



# Appendix A: Literature Review Memo

Resilience Improvement Plan

Connecticut Department of Transportation

# INTRODUCTION

The Literature Review Memo was created to identify synergies between the CTDOT Resilience Improvement Plan (RIP) and previously published statewide and regional resiliency planning efforts. The literature review covered pertinent planning documents developed by other entities across the state and are included in the RIP for reference. This literature review examines twelve (12) existing Connecticut plans, including the 2023 Connecticut State Hazard Mitigation Plan, and each of the nine (9) Councils of Government (COG) Hazard Mitigation Plans. Localized extreme weather projections were also included in this literature review exercise. The review identified common weather-related challenges and active projects, providing CTDOT with a knowledge base of identified resilience opportunities for potential action.

## LITERATURE REVIEW

In order to develop an understanding of the resilience work completed to date, the literature review consisted of statewide and local hazard mitigation plans, climate resiliency plans, Connecticut Institute for Resilience and Climate Adaptation (CIRCA) planning reports, and the Connecticut Statewide Long-Range Transportation Plan. Information from the plans helped to inform final, high-level takeaways for the CTDOT RIP.

The plans reviewed as part of this exercise are listed below in Table 1.

**TABLE 1: PLANS REVIEWED**

Plan	Planning Period
2023 Connecticut Natural Hazard Mitigation Plan (CT HMP)	2023-2028
2018 Connecticut's Statewide Long-Range Transportation Plan 2018-2050 (LRTP)*	2018-2050
2024 Capitol Region Natural Hazard Mitigation and Climate Adaptation Plan Update (CRCOG)	2024-2029
2023 South Central Regional Council of Governments Hazard Mitigation Plan Update (SCRCOG)	2023-2028
2023 Southeastern Connecticut Council of Governments Multi-Jurisdictional Hazard Mitigation and Climate Adaptation Plan Update (SECOG)	2023-2028

2021 Western Connecticut Council of Governments Multi-Jurisdiction Hazard Mitigation Plan Update (WestCOG)	2021-2026
2015 Northeastern Connecticut Council of Governments Regional Hazard Mitigation Plan (NECOG)	2015-2019
2021 Naugatuck Valley Council of Governments Hazard Mitigation Plan Update (NVCOG)	2021-2026
2021 Lower Connecticut River Valley Hazard Mitigation Plan Update (RiverCOG)	2020-2025
2019 Natural Hazard Mitigation Plan Update (MetroCOG)	2019-2024
2016 Litchfield Hills Natural Hazard Mitigation Plan (NHCOG)	2016-2021
2023 Connecticut Department of Transportation Carbon Reduction Strategy (CRS)	N/A

\*CTDOT is currently developing the next iteration of the state’s LRTP titled, “[Connecticut 2055 Long-Range Transportation Plan](#),” to cover the planning period of 2025-2055. It is anticipated to be completed in 2026.

Resiliency actions and data sources from the reviewed plans are summarized in the following sections. In general, the plans are intended to serve as planning tools to improve the resilience of a region or transportation system and to provide a basis for policy making.

## LITERATURE REVIEW FINDINGS

A review for resiliency planning in existing state and local plans, as well as modern and historical datasets, was conducted concurrently with the production of the RIP. Some of the most common challenges mentioned across the plans were limited mitigation project funding, management capacity, and the need to improve the resilience of transportation infrastructure to natural hazards. Most plans mentioned hazard mitigation and climate adaptation goals, such as reducing vulnerabilities to life and property as well as capacity building goals, such as enhancing the ability of agencies and local governments to identify vulnerabilities and risks.

The following sections summarize the findings from the literature review.

### RESILIENCE GOALS

When performing the literature review, six (6) common resiliency goals were identified. These common resiliency goals include:

- Hazard mitigation
- Climate adaptation
- Sustainability
- Resilience
- Education
- Capacity building

The most common goals throughout all plans centered on reducing vulnerabilities to life and property and enhancing the preparedness of agencies and local governments to identify vulnerabilities and risks. Developing an understanding of these commonalities provided CTDOT with insight as to what it would like to accomplish with the RIP.

## **RESILIENCE CHALLENGES**

The reviewed plans noted challenges to implementing resilience actions or projects. These identified challenges were categorized into ten (10) main subject areas:

- Municipal Staff Capacity
- Budget Constraints
- Operational
- External Coordination
- Communication
- Infrastructure
- Climate Change
- Health and Safety
- Hazard Mitigation Planning
- Economic

## **LITERATURE REVIEW SUMMARIES**

During the development of the RIP, a review of pertinent resiliency-related planning documents was performed. For each of the twelve (12) plans reviewed, a summary table was created to show the plan overview, connections to resilience, and identified resilience actions.

**TABLE 3: SUMMARY TABLE**

2018 CONNECTICUT'S STATEWIDE LONG-RANGE TRANSPORTATION PLAN			
PUBLISHED: 2018	EXPIRES: 2050	ORG: CTDOT/CDM SMITH	REGION: STATEWIDE
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: 2018 – 2050</li> <li>• Publication Year: 2018</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Future policy and planning and resilient transportation systems</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Provide more walking and bicycling opportunities in community centers</li> <li>• Integrate Department's Complete Streets policies into design and programming*</li> <li>• Ensure that transportation projects consider and incorporate sea level rise and resiliency</li> </ul>			

\*This identified action has since been completed.

## 2023 CONNECTICUT NATURAL HAZARD MITIGATION PLAN

**PUBLISHED: 2023**

**EXPIRES: 2028**

**ORG: DEWBERRY**

**REGION: STATEWIDE**

### Plan Overview

- Planning period: 2023 – 2028
- Publication Year: 2023
- Resilience-Related Projects: Yes
- Identifiable Opportunities for Enrichment: Yes
- Connections to Resilience: Yes

### Connections to Resilience

- Hazard mitigation and climate adaptation
- Natural system protection
- Future policy and planning and resilient transportation systems
- Awareness, education, and outreach
- Capability and capacity building

### Identified Resilience Actions

- Zero-carbon Energy Supply by 2040 and Integrated Resources Plan
- New Haven Long Wharf Resilience
- Promote CRS Participation
- Resilient Bridgeport Project Support
- Governor’s Council on Climate Change (GC3)
- Connecticut Greener.Gov and Lead by Example
- Resilient Stormwater and Drainage Systems
- Statewide Transportation Resilience Improvement Plan
- Resilient State Facilities Initiative
- Implementation on Strategy for Public Act 13-15
- CT Conference on Climate Change and Insurance (C41)
- Elevate infrastructure above the base flood elevation
- Engineering of infrastructure and coordination with State DOT
- Establish riparian or vegetative buffers to prevent erosion
- Public education and awareness campaigns on hazard mitigation
- Assist with Funding of Studies

**2024 CAPITOL REGION NATURAL HAZARD MITIGATION AND CLIMATE ADAPTATION PLAN UPDATE (CRCOG)**

<b>PUBLISHED: DRAFT</b>	<b>EXPIRES: 2029</b>	<b>ORG: CIRCA</b>	<b>REGION: CT CAPITOL REGION</b>
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: 2024 – 2029</li> <li>• Publication Year: DRAFT 2024</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Future policy and planning and resilient transportation systems</li> <li>• Capability and capacity building</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Resilient corridors</li> </ul>			

2023 SOUTH CENTRAL REGIONAL COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE (SCRCOG)

<b>PUBLISHED: 2023</b>		<b>EXPIRES: N/A</b>		<b>ORG: JAMIE CAPLAN CONSULTING</b>		<b>REGION: SCRCOG</b>	
<b>Plan Overview</b>				<b>Connections to Resilience</b>			
<ul style="list-style-type: none"> <li>• Planning period: N/A</li> <li>• Publication Year: 2023</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: No</li> <li>• Connections to Resilience: Yes</li> </ul>				<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Natural system protection</li> <li>• Future policy and planning and resilient transportation systems</li> <li>• Awareness, education, and outreach</li> <li>• Capability and capacity building</li> </ul>			
<b>Identified Resilience Actions</b>							
<ul style="list-style-type: none"> <li>• Greater New Haven Water Pollution Control Authority</li> <li>• CIRCA project “New Haven – Assessing Impacts of Tides and Precipitation on Downtown Storm Sewer System”</li> <li>• Ensure that transportation projects consider and incorporate sea level rise and resiliency</li> <li>• Public education and awareness campaigns on hazard mitigation</li> </ul>							

**2023 SOUTHEASTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTIONAL HAZARD MITIGATION AND CLIMATE ADAPTATION PLAN UPDATE (SCCOG)**

<b>PUBLISHED: 2023</b>	<b>EXPIRES: N/A</b>	<b>ORG: JAMIE CAPLAN CONSULTING</b>	<b>REGION: SCRCOG</b>
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: N/A</li> <li>• Publication Year: 2023</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Future policy and planning and resilient transportation systems</li> <li>• Capability and capacity building</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Resilient corridors</li> <li>• Resilient Connecticut</li> <li>• Drinking Water Vulnerability Assessment and Resiliency Plan</li> <li>• 2019 Wastewater Management Plan</li> <li>• SCCOG Critical Facility Resiliency Assessment</li> <li>• Historic Resources Resiliency Planning Meeting in June 2016</li> </ul>			

**2021 WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN  
UPDATE (WESTCOG)**

<b>PUBLISHED: 2021</b>	<b>EXPIRES: 2026</b>	<b>ORG: MILONE &amp; MACBROOM, INC.</b>	<b>REGION: WESTCOG</b>
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: 2021 – 2026</li> <li>• Publication Year: 2021</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: No</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Capability and capacity building</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• CT lawmakers adopted Public Act No. 18-82 in 2018</li> <li>• SHPO conducted a resiliency planning study for historic and cultural resources (2016 – 2018)</li> <li>• Mitigate damages caused by outages by working to increase the resiliency of the power grid, etc.</li> <li>• UConn prepared climate change projections in connection with a drinking water resiliency study</li> <li>• America’s Water Infrastructure Act (AWIA) of 2018 requires community water systems serving over 3,300 people to manage public water system risk through a Risk and Resilience Assessment and create and maintain an Emergency Response Plan.</li> </ul>			

## 2015 NORTHEASTERN CONNECTICUT COUNCIL OF GOVERNMENTS REGIONAL HAZARD MITIGATION PLAN (NECOG)

PUBLISHED: 2015	EXPIRES: 2019	ORG: NECCOG	REGION: NECCOG
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: 2015 – 2019</li> <li>• Publication Year: 2015</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Awareness, education, and outreach</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Improve floodplain management regulations</li> <li>• Flood proof critical facilities/relocating critical facilities so they are outside flood prone areas</li> <li>• Engineering of infrastructure and coordination with the State DOT</li> <li>• Protection and restoration of natural flood mitigation features</li> <li>• Establish riparian or vegetative buffers to prevent erosion</li> <li>• Public education and awareness campaigns on hazard mitigation</li> </ul>			

## 2021 NAUGATUCK VALLEY COUNCIL OF GOVERNMENTS HAZARD MITIGATION PLAN UPDATE (NVCOG)

**PUBLISHED: 2022**

**EXPIRES: 2026**

**ORG: SLR CONSULTING**

**REGION: NVCOG**

### Plan Overview

- Planning period: 2021 – 2026
- Publication Year: 2022
- Resilience-Related Projects: Yes
- Identifiable Opportunities for Enrichment: No
- Connections to Resilience: Yes

### Connections to Resilience

- Hazard mitigation and climate adaptation

### Identified Resilience Actions

- Mitigate damages caused by outages by working to increase the resiliency of the power grid, etc.
- Improve floodplain management regulations
- Flood proof critical facilities/relocating critical facilities so they are outside flood prone areas
- Elevate infrastructure above the base flood elevation
- Engineering of infrastructure and coordination with State DOT
- Town of Cheshire replaced three (3) bridges
- Naugatuck River Greenway (NRG) Trail helps preserve open space along the river, which helps reduce flood hazards
- Heritage Village Water Company and CT Water Company worked together to foster drought resilience.
- Protection and restoration of natural flood mitigation features
- Establish riparian or vegetative buffers to prevent erosion
- Public education and awareness campaigns on hazard mitigation

**2021 LOWER CONNECTICUT RIVER VALLEY HAZARD MITIGATION PLAN UPDATE (RIVERCOG)**

<b>PUBLISHED: 2021</b>	<b>EXPIRES: 2025</b>	<b>ORG: RIVERCOG, DEWBERRY, AND MILONE &amp; MACBROOM</b>	<b>REGION: RIVERCOG</b>
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: 2020 – 2025</li> <li>• Publication Year: 2021</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Awareness, education, and outreach</li> <li>• Capability and capacity building</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Promote Carbon Reduction Strategy (CRS) Participation</li> <li>• Improve floodplain management regulations</li> <li>• Engineering of infrastructure and coordination with State DOT</li> <li>• Protection and restoration of natural flood mitigation features</li> <li>• Establish riparian or vegetative buffers to prevent erosion</li> <li>• Public education and awareness campaigns on hazard mitigation</li> <li>• Assist with Funding of Studies</li> </ul>			

**2019 NATURAL HAZARD MITIGATION PLAN UPDATE (METROCOG)**

<b>PUBLISHED: 2019</b>	<b>EXPIRES: 2024</b>	<b>ORG: MILONE &amp; MACBROOM AND THE NATURE CONSERVANCY</b>	<b>REGION: GREATER BRIDGEPORT REGIONAL PLANNING AREA</b>
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<b>Plan Overview</b>	<b>Connections to Resilience</b>
<ul style="list-style-type: none"> <li>• Planning period: 2019 – 2024</li> <li>• Publication Year: 2019</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>	<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> <li>• Natural system protection</li> <li>• Awareness, education, and outreach</li> <li>• Capability and capacity building</li> </ul>

<b>Identified Resilience Actions</b>
<ul style="list-style-type: none"> <li>• Promote CRS Participation</li> <li>• Mitigate damages caused by outages by working to increase the resiliency of the power grid, etc.</li> <li>• Improve floodplain management regulations</li> <li>• Flood proof critical facilities/relocating critical facilities so they are outside flood prone areas</li> <li>• Elevate infrastructure above the base flood elevation</li> <li>• Engineering of infrastructure and coordination with State DOT</li> <li>• Encourage municipalities to adopt local water use restriction during periods of severe to extreme drought</li> <li>• Public education and awareness campaigns on hazard mitigation</li> <li>• Assist with Funding of Studies</li> </ul>

**2016 LITCHFIELD HILLS NATURAL HAZARD MITIGATION PLAN (NHCOG)**

<b>PUBLISHED: 2016</b>	<b>EXPIRES: N/A</b>	<b>ORG: NHCOG</b>	<b>REGION: LITCHFIELD HILLS REGION</b>
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: N/A</li> <li>• Publication Year: 2016</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: No</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Hazard mitigation and climate adaptation</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Improve floodplain management regulations</li> <li>• Flood proof critical facilities/relocating critical facilities so they are outside flood prone areas</li> <li>• Public education and awareness campaigns on hazard mitigation</li> </ul>			

**2023 CONNECTICUT DEPARTMENT OF TRANSPORTATION CARBON REDUCTION STRATEGY (CRS)**

<b>PUBLISHED: 2023</b>	<b>EXPIRES: N/A</b>	<b>ORG: CTDOT/DEWBERRY</b>	<b>REGION: STATEWIDE</b>
<b>Plan Overview</b>		<b>Connections to Resilience</b>	
<ul style="list-style-type: none"> <li>• Planning period: N/A</li> <li>• Publication Year: 2023</li> <li>• Resilience-Related Projects: Yes</li> <li>• Identifiable Opportunities for Enrichment: Yes</li> <li>• Connections to Resilience: Yes</li> </ul>		<ul style="list-style-type: none"> <li>• Sustainable construction</li> <li>• Future policy and planning and resilient transportation systems</li> <li>• Capability and capacity building</li> </ul>	
<b>Identified Resilience Actions</b>			
<ul style="list-style-type: none"> <li>• Provide more walking and bicycling opportunities in community centers</li> <li>• Integrate Department's Complete Streets policies into design and programming</li> <li>• Ensure that transportation projects consider and incorporate sea level rise and resiliency</li> </ul>			