LONG-TERM STRATEGY FOR CLIMATE ADAPTATION AND RESILIENCE: RESILIENT CONNECTICUT 2.0

THE NEXT PHASE III PROJECTS

Annual Summit
December 1, 2023

John Truscinski, CFM
David Murphy, PE, CFM
Agenda

• Resilient Connecticut 2.0
  • Lower Connecticut River Area (RiverCOG)
  • Southeastern Connecticut (SCCOG)
• Introduction to Each Proposed Project
  • Portland
  • East Haddam
  • Stonington/Mystic
  • Jewett City
• Closing Remarks
RESILIENT CONNECTICUT 2.0


- Goals are to continue (1) supporting development of a statewide resilience project pipeline and (2) increasing coordination across municipal, regional, and state planning.

- Data and mapping tools to support project development include a new Statewide Climate Change Vulnerability Index (CCVI) for flooding and heat, additional zones of shared risk, and identification of additional resilience opportunity areas.
RESILIENT CONNECTICUT 2.0

Potential Climate Adaptation and Resilience Opportunity Areas in Southeastern Connecticut
Draft: March 15, 2023

<table>
<thead>
<tr>
<th>ROA Location</th>
<th>ROA Description</th>
<th>Potential Climate Impacts</th>
<th>Resilience Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>New London</td>
<td>ROA located in New London</td>
<td>Flooding and extreme heat</td>
<td>Increase green space, improve infrastructure</td>
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<tr>
<td>Willimantic</td>
<td>ROA located in Willimantic</td>
<td>Stormwater management</td>
<td>Implement green roofs, enhance stormwater management systems</td>
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<tr>
<td>Stonington</td>
<td>ROA located in Stonington</td>
<td>Sea level rise</td>
<td>Elevate critical facilities, develop sea level rise planning</td>
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</tbody>
</table>

Critical Facilities or Regional Assets present:
- >10 Critical Facilities or Regional Assets
- 6-10 Critical Facilities or Regional Assets
- 3-5 Critical Facilities or Regional Assets
- 1-2 Critical Facilities or Regional Assets
- Critical Facilities or Regional Assets not present
RESILIENT CONNECTICUT 2.0

Potential Climate Adaptation and Resilience Opportunity Areas in the Lower Connecticut River Valley Region
Draft: March 29, 2023

ROAR Name
What is a ROAR?
A ROAR is a complex climate adaptation and resilience Opportunity Area with potentially unmet needs related to two climate change threats: flooding and extreme heat. Each of these ROARs is generally positioned where flood vulnerability is moderate to high and heat vulnerability is moderate to high.

Location
These are the primary municipalities where the ROARs are located.

These are some of the assets “counted” to identify ROARs. Many were provided by RiverCOS in a GIS layer, while some assets and resources were taken from other lists and maps. See the reverse side of this sheet for a key.

<table>
<thead>
<tr>
<th>ROAR Name</th>
<th>Location</th>
<th>Critical Facilities</th>
<th>Regional Assets</th>
<th>Historic Resources</th>
<th>Environmental Hazards</th>
<th>Existing Affordable Housing</th>
<th>Transient Oriented Development</th>
<th>Building Elevations in 500 Year Flood Zone</th>
<th>&quot;Resilient Corridor&quot; Potential</th>
<th>Septic Systems</th>
<th>Public Water Supply Wells</th>
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<tr>
<td>Downtown to South Farms</td>
<td>Middletown</td>
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<td>Plains Road Corridor</td>
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<td>Route 154 Loop</td>
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RESILIENT CONNECTICUT 2.0

- The seven pilot projects ("Phase III") of Resilient Connecticut 1.0 are the purple icons in southwest Connecticut.

- The upcoming projects under Resilient Connecticut 2.0 Phase III are the blue icons in the RiverCOG and SCCOG regions.
INTRODUCTION TO EACH PROPOSED PROJECT

- The four projects will attempt to address different kinds of flood risks
- Two of the four will also address extreme heat

<table>
<thead>
<tr>
<th></th>
<th>Coastal Flood Adaptation</th>
<th>Riverine Flood Adaptation</th>
<th>Stormwater Flood Adaptation</th>
<th>Extreme Heat Adaptation</th>
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<tbody>
<tr>
<td>Portland</td>
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<td>East Haddam</td>
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<tr>
<td>Mystic/Stonington</td>
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<td>Jewett City</td>
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</table>
How to Participate
Flood and Heat Risk Reduction

- Three critical facilities are affected by flooding from stormwater – the police station, senior center, and library.

- The senior center is the food pantry and the Town’s primary cooling center.

- Imagine a very intense precipitation event occurring while the cooling center is occupied.
RESILIENT PORTLAND

Dashed line is area of flooding

Blue line is a potential buried watercourse heading to the south
RESILIENT PORTLAND

Typical heavy rain event; photo from Town of Portland

Dashed line is area of flooding

Blue line is a potential buried watercourse heading to the south
What would you do to make the senior center/food pantry/cooling center more resilient? People may be inside the facility during intense precipitation events.
Please rank the following choices

1st: Drainage improvements
2nd: Choose a different facility for these important uses
3rd: Flood barriers at openings
4th: Move usable spaces higher inside the building
RESILIENT PORTLAND

What would you do to make the police station more resilient? Police need access during intense precipitation events.
Please rank the following choices

1st: Drainage improvements
2nd: Flood barriers at openings
3rd: Move the police station
What would you do to make the library more resilient? People may be inside the facility during intense precipitation events.
Please rank the following choices

1st: Drainage improvements

2nd: Flood barriers at openings

3rd: Do nothing; this is a library
RESILIENT PORTLAND

Thinking about the three facilities together, what should be done to make them more resilient?
Please rank the following choices

1st: Drainage improvements
2nd: Floodproof everything
3rd: Move everything
**Flood Risk Reduction**

- Succor Brook corridor has a flashy nature and has flooded nonresidential buildings used by Goodspeed

- The Actor Housing development (constructed 2011) has flood risk but has not yet flooded

- The Town’s WWTP is at risk of flooding from the Connecticut River
RESILIENT EAST HADDAM

Nonresidential Goodspeed buildings

1% Annual Chance Flood Zone (SFHA) associated with Succor Brook

SFHA associated with Connecticut River

Goodspeed Actor Housing

Goodspeed Opera House
RESILIENT EAST HADDAM

Did you know...

- Actors’ unions set maximum distances between performing spaces, housing, and rehearsal spaces?

  and

- East Haddam center doesn’t have much excess space!
Buildings that have flooded or nearly flooded in recent years:

- Rehearsal Hall
- Offices and Administration
- Housing

- CIRCA developed HEC-RAS modeling and inundation mapping for Succor Brook, since the SFHA is an A zone

- The lateral extent of flood risk is not significantly different when comparing the 1% to the 0.2% chance flood events
RESILIENT EAST HADDAM

Succor Brook
East Haddam, CT
1% Chance of Flood
(100 yr flood)

Legend
- High
- Low

Sources: ESRI, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, EarI Japan, METI, Earl China (Hong Kong), (c) OpenStreetMap contributors, and the iGeo User Community.

Flood
What would you do to make the rehearsal hall more resilient, or make the use (rehearsing) more resilient? The actors cannot walk further than their union contracts allow.
Please rank the following choices

1st: Acquire and demolish the building while finding a new rehearsal space

2nd: Floodproof the entire building

3rd: Do nothing; musicals are not my thing
What would you do to make the office building more resilient, or make the uses (administration, facilities management) more resilient?
Please rank the following choices

1st: Combination of grading and floodproofing
2nd: Regrade the area
3rd: Flood barriers at openings
RESILIENT EAST HADDAM

What would you do to make the actor housing more resilient? The actors cannot walk further than their union contracts allow.
Please rank the following choices:

1st: Create floodplain enhancements to reduce flood elevations
2nd: A combination
3rd: Elevate the cottages
4th: Move the cottages
**Flood Risk Reduction**

- Numerous regional assets, critical facilities, key roads, and historic and cultural resources have coastal flood risk; these include:
  - Mystic Seaport
  - Mystic Fire Company
  - Town WWTP
  - Train Station

- Sea level rise will increase the incidence and depth of flooding

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### Resilient Connecticut 2.0 Phase II

#### Regional Adaptation/Resilience Opportunity Areas

<table>
<thead>
<tr>
<th>Consideration</th>
<th>Characteristics of Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Vulnerability</td>
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<tr>
<td>Heat Vulnerability</td>
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<tr>
<td>Social Vulnerability</td>
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</tbody>
</table>

The Mystic section of Stonington experiences coastal flood inundation from king tides and storm surges. Over time, flooding is expected to increase in frequency and duration. Inundation has impacted and/or isolated private and public properties, transportation infrastructure, transit lines, critical facilities such as the Mystic Fire Company, historic and cultural resources, and major economic assets such as Mystic Seaport Museum. Inherent challenges include the fact that historic structures may be impossible to elevate; the geometry of the road network may complicate elevations of individual road surfaces, and critical facilities such as the Mystic Fire Company and the wastewater treatment plant could become isolated in a flood. Meanwhile, new developments are elevated or floodproofed, making them relatively resilient without addressing isolation risks. Extreme heat management is a concern in Mystic. The cooling centers for the Town of Stonington are in the high school and police station; several miles from Mystic. If cooling centers are needed during a flood event, roads may be impassable and people may not be able to reach them. Options for extreme heat management in Mystic may be limited, and the community may wish to consider methods of reducing the causes of heating as well as methods of providing respite from heat.
RESILIENT MYSTIC/STONEINGTON

- **Pink** = 0.2% flood (FEMA)
- **Light blue** = 1% flood (FEMA)
- **Green** = 1% flood (shallow) (CIRCA flood analysis)
- **Dark blue** = 1% flood (deep) (CIRCA flood analysis)
RESILIENT MYSTIC/STONINGTON

12/22/23 Coastal Flood Event; photos from CIRCA
RESILIENT MYSTIC/STONINGTON

What would you do to make privately owned buildings more resilient?
Please rank the following choices

1st: Coordinate elevations and floodproofing in the community

2nd: This is the property owners' decision

3rd: All of the above!

4th: Don't do anything until the roads are elevated

5th: Those sandbags look pretty cool
What would you do to make the Mystic Fire Company Station more resilient?
Please rank the following choices

1st: Flood barriers for internal utility rooms
2nd: Move the Fire Company
3rd: Flood barriers at buildings openings
RESILIENT MYSTIC/STONINGTON

What would you do to make important historic and cultural resources more resilient?

Photos from Mystic Seaport Museum
Please rank the following choices:

1st - Combinations of elevations and floodproofing
2nd - Rearrange buildings to take advantage of differences in grade
3rd - All of the above
4th - Tolerate flooding of historic and cultural resources
What would you do to make the wastewater treatment plant more resilient?
Please rank the following choices

1st: Flood protection system around the property
2nd: Floodproof individual components
3rd: Eliminate the facility by expanding either the Borough or Pawcatuck treatment facility
4th: Relocate the facility
RESILIENT JEWETT CITY

- Floodway (pink)
- 1% Annual Chance Flood Zone (SFHA) (teal)
- 0.2% Annual Chance Flood Zone (500-yr) (blue)
- Critical facilities in the Borough
- Sewer pumping station
RESILIENT JEWETT CITY
RESILIENT JEWETT CITY

What would you do to make these condominium units more resilient? It looks like the lower levels were initially designed to flood.
Please rank the following choices

1st: Make the lower levels floodable by converting to storage, parking, and access; replace the living space by expanding laterally or upward

2nd: Make the lower levels floodable by converting to storage, parking, and access; do not replace the living space

3rd: Managed retreat: relocate residents

4th: Flood protection system

5th: Elevate the entire buildings to preserve lower level uses while reducing risk
What would you do to make these condominium units more resilient? It looks like the lower levels were not initially designed to flood.
Please rank the following choices:

1st: Managed retreat: relocate residents
2nd: Make the lower levels floodable by converting to storage, parking, and access; do not replace the living space
3rd: Flood protection system
4th: Make the lower levels floodable by converting to storage, parking, and access; replace the living space by expanding laterally or upward
5th: I'm not sure; these buildings look challenging!
6th: Elevate the entire buildings to preserve lower level uses while reducing risk
What would you do to make these condominium units more resilient? Information about the lower levels is not clear.
Please rank the following choices

1st: Some combination of elevations and relocation
2nd: Flood protection system
3rd: I'm ready for the break
RESILIENT JEWETT CITY

What would you do to make the sewer pumping station more resilient?
Please rank the following choices

1st: Elevate
2nd: Floodproof
3rd: Relocate
RESILIENT CONNECTICUT AND THE PROJECT PIPELINE

Grant Opportunities

Sustained Engagement

Identify Need → CIP or HMP → Concept Design → Benefit Cost Analysis → Additional Design → Revisions & Permitting → Final Design → Bidding → Construction → In Service → Monitoring

Portland → East Haddam → Jewett City → Stonington Mystic → Fairfield → Ansonia → Fair Haven → South Norwalk → Stratford → Danbury

Taking a step backward is possible and often will occur, in practice, along a project pipeline

CIRCA interventions and value added possible
CLOSING REMARKS

- Coordination with Hazard Mitigation Plan updates was beneficial for the SCCOG and CRCOG municipalities
  - We asked “what are the challenges?”
- The *Resilient Connecticut* approach allows CIRCA to develop concepts that the municipalities are not advancing to a study phase on their own
  - Where can we help solve complex challenges?
- Adaptation planning takes time
  - Planning support needed for next 20-30 years
  - Innovative approaches are needed
  - Coordination with economic activity, redevelopment, and housing needs
  - We all need to help municipalities win federal funds