Resilient Yantic River
Municipal Staff Focus Group

May 5, 2025

TABLE OF CONTENTS

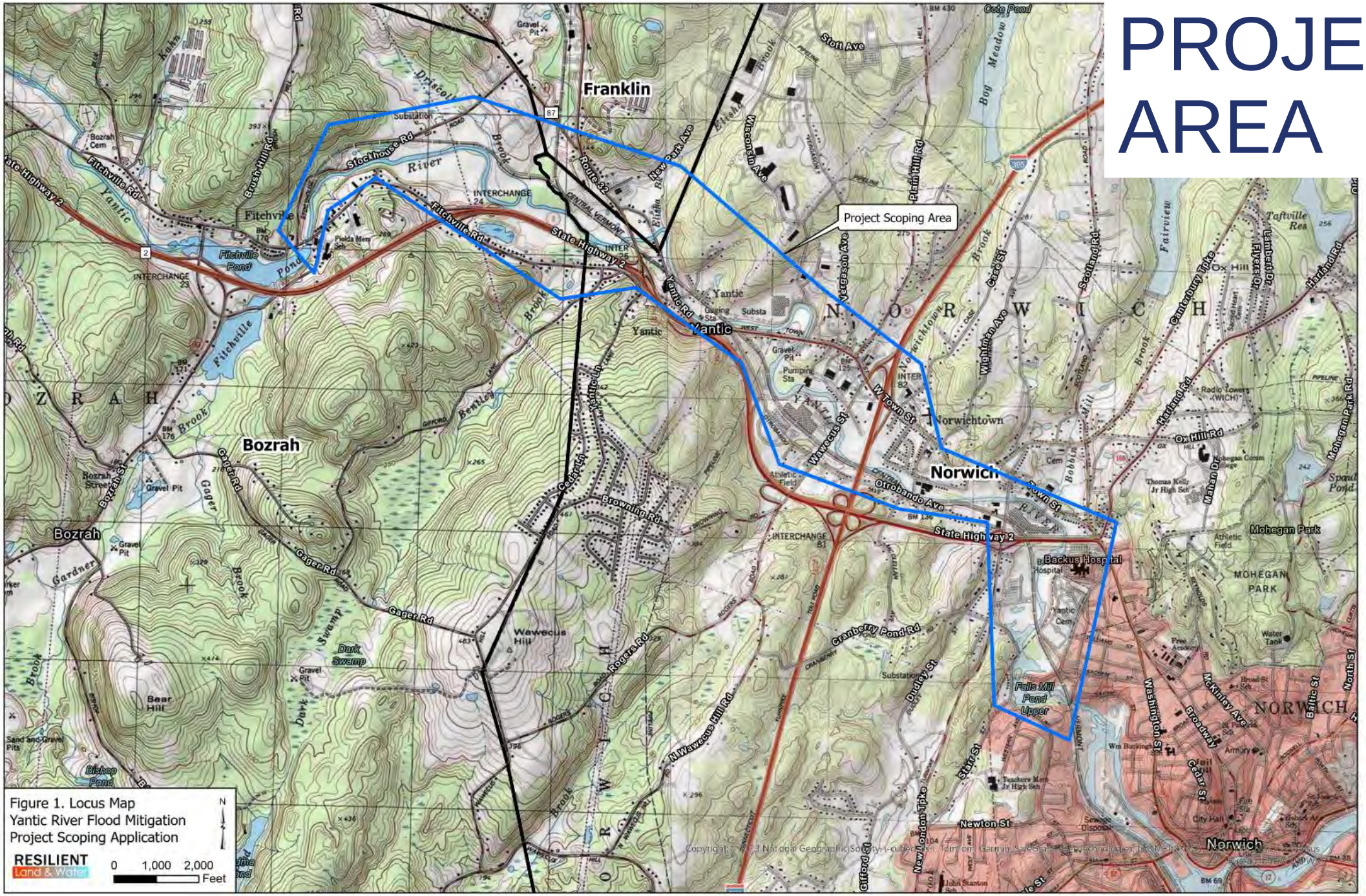
01

PROJECT BACKGROUND

RESILIENT YANTIC RIVER PROJECT GENESIS

- January 2024 flooding brought municipal leaders together.
- Flooding event coincident with FEMA BRIC FY23 application deadline – state DEMHS encouraged an application.
- CIRCA Resilient CT Phase III funding allowed flood mitigation planning efforts to begin outside of FEMA BRIC process.
- Focus in on area from Fitchville Pond downstream to Uncas Leap.

PROJECT AREA



PROJECT GOALS

- Assess current and future flood conditions along the Yantic River from Fitchville Dam, downstream to Uncas Leap.
- Develop summary of priority locations, preferred adaptation strategies indicated by stakeholder engagement.
- At a minimum, include at least three concept designs for the top three flood mitigation strategies as ranked through the stakeholder engagement process.
- Set team up to pursue funding for next design phase and implementation.

WHERE WE ARE IN PROJECT PROCESS

Planning Phase

Extended longer than we wanted – awaited ongoing FEMA flood modeling that was never forthcoming.

Current flood risk model dates to the 1980s.

Project site walks and first project community and technical advisory committee meetings.

Initial Technical Analysis

Project engineers started evaluation in the upstream end of the study area.

Proceeded to model of the Upper Falls Dam.

Proceeded to evaluation of large structural solution and building-specific solutions for Town Street corridor.

Engagement*

5/5 - Municipal staff focus group.*

5/7 – Business community focus group.

5/21 – Public meeting.

02

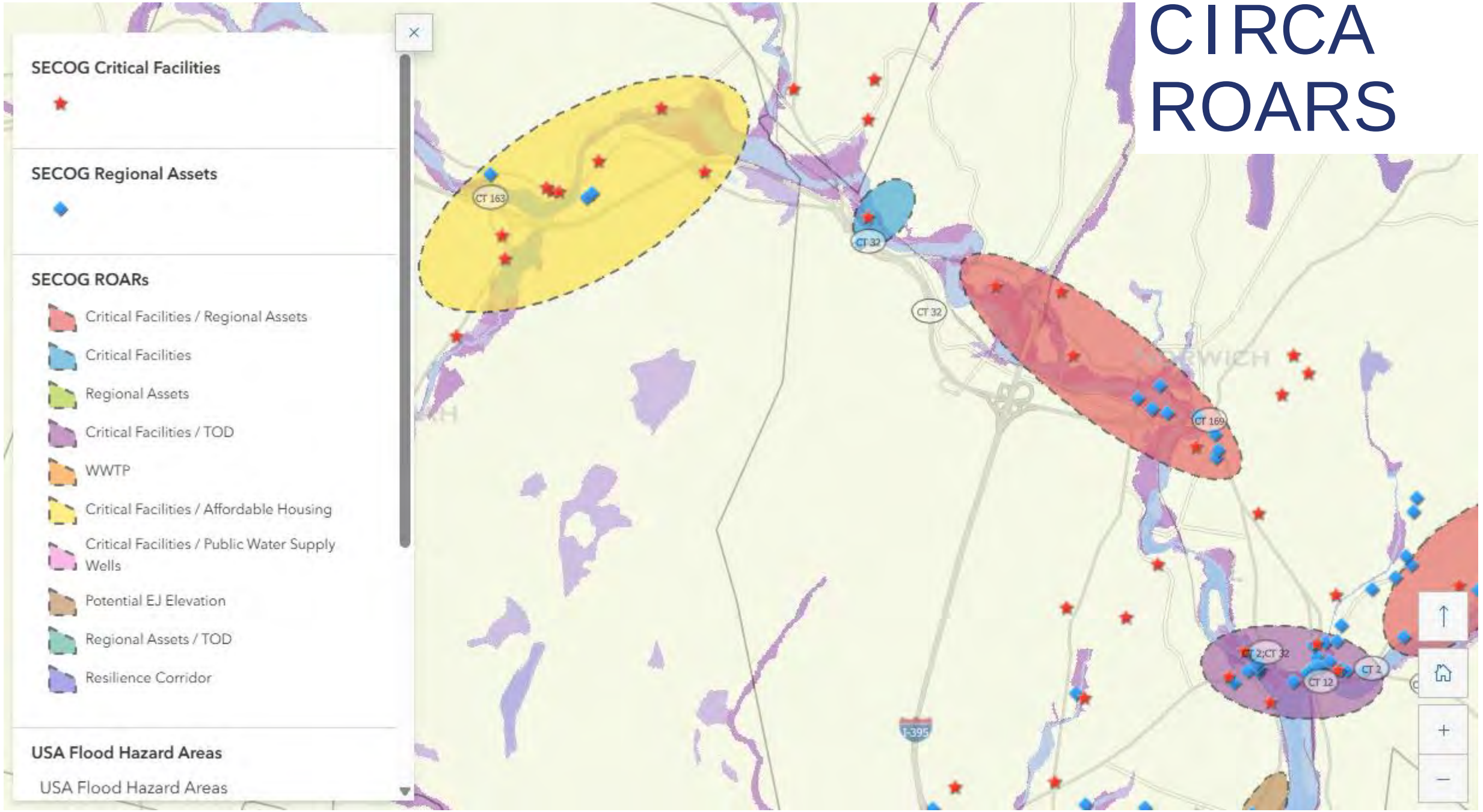
TARGET AREA OVERVIEW

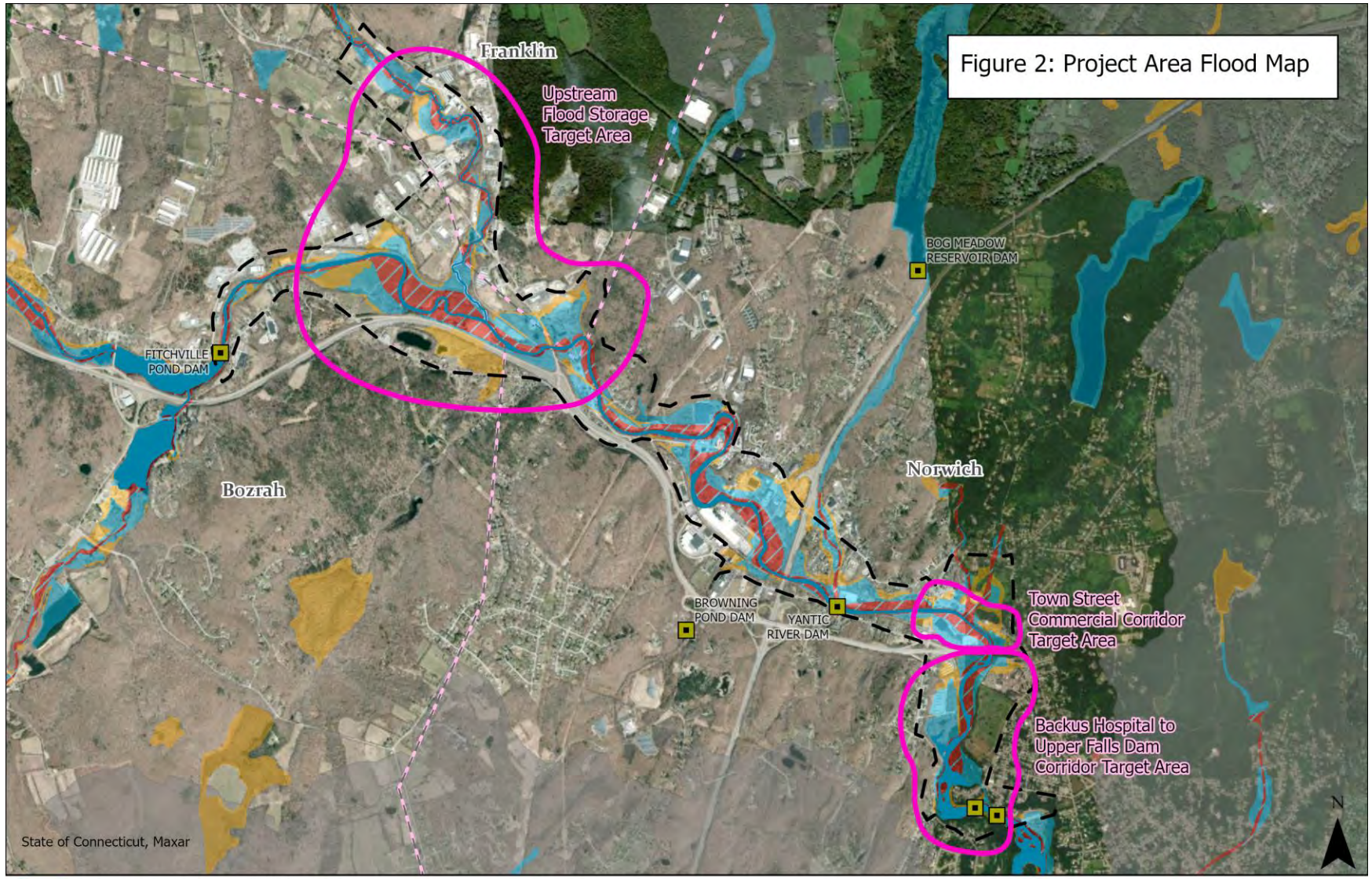
BUILDING ON PREVIOUS PLANNING

Action Number	Action
BZ5	Consider flood mitigation study along Yantic River to characterize risks to properties and Stockhouse Road.
NW12	Working with an engineering firm or non-profit conservation entity, determine the feasibility of removing the Upper Falls dam on the Yantic River to eliminate backwater flooding at Sherman Street
NW15	Support additional linear park and trail systems in the 1% annual chance floodplain, and expand the Heritage Riverfront Walkway.
NW16	Directly support voluntary acquisitions (buyouts) of 1, 2, 3, and 4-unit residential structures (i.e., houses) in areas of flood risk and convert to open space.
NW17	Directly support voluntary acquisitions (buyouts) of commercial and industrial properties in areas of flood risk and convert to open space when these properties cannot be feasibly re-used or redeveloped.
NW23	Conduct study and design to reduce flood risk at the Bean Hill Substation, which serves critical facilities such as the emergency backup Norwichtown Well. This action is for the study and design; construction is deferred.
COG7	Work with CIRCA to scope a complex climate adaptation and resilience study and concept design (through Resilient Connecticut 2.0 Phase III) that addresses flooding and extreme heat events.

- Project Steering Committee's knowledge of the area and site visit discussions.
- SECOG's 2023 Multi-Jurisdictional Hazard Mitigation and Climate Adaptation Plan Update (HMCAP) developed municipal hazard mitigation actions, including the actions related to flood risk from the Yantic River.
- CIRCA's previous resilience planning work identified Regional Adaptation/Resilience Opportunity Areas (ROARs), illustrating the intersection of climate induced flooding and/or heat risks with vulnerable populations and regional assets.

CIRCA ROARS


SECOG Critical Facilities
SECOG Regional Assets
SECOG ROARs
Critical Facilities / Regional Assets
Critical Facilities
Regional Assets
Critical Facilities / TOD
WWTP
Critical Facilities / Affordable Housing
Critical Facilities / Public Water Supply Wells
Potential EJ Elevation
Regional Assets / TOD
Resilience Corridor
USA Flood Hazard Areas
USA Flood Hazard Areas
CT 163
CT 32
CT 32
CT 169
CT 2;CT 32
CT 12
CT 2
I-395



TARGET AREAS

- Target Area #1: Upper Watershed Floodwater Storage
- Target Area #2: Town Street Commercial Corridor
- Target Area #3: Backus Hospital to Upper Falls Dam River Corridor

03

CURRENT & FUTURE FLOOD RISK

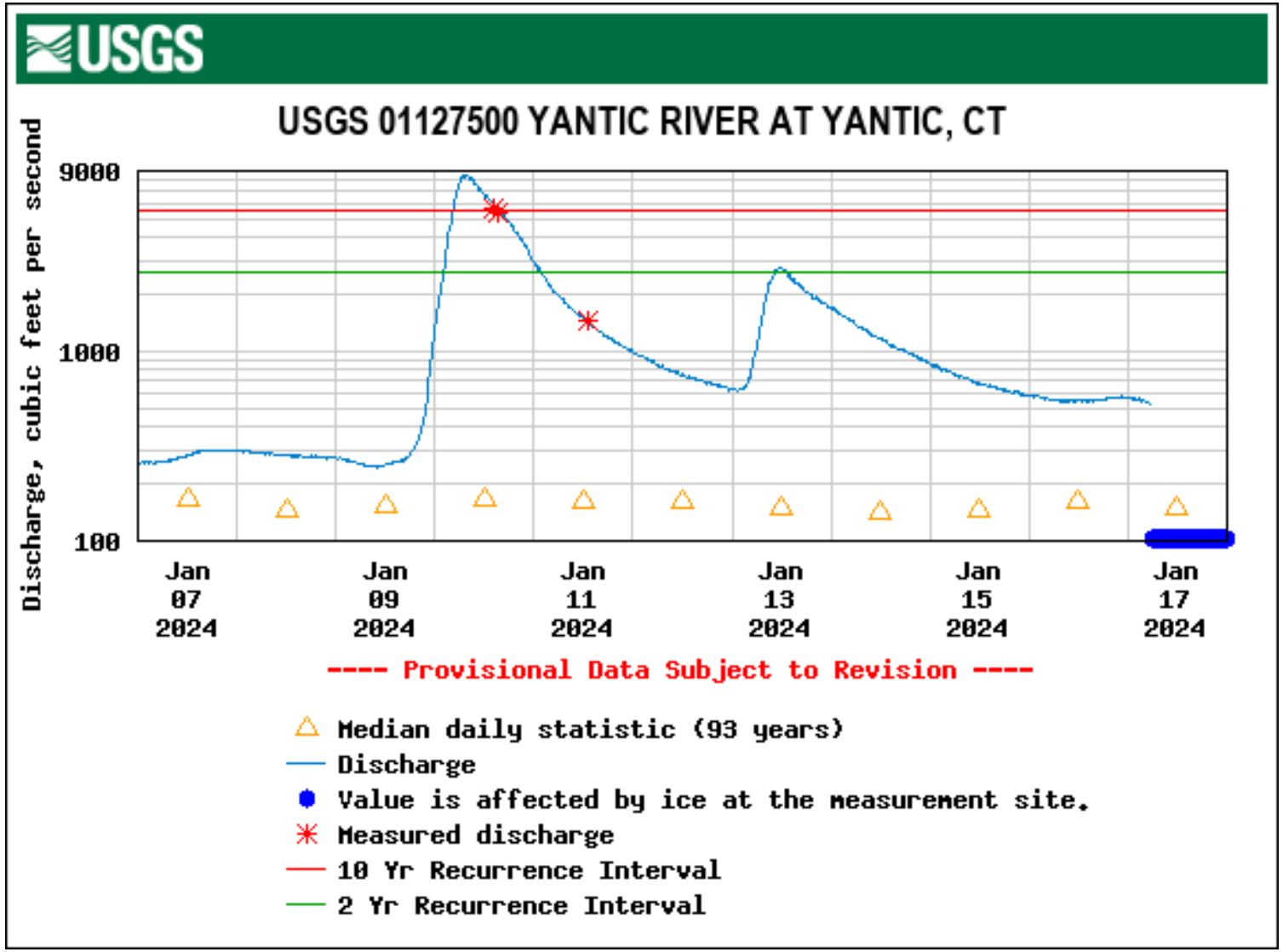
HISTORIC FLOOD EVENTS

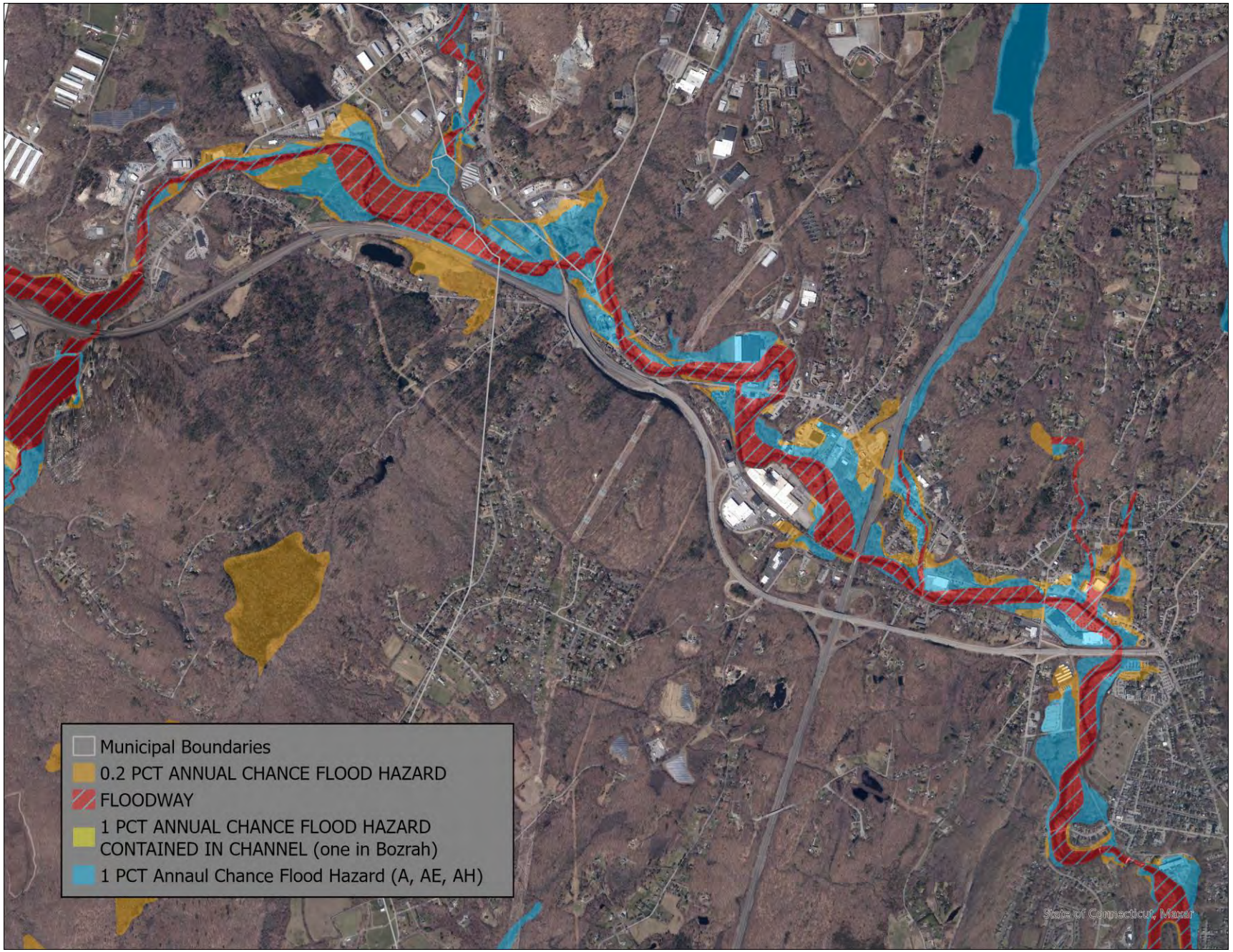
GZA-Estimated Flood Flows

Annual Exceedance Probability (%)	Recurrence Interval (yr)	Peak Flow (cfs)	No. of Exceedances at Gage (1931-2022, 2024)	Years of Exceedance
1	100	11,500	1	1938 (13,500 cfs)
2	50	9,600	2	1938, 1982 (9,850 cfs)
5	20	7,300	5	1938, 1982, 1979, 2010, **2024** (8,500 cfs)
10	10	5,800	12	Above + 1936, 1956, 1978, 1980, 2009, 2018, 2021

Flood Assessment Summary

- **January 2024 Flood**
  - **Peak Flow about 8,500 cubic feet/sec**
  - **Close to the 50-yr Flood = 9,900 cubic feet/sec (FEMA)**





CURRENT SPECIAL FLOOD HAZARD AREA

The area has had five floods beyond the 10-year magnitude in the past 15-16 years (2009-2024) vs the one or two expected by the probabilities.

Flood Assessment Summary

- **Hydrologic and hydraulic modeling to supplement existing flood information**
- **Our objective for this study is to find a good fit to support the development of concept designs to mitigate flooding**
- **In summary, the predicted flood depths and extents are severe**
- **The watershed is relatively large and this type of flooding is challenging to solve for the region without large-scale, expensive interventions**

04

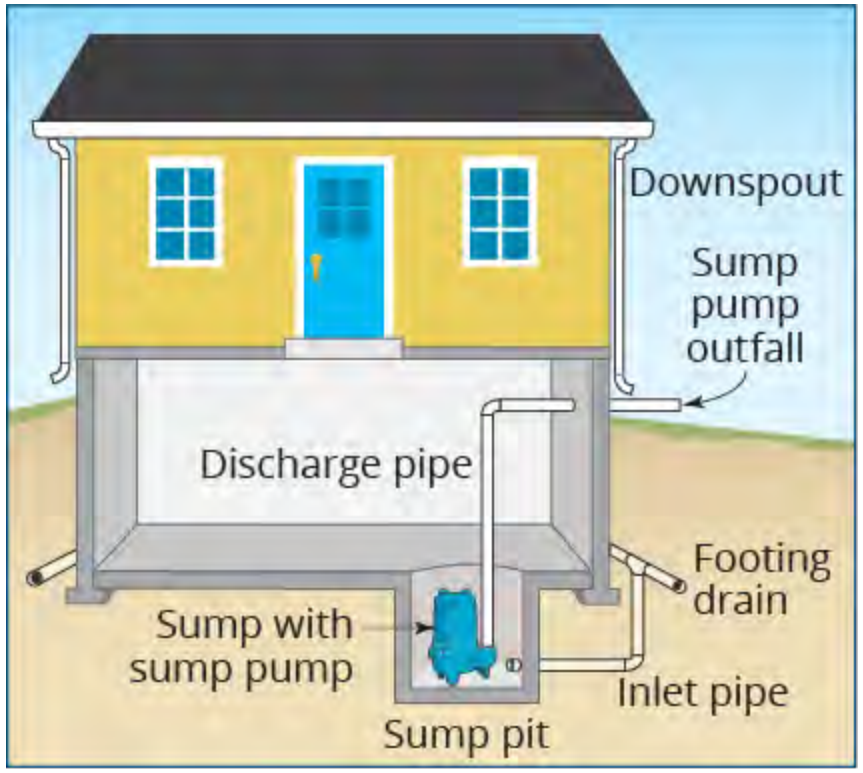
FLOOD MITIGATION ALTERNATIVES

Flood Mitigation Alternatives for Structures

Mitigation Alternative	Applicability	Funding Source?
Install basement sump pumps in flood prone structures	Residential or Non-residential Properties	Private owners
Relocate critical equipment above flood levels	Residential or Non-residential Properties	Private owners, federal grants
Wet floodproofing measures for unoccupied ground floors	Residential or Non-residential Properties	Private owners, state / federal grants
Dry floodproofing measures for shallow floods	Non-Residential Properties	Private owners, state/federal grants
Raise / elevate buildings	Residential Properties (generally)	Private owners, state/federal grants
Strategic relocation (moving up)	Residential or Non-residential Properties	City, state, federal

Flood Mitigation Alternatives for Structures

Sump pumps: unlikely to mitigate major floods but helps reduce flood duration and mitigate minor floods

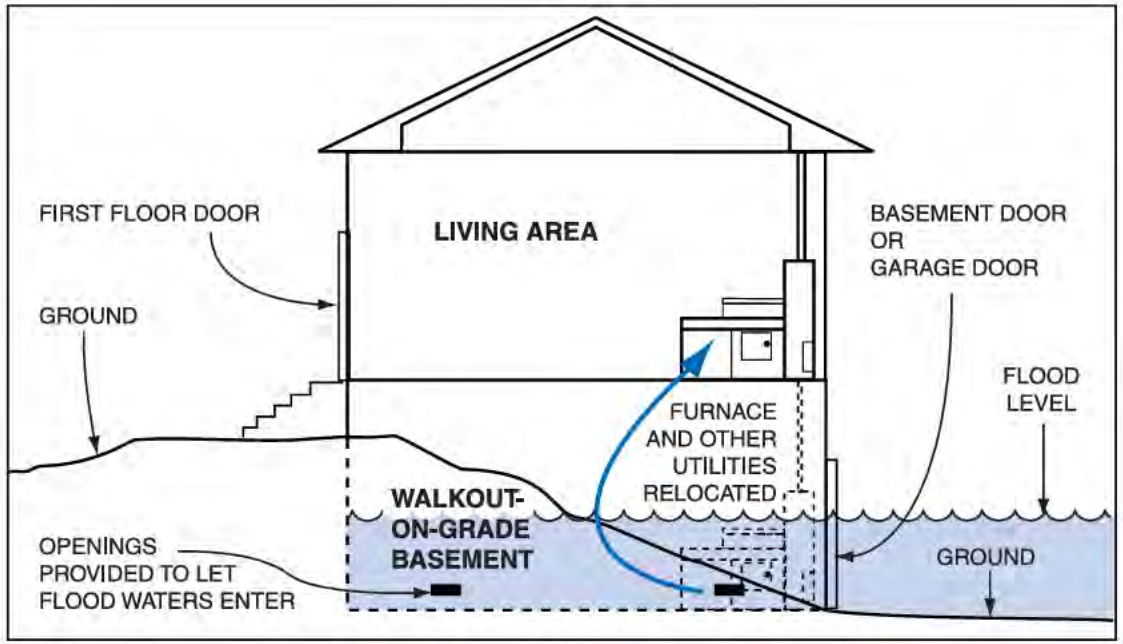


Source: FEMA.gov

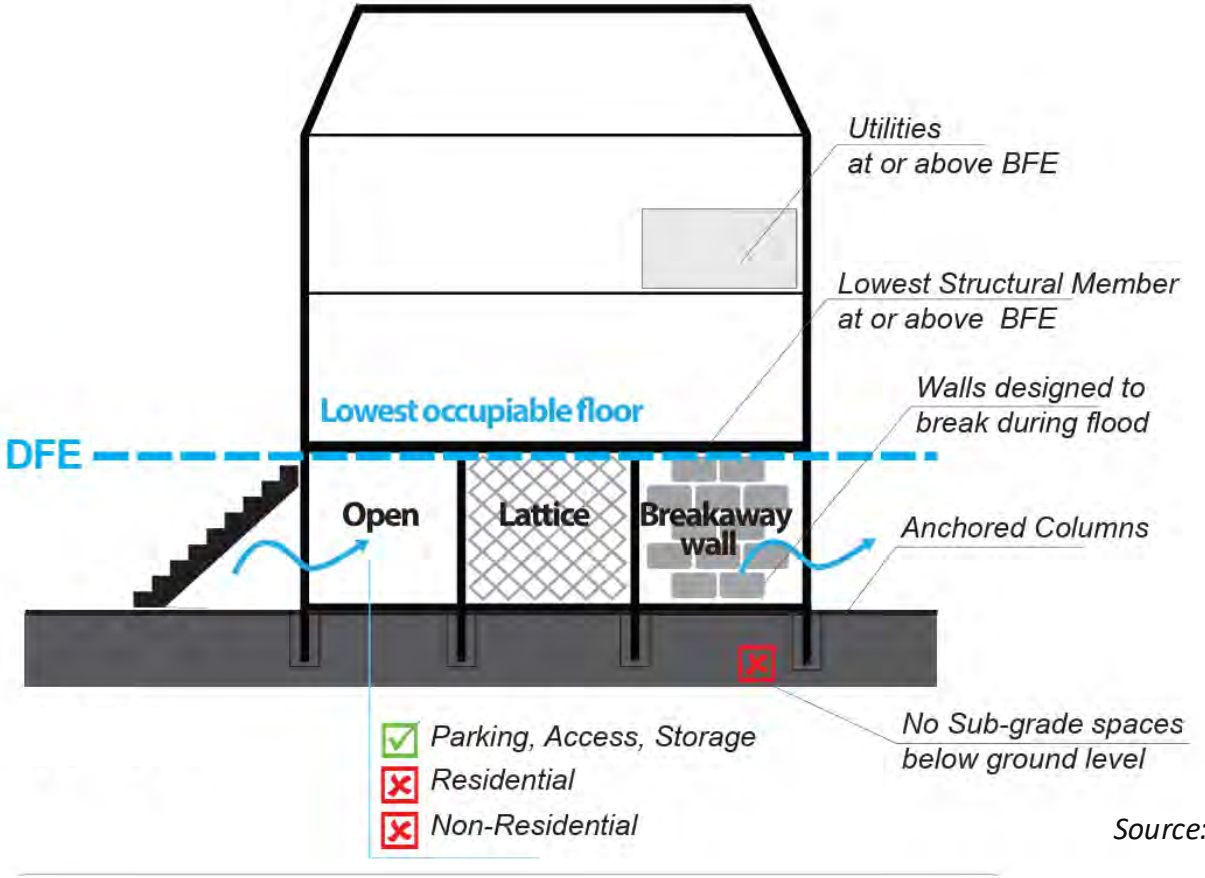
Relocate critical equipment above flood level: elevation on blocks etc. or relocation (e.g., to the roof) helps a structure be usable again faster and reduces losses due to flooding

Flood Mitigation Alternatives for Structures

Wet floodproofing: Allowing floodwaters to enter and exit an area designed and constructed to resist damages from flooding. Can be used for residential or non-residential structures. Floodproofed area usable only for parking, storage, access.



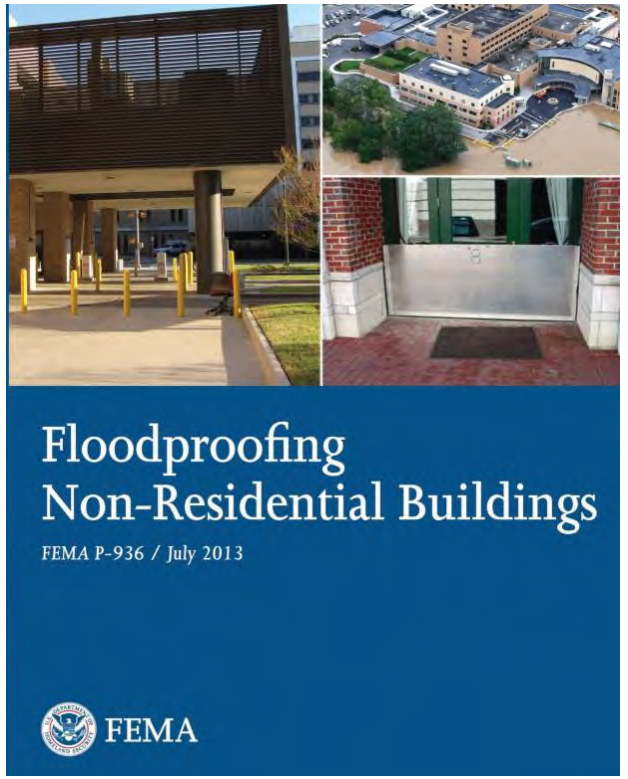
Source: fema.gov



Source: nyc.gov

Flood Mitigation Alternatives for Structures

Dry floodproofing: Making a structure watertight (sealants, temporary or permanent flood shields, etc.) so that floodwaters cannot enter.
Recommended for non-residential structures. May require active human intervention.
Limited to areas of shallow (<3 ft) depth and slow-moving waters.



Flood Mitigation Alternatives for Structures

Elevation: Raising the structure above the flood. Common for residential structures. May be cost-prohibitive. Unlikely to be an option for single-story commercial structures.

Source: National Parks Service

Flood Mitigation Alternatives for Structures

Moving Up: Relocating to areas without significant flood exposure.

Kristin Walker, project engineer for the USDA's Natural Resource Conservation Service, explains how a former home site is now being planted with native species to create a flood plain habitat. Credit: UCONN

Flood Mitigation Alternatives for Structures

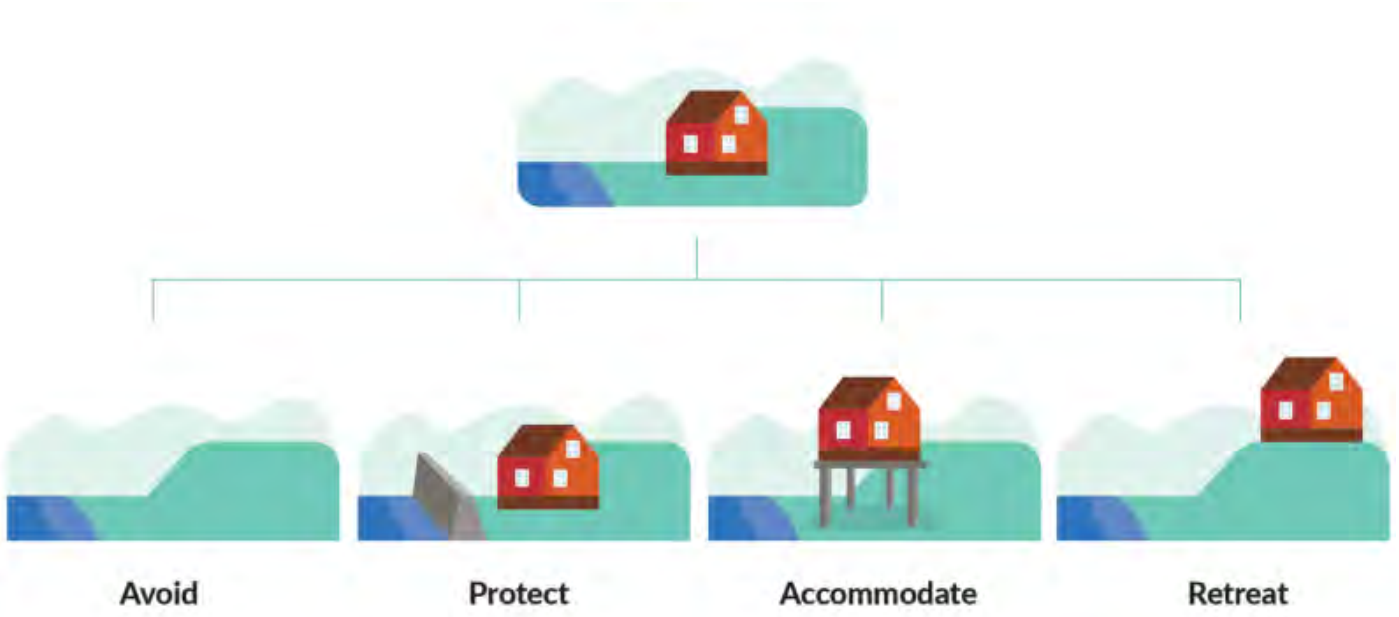
"Moving Up" — A Potential Resilience Strategy

Why Now:

- More intense and frequent flooding from the Yantic River is expected in the future
- Increased insurance premiums and repetitive losses & property damages
- Staying low is risky, costly and disruptive to business

What Is It:

- Proactive, community-supported relocation to higher ground
- Begins with assessments and ***voluntary*** participation



Flood Mitigation Alternatives for Structures

"Moving Up" — Pros and Cons

Benefits	Challenges
Risk reduction and public safety	Financial constraints
Reduced municipal losses	Equity and justice concerns
Environmental restoration	Lack of relocation sites
Cost savings over time	Community resistance
Opportunity for sustainable planning	Maintenance of tax revenue
Enhanced public access to shorelines/Creation of new public space	Lack of organization results in negative perception
Less dependence on emergency response services	Legal concerns

Flood Mitigation Alternatives for Structures

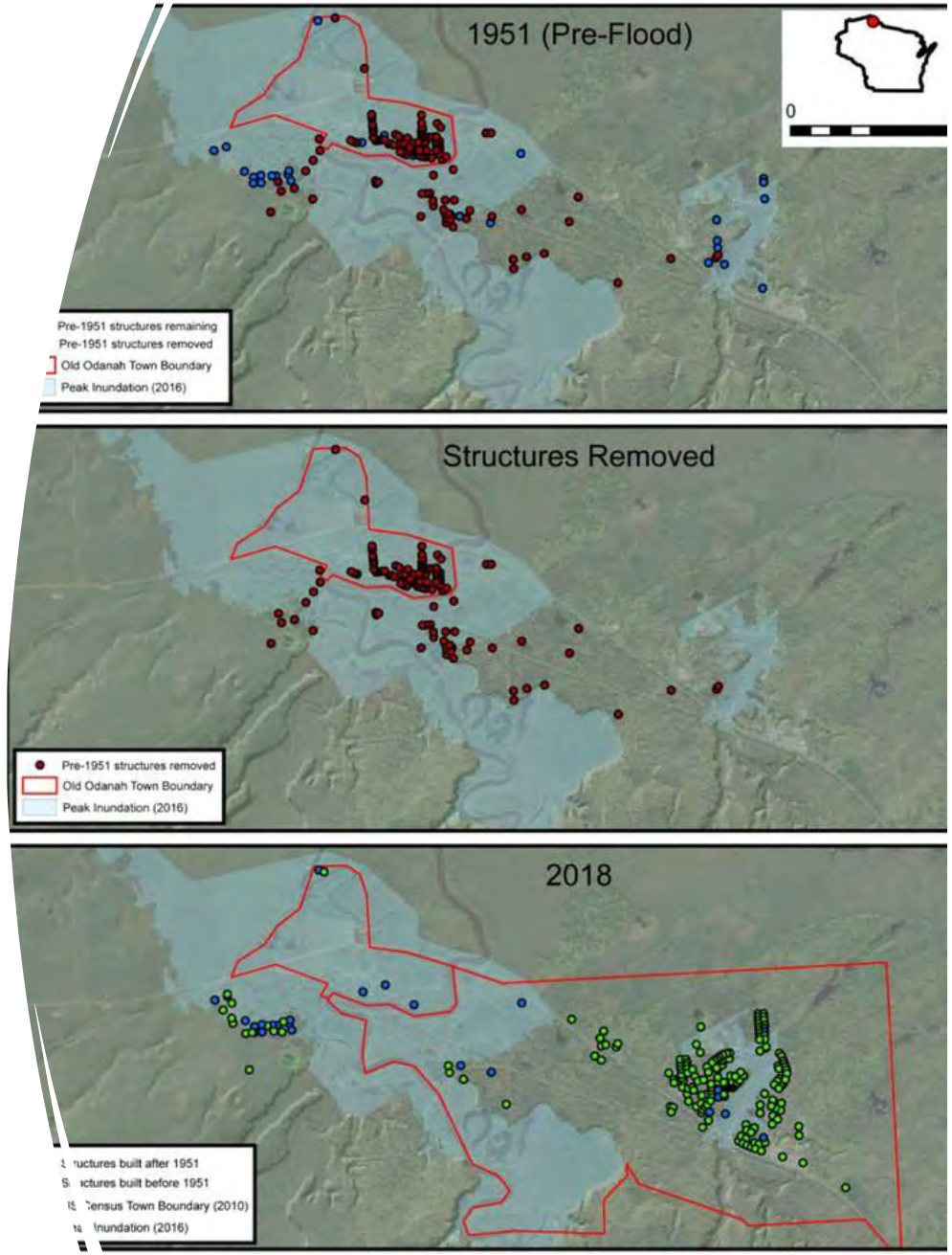
“Moving Up” — What it could look like

- Assessment of community needs
- Voluntary Buyouts at pre-disaster appraised property value
- Planning for safer and sustainable economic redevelopment
- Returning floodplain to public parks or open space
- Support tools include FEMA, CDBG, zoning reform, and equity mapping
- New Jersey DEP Blue Acres as model State run program

Flood Mitigation Alternatives for Structures

“Moving Up” — Success pathways

- Community collaboration is essential
- Pre-disaster recovery actions assessments and risk identification
- Buyout programs must be fair, transparent, and well-funded
- Relocation plans should ensure affordability and opportunity
- Success depends on equity, inclusion, and shared vision



Ocean Beach Park after the Great Hurricane of 1938

Moving Up has been done before in Connecticut!

Center for Land Use Education and Research at the University of Connecticut

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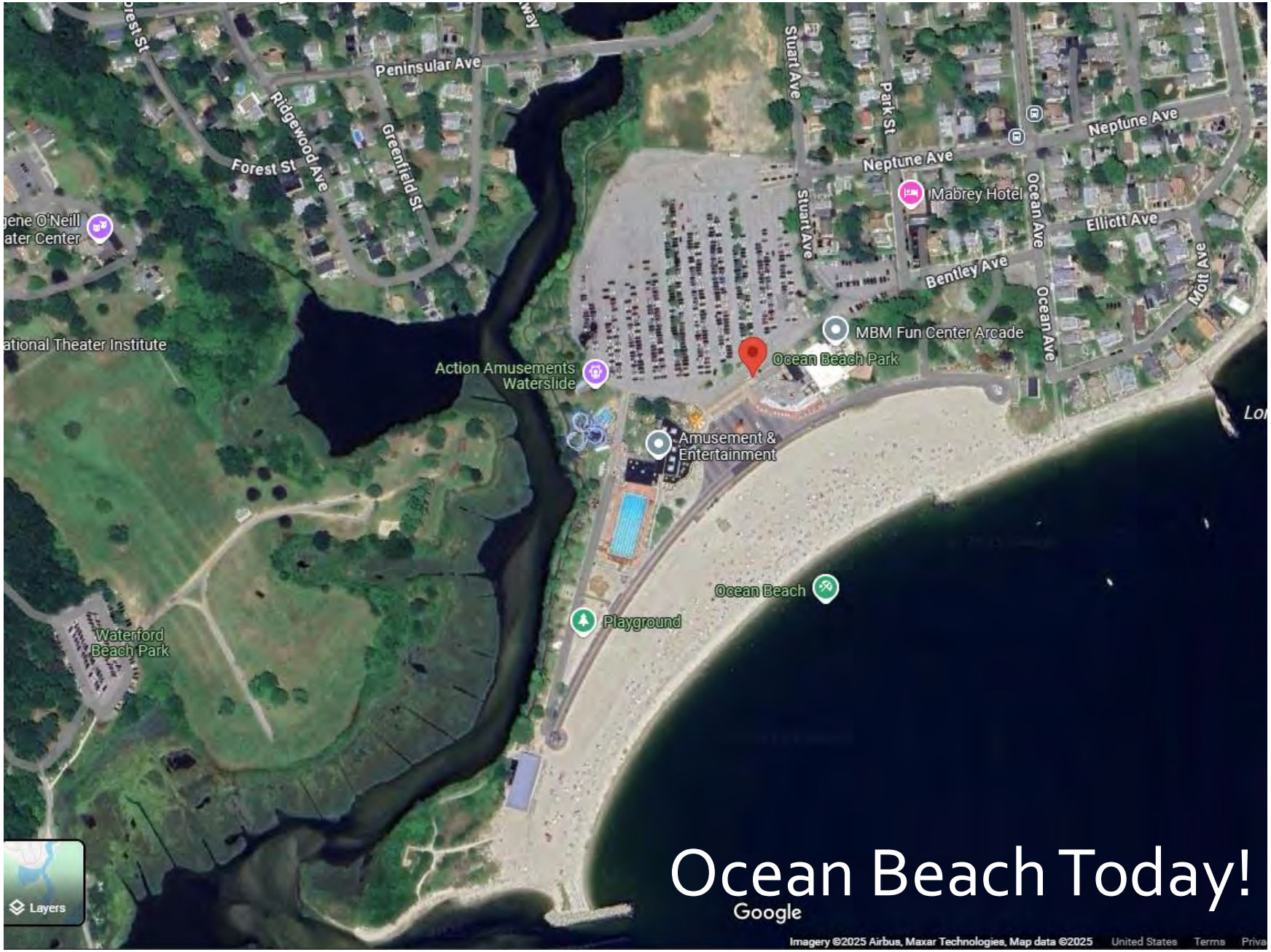
Center for Land Use Education and Research at the University of Connecticu



Ocean Beach Today!

Flood Mitigation Alternatives for the Region

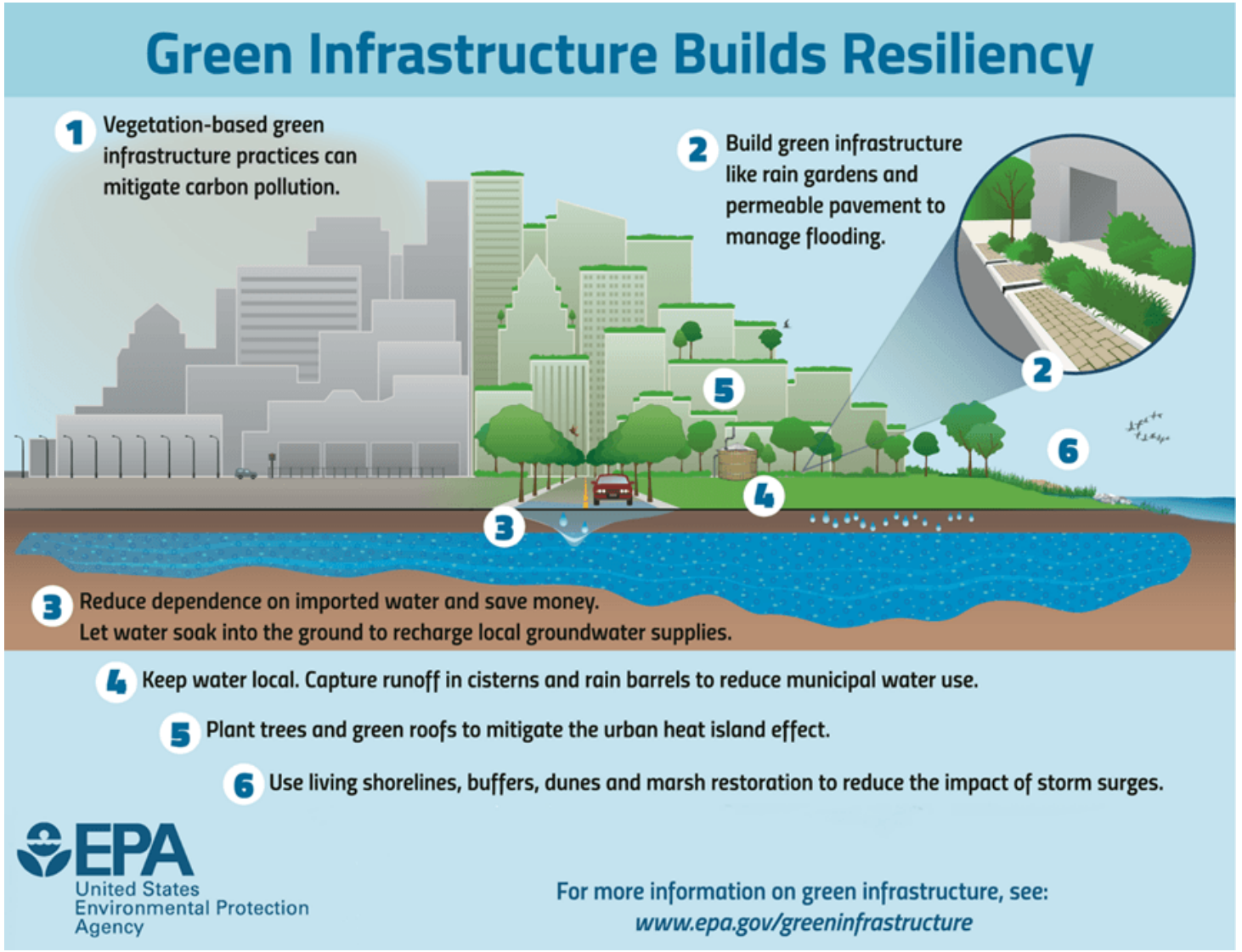
Mitigation Alternative	Benefit and Cost	Funding Source?
Berms Walls and Levees	Moderate benefit, high cost	City, State, Federal
Downstream Dam Removal	Low to moderate benefit, moderate cost	Numerous grant possibilities
River Maintenance and Dredging	Low benefit, moderate to high cost	City
Widening Bridge Spans and Culverts	Low to moderate benefit, high cost	State (DOT)
Watershed-scale Improvements	Long-term moderate benefit, moderate to high cost	City, State, Private Property Owners

Regional Flood Mitigation Alternatives

Widening Bridge Spans and Culverts: Increasing the size of water passageways below roads. Unlikely to significantly reduce major flood levels by itself near Town Street since existing bridges do not appear to cause severe water backups. Larger openings pass more flood flow to downstream areas.

Regional Flood Mitigation Alternatives

<u>Design and implement holistic watershed-scale improvements</u>: Reducing impervious areas, adding green infrastructure, increasing storage. Long-term action. Requires coordination and cooperation from many different parties, including private property owners.



05

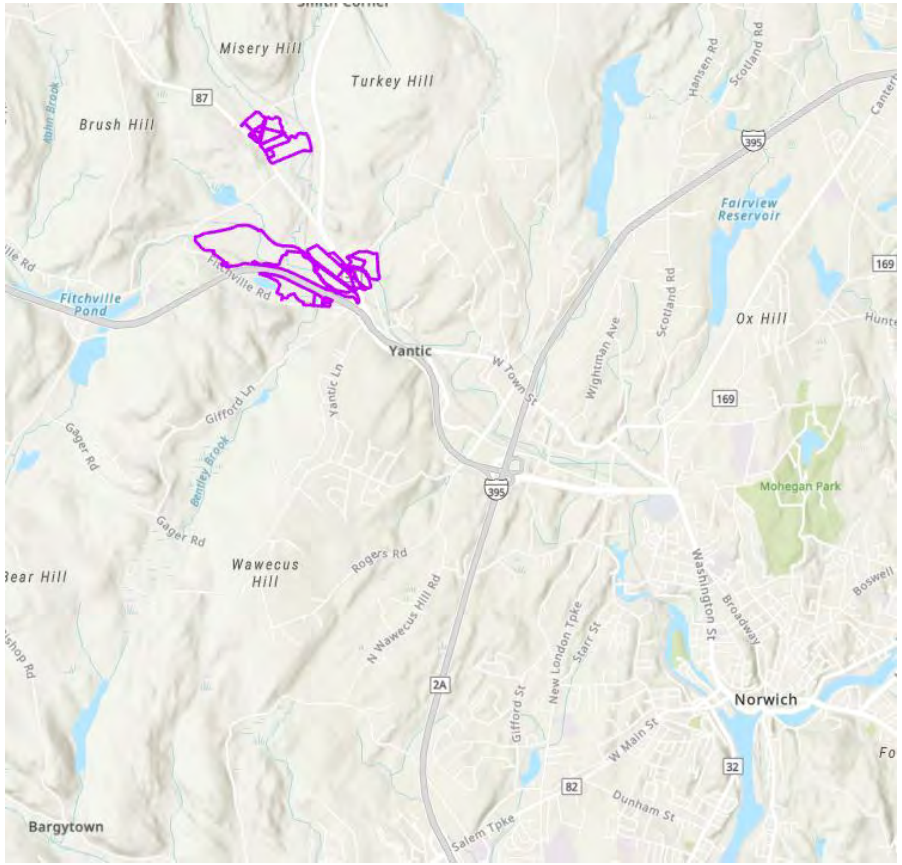
APPLYING FLOOD MITIGATION ALTERNATIVES TO TARGET AREAS

Upper Watershed

Upper Watershed Storage

Potential Flood Storage Areas

- 30 properties
- ~ 3.5 miles upstream of commercial district and Backus Hospital area
- Bozrah, Franklin, Norwich
- Ownership
  - Private
  - State owned
- Land use
  - Residential
  - Commercial
  - Industrial
  - Vacant Land
  - State DOT



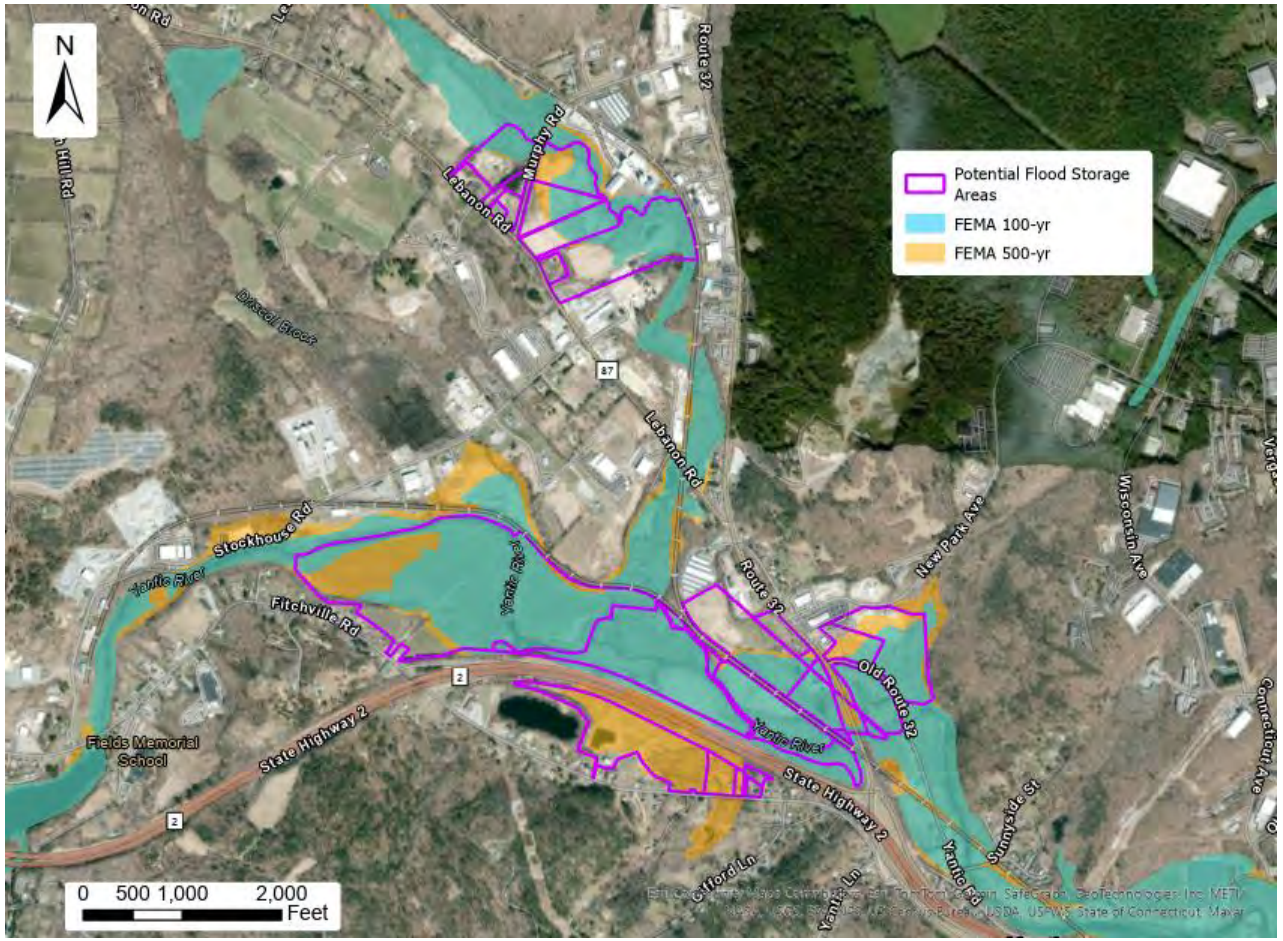
Upper Watershed Storage

Evaluation Criteria

- Parcel area
- Ground elevation within 100-yr flood area
- Ground elevation outside of 100-yr flood area
- Area outside of 100-yr flood area

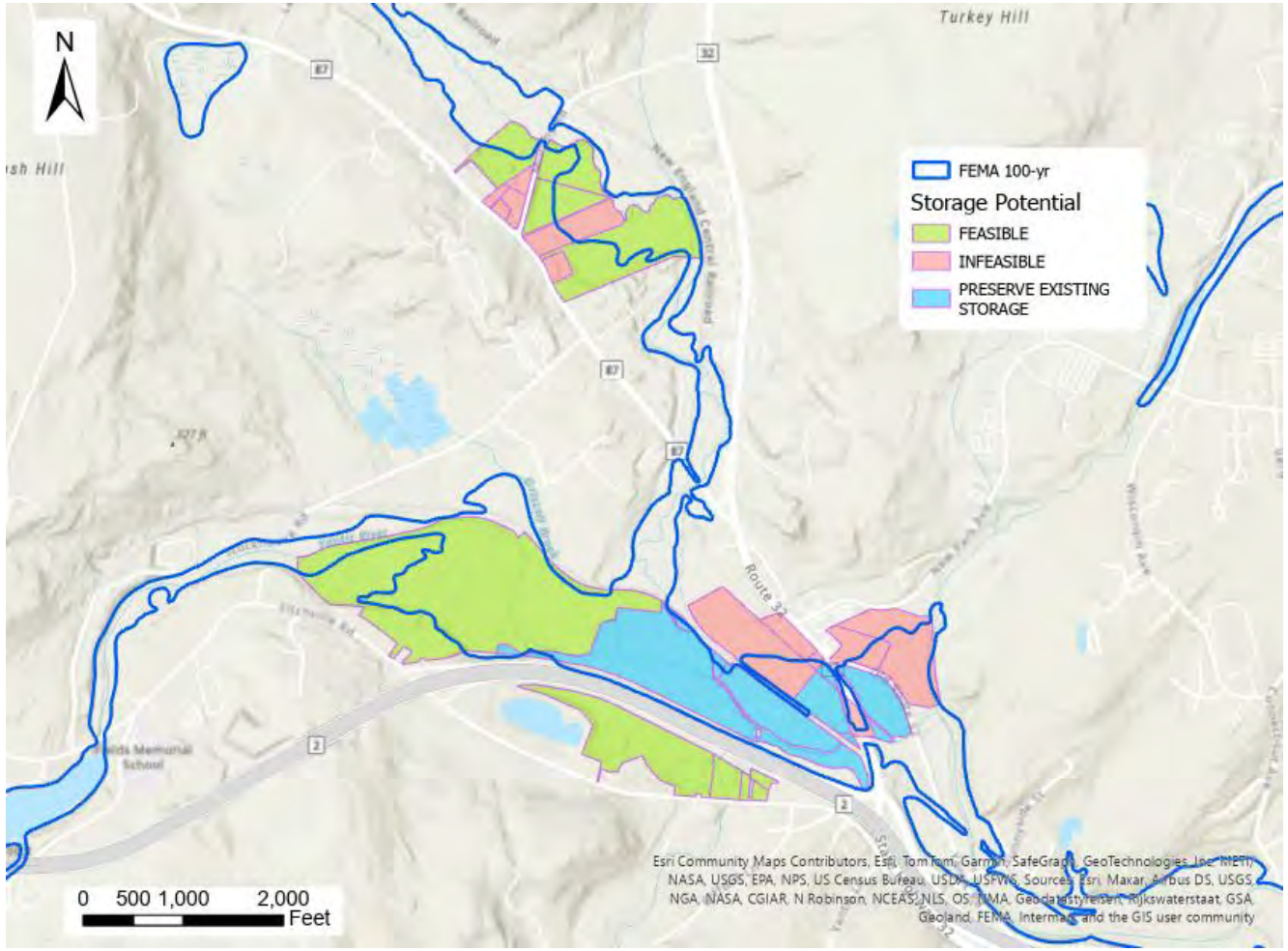
Categories

- Feasible flood storage area
- Infeasible flood storage area
- Preserve existing floodplain storage



Upper Watershed Storage

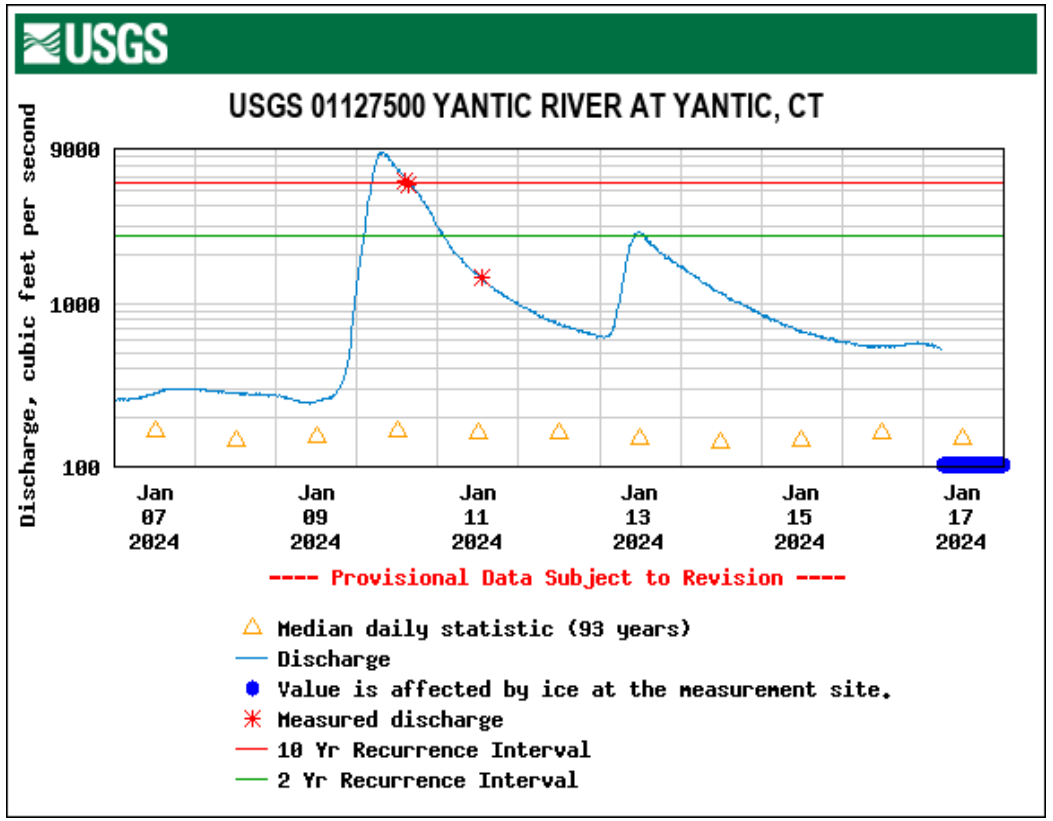
Feasible: 10 Parcels
Infeasible: 12 Parcels
Preserve: 8 parcels



Upper Watershed Storage

Flood Storage

- Additional flood storage from parcels ~ 90 acre-ft (without grading changes)
- About 1% of the 2-day flood volume – unlikely to make much impact
- May be more helpful for smaller storms

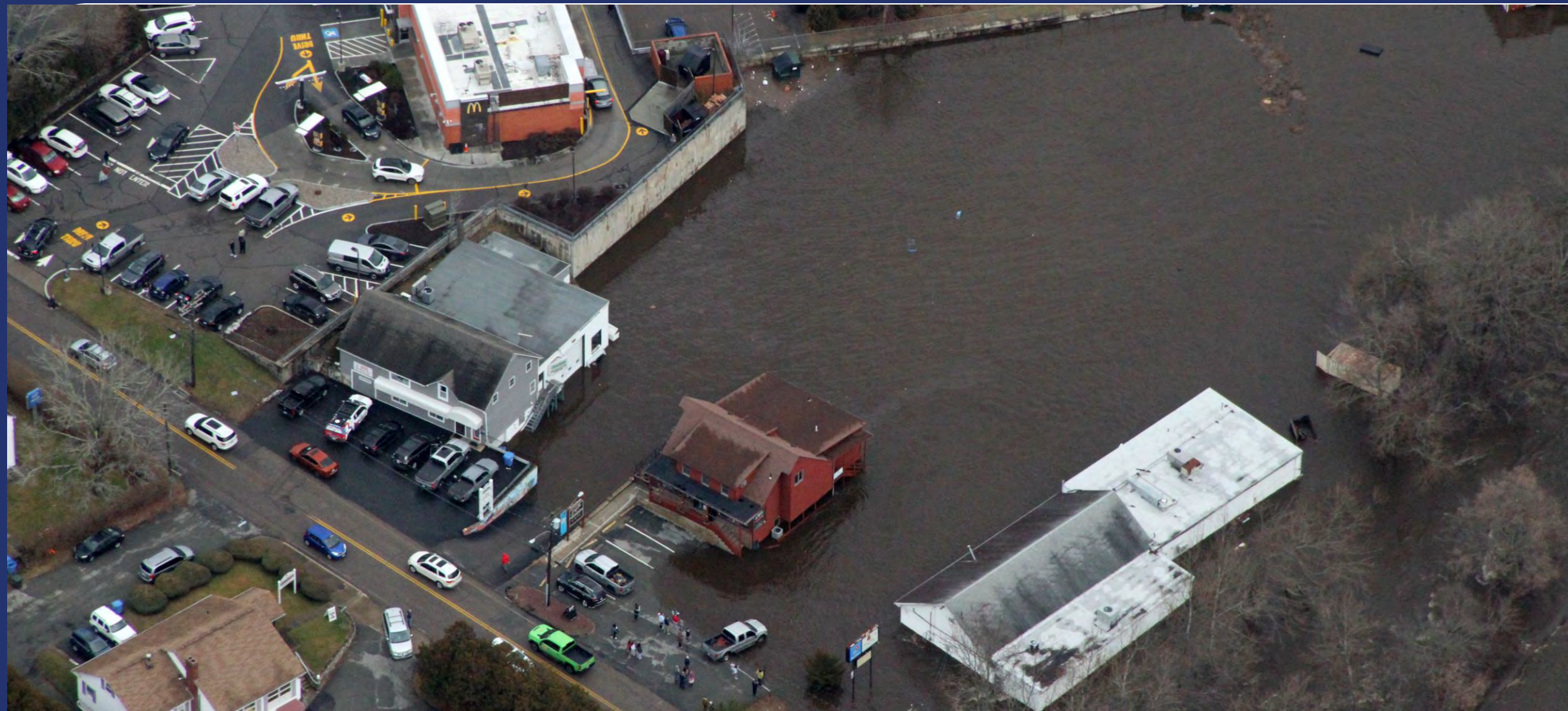


Fitchville Dam

Challenges with converting to a flood control structure

- Initial expense
- Long-term maintenance – who would own it and maintain it?

Town Street Corridor



Current Zoning Map

Zoning Districts

Residential

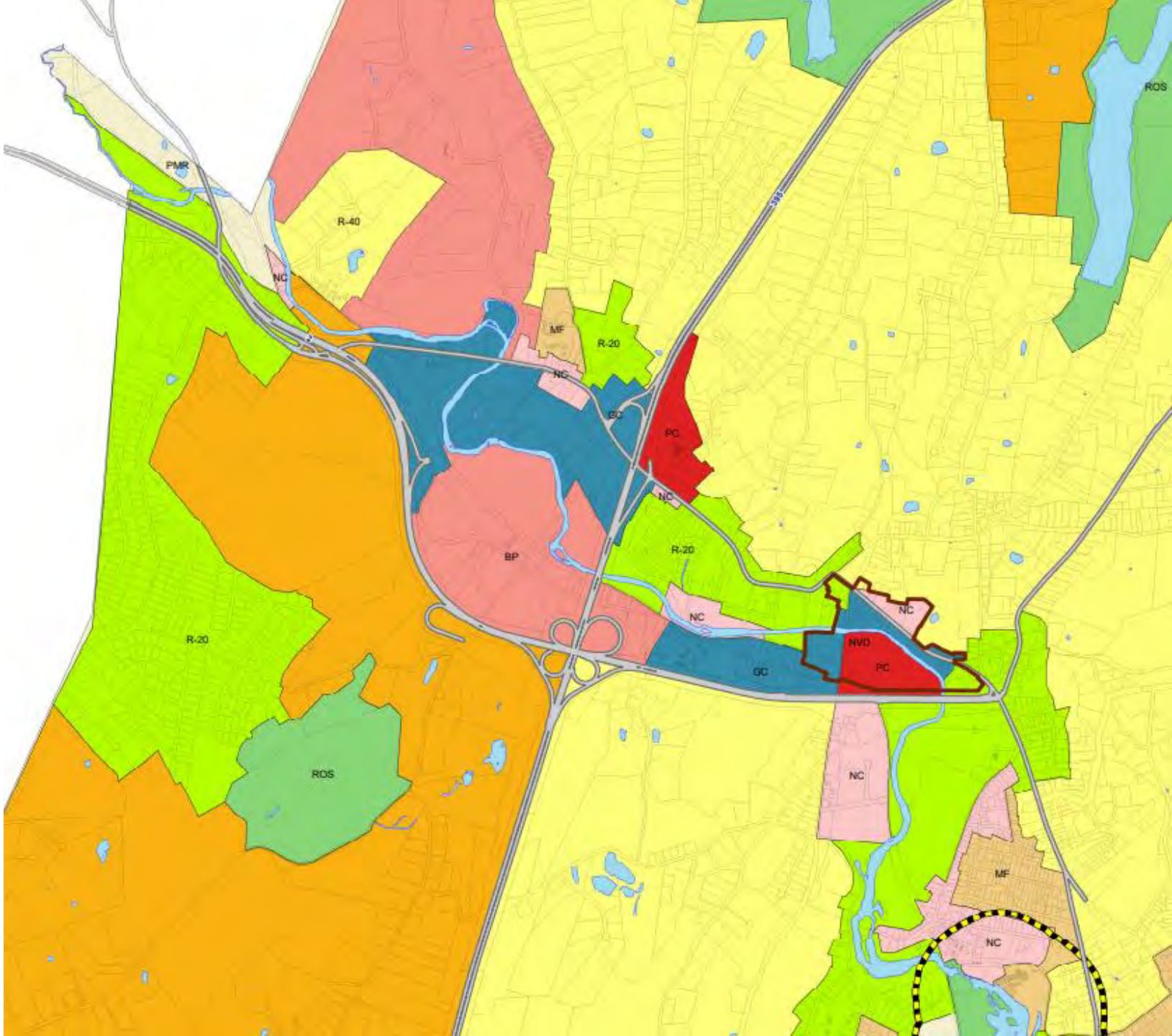
- R-80
- R-40 (Residential)
- R-20
- MF (Multi-Family)
- ROS (Recreation Open Space)

Commerical/Industrial

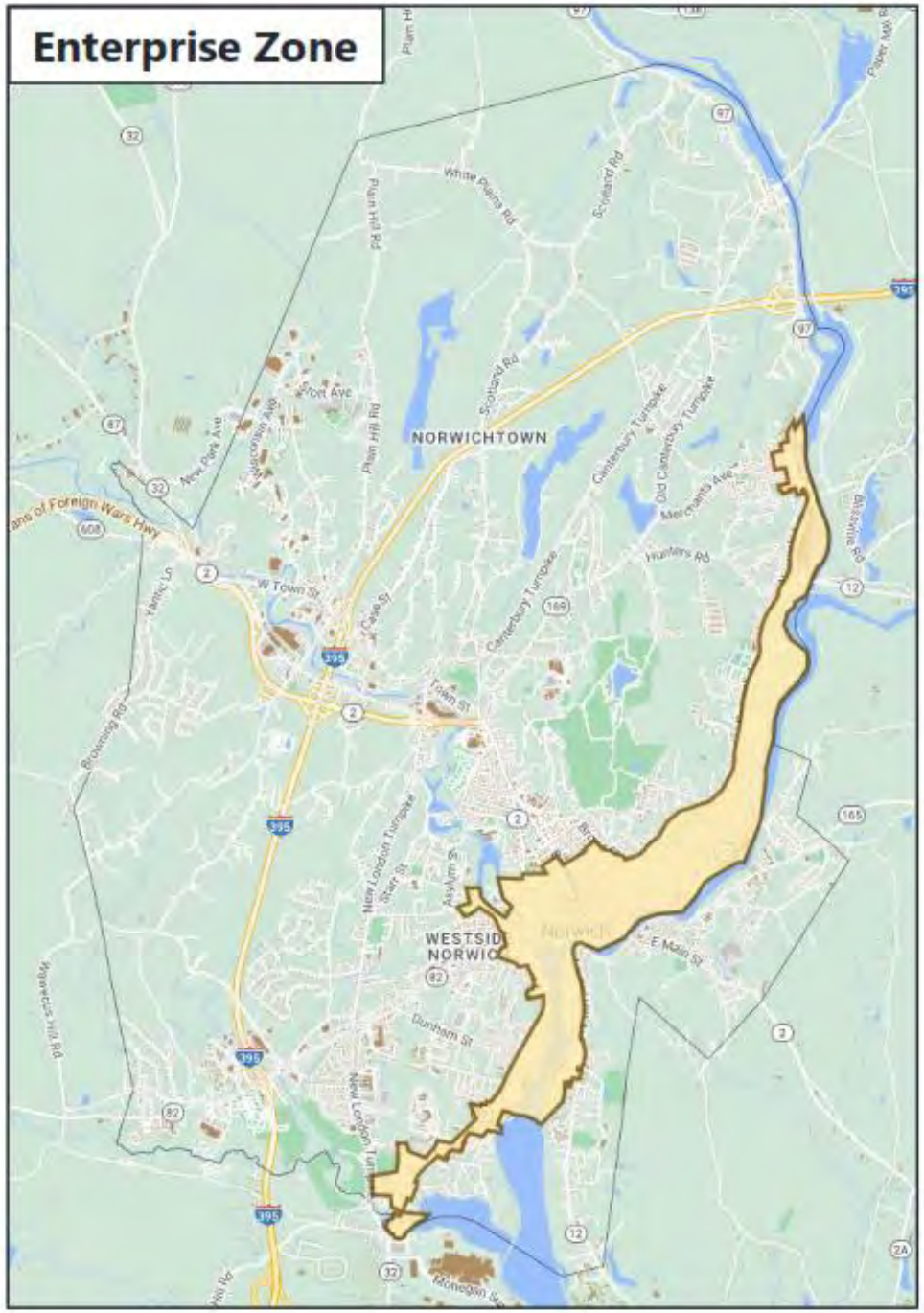
- CC (Chelsea Central)
- WD (Water Development)
- GC (General Commercial)
- PC (Planned Commercial)
- NC (Neighborhood Commercial)
- BP (Business Park)
- PMR (Production, Manufacturing and Research)
- PDD (Planned Development)

Overlay Districts

- IHOD Incentive Housing Overlay District
- ABOD Agriculture Business Overlay District
- NVD Norwichtown Village Overlay District
- Coastal Area Management Overlay District



Economic Development Background



Source: City of Norwich MapGeo GIS

Source: City of Norwich MapGeo GIS

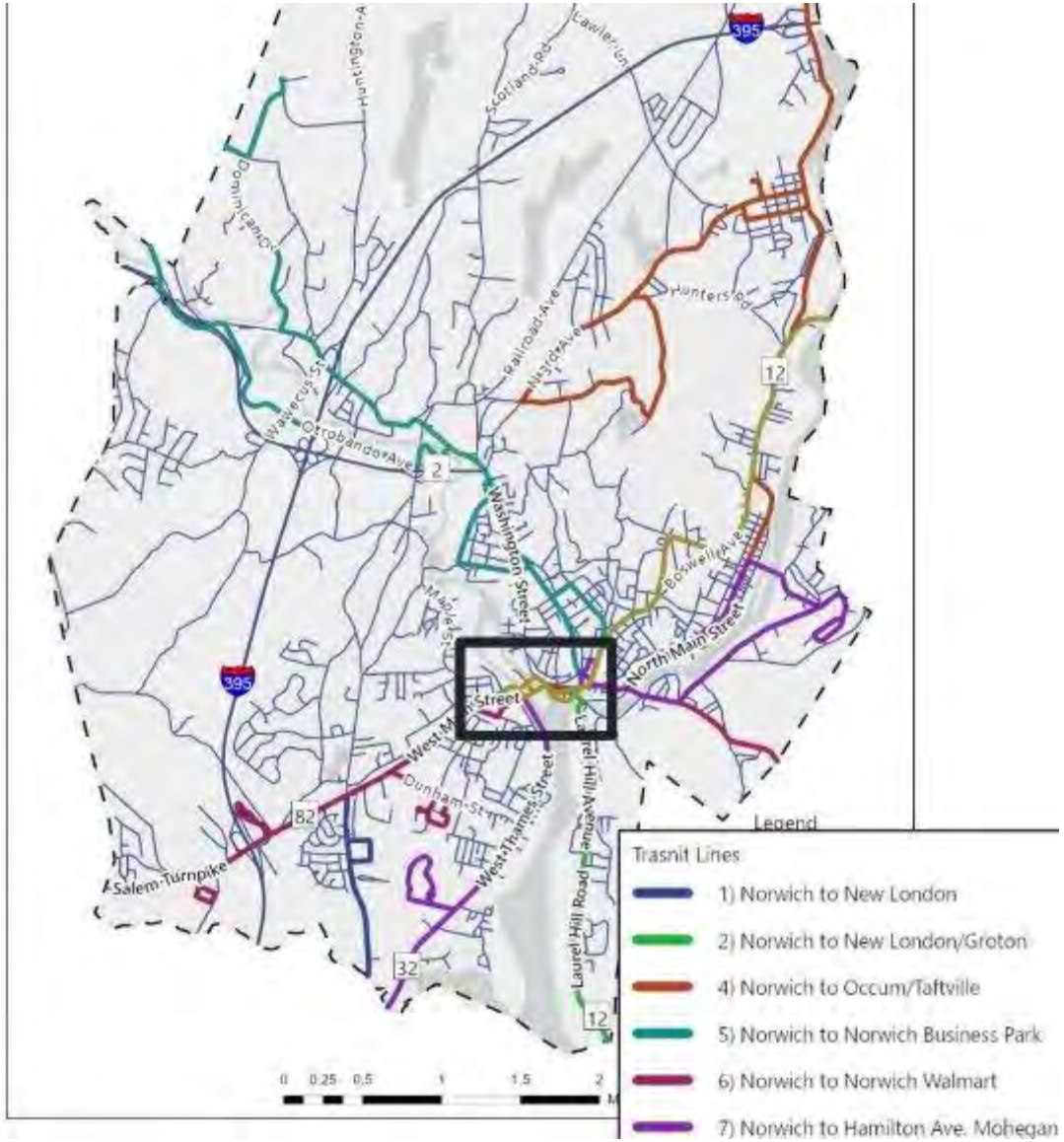
Economic Development Background

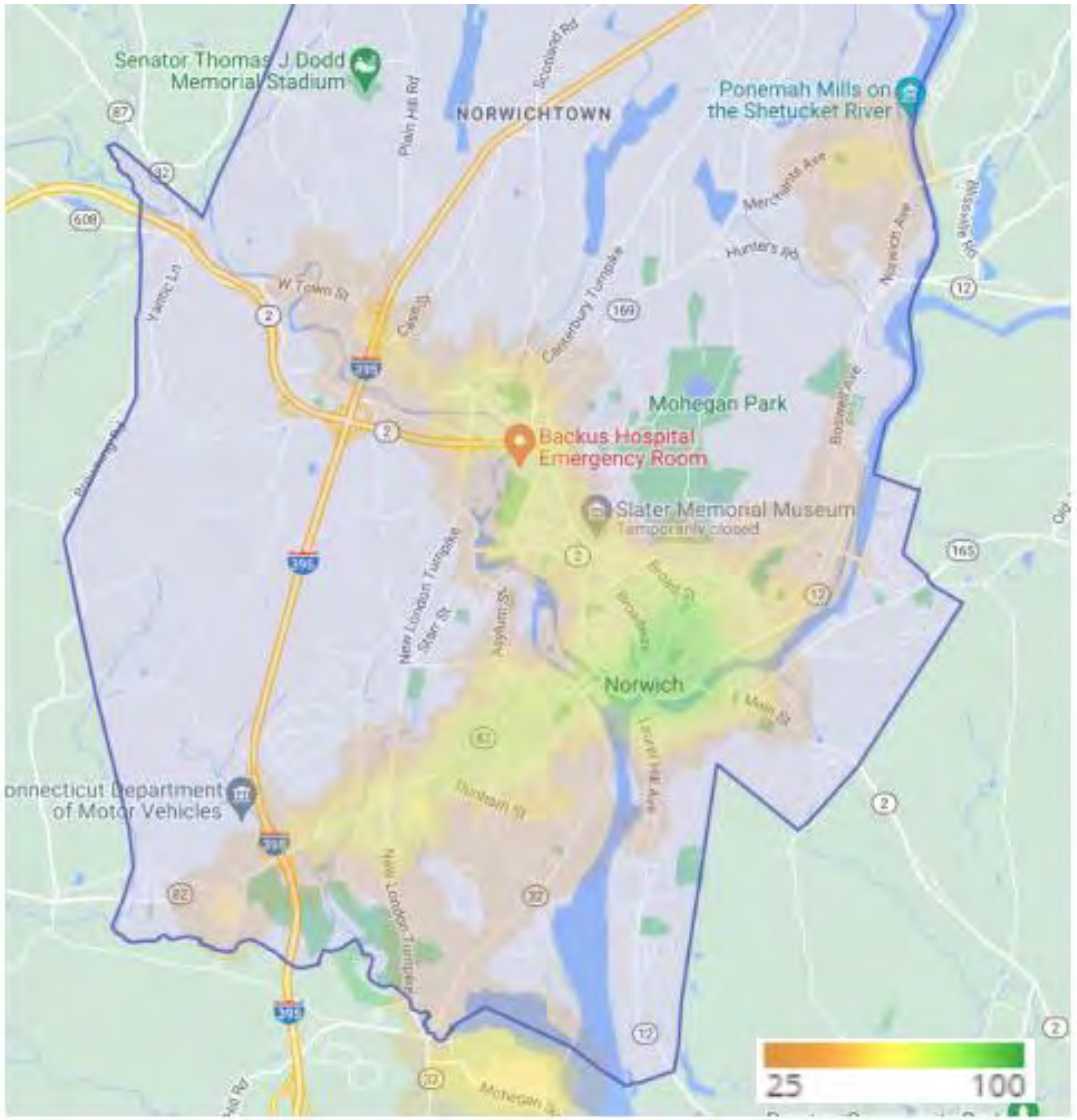
City of Norwich Principal Property Taxpayers: 2021

Name	Taxable Assessed Value	Percent of Total
Computer Science Corporation 100 Winneden Road	$49,644,000	2.4%
Norwich Town Commons 42 Town Street	$19,080,000	0.9%
Bob's Discount Furniture 72 Jewett City Road	$16,778,000	0.8%
Norwich Realty Associates LP 624 West Main Street	$11,381,000	0.6%
Domino Solar Ltd. Multiple Sites – Solar Panels	$11,203,000	0.6%
Plaza Enterprises 107-113-117 Salem Turnpike	$11,026,000	0.5%
Mashantucket Pequot Tribe 607 West Thames Street & 80 Stonington Road	$10,297,000	0.5%
Elk Thamesview LLC 495 Laurel Hill Road	$9,411,000	0.5%
Wal-Mart Stores, Inc. 220 Salem Turnpike	$9,151,000	0.3%
Algonquin Gas Transmissions LLC Multiple Sites - Utility	$8,772,000	0.5%
Total Principal Taxpayers	**$156,743,000**	**5.5%**
Total All Taxpayers	**$2,850,539,307**	**100.0%**

Source: Norwich 2021 Annual Comprehensive Financial Report

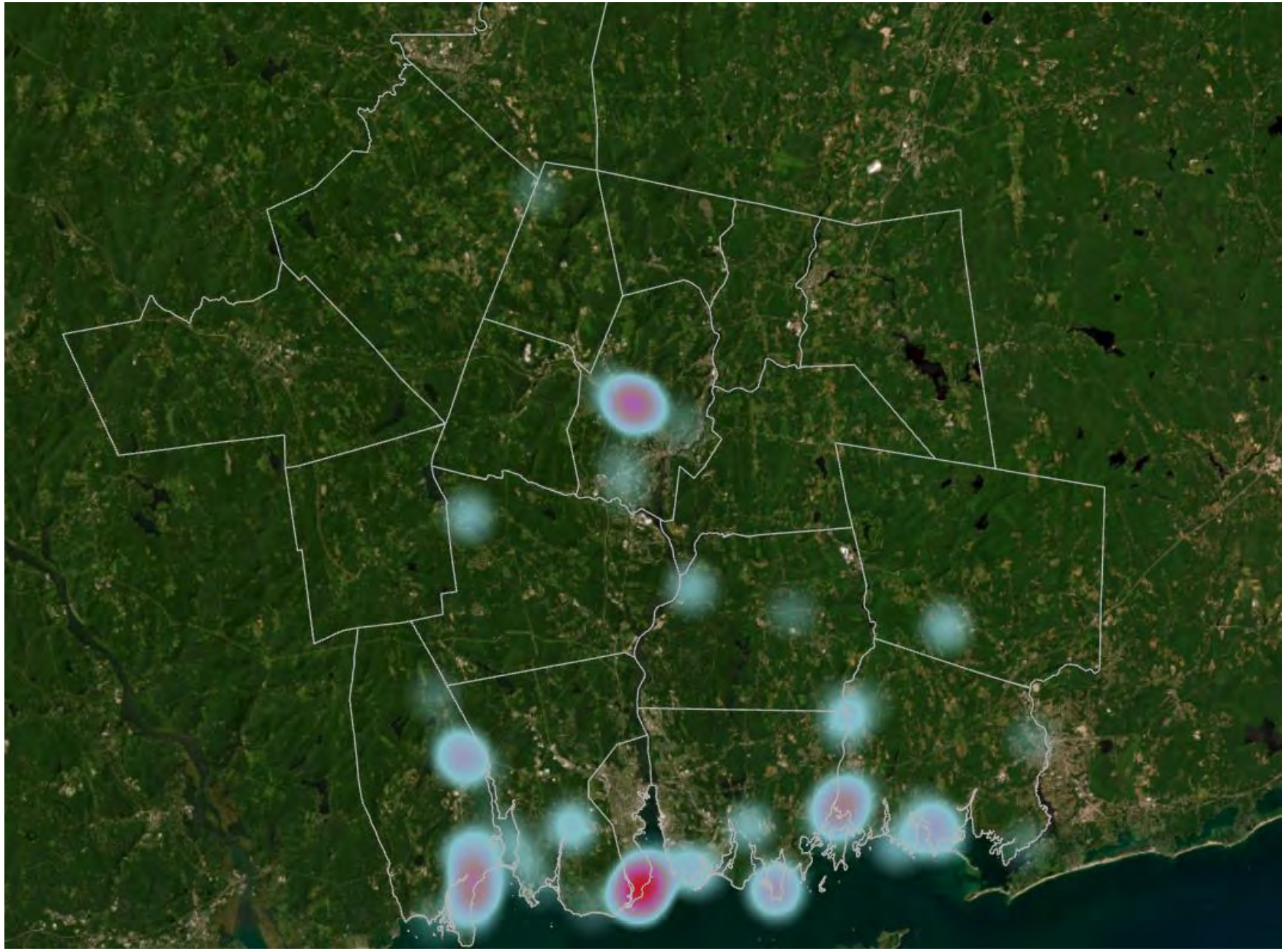
Transit / Mobility





Source: walkscore.com

SECOG Region Repetitive Loss Properties



Flood Assessment Summary

January 2024 Flood

Max Flood Depths

Town Street Roadway

1 to 4 feet

Yantic River North Bank

2 to 6 feet

Norwichtown Commons

3 to 5 feet

Flood Assessment Summary

FEMA 100-year Flood

- **Peak Flow = 11,530 cubic feet/sec**

Max Flood Depths

Town Street Roadway

2 to 6 feet

Yantic River North Bank

3 to 8 feet

Norwich Commons

5 to 9 feet

Corridor in Local Planning Docs

Envision 06360 Framework

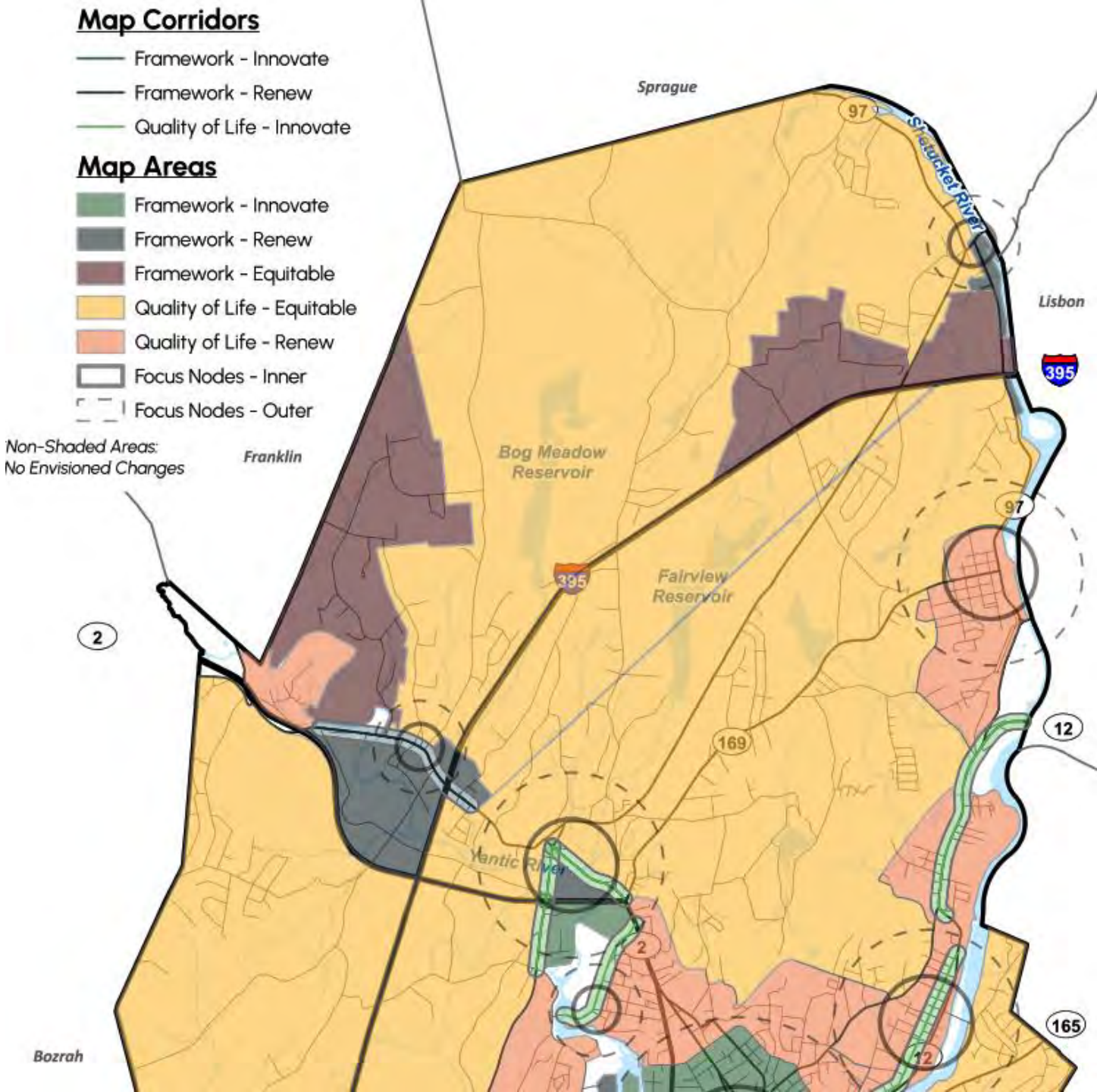
The City of Norwich and the Norwich Community Development Corporation will continue to pursue smart growth strategies, with particular emphasis on **Downtown, neighborhood nodes, the Stanley Israelite Business Park, and the new Business Park North**.

Live Goal 1 – Town Street

Town Street—which forms the spine of the Norwichtown Village District and has its own set of guidelines for character and development—serves as the "Main Street" for Norwichtown, serving as a both a local and regional shopping district with retail, services, and restaurants. Over the last decade, there has been a turnover in businesses as online services have become more prevalent. There is a strong opportunity for redevelopment in this corridor, with potential infrastructure investments creating a stronger sense of place.... L1.1 - Work with neighborhood residents and business organizations to identify the distinct needs of each corridor while balancing the needs of adjacent residential neighborhoods.

Envision 06360 Map

- **Innovate areas** will promote arts and culture, innovation, and small business start-up and development to help Norwich move forward. Over the next decade, policies and recommendations will be put into place to help promote business development, retention, expansion, site remediation, and placemaking.
- Renew areas will focus on the locations in Norwich in need of strengthening and preservation, combined with innovation to help them move forward over the next decade. These neighborhoods include the older residential, commercial, and industrial sections of Norwich. Initiatives will include adaptive reuse, brownfield redevelopment, infrastructure investment, and neighborhood stabilization.



Renew Areas

Renew Framework

These areas of Norwich are older, former industrial or manufacturing areas, or auto-oriented commercial corridors. Many successful businesses are located here, and Norwich should continue to promote policies that allow these businesses to be successful and grow. Over the 10-year period of Envision 06360, as market conditions evolve, some locations in these areas may become prime redevelopment sites due to outdated buildings or site layouts. These areas should be prioritized to remain commercial/industrial whenever possible.

Commercial Corridors

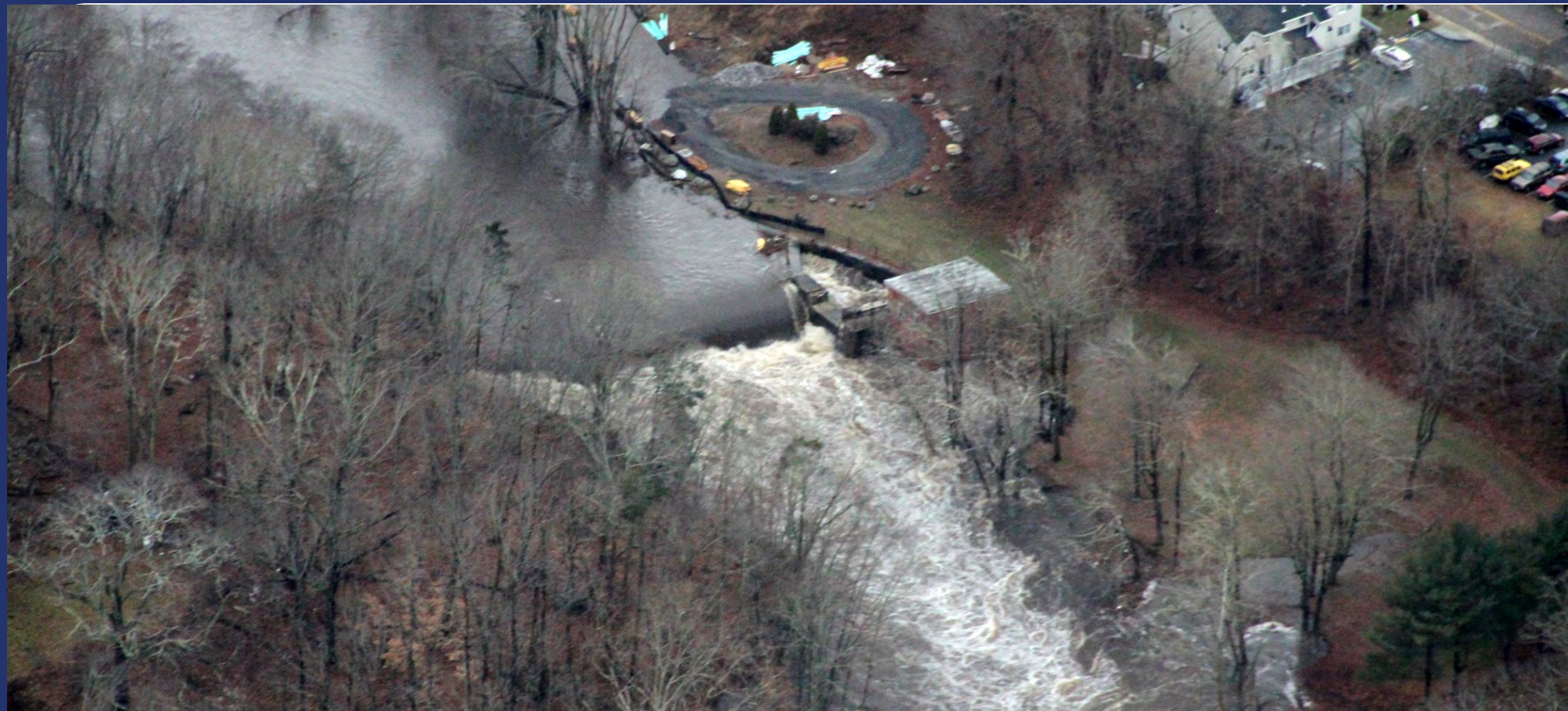
Norwich's auto-oriented corridors along Salem Turnpike and West Town Street could also need to adapt to new market demands and the changing retail landscape. Today, these corridors contain a mix of retail stores, services, restaurants, and more. The rise of e-commerce and changing consumer preferences have led to a shift away from traditional large "big-box" developments and towards smaller one-tenant buildings. Norwich will need to ensure that policies and related zoning regulations allow for a high level of reuse and redevelopment… Policy priorities in these areas include transportation and streetscape enhancements, modifications to parking requirements, and zoning regulation updates to facilitate development.

Regional Flood Mitigation Alternatives

Berms, Walls, Levees: Physical barrier restricting flooding of a portion of the floodplain. Long-term option. May be cost-prohibitive. Restricts access to river. Aesthetic concerns.

Source: nyc.gov

Backus to Upper Falls Dam



Regional Flood Mitigation Alternatives

Downstream dam removal: Removal of Upper Falls Dam to reduce upstream flood levels. **Unlikely to reduce flood levels around Town Street by more than a few inches. Requires vetting and community outreach, significant permitting, construction cost. …Good for commercial meeting, but for muni staff.. What's the effect on Backus?**

Source: The Bulletin

Regional Flood Mitigation Alternatives

River maintenance and dredging: Removal of accumulated sediment within the main Yantic River channel. Restores channel capacity, clears partially blocked bridges and culverts. Unlikely to significantly reduce major flood levels since floods mainly use floodplain and overbank areas.

Source: National Park Service

06

CLOSE OUT

NEXT STEPS

CONCEPT DESIGN

Based on preferences voiced by stakeholders and public, design at least three concepts for flood risk mitigation projects.

ENGAGEMENT FOLLOW-UP

Decide on best forum for communicating back to public and stakeholders.

Relay concept designs and integrate any additional feedback.

Communicate next steps in project design.

NEXT PROJECT PHASE

Find funding for full design and engineering, benefit-cost analysis, EHP review, etc.