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CONNECTICUT INSTITUTE FOR RESILIENCE & CLIMATE ADAPTATION (CIRCA)

Resilient Connecticut

CIRCA

A LONG-TERM STRATEGY FOR CLIMATE ADAPTATION AND RESILIENCE: PROGRAM UPDATE

December 1st, 2023

James O'Donnell, Executive Director, CIRCA
John Truscinski, CFM, Director of Resilience Planning, CIRCA

CIRCA

Connecticut Institute for Resilience and Climate Adaptation (CIRCA)

Mission:

CIRCA's mission is to increase the resilience and sustainability of communities vulnerable to the growing impacts of climate change on the natural, built, and human environments. Our Institute is a multi-disciplinary, center of excellence that brings together experts in the natural sciences, engineering, economics, political science, finance, and law to provide practical solutions to problems arising as a result of a changing climate

Executive Director: James O'Donnell

CIRCA's climate research focus areas:

- Coastal and inland flooding
- Heat islands
- Resilience of critical infrastructure
- Innovative adaptation approaches (green infrastructure & living shorelines)
- Environmental Justice

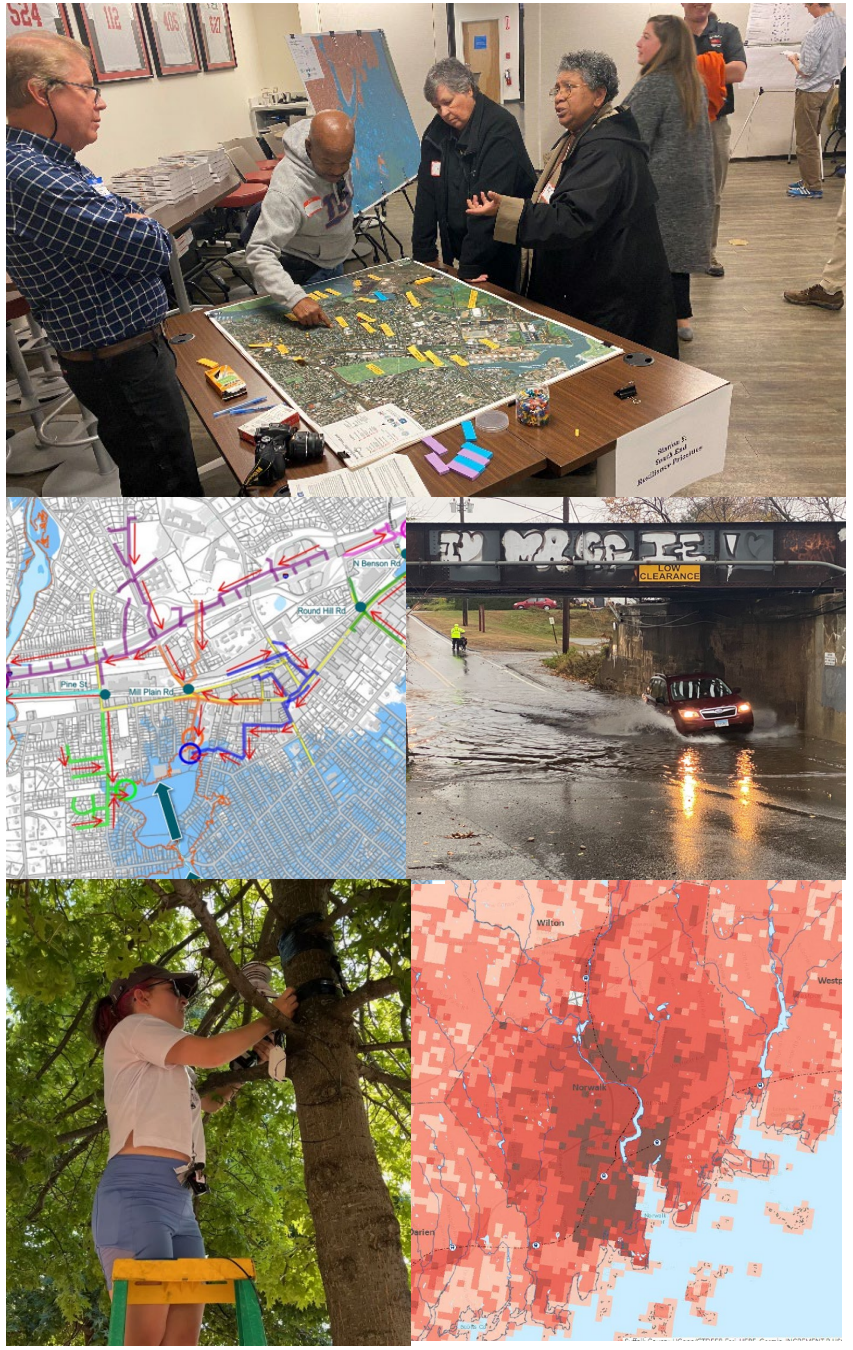
CIRCA – Resilient Connecticut

- The CT Institute for Resilience & Climate Adaptation (CIRCA) initiated Resilient CT in Fairfield and New Haven Counties 2018 – 2023. Program expanded to New London, Middlesex, Hartford, and Tolland Counties in 2021-2024.

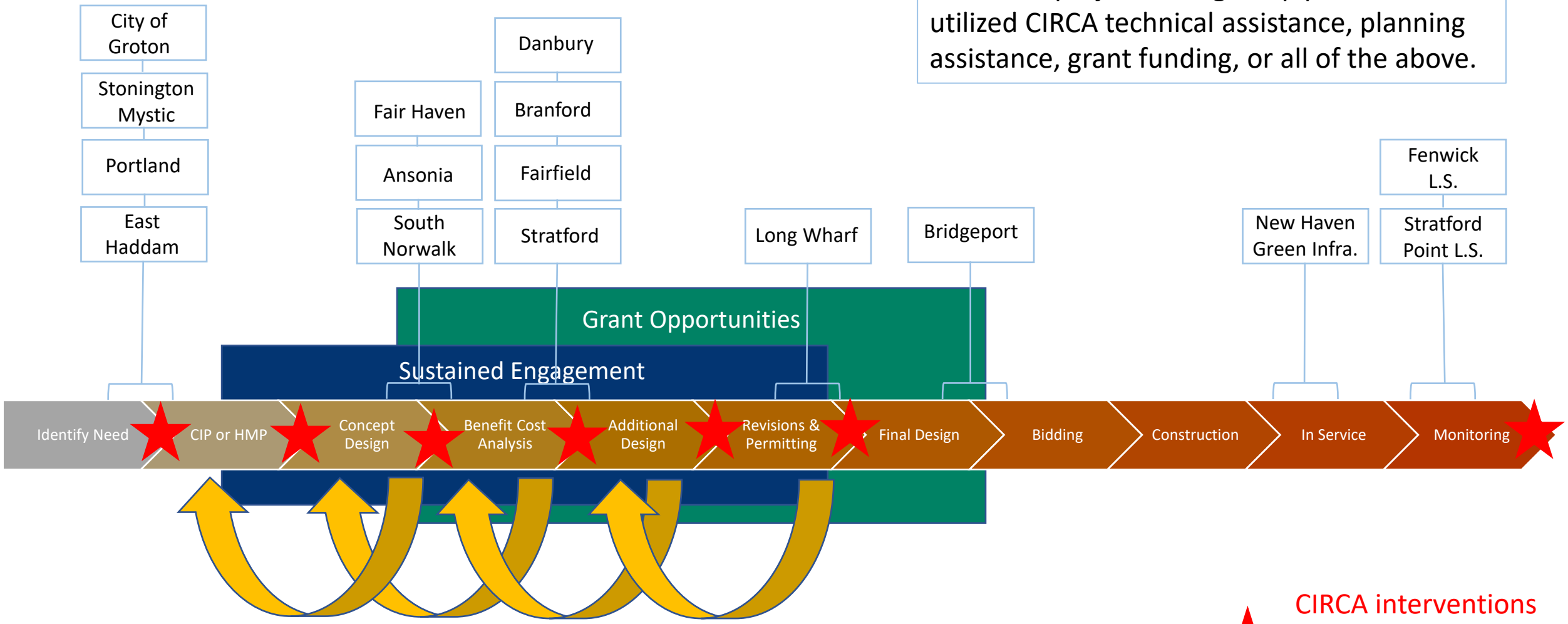
- Goals are to support development of a statewide resilience project pipeline, increase coordination across municipal, regional, and state planning.

- Data & mapping tools to support project development include: Climate Change Vulnerability Index (CCVI) for flooding and heat, zones of shared risk, resilience opportunity areas.

- EJ projects include creation of a statewide EJ Screen mapping tool in partnership with DEEP/DPH and EJ community organizations, and Climate & Equity Grants program w/ DEEP.

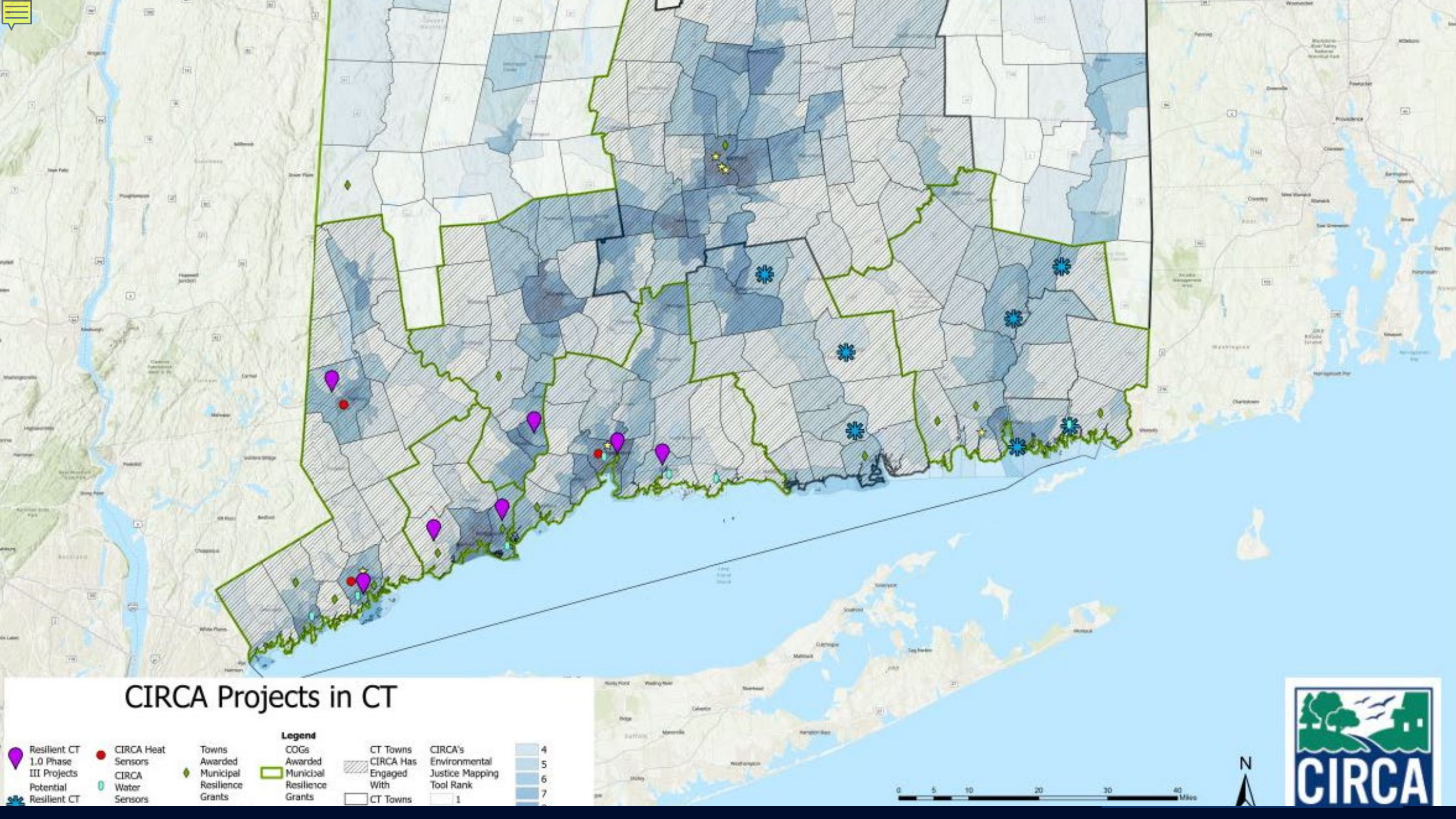


The listed projects along the pipeline have utilized CIRCA technical assistance, planning assistance, grant funding, or all of the above.



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

★ CIRCA interventions and value added possible


CIRCA Projects in CT
Legend
Resilient CT 1.0 Phase III Projects
Potential Resilient CT
CIRCA Heat Sensors
CIRCA Water Sensors
Towns Awarded Municipal Resilience Grants
COGs Awarded Municipal Resilience Grants
CT Towns CIRCA Has Engaged With
CT Towns
CIRCA's Environmental Justice Mapping Tool Rank
1
4
5
6
7
0 5 10 20 30 40 Miles
N
CIRCA

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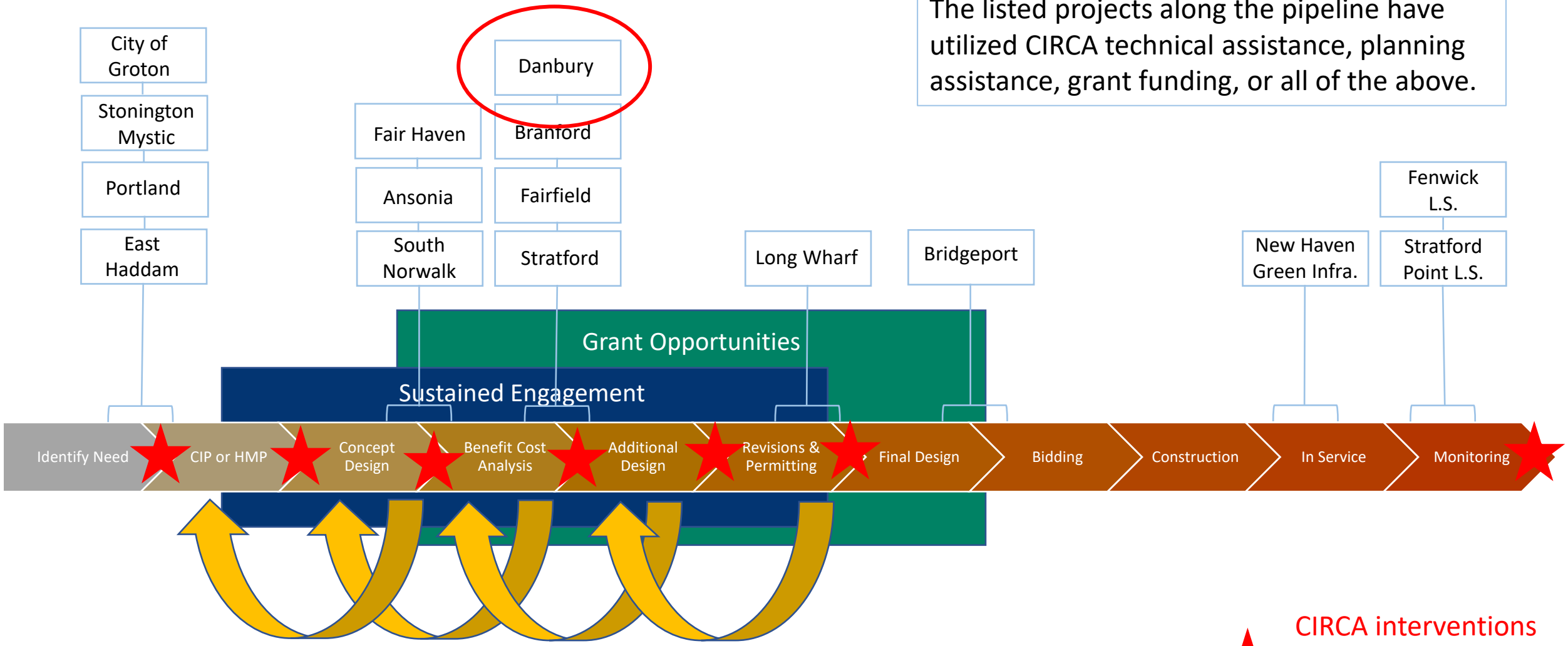

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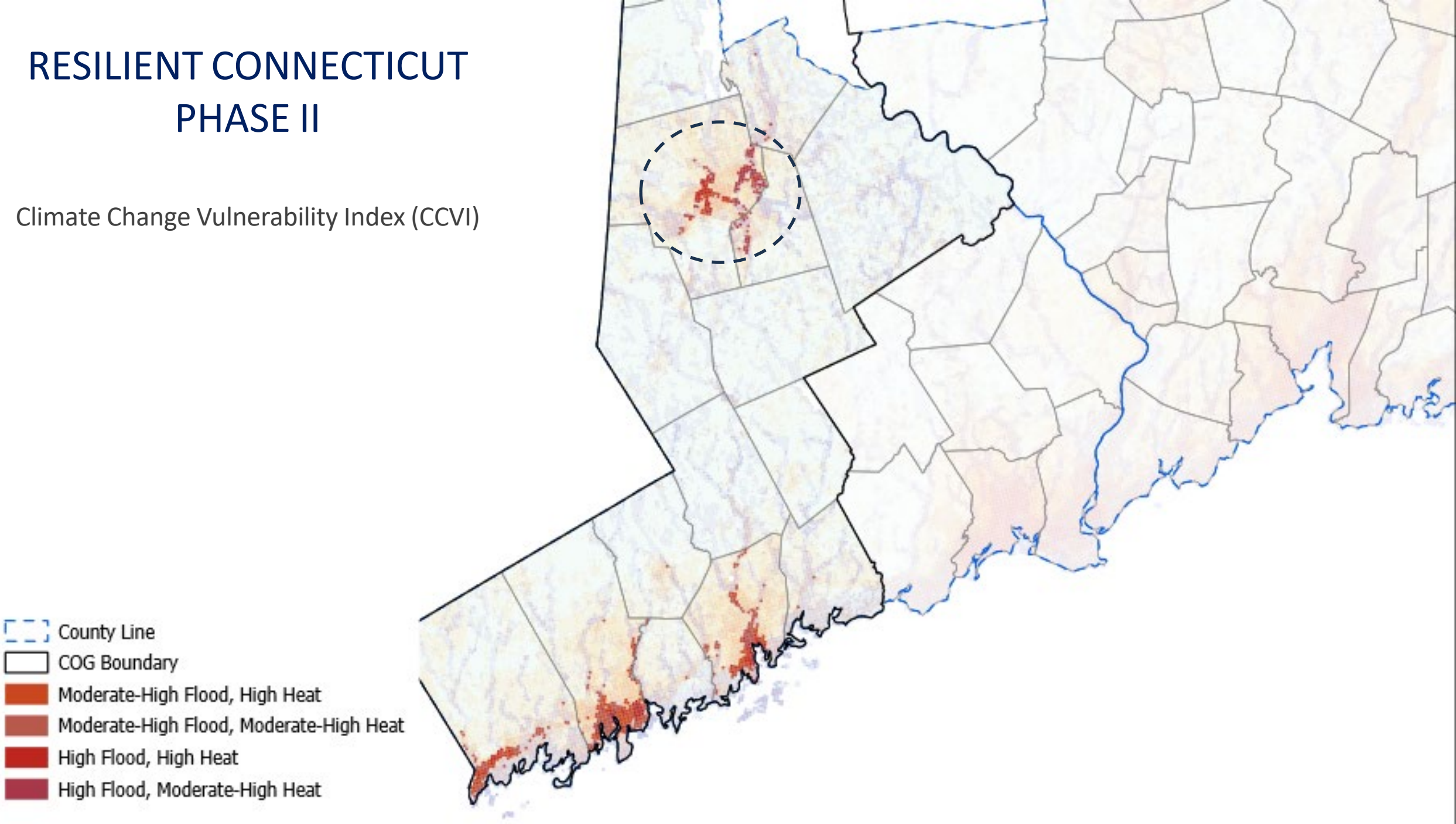
RESILIENT CONNECTICUT PHASE II

Climate Change Vulnerability Index (CCVI)



RESILIENT CONNECTICUT PHASE II

RESILIENT DANBURY

Resilient Connecticut Phase II

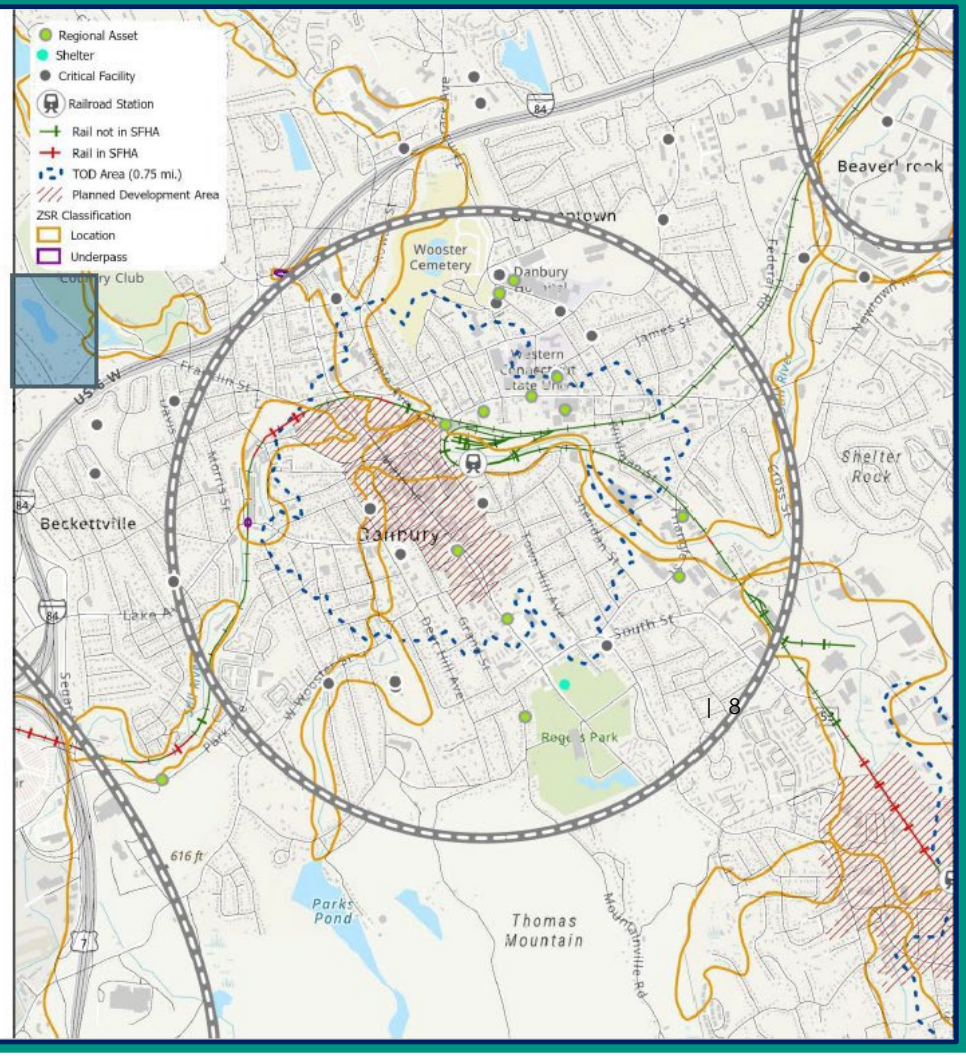
Regional Adaptation/Resilience Opportunity Areas

Name: Downtown Danbury
Location: Danbury

Considerations	Characteristics of Area
Flood Vulnerability	●●●●●
Heat Vulnerability	●●●●○
Social Vulnerability	●●●●●

The center of Danbury is characterized by zones of shared risk associated with the confluence of Padanarum Brook, Kohanza Brook, and the Still River. Despite many flood risk reduction projects undertaken over decades, TOD and planned development areas are located in close proximity to – or within – these zones of shared risk. Numerous critical facilities, historic resources, and the terminus of the MetroNorth Danbury line are also located in the area. Downtown Danbury is a regional center for northern WestCOG.
Almost all of the downtown area is moderately vulnerable to heat, with the highest vulnerable area concentrate along route 53 commercial properties. Presenting few opportunities for shade or street trees, the area has high heat emittance. In addition, there is high social sensitivity throughout the area.

City Hall
Fire headquarters
Hose Co. 5, 6, 7, and 9
Danbury Hospital
Danbury Health and Housing Dept.
Western CT State College Police
Assisted living facilities
War Memorial
Substation
Power plant
Museums



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DANBURY CONNECTICUT
FUSS & O'NEILL
Dewberry

EAST DITCH FLOODING

RESILIENT DANBURY

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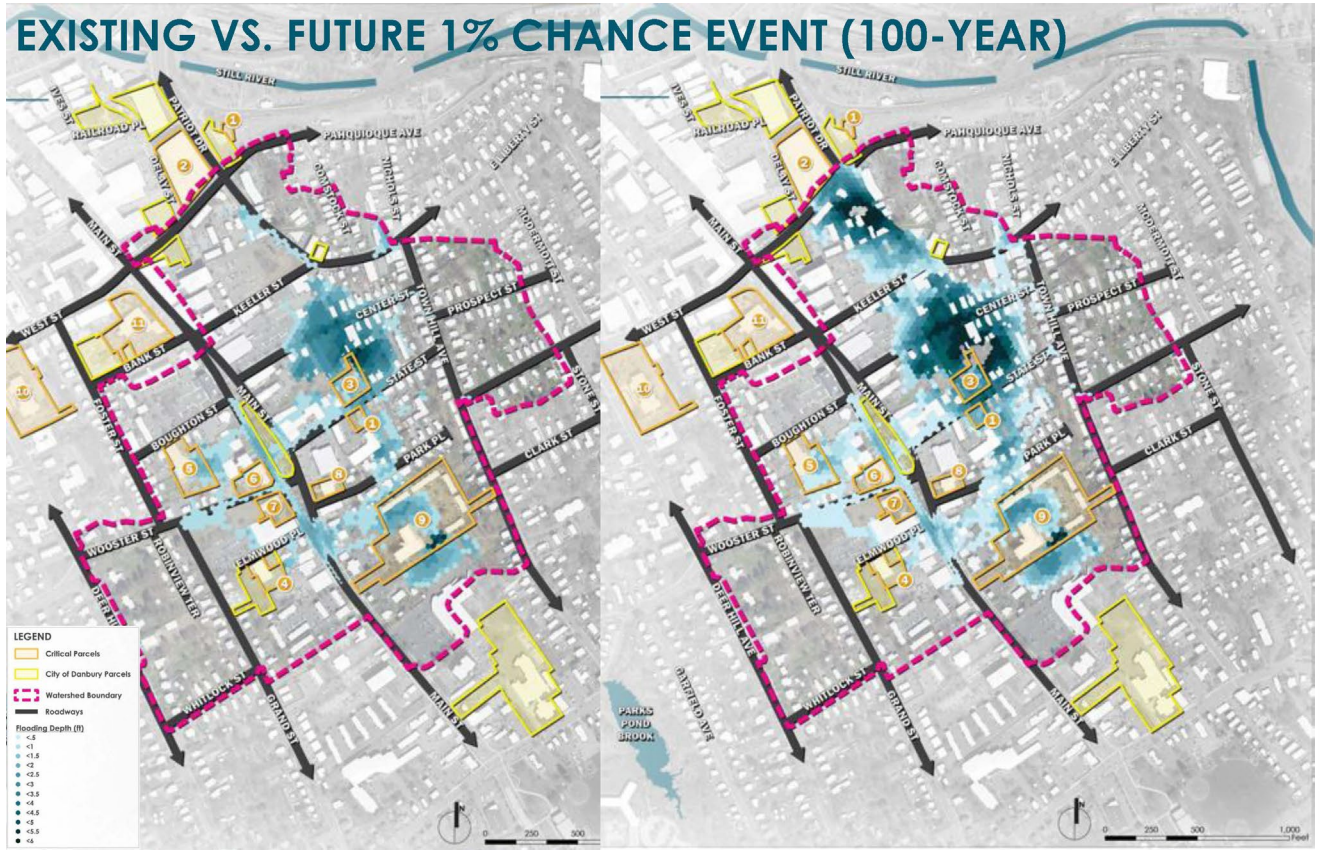
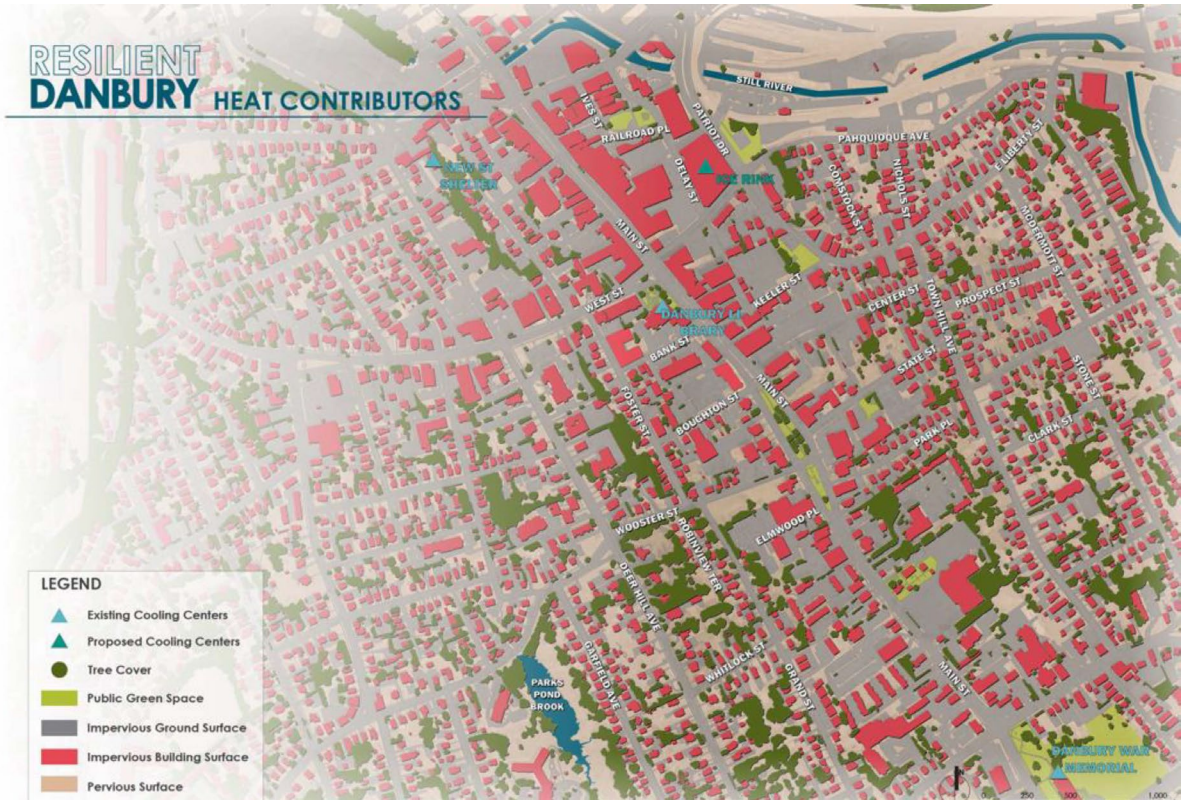
DANBURY CONNECTICUT
FUSS & O'NEILL
Dewberry

RESILIENT CONNECTICUT PHASE III

- Modeling and mapping existing and future conditions for flooding and heat





RESILIENT DANBURY

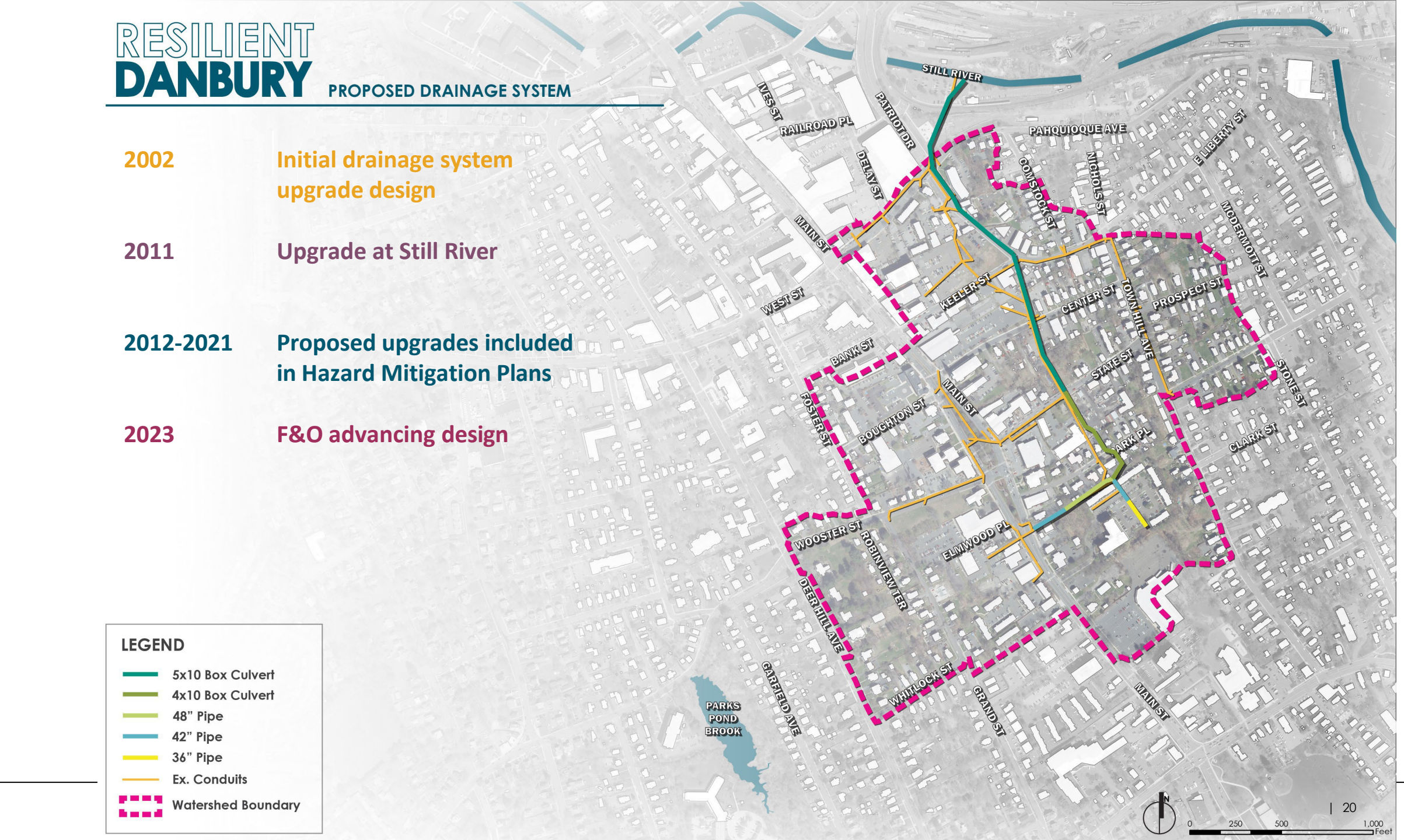
PROPOSED DRAINAGE SYSTEM

2002 — Initial drainage system upgrade design

2011 — Upgrade at Still River

2012-2021 — Proposed upgrades included in Hazard Mitigation Plans

2023 — F&O advancing design



LEGEND

- 5x10 Box Culvert
- 4x10 Box Culvert
- 48" Pipe
- 42" Pipe
- 36" Pipe
- Ex. Conduits
- Watershed Boundary

Walk and Shop

- Streetscape improvements
- Improve pedestrian experience
- Collect runoff

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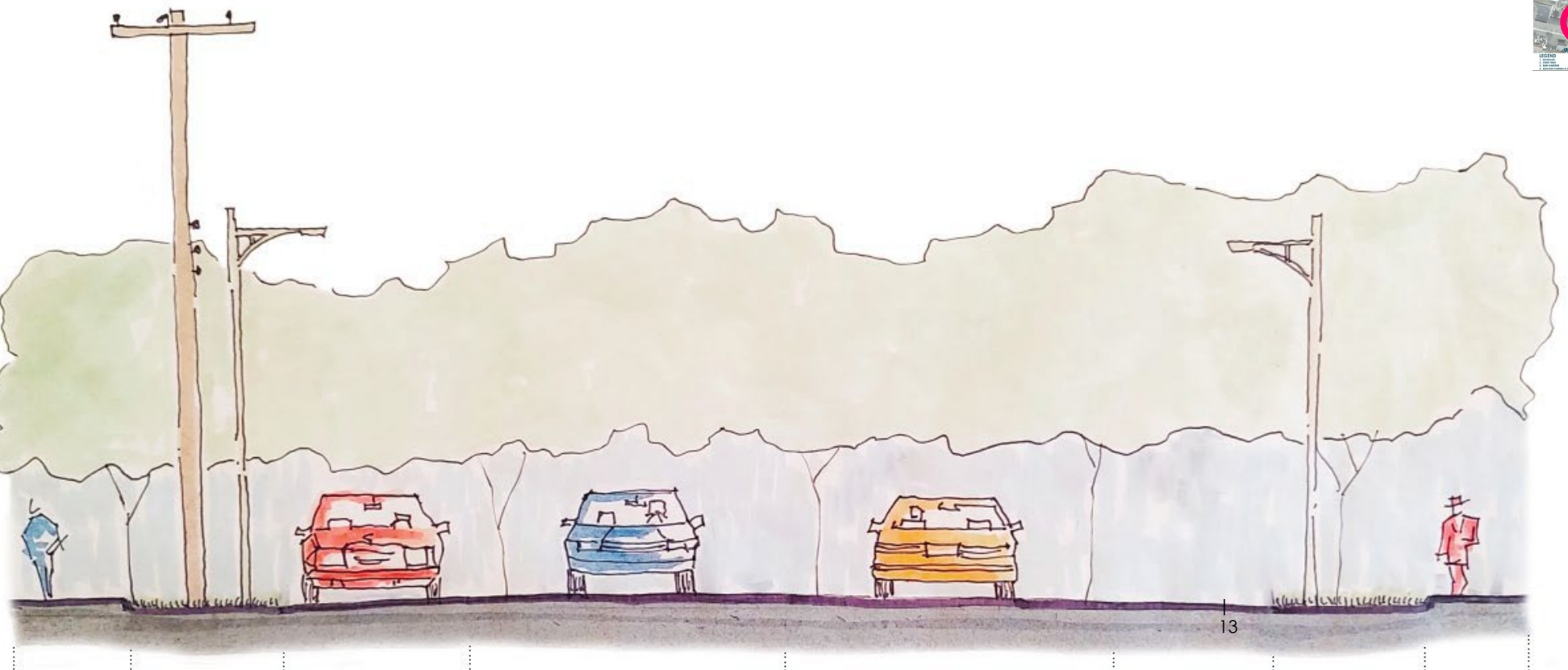
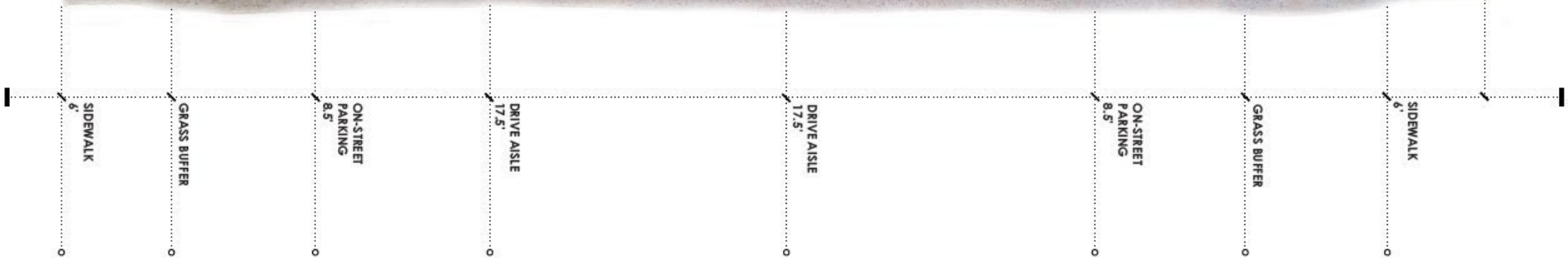
DANBURY CONNECTICUT
FUSS & O'NEIL

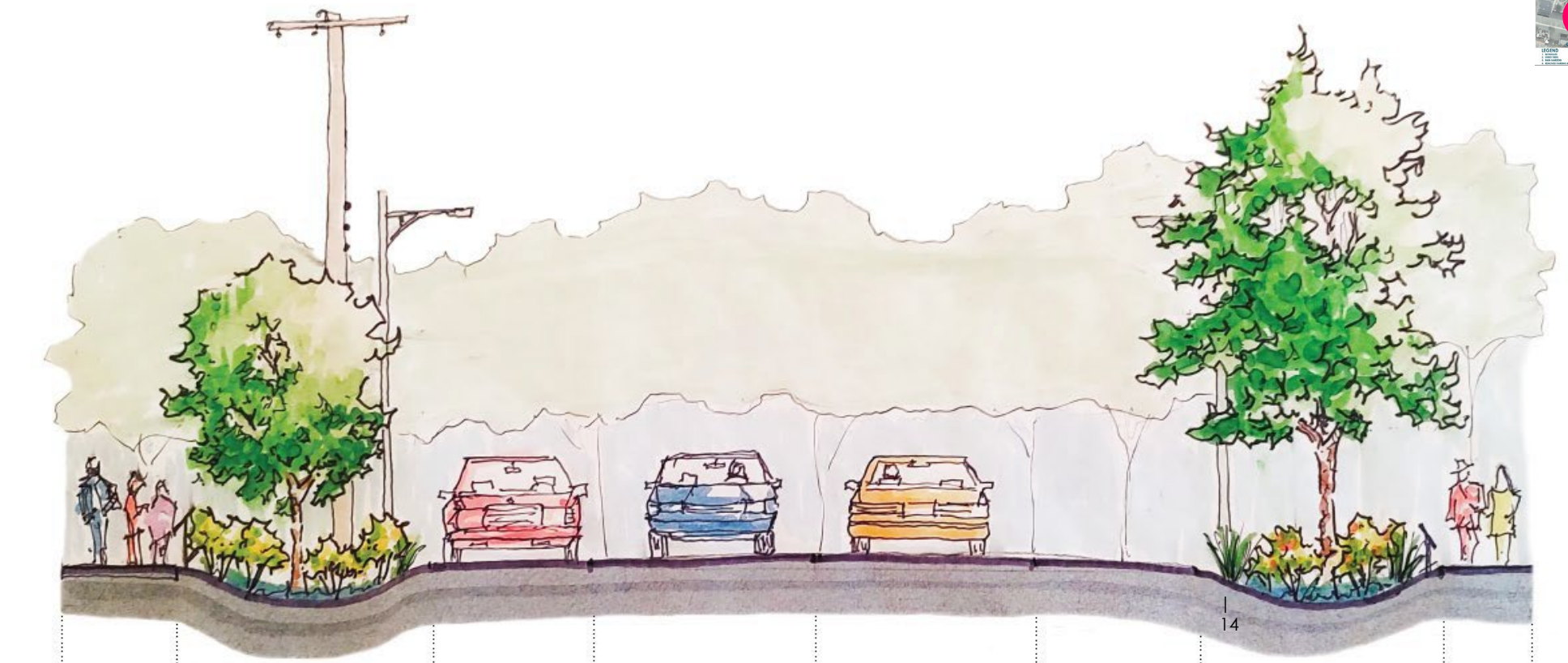
SOUTH MAIN ST EXISTING STREETSCAPE





NOT TO SCALE

RESILIENT DANBURY SOUTH MAIN ST STREETSCAPE IMPROVEMENTS



14

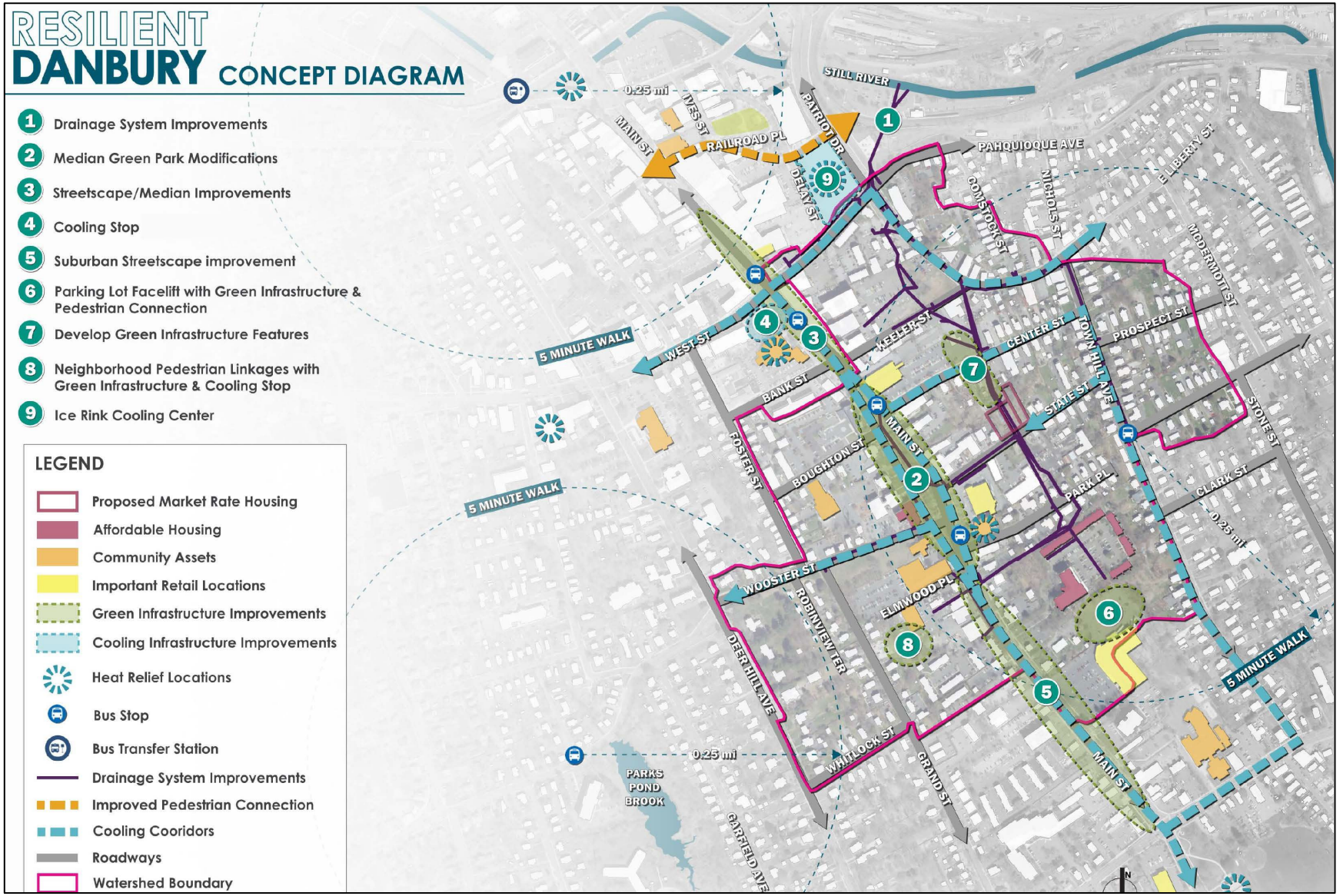
SIDEWALK 6'
RAIN GARDEN
ON-STREET PARKING 8.5'
DRIVE AISLE 12'
DRIVE AISLE 12'
ON-STREET PARKING 8.5'
RAIN GARDEN
SIDEWALK 6'

NOT TO SCALE

RESILIENT DANBURY

Flood Risk Reduction

- A new master plan envisions the long-planned drainage system modifications and an extensive system of green infrastructure
- Co-benefits to managing extreme heat were important in this project



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RESILIENT DANBURY

Lessons Learned

Resilient Danbury

- Extreme Heat: Opportunities to reduce heat exposure may be advanced using green infrastructure; respite from heat may be provided with cooling centers.
- Floods: Increased frequency of intense precipitation is already contributing to loss of service from critical facilities and flooding of socially vulnerable populations living in affordable housing where FEMA flood mapping is absent.
- Community: Sustained attention to climate risks can lead to simple acts (i.e., a memorandum of understanding) that formalize the use of new critical facilities.

Strategic Findings

In developed city centers, green infrastructure alone cannot reduce flood losses; long-delayed infrastructure improvements must be advanced. Additional opportunities to incorporate elements of climate adaptation and resilience may appear when new affordable and market rate housing developments are proposed.

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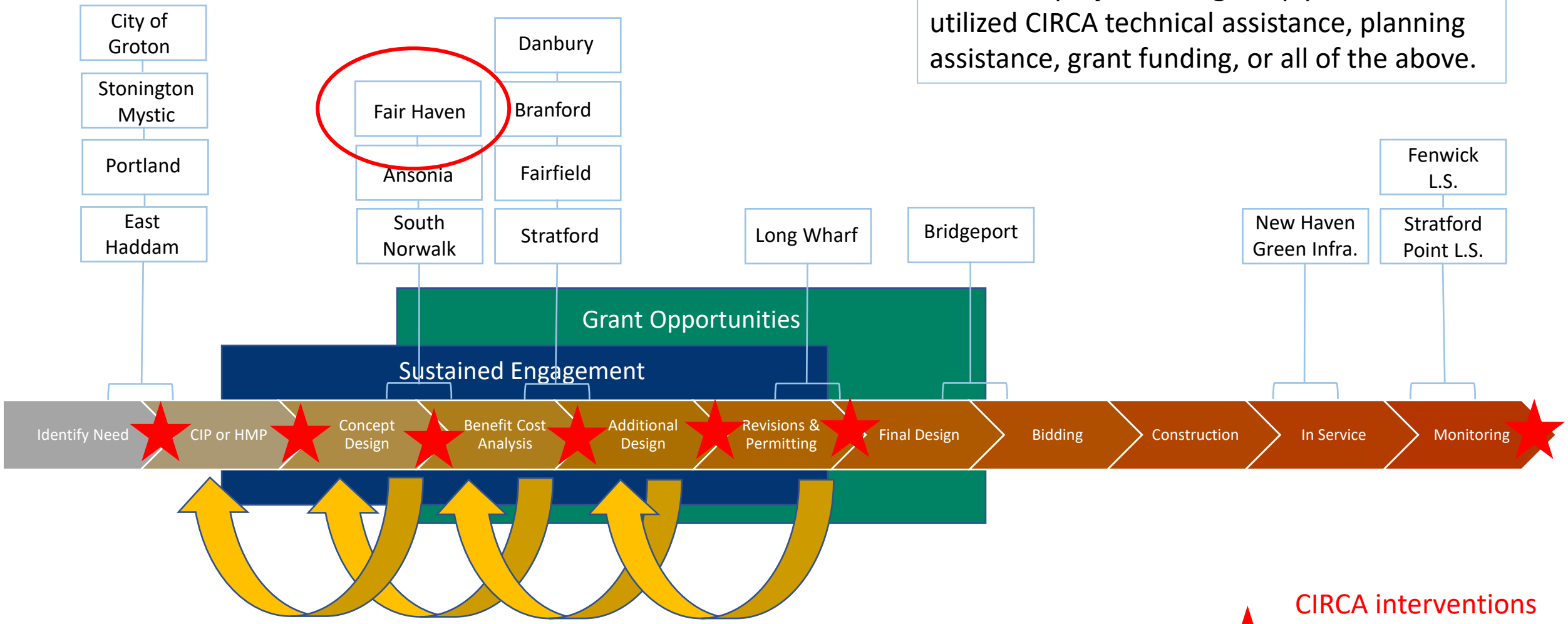


Taking a step backward is possible and often will occur, in practice, along a project pipeline

★ CIRCA interventions and value added possible

Resilient Connecticut Phase II

Regional Adaptation/Resilience Opportunity Areas

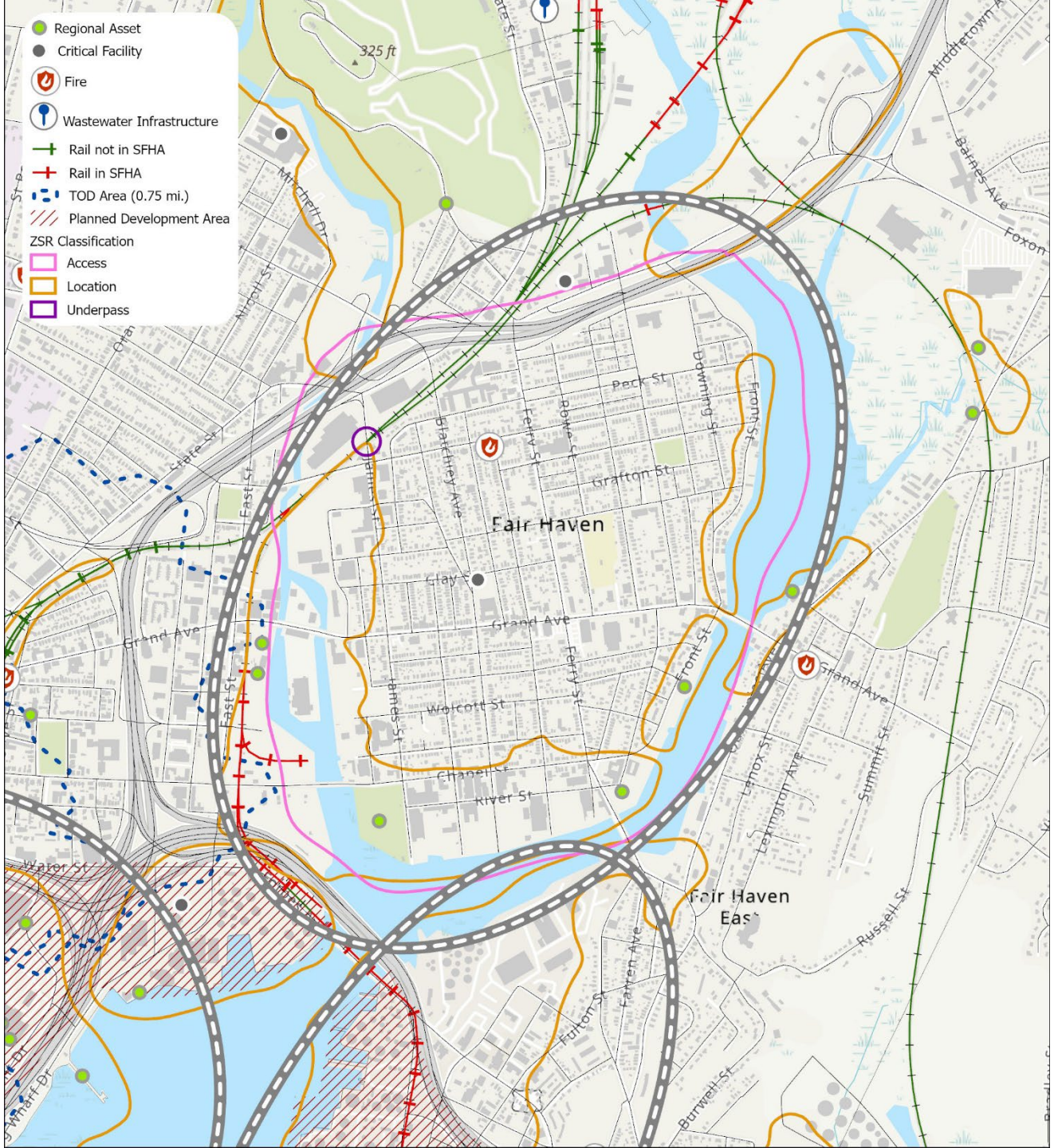
Name: Fair Haven/Mill River
Location: New Haven

Considerations	Characteristics of Area
Flood Vulnerability	
Heat Vulnerability	
Social Vulnerability	

Zones of shared risk along the Mill River and Quinnipiac River merge with a zone of shared risk drawn around Fair Haven (for isolation risks) to highlight an opportunity area centered on Fair Haven. While TOD does not overlap with Fair Haven, it is present just west of the Mill River. Numerous resilience opportunities may be available as the City promotes and supports redevelopment in the Mill River and Fair Haven areas. Care should be taken to enhance livability in Fair Haven and connectivity to surrounding areas.

Fair Haven is entirely high heat vulnerable. This is attributed primarily to the high social sensitivity present here, combined with dense housing, high amounts of pavement, and disconnected green space for shade.

- Fire station
- Public works
- School
- Substation
- Coastal access



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RESILIENT FAIR HAVEN

PROJECTED FUTURE FLOODING

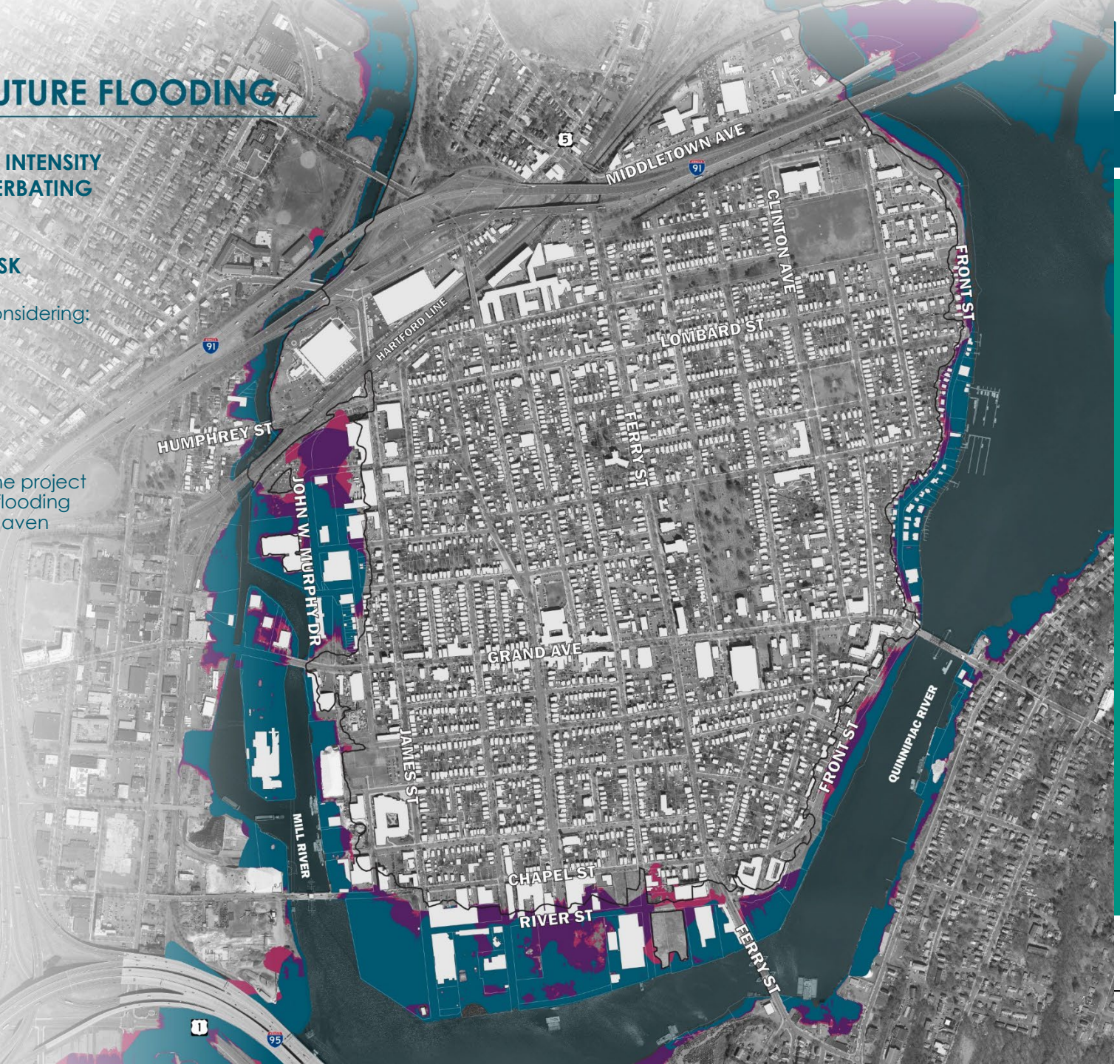
WITH A WARMER AND WETTER CLIMATE, RAINFALL INTENSITY WILL INCREASE, AND SEA LEVELS WILL RISE, EXACERBATING COASTAL AND INLAND FLOODING.

WHAT IS ACCOUNTED FOR IN COASTAL FLOOD RISK MODELING?

- Maximum floodwater elevation, depth, and extent considering:
- Topography
- Storm surge
- Waves
- Tidal action
- Projected sea level rise (20 inches by the year 2050)

PROJECTED DRAINGE RELATED FLOODING:

Storm drainage system modeling was not included in the project scope. Therefore, current and future drainage-related flooding depths and extents cannot be calculated for the Fair Haven neighborhood at this time.



RESILIENT
FAIR HAVEN

CRITICAL COMMUNITY ASSETS

CRITICAL COMMUNITY ASSETS ARE PARTICULARLY IMPORTANT TO THE SOCIAL RESILIENCE OF THIS COMMUNITY PROVIDING COMMUNITY COHESION, CHARACTER, AND QUALITY OF LIFE.

SEVERAL NATIONAL AND LOCAL HISTORIC DISTRICTS ARE LOCATED WITHIN FAIR HAVEN, REFLECTING THE AREA'S MARITIME AND INDUSTRIAL PAST AND EMPHASIS ON HISTORIC PRESERVATION.

Library / Post Office
- 01 FAIR HAVEN BRANCH LIBRARY
- 02 UNITED STATES POSTAL SERVICE

Emergency Response
- 01 NEW HAVEN POLICE DEPARTMENT
- 02 NEW HAVEN FIRE DEPARTMENT ENGINE 17
- 03 NEW HAVEN FIRE DEPARTMENT ENGINE 10/TRUCK 9
- 04 YALE NEW HAVEN HOSPITAL CENTER FOR EMS

Senior Center
- 01 ATWATER SENIOR CENTER
- 02 MARY WADE HOME

Healthcare Facility
- 01 COCENTRA URGENT CARE + DEPT. OF SOCIAL SERVICES CT
- 02 NEW HAVEN PHARMACY
- 03 PIONEER REHAB DBA + PHYSICAL THERAPY
- 04 FAIR HAVEN COMMUNITY HEALTHCARE
- 05 NEW HAVEN MEDICAL CENTER

School
- 01 FARNAM NEIGHBORHOOD HOUSE + NURSERY SCHOOL
- 02 ELM CITY COLLEGE PREPARATORY ELEMENTARY SCHOOL
- 03 FAMILY ACADEMY
- 04 LITTLE ESTRELLITAS LICENSED FAMILY HOME DAYCARE
- 05 JOHN S. MARTINEZ SCHOOL
- 06 COLD SPRING SCHOOL
- 07 FAIR HAVEN SCHOOL
- 08 TITI TANIA'S DAYCARE
- 09 AUNTIE ROSE CHILDCARE DEVELOPMENT CENTER
- 10 ALL SAINTS CATHOLIC ACADEMY
- 11 LITTLE SKY FAMILY CHILDCARE
- 12 TIA HILDA'S DAYCARE LLC
- 13 CLINTON AVENUE SCHOOL
- 14 BOSS BABY LEARNING + DAY CARE

Religious Center
- 01 STRAIGHTWAY CHURCH
- 02 GLESIA SALVACION Y VIDA ETERNA
- 03 IGLESIA CRISTIANA ESTRELLA RESPLANDECIENTE DE JACOB
- 04 APOSTLE IMMIGRANT SERVICES
- 05 THE REDEEMED CHRISTIAN CHURCH OF GOD
- 06 IGLESIA DE DIOS PENTECOSTAL MI
- 07 IGLESIA BAUTISTA EL CALVARIO
- 08 CHURCH OF GOD OF PROPHECY
- 09 INSPIRATIONAL EVANGELISTIC
- 10 OUR LADY OF GUADALUPE PARISH
- 11 IGLESIA CRISTIANA DIOS DE PACTOS
- 12 IGLESIA CRISTIANA BETANIA AD
- 13 IGLESIA DE DIOS LA NUEVA JERUSALEN INC

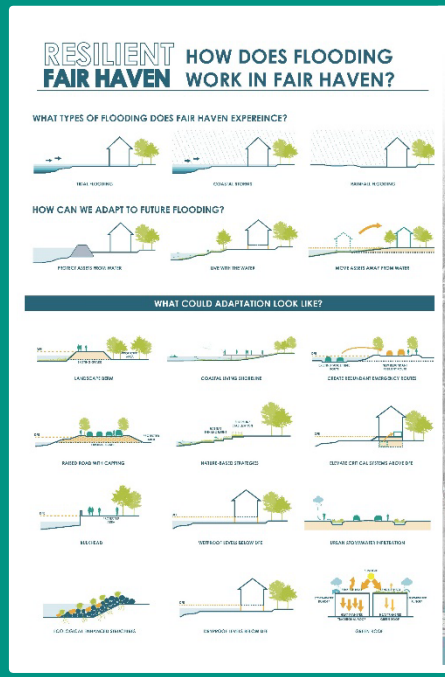
Public Open Space
(Park, Urban Farm, Community Garden)
- 01 CRISCUOLO PARK
- 02 MILL RIVER TRAIL- OPEN SPACE
- 03 JOHN S. MARTINEZ SCHOOL- OPEN SPACE
- 04 ESMERALDA PARK
- 05 WOLCOTT & LLOYD COMMUNITY GREENSPACE
- 06 WOOLSEY ST COMMUNITY GARDEN
- 07 WOLCOTT & FERRY STREET FARM
- 08 FERRY STREET TRIANGLE
- 09 QUINNIPIAC RIVER PARK
- 10 FAIR HAVEN SCHOOL- OPEN SPACE
- 11 CLINTON AVE- OPEN SPACE
- 12 GRAND ACRES COMMUNITY GARDEN
- 13 LEWIS STREET PARK
- 14 CHATHAM SQUARE PARK
- 15 ENGLISH MALL
- 16 CLINTON PARK
- 17 QUINNIPIAC RIVER FRONT ST BOAT RAMP
- 18 DOVER BEACH
- 19 FERRY STREET FARM
- 20 STALLWORTH COMMUNITY GARDEN
- 21 CHABASO BAKERY GARDEN
- 22 MARKET & JAMES STREET FARM
- 23 COMMUNITY GARDEN SHELTER & CLAY STREETS
- 24 FAMILY ACADEMY- OPEN SPACE
- 25 MILL RIVER TRAIL

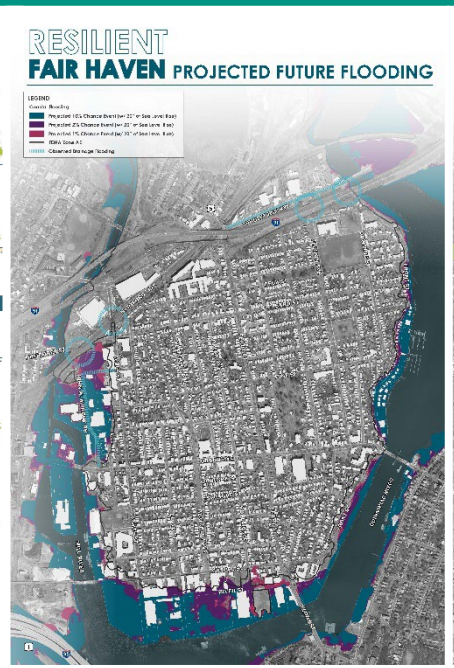
LEGEND
- River Street Historic District
- Quinnipiac River Historic District
- Quinnipiac Avenue Historic District
- Public Open Space
- FEMA Zone AE

STAKEHOLDER + COMMUNITY OUTREACH

RESILIENT FAIR HAVEN

- Recent Efforts (CMT, Fair Haven Day, Survey, RiverFest, Flyer Distribution, Meetings with Economic Development, Emergency Management)
- Next Steps (Upcoming meeting with GNHWPCA, Family Fun Day – FAME School and/or Junta Back to School event – Both in AUG)

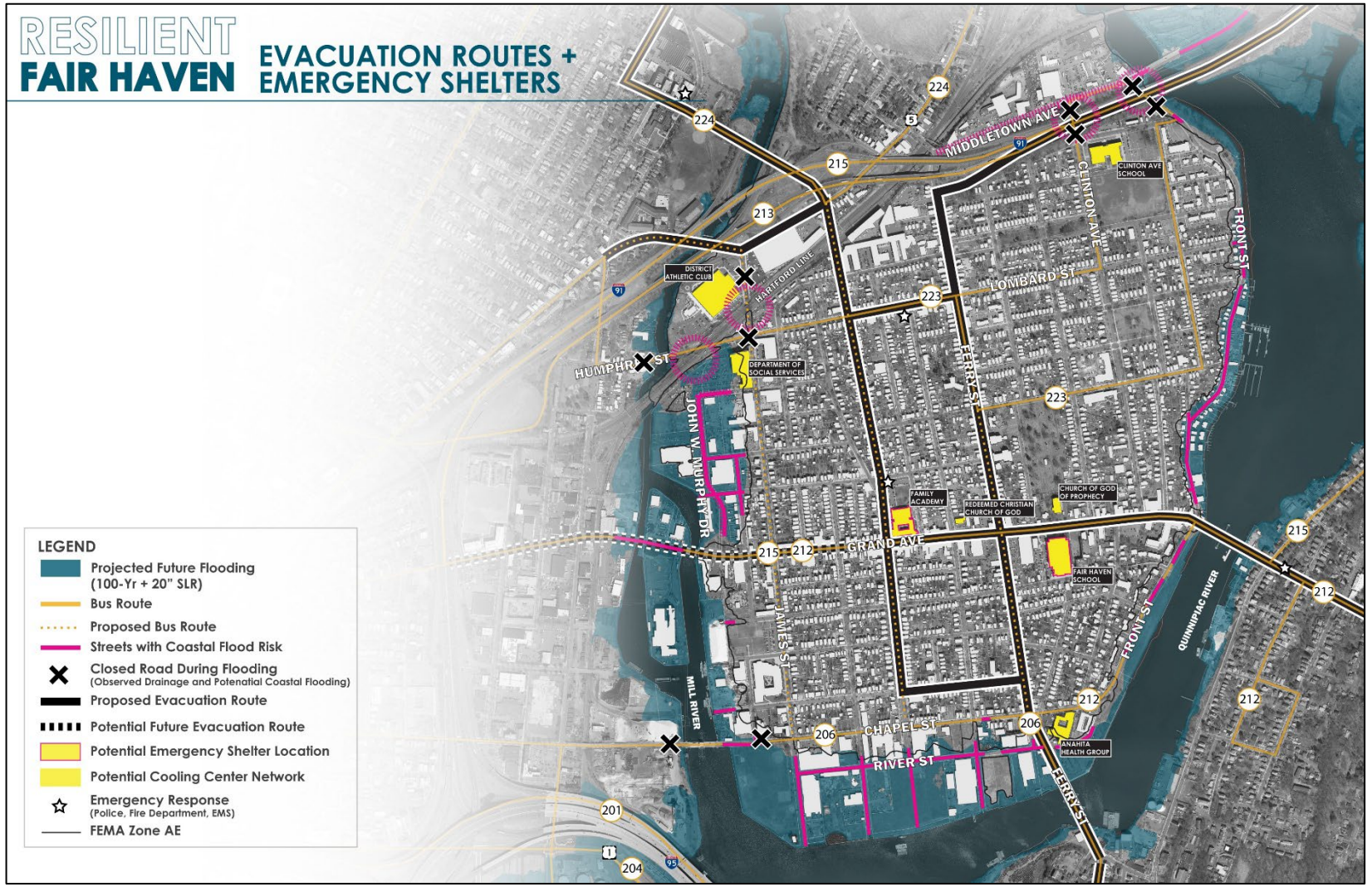




RESILIENT FAIR HAVEN

Flood Risk Reduction

- One key outcome of the study was an active statement about which roads out of Fair Haven should be the primary evacuation routes, given the number of bridges and underpasses present
- Potential shelters and cooling centers were mapped out in relation to these resilient corridors



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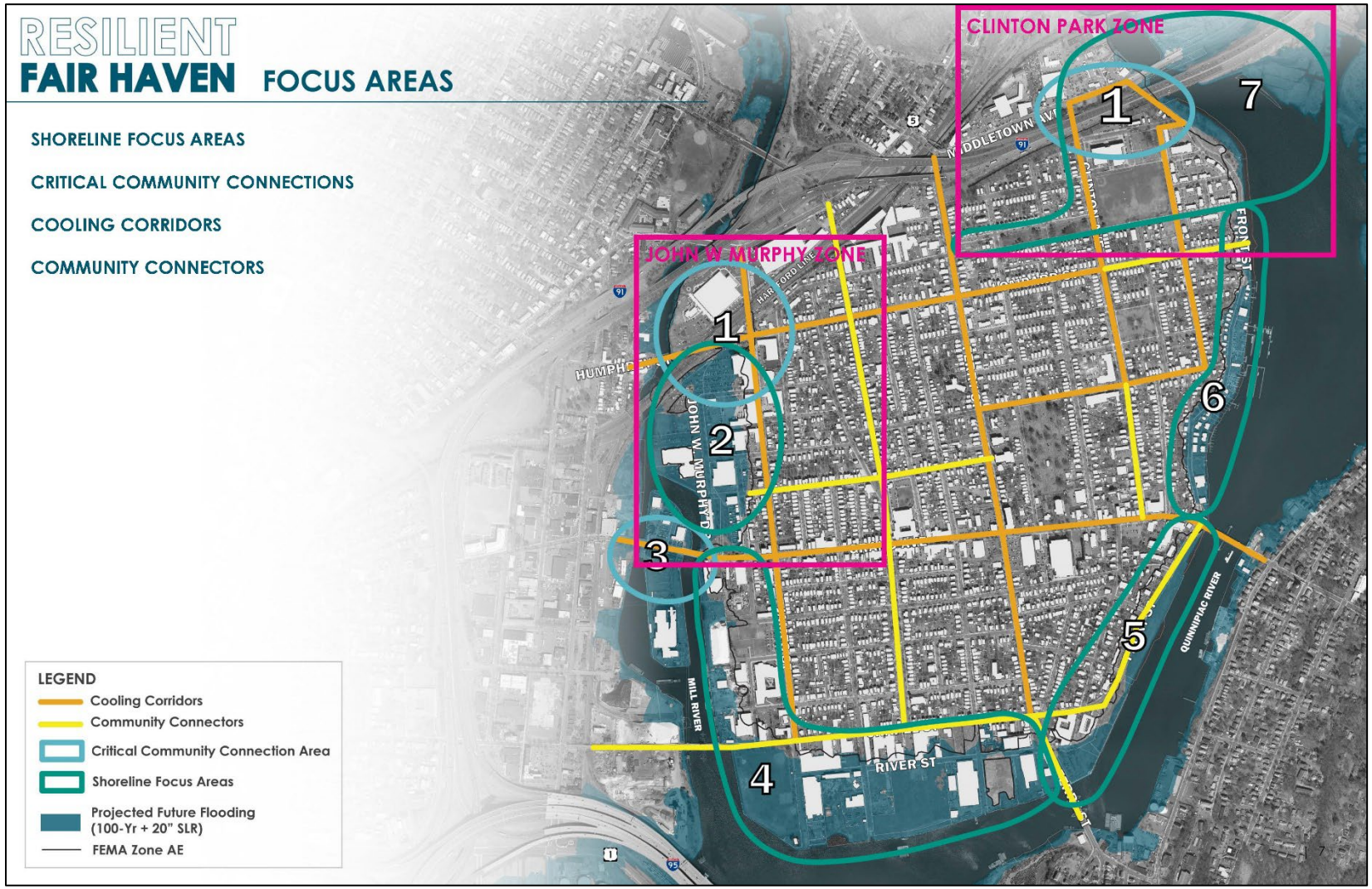
RESILIENT FAIR HAVEN

Flood Risk Reduction

- Close coordination with City Plan, Engineering, Economic Development, and stakeholders such as Save the Sound revealed that two broad areas were receiving less attention and may have unmet needs:

John Murphy Zone

Clinton Park Zone



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RESILIENT
FAIR HAVEN

JOHN W. MURPHY DRIVE AREA

GOALS

- Reduce flood risk along Mill River and address extreme heat risk
- Reduce impervious surfaces and soften shoreline
- Enhance access to Mill River
- Create cooling/resilience corridors
- Provide shading of school parking lot and outdoor classroom space as pilot project

RESILIENT FAIR HAVEN

RECOMMENDED ACTIONS

1. **370 James Street Parking Lot & Urban Cooling Center -** Shade trees, parking garage, walking path, natural restoration area, plantings
   Estimated Cost: $17,500,000

2. **Mill River Trail -** Overlooks, shade trees, walking paths
   Estimated Cost: $2,000,000

3. **Outfall Improvements -** Check valve/backflow retrofit, daylighting and new headwall
   Estimated Cost: $1,000,000

4. **Floodable Park and Gateway Property -** Acquisition and demolition of building at 451 Grand Avenue (and re-location of existing business), shade trees, floodable park development
   Estimated Cost: $4,600,000

5. **John W. Murphy Drive Elevation and Flood Barrier -** Road raising and flood berm/sheet pile, interior drainage/pump station, utility relocation, shade trees, paving, fencing/guide rail, side street connections
   Estimated Cost: $25,000,000

6. **Grand Avenue Road and Bridge Elevation -** Road raising, utility relocation, paving, retaining walls, bridge elevation/replacement
   Estimated Cost: $19,900,000

7. **Cooling/Resilience Corridors -** Tree plantings, green stormwater infrastructure
   Estimated Cost: $6,000,000

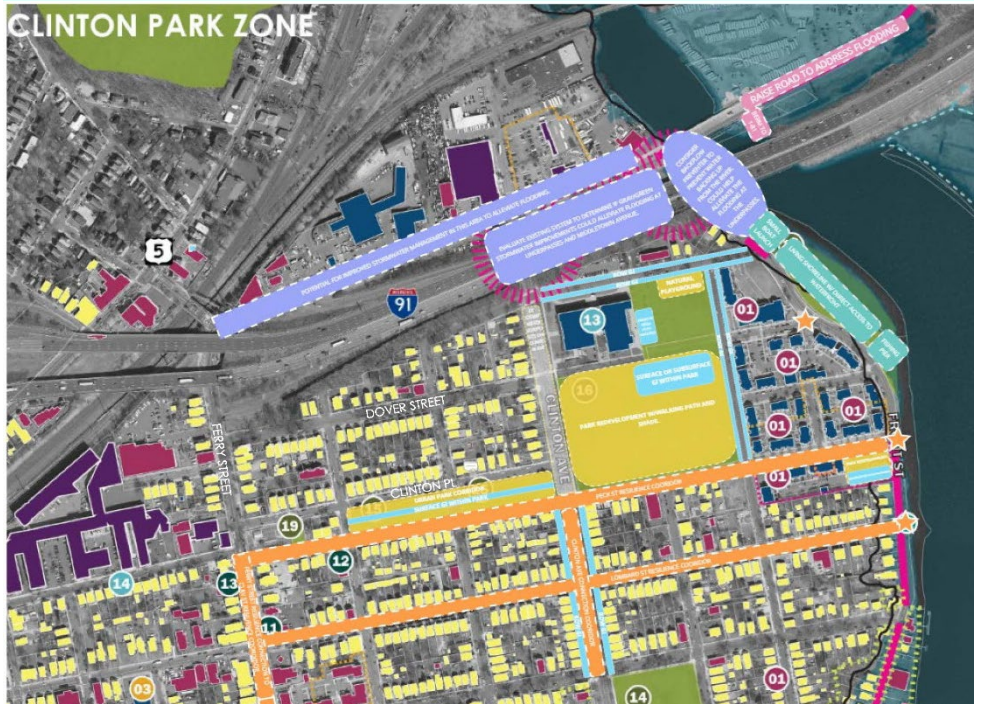
8. **Family Academy of Multilingual Exploration (FAME) School Parking Lot Cooling Improvements -** Shade structure and green roof, shade trees, plantings in existing play yard
   Estimated Cost: $2,600,000

TOTAL COST (-30% TO +50% ROUNDED) $81,000,000 - $127,900,000

RESILIENT FAIR HAVEN

Lessons Learned

FOCUS AREA SELECTION



Resilient Fair Haven

- Extreme Heat: Opportunities to reduce heat exposure may be advanced using green infrastructure; respite from heat may be provided with cooling centers and water access.
- Floods: Coastal floods and intense precipitation will increasingly hinder access from Fair Haven to adjacent parts of New Haven using the many bridges and underpasses.
- Community: Residents have pressing needs related to housing, safety, health, economic insecurity which may be higher current priorities than climate resilience.

Strategic Findings

Communities with significant health, socioeconomic, and recreational needs may not have time to dedicate to climate resilience needs. To foster interest, opportunities to advance climate adaptation may need to be linked to improvements in transit, walkability, recreation, public and critical facilities, community spaces, and water access.

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2023 CIRCA Summit: A Climate Resilience Roadmap for Connecticut

Agenda:

9:15-9:45 *Arrival, registration, coffee*

9:45-9:50 **Welcome:** Joe MacDougald (CIRCA)

9:50-10:20 **Resilient Connecticut Presentation** Jim O'Donnell (CIRCA) / John Truscinski (CIRCA)

10:20-11:00 **Session 1: Resilient Hubs for a More Resilient CT** Joanna Wozniak-Brown (OPM) / Rebecca French (DEEP) / Elle Ouimet (UConn). Moderated by John Truscinski (CIRCA)

11:00-11:15 *Morning break*

11:15-12:30 **Session 2: UConn Panel** Jim O'Donnell (CIRCA) / David Dickson (CLEAR) / Carol Atkinson Palombo (UConn) / Leslie Shor (UConn). Moderated by Joe MacDougald (CIRCA)

12:30-1:30 **Lunch with Keynote Speaker: Katie Dykes, Commissioner, Connecticut DEEP**

1:30-3:30 **Afternoon Breakouts**

1:30-2:20 *Breakout 1*

- Track 1: **CIRCA Phase III Projects**: **Starr Reading Room** John Truscinski (CIRCA) / David Murphy (CIRCA) / Emmeline Harrigan (Planner in Fairfield) / Michelle Andrzejewski (Planner in City of Norwalk)
- Track 2: **Zoning For Resilience**: **Starr 204** Louanne Cooley (CIRCA) / Kayla Vargas (CIRCA)
- Track 3: **Connecticut Environmental Justice Screening Tool: Environmental Justice for Resilient Pathways through Geospatial Information**: **Starr 225** Yaprak Onat (CIRCA) / Mary Buchanan (CIRCA) / Libbie Duskin (CIRCA)

2:20-2:30 *Afternoon breakout*

2:30-3:30 *Breakout 2*

- Track 1: **CIRCA Phase III 2.0**: **Starr Reading Room** David Murphy (CIRCA) / Mary Buchanan (CIRCA)
- Track 2: **Municipal Roadmap with a focus on Municipal Energy Resilience**: **Starr 204** John Truscinski (CIRCA) / Kirt Mayland CIRCA)
- Track 3: **Data Equity for Enhanced Resilience: Bridging Gaps, Facilitating, Sharing, and Shaping Tomorrow's Plans**: **Starr 225** Alfredo Hererra (OPM) / Pauline Zaldoni (OPM) / Debs Ghosh (UConn) / Ashley Benítez Ou (DEEP) / Greg Ciparelli (CT DOT). Moderated by Yaprak Onat (CIRCA) & Nicole Govert (CIRCA).

3:30-4:00 **Closing and Networking** Jim O'Donnell (CIRCA)

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