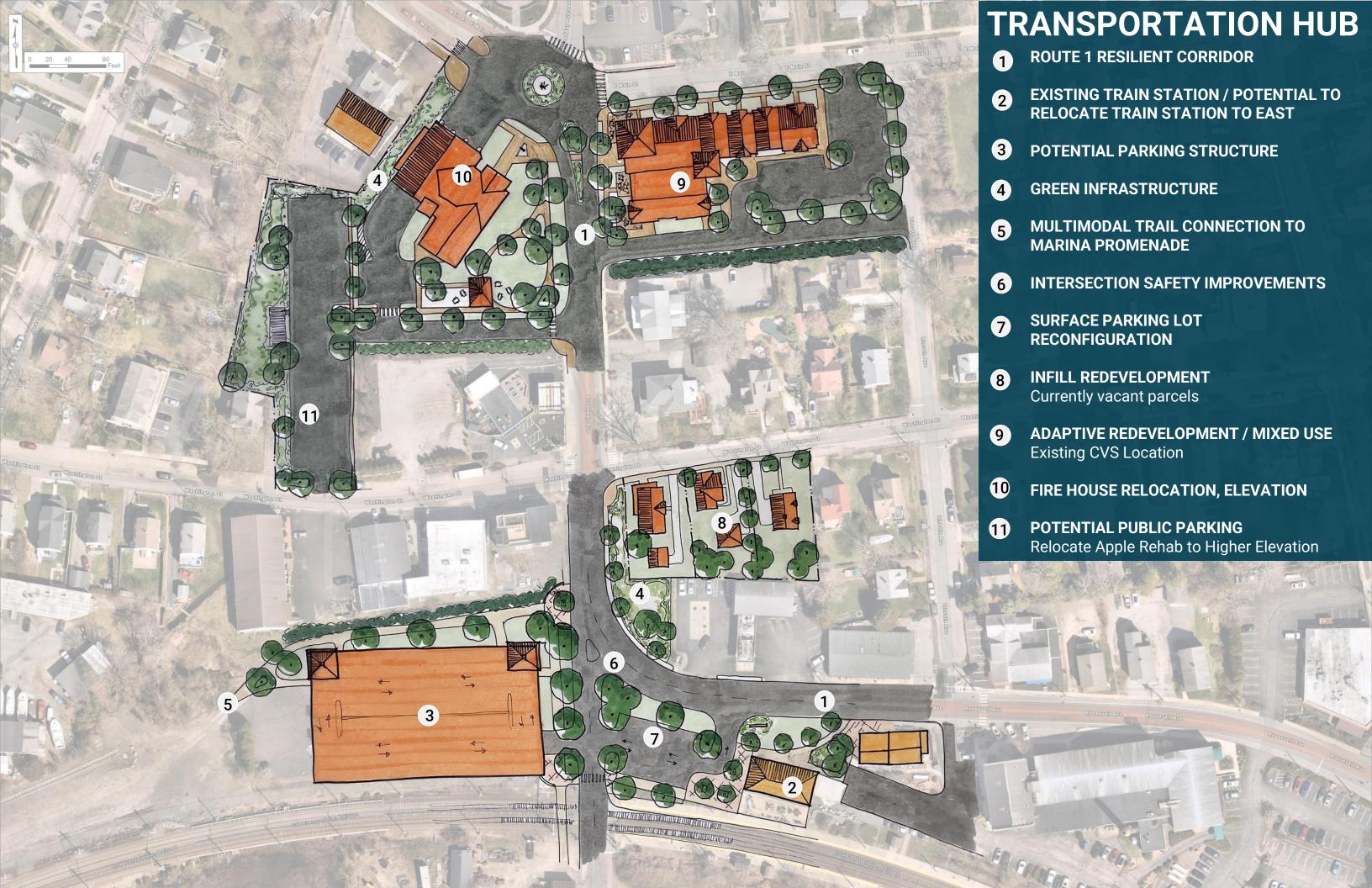


PRIORITY AREA #1B: FIRE STATION & TRAIN DEPOT

- Partners needed
 - · State owns the road
 - Property owners abutting the road will be directly affected
- Need to evaluate road raising relative to coastal surge, tidal flooding, AND pluvial flooding to avoid creating a barrier to stormwater drainage.
- Retain critical infrastructure (fire station & train depot) in their current locations. OR, could consider relocating the fire station to higher ground.









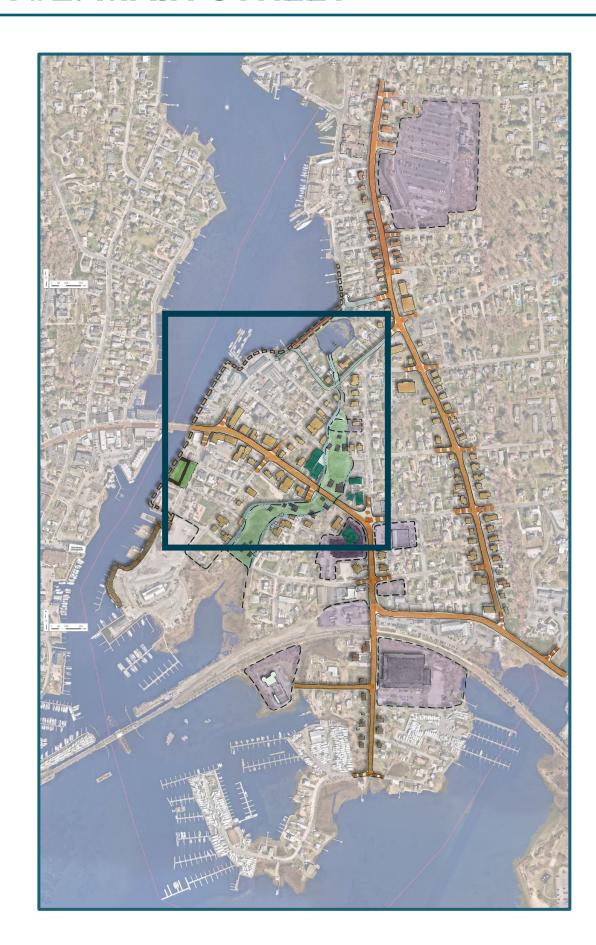
PROJECT AREA VISUALIZATIONS





PRIORITY AREA #2: MAIN STREET

- Partners needed
 - State owns the road
 - Property owners abutting the road will be directly affected
- Need to **evaluate** road raising relative to coastal surge, tidal flooding, AND pluvial flooding to avoid creating a barrier to stormwater drainage.
- Potential for **infill zoning** to reinforce corridor and build out contiguous streetscape.
- Potential for letting the water in and creating floodable recreational **spaces** adjacent to the Main Street corridor.



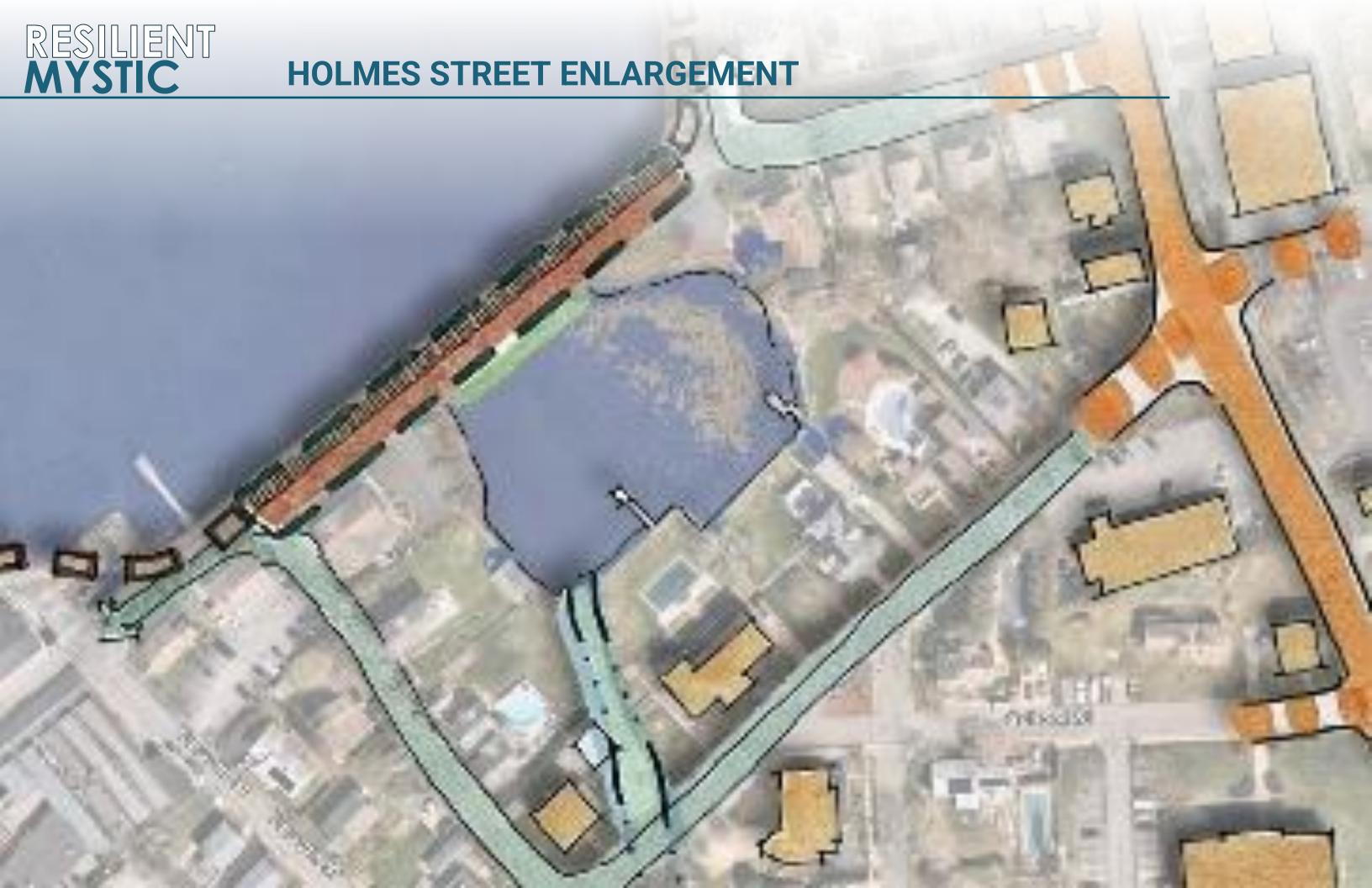


ZONING AND LAND USE PLANNING



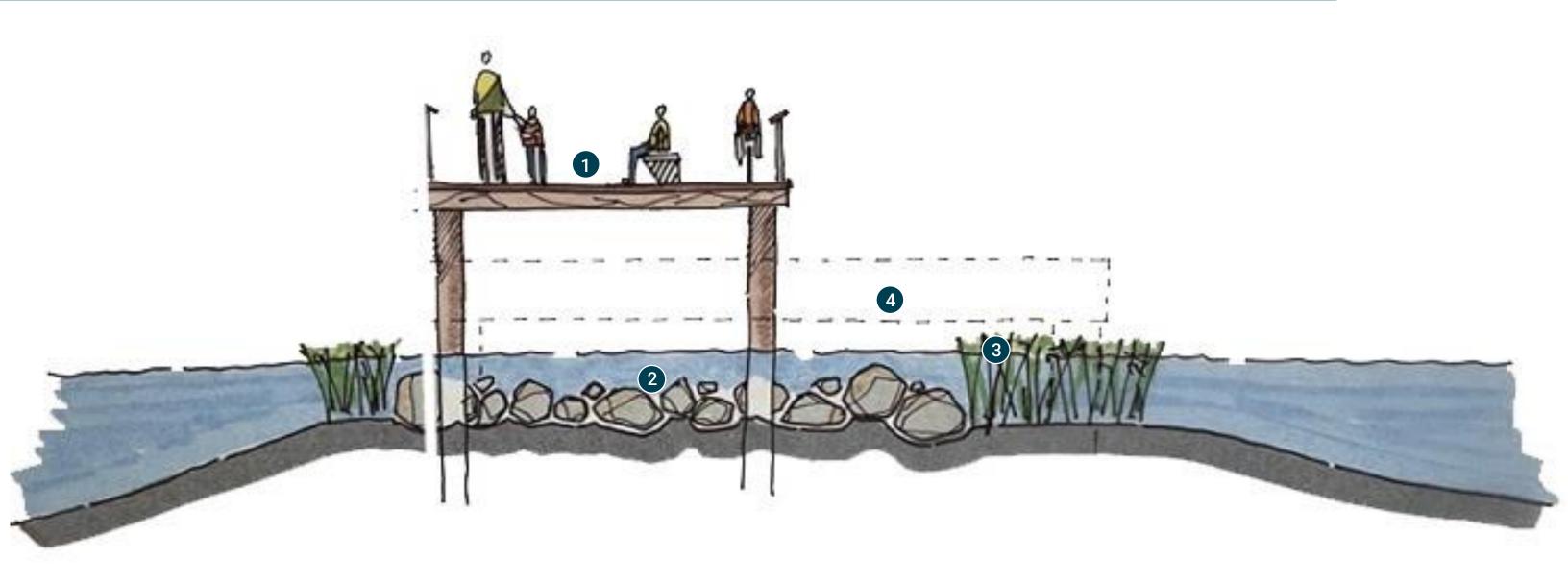
- Recommend "Village District" in Zoning Revision
- Density to maintain housing and economic vitality
- Allowing/expanding mixed-use
- Form-based code as tool for better outcomes
- New development in keeping with historic scale and character
- Adaptation of historic structures guided







HOLMES STREET MULTIUSE PROMENADE EXTENSION

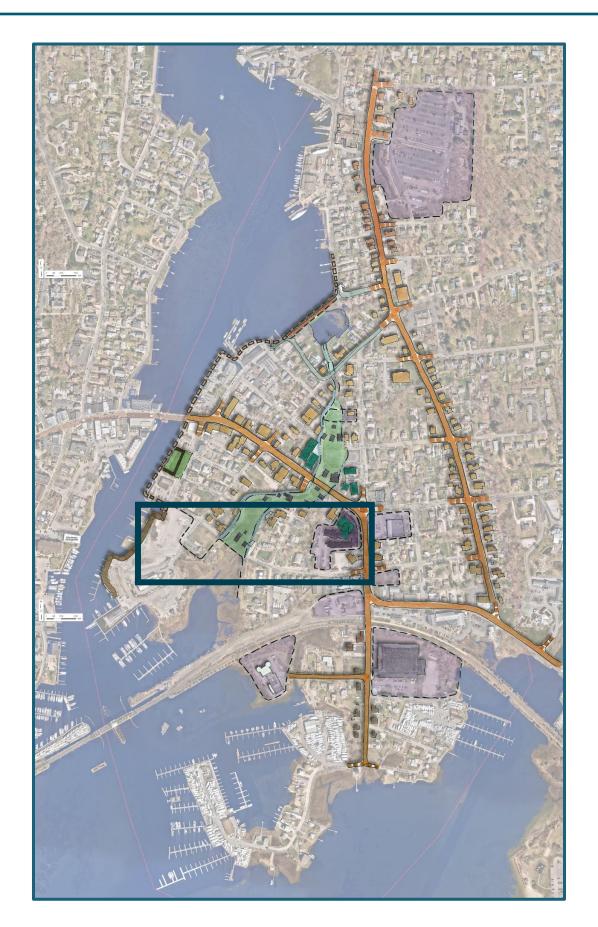


- 1 MULTI-USE PATH RAISED ABOVE FUTURE 1% AEP FLOOD DEPTH
- 2 HABITAT ENHANCEMENTS
- **3** LIVING SHORELINES
- **4** EXISTING ELEVATION OF HOLMES STREET



PRIORITY AREA #3: WASHINGTON STREET

Town owns the road





RESILIENCE CORRIDOR ADAPTATIONS



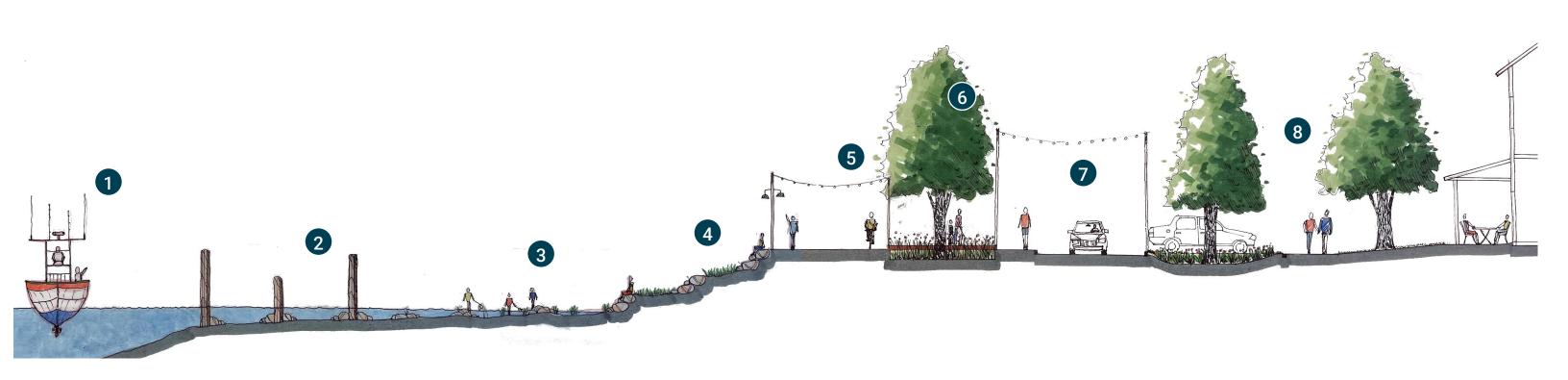
- OFFSTREET SHARED USE PATH
- ROAD ELEVATION ABOVE FUTURE 1% AEP FLOOD

Note: Elevations range between 1 and 6 feet depending on location

- EXISTING ROAD ELEVATION
- GREEN INFRASTRUCTURE
- BUILDING ELEVATIONS TO TIE INTO RAISED ROADS



COTTRELL & WASHINGTON STREETSCAPE RESILIENCE CONCEPT



- DRAWBRIDGE/BOAT STAGING AREA Note: Dinghy Dock + Boat Tie-Ons Remain
- 2 HISTORIC REMNANT PILINGS Ecologically Enhanced Breakwaters
- **INTERACTIVE TIDEPOOL**
- **FLOODABLE LIVING LAB TERRACES**
- **MULTIMODAL WATERFRONT PROMENADE**
- **GREEN INFRASTRUCTURE**
- **COTTRELL ST. FLEXIBLE EVENT CORRIDOR**
- **GREEN INFRASTRUCTURE + ONSTREET PARKING**



AREA OF INTEREST: ROUTE 27 & MYSTIC SEAPORT MUSEUM POTENTIAL RESILIENCE HUB

- Partners needed
 - State owns the road
 - Mystic Seaport Museum owns the parking lot
- Need to **evaluate** road raising relative to coastal surge, tidal flooding, AND pluvial flooding to avoid creating a barrier to stormwater drainage.
- Potential for letting the water in and creating floodable recreational spaces along with a structured parking facility in close proximity to Downtown Mystic.



RESILIENT MYSTIC

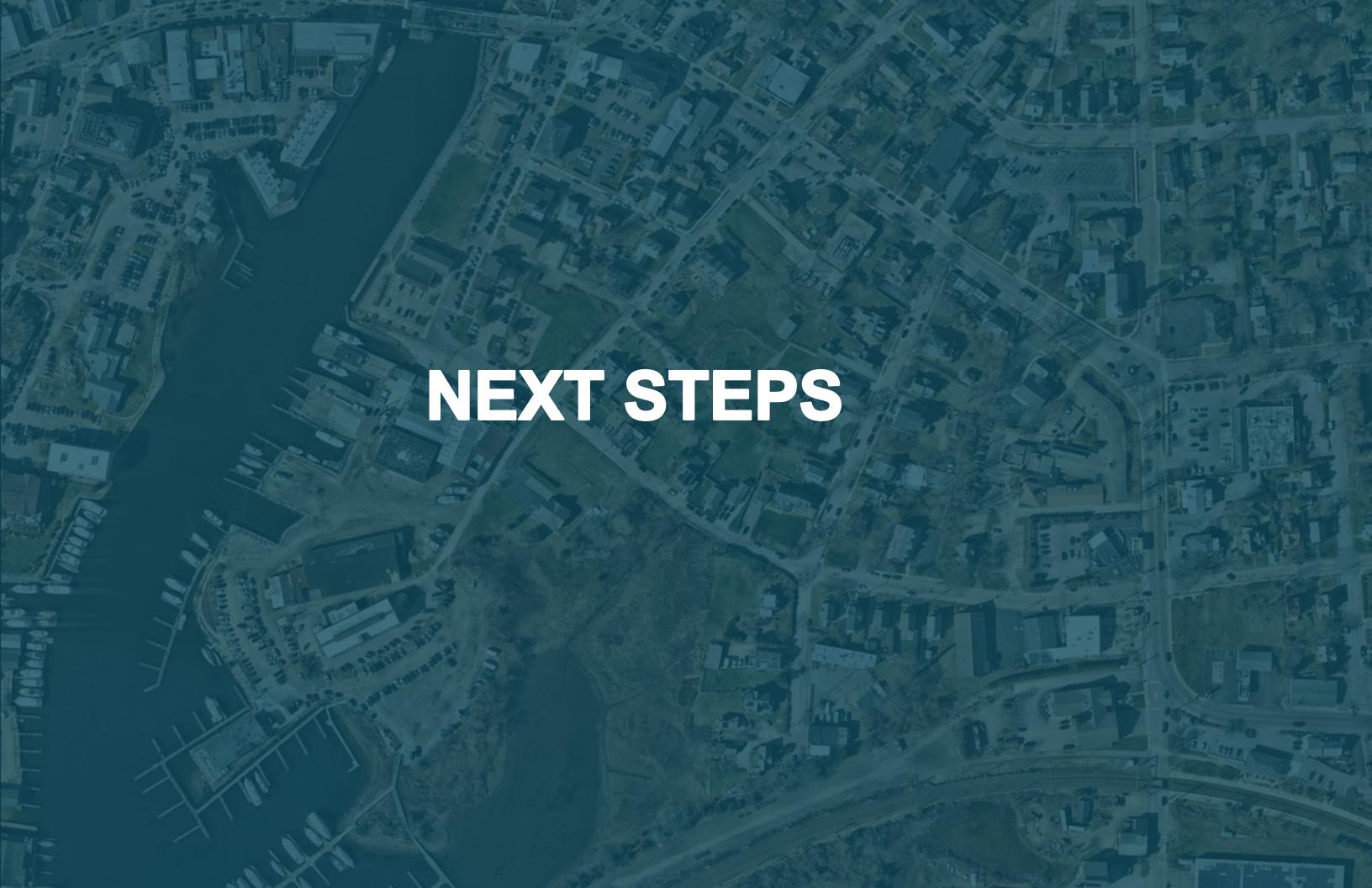
AREA OF INTEREST: ROUTE 27 & MYSTIC SEAPORT MUSEUM POTENTIAL RESILIENCE HUB





MYSTIC SEAPORT MUSEUM SURFACE PARKING RESILIENCE CONCEPT





WE WANT TO HEAR FROM YOU!



HOME

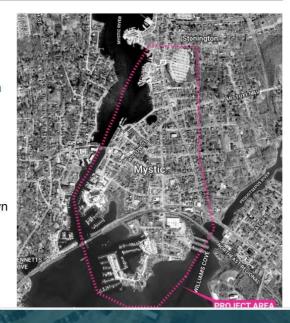
ABOUT

GET INVOLVED

PROJECT OVERVIEW

Mystic, Connecticut has long forged its identity around its relationship to the sea. For centuries, ship builders and manufacturers have used Mystic Harbor's sheltered location as a staging ground for maritime commerce. Mystic today contains hundreds of historic sites, residential properties, and tourist

As the climate has changed and sea levels have risen, however, this proximity to the sea has led to increasingly frequent and severe coastal flooding. In response to this urgent threat, the town of Stonington and Connecticut Institute for Resilience and Climate Adaptation (CIRCA) are coordinating with local stakeholders to identify coastal flood vulnerabilities and develop cost-effective solutions in the downtown area.





MYSTIC

ABOUT HOME

GET INVOLVED

JOIN US AT OUR UPCOMING COMMUNITY WORKSHOP!





JOIN US FEBRUARY 23rd-26th for four days of public events to find solutions to coastal flooding in Downtown Mystic!

PROJECT KICKOFF SUNDAY 3PM-4PM VIRTUAL (MICROSOFT TEAMS) VISIT WEBSITE FOR TEAMS LINK

WORKSHOP KICKOFF & WALKSHOP

MONDAY 10^{AM}-12^{FM}
JAMES T. CARLTON SCIENCE CENTER CLASSROOM AT WILLIAMS-MYSTIC
50 GREENMANVILLE AVE

PROJECT VISIONING

MONDAY 6PM-8PM ST. PATRICK'S CATHOLIC CENTER 32 F MAIN ST

PROJECT OPEN HOUSE

FINAL WORKSHOP PRESENTATION WEDNESDAY 5:30°M-7°M





TELL US HOW FLOODING & EXTREME HEAT AFFECTS YOUR COMMUNITY

us your input by adding pins to the Points of Interest Map or by filling out the Community Impacts Survey below.

→ Open the Points of Interest Map

WE WANT TO HEAR FROM YOU!

Welcome to the Resilient Mystic Points of Interest Map!

Use the tools on the top right to add and explore pins at points of interest for the Resilient Mystic Project. Points of interest include areas of past flooding, extreme heat, water recreation, etc.



Legend Button

Use this to see what the symbols on the map are.



Filter Button

Use this to filter the pins that show up on the map.



Add a Pin Button

Use this to add a pin to the map.

 \rightarrow Continue to the Map

4

Resilient Mystic Points of Interest

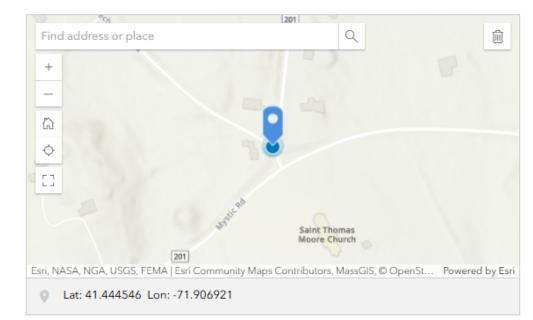
Add pins to the map to identify locations of flooding, extreme heat, important places, water recreation, and more!

Name*

What kind of pin would you like to add to the map?*

-Please select-

Choose the location of your pin.*



Submit your photo.

(Photos will be publicly viewable on the map)

Drop image here or select image



Submit

