Appendix A

Municipal Planning Process

HAZARD MITIGATION PLAN UPDATE FOR THE WESTERN CONNECTICUT REGION

Municipal Meetings

Presented by:
Milone & MacBroom, Inc.

Spring 2020

WESTCOG

MILONE & MACBROOM

AGENDA

- Purpose and Need for Hazard Mitigation Plan
- Update on Hazard Mitigation Grant Programs
- Hazards to Include in the Plan
- Introduction to Hazard Mitigation Strategies and Actions
- Review Mitigation Successes
- Components of the Planning Process
- Data Collection and Discussion
- Consider New Statewide Requirements
- Consider Statewide Initiatives
- Update Mitigation Actions
- Next Steps

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

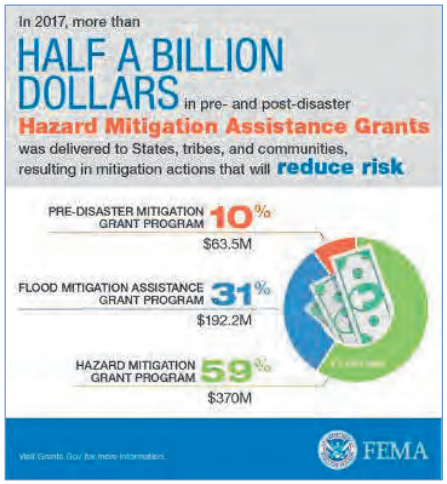
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)



Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Status of Plans in Connecticut

- Most initial plans developed 2005-2011
- Local plans are updated every five years

Status of Former HVCEO Plans

- The ten individual plans were approved in sequence from 11/2014 through 3/2017
- Three were updates (Danbury, Sherman, New Fairfield) and seven were initial plans

Status of Former SWRPA Plan

- The Southwest Region HMP Update was approved in May 2016

Status of Your Plan

- Lapse 5 years after adoption

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

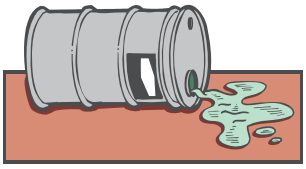
New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Hazard Mitigation Plan does not *directly* address:

- Disaster Response and Recovery
- Terrorism and Sabotage
- Human Induced Emergencies
  (some fires, hazardous spills and contamination, disease, etc.)
- **Pandemics**



PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

Connect

- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

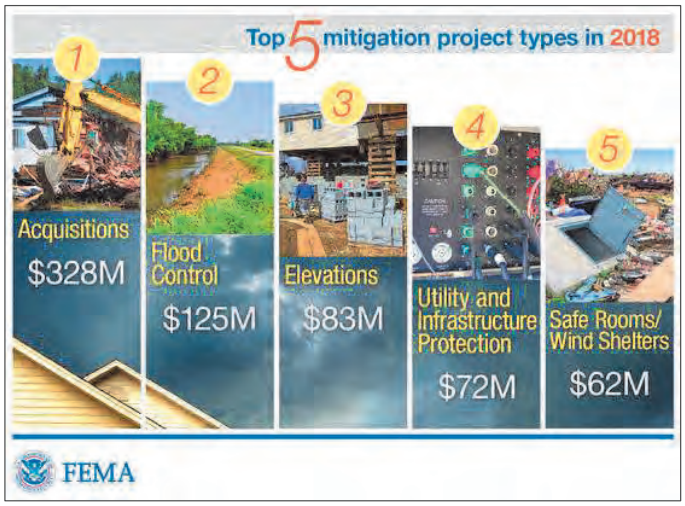
UPDATE ON HAZARD MITIGATION GRANT PROGRAMS

- Local communities must have a FEMA-approved Hazard Mitigation Plan in place to receive Federal Grant Funds for Hazard Mitigation Projects
  - PDM (Pre-Disaster Mitigation)
  - HMGP (Hazard Mitigation Grant Program)
  - FMA (Flood Mitigation Assistance)

- Connecticut has allocated its HMGP funds from the winter storm of early 2015, the storms of May 2018, and the flood of September 2018
- **Presidential Disaster Declaration for COVID-19 (DR-4500) – we expect money will go into HMGP but we don't yet know implications for natural hazard mitigation**
- Next opportunity for PDM grant applications will be at the end of this year (2020)

HOW CAN THE PLAN BE USED?

- Local communities must have a FEMA-approved Hazard Mitigation Plan in place to receive Federal Grants for Hazard Mitigation Projects



Graphics courtesy of FEMA

HOW CAN THE PLAN BE USED?

Grants can be used for:

- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities

This home in Trumbull was acquired and demolished using a FEMA grant

HOW CAN THE PLAN BE USED?

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA

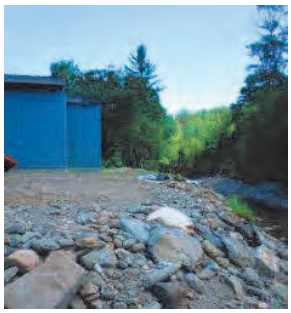
Floyd 1999

Irene 2011

HOW CAN THE PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011



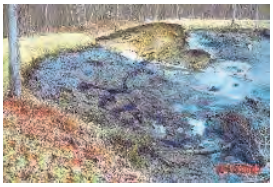
Post-Irene 9/2011

Construction
August 2017

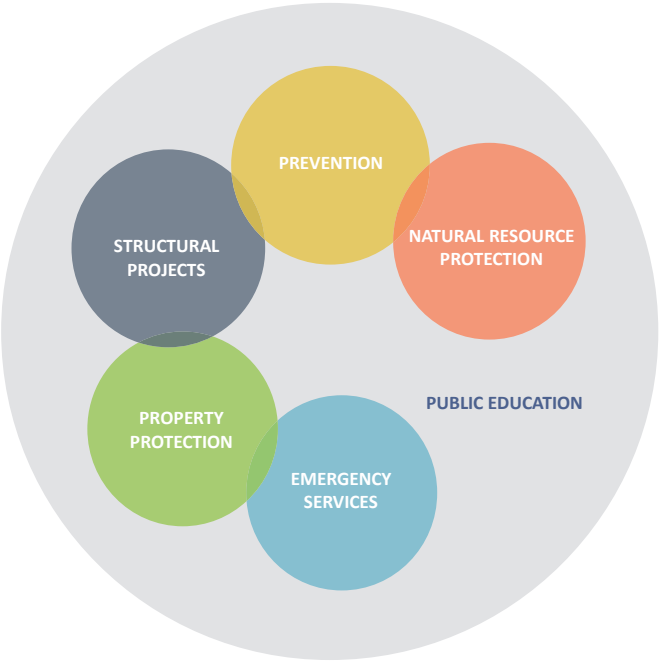
HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Sea Level Rise
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Dam Failure
- Earthquakes

CLIMATE CHANGE



HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify POCD
- Stormwater Management Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

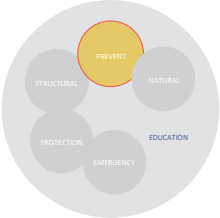
OTHER HAZARD MITIGATION STRATEGIES

- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

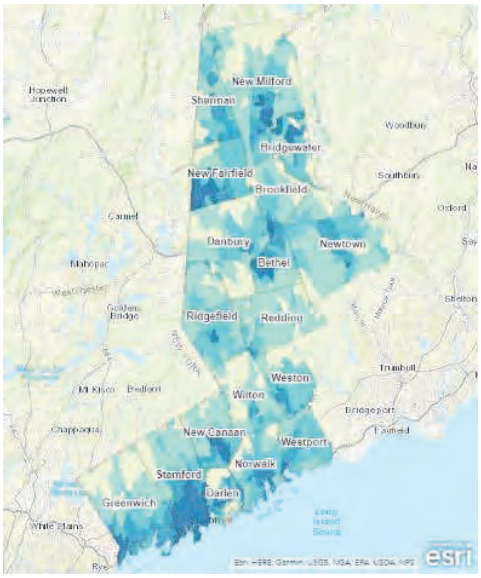
Dry Hydrants

REVIEW MITIGATION SUCCESSES



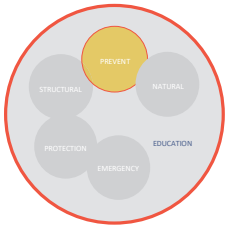
Think about mitigation in the Region that is already happening

- MS4 Priority Mapping
- Regional action (WestCOG)
- **Type: Prevention**



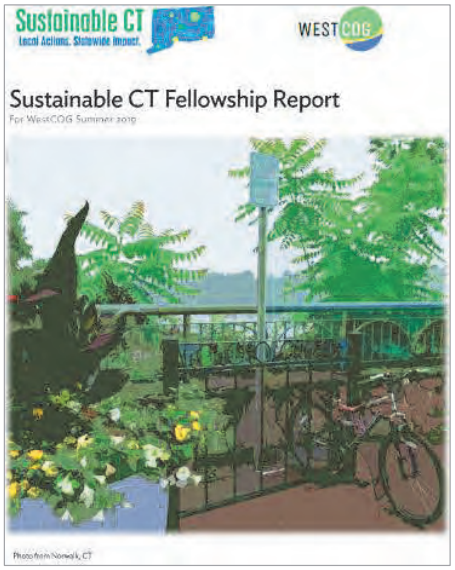
ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

REVIEW MITIGATION SUCCESSES



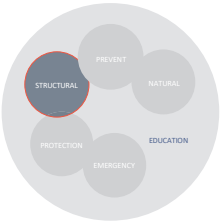
Think about mitigation in the Region that is already happening

- Sustainable CT
- State, regional, and local action
- WestCOG Sustainable CT Fellowship
- Municipal Sustainable CT participation:
  - Greenwich
  - Stamford
  - Darien
  - Wilton
  - Weston
  - Westport
  - Ridgefield
  - Brookfield
- **Type: Public Education / Prevention**



2019 Sustainable CT Fellowship Report
www.westcog.org

REVIEW MITIGATION SUCCESSES

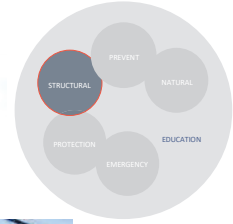


Think about mitigation in the Region that is already happening

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.
- **Type: Structural**

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

REVIEW MITIGATION SUCCESSES

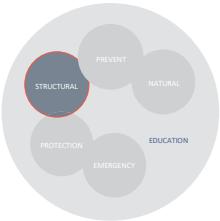


Think about mitigation in the Region that is already happening

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project
- **Type: Structural**

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

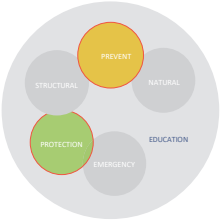


Think about mitigation in the Region that is already happening

- New Milford Squire Hill Road and Long Mountain Road Repairs
- Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road
- **Type: Structural Protection**

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

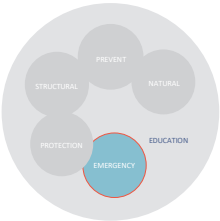


Think about mitigation in the Region that is already happening

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"
- **Type: Property Protection**

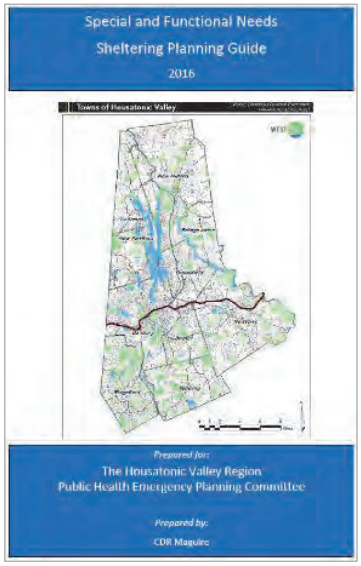
Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES



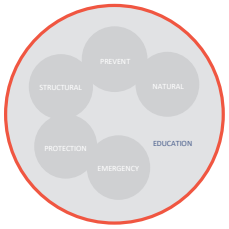
Think about mitigation in the Region that is already happening

- Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016
- Regional Action
- **Type: Emergency Services**



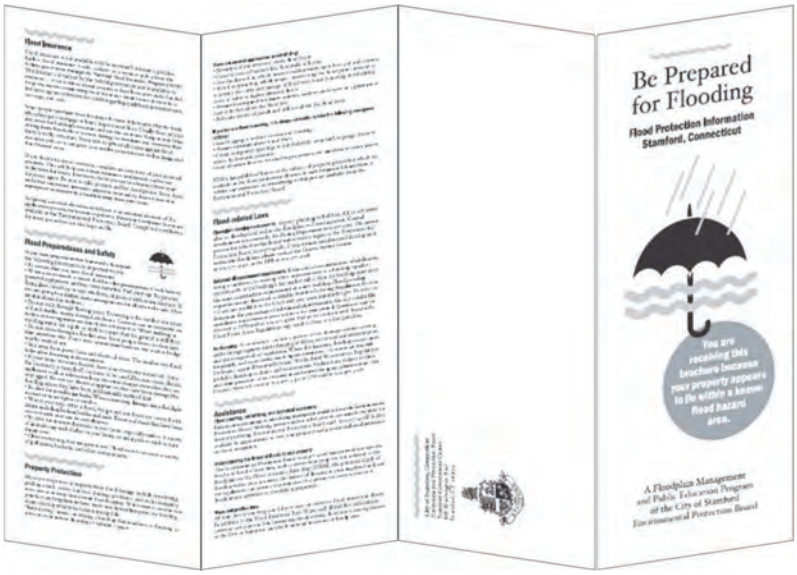
Special and Functional Needs Sheltering Planning Guide, 2016

REVIEW MITIGATION SUCCESSES



Think about mitigation in the Region that is already happening

- Stamford
  - Be Prepared for Flooding
  - Annual brochure sent to residents within known flood hazard areas
- **Type: Public Education**



January 2020 Flood Preparedness Brochure

COMPONENTS OF THE PLANNING PROCESS

- Review and profile natural hazards that could occur
- Identify critical facilities and areas of concern
- Update the vulnerability and risk assessments for structures and populations
- HAZUS analysis for floods, hurricane winds, and earthquakes using current version of the program with Census 2010 data
- Loss estimates for all hazards, based on the State HMP at a minimum but supplemented by local sources of information and FEMA Public Assistance reimbursements
- Incorporate effects of the federally declared disasters that have occurred since the current HMP was adopted

COMPONENTS OF THE PLANNING PROCESS

- Review locations of repetitive loss properties
- Consider historic and cultural resources
- Public participation
- Outreach to neighboring communities
- Assess adequacy of mitigation measures currently in place
- Update mitigation goals, strategies, and actions
- Develop plan document
- State (DEMHS) and FEMA reviews
- Plan adoption

Old Greenwich
(Noah Fram-Schwartz/Greenwitch Time)

Cannondale in Wilton (The Wilton Bulletin)

DATA COLLECTION AND DISCUSSION

- Have critical facilities changed? Have any received new standby power?
  - *"facility for which ANY threat of flooding is too great"*
- Have shelters and evacuation routes changed?
- Development and redevelopment trends
- Discussion of recent storms
- Update on areas of flooding
- How are drainage and flooding complaints received and tracked?
- Which bridges, culverts, and stormwater systems been replaced or upgraded?

Lightning-Strike Brush Fire in Brookfield, 2019
(Brookfield Volunteer Fire Company)

DATA COLLECTION AND DISCUSSION

- Update on areas prone to wind damage or increased wind damage risk
- Tree maintenance and tree warden budget
- Update on snow and ice removal routes and capabilities
- Update on areas prone to icing or snow drifts in winter

Photo Courtesy of CT Post, 2010

DATA COLLECTION AND DISCUSSION

- Repetitive Loss (RL) Properties

UPDATE MITIGATION ACTIONS

Review prior actions

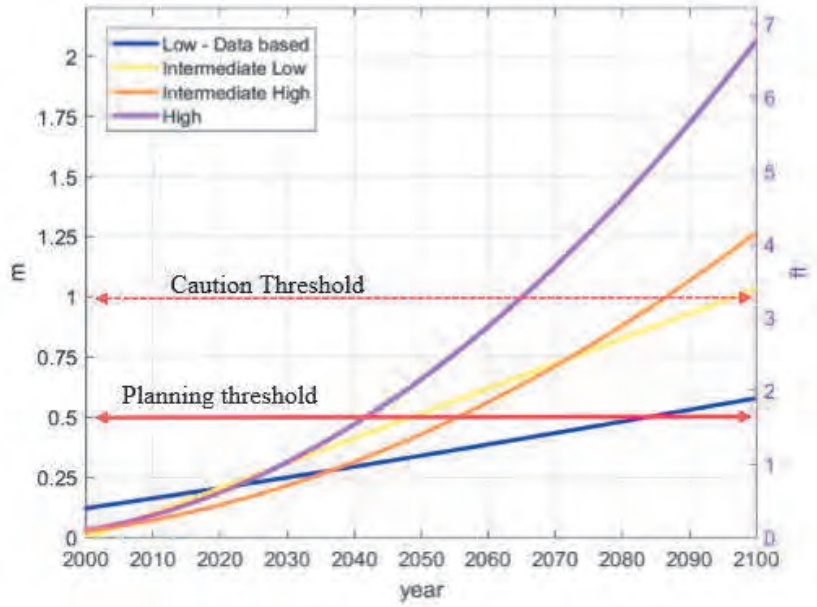
- "Ongoing" and "continue" are defined as "capabilities"
- Consolidate actions that are similar

New mitigation actions

- Be judicious about which actions are carried forward
- The goal should be a somewhat achievable list of 20-25 actions
- Actions should be achievable within five years (i.e. "design" rather than "construct" – break up big projects into smaller steps)
- What one or two things can be done with current budgets?
- What one or two things would be done if funding was not a concern?

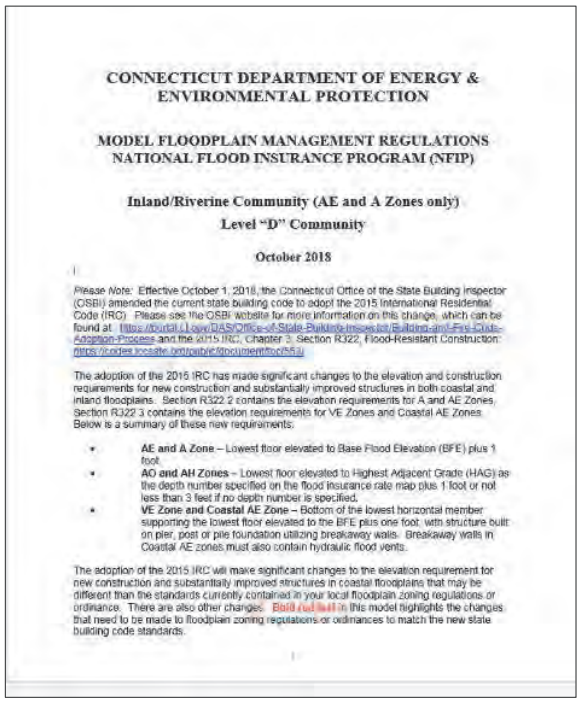
CONSIDER NEW STATEWIDE REQUIREMENTS

- Sea level rise projections adopted by Public Act 18-82 and incorporated into Statutes for planning
- Other Climate Change impacts as well



CONSIDER NEW STATEWIDE REQUIREMENTS

- Revised State Building Code (effective 10/1/18)
- Revised State Model Flood Regulations



CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION

MODEL FLOODPLAIN MANAGEMENT REGULATIONS NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

Inland/Riverine Community (AE and A Zones only)
Level "D" Community

October 2018

Please Note: Effective October 1, 2018, the Connecticut Office of the State Building Inspector (OSBI) amended the current state building code to adopt the 2015 International Residential Code (IRC). Please see the OSBI website for more information on this change, which can be found at: https://portal.ct.gov/DAS/Office-of-State-Building-Inspector/Building-and-Fire-Code-Adoption-Process and the 2015 IRC, Chapter 3, Section R322, Flood-Resistant Construction: https://codes.iccsafe.org/public/document/toc/845/.

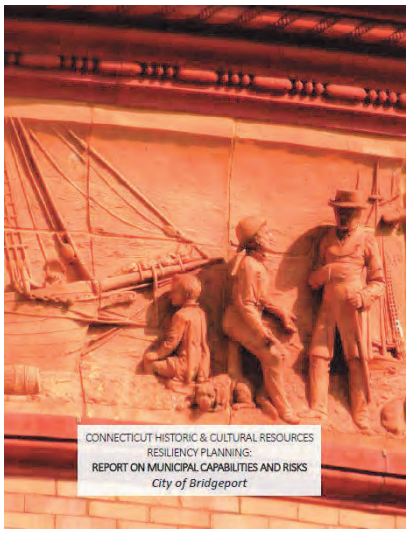
The adoption of the 2015 IRC has made significant changes to the elevation and construction requirements for new construction and substantially improved structures in both coastal and inland floodplains. Section R322.2 contains the elevation requirements for A and AE Zones. Section R322.3 contains the elevation requirements for VE Zones and Coastal AE Zones. Below is a summary of these new requirements:

- **AE and A Zone** – Lowest floor elevated to Base Flood Elevation (BFE) plus 1 foot.
- **AO and AH Zones** – Lowest floor elevated to Highest Adjacent Grade (HAG) as the depth number specified on the flood insurance rate map plus 1 foot or not less than 3 feet if no depth number is specified.
- **VE Zone and Coastal AE Zone** – Bottom of the lowest horizontal member supporting the lowest floor elevated to the BFE plus one foot, with structure built on pier, post or pile foundation utilizing breakaway walls. Breakaway walls in Coastal AE zones must also contain hydraulic flood vents.

The adoption of the 2015 IRC will make significant changes to the elevation requirement for new construction and substantially improved structures in coastal floodplains that may be different than the standards currently contained in your local floodplain zoning regulations or ordinance. There are also other changes. Bold red text in this model highlights the changes that need to be made to floodplain zoning regulations or ordinances to match the new state building code standards.

CONSIDER STATEWIDE MITIGATION INITIATIVES

- Historic resources resiliency planning and best practices



CONSIDER STATEWIDE MITIGATION INITIATIVES

- Coastal and inland green infrastructure; living shorelines

CONSIDER STATEWIDE MITIGATION INITIATIVES

- Spills from small businesses during floods and other events

NEXT STEPS

- Update local coordinator
  - **Who will we remain in contact with?**
- Provide any information requested today
  - *Loss Estimates from Previous Events*
  - *Status of Mitigation Actions*
- Internet-based survey in April/May 2020
- Public information meeting
  - *Preferred local news outlets for public announcements?*

Bethel HMP Planning Meeting Memo

The Town of Bethel opted to not have a municipal planning meeting as was originally planned. The town did however review information and provide notes.

On June 3, 2020 Thomas Galliford, the Bethel Fire Marshal, returned notes to MMI which included changes to critical facilities, updates on eight previous actions, and notes and edits for the update which was based on the previous Hazard Mitigation Plan.

MMI then reviewed the previous actions to attempt to identify the status of the remaining previous actions. These notes were then sent back to the town on June 8 for any additional comments.

On July 2, 2020 Thomas Galliford sent additional comments in response to those that were sent to stakeholders on June 8.

Edits for Update

Provided by Thomas Galliford On June 3, 2020

Updates needed to previous version of the Hazard Mitigation Plan: each update is referenced to the plan page number as well as the PDF page number, for ease of searching.

Plan page #/pdf page #

- **ES-2/12** reference to building new PD- this was completed Oct 2018
- **1-12/24** Need to update list of Town officials updating the plan (multiple changes)
- **2-15/41** Update critical facilities (see separate document)
- **2-16/42** 2nd paragraph- remove new PD reference
- **2-16/42** 3rd paragraph- High School now has a full generator – planning for use as shelter
- **2-17/43** Microwave link is completed as of 10/2018
- **3-5/48** Add May 2018 Macroburst to significant storm list
- **3-6/49** Zoning Regs update 1/1/2020 https://www.bethel-ct.gov/filestorage/1190/136/146/Zoning_Regulations_with_Amendments_-_2016-12-28.pdf
- **3-8/51** Wetlands and Watercourse regs update 10/15/2016 add link? https://www.bethel-ct.gov/filestorage/1190/136/13158/Bethel_Wetlands_Regulations_-_Effective_101516.pdf
- **3-8/51** Reference to 2007 Plan Conservation & Development- this was updated 1/1/2020 https://www.bethel-ct.gov/filestorage/1190/136/146/285/Final_Bethel_POCD.pdf
    - Multiple references to 2007 POCD 2nd paragraph reference to new PD again
- **3-9/52** Reference to New PD needs
- **3-10/53** Rte 58/Sara's Way culvert complete, Chestnut/Nashville culvert complete, Whittlesey Dr/Plumtrees rd culvert complete.
- **3-11/54** P&Z has added requirement to FEMA flood cert in their sect 5.1
- **3-12/55** Animal Shelter plans to re-locate- some working being planned- check with DPW
- **3-23/66** need outreach to Zoning for more info- "*Summary of Recommended Strategies & Actions*"
- **5-6/88** Add May 2018 Macrobursts
- **8-1/118** Dams- plans have been written and approved by DEEP Jan 2018
- **8-9/126** Update recommended strategies/actions: Inundation maps and dam inspections are part of Dam EOP Jan 2018.
- **10-1/136** Section 10.1 addtl strategies/actions: Generator for High School and Microwave link is complete.
- **10-3/138** Dam Failure work is complete (due for a biennial update)
- **11-1/144** Update table 11-1 w/ most recent dates/actions
- **11-3/146** Update table 11-2
- **Appendix A** Update Table on Strategies and Actions to reflect most current information

Bethel Critical Facilities

Updates are noted in the Notes column, or in crossed-out text.

Name	Address	Type	Notes
Police Department	12 Judd Avenue ~~49 Plumtrees Rd~~	Public Safety/Communications	*New location*
Stony Hill Fire Department	59 Stony Hill Road	Public Safety	
Bethel Fire Department	36-38 South Street	Public Safety	
Municipal Center	1 School Street	Seat of Govt	
Public Works Garage	1 Sympaug Park Road	DPW	
Radio Tower	38 Spring Hill Lane	Communications	
R.M.T. Johnson School	500 Whittlesey Drive	Elementary	
Anna H. Rockwell School	400 Whittlesey Drive	Elementary	
Saint Mary School	24 Dodgingtown Road	Private	
Frank A. Berry School	200 Whittlesey Drive	Elementary	
Middle School	600 Whittlesey Drive	School	
Bethel High School	300 Whittlesey Drive	School	
Bethel Healthcare	13 Park Lawn Drive	Convalescent Home	
Augustana Congretate	101 Simeon Road	Elderly Housing	
Reynolds Ridge	14 Reynolds Ridge	Elderly Housing	
Maplewood of Bethel	46 Stony Hill Rd	Assisted Living	*New Dementia living facility*
Simeon Village ~~Bishop Curtis Homes~~	1-42 Simeon Road		*New name of housing development*
Eureka Water Plant	Long Ridge Road, Danbury	Public Water	
Chestnut Ridge Plant	07U Webb Road	Public Water	
Maple Avenue Wells	17U Ballfield Road	Public Water	
Chimney Heights Well	Pondview Drive	Public Water (Aquarion)	
Water & Sewer Pump Stations	Various		

Bethel Previous Actions

Black text = Notes and Comments from Thomas Galliford
Blue text = Notes from MMI that are likely OK to use for update
Red text = Notes from MMI that municipal staff should help with identifying the status or revisions

#	Description	Responsible Party	Status	Notes
Be1	Incorporate the identified strategies of this HMP into local planning activities	FS, LC	*Continuous*	*Remove*
Be2	Obtain appropriate supplies and equipment including a generator to outfit the high school as the primary shelter	EMD, FS		*DONE 9/2019*
Be3	Obtain emergency generators that may be used to provide standby power to other critical facilities per the Town's list	EMD, FS	*Complete (all critical facilities have some form of generation)*	*Has this been done? We have two 5k portable generators in storage. Not a feasible plan to get more due to limited use.*
Be4	Install microwave link for the Police Department at the Town's communication tower to reduce reliance on phone lines and cellular service	EMD, FS	*Complete*	*Completed 10/2018*
Be5	Require a minimum freeboard of one foot for all new development or substantial improvements in SFHAs	PZC	*Incomplete*	*Carry forward*
Be6	Adopt regulations to mitigate or reduce peak flows leaving a development site	PZC	*Incomplete*	*I see the stormwater management plan, goal also listed in POCD Carry forward*
Be7	Establish a Conservation Commission to oversee stream buffers in accordance with the POCD	BOS	*Carry forward*	*POCD has same goal*
Be8	Provide outreach to owners of RLPs regarding the potential availability of grant funding to mitigate future flooding damage	LU		*Educational action*
Be9	Pursue grants to mitigate RLPs with permission of property owners	LU	*ongoing*	*Capability/Remove*
Be10	Identify properties within SFHAs and encourage those property owners to purchase flood insurance and complete elevation certificates	LU		*Any progress? If not, how might we be able to refine this action?*
Be11	Require the use of the FEMA Elevation Certificate to formally record elevations for compliance with the Zoning Regulations	PZC		*Is this being done?*
Be12	Construct a new Police Station facility outside of the SFHA and relocate EOC and animal shelter to this facility	BOS	*Complete*	*Done 10/2018*
Be13	Convert the existing Police Station property to open space such as a park or recreational area	BOS, LU	*Carry Forward*	*Under consideration*

#	Description	Responsible Party	Status	Notes
				Do we want to identify a feasibility study as mentioned in the POCD?- will check with BOS/zoning
Be14	Pursue open space connections along Sympaug Brook and East Swamp Brook in accordance with the POCD	LU, BOS		*Is this done? Are there specific locations we can identify in a future action? Want to include Wolf Pit Brook as mentioned in POCD?*
Be15	Encourage Connecticut DOT to mitigate flooding along Bethel Reservoir Brook (a.k.a. Terehaute Brook) at Route 53	FS	*Incomplete*	*Carry Forward?*
Be16	Perform a formal study to identify areas of concern requiring stream maintenance and to prioritize stream improvement projects	LU	*Incomplete?*	*Still a goal? Are there certain projects in mind?*
Be17	Pursue funding to mitigate poor drainage flooding and improve conveyance in the downtown area along Chestnut Brook and its tributary drainage systems	BOS, PW	*Carry forward*	
Be18	Study and enact potential mitigation solutions to poor drainage flooding and overbank flooding along East Swamp Brook and Bethel Reservoir Brook	BOS, PW	*Carry forward*	
Be19	Recheck the conveyance capacity of all drainage structures using more recent rainfall return periods	PW	*Incomplete*	*Carry forward?*
Be20	Utilize updated conveyance data to prioritize and implement projects to mitigate poor drainage flooding	PW		*Have projects been identified?*
Be21	Update the Zoning Regulations to require underground utilities for all new buildings regardless of zone	PZC	*Incomplete?*	*Only see reg for EP and PRD*
Be22	Encourage the use of structural techniques related to wind damage mitigation in new structures	LU		*Educational action*
Be23	Require the use of structural mitigation techniques to harden new municipal critical facilities	PZC		*Was this done with the new police department? YES-*
Be24	Consider locations where a micro-grid could be installed	LU		*Energy Commission*
Be25	Pursue funding to place utilities underground along Wolf Pits Road	BOS, PW	*Carry forward*	
Be26	Conduct outreach to residents in the Far Horizons Drive and Apple Tree Road area regarding lightning safety and proper grounding of structures	EMD, BD	*Carry forward*	*Educational action*
Be27	Evaluate critical facilities for acceptable snow loading and develop a response plan to clear roofs when necessary	BD, PW	*Carry Forward*	
Be28	Enact regulations preventing new residential development in areas prone to collapse such as at the bottom of steep slopes	PZC		*Remove – likely done during site plan review? YES*

#	Description	Responsible Party	Status	Notes
Be29	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings	EMD	*COOP planning ongoing*	*Can we revise this to target document storage to allow remote work? Yes- good idea*
Be30	Prepare inundation mapping and EAPs for Town-owned high hazard dams	PW		*DONE*
Be31	File copies of EAPs/EOPs for dams whose failure may potentially affect areas of Bethel in a central location for reference	EMD		*DONE*
Be32	Utilize inundation mapping to identify properties that may be affected and conduct outreach to ensure contact information is in Everbridge system	EMD, LU		*DONE*
Be33	Enact a Flood and Erosion Control Board in order to be eligible for funding to repair municipally-owned dams	BOS	*Carry forward? YES*	
Be34	Identify and implement projects to increase fire-fighting access to the Bald Rock area and Huntington State Park	EMD, FS	*CLOSEOUT*	*Have specific projects been identified that we can include? Huntington has good access now with trails and Bald Rock still undeveloped but mutual aid plans with surrounding FD's with ATVs and CT DEEP wildand firefighting personnel are in place.*

Bridgewater HMP Planning Meeting Memo

The Town of Bridgewater opted to not have a municipal planning meeting as was originally planned. The town did however review information and provide notes.

On June 11, 2020 Curtis Read, the Bridgewater First Selectman, returned notes to MMI which included changes to critical facilities and updates on previous actions.

Status of Previous Actions, Bridgewater

#	Description	Responsible Party	Status	Notes
1	Pursue funding to acquire portable generators and acquire transfer switches to facilitate the use of portable generators when needed	EMD	ongoing	*As budget allows*
2	Pursue the steps needed to construct a combined Police Department/EOC with the capabilities of the nearby Danbury and new Fairfield EOCs including internet and communications capabilities.	EMD	On hold	*Not necessary*
3	Work with CT DOT to ensure that safety improvements to Route 133 are consistent with the goals of this hazard mitigation plan.	EMD	done	*Safety improvements completed*
4	Utilize the CT Alert emergency notification system to its fullest capabilities	EMD	Done	*Encourage town residents to participate*
5	Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	done	*On town website*
6	Add pages to the town website dedicated to citizen education, evacuation routes and preparation for hazard events.	EMD	Under review	*Not really necessary in our small town*
7	Consider updating the Town floodplain ordinances in order to put additional restrictions on floodplain development.	P&Z	N/A	*Flood plain is almost nonexistent in town*
8	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Implemented	*P&Z would use P.E. to determine appropriate methodology. Ther are currently no pending large development proposals.*
9	Consider conducting a Wewaka Brook flood mitigation study to identify appropriate methods of reducing flood risk along the stream corridor.	PW	Not done	*It seems that this is not a concern as no flooding has happened in years*
10	Evaluate the small number of floodprone properties along Wewaka Brook to determine potential flood damage reduction methods for these properties.	PW	Not done	*This is responsibility of each property owner*

#	Description	Responsible Party	Status	Notes
11	Provide technical assistance regarding floodproofing measures to interested residents. Pursue funding for home elevations should any residents become interested.	BD	Not done	*Same as above*
12	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	P&Z	Not realistic	*Unnecessary and applicant's responsibility*
13	Develop an open space acquisition program as recommended in the POCD.	FS	ok	*Already have an open space fund for case by case purchases*
14	Develop buffer zone requirements for land adjacent to water as recommended in the POCD.	P&Z	Not done	*Covered by wetlands regulations*
15	Identify locations for stormwater detention/retention in the town center area and along Route 133 to reduce peak flows that cause flashy conditions and streambank erosion along Clapboard Oak Brook.	PW	Not done	*Will explore possible locations on private property*
16	Pursue streambank stabilization improvements along Clapboard Oak Brook.	PW	yes	*As recommended to private property owners*
17	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance and develop a priority list of culverts for replacement.	PW	Not necessary	*Covered by CT Bridge Inspection Program*
18	Develop a plan to address dead trees throughout the town in an effort to minimize damage from falling trees.	PW	ongoing	*Working with Tree Warden and property owners*
19	Work with CL&P to determine the feasibility of placing non-conducting steel cable above the power lines	PW	N/A	*That is their job/interest*
20	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	BD, EMD	N/A	*This is up to the CT Building Codes, not local*

#	Description	Responsible Party	Status	Notes
21	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	EMD	Done	*We survey snow loads and ice dams and remove as necessary*
22	Work in rights of way to provide wind breaks and reduce drifting along town roads.	PW	done	*We require some properties to install snow fencing to prevent drifting*
23	When permits are issued for clearing of properties, require mitigation by land owners to prevent snow drifts from affecting adjacent roads. Snow fencing and certain vegetation buffers may be effective to reduce drifts.	P&Z	done	*As needed after reviews and site walks*
24	Install drainage improvements along Second Hill Road to reduce the potential for icing.	PW	done	*Some spots done and we use sand and salt if needed*
25	Work with the owners of the Paparazzo dam on Clapboard Oak Brook to develop an EAP for this dam despite its relatively low hazard classification, as the town is concerned with its condition and potential for failure.	FS	N/A	*No risk downstream currently inspected by Dam Safety Division*
26	File EOP's/EAP's with town departments and emergency personnel	EMD	Done	*As needed*
27	Consider updating the Zoning Regulations to require the installation of fire protection sources in new developments.	P&Z	Done	*Based on recommendation of Fire Marshall*
28	Revise and enhance the town's website concerning the local regulatory requirements concerning Open Burning	FD	N/A	*Info is available and must call burning official*
29	Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	FS	N/A	*Unnecessary in town with high percentage of open space*
30	When replacing or upgrading culverts, work with CT DOT to incorporate findings of the climate change pilot study and work with HVA to incorporate findings of the stream crossing assessment training.	PW	N/A	*Public Works works with engineers when needed and oversizes pipe and culverts*
31	Consider preventing new residential development in areas prone to collapse. In particular the 2012 POCD recommends reviewing the definition of steep slopes and limiting residential development on steep slopes.	P&Z	N/A	*Not a problem at this time*

#	Description	Responsible Party	Status	Notes
32	Consider bracing vulernable systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMD,PW	N/A	
33	Include dam failure inundation areas in the CT Alert emergency contact database.	EMD	N/A	
34	Consider the use of beaver deterrent devices such as beaver stops or beaver bafflers.	PW	N/A	
35	The town should develop a list of "at risk" wildfire areas and consider a combination of all available methods of risk reduction, and then increase the availability of water sources in the town's high risk areas.	FD	ongoing	*Areas are already known to Fire Department*

Critical Facilities List

Facility	Location	Notes
Senior Center	132 Hut Hill Road	Emergency Operations Center (EOC) And the Primary Shelter
Bridgewater Volunteer Fire Department	100 Main Street South	Emergency Response
Bridgewater Public Works Highway Garage	324 Hut Hill Road	Emergency Assistance
The Village Store	27 Main Street South	Emergency Supplies and Back-Up Shelter
Bridgewater Police Department	152 Hut Hill Road	Emergency Response
Bridgewater Town Hall	44 Main Street South	Secondary Shelter and Back-Up Eoc
Burnham Elementary School	80 Main Street South	School
Mobil Gas Station	11 New Milford Road	Provides Fuel for Emergency Response
Bridgewater Leaf Compost Facility		
Connecticut State Police Troop A - Bridgewater Resident State Trooper	132 Hut Hill Road	State Police

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	4/7/2020	**ATTENDEES:**	Ralph Tedesco – Director of Public Works
PROJECT:	WestCOG HMP Update		Jason DeSousa – Fire Marshal
MMI #:	3101-22		Demy Parpana – Building Official
SUBJECT:	Town of Brookfield		Jay Purcell – Chief of Police
LOCATION	Virtual/Remote		Alice Dew – Land Use Director
	Zoom		Steve Dunn – First Selectman
			Noah Slovin – MMI

Noah Slovin met with Town of Brookfield representatives on April 7, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A Powerpoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format.

An earlier phone call was held between Noah Slovin and Ralph Tedesco. Notes from that call have been incorporated into these meeting notes.

Discussion topics are grouped below.

Critical Facilities

Meeting attendees discussed changes to the critical facilities list included in the previous HMP. This list is presented in the table below:

NOTE: Would the town like to retire anything from this list (daycare or condo/apts could be removed)?

Facility	Address or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Brookfield Volunteer Fire Company	92 Pocono Road	Emergency Response	✓			
Brookfield Volunteer Fire Department, Candlewood Co.	18 Bay View Drive	Emergency Response	✓			
Brookfield Ambulance Facility	4 Obtuse Hill Rd / Rt 133	Emergency Response				
Brookfield Town Hall and Brookfield Senior Center	100 Pocono Road	Emergency Support and Response				
Brookfield Police Department	63 Silvermine Road	EOC	✓			
Brookfield High School	45 Longmeadow Hill Rd	Primary Shelter	✓	✓		*New generator 2019*
Huckleberry Hill Elementary School	100 Candlewood Lake Rd	Proposed Secondary Shelter				*Secondary Shelter with emergency power by 2022*
Brookfield YMCA	2 Huckleberry Hill Road	Emergency Assist. (Showers)				

Facility	Address or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Brookfield Public Works Gara.	81 Gray's Bridge Road	Emergency Support	✓		✓	
Sewer Pump Stations	Various Locations	Critical Facility				
Water Pump Stations	Various Locations	Critical Facility				
Water tank		Critical Facility				
Elderly Housing "Brooks Quarry"	3 Brooks Quarry Road	Elderly Housing				
Assisted Living	246 Federal Road	Assisted Living				
Brookfield School Age Program	100 Candlewood Lake Rd	Day Care				
Christian Life Academy	133 Junction Road	Day Care				
Country Kid's Club	94 Old State Road	Day Care				
Country Kids Play Farm	107 Old State Road	Day Care				
Greenknoll Children's Center	60 Old New Milford Rd	Day Care				
Greenknoll Children's Center	2 Huckleberry Hill Road	Day Care				
The Goddard School	1 Production Drive	Day Care				
Kid's Castle Learning Center	777 Federal Road	Day Care				
Montessori Community Center	21 West Whisconier	Day Care				
Prince of Peace	179 Junction Road	Day Care				
Brookfield Hills Condominium	Vail Road	Condominium/Apts				
Cederbrook Condominium	Whisconier Road	Condominium/Apts				
High Meadows Condominium	Route 133	Condominium/Apts				
Lake Lillinonah Shores	Hearthstone Drive	Condominium/Apts				
Ledgewood Condominium	Route 133	Condominium/Apts				
Mill River Condominium	Federal Road	Condominium/Apts				
Newbury Crossing	Silvermine Road	Condominium/Apts				
Newbury Village	Federal Road	Condominium/Apts				
Oak Meadows	Federal Road	Condominium/Apts				
Orchard Place Apts	Orchard Street	Condominium/Apts				
Riverview Condominium	Federal Road	Condominium/Apts				
Rollingwood Condominium	Federal Road	Condominium/Apts				
Sandy Lane Village	Sandy lane	Condominium/Apts				
Silvermine Manor	Silvermine Road	Condominium/Apts				
Stony Hill Village	Stony Hill Road	Condominium/Apts				
Town Brooke Commons	Nabby Road	Condominium/Apts				
Whisconier Village	Whisconier Road	Condominium/Apts				
Woodcreek Village	Prange Road	Condominium/Apts				
Facilities to Add to the List						
Second Assisted living	*291 Federal Road*	*Assisted Living*				*Under construction*
Department of Parks and Recreation	*162 Whisconier Road*	*Emergency Support*				*Some disaster response: tree-cutting, clear roads & trails*
Brookfield Library	*182 Whisconier Road*	*Critical Facility*				
Whisconier Middle School	*17 West Whisconier Road*	*Critical Facility*				
Center Elementary School	*8 Obtuse Hill Road*	*Critical Facility*				
Algonquin Gas Facility	*78 High Meadow Lane*	*Critical Facility*				

Town staff noted the following changes and corrections to this list:

- *A new generator was installed at the Brookfield High School in 2019*
- *There is a second assisted living facility, currently under construction, on Federal Road (located at 291 Federal Road)*
- *The Brookfield Department of Parks and Recreation at 162 Whisconier Road should be added to the critical facilities list. This department assists with disaster response in some cases by cutting trees and clearing roads and trails. The department assisted with cleanup following the 2018 macroburst.*
- *The Brookfield Library at 182 Whisconier Road should be added.*
- *Brookfield schools, in addition to the emergency shelters (Brookfield High School and Huckleberry Hill Elementary School), should be added to the critical facilities list. These include Whisconier Middle School (17 West Whisconier Road) and Center Elementary School (8 Obtuse Hill Road).*
- *The Algonquin Gas Transmission Company facility at 78 High Meadow Lane should be added to the critical facilities list.*

Town staff reported that a Huckleberry Hill Elementary School reconstruction project will take place by 2022. As part of this project, the school will become secondary shelter with backup power.

Development Trends

Town staff reported that development in town is focused in the Town Center District (TCD district in Zoning), which was previously called "Four Corners." This area is located along Federal Road / Route 202 and the Still River. Examples of development in this corridor are Brookfield Village and Laurel Hill Apartments.

Another recent development is a new assisted living facility at 291 Federal Road.

Recent Events

The most significant recent natural disaster to impact Brookfield was a macroburst that struck on May 15, 2018. A description from DEMHS of the event's impact in Brookfield is presented below:

> *A macroburst powering winds of an estimated 110 miles per hour tore into Brookfield at approximately 5 pm on May 15, knocking out power to more than 90% of the town's 17,000 residents, businesses, schools, and other public buildings. Most of the town's streets and parks were instantly impassable because of downed trees and power lines. Virtually every road in town had trees and power lines down. We estimate 7,000 trees fell and another 1,000 were seriously damaged, with hanging limbs threatening to fall. The town's preliminary damage assessment is $3,783,000 (not including personal property).*]

The Town reported no flood events have occurred in recent years. The Town does experience minor brush fires on a seasonal basis (summer), but the fire department is able to handle such events and none have caused notable damage.

Repetitive Loss Properties

Meeting attendees reviewed Repetitive Loss Properties (RLP) in Town. Town staff had no comments on any changes to the RLP list or specific mitigation needs for those properties.

Hazards Discussion

Concerns and issues relating to specific hazards were discussed.

Town staff report that significant precipitation during thunderstorms will occasionally produce localized flooding for brief time periods (about 15 minutes or so). Staff have not found this to be a significant problem.

Flooding is a concern at the following locations:
- In the Still River Corridor
- At the Candlewood Plaza Shopping Center
- At properties on Hollow Oak Lane
- On Merwin Brook Road

The following historic resources were noted as potentially being at risk from natural hazards:
- Merwin Brook Cemetery – located at the southern end of the Gurski Farm Open Space property, near Merwin Brook and Obtuse Hill Road. The state has established an easement on the site. The Town is not aware of any recent flooding impacting the site.
- Brookfield Craft Center, Inc. – located at 286 Whisconier Road, the historic building is adjacent to the Still River (it is a historic mill building).

Capabilities

Meeting attendees identified hazard mitigation capabilities that the Town has, and changes or improvements to those capabilities since the previous HMP.

- In 2017 and 2018 the Town worked with WestCOG on developing a local snow action plan, which included an update of road clearing routes and the salt distribution plan. This was part of the regional winter maintenance practices initiative led by WestCOG[1].
- Complaints about flooding or drainage issues are submitted to the DPW through an online work-order system. The Town reported that complaints are usually isolated to one or two properties, rather than widespread flooding.
- The Town replaces culverts and catch-basin tops during road repaving, meaning that these drainage improvements are made on an ongoing basis.
- The Town has a robust tree maintenance program, with a sufficiently large annual budget for it to maintain right-of-way trees. The tree warden focuses on identifying dead and dying trees and hazardous branches, and those hazards are then removed. The Town also works very closely with Eversource, which maintains trees along power lines.
- The Town has robust road-clearing capabilities with regard to snow events. The Town uses treated salt to treat the roads, has 14 trucks (standard plows and salters), and has sufficient staff to clear roads without needing outside assistance. There are no specific problem areas in Town.

[1] Reports produced as part of that initiative are:
- Winter Maintenance Practices Baseline Assessment Report, November 2017. Prepared for WestCOG by Axiomatic, LLC
- Winter Maintenance Practices Guide, September 2018. Prepared for WestCOG by Axiomatic, LLC

- The Town has created a constructed-wetlands retrofit along the Still River and the Still River Greenway, which is designed to collect stormwater from the Brookfield Town Hall and Police Station properties and filter it through the wetlands before it reaches the river. This project was completed with a grant through NWCD and CT DEEP. The project is also used as an educational tool for future development along the river.

Goals, Objectives, and New Actions

- The Town plans to service or replace three culverts (the Town notes that these are effectively small bridges) in the near future. The culverts will be evaluated and replaced in-kind unless there is evidence to indicate upsizing is necessary. These culverts are located on:
    - W. Whisconier Road
    - Hop Brook Road
    - Hidden Brook Drive

Local Coordinator

- Ralph Tedesco will be the Local Coordinator

Status of Previous Actions

#	Title	Description	Responsible Party	*Status*	*Notes*
Br1	Critical Facility Generators	Pursue funding to acquire backup generators for the YMCA, Huckleberry Hill School and sewer pumping stations	EMS	Carry Forward with Revisions	*YMCA: action not yet completed* *Reconstruction of Huckleberry Hill School planned in the next couple of years. As part of the reconstruction project, the school will be made a secondary shelter for the Town (for example, backup power will be installed).* *Sewer Pumping Stations: status unknow – contact John Siclari of WPCA* *Action will be split into three separate actions & carried forward to completion*
Br2	High School Generator	Pursue funding to increase the capacity of the generator at the high school	EMS	Completed	*Brand new generator installed in 2019.*
Br3	West Side Emergency Shelter	Develop a plan to designate a shelter on the west side of town. Determine the feasibility of renovating the Huckleberry Hill School for this use	EMS	Completed	*Renovation of Huckleberry Hill School has been determined to be feasible, and will take place in the next couple of years. This action (developing a plan to designate a shelter) is considered complete, and a separate action to actually complete the renovation is carried forward.*
Br4	CT Alert	Utilize the CT Alert emergency notification system to its fullest capabilities	EMS	Capability	*Brookfield police department uses CT Alert. The Town has also acquired a CodeRed subscription, expanding its capabilities for alerting the public about disasters.* *The Town sends out a daily email to residents during a disaster, providing updates on the disaster and information on sheltering or evacuations. The Code RED tool is used to send out voice calls, texts, and emails. The Town also uses its Facebook page to inform the public during events. If necessary, the Town can access large mailing lists from the public schools as well.*
Br5	NOAA Weather Radios	Encourage residents to purchase and use NOAA weather radios with alarm features	EMS	Drop	*Town urges residents to sign up for CT Alerts through links on the Town website and Town Department websites. The Town is also able to communicate with residents through CodeRed. The Emergency Preparedness page on the Town Website encourages acquisition of a battery powered radio. Because the public has so many different communication platforms, the Town does not think it is necessary to encourage the purchase of NOAA weather radios, specifically.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br6	Informational Pamphlets	Disseminate informational pamphlets regarding natural hazards to public locations	EMS	Drop	*The Town has information about emergency preparedness on the Town website, through the Fire Marshal page. Storm and flood preparedness information is available through the Health Department page.* *The town does not believe that dissemination of informational pamphlets about natural hazards is necessary.*
Br7	Evacuation Routes	Review potential evacuation routes to ensure timely migration of people seeking shelter in all areas of town.	EMS	Drop	*The Town is confident in its evacuation routes. Evacuation routes are not labeled, but the Town is able to use cones and signs to direct traffic as needed. Roads are inspected on an annual basis for safety, helping ensure evacuation routes remain in good condition.*
Br8	Publish Emergency Information	Ensure that emergency information is available through several different media, such as newspaper, radio, internet and phone.	EMS	Capability	*Emergency information is available by email, on the Town website, through social media outlets, through CT Alert, and by voice message, text, and email using Code Red.*
Br9	Hazards on Town Website	Add pages to the town website dedictaed to citizen education and preparation for hazard events	EMS	Capability	*The Town has information about emergency preparedness on the Town website, through the Fire Marshal page. Storm and flood preparedness information is available through the Health Department page.*
Br10	Elevation Regulations	Consider requiring new buildings constructed in floodprone areas to be protected to the highest recorded flood level regardless of being within a defined SFHA.	P&Z	Drop	*The Town requires 3rd-party-engineer review of new permits in flood zones, usually through wetlands and occasionally through zoning. Town requires wetland development be limited to uses that will not increase flood risk, such as parking lots, and requires inclusion of runoff retention systems.* *This specific action is not deemed necessary.*
Br11	Catch Basin Program	Develop a town-wide catch basin cleanout program to reduce flood impacts due to drainage issues.	PW	Completed	*Town has developed a town-wide catch basin cleanout program; every basin in Town is inspected on a yearly basis, and cleaned as needed. The Town purchased a vacuum truck to aid in this process.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br12	Stormwater Retention/Detention	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Capability	*The Town requires this, and works with developers to ensure appropriate detention or retention is constructed. The Town has worked with the Northwest Conservation District on several larger projects, and continues to do so.* *The Town has created a constructed wetlands retrofit along the Still River and the Still River Greenway, which is designed to collect stormwater from the Brookfield Town Hall and Police Station properties and filter it through the wetlands before it reaches the river. This project was completed with a grant through NWCD and CT DEEP. The project is also used as an educational tool for future development along the river.*
Br13	Still River Corridor Evaluation	Evaluate floodprone properties along the Still River Corridor, specifically in the vicinity of Dean Road, Federal Road and Sand Cut Road to determine potential flood damage reduction methods.	PW	Completed Carry Forward with Revisions	*Evaluation has been completed, and identified a list of priority mitigation measures and locations.* *Meadowbrook Manor was the top priority of that evaluation; the neighborhood mitigation project that was performed came out of that evaluation.* *Other mitigation measures identified in the evaluation have not yet been pursued. Action is completed, and new actions will be added to this plan to address specific measures identified in the evaluation.*
Br14	Public Works Garage Mitigation	Consider flood mitigation methods at the Public Works Garage, such as berm construction and/or floodproofing to reduce flood risk.	PW	Carry Forward with Revisions	*The Town removed underground fuel tanks, and installed new tanks above ground on a concrete bed, so that the tanks are above the 1% annual chance flood elevation.* *The Town is also working with the Housatonic Valley Association on a grant application through the Long Island Sound Futures Fund to create a buffer and mitigation area along the Still River, between the river and the Public Works facility.* *The Town is interested in pursuing additional mitigation measures for this site.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br15	Public Works Garage Relocation	Consider relocating the Public Works Garage to eliminate flood risk.	PW	Carry Forward with Revisions	*Town has considered this action, but has not been able to identify a location with adequate space for the facility. Pursuing this action would require purchase of a significant piece private land.* *Relocation of the PW Garage continues to be listed on the Town 10 year Capital Improvement Plan. The Town will continue to monitor opportunities. This action is carried forward, but will be revised to identify smaller steps that are achievable in the next five years.*
Br16	Flood Insurance	Encourage property owners to purchase flood insurance under the NFIP.	EMS	Drop	*Town does not have any specific initiatives to encourage purchase of flood insurance, but assists property owners as needed. More proactive measures are not considered necessary.*
Br17	Candlwood Plaza Technical Assistance	Provide technical assistance to the Candlewood Plaza occupants to pursue floodproofing that will make them more resilient.	EMS	Drop	*The Town worked with occupants of Candlewood Plaza to remove a beaver dam on the Westbrook River located behind the Plaza. The Plaza recently renovated its stormwater detention system. Additionally, the Plaza is in the process of constructing a new bank building, which will have its own stormwater detention system.* *The Town does not believe it is necessary to proactively provide technical assistance to each occupant, though it will offer assistance if approached.*
Br18	Community Rating System	Consider enrolling in the Community Rating System	First Selectman	Carry Forward	*Town has not yet enrolled in the CRS but continues to be interested.*
Br19	Regulation Checklist	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	P&Z	Drop	*Applications for new construction first goes through the Inland Wetlands Commission, and then to Land Use for approval. If any bylaws, regulations, or codes related to flood damage prevention are not met or appropriately addressed, they are able to inform the applicant.* *The Town has a list of activities that are not permitted within the Brookfield Aquifer Protection Zone, which covers a much olarger area than the CT DEEP Aquifer Protection Zone and runs along most of Federal Road and the Still River (including the Town Center District, where development is focused).* *The Town does not believe a checklist is necessary.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br20	Flood Mitigation Outreach	Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques (Section 3.6.2) to private homeowners and businesses with flooding problems.	Building Official	Drop	*The Town enforces the State Building Code, which has some requirements with regard to flood mitigation. Outreach is occurring through the local administration of the State Building Code, and additional outreach is not needed.*
Br21	Municipal Training	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z	Carry Forward with Revisions	*The DPW Director keeps up to date with regard to training, specifically with regards to stormwater management. The Wetlands Enforcement Officer stays up to date with regard to wetlands trainings.* *This action is revised to be more specific and is carried forward.*
Br22	Conservation	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents.	First Selectman	Capability	*Conservation Commission oversees pursuit of conservation recommendations.* *One example is the acquisition of the Eriksen Farm Open Space parcel in 2009. Another example is the acquisition and conservation of open space as part of the Still River Greenway.*
Br23	Regulate Development	Continue to regulate development in protected and sensitive areas, including steep slopes, wetlands, and floodplains.	P&Z	Capability	*This is a capability*
Br24	Open Space Acquisition	Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	First Selectman	Capability	*Acquisition is part of POCD; this is a capability.*
Br25	Remove Debris from Still River	Develop a plan to selectively remove debris from the Still River to prevent obstructions of bridges and culverts.	PW	Carry Forward with Revisions	*The Land Use Department has partnered with a volunteer group to clean out debris in the past. Since the 2018 macroburst, debris has accumulated again. There is particular concern near the Greenway bridge: trees fell from a CT DOT property into the river, creating concern about flooding from backed-up water.* *Carry Forward with Revision*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br26	Drainage Improvement in Meadow Brook	Conduct drainage improvements within the Meadow Brook Manor neighborhood.	PW	Completed	*Project has been completed.* *Town installed 40- to 60-inch pipes below the neighborhood to convey a waterway and mitigate the potential flooding from a 100-year precipitation event. Project was completed with support from a FEMA grant.*
Br27	Review Culvert Capacities	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	Drop	*The Town does not believe it is necessary to apply this action to all culverts, and believes it appropriately addresses culvert conveyances on a case-by-case basis.*
Br28	Road Barricades	Ensure adequate barricades are available to block flooded streets in floodprone areas	EMS	Completed	*Police department and Public Works have a good supply.*
Br29	Tree Limb Inspection and Maintenance	Provide town wide tree limb inspection and maintenance programs to ensure that the potential for downed power lines is diminished.	PW	Capability	*This is a capability. The tree warden and assistant tree warden regularly inspect tree and limb risks along Town rights-of-way. The Town has sufficiently budgeted for tree maintenance, and has a crew ready to respond to specific needs.*
Br30	Require Underground Utilities	Continue requiring the location of utilities underground in new developments or during redevelopment whenever possible.	P&Z	Capability	*This is required.*
Br31	Structural Wind Mitigation	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	Building Official, EMS	Drop	*The Town enforces state code. They do not believe it is necessary to enforce to a higher code.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br32	CL&P Liaison	Work with the ~~CL&P~~ *Eversource* liaison to ensure a more pro-active approach to tree trimming in Brookfield	PW	Capability	*Town communicates with Eversource on a regular basis, and has a strong, ongoing relationship. Eversource has been very aggressive with tree trimming in response to the damage from the macroburst in 2018.*
Br33	Power Line Hardening	Work with ~~CL&P~~ *Eversource* to determine the feasibility of placing non-conducting steel cables above power lines to protect them from falling branches and trees.	PW	Capability	*Eversource has been doing this.*
Br34	Literature for Design Standards	The Building Department should provide literature regarding appropriate design standards for wind.	Building Official, EMS	Capability	*Links to the State Building Inspector and State Building Codes are available on the Town website. This is considered to be sufficient.*
Br35	Snow Removal Plan	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	PW	Capability	*Town procedure is for building inspector to visit each critical facility after each storm to evaluate. When needed the Town hires contractors to help with snow removal. Board of Education is responsible for school roofs.*
Br36	Snow Plowing Routes	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EMS,PW	Drop	*In 2017 and 2018 the Town worked with WestCOG on developing a local snow action plan, which included an update of road clearing routes and the salt distribution plan.* *Town does not believe that posting plowing routes is necessary or helpful.* *Action is dropped.*
Br37	Contingency Access Plans	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMS	Capability	*Town has determined that there are no specific areas that are difficult to access during winter storm events.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br38	Reduce Snow Risk on Steep Roads	Develop a plan to reduce accident risks along steep roads such as Elbow Hill Road, North Mountain Road, North Obtuse Road and Obtuse Road. Consider the use of snow fencing or vegetative buffers.	PW, EMS	Carry Forward with Revision	*Action has not yet been taken on this strategy. Town would like to carry this action forward to explore possible solutions, such as installation of guardrails, or public education campaigns.* *The Town notes that vegetation presents a visibility problem in some of these locations, and does not wish to pursue planting vegetative buffers.*
Br39	Literature for Icing Mitigation	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Capability	*Links to the State Building Inspector and State Building Codes are available on the Town website. This is considered to be sufficient.*
Br40	Areas Prone to Collapse	Consider preventing new residential development in areas prone to collapse.	P&Z	Drop	*Town regulates development on slopes, and believes that is sufficient.*
Br41	Backup Facilities for Earthquakes	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	EMS,PW	Carry Forward with Revisions	*Brookfield is currently improving its capabilities with regards to remote operations because the COVID-19 pandemic has resulted in a loss of access to municipal buildings. The Town has been in the process of providing workspaces at homes and allowing remote access to computer files.* *Action is revised to focus on remote work and remote file access capabilities.*
Br42	Harden Critical Facilities	The town may consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMS,PW	Drop	*Town has completed a full backup of all systems on the cloud. Town clerk records have been digitized back to 1972, before that still paper. Land Use files– hard copies in vault, everything else also in viewpoint.* *Town replaced the Town Hall roof in 2017. The repair included replacement of rotting rafters as well as the roof.*
Br43	Dam Failure Areas in CT Alert	Include dam failure innundation areas in the CT Alert emergency notification system contact database	EMS	Capability	*First Light inundation maps for rocky river project in case of Danbury dike failure – digitized and noted in CT Alert.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br44	Technical Assistance to Dam Owners	Provide technical assistance to private dam owners regarding effective maintenance strategies	EMS	Drop	*Town does not believe this action is necessary, as the State has been addressing this*
Br45	Dam EAPs	File EOP's/EAP's with town departments and emergency personnel	EMS	Completed	*Town has the EAP for Rocky River system at the Police Department and with the Emergency Management Director. The EAP is incorporated into the town's EOP.*
Br46	Expand Public Water Service	Support the expansion of public water service (provided by Aquarion Water Company) in Brookfield.	PW, Fire Department	Complete and Capability	*Expansion of public water service is an ongoing effort supported by the Town. Thousands of feet of water main have been installed over the last ten years, and the Aquarion Water Company has taken over smaller systems, improving reliability and efficiency.* *The Town expects that upcoming water main extension projects will take place on Candlewood Lake Road from Nabby Road to the Huckleberry Hill Elementary School, and on Vale road.*
Br47	Fire Protection in Development	The Town should continue to require the installation of fire protection water in new developments where municipal water service is unavailable, and sprinkler systems where access is limited for fire apparatus.	P&Z	Capability	*Latest subdivision was required to have inground storage tanks*
Br48	Coordinate with Water Company	The Fire Departments should coordinate with the Water Company to identify areas where fire-fighting capacity may be limited due to lack of water pressure or storage. Deficiencies should be addressed as they are identified and funding allows.	Fire Department	Capability	*Expansion of public water service is an ongoing effort supported by the Town, and the Fire Department has been coordinating with this expansion (see action 46). Any new development is reviewed for availability of firefighting water.*

#	Title	Description	Responsible Party	*Status*	*Notes*
Br49	Coordinate with Natural Gas Company	Coordinate with the local natural gas company to ensure that procedures are in place to address fires associated with potential pipeline failures.	Fire Department	Capability	*The three local natural gas companies are Algonquin, Iroquois, and Eversource.* *The companies regularly host liaison meetings with emergency responders so everyone is up to date on procedures and facilities.*
Br50	Outreach on Burning and Campfires	Provide outreach programs on how to properly manage burning and campfires on private property.	EMS	Capability	*This action is addressed by state statute regarding open burning policies. Information is available on the Town website.*
Br51	Open Burning Requirements on Website	Revise and enhance the town's website concerning local regulatory requirements concerning Open Burning.	P&Z, Fire Department	Complete	*Information on open burning is available on the Town website.*
Br52	Prevent Unauthorized Campfires	Patrol Town-owned open space and parks to prevent unauthorized campfires.	Fire Department	Capability	*Police take note of open burning on patrols.*

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	4/20/2020	**ATTENDEES**	Sharon Calitro – Planning Director
PROJECT:	WestCOG HMP Update		Jennifer Emminger – Deputy Planning Director
MMI #:	3101-22		TJ Weidl – Fire Department Chief
SUBJECT:	City of Danbury		Tim Nolan – Public Services Superintendent
LOCATION	Virtual/Remote		Dave Newland – Building Official
	Zoom		Noah Slovin – MMI

Noah Slovin met with City of Danbury representatives on April 20, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A Powerpoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format.

Discussion topics are grouped below.

Critical Facilities

Meeting attendees discussed the critical facilities list to be included in the HMP.

The table below lists critical facilities included in the previous version of Danbury's HMP:

Facility	Address or Location	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Educational facilities	29 private & public	x			*City will only list High School, which is a shelter and has emergency power. Other schools will be included as a single category but specific buildings and locations will not be included*
Fire	Headquarters				*Replaced by following table*
Fire	16 engine companies				*Replaced by detailed list in following table*
Fire	Training facility				*Replaced by following table*
HazMat Reporter	33 facilities				*Refers to facilities that produce or store hazardous materials. Carried forward as a general category.*
Healthcare	9, including hospital				*Replaced by detailed list in following table*
Airport					
Danbury Fair Mall					
Public Works		x			*Replaced by following table*
Police Department		x			*Replaced by following table*
Electrical substations					*Maintained as a category – no specific sites of concern*
Housatonic Area Regional Transit (HART) buses					
City Hall		x			*Has emergency power*
Infrastructure	7 other facilities				*Remove*
Worship	41 facilities				*Note in plan but remove from critical facility list*

Facility	Address or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Danbury Fire Department - Headquarters	19 New Street	Fire/ EOC	x			
Padanarum Hose Company 3 Incorporated	17 North Street	Fire	x			*Relocation in process*
Independent Volunteer Hose Company 4	37 Hoyt Street	Fire				
Wooster Volunteer Hose Company 5	7 Coalpit Hill Road	Fire				
Citizens Volunteer Hose Company 6	65 Jefferson Avenue	Fire				
Water Witch Volunteer Hose Company 7	37 Locust Avenue	Fire				
Phoenix Volunteer Hose Company 8	14 Well Avenue	Fire	x			
Beckerley Volunteer Hose Company 9	69 Liberty Street	Fire				
Germantown Volunteer Hose Company 10	36 Germantown Rd	Fire				
Mill Plain Volunteer Fire Company 12	54 Mill Plain Road	Fire				
Miry Brook Volunteer Fire Company 13	51 Miry Brook Road	Fire				
Danbury Fire Department Engine 23	210 Osborne Street	Fire	x			
Danbury Fire Department Engine 24	36 Eagle Road	Fire	x			
Danbury Fire Department Engine 25 *Volunteer Engine Company 14*	171 South King St	Fire	x			*Volunteer Engine Company 14 is attached to building*
Danbury Fire Department Engine 26	75 Kenosia Avenue	Fire	x			
The Beaver Brook Volunteer Fire Company Incorporated	57 Beaver Brook Rd	Fire				
Danbury Fire Training Facility	23 Plumtrees Road	Fire				
Danbury Public Works Complex, WWTP, And Landfill	53 Newtown Rd	Public Works	x			
Danbury Hospital (Danbury Health Care Affiliates Incorporated)	24 Hospital Avenue	Care Facility *Hospital*	x			
Pope John Paul Health Care	33 Lincoln Avenue	Care Facility				
Danbury Assisted Living, Llc.	8 Glen Hill Rd	Care Facility				
Maplewood At Danbury Alsa, Llc	22 Hospital Ave	Care Facility				
Saint John Paul Ii Center	33 Lincoln Ave	Care Facility				
Hancock Hall	31 Staples St	Care Facility				
Glen Hill Center	1 Glen Hill Rd	Care Facility				
Filosa, For Nursing And Rehabilitation	13 Hakim St	Care Facility				
Western Rehabilitation Care Center	107 Osborne St	Care Facility				
Western Connecticut State College Police	181 White Street	Police				
Danbury Police Department	120 Main Street	Police				
Danbury Ambulance Service Incorporated	14 Walnut Street	Emergency				
All Star Energy Llc	133 Padanaram Rd	Utility				
Danbury Health and Housing Department	155 Deer Hill Ave	Municipal				
Federal Correctional Institution - Danbury	33 Pembroke Road	Prison				
Danbury High School	43 Clapboard Ridge Rd	*Shelter*	X	X		
Danbury War Memorial	1 Memorial Dr	*Shelter*	x	X		

City staff noted that some of the fire facilities have had new generators installed, or generators updated, in the last 5 years. Engine 26 has a fairly new generator, but it may be more than 5 years old. Engine 14 had an updated generator installed in 2019.

- *MMI will send a list of facilities with generators listed in the previous plan to T.J. Wiedl, who will identify which have had new generators installed in the last few years.*

Development Trends

City discussed development trends in Danbury. Development and redevelopment continue to be focused on the West Side of the City, and in the downtown area. The downtown area is largely in or adjacent to a flood zone associated with the Still River.

The city reviewed the status of development projects listed in the previous plan. These projects are listed below, with updates in *italics* text:

- "The Reserve" and "Crown Point" developments on former Union Carbide land in the western edge of the city will combine to have 2,500 units when fully built out. Approximately 1,800 units had been built through 2010.
    - *This project is still underway: the Crown Point area has been completed, but development in The Reserve is still in process.*
- A 58-unit cluster development of single-family homes was proposed near Wooster School.
    - *This project is on hold; city staff do not expect progress in the next five years.*
- A developer may be tearing down an abandoned four-story office complex at 44 Old Ridgebury Road to build new condominiums.
    - *City staff were not sure what this project was referring to. An office building downtown was rezoned, but a redevelopment project did not end up going through. A couple of other downtown buildings have been redeveloped for medical use. Staff will check this.*
- The former Novo Labs building on Turner Road may be converted to residential units.
    - *The Belimo company has occupied this property – conversion to residential units is no longer being pursued.*
- The Matrix Corporate Center is undergoing an ambitious top-to-bottom renovation and actively leasing office space.
    - *This project is underway. The building is being redeveloped into a multi-use property combining office, residential, and industrial uses.*
- Western Connecticut State University is building a $97 million fine arts building on its "West Side" campus.
    - *This project has been completed.*
- A proposed mixed-use development off Route 202 will include multistory residential structures, an assisted living center, an office building, a medical research facility and urgent care building, a retail building, and other commercial structures and parking lots. This development will straddle a tributary to the Still River upstream of the Danbury Fair Mall and may experience flooding issues itself or affect flooding downstream.
    - *City staff were not sure what this description is referring to. The city will look into this.*

New development projects identified by city staff include:

- News Times Property: located at 333 Main Street along Padanaram Brook near the convergence with the Still River. Redevelopment recently occurred at this site, including construction of a new vehicular bridge and work performed in a floodway. A detailed flood analysis was performed as part of the project.
- Mallory Site: This is a city-owned brownfield property adjacent to the Still River located off Rose Hill Ave. A portion of the site is being redeveloped as transitional housing, and a detailed flood

analysis has been performed. The approval process for the project is just beginning. As a brownfield site, the property first has to undergo a clean-up.

- *MMI is working with the Town on a school redistricting project and has compiled a list of recent developments as part of the project. MMI will work on finding this list, with help from Jennifer.*

Recent Events

City staff reported a landslide along a train track occurred in 2017. This track has some areas with very steep adjacent slopes. *Staff will provide any details on location, impacts.*

There have not been any major flood events in Danbury since adoption of the previous HMP in 2016.

Repetitive Loss Properties

Meeting attendees reviewed Repetitive Loss Properties (RLP) in the City. City staff had no comments or changes.

Hazards Discussion

City staff did not have an opportunity to discuss concerns and issues relating to specific hazards. City staff will inform MMI of any specific hazard concerns (flooding, wind, wildland-fire, power outages etc).

Ice jams have not been a problem in Danbury.

Capabilities

Meeting attendees identified hazard mitigation capabilities that the City has, and changes or improvements to those capabilities since the previous HMP.

Danbury is consistently working to improve its emergency communication capabilities.

The city has updated emergency power capabilities at numerous fire facilities.

A new communication and dispatch center has been established in Danbury.

The Danbury floodplain regulations were updated in 2012.

Dam inspections are done every two years as part of state requirements. The Town has EAPs on file for all dams, which include elevations at which point certain actions need to take place (such as alerting the state or the public). Monitoring is performed by Public Works.

Local Coordinator

Tim is currently in the role of emergency management director, and will serve as the interim local plan coordinator. City will hire a new emergency management director, probably effective July 1, 2020. This staff member will be the local coordinator.

MMI will send a sample of the plan adoption paperwork to Danbury.

Status of Previous Actions

#	Action	Responsible Party	Status	Notes
Da1	Add pages to City website dedicated to citizen education and preparation for natural hazard events	OCP	Carry Forward	This action has not yet been completed. *Carry forward* *City staff will double-check.*
Da2	Upgrade emergency communications as necessary to better facilitate emergency response and coordination with neighboring towns	OCP, Fire Dept.	Completed	This action has been completed. City has ongoing work to increase transmission and reception abilities around the City. They have also improved their communication system with surrounding towns through mutual aid agreements, which work very well. A new communication and dispatch center has been established in city, further improving both its emergency response capabilities and its ability to coordinate with neighboring communities.
Da3	Assess the interim POCD update for appropriate changes to egress regulations. If inadequate, prepare to make changes to next POCD update.	PZC	Drop	POCD has not been changed since adoption of the previous HMP; the next scheduled update is 2023. Town looks at site egress as part of the site plan review process for permitting. This action is not considered necessary.
Da4	Ensure that both specific actions and general recommendations presented in this Plan Update are considered during the POCD update process, which will be completed after the end of this document's planning horizon.	PZC	Carry Forward	POCD has not been changed since adoption of the previous HMP; the next scheduled update is 2023 This action is carried forward.
Da5	Pursue funding to place utilities underground in existing developments	OCP	Carry Forward (with Revisions)	Subdivision regulations require that new utilities be buried underground, but the city has not succeeded in securing funding for burial of existing utilities. The city continues to be interested in placing existing utilities underground. This action is carried forward (potentially with revisions if more a more specific action is identified).
Da6	Require floodplain permits to be reviewed by both the Fire Department and OCP for potential problems and any comments addressed before permit issuance	PZC	Capability	Through the site plan review process, all permits are reviewed by the fire department. Floodplain permits are reviewed by the department of planning and zoning, and outside technical experts are hired for more complicated projects as necessary to ensure compliance with regulations.
Da7	Expand definition of "substantial improvement" in the floodplain zoning ordinance to include work performed of two or three years, instead of just one	PZC	Drop	Floodplain regulations were updated in 2012, and the town decided to keep the definition of substantial improvement to be cumulative over a single year. The city does not observe a consistent problem with properties completing major improvements in a manner to avoid having to be brought into code; this action is not considered necessary.

#	Action	Responsible Party	Status	Notes
Da8	Add a freeboard requirement to the floodplain zoning ordinance	PZC	Completed	City requires one foot of freeboard.
Da9	Perform flood studies to determine base flood elevations for unnumbered A zones	PZC	Carry Forward	City has not succeeded in completing this action. One specific area of concern is the Sugar Hollow Area, along West Redding Road. Carry Forward.
Da10	Select a City employee to participate in events sposored by the CT Association of Flood Managers thorughout the year.	OCP *PZC*	Capability	Jennifer Emminger is a member of CAFM.
Da11	Pursue property acquisitions of floodprone properties in the floodplain of Blind Brook. Utilize the land acquired along Blind Brook to expand Blind Brook Park or to provide additional floodplain storage.	Mayor	Carry Forward	Blind Brook continues to be a problem area with localized flooding. The area has many multi-family houses, with no vacant land and flooding occurring in backyards and basements. There are repetitive loss properties in that area. City has not succeeded in pursuing acquisitions in this area. Carry Forward. *City will consider adding or replacing action with one to conduct a study of improvements and alternatives for reducing flooding in the Blind Brook corridor. A question for staff is: has any such study been performed? In the past, the Danbury OEM director has tried to get funding for such a study from NRCS, and been hesitant to pursue acquisition without an engineering study showing the benefits.*
Da12	Perform floodplain elevation studies in the vicinity of repetitive loss properties mapped in the 500-year floodplain	DPW		*Tim will review with DPW director.*
Da13	Perform a study of the lower Kohanza Brook / Padanaram Brook area to make recommendations regarding resizing area bridges	DPW		*Tim will review with DPW director.*
Da14	Complete the dredging project for the Still River West Street Railroad Underpass	DPW		*Tim will review with DPW director.*

#	Action	Responsible Party	Status	Notes
Da15	Pursue property acquisitions along the Still River near Eagle Road and Newtown Road: specifically target structure within floodway.	Mayor	Carry Forward with Revisions	City has not succeeded in pursuing acquisitions in this area. It is possible that planned improvements to I-84 will increase bridge sizes and help convey water downstream more quickly, reducing flood peaks in this area. Carry Forward with Revisions (*Staff will consider: conduct a study to identify mitigation alternatives, or monitor changes to flood risk after I-84 improvements are complete*) *Staff will check with mayor.*
Da16	Pursue a replacement building for Fire Engine Company 3 on North Street outside of the 100-year floodplain and relocate the department	Mayor / Fire Dept.	Completed	*This project is approaching completion as part of a general volunteer fire department consolidation project. The department has already moved out of the building but the relocation process is not yet complete and negotiations are ongoing. Existing building is located right on Kohanza Brook just upstream of the confluence with Padanaram Brook, and will most likely be demolished after relocation is completed. The building is currently being used during the COVID-19 pandemic for the career Fire Department to accommodate social distancing needs.*
Da17	Pursue funding for floodproofing measures at Fire Engine Company 3	Mayor	Drop	This building will be demolished after relocation is completed; floodproofing will therefore not be necessary.
Da18	Perform a study to determine if the 100-year floodplain is properly mapped in the vicinity of Fire Engine Company 24 on Eagle Road.	DPW		*Tim will review with DPW director.*
Da19	Evaluate cost of enrolling in the Community Rating System and calculate the benefit to residents	Mayor / PZC	Carry Forward with Revisions	*City worked with WestCOG to explore CRS participation, but found the administrative requirements to be beyond the capabilities of the City. Danbury is interested in participating if it can get assistance with administration, perhaps by WestCOG.* *Carry forward with revisions.*
Da20	Ensure that the new bridges at Crosby Street is sized based on NRCC rainfall return periods	DPW		*Tim will review with DPW director.*
Da21	Complete the scheduled removal of vegetation, dredging, and river wall repair along the Still River protection projects to ensure proper protection levels	DPW		*Tim will review with DPW director.*
Da22	Construct the Chestnut Street and Wildman Street drainage improvements	DPW		*Tim will review with DPW director.*

#	Action	Responsible Party	Status	Notes
Da23	Construct the proposed Phase II East Ditch drainage improvements	DPW		*Tim will review with DPW director.*
Da24	Construct the proposed Blind Brook channel improvements (channel widening and detention basin)	DPW		*Tim will review with DPW director.*
Da25	Incorporate NRCC rainfall return periods into ongoing bridge studies	DPW		*Tim will review with DPW director.*
Da26	Develop a hydrologic and hydraulic model of the Still River watershed using NRCC rainfall data as a way for the city to prioritize mitigation activities, determine the potential impacts of developments, and prioritize culvert and bridge upgrades and installation of retention and detention basins	DPW		*Tim will review with DPW director.*
Da27	Implement options to reduce flooding from adjacent swamps on West Redding Road and Old Lantern Road	DPW		*Tim will review with DPW director.*
Da28	Encourage the use of wind-mitigation structural techniques in new structures to protect new buildings to a greater level than the required standard	PZC / ZEO	Drop	This action is not considered necessary; wind-load requirements are built into new state building code.
Da29	Require wind-mitigation structural techniques in new municipal critical facilities	PZC	Drop	This action is not considered necessary; wind-load requirements are built into new state building code.
Da30	Collaborate with the Stormwise project, participate in education, management, and research efforts, and implement the Stormwise framework on forests adjacent to key roads.	DPW		*Tim will review with DPW director.*
Da31	Determine whether development of a microgrid is feasible within the City to maintain power at certain facilities or areas during regional outages.	DPW		*Tim will review with DPW director.*

#	Action	Responsible Party	Status	Notes
Da32	Post the snow plowing routes in municipal buildings each winter	OCP *DPW*	Drop	City does not believe this action will provide benefits that reduce losses from winter storms.
Da33	Perform a GPS study of roads in order to prioritize plowing routes, increase efficiency and efficacy of plowing efforts, and help plan evacuation routes	DPW		*Tim will review with DPW director.*
Da34	Ensure that municipal departments and critical facilities (e.g. WWTF) have adequate backup equipment (e.g. generators) in case damage occurs	DPW		*Tim will review with DPW director.*
Da35	Include dam failure areas in the Connect CTY emergency contact database	OCP	Drop	City uses its 3-1-1 system to send out calls about weather and other hazards to residents. It has EAPs on file for all dams, and public alerts are part of the emergency procedures. Residents in dam failure areas are notified as part of the broader alerts.
Da36	Develop an ordinance standardizing fire protection requirements for new developments	PZC / Fire Dept.	Drop	City has regulations and a review process for new development which includes fire protection requirements and fire department review. Ordinance is not believed to be necessary.
Da37	Perform prescribed burning on municipal land when and where appropriate	Fire Dept.	Drop	City does not believe prescribed burning is necessary.

Facilities with emergency power listed in the previous HMP:

- War Memorial
- City Hall (entire building)
- Danbury Hospital

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	April 3, 2020	**ATTENDEES:**	Jayme Stevenson, First Selectman
PROJECT:	WestCOG HMP Update		Jeremy Ginsberg, Director of Planning and Zoning
MMI #:	3101-22		Marc McEwan, Emergency Management Director
SUBJECT:	Town of Darien		Pete Solheim, Building Official
LOCATION	Virtual/Remote Zoom		Ed Gentile, Director of Public Works
			David Knauf, Director of Health
			Don Anderson, Chief of Police
			Nicole Sullivan, WestCOG
			Victoria Brudz, MMI

Victoria Brudz and Nicole Sullivan met with Town of Darien representatives on April 3, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A PowerPoint presentation was used to explain the planning process and guide the meeting. Discussion topics are grouped below.

Critical Facilities

- The town hall is currently in the process of installing a new generator, which will also serve the senior center and will be capable of serving as the primary shelter. The project is anticipated to be complete by the end of 2020.

Development Trends

- Recent development includes three new mixed-use developments, all of which include upgrades to drainage systems.
- The projects are just underway and are expected to all be complete within two to four years.

Recent Events

- The May 2018 events did not impact Darien to the extent of nearby communities. The microburst resulted in downed electrical wires, with minimal impact to public facilities that have standby power.
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RL Properties

- There are 55 RL properties in town.
- It is thought that a majority of RL properties are coastal with several properties having been elevated.

Hazards Discussion

- Two areas of flooding concern include where the mixed-use development is situated, and the other located in a residential neighborhood adjacent to town hall. It is anticipated that the drainage upgrades associated with the mixed-use projects will help alleviate these concerns.
- Icing is often a concern for the entire community. While there is no one area of concern, the degree of impacts to certain areas is variable with each storm.
- Poor drainage is a major concern at several critical intersections. These intersections include along Boston Post Road, Hecker Avenue, and Leroy Avenue, and Raymond Street at train underpasses. There are regularly 4 to 5 stranded vehicles at railroad underpasses due to flooding.
- Flooding at the intersection of state and town roads results in major traffic diversions and impedes emergency response capabilities, as the reroutes for emergency vehicles are very indirect.
- Flooding in front of the Jaguar Dealership along Boston Post Road, just south of the I-95 interchange, is also problematic. The dealership has begun to address flooding on the property with pursuing the installation of a floodwall, however, the roadway still floods.
- Pear Tree Beach regularly floods during high tides. This flooding has introduced a new challenge as the town begins to explore upgrades to the public facilities located on this beach.
- Many of the coastal, low-lying areas that experienced flooding during Sandy have elevated homes, or in the process of elevating.
- Other areas of concern for coastal flooding include Holly Pond, Contentment Island, and Tokeneke.
- Flooding is also a concern for one of the primary sewer pumping stations near Weed Beach. The station was close to inundation during Sandy, and the town is concerned that with sea levels rising inundation may occur soon, ultimately disrupting the sewer service.
- No specific areas of concern were noted regarding windstorms. Multiple public facilities have been recently updated and meet or exceed wind codes.
- The Department of Public Health has great concern over loss of power as it directly impacts food safetym water potability/availability, and the municipal sewage system during a crisis.

Capabilities

- The town tracks and flooding and other complaints as they are filed with planning and zoning, public works, and the First Selectman's office.
- There is a tree maintenance program which includes an active pruning list.

Goals, Objectives, and New Actions

- The town is looking to designate a new primary shelter.
- The intersections of concern are impacting access and the town would like to seek solutions for these issues.
- The pumping station at Weed Beach is vulnerable to inundation and mitigation actions may be necessary to protect this infrastructure.
- Regular flooding of Peach Tree Beach is impacting the necessary upgrades of public facilities and needs to be addressed.

Local Coordinator

- The First Selectman will be the local coordinator.

Status of Previous Actions

#	Title	Description	Responsible Party	Status	Notes
1	Targeted Outreach	Targeted outreach and education to vulnerable communities and neighborhood associations to inform them of natural hazards that may impact them. Includes preparedness techniques such as understanding why voluntary evacuations should be taken seriously, the potential for emergency responders to not access parts of the community during severe events, and other concerns.	EM	Carry forward with revisions	The town often sees pushback with this type of outreach and would like to see this incorporated into generic outreach activities.
2	Public Information	Develop a series of additional brochures or website information promoting 'best management practices' for natural resources targeted to homeowners. Brochure examples include: sound landscaping practices and stormwater management.	Planning, DPW	Complete	Town is actively developing outreach materials. The Environmental Protection Committee also developed a wetlands brochure.
3	GIS	Review and continually update Darien's GIS system with information on Natural Disasters and other map layers that can be accessed for emergency as well as planning.	Planning & Zoning, EM	Complete	Capability. The town is continuously incorporating new data, including updated FEMA maps, into the GIS system.
4	Tokeneke Evaluation	Conduct-drainage and watershed evaluations for the Tokeneke watershed.	P&Z, DPW	Remove	Town sees this action as no longer pertinent. The risk does justify an evaluation.
The5	Transportation Infrastructure	Bridges, roadways and culverts, including those over navigable waterways should be maintained, inventoried, operated, repaired, and built to avoid or reduce potential for any significant adverse impacts on navigation, safety, environmental quality. Focus on several remaining bridges and culverts.	DPW	Carry forward with revisions	Revise this action to specifically identify the intersections and underpasses discussed.
6	Route 1 at Metro North Study	Conduct an engineering study to assess the flood impacts and associated mitigation measures along Route 1 at the Metro-North rail overpass	CTDOT, Metro-North, Town	Carry forward with revisions	The town would like to pursue this action, however, the financial burden should not full completely upon Darien. A revised action will provide more specificity.
7	Outreach and Education	Conduct outreach and education to volunteer Fire Department staff regarding emergency shelter operations, including associated protocols and best management practices.	EM, Fire	Carry over with revisions	Would like this action geared toward volunteer sheltering staff and not fire department staff as they are not typically involved in sheltering procedures.

#	Title	Description	Responsible Party	Status	Notes
8		Support and encourage the development of Long Range Water Supply Plans, to meet the future water supply needs. These include the State Drought Plan, the State Water Plan, and the Western CT Coordinated Water System Plan.	P&Z, HD, DPW	Complete	These plans are all complete as of 2018-2019, and the responsible agencies are working on implementation. This is an ongoing capability and the town remains active in supporting water supply planning implementation.
9		Support regulatory changes recommended in the PoCD regarding Zoning, Subdivision, Inland Wetlands and Watercourses regulations; and Harbors Ordinances.	P&Z	Complete	The town is continuously supporting changes, and also relies on guidance from FEMA and changes necessary changes to regulatory standards.
10		Explore ways to protect and preserve open space, particularly coastal lands, wetlands and land within the flood plain. Acquire or protect land in the flood zone to minimize the risk of flooding.	P&Z	Complete	This is an ongoing activity and capability of the town.
11		Continue to provide capital budget funds for drainage projects and investigation of drainage problems. Specifically, focus on remaining projects in capital improvement plan.	DPW	Complete	This is an ongoing, continuous action. The town wants to focus on the previous issues discussed.
12		Continue to encourage best management practices, including innovative Low-Impact Development (LID) practices, for managing stormwater runoff.	P&Z	Complete	Capability. The town already promotes these activities.
13		Support local, regional and state efforts to provide protection and preservation of groundwater aquifers. These include the State Drought Plan, the State Water Plan, and the Western CT Coordinated Water System Plan.	HD	Complete	Municipal staff is active in water supply planning, aquifer protection, and maintains a good relationship with Aquarion. The Plans mentioned are complete, and the responsible agencies are working on implementation.

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	4/13/2020	**ATTENDEES:**	Jim Michel - Dept. Commissioner Public Works
PROJECT:	WestCOG HMP Update		Amy Siebert - Commissioner of Public Works
MMI #:	3101-22		Pat Sesto - Director of Environmental Affairs (Wetlands and Conservation)
SUBJECT:	Town of Greenwich		Jodi Couture - Zoning Enforcement Officer, Floodplain Manager
LOCATION	Virtual/Remote: Zoom		Noah Slovin – MMI

Noah Slovin met with Town of Greenwich representatives on April 13, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A Powerpoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format.

Discussion topics are grouped below.

Critical Facilities

Meeting attendees discussed changes to the critical facilities list developed from GIS data for this planning process. This list is presented in the table below, and may differ from the list used in the SWRPA planning process in 2014-2015:

Facility	Address Or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Town Hall	101 Field Point Road	Town Hall	X			*Partial power*
Western Greenwich Civic Center	449 Pemberwick Road	Shelter	X	X		
Eastern Middle School	51 Hendrie Avenue	Shelter	X	X		
Brunswick School	100 Maher Avenue	School				*Public schools are managed somewhat independently by the BOE. Contact BOE for information about emergency power.* *Emergency power capabilities at private schools is not known by town.* *In HMPs, schools that are not shelters, warming stations, or comfort stations are typically not on the list of critical facilities. If Town does not object, Noah will retire all these schools from the list.*
Central Middle School	9 Indian Rock Ln.	School				
Connecticut Institute Of Art	581 West Putnam Avenue	School				
Convent Of The Sacred Heart	1177 King Street	School				
Cos Cob School	300 East Putnam Ave.	School				
Glenville School	33 Riversville Rd.	School				
Greenwich Academy	200 North Maple Ave	School				
Greenwich Catholic School	471 North Street	School				
Greenwich Country Day School	401 Old Church Rd	School				
Greenwich High School	10 Hillside Rd.	School				
Greenwich Kokusai Gakuen	521 E Putnam Ave	School				
Hamilton Avenue School	184 Hamilton Ave.	School				
International School At Dundee	55 Florence Rd.	School				
Julian Curtiss School	180 East Elm St.	School				
New Lebanon School	25 Mead Ave.	School				
North Mianus School	309 Palmer Hill Rd.	School				
North Street School	381 North St.	School				
Old Greenwich School	825 Sound Beach Ave.	School				
Parkway School	141 Lower Cross Rd.	School				

Facility	Address Or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Riverside School	90 Hendrie Ave.	School				
The Greenwich Japanese School	15 Ridgeway	School				
The Stanwich School	257 Stanwich Rd	School				
Westchester Fairfield Hebrew Aca.	300 East Putnam Ave	School				
Western Middle School	1 Western Junior Hwy.	School				
Whitby School	969 Lake Avenue	School				
Binney Park Shed	0 Sound Beach Avenue	Public Works				
Bldg Maint/Construction	1 Newman Street	Public Works				
Byram Hwy Shed	*location*	Public Works				*Unknown Location: Consider retiring from list*
Byram Park Dockmaster	0 Byram Shore Road	Public Works				
Cos Cob Dockmaster	0 Strickland Road	Public Works				
Indian Field Highway Shed and Fleet Maintenance	100 Indian Field Road	Public Works	X			*Also referred to as "Cos Cob/Boro Hwy Shed"* *2 separate generators*
Grass Island Waste Treatment Plant	0 Shore Road	Public Works				
Greenwich Point - Dockmaster	0 Tods Driftway	Public Works				
Havemeyer (Shed)	381 North Street	Public Works				*Redundant with North Street School: Consider retiring from list*
North Field Maintenance, Tree Crews; and Animal Shelter	393 North Street	Public Works	X	X		*Animal Shelter* *2 separate generators*
Old Greenwich Hwy Shed	*location*	Public Works				*Unknown Location: Consider retiring from list*
Holly Hill Transfer Station	*101 Field Point Road*	*Public Works*	X			
Greenwich Police Department	11 Bruce Place	Police / EOC	X			
Greenwich Police Marine Division	100 Arch Street	Police				
Greenwich Hospital	5 Perryridge Road	Hospital	X			
Central Fire Station (Station 1 – Headquarters)	15 Havemeyer Place	Fire	X			
Cos Cob Fire Station (Station 2)	200 East Putnam Ave	Fire	X			
Byram Fire Station (Station 3)	264 Delavan Avenue	Fire				*Under renovation, will have backup power when complete*
Glenville Fire Station (Station 4)	266 Glenville Road	Fire	X			
Sound Beach Fire Station (Station 5)	207 Sound Beach Avenue	Fire	X			
Round Hill Fire Station (Station 6)	166 West Old Mill Road	Fire	X			
North Street Fire Station (Station 8)	669 North Street	Fire	X			
Horseneck Fire Station	*1 Horseneck Lane*	*Fire*	X			
Greenwich Health Department	101 Field Point Road	At Town Hall				*Backup power for medicine refrigeration.*
Pemberwick Center	131 Pemberwick Road	Community Center				
Senior Center	299 Greenwich Avenue	Community Center				
Fairview Healthcare Center Of Greenwich	1188 King St	Care Facility				
Family Centers, Inc.	20 Bridge Street	Care Facility				
Greens At Greenwich, The	1155 King St	Care Facility				
Greenwich Laurelton Nursing & Conv Home	1188 King St	Care Facility				
Greenwich Woods Health Care Center	1165 King St	Care Facility				
Greenwich Woods Rehabilitation	1165 King St	Care Facility				
Greenwich Youth Options	55 Old Field Point Road	Care Facility				
Merry Go Round Alsa	1/2 Bolling Place	Care Facility				
Nathaniel Witherell	70 Parsonage Rd	Care Facility	X			
Parsonage Cottage Senior Residence	88 Parsonage Road	Care Facility				
Pathways, Inc	175 Milbank Ave	Care Facility				
Glenville Service Center Inc	2 Riversville Rd	Gas Station				*Consider retiring from list*
Greenfield EMS Medic 4	*143 Lower Cross Road*	*Emergency Response*	X			

Town staff noted the following changes and corrections to this list:

- The Town Hall does not have full backup power, but certain systems are tied-in to an emergency generator.
- Greenwich Fire Department Station 3 is currently closed and under renovation. When renovation is complete the site will have backup power.
- This list does not include Ambulance centers. The Town will send a list to Noah for inclusion.

This list will be reviewed to determine whether any facilities are located within a 1% annual-chance flood zone.

Development Trends

Town staff noted that development continues to take place in low lying areas that may be at risk from flooding, however those developments meet or exceed current FEMA standards.

Recent Events

Town staff reported that they have not experienced any major storms in the last 5 years that have caused significant damage or other major impacts. Superstorm Sandy and Tropical Storm Irene were the last major natural disaster events.

- The Town experiences many high-intensity, low-duration storms; for example, a couple inches of rain will fall in less than an hour, overwhelming drainage systems and causing flooding of roadways, yards, etc. Town staff observe that the frequency of such events seems to have increased in the last five years.
- Town was hit relatively hard by a nor'easter on March 2, 2018[1]. Precipitation saturated the soil, and high winds then downed many trees. Power outages were substantial. Property damage was *not* substantial.
- A significant drought impacted Greenwich between 2015 and 2017
    - Aquarion enacted watering restrictions, which are still in force: irrigation has been limited to two days a week for private wells, indefinitely
    - The Wastewater Division cut back on sewer cleanings during drought peak so save water
    - Town put restrictions on private well withdrawals
    - Reservoir levels were low; this affects fire protection abilities
    - Town working with NRCS to update the Town's most recent groundwater study conducted around 10 years ago
    - Consideration of the impact of droughts is important to the Town

Repetitive Loss Properties

Meeting attendees reviewed Repetitive Loss Properties (RLP) in Town.

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[1] According to a Patch article on the event:
- Power was out for over 6,600 customers
- The town set up temporary storm shelters (warming/charging centers at Greenwich Public Safety Complex, Western Greenwich Civic Center, Greenwich Library)
- Several hundred trees were downed
- Downed trees closed the Merritt Parkway, Sound View Drive near Field Point Road, Lake Avenue near Greenwich Hospital

The Town has pursued some projects to reduce the risks to RLPs.

- In 2019 Greenwich explored participation in FEMA's Community Rating System (CRS) program, after WestCOG encouraged them to do so. Ultimately the Town decided not to pursue participation.
- Greenwich has updated its zoning regulations over time to increase flood zone requirements (this is a capability, not an action completed in the last five years)
    - Stricter regulations encourage people to elevate homes
    - Substantial Improvement definition calculates improvement cumulatively since property became out-of-compliance with regulation updates (as far back as 1986)
    - Far exceed other communities in efforts to bring homes into compliance
    - Town still struggles to get property owners to comply
- Greenwich had over 20 homes elevated as part of an HMGP grant associated with Superstorm Sandy. Additionally, many more properties were elevated without HMGP assistance, making the total number of homes elevated in recent years significantly higher.

Town staff noted that many property owners don't have flood insurance, or don't file claims following damage, so information is missing about damages and risk. Data on damages and costs of flooding reflects less damage and lower costs than what is actually happening.

<u>Hazards Discussion</u>

Concerns and issues relating to specific hazards were discussed.

Flooding is a concern at the following locations:

- Sound Beach Avenue in Old Greenwich
    - Town staff have observed road flooding more frequently in recent years. Coastal flooding and drainage flooding.
    - Flooding impacts emergency access. Town has explored alternative routes for emergency access, but flooding also floods those alternative routes.
        - *Jim will send a map of flooding and emergency routes in this area*
- Shore Road, near Greenwich Point
    - Experiences "nuisance" flooding
- Byram River between Route 1 and Comly Avenue
    - Flooding is a problem in the Pemberwick Neighborhood
    - Town has been working on a study with CT DOT since 2012 for this area. A draft Feasibility Study for proposed improvements to the area is nearing completion. The study addresses replacing bridges on Route 1 at the state line, so New York DOT is also involved.
- Greenwich Creek at East Putnam Avenue and Hillside Road, near Greenwich High School
    - Flooding has been a problem here in the past.
    - CT DOT will be redoing the bridge at East Putnam Avenue and Hillside Rd in 2020.

Town staff have observed that high tides have been getting higher due to sea level rise, and this is causing more nuisance flooding, and increased impacts from high tides. This is especially true during King Tides or Spring Tides.

The Town has sufficient staff and equipment for snow clearing. Snow loads on roofs have not generally been a problem in Greenwich; however, in the winter of 2018 a parking garage roof collapsed due to snow[2]. In general, snow hazards are not a significant concern for the Town.

Capabilities

Meeting attendees identified hazard mitigation capabilities that the Town has, and changes or improvements to those capabilities since the previous HMP.

- Tree Maintenance – The Parks and Recreation department is responsible for tree maintenance. Additionally, Eversource has been performing a significant amount of tree maintenance along power lines, and CT DOT maintains trees along state roads. The town ran an "at-risk trees program" that was funded for a number of years, and which addressed a number of at-risk trees throughout the Town's right-of way [*Amy will find more information about this program*]. During the nor'easter in March of 2018 many trees came down, and so there are fewer problem trees left standing. In all, Greenwich considers its tree maintenance capabilities to be robust.
    - *[At the time of the meeting, there was a high-wind event underway. Noah will check in with the Town about the impacts of that storm.]*

- Climate Change Risks – Town has a climate change study underway to evaluate the impacts of sea level rise and storm surge. The study explores impacts along the coast and along four town-owned, tidally-influenced ponds: Eagle Pond, Mill Pond, Binney Pond, and Bruce Pond. This study is scheduled to be completed in the fall of 2020.
- Flooding and drainage complaints – residents can submit complaints by phone, email, or a form on the town webpage. Complaints are sent or forwarded to the Engineering Department. The department compiles a list of complaint locations and tracks locations of concern over time. Complaints are often minor, requiring only minor maintenance or cleanings to address. The Town has, however, been receiving a larger volume of more significant complaints over time.
- Greenwich has performed many drainage improvement projects over the last five years. These include:
    - Replacing a 12-inch pipe with a 42-inch pipe under one roadway [*location*]
    - Complete drainage network rehabilitation on Route 1 near Mason Street (including a distance down Mason Street). This project helps protect a critical telecommunication facility on Sherwood Avenue.
    - Major drainage improvement project in Old Greenwich, along Park Avenue, Highview Avenue, Sound Beach Avenue, and Arcadia Road.
    - *[Jim will provide a more comprehensive list]*
- The Town has elevated three sewer pump stations in the coastal area:
    - Ballwood Pump Station
    - Heusted Pump Station
    - Meadow Pump Station
- Work is underway to determine how to best protect and floodproof the Grass Island Waste Treatment Plant.

[2] Noah was not able to find more information about this online, but did find a report of a private garage at the Putnam Park Apartments complex that collapsed from snow on March 4, 2015. Nobody was injured, but cars were damaged.

  - Town staff note that, to date, they've had no success getting financial assistance for any of their wastewater-related hazard-mitigation projects
- Town elevated a bathroom and a new pool in a public park

Goals, Objectives, and New Actions

The following new actions were raised during the meeting:

- Town is working with NRCS to update the Town's most recent groundwater study conducted around 10 years ago
- Completion of Grass Island Waste Treatment Plant mitigation projects
- Completion of Byram River flood mitigation feasibility study, and implementation of recommended projects
- Completion of climate change study, and implementation of recommended projects
- Town may wish to implement a new drought-related action

Local Coordinator

- Dan Warzoha, the Emergency Management Operations Coordinator (EMOC), will be the local coordinator.

Status of Previous Actions

#	Description	Responsible Party	*Status*	*Notes*
1	Focus on implementing public safety projects identified in the town drainage studies.	DPW	Capability	*Town has made significant process on this, and will continue to in the future.* *Strickland Brook drainage improvements were one of the projects identified in these studies that has been completed.*
2	Conducting drainage and watershed evaluations for all waterbodies in the town. (Looking at water quality)	DPW	Completed	*Drainage and watershed evaluations have been completed for most waterbodies in Town, from a flooding standpoint. Most of this work has been with a riverine perspective. Moving forward, the Town will be to exploring coastal flooding and the impacts of sea level rise (as part of the climate change study currently underway).* *The Town recently completed a Binney Pond sediment study that modeled sediment sources. Following the study, the pond was dredged, which may have benefited water quality.* *The Town does not believe a focus on water quality is necessary at this time. Action is considered complete, and new actions addressing next steps will be added to plan.*
3	Work with the Army Corps of Engineers to address the Byram river areas, such as the Route 1 bridge, Byram and Pemberwick.	DPW	Carry Forward with Revisions	*A feasibility study is scheduled to be completed in 2020. A number of alternatives will be presented in this study. Implementation of projects will depend on funding from federal and state sources as well as the local budget.*

#	Description	Responsible Party	*Status*	*Notes*
4	Work with the state to inventory condition of town owned culverts, bridges and dams and repair and place as needed.	DPW, CTDEEP, CTDOT	Drop	*Greenwich evaluates all bridges and culverts on a 5-year schedule, with some structures evaluated more frequently. This is a capability. [Town to provide list of bridges that have been replaced in last 5 years]* *Most dams in Town are privately owned, and state efforts to ensure dam maintenance address the needs of those structures.* *Town is currently performing significant improvements to the Cos Cob dam. Aquarion recently performed significant work on the Rockwood Lake Dam off North Street. The Town also recently performed vegetation maintenance at the dam near the Greenwich High School.* *Town has sufficient capabilities with regard to culvert, bridge, and dam maintenance. Working with the state on a condition inventory is not believed necessary at this time.*
5	Evaluate Binney Park storage shed to determine appropriate flood proofing method, such as raising its elevation.	P&R	Carry Forward	*Renovation of the Binney Park Storage Shed is expected in the next several years, and flood proofing will take place at that time. The Town follows floodplain regulations during construction of municipal structures.*
6	Implement improvements described in the Old Greenwich Business District and Surrounding Streets-Drainage Study.	DPW	Completed	*This action has been completed.*
7	Request that FEMA and Army Corps of Engineers reevaluate the Flood Insurance Rate studies for riverine sections.	P&Z, ZEO	?	*[Jodi will provide information on this]*
8	Conduct education and outreach regarding Best Management Practices (BMPs) for maintaining and restoring tidal wetlands.	P&Z, CC	Carry forward with Revisions	*The Town work with a conservation nonprofit to provide some outreach about tidal wetlands.* *A more specific action will be carried forward.*

#	Description	Responsible Party	*Status*	*Notes*
9	Maintain the NFIP. Also promote mitigation of properties in the flood zone, including first floor elevations to account for Sea Level Rise	P&Z, CC	Capability	*This is an ongoing capability*
10	Evaluate and implement a strategy for a living shoreline (ex. To protect Greenwich Point and surrounding area).	CC, P&Z, P&R	Carry Forward with Revisions	*The Nature Conservancy is currently conducting a study exploring living shoreline potential along the Greenwich coast.* *A new action to implement recommendations identified in this study will be carried forward.*
11	Vulnerability Assessment of town owned infrastructure	EM,DPW, WCCOG	Completed	*Town has compiled basic information about the elevation of the first floor elevations and base flood elevations for all Town facilities.* *Additionally, a Waste Treatment Plant vulnerability assessment has been completed, and is informing the Capital Improvement Plan moving forward.* *This action is considered to be completed.*
12	Manage roadside forests to reduce storm impacts.	CL&P, P&R, Town	Capability	*This is an ongoing capability*
13	Conduct a town wide tree management program	DPW, Private, Citizens	Capability	*This is an ongoing capability*
14	Review and update memorandums of understanding as needed with Red Cross and transportation providers to make sure they meet the needs of the Town in the event of a flood event.	EOM, Health		*The EMOC will provide information on this action*

#	Description	Responsible Party	*Status*	*Notes*
15	Mitigate flooding in Cos Cob region and Cos Cob Firehouse.	DPW, Fire, Engineering	Carry Forward with Revisions	*The Town conducted a flood study of Strickland Brook. Some of the actions identified in that study are expected to help mitigate flooding at the Firehouse.* *Additional mitigation actions will be identified through the Climate Change Study (The Firehouse is coastal, located across road from Mill Pond, which is being evaluated as part of the Climate Change Study).* *Carry forward, informed by those other studies*
16	Improve resiliency of the Waste Water Treatment Plant (e.g. Develop Berm, Raise the plant, Relocation)	DPW	Carry Forward with Revisions	*A vulnerability and mitigation study has been completed, and is informing projects included in the Capital Improvement Plan.* *Carry forward, informed by the vulnerability study.*
17	As needed procure equipment to sustain critical facilities in the event of a disaster (i.e. obtain additional generators) to enhance EOC capabilities.	EOM	Capability	*This is a capability*
18	Explore improvements to telecommunications systems to minimize disruption and delays during an emergency. Continue to maintain emergency notification system and upgrade as needed.	EOM, Utilities	Capability	*This is a capability*
19	Evaluate municipalities' sheltering and evacuation needs for a variety of storm scenarios.	EOM, DEMHS, WCCOG		
20	Improve and enlarge storage of fuel tanks	Fleet DPW		
21	Develop communication & education strategy for at risk populations & disaster preparedness.	EOM		
22	Provide targeted education and outreach for households in isolated locations (Isolated during hazards).	EOM, Neighborhood Associations, CC		

#	Description	Responsible Party	*Status*	*Notes*
23	Improve Communication channel for residents	EM, IT, Police		*Reverse 9-11? CT Alerts? Code Red?*
24	Coordination and cooperation with utilities.	Utilities, WCCOG, CT and NY	Capability	*Town has a positive relationship with local utility providers. This is a capability*
25	Implement and maintain interactive GIS software which coordinates with all town departments. (Monitors closed roads, downed trees, truck resources location.) Improved IT for live updates	All Town Dept., WCCOG		
26	Improve Power Grid Resiliency	CL&P *(acquired by Eversource)*	Completed	*Eversource has been effective at improving power grid resiliency, and is consistently working to make further improvements.*
27	Upgrade and maintain storm drain system.	DPW	Capability	*This is an ongoing capability*
28	Work with Aquarion Water Company to encourage appropriate water line extensions to meet fire protection needs.	Fire		
29	Plan for Fire house in North West Greenwich	CEO, DPW, Fire	Drop	*Town has determined that the cost-benefit ratio of this action does not warrant its implementation.*
30	Improve communications between the town, state and Aquarion prior to and during drought conditions.	CC	Completed	*Action has been completed*
31	Work with State to update the Drought Management Plan.	CC, Aquarion	Completed	*This action has been completed*
32	Review USGS groundwater study and make recommendations for regulations to protect groundwater quality and quantity.	CC, Health, P&Z		*Town is exploring development of an updated groundwater study.*
33	Work with Aquarion Water Co. on infrastructure improvements, both in town and inter-town.	Aquarion, CC	Completed	*Action has been completed*

#	Description	Responsible Party	*Status*	*Notes*
34	Identify which dry hydrants work in drought conditions and which do not. Evaluate which hydrants may need to be deeper and areas where more hydrants need to be installed. Explore the need for underground storage tanks for fire protection should be required for new development	Fire, CC		
35	Continue outreach programs encouraging water conservation.	Health, Aquarion, CC	Capability	*This is a capability*
36	Maintain Emergency Operation Plan and specific information needed to respond to drought conditions.	EOM, CC, Health		

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	6/11/2020	**ATTENDEES**	Maria Coplit – Town Engineer
PROJECT:	WestCOG HMP Update		Joe Zagarenski – Senior Engineer
MMI #:	3101-22		Lynn Brooks Avni – Town Planner
SUBJECT:	Town of New Canaan		Tiger Mann – Public Works Director
LOCATION	Virtual/Remote		Noah Slovin - MMI
	Zoom		

Noah Slovin met with Town of New Canaan representatives on June 11, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. Attendees followed an open discussion format.

Discussion topics are grouped below.

Critical Facilities

Meeting attendees discussed the critical facilities list to be included in the HMP.

The table below lists critical facilities to be included in the New Canaan HMP:

Facility	Address or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Town Hall	77 Main St.	Town Hall / Backup EOC	X			
Department Of Public Works	77 Main St.	Public Works				*Recently relocated back to 77 Main Street after from 174 South Avenue*
New Canaan Health Department	77 Main St.	Community Health Programs Administration				
Human Services	77 Main St.					*Located in Town hall annex – separate building from Town Hall*
New Canaan Police Dept.	174 South Ave	Police / EOC	X			
New Canaan YMCA	564 South Ave	Shelter	X	X		*Looking at putting in combined heat & power system*
Waveny House	Waveny Park	Shelter		X		
Lapham Community Center	Waveny Park	Shelter	X	X		
New Canaan High School	11 Farm Rd.	School	X			
Saxe Middle School	468 South Ave	School	X			
East School	54 Little Brook Rd	School	?			*Town will check generator status*
West School	769 Ponus Ridge	School	?			*Town will check generator status*
South School	8 Farm Rd	School	?			*Town will check generator status*
Silver Hill Hospital	208 Valley Rd	Hospital				
New Canaan Fire Company 1	60 Main St	Fire	X			
Waveny Care Center, Inc.	3 Farm Rd	Care Facility	X			
New Canaan Volunteer Ambulance Incorporated	182 South Ave	Ambulance Service	X			
Highway Department	394 Main St	Municipal Services	X			
WWTF	394 Main St	Municipal Services	X			

Recent Events

Meeting attendees reviewed recent events. Attendees noted that a tornado hit the town in the late summer of 2018. Impacts of the storm were reported to be limited to downed trees and power lines, and temporary road closures. The tornado began near Weed Street and Marshall Ridge Road and traveled southeast through Waveny Park to Conrad Road. The Tornado "hopped over" the High School and Middle School without causing any damage.[1]

The town reported no other recent hazard events of significance.

Repetitive Loss Properties

Meeting attendees report that there is a Repetitive Loss Property (RLP) that the Town has considered for acquisition and removal in the past; however other mitigation steps have been taken. Other RLPs were not discussed. *MMI: was this an RLP or just an at-risk property?*

Hazards Discussion

Blocked roads or loss of power due to falling trees is a concern for the town; the Public Works Department aggressively funds tree maintenance and considers its capabilities to be adequate.

The engineering department has a list of drainage area concerns. *Can Maria provide a list of drainage area concerns to MMI?*

Capabilities

Meeting attendees identified hazard mitigation capabilities that the Town has, and changes or improvements to those capabilities since the previous HMP.

- Mill and Mead Ponds are dredged on an annual basis
- The Town worked with the owner of a property with known flood issues to take mitigation steps
- The DPW tree maintenance budget is very robust
- Town has three methods of contacting residents in emergencies:
    - Blackboard Connect (the Town is reviewing this service, and potential alternatives)
    - Smart911: residents can sign up for this service
    - Town-wide email list
- Human Services has been providing additional services to seniors during the COVID-19 crisis, including grocery shopping and regular check-ins. The institution of these practices during this emergency has improved HS capabilities in a way that is expected to be long-lasting.
- A trailer to transport a portable generator has been acquired.
- The Town has hardened its emergency radio system by installing additional emergency generators.

[1] According to the NCEI, the tornado occurred on October 2, 2018 and was rated an EF1. Wind speeds were around 100 miles per hour. The path was nearly 4 miles long and about 300 feet wide. Damage to cars was reported; total property damage was estimated at $50,000.

- The Town has a strong solarization initiative, with solar panels having been added to many municipal buildings and plans for expanding solarization in the works. The Town Pool and Nature Center solar systems are able to operate off the grid.
- The completed drainage and flood mitigation study of Five Mile River is used as an additional element for review during the permitting process.
- The Town has helped some property-owners complete Letters of Map Amendment (LOMAs) to submit to FEMA.

Actions:

New actions to include in the plan were identified during the meeting. Additionally, Noah has listed a number of suggested new actions based on challenges and issues identified during the meeting. *The Town will review Noah's suggestions for inclusion in the plan.*

- *Perform maintenance of drainage ditches and waterways on Southwood Drive*
- *Complete the Bristow Bird Sanctuary rehabilitation project, incorporating floodplain restoration and other flood mitigation actions. The project will include wetland restoration and dredging, and should improve floodplain storage capacity. Project is scheduled to be completed over the next 3 years.*
- *Working with the state on addressing drainage issues on Old Stamford Road / Route 106.*
- *Develop a drainage improvement plan for Waveny Park*

Local Coordinator

- Tiger Mann, DPW Director, will be the local coordinator

Status of Previous Actions

#	Action	Responsible Party	Status	Notes
NC1	Maintenance dredging of Mill and Mead Ponds, including other areas as necessary	DPW	Capability	Town performs maintenance dredging annually as part of normal operations. This is a capability.
NC2	Reconstruct Nursery Road Bridge to widen waterway opening and mitigate flooding issues.	DPW	Carry Forward	Reconstruction of the bridge has been included in the Town's 5-year Capital Improvement Plan. The bridge is structurally sound, but its narrowness has in the past caused upstream ponding that has affected nearby properties. The Town has not experienced any flooding related to this bridge in the last 5 years.
NC3	Purchase properties known to have flooding problems and that reside within the 100 year floodplain.	DPW	Complete/ Drop	At the time of the adoption of the previous HMP the Town had identified one property with known flood risks for which this action was considered. Since then, the Town and the property owner collaborated to take flood mitigation steps, successfully addressing most flood concerns. There has not been any flooding at this property since then. The Town has not identified any other properties for which this action would be appropriate. Action is complete and can be dropped.
NC4	Budget appropriate money necessary to maintain and remove dead, dying, dangerous or diseased trees.	DPW	Capability	The Town reports that its tree maintenance budget is adequate.
NC5	Maintain a reverse 911 or similar system to alert residents of natural phenomena and if necessary, evacuation procedures.	EM	Completed	Town has 3 methods for alerting residents of hazards: - Blackboard Connect - Smart911 - Townwide email system The Town is not satisfied with Blackboard Connect and is currently exploring alternatives. This action is considered complete, but a new action addressing the Blackboard Connect Update will be added to the plan.
NC6	Enhance services to at-risk populations	~~EM, HD, Various State Agencies~~ *Human Services*	Complete/ Carry Forward with Revisions	As part of its COVID-19 response, Human Services has been providing additional support services for seniors, including grocery shopping for them and performing more frequent check-ins. This has improved the Town's capabilities in this regard and is considered to be progress toward completion of this action. This action is carried forward, but revised to specifically address formalization of lessons learned from the COVID-19 response to improve the Town's ability to provide emergency services to at-risk populations during and following natural hazard events.

#	Action	Responsible Party	Status	Notes
NC7	Develop a strategy and obtain the necessary equipment (including generators) to provide adequate heat at emergency shelters.	DPW	Completed	Town has pursued, and continues to pursue, acquisition of portable generators and supporting equipment, as well as installation of Combined Heat and Power (CHP) systems, at critical facilities, including shelters. The Town has acquired a trailer to transport a portable generator to provide backup power to shelters, and is looking into acquiring a second, larger trailer. The Town is currently developing engineering plans for installation of a CHP system at the Middle School, and has proposed funding for the coming fiscal year to install a CHP at the High School. The Town is exploring installation of a CHP at the YMCA. This action of development of a strategy is considered complete. New actions regarding the specific steps included in this strategy (listed above) will be included in the plan.
NC8	Improve access along the transportation network during emergencies.	DPW, ~~CL&P~~ *Eversource*	Capability	Town staff report that treefall and debris are the primary impacts affecting the transportation network during hazard emergencies. New Canaan budgets adequately for tree maintenance. The Town has a strong coordination system with Eversource. The tree warden works closely with the state arborist on state roads. This is a capability.
NC9	Enhance the resiliency of the power grid. Explore options to install a micro-grid (gas-powered) for downtown and emergency services	Town, ~~CL&P~~ *Eversource*, BOE	Complete/ Carry Forward with Revisions	Town has pursued, and continues to pursue, acquisition of portable generators and supporting equipment, as well as installation of Combined Heat and Power (CHP) systems, at critical facilities, including shelters. Town will be installing a CHP at the Highway Garage and WWTF. They are putting together engineering plans to install a CHP at the middle school, and have proposed including money for a CHP at the High School in next year's budget. The Town is exploring installing a CHP at the YMCA. The Town has solarized 4 municipal buildings, and one school (South School). The Town is currently in the process of solarizing East School. They have plans to solarize parts of the Middle School, High School, and WWTF. A partnership has been formed between the YMCA and Waveny Care Network to solarize their properties. There is also solar at the Town Pool and Nature Center; those two are able to operate off the grid. Increasing local power generation enhances local power resiliency in the long term, despite the fact that currently these solar systems are connected to the grid and cannot be operated if the grid goes down. The Town has a strong tree maintenance budget, and works closely with Eversource to ensure powerlines are protected from dangerous trees. Revise and carry forward an action to explore microgridding, or enabling solar-powered facilities to operate off the grid in an emergency.

#	Action	Responsible Party	Status	Notes
NC10	Review plans that fulfill DEEP Storm Water Management, Phase II requirements and identify projects that may be eligible for FEMA natural hazard mitigation grants.	Wetlands	Carry Forward	The Town continues to identifying projects to meet MS4 requirements; at this point it has not identified any that would be eligible for FEMA grants. Carry Forward
NC11	Review completed drainage study of Five Mile River with an eye to adopting and instituting additional mitigation measures.	DPW	Completed	This drainage study has been completed, and is used as another element for review during permitting processes. Five Mile River has a TMDL plan, and the drainage study was completed in adherence with that plan.

New Fairfield HMP Planning Meeting Memo

The Town of New Fairfield opted to not have a municipal planning meeting as was originally planned. The town did however review information and provide notes.

On June 25, 2020 Maria Evans, the New Fairfield Emergency Management Director, returned notes to WestCOG which included changes to critical facilities and updates on previous actions.

New Fairfield Critical Facilities

Name	Address	Type	Notes
New Fairfield High School and Middle School	54 Gillotti Road	School/Shelter	*No Change*
New Fairfield Senior Center	33 Route 37 North	Shelter	*No Change*
New Life Community Church	1 Beaver Bog Road	Shelter	*No Change*
Town Hall and Annex	4 Brush Hill Road	Government	*No Change*
Public Safety Complex (Police Department, Fire Station, and Emergency Operation Center)	302 Ball Pond Road	Police/Fire	*No Change*
Ball Pond Volunteer Fire Department	7 Fairfield Drive	Fire	*No Change*
Squantz Engine Company Volunteer Fire Department	255 Route 39	Fire	*No Change*

New Fairfield Previous Actions

Strategy	Description	Responsible Party	Status	Notes
NF1	Acquire up to three additional portable generators to be stored at the Town Hall, the Drop-Off Center, and the Library.	DPW	In-Progress Carry Forward with Revisions	A permanent generator has been installed at the Town Hall, and a second has been installed at the Town Hall Annex. A hookup for a portable generator has been installed at the Senior Center, and a portable generator acquired. Significant progress has been made on this action. This action is carried forward to call for acquisition of portable generators to be stored at the Drop-Off Center and the Library only.
NF2	Upgrade emergency notification system to a company that has more capabilities for assisting residents with special needs.	OEM	Carry Forward with Revision	Town has been exploring options for updating its emergency notification system. It currently uses the AlertNow system, but has identified the Everbridge system as the system to which it will transition.
NF3	Review and update potential evacuation routes while allowing flexibility in case of downed trees or power lines blocking the road.	OEM	Capability	This action is performed regularly and as part of standard operations during and following hazard events.
NF4	Create a public road-closure reporting system so residents can inform the town of the locations of downed tree limbs and power lines, or flooded roads.	DPW	Completed	Residents are instructed to call the New Fairfield Communications Center (by dialing 9-1-1). The Communications Center relays information to the DPW.
NF5	Pursue funding to place utilities underground in existing developed areas.	DPW	Drop	Town does not believe this action will necessarily increase hazard mitigation capabilities. Town works with utility companies to support grid resiliency efforts. Action is dropped.

Strategy	Description	Responsible Party	Status	Notes
NF6	Require developers to determine whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project, rather than having the responsibility be on Town officials.	ZC	Capability	Stormwater retention/detention is covered in the 2007 Zoning Regulations Section 6.5: Residential & Commercial Post Development. New Fairfield Planning Commission approves subdivision and redevelopment applications
NF7	In conjunction with the land trusts in town, pursue the acquisition of additional municipal open space inside SFHAs and set it aside as greenways, parks, or other nonresidential, noncommercial, or nonindustrial use.	PC, ZC	Capability	This is a capability
NF8	Coordinate with the CTDOT and pursue/allocate funding to upgrade the Ball Pond Brook road crossing at Bigelow Corners	DPW	Drop	This is a State Road, and the Town is not involved in decision-making. CTDOT maintains and improves State Roads as needed.
NF9	Collaborate with the Stormwise project, participate in education, management, and research efforts, and implement the Stormwise framework.	DPW	Drop	Town DPW maintains trees using best known practices. This specific action is not necessary.
NF10	Develop a microgrid within the Town using both private and Town-owned generators.	DPW	Carry Forward	Action has not yet been pursued due to limited funding and municipal resources. Carry forward, revised to refer specifically to critical facilities.
NF11	Evaluate the cost-effectiveness of installing solar panels on Town buildings to provide an additional source of local electricity in the event of a regional power outage.	Selectman's Office	Carry Forward	Action has not yet been pursued due to limited funding and municipal resources. Carry Forward.
NF12	Evaluate the cost-effectiveness of performing a GPS study of roads in order to prioritize plowing routes, increase efficiency and efficacy of plowing efforts, and help plan evacuation routes.	DPW	Drop	DPW believes existing plow routes are acceptable.

Strategy	Description	Responsible Party	Status	Notes
NF13	Regulate development on and near slopes to prohibit construction on slopes greater than 25%	ZC	Capability	Regulated through Zoning Commission Regulations
NF14	Make copies of EOP/EAP documents available at the Town Hall for reference and public viewing.	OEM	Carry Forward with Revisions	Action is redundant with Action #16, below.
NF15	Include potential dam failure areas into the AlertNow emergency notification system.	OEM	Carry Forward with Revisions	Action will be completed during transition to Everbridge System.
NF16	Actively coordinate with the Town of Danbury to ensure that New Fairfield receives a copy of the Dam Failure Analysis and EAP for the Margerie North Pond Dam.	Selectman's Office	Carry Forward with Revision	Town has requested document from Danbury and is awaiting a response.
NF17	Encourage property owners to widen access roads such that fire trucks and other emergency vehicles can access remote locations.	Fire Department	Capability	Planning & Zoning requires this and enforces during review of new proposals.
NF18	Provide outreach programs on how to properly manage burning and campfires on private property	Fire Department	Carry Forward with Revisions	Action has not yet been pursued due to limited staff resources. Action is carried forward, revised to be the responsibility of the Emergency Manager.
NF19	Coordinate with the State of Connecticut to ensure there is adequate monitoring of fires on State Forest land.	Selectman's Office	Capability	This is performed by the Fire Department.
NF20	Coordinate with the State of Connecticut to ensure there is adequate accessibility for emergency vehicles to respond to fires on State Forest land.	Selectman's Office	Capability	Conservation Officers and State Forest are responsible for implementing these practices.
NF21	Perform prescribed burning on municipal land when and where appropriate.	Fire Department	Capability	Fire Department coordinates with the Town, and perform burning under appropriate conditions.

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	April 2, 2020	**ATTENDEES:**	Mayor Pete Bass
PROJECT:	WestCOG HMP Update		Kevin Reynolds, Deputy Fire Marshal
MMI #:	3101-22		Laura Regan, Town Planner
SUBJECT:	Town of New Milford		Alan Wilcoxson, Police Captain
LOCATION	Virtual/Remote		Jim Ferlow, Wetlands Enforcement Officer
	Zoom		Jack Healy, Public Works Director
			Noah Slovin, MMI

Noah Slovin, met with Town of New Milford representatives on April 2, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A Powerpoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format. Discussion topics are grouped below.

Critical Facilities

- A new addition was constructed for the Richmond Citizen Center. This addition has backup power, along with the rest of the building.
- The emergency generator fuel tank at the Police Department was replaced in 2019
- The emergency generator fuel tank at the Sarah Noble School is scheduled to be replaced in 2020

Facility	Address or Location	Comment	Emergency Power?	Shelter?	In 1% Annual Chance Floodplain?	Notes / Changes
New Milford Community Ambulance Corporation	1 Scovill Street	Floodprone access, Houses EOC	✓			
Richmond Citizen Center	40 Main Street	Senior Center	✓	✓		*New addition*
"The Maxx" New Milford Youth Agency	94 Railroad Street	Teen Center	✓	✓		
Police Department	49 Poplar Street		✓			*Replaced fuel tank for generator last year*
Water Witch Hose Co. No. 1	16 Lanesville Road	Fire Department				
Water Witch Hose Co. No. 2	8 Prospect Hill road	Fire Department	✓			
Northville Fire Department	355 Litchfield Road		✓			
Gaylordsville Fire Department	700 Kent Road		✓			
Town Hall	10 Main Street					
Public Works Garage	6 Youngs Field Road		✓*		✓	
Water Pollution Control Facility	123 West Street		✓		✓	
Sarah Noble School	25 Sunny Valley Road	Intermediate School	✓	✓		*Replacing fuel tank for generator here*

Development Trends

- Town staff report that there is no new development within the flood plain (FEMA Special Flood Hazard Areas, SFHA).
- In general, development is relatively minor, and residential.
- A few residential properties have been developed in Gaylordsville, along Route 7.
- Most development is built outside the floodplain; construction within the floodplain is built with appropriate mitigation measures in place (for example, the first floor is uninhabited.
- A major residential project was approved at the Bleachery property, which is located in a flood zone [previously, only commercial use had been located on the property]. The parking garage is located on the first floor, with residential space elevated above. As part of development of residential units, a new emergency crossing was built across railroad to allow access and egress if flooding blocks West Street.
- Historic properties in town are mostly located outside the floodplain.

Recent Events

- The Town saw damage during Winter Storm Alfred, Tropical Storm Irene, and Superstorm Sandy
- The 2018 microburst caused major damage throughout the southern end of New Milford. The High School roof was badly damaged. Positive pressure blew out a wall of an industrial building causing a collapse. Power was down for a week and a half in southern New Milford, and access was blocked to Pump Hill, the Candlewood Lake area, and between New Milford and Brookfield. The Town was not eligible for disaster funding because Litchfield County did not receive a disaster declaration (though adjacent Fairfield County did [as did New Haven County]).

RL Properties

- The town reported no changes to repetitive loss properties.
- Some of the repetitive loss properties are rental properties. Landlords are interested in adding more rental units to the first floor, but the Town has not allowed these activities.
- FEMA Flood Insurance Rate Maps (FIRMs) have not been updated for Litchfield County in many years (New Milford's FIRM has not been updated since 1987), and no digital FIRM (DFIRM) is available for New Milford. Staff report that this situation (having older maps and no DFIRMs) makes enforcement of FEMA requirements more difficult locally than they expect it would be if they had updated, digital maps with flood elevations presented using the NAVD88 datum (such as in Fairfield county). There appears to be a perception among some members of the community that FEMA regulations are different in an area without up-to-date mapping.

Hazards Discussion

- Brush fires occur in Town, but so far have been easily contained. There was, however, a recent fire in the State Forest that took days to fight [*referring to a 10-acre fire in Lovers Leap State Park that began on Friday, July 22, 2016 and burned through Sunday, July 24, 2016. The Water Witch Hose Company #2 from New Milford, fire crews from Gaylordsville and Northville, and 12 DEEP firefighters, teamed to extinguish the fire*]. Town staff are concerned that if a fire of this strength were to start in a remote

area, such as on Candlewood Mountain, it could be a problem for the Town in terms of its firefighting capabilities.

- There are approximately 250 buildings located within a 100-year floodplain.
- Downed trees and limbs are a problem throughout Town. There are only a couple major state roads to travel through and out of Town, and both can be impacted by debris. The Town has more than 220 miles of road, mostly tree-lined, making management a challenge. Exacerbating this is the large number of dead Ash trees in Town.
- Vulnerable areas include:
    - **Bleachery**
    - **West Street** – road floods and becomes impassible. The Bleachery is located at the end of the street.
    - **Pratt Nature Center** – highly prone to flooding. Not a top concern for the Town.
    - **Public Works Garage** – flood risk is an issue here. The Town is still considering relocating it to Pickett District Road. Relocation would allow the Town to move critical infrastructure out of a flood zone and restore the current property to open space.
    - **EOC** – The facility itself is located outside a floodplain, but after a 10- to 25-year storm event flooding cuts off all 3 roads to the site.
    - **WPCF**
    - **Route 7 from Bridge to Sunny Valley** – this is the Town's commercial corridor. It is definitely a problem area with regards to flooding, lying mostly in a SFHA.
- The Kimberly Clark building is a very large, economically critical manufacturing building (paper manufacturing). The building has a large flat roof. The company cleans its own roof of snow using snow blowers.
- The town has had ice-dam issues in the past, and it is a hazard of concern.
    - At the Bleachery Dam, ice jamming results in large chunks of ice being tilted upward as high as two-stories. Directly below the dam is a railway bridge, which is potentially at risk from these ice chinks.
    - Lovers Leap Gorge is a significant constriction on the flow of the Housatonic River, which can result in ice jam issues at the site. Water can be backed up all the way into town.
    - Ice jams are a problem upstream in Kent. They have never experienced a full breach of an ice dam upstream, which would cause significant flooding in New Milford.
- Snow drifting is sometimes a problem on Ridge Road, but less often elsewhere in Town.

<u>Capabilities</u>

- Flooding complaints go to the Wetlands Enforcement Officer, or else Public Works if it is a roadway issue. Jim Ferlow has record information about many properties that have flooding problems.
- Tamarack Road is in process of being reconstructed.
- Two or three bridges have been reconstructed in recent years.
    - Mill Street over Great Brook ("Butter Brook?")
    - Bridges over Aspetuck River
- Bridge reconstruction with permits currently under review, or at other stages of the permitting/planning process:
    - Mud Pond Road over Bull Mountain Brook
    - Gaylordsville [*no Gaylordsville Road in New Milford*]
    - Tamarack Drive

Figure 1: Mill St. Bridge Reconstruction captured by Google Satellite Imagery, 2020

  - Merryall Road over the West Aspetuck River
  - Ternesky [*location?*]
  - Upland Road over the Aspetuck River
- Tree Maintenance: the Town has two certified tree wardens, as well as its own bucket truck. They also have a contractor service that is constantly removing trees.
- The Town has a fully-staffed Public Works department that does a good job of removing snow from the roads.
- The facilities department is responsible for removing snow from the roofs of municipal buildings. In the past they have used snow blowers on large flat roofs. The largest flat roofs are those of the schools, and the school system is responsible for snow removal from its own roofs (also using snowblowers).
- The Town has an ice management program, through which municipal staff identify roads with icing problems, and implement drainage projects to address those problems. On state roads, problems are communicated to the state.

<u>Goals, Objectives, and New Actions</u>

- The town is interested in pursuing dam repair projects.

<u>Local Coordinator</u>

- Jack Healy, Public Works, will be the Local Coordinator

Status of Previous Actions

#	Description	Responsible Party	Status	Notes
Ne1	Incorporate the identified strategies of this HMP into local planning activities	MA, LC	*Capability*	*More specific recommendations will be carried forward.*
Ne2	Acquire a generator for the Town Hall and then relocate the Emergency Operations Center to the Town Hall	EMD	*Carry Forward*	*Action has not yet been completed due to funding constraints; however, finding a new EOC location – either at Town Hall or a nearby facility – is a top priority.*
Ne3	Adopt a standardized drainage policy to ensure consistency between developments	PC, ZC	*Capability*	*Town has consistent drainage policies for both municipal and private development.*
Ne4	Adopt low-impact development standards into the Zoning Regulations and Subdivision Regulations	PC, ZC	*Completed*	*Town LID standards have been incorporated into zoning and subdivision regulations.*
Ne5	Adopt a freeboard requirement of one foot for all new development or substantial improvement within the SFHA	PC, ZC	*Capability*	*Town enforces State building code, which has freeboard requirement.*
Ne6	Require the use of the FEMA Elevation Certificate to formally record elevations for compliance with the Zoning Regulations	ZC	*Carry Forward*	*Town requires Elevation Certificates on a case-by-case basis, but often obtains the same information in other manners more aligned with the building permit process. Building permits are reviewed by Building Department.* *The Town is interested in carrying this action forward.*
Ne7	Encourage town practices to employ measures to reduce stormwater flow	MA, PZ	*Completed*	*Town is implementing new MS-4 requirements locally.*
Ne8	Educate residents and property owners on ways that they can reduce stormwater runoff, and possibly adopt regulatory incentives over the long term	PZ, PW	*Capability*	*Education about runoff reduction is performed by the local done by "Watersmart" group, as well as regionally by WestCOG. MS-4 requirements call for public education as well.*

#	Description	Responsible Party	Status	Notes
Ne9	Create an Open Space Plan to prioritize future open space acquisition that encourages the creation of recreational open space within SFHAs	PC, PZ	*Completed*	*Town is currently updating its Open Space Plan through its POCD update (under its final editing stage at the time of this meeting).*
Ne10	Assist residential property owners interested in obtaining grant funding to elevate properties within SFHAs	MA	*Carry Forward with Revisions*	*The Town hired a new grant coordinator in 2019, and will explore having this kind of assistance falling under their purview. The town notes that many properties located in floodplains are significantly older structures, and elevation may be difficult.*
Ne11	Encourage property owners within the SFHA to purchase flood insurance through the NFIP and complete FEMA elevation certificates for their structures	PZ	*Drop*	*Town encourages property owners to get flood insurance on a case by case basis. Most banks require purchase of flood insurance as well, so this action may not be necessary.*
Ne12	Relocate the Public Works Garage out of the SFHA	PW	*Carry Forward*	*Progress has been impeded due to lack of funding and available space. Some planning has occurred.*
Ne13	Elevate one or more roads leading to the Ambulance facility to ensure that egress is available during the 1% annual chance flood	PW	*Carry Forward with Revisions*	*This action is not feasible.* *Might be more cost-effective to relocate facility. A new action will be developed.*
Ne14	Elevate portions of West Street to ensure that egress is maintained to the Water Pollution Control Facility during floods	PW	*Completed*	*There is a separate emergency crossing across the railroad tracks to provide access to the WPCF during floods. Elevating West Street is not necessary, nor feasible.*

#	Description	Responsible Party	Status	Notes
Ne15	Elevate portions of West Street or develop an emergency mode of egress to the Bleachery commercial development	PW	*Complete*	*The Bleachery property owner constructed an emergency access route to Anderson Road across the railroad tracks, to provide access and egress during flood events.* *Elevating West Street is not necessary, nor feasible. The parking lot and first floor of the building are about 10 feet below the 1% annual chance flood stage.*
Ne16	Widen portions of the side roads that are used to detour traffic when flooding occurs along Route 7 between Bridge Street and Sunny Valley Road	PW	*Carry Forward with Revisions*	*The Town has considered this action, and believes it is feasible to widen the road from 22 feet to 30 feet, and that this would address the challenge in question.* *At the same time, MS-4 requirements are calling to reduce the amount of paving in communities. The benefits of widening the road may not be worth the increased runoff from the increased impervious surface.* *The Town will explore this question further.*
Ne17	Elevate one of the three bridges over the Housatonic River to be unaffected by the 0.2% annual chance flood event	PW, MA	*Carry Forward with Revisions*	*The Town does not think it is feasible to elevate one of the three existing bridges. They would like to pursue constructing a new, fourth bridge, at a higher elevation than the existing bridges.* *This action is replaced with an action to conduct a feasibility study and cost estimate for construction of a fourth bridge.*
Ne18	Evaluate the potential flood mitigation effects of installing inflatable flashboards at the Bleachery Dam	PW, MA	*Completed*	*Town has completed an evaluation. Installation of these flashboards has the potential to drop river levels by 2 or 3 feet before a flood, protecting the center of town.* *Town applied for a grant in the past, from funding associated with pollution from the Pittsfield Plant, but did not receive the award.* *This action is completed, and is superseded by a new action to install inflatable flashboards.*
Ne19	Perform a drainage study along the Housatonic River to identify drainage systems that should be outfitted to prevent floodwater from flooding Route 7	PW	*Carry Forward*	*This action has not been completed, and is carried forward.* *The Town has explored installing clapper valves on drainage in this area, but found that this would make it more difficult to get water off the roads.*

#	Description	Responsible Party	Status	Notes
Ne20	Check the conveyance of all bridges and culverts based on more recent rainfall data statistics	PW	*Carry Forward with Revision*	*Town does not have the ability to perform a complete inventory. Bridges and culverts are assessed as needed, and replaced or upgraded during road reconstruction.* *This action is replaced with a new action directing the town to use Northeast Regional Climate Center rainfall statistics when sizing culvert and bridge replacements*
Ne21	Construct a slope stabilization project to prevent mudslides along Grove Street	PW	*Carry forward*	*Town hired a consultant to perform a slope stability assessment in 2011. The slope in question is all located on private land, and the owner is aware of possible issues. The Town is careful to maintain drainage infrastructure in the area to mitigate factors that may contribute to slope failure. The Town has not yet felt it to be necessary to compel the private landowner to either perform slope stabilization work, or to allow the Town to perform such work.* *The slope continues to be a concern, and so this action is carried forward.*
Ne22	Update the Zoning Regulations to require underground utilities for all new buildings regardless of zone unless such installation is deemed infeasible	ZC	*Drop*	*Town staff do not think that the benefits of a widespread requirement for burial of utilities outweighs the costs of such construction, and the impacts it would have on development. Town staff note that the electric company requires most new buildings to connect to the grid through underground wires.*
Ne23	Encourage the use of structural techniques related to wind damage mitigation in new structures	PZ	*Completed*	*The Town enforces the State Building Code, which includes wind-load requirements.*
Ne24	Require the use of structural mitigation techniques to harden new municipal critical facilities	ZC	*Drop*	*The Town does not feel believe this action is necessary relative to the risks posed by wind hazards. The State Building Code will be applied.*

#	Description	Responsible Party	Status	Notes
Ne25	Consider locations where a micro-grid could be installed	EMD	*Capability*	*A microgrid has been installed at the High School, allowing it to operate in island-mode during a widespread power outage. Town staff note that small microgrids have been installed at other locations as well. [MMI will follow up with the Town for more information]* *Additionally, the Town's 2020 POCD update recommends that the Town's energy service company evaluate electrical infrastructure in municipal buildings; one sub-task of this recommendation is that the company explore opportunities for installation of microgrids.* *A new action directing the Town to pursue any recommendations of the energy service company evaluation will be included in this HMP.*
Ne26	Evaluate critical facilities for acceptable snow loading and develop a response plan to clear roofs when necessary	BD, PW	*Capability*	*Town has sufficient capabilities and protocols in place for snow removal from roofs.*
Ne27	Enact regulations preventing new residential development in areas prone to collapse such as at the bottom of steep slopes	PC, ZC	*Drop*	*Town does not feel this action is necessary given development patterns and existing regulations.*
Ne28	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings	EMD	*Capability*	*Town has reviewed critical facility needs. The Town has the ability to relocate critical functions between different facilities if a given facility is compromised.*
Ne29	Prepare inundation mapping and EAPs for Town-owned significant hazard dams	PW	*Completed*	*Town owns one dam (United New Milford Reservoir #4 Dam, Class B). EAPs are completed for the Bleachery dam, Reservoir #4, all dams associated with Candlewood Lake, and the Bulls Bridge Powerhouse.*
Ne30	Utilize inundation mapping to identify properties that may be affected and conduct outreach to ensure contact information is in Everbridge system	EMD, PZ	*Completed*	*The Town has been completing this action and was almost finished at the time of the planning meeting.*

#	Description	Responsible Party	Status	Notes
Ne31	Enact a Flood and Erosion Control Board in order to be eligible for funding to repair municipally-owned dams	MA	*Drop*	*There is only one municipally owned dam in New Milford. Town does not believe this action is necessary given the limited needs.*
Ne32	Identify and implement projects to increase fire-fighting access to areas at increased risk for wildfire	EMD	*Carry Forward with Revision*	*Town has considered this action and is concerned that increasing accessibility to remote areas for firefighting purpose will also increase access for ATV-riders and other recreational purposes, which may result in an increased risk of wildfires being initiated in these locations. Additionally, most forested areas in Town are located on private land, making establishment of access routes more difficult.* *This action is dropped and replaced with a new action to address the risk of remote wildfires.*

New Actions

The Town indicated interest in participating in the Community Rating System program.

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	April 2, 2020	**ATTENDEES:**	Rob Sibley, Deputy Director of Planning
PROJECT:	WestCOG HMP Update		Victoria Brudz, MMI
MMI #:	3101-22		
SUBJECT:	Town of Newtown		
LOCATION	Virtual/Remote		
	Zoom		

Victoria Brudz met with Town of Newtown representative on April 2, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A PowerPoint presentation was used to explain the planning process and guide the meeting. Discussion topics are grouped below.

Critical Facilities

- The town has a new community center located at 8 Simpson Street.
- A New Sandy Hook School was constructed at 12 Dickinson Drive
- The High School remains the primary shelter, however, there is consideration for moving this to the new community center.
- Most facilities in town have standby power.

Development Trends

- Recent trends have included in roughly 100 condo/townhouse units in 2019; these are not age restricted units.
- 2019 was also one of busiest year for single family home construction since 2007
- An estimated 400 condo/townhouse units are anticipated to be constructed within the next 5 to 10 years.

Recent Events

- Since 2010 there have been 7 emergency declarations in the town. Often the most challenging aspect of these events have been downed trees and associated power loss.
- Some neighborhoods were without power for almost 30 days after a recent event. This is attributed to the lack of redundancy in the system; "one line in, one line out".
- The May 2018 microburst resulted in downed trees and outages. A town shelter was open and housed less than 5 people. Some roads were impassible for days, and emergency services could not access some areas for 72 hours.
- There were minimal impacts from the September 2018 event.

RL Properties

- There are 3 documented RL properties in town.

- The property on Todds Road is currently vacant, with no building on the property. The other two properties, both on Housatonic Drive, are also of minimal concern. One property owner moved the building away from the flood hazard, and the other property is currently under foreclosure.

Hazards Discussion

- Flooding is a concern near the mills along Glenn Road. One mill houses a hydro company which resulted in a flood in the past due to malfunctioning equipment.
- The town would like to see action taken here consisting of dam removal, not dam replacement.
- Windstorms are one of the largest concerns due to the risk of downed trees and outages.
- Most facilities that would have been impacted by heavy snow were in fact impacted in 2011.
- No specific areas of risk regarding snow or ice removal or drifts.

Capabilities

- The town regularly and successfully tracks events on Crisis Track.
- Multiple major bridge upgrades have recently been executed including:
    - Turkey Hill Road
    - Walnut Tree Hill Road
    - Toddy Hill Road
- The town maintains a good relationship with Eversource. The town often sees downed tree removal soon after an event because the Eversource tree removal contractor stages in town after a storm and must clear their way to get to nearby communities.
- Currently, the town is developing a system to monitor the capability and capacity of the drainage system.
- There is an underwater search and rescue team that can be deployed when necessary for evacuations or rescues.
- Town evacuation routes were recently updated.
- The town maintains strong flood zone regulations including a 3 foot freeboard requirement for residential development and a 10 foot freeboard requirement for commercial. Stringent requirements tend to deter major development in areas of flood risk.

Goals, Objectives, and New Actions

- The town is evaluating possibly designating the new community center as the new primary shelter.
- The town wants to continue working on moving utilities underground, especially in the riverside communities which are often the most impacted by outages.
- Work to complete the Meadow Brook Road bridge replacement.
- The town wants to address drainage concerns in the 5 lakeside communities.
- The town would like to target future acquisitions within the Halfway River watershed.

Local Coordinator

- The Deputy Director of Planning will be the local coordinator.

Status of Previous Actions

#	Description	Responsible Party	Status	Notes
1	Utilize the Code RED emergency notification system to its fullest capabilities	EMS	Complete	Capability – town uses this system regularly
2	Encourage residents to purchase and use NOAA weather radios with alarm features	EMS	Remove	Has not been addressed, priorities have shifted to other technology. Omit action
3	Disseminate informational pamphlets regarding natural hazards to public locations	EMS	Carry forward with revision	Condense #3, 4, 5, and 6 (and other outreach) town is continuously conducting outreach
4	Review potential evacuation routes to ensure timely migration of people seeking shelter in all areas of town.	EMS	Remove	Review was conducted last fall
5	Post a list of town sheltering facilities on the Town Hall and on the Town's website so residents can be prepared during a hazard event	EMS	Remove	On the website – evacuation routes are part of GIS layer system and need to be shared with WestCOG
6	Add pages to the town website dedicated to citizen education and preparation for hazard events	EMS	Carry forward with revision	Condense outreach activities
7	Pursue improved communications with the Town of Oxford and First Light regarding emergency response along Lake Zoar.	EMS	Complete	Previous action had to do with cell towers and communications, entire emergency communication system is being replaced, Newtown is part of annual planning process with First Light
8	Prepare status memo that describes objectives and policies from this hazard mitigation plan that may be considered for incorporation into the Plan of Conservation and Development when it is updated in 2024; and provide the memo to the Planning and Zoning Commission.	P&Z	Carry Forward	Over next few years, moving into POCD phase, 2024,
9	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z	Complete; now a capability	Part of engineers' stormwater report
10	Encourage property owners to purchase flood insurance under the NFIP.	EMS	Ongoing	Educational – part of CRS outreach

#	Description	Responsible Party	Status	Notes
11	Conduct drainage evaluations along Turkey Hill Road, Nearbrook Drive, Meadow Brook Road and in the vicinity of the five lakeside communities to determine appropriate measures for improved drainage and flood mitigation.	PW	Portions are complete	Nearbrook and Turkey Hill are complete – Meadow Brook is underway, and needs to be approved by army corps. Some projects in the five lakeside communities some have been completed . new action: address remaining issues in 5 lakeside communities
12	Pursue elevation of residential properties that suffer flood damage. Properties may be classified as repetitive loss or not classified as repetitive loss, but RLPs should be prioritized.	First Selectman	Remove	The town has received numerous elevation certificates due to changing regulations. The RL properties are not candidates for elevation currently, and the overall need for elevation is minimal.
13	Compile a checklist that cross-references the bylaws, regulations, and codes related to flood damage prevention that may be applicable to a proposed project and make this list available to potential applicants.	P&Z	Carry over	
14	Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques (Section 3.6.2) to private homeowners and businesses with flooding problems.	Building Official	Ongoing	Part of CRS
15	Hold workshops involving all Town departments to provide training for dealing with widespread flooding damage.	P&Z	Carry forward with revision	Develop and hold and annual workshop with town departments to provide training for dealing with widespread flooding damage.
16	Evaluate scour damage along Pond Brook and develop mitigation measures		Carry over	Still need to continue – some sections of Pond Brook are dirt road, suffers badly during storms. Not achieved due to lack of funding.
17	Develop a priority list of areas identified (during stream reconnaissance work) that are in need of stabilization and implement corrective actions	P&Z	Carry over	List has not been developed yet. The responsible party may need to be shifted.
18	Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	First Selectman		Continued – New action Acquisitions focused within the Halfway River watershed. Least developed, highest quality river in town.
19	Consider conducting a town wide drainage analysis to determine appropriate mitigation measures such as stormwater retrofits.	PW	Ongoing	As part of MS4 only for critical areas - capability

#	Description	Responsible Party	Status	Notes
20	Review culvert conveyances based on Northeast Regional Climate Center guidance for increasing precipitation [regional analysis of rainfall extremes (http://precip.eas.cornell.edu/) for engineering design]	PW	Ongoing	Working on this system
21	Develop a plan to stabilize low-lying roads, especially in the lakeside communities	PW	Carry over	Ownership is changing – new legal guidance, carry forward
22	Complete necessary improvements of town bridges. Specifically, Turkey Hill Bridge and Meadow Brook Bridge which are due for replacement.	PW	Carry over with revision	Complete –Meadow Brook bridge is not finished – Carry over Meadowbrook improvements
23	Ensure adequate barricades are available to block flooded streets in floodprone areas	EMS	Complete	Capability
24	Continue town wide tree limb inspection and maintenance programs to ensure that the potential for downed power lines is diminished.	PW	ongoing	Capability
25	Pursue funding to place utilities underground in existing developed areas	P&Z	Ongoing	
26	The Building Department should provide literature regarding appropriate design standards for wind.	Building Official, EMS	Complete	Capability; Town administers the State Building Code
27	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	Building Official, EMS	Complete	
28	Improve communications with CL&P, particularly with respect to trimming times and locations within Newtown.	PW	Complete	An appropriate relationship has been maintained
29	Work with CL&P to determine the feasibility of placing non-conducting steel cables above power lines to protect them from falling branches and trees.	PW	Carry over	

#	Description	Responsible Party	Status	Notes
30	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.		Remove	Not concern – omit
31	Provide information on the dangers of cold-related hazards to people and property.		Ongoing	Educational – capability
32	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EMS,PW	Complete	Complete online -
33	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMS	Ongoing	Capability
34	Address icing along Route 53 through the development and implementation of appropriate drainage projects.	PW	Carry over with revisions	Icy conditions prevent resident and emergency access during storm events; one residence is extraordinarily difficult to get to during storms. An evaluation needs to be done to identify and reduce the risk of icing
35	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Complete	Capability
36	Consider the protection/hardening of utilities to minimize power outages during storm events	PW	Carry over	Merge with action #29 to address electric system vulnerabilities.
37	Consider preventing new residential development in areas prone to collapse.	P&Z	Remove	The town reviews this on a case by case basis.
38	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	EMS,PW	Complete	This is addressed for all storms/events.
39	The town may consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMS,PW	Complete	Town has developed a redundant system

#	Description	Responsible Party	Status	Notes
40	File EOPs/EAPs with town departments and emergency personnel	EMS	Complete	
41	Include dam failure inundation areas in the CodeRED emergency notification system contact database	EMS	Complete	
42	Work with the owner of 27 Glen Road Dam to determine the feasibility of removing the dam to reduce the amount of water and material behind it.	EMS,PW	Carry over	Continuous effort
43	Continue to require the installation of fire protection water in new developments where municipal water service is unavailable, and sprinkler systems where access is limited for fire apparatus.	P&Z	Complete	Capability
44	Provide outreach programs on how to properly manage burning and campfires on private property.	EMS	Complete	Capability
45	Revise and enhance the town's website concerning local regulatory requirements concerning Open Burning.	P&Z, Fire Department	Complete	Capability
46	Patrol Town-owned open space and parks to prevent unauthorized campfires.	Fire Department	Ongoing	Capability
47	The Fire Departments should coordinate with Aquarion Water Company to identify areas where fire-fighting capacity may be limited due to lack of water pressure or storage.	Fire Department	Complete	

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	April 7, 2020	**ATTENDEES:**	Michele DeLuca, Deputy EMD
PROJECT:	WestCOG HMP Update		Vanessa Valadares, Principal Engineer
MMI #:	3101-22		Chris Torre, Superintendent of Operations
SUBJECT:	City of Norwalk		Mike Yeosock, Assistant Director of Transportation
LOCATION	Virtual/Remote Zoom		Victoria Brudz, MMI

Victoria Brudz met with City of Norwalk representatives on April 7, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A PowerPoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format. Discussion topics are grouped below.

Critical Facilities

- There have been no major changes to critical facilities.
- There is standby power at the following:
    - 2 shelters
    - City Hall
    - WWTP
    - Public Works
    - Sanitary Sewer Pump Stations

Development Trends

- Recent development has consisted primarily of multi-use (or mixed-use) apartments.
- There is an estimated 700 to 1,000 units being constructed in the near future within the areas of the Norwalk train station and Glover Avenue.

Recent Events

- The May 2018 events did not impact Norwalk to a great extent.
- Flooding events in 2018 revealed a few infrastructural inadequacies. The City was about to do some minor repairs to these assets.
- Recent high tides, or "king tides", have caused some minor flooding, however, the water does tend to recede quickly.
- The longest power outage in recent history was likely Sandy, which lasted about 7 days in some neighborhoods.
- The city has experienced rolling brownouts during the summer months; however, this occurrence has declined over the past few years.

RL Properties

- The city has applied for funds for residence mitigation and has been both successful and unsuccessful in securing funds. Issues have occurred when property owners deviate from their initial plans, ultimately jeopardizing the funds for other applicants.
- City staff is researching ways to improve this process on their end as there have been challenges with homeowner compliance.
- Property acquisitions, especially in coastal areas, is likely not an option the city would pursue.

Hazards Discussion

- Water Street, including some surrounding areas, experiences flooding during high water events.
- There is also occasional flooding in the Taylor Pond area. While the city has made upgrades to pipes in the area which has alleviated some flooding, there is concern as to what this area will look like under future elevated sea levels.
- There were no specific areas of concern regarding snow drifting or removal, icing, or windstorms.
- Two districts have electric assets underground.

Capabilities

- Flooding complaints are entered into Cityworks, an asset management software, which allows the city to update a map of flooding concerns.
- The city has hired a consultant to conduct flood mitigation strategy evaluations in two areas in the city, and to also conduct an assessment on bridges and culverts that are at elevations under 20 feet to assess their condition and identify those that may need repairs or upgrades.
- The city is continuously addressing drainage concerns when re-pavement projects are done.
- The city does have a tree warden and a budget which allows for equipment and machinery. The warden also maintains a tree asset identification system which identifies trees as they are addressed; this system helps to track the current state of the city's tree canopy.
- The City has available resources online including flood maps, along with helpful resources and links as hurricane season approaches. Some of these resources include low and no cost mitigation strategies.

Goals, Objectives, and New Actions

- The city would like to include more information for residents on the process and importance of elevation projects to reduce flood risks.
- Seek funding for a physical flood alert system.

Local Coordinator

- The Deputy EMD, Principal Engineer, Superintendent of Operations, and Assistant Director of Transportation will be the local coordinators.

Status of Previous Actions

#	Description	Responsible Party	Status	Notes
1	Provide adequate back-up generators at sanitary sewer pumping stations (in progress)	DPW	Complete	
2	Provide adequate back-up generators at storm water pumping stations	DPW	Carry Forward	This has been an ongoing effort. Backup power has not been installed at all locations due to time and planning constraints.
3	Provide adequate back-up generators at shelters.	EMD	Complete	Both shelters have standby power.
4	Ensure the ability of Departments to function beyond first 24 hours by executing pre-positioned contracts for logistical support.	OEM Purchasing/ Finance	Carry Forward with Revisions	The Deputy EMD believes there is room for progress here and would like to evaluate the needs and capabilities.
5	Encourage development (especially higher density) to be located outside flood-prone areas wherever possible, including increased setbacks to account for sea level rise .	P&Z		P&Z needs to weigh in on the status of this action.
6	Improve coordination with CL&P for emergency response efforts	OEM, CL&P	Carry Forward with Revisions	Add “PW” to responsible party. Also, there is a lack of consistency with Eversource, not only coordination. The city would like to focus on improving both consistency of communication, and coordination.
7	Work to identify a suitable site to store DPW communications and vehicles out of harm’s way, during flood events.	OEM, DPW, WPCA	Carry Forward	The city has inquired about several sites; however, none have been suitable thus far.
8	Request that FEMA and Army Corps of Engineers reevaluate the Flood Insurance Rate studies for riverine sections.	P&Z, ZEO		P&Z needs to weigh in on the status of this action.
9	Conduct mitigation at WWTP/DPW center.	DPW	Carry Forward with Revisions	Flooding is a concern at the WWTP; however, the city is currently unsure of what type of mitigation action is appropriate. Modify this action to include an evaluation of the needs of the WWTP. Omit the DPW as the risk does not require a mitigation evaluation.

#	Description	Responsible Party	Status	Notes
10	Evaluate municipalities' sheltering and evacuation needs and how these needs can be met through local and regional sheltering concepts.	OEM	Carry Forward with Revisions	The city has developed regional sheltering plans and addressed those needs; however, evacuation concerns need to be addressed. When evacuation actions are presented to the community, the city sees pushback. Revise this action to include more education and outreach on evacuation procedures versus signage and high water marks.
11	Provide outreach and education to all residents of their vulnerabilities to natural hazards. Ensure outreach is targeted to those with limited English proficiency, and those with visual/auditory impairments. Including preparedness, mitigation and recovery	OEM	Carry Forward with Revision	The city works closely with non-profit agencies and would like to modify education and outreach to include identifying, and taking advantage of, opportunities to present hazard mitigation information through these non-profit organizations.
12	Increase harbor shore communication and create an individual resiliency plan that assists in making at-risk residents more resilient to natural hazards. For example, teaching residents how to do a flood audit to protect/safeguard against flooding	OEM, Residents	Carry Forward with Revisions	Incorporate action into #11, non-profit educational opportunities.
13	Build a barrier system to prevent debris associated with flooding from impacting King Industries and associated chemical storage	Private (King Chemical)		The city is unsure of any progress on this and will follow up with King Industries.
14	Raise at-risk pump stations to make them more resilient to natural hazards.	DPW, OEM	Carry Forward with Revisions	All sanitary pump stations have elevated generators. The city is currently working to elevate Keeler Brook pump station; however, time and planning has prevented the elevation of remaining stations.
15	Raise and expand levee protecting Wastewater Treatment Plant.	DPW, OEM	Remove	This addresses the above action #9

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MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	March 31, 2020	**ATTENDEES:**	Julia Pemberton, First Selectman
PROJECT:	WestCOG HMP Update		Stephen Schnell, Police Communications Supervisor
MMI #:	3101-22		Jeff Hanson, Public Works Director
SUBJECT:	Town of Redding		Nicole Sullivan, WestCOG
LOCATION	Virtual/Remote		Michael Towle, WestCOG
	Zoom		Noah Slovin MMI

Noah Slovin, Nicole Sullivan, and Michael Towle met with Town of Redding representatives on March 31, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A Powerpoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format. Discussion topics are grouped below.

Critical Facilities

- Few changes in critical facilities were noted
- Most critical facilities have emergency power
- The Joel Barlow High School and the John Read Middle School continue to be the town's primary and back-up emergency shelters, respectively.
- The Police Department continues to be the EOC.
- Town staff added the Meadow Ridge Facility to the list of critical facilities. This is an elderly housing complex located in the Georgetown area, and is relatively isolated. The facility includes a senior living center (does not have a generator), a long term care facility (has an emergency generator) and an assisted living center (has a generator). The Meadow Ridge Facility is located on top of hill, and does not have any direct flood risk. Access to the site during or following a disaster is a concern due to its relative isolation – roads may be blocked by flooding or debris. During past storms, the facility has opened its doors for town residents to go to as a warming center, to use the showers, etc. The Town has been discussing with Eversource whether the facility is considered critical with regards to power restoration following an outage.

Facility	Address or Location	Comment	Emergency Power?	Shelter?	In 1% Annual Chance Floodplain?	Notes / Changes
Redding Community Center	37 Lonetown Road	Warming Center	✓		No	
Joel Barlow High School	100 Black Rock Turnpike	Primary Shelter	✓	✓	No	
John Read Middle School	486 Redding Road	Back-up overnight shelter	✓	✓	Yes	
Police Department and EOC	96 Hill Road	Emergency Operations Center (EOC)	✓		No	
Town Hall	100 Hill Road	Town Hall	✓		No	

Facility	Address or Location	Comment	Emergency Power?	Shelter?	In 1% Annual Chance Floodplain?	Notes / Changes
Sewage Facility / Wastewater Treatment Plant	19 North Main Street		✓		No	
Highway Garage	28 Great Oak Ln	Emergency Assistance	✓	✓	No	
Georgetown Fire Department	6 Portland Avenue	Emergency Response	✓		No	
Redding Ridge Fire Dept and EMS Company – Fire District #1	186 Black Rock Turnpike	Emergency Response	✓		No	
West Redding Fire Department – Fire District #2	306 Umpawaug Road	Emergency Response	✓		No	
Town Cell Towers	Multiple locations	Communications			No	
Meadow Ridge Facility	*Georgetown*	*Elderly Housing Warming / Comfort Station*	*partial*		*Access Routes*	*Senior living Long term care assisted living Discussing with Eversource about whether it's critical re: power.*

Development Trends

- Development and redevelopment are focused around the Branchville TOD in Georgetown. The TOD area is located along the Norwalk River where a SFHA and floodway are mapped. Increasing development density in this area will need to be carefully balanced with the flood risk.
- The Gilbert and Bennett site continues to be unoccupied. The Town is currently waiting on a court decision on whether or not to foreclose on the property, allowing the Town to acquire it. It is expected that the foreclosure will go through, but the decision is delayed due to coronavirus closures. The site is a brownfield, and poses a risk of contamination to the river if flooded; it is in the floodplain. The first step to any redevelopment following acquisition would be to raise the river walls to protect the site from flooding. Remediation of the site would follow. The town anticipates that acquisition, remediation, and redevelopment of the site will require significant financial support through grants. This is a National Register historic site.
- No other significant development is projected in town.

Recent Events

- Town staff had no comments on recent events

RL Properties

- There are no repetitive loss properties in town.

Hazards Discussion

- Georgetown is at risk from flooding from the Norwalk River

- West Redding near the Danbury line goes through a floodplain. The river hasn't run over its banks but the town gets flooding there during major rain events. There is no plan to mitigate in that area.
- Downed trees and wires have been a big challenge in previous storms, and continue to be a major concern for the town. Putting power lines underground would help, but the town does not think there is any chance that Eversource would facilitate that.
- The town sees small brush fires every year. None have caused any property damage.
- There is no public water system available in the area of the Redding Elementary School. This is an area of particular concern – if there were fire at the school the Town would not be able to provide enough water pressure to protect the structure. Under current conditions the town would pull water directly out of the pond across the way.
- CT Route 58 near Putnam Park Road continues to be a flood prone area
- CT Route 53 and Umpawaug Road continues to be a flood prone area; however, the bridge has been rebuilt by the state at a higher elevation. The Town hasn't experienced a major flood event since the bridge was rebuilt, but they think that the raised elevation will help mitigate some flooding. Water formerly inundated the road at this site from time to time. The Town noted that the low-lying areas on either side of the bridge continue to be low lying, and so at risk from flooding.
- John Read Middle School – a mile south of Umpawaug Road – is partly located in a flood zone, and the property experiences flooding frequently. Additionally, the road to the school becomes impassible. This building is a backup emergency shelter.
- Chestnut Woods Road – water runs over the road often.
- Beaver dams are a big concern in town. Particular problem locations are around Topstone Road, Marchant Road, and Chestnut Road. These beaver dams cause a lot of drainage issues and damage, but at this point damage is not to private property.
- The Gilbert and Bennett site is on the National Register of Historic Places. There is also a Church in Georgetown on the National Register – it is not at risk from flooding.

Capabilities

- Redding's firefighting capabilities are strong
- CT Route 53 bridge has been rebuilt at a higher elevation
- The town has a robust road reconstruction plan. The town is always working through a list of roads to redo, and drainage is redone when the roads are redone. Culverts are upgraded as needed.
- The following table summarizes recent and planned road/bridge/culvert repairs:

Road	Notes
Stepnee Road	Bridge Redone in 2015
Bald Rock Road	Completed
Diamond Hill Road	Completed
Poverty Hollow Road	Partial – haven't done whole road yet
Station Road	Planned for summer 2020
Marchant Road	No progress yet
Simpaug Turnpike	Just south of post office. Not yet.
Topstone Road	Two low-lying areas on this road: one is dirt road, one is paved. Water often runs over the paved section of road. It is an ongoing project to address.

- The town has an Open Space Manager.

- The Open Space Manager keeps an eye on beaver dams. When they start impacting rivers, DPW staff go around and try to break up or remove dams as possible. They use machinery and also break up dams by hand.
- Town has a tree warden. Tree maintenance is a huge problem. The town's tree maintenance budget does not come anywhere near to what needs to be done. It is a very rural town, and there are many dead Ash trees all around town that are fall risks. The DPW is chipping away little by little, but doesn't have the budget to address everything, including many trees that need to be removed.
- Snow removal capabilities seem to be strong. There hasn't been a winter with major snow accumulation in a couple of years, so it is difficult to judge. Snow on the roofs of critical facilities has not been an issue – there is no snow-removal from roofs plan.
- Redding is currently in the process of rewriting the town EOP to conform with the new State template. The EOP will be in a new digital format.

Goals, Objectives, and New Actions

- Town plans to install dry hydrants in the pond across from Redding Elementary School.

Local Coordinator

- The Police Communications Supervisor and the First Selectman will be the local coordinators.

Status of Previous Actions

#	Title	Description	Responsible Party	Status	Notes
Re1	CT Alert	Utilize the CT Alert emergency notification system to its fullest capabilities	EMD	Capability	*Town pushes out information to get as many residents as possible to sign up. They have been using the CT Alert system during the Covid-19 crisis, and signing more people up. Currently the system has 6,300 contacts in Town. Alerts can be sent by voice, text, email, and social media.* *Town will continue educating residents on use.*
Re2	NOAA Weather Radios	Encourage residents to purchase and use NOAA weather radios with alarm features	EMD	Capability	*Emergency communication equipment is on the list of emergency supplies and materials to have on hand, put out through the Health Department on the town webpage. With changing technology, a NOAA radio might not be the specific recommendation, but the Town does have general recommendations about communication tools.*
Re3	Evacuation Routes	Review potential evacuation routes to ensure timely migration of people seeking shelters.	EMD	Capability	*Town is aware of areas that get flooded and may be cut off. The evacuation routes the town has established are sufficient.*
Re4	Hazards on Town Website	Add pages to the Town website ~~(www.Reddingct.gov)~~ dedicated to citizen education and preparation for hazard events.	EMD	Capability	*The town web page is updated frequently. www.Townofreddingct.org There is an emergency alert system through the webpage. The town also has a very active town social media presence with regards to emergency alerts.* *The Health Department puts out information to remind people where to find hazard information on the website.*
Re5	Hazards into POCD	Incorporate elements of the hazard mitigation plan into the Plan of Conservation and Development when it is updated in 2018.	P&Z	Complete	*The POCD is virtually complete), and just has to go to public hearing and be adopted (as of April, 2020). Hazards are incorporated into the document.*
Re6	Stormwater Retention / Detention	Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream of a project and provide a design for the appropriate alternative.	P&Z, ZEO	Capability	*There are requirements related to runoff in new development.*

#	Title	Description	Responsible Party	Status	Notes
Re7	Saugatuck River Drainage Analysis	Conduct a drainage analysis of the Saugatuck River drainage basin, with a focus on Route 53 and Umpawaug Road, Long Ridge Road and Simpaug Turnpike, to determine potential flood reduction methods.	PW	*Carry Forward*	*This action has not yet been completed. The intersection (Long Ridge / Side Cut / Simpaug) has recently been redone, and a portion of the intersection was raised (although not for hazard mitigation purposes) and drainage improvements were made.* *This action is carried forward*
Re8	Little River Drainage Analysis	Evaluate drainage issues along the Little River in the vicinity of Route 58 and Putnam Park Road to determine potential flood reduction methods.	PW	*Carry Forward with Revisions*	*No action has been taken on this strategy. There is a beaver dam problem at this site. This site is the responsibility of the State DOT; there are no town roads or facilities in that area. The road was just repaved about 2 years ago.* *Carry forward with revision: request action from state.*
Re9	Flood Insurance	Encourage property owners to purchase flood insurance under the NFIP.	ZEO	Capability	*No specific action has been taken*
Re10	Community Rating System	Consider enrolling in the Community Rating System (CRS)	ZEO	?	*Talk to Aimee Pardee (Zoning and Wetlands Enforcement zoning@townofreddingct.org)*
Re11	Flood Mitigation Outreach	Provide outreach regarding home elevation and relocation, flood barriers, dry floodproofing, wet floodproofing, and other home improvement techniques to private homeowners and businesses with flooding problems	Building Official, ZEO	Drop	*The town does not feel this action is necessary, as there are no homes or businesses with specific known flood problems*
Re12	Municipal Training	Ensure that the appropriate municipal personnel are trained in flood prevention methods ~~(note that Redding is a CAFM member)~~	ZEO, EMD	?	*Talk to Aimee Pardee (Zoning and Wetlands Enforcement zoning@townofreddingct.org)* *In the past, some Redding staff were members of CAFM; this is no longer the case.*
Re13	Conservation	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents.	First Selectman	Capability	*This is a capability.* *Since the previous plan, the Town acquired the Mary Ann Guitar Preserve to maintain as open space within the Centennial Watershed State Forest. The acquisition was performed with money from an OSWA grant, Aquarion, and the Redding Land Trust. The site is bordered by 107, 53, Newtown turnpike. It was previously known as the Biehn Property.*

#	Title	Description	Responsible Party	Status	Notes
Re14	Review Culvert Capacities	Review culvert conveyances based on existing hydrology and Northeast Regional Climate Center guidance.	PW	?	*Talk to Aimee Pardee (Zoning and Wetlands Enforcement zoning@townofreddingct.org)*
Re15	Encourage CT DOT to Remediate Undersized Culverts	Several undersized culverts are located along State roads. Redding could encourage the CT DOT to remediate these areas.	PW		*The Town has a good relationship with the local DOT staff, and calls them directly when issues are observed.* *In recent years, Rt 53, Rt 107, and half of Rt 58 have been redone by the state. All of the culverts would have been improved during that work.* *Rt 58 from Cross Highway to the Bethel town line has not been redone.*
Re16	Upgrade Culverts on Select Roads	Upgrade drainage and culverts: Bald Rock Road Diamond Hill Road Poverty Hollow Road Station Road Marchant Road Simpaug Turnpike Topstone Road	PW	Carry Forward with Revision	*Stepnee Road, Bald Rock Road, and Diamond Hill Road have been completed. Progress has been made on Poverty Hollow Road, but road reconstruction is not yet complete.* *Poverty Hollow Road, Station Road, Marchant Road, Simpaug Turnpike, and Topstone Road are carried forward.*
Re17	Route 58 and Putnam Park Road Evaluation	Evaluate flooding at the intersection CT Route 58 and Putnam Park Road which may impact emergency vehicles, school buses, and the general public to ensure adequate access to the Hospital in Danbury.	PW, EMS	Drop	*Town has not seen significant flooding at this site in 9 years, and believes that drainage work completed on Putnam Park Road may have addressed this issue. Additionally, there are multiple routes around this intersection, so flooding would not significantly hinder access.*
Re18	Tree Limb Inspection and Maintenance	Continue tree limb inspection and maintenance programs to ensure that the potential for downed power lines is diminished.	PW	Capability	*This is a capability, though the town wishes to increase its tree maintenance capabilities.* *Following Irene and Superstorm Sandy, it was impossible to travel anywhere due to downed trees. Rt 53 and Rt 58 are the main corridors to Danbury. EMS departments follow same routes every time, but trees fell down and blocked all state roads. In a major storm, if it knocked down trees, that would severely impact access to hospital.* *The town notes that it is the state's responsibility to clear trees. An action related to tree clearing may be advisable.*

#	Title	Description	Responsible Party	Status	Notes
Re19	Power Line Hardening	Work with CL&P to determine the feasibility of placing non-conducting steel cable above the power lines	PW	Drop	*Town does not think this is a realistic action.*
Re20	Literature for Design Standards	The Building Department should provide literature regarding appropriate design standards for wind.	Building Official	Capability	*Building department addresses wind design standards on a case by case basis.* *As an example, somebody wanted to put a prefabricated structure on their property, but the building official wouldn't allow it because it didn't meet wind standards. The official brought in information about wind loads to educate the individual in question.*
Re21	Structural Wind Mitigation	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	Building Official, EMS	?	*MMI will follow up about this action*
Re22	Snow Removal Plan	Develop a plan to prioritize snow removal from the roof of critical facilities and other municipal buildings each winter. Ensure adequate funding is available in the Town budget for this purpose.	EMD	Drop	*This hasn't been an issue.*
Re23	Information on Cold-Related Hazards	Provide information on the dangers of cold-related hazards to people and property.	EMD	Capability	*Pushed out through town website and health department, social media*
Re24	Snow Plowing Routes	Consider posting the snow plowing routes in Town buildings each winter to increase public awareness.	EMS, PW	Drop	*There are 10 plow routes in town. The routes start in the center and spiral out.* *In the past the DPW has sent out information to the public explaining prioritization without providing specifics.* *Town does not feel this is necessary.*

#	Title	Description	Responsible Party	Status	Notes
Re25	Contingency Access Plans	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMD	Capability	*DPW and the fire departments (which also operate EMS) have a good relationship. In big winter storms the highway department will have plows assist responding vehicles.*
Re26	Literature for Icing Mitigation	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	?	*MMI will follow up with the building department about this action*
Re27	Route 53 Drainage Improvements	Identify drainage improvements that may reduce icing along Route 53.	PW	Drop	*This is a state road and a state responsibility. Town has a good relationship with State DOT staff. Action not needed.*
Re28	Backup Facilities for Earthquakes	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	EMD, PW	Capability	*Town is going through this now because of the COVID-19 crisis. They have had to improve the capabilities for people to work remotely.* *Nothing specific to earthquakes has been completed, or is deemed necessary.*
Re29	Harden Critical Facilities	The town may consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMD, PW	Drop	*Hard records are all being scanned and going onto the cloud, and all electronic records are backed up in cloud. Physical bracing is not necessary.*
Re30	Dam Failure Areas in CT Alert	Include dam failure inundation areas in the CT Alert emergency notification system contact database	EMD	Drop	*Town can isolate specific areas for notification through CT Alert. They do not think preemptively setting areas in dam failure zones is necessary.*
Re31	Dam EAPs	File EOPs/EAPs with town departments and emergency personnel	EMD	Capability	*MMI will follow up about this action.*

#	Title	Description	Responsible Party	Status	Notes
Re32	Topstone Dam	Coordinate with the owner of Topstone Dam to ensure scour issues are addressed, in order to minimize impacts to Topstone Road.	EMD	*Carry Forward*	*This has not yet been completed. An engineering study was done several years ago, and the state has the dam listed as a problem, but there are significant obstacles for getting to the dam to perform work. Building a road would cost half a million dollars, and the dam repair cost would be a small fraction of that. The town is currently considering reducing water level in the impoundment and driving equipment to the dam over the beach during the off season.* *Carry Forward.*
Re33	Beaver-Impacted Culverts	Consider replacing culverts frequently flooded by beavers with free span bridges.	PW	Drop	*The town does not think this action is feasible. They will focus on beaver control measures and upgrading culverts as needed.*
Re34	Beaver Management Plan	Develop a long-term beaver management plan	PW	Drop	*Town has a standard procedure for dealing with beavers, and does not need a formal long term plan. The town breaks up the dams as needed, and is aware of problem locations. Beaver dams are not endangering homes or roads, just causing occasional nuisance flooding.*
Re35	Beaver Deterrents	Consider the use of beaver deterrent devices such as beaver stops, beaver bafflers or beaver deceivers.	PW	Carry Forward	*The town has not yet used such measures.* *Carry Forward*
Re36	Coordinate with Water Company	Coordinate with Aquarion Water Company to identify areas where fire-fighting capacity may be limited due to lack of water pressure or storage.	Fire Department	Carry Forward	*Town plans to install dry hydrants at the pond across from the Elementary School (see above).*
Re37	Open Burning Requirements on Website	Revise and enhance the town's website concerning the local regulatory requirements concerning open burning.	Fire Department	Complete	*Requirements are listed on website, and the names of fire marshals to contact for more information are given.*
Re38	Expand Public Water Service	Increase the availability of water sources in the town's high risk areas	Fire Department	Carry Forward	*Elementary School (see above)*

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	6/3/2020	**ATTENDEES**	Rudy Marconi, First Selectman
PROJECT:	WestCOG HMP Update		Dick Aarons, EMD
MMI #:	3101-22		Charlie Fisher, Town Engineer
SUBJECT:	Town of Ridgefield		David Murphy, PE, CFM, Milone & MacBroom, Inc.
LOCATION	Virtual/Remote		
	Zoom		

David Murphy met with Town of Ridgefield representatives on June 3, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. Attendees followed an open discussion format that focused on updates to critical facilities and mitigation actions.

Critical Facilities

Meeting attendees discussed the critical facilities list to be included in the HMP. The table below lists critical facilities included in the previous version of the Ridgefield HMP. The previous list is applicable for the updated plan, although some changes in standby power have occurred. Laurel Ridge and Ridgefield Crossing have standby power and are also priority power restoration customers with Eversource. The Town Hall has a generator. The only major building that requires a generator is the Town-owned Venus Building which is used for municipal services.

Facility	Address or Location	Comment	Emergency Power?	Shelter?	In 1% Annual Chance Floodplain?
Emergency Operations Center	Yanity Gymnasium 60 Prospect Street	EOC; shelter for disaster workers	Yes	Yes	No
Police Department	76 East Ridge Road	Emergency Response	Yes		No
Fire Headquarters	6 Catoonah Street	Emergency Response	Yes		No
Ridgebury Fire Station	169 Old Stagecoach Road	Emergency Response	Yes		Adjacent
Town Hall	400 Main Street	Critical Records	Yes		No
Town Hall Annex	66 Prospect Street	Health Dept. and Engineering Dept.			No
Highway Garage	60 South Street	Emergency Assistance	Yes		No
Ridgefield Recreation Center	195 Danbury Road	Primary Shelter	Yes	Yes	No
Barlow Mountain Elementary School	115 Barlow Mountain Road	Secondary Shelter	*	Yes	No
East Ridge Middle School	10 East Ridge Road	Tertiary Shelter	*	Yes	No
Scotts Ridge Middle School	750 North Salem Road	MPOD Emergency Distribution Center	*		No
Prospect Ridge Congregate Care	51 Prospect Ridge	Ridgefield Housing Authority owned Assisted and Senior Living			No

Ballard Green	25 Gilbert Street	Ridgefield Housing Authority owned 72-unit senior housing facility			No
Laurel Ridge	642 Danbury Road	Convalescent home and rehab center	Yes		No
Ridgefield Crossing	640 Danbury Road	Assisted living and Alzheimer's care	Yes		No
Wastewater Treatment Plants (2)	Various Locations	Critical Facilities	Yes		-
Water Pumping Stations	Various Locations	Critical Facility, Aquarion Water Company			-
Railroad Station	50 Ethan Allen Highway	Critical Facility			Yes
Major Roads	Various	Transportation arteries			-
Boehringer Campus	900 Ridgebury Road	Large employee base			No
Commercial Town Center	Vicinity of Main Street and Danbury Road	Critical Facility (supermarket, drug store)			No

*These generators are sufficient only for lighting and sustaining critical IT systems; they do not support full building use or sheltering

The Town would like generators for additional schools. In particular, the Branchville School would benefit from a fixed-in-place generator given that the school is a non-transient non-community water system. At the present time, the school has provisions for a portable generator hookup to operate as an emergency water supply. The school should probably be added to the list of critical facilities.

The two sewage treatment plants will eventually be consolidated into one facility at South Street. The railroad station is DOT-owned and Town-leased.

Throughout the document, references to "EMS" as emergency management need to be changed to "OEM."

Development Trends

Not discussed; follow up with Town.

Recent Events

Not discussed; follow up with Town.

Repetitive Loss Properties

Not discussed; follow up with Town.

Hazards Discussion

Drainage and flooding continue to be the primary concerns in Ridgefield. The need for drainage studies was discussed in the current hazard mitigation plan. The Town has made some progress in this area.

For example, Tighe & Bond is finishing one phase of a drainage study and will be continuing with the next phase soon. Joe Canas is the contact.

The Town is concerned with new flood risks associated with the potential decommissioning of Fox Hill Dam[1]. DEEP and NRCS have been evaluating the dam, which was built for flood control. If the dam is removed, numerous properties may have new flood risks. Charlie can provide additional information if needed.

Capabilities

As noted above, the Town is proceeding with drainage studies.

Significant capabilities exist for tree maintenance:

- The Town is active with tree trimming and works with Eversource to reduce risks of power loss due to downed lines.
- The tree warden has a budget of $400,000 per year and has access to additional funds when needed.
- The Town expects to expend $500,000 in 2020 for tree and tree limb maintenance.

Significant changes in fire protection are underway and the Town has a variety of capabilities for fire suppression:

- Aquarion Water Company has been extending its system and consolidating small systems in the northern part of the town.
- The Town is working with Aquarion to get fire hydrants installed where they were not previously installed.
- The former Rural Water and Topstone Water systems (now owned by Aquarion) are being upgraded to larger-diameter water mains.
- A water main may be extended to Branchville School, which would allow retirement of the school water system.
- Cisterns are required by the fire marshal for new developments that do not have access to the Aquarion system.
- Mutual aid agreements are in place for firefighting.
- Open burning is allowed by permit only.
- The Conservation Commission administers a ranger program to patrol open space and parks.

Actions

New actions to include in the plan were identified during the meeting, such as new standby power supply. Overall, the Town wishes to pursue projects that are identified by the drainage studies. Rudy

[1] https://www.theridgefieldpress.com/news/article/Ridgefield-s-Fox-Hill-flood-control-dam-repairs-14933040.php

asked if the current list of actions implied a priority, and David explained that they were arranged by hazard. He explained that the Town would work with MMI to develop a priority list for the update.

Attendees asked about next steps. David explained that the local coordinators would be gathered for an on-line workshop after all local meetings are completed. Nicolle added that a public meeting would also be scheduled.

Local Coordinator

The First Selectman will be the local coordinator.

Status of Previous Actions

#	Description	Responsible Party	Notes
Ri1	Pursue funding to acquire backup generators for critical facilities such as the town hall.	EMS, PW	Complete. The Town would like additional generators.
Ri2	Pursue funding to conduct necessary repairs to the Spruce Mountain Danbury/Ridgefield/DEMHS radio facility.	EMS, PW	Complete
Ri3	Pursue micro-grids at the high school / middle school complex and Town Hall / EOC / Fire Department	EMS	The Town would like to evaluate this. A grants coordinator is needed.
Ri4	Utilize the CT Alert emergency notification system to its fullest capabilities	EMS	Ongoing; however, the Town is evaluating updating its subscription to add Everbridge services that include messages related to response and recovery.
Ri5	Encourage residents to purchase and use NOAA weather radios with alarm features	EMS	Complete; other services and options are available now, as well. The Town would like to consider utilizing a weather monitoring service to alert employees of dangerous weather conditions.
Ri6	Disseminate informational pamphlets regarding natural hazards to public locations	EMS	Ongoing capability.
Ri7	Review potential evacuation routes to ensure timely migration of people seeking shelter in all areas of town.	EMS	Ongoing capability. WestCOG has assisted in this, as well, working with the DEMHS regions.
Ri8	Incorporate elements of this hazard mitigation plan into the Plan of Conservation and Development when it is updated in 2020	First Selectman	Glen Chalder did this for the Town during the POCD Update. In particular, the Town added the importance of the ongoing drainage studies.
Ri9	Update the Town's Floodplain regulations to reflect the most recent recommendations from the CT DEEP	P&Z	Complete
Ri10	Encourage property owners to purchase flood insurance under the NFIP and to report claims when flooding damage occurs.		
Ri11	Evaluate floodprone properties along the Norwalk River, Titicus River and Ridgefield Brook to determine potential flood damage reduction methods.	PW	Local, State, and NRCS representatives have met to discuss flood risks. Overall, the community does not prefer structural methods for flood control. The removal of the Fox Hill Dam, if it occurs, will have a substantial impact on the adjacent and downstream properties.

#	Description	Responsible Party	Notes
Ri12	Pursue funding for home elevations and or acquisitions should any residents become interested. The home along Wooster Street near the Titicus River may be a good candidate for elevation.	PW	Acquisitions have been considered for some properties, especially where projects may result in changes to private properties. However, not much progress has been made in this area. A grants coordinator is desired.
Ri13	Forward technical assistance from FEMA, regarding floodproofing, to the commercial properties prone to flooding, such as Precision Brake on Route 7.	EMS	The Town believes that this should be conducted with cooperation and participation of DEEP.
Ri14	Work with CT DOT to determine whether flood mitigation methods are feasible at the Metro-North Railroad, Branchville Station, such as berm construction and/or floodproofing to reduce flood risk.	PW	The Town leases the property from the DOT. The burden of construction should be placed on the DOT. The construction of a berm in this area will have a substantial impact on the area's floodplain and may not be feasible or permitted. Drop action in favor of a different approach for risk reduction.
Ri15	Ensure that future development within the Branchville area and at the Schlumberger site in downtown Ridgefield is flood damage resistant due to the proximity to flood risk zones.	P&Z	The former Schlumberger site is town-owned and is not at risk. A drainage study of the downtown area is in progress. This action should be modified.
Ri16	Development reviews must ensure that commercial development north of downtown does not contribute to downstream flooding.	P&Z	A drainage study of the downtown area is in progress. This action should be modified.
Ri17	Development reviews associated with construction upstream of the Casagmo Condominium Complex must ensure that additional impervious surfaces will not increase localized flooding.	P&Z	The downtown drainage study will help guide the P&Z department in its evaluation of upstream development. This action should be modified.
Ri18	Work with ACOE and NYCDEP to support flood mitigation and channel improvements along the Titicus River.	P&Z	A grant will be required for this work. The Town should consider the use of a grant coordinator.
Ri19	Evaluate the cost of joining FEMA's Community Rating System and calculate the benefits to residents.	First Selectman	The Town is likely not interested in CRS.
Ri20	Ensure that the appropriate municipal personnel are trained in flood damage prevention methods.	P&Z	Modify to be more specific, such as attendance at DEEP, FEMA-deployed, and CAFM trainings.
Ri21	Selectively pursue conservation recommendations listed in the Plan of Conservation and Development and other studies and documents.	First Selectman	Ongoing

#	Description	Responsible Party	Notes
Ri22	Pursue acquisition of additional municipal open space in SHFAs and set it aside for greenways, parks, etc.	First Selectman	Ongoing
Ri23	Review culvert and bridge conveyances based on Northeast Regional Climate Center guidance for increasing precipitation.	PW	This is a substantial effort and would require a grant to proceed. The Town should consider the use of a grant coordinator.
Ri24	Conduct a drainage study along George Washington Highway and consider replacing and increasing increase the capacity of culverts if the drainage study demonstrates a benefit from doing so.	PW	The Town likely does not see a need for GWH. Ridgebury Road is being fitted with new box culverts this year to replace collapsing and older metal pipes.
Ri25	Replace the North Bridge and the Florida Hill Bridge at the Norwalk River if application of the Northeast Regional Climate Center guidance demonstrates a benefit from doing so.	PW	Progress has been impeded by lack of capital funds. This work will require a grant to proceed.
Ri26	Conduct a drainage study along Route 116 and Barlow Mountain Road and increase the capacity of the drainage system to reduce flooding impacts if the drainage study demonstrates a benefit from doing so.	PW	Risk is not believed present. Action can be dropped.
Ri27	Replace and increase the capacity of the culverts along Bennett's Farms Road.	PW	Ongoing project.
Ri28	Evaluate methods of reducing flood risk at Wilton Road East, Rowland Lane, Oreneca Road, Rippowam Road, Wooster Street, Spring Valley Road, Ledges Road, New Street at Route 7, Portland Avenue, and South Street.	PW	Progress has been impeded by lack of capital funds. This work will require a grant to proceed. Revise action to be more specific.
Ri29	Ensure adequate barricades are available to block flooded streets in floodprone areas	EMS	Ongoing capability. The Highway Department does this.
Ri30	Determine the elevation of the Ridgebury Fire House relative to the base flood elevation and evaluate whether floodproofing is warranted.	EMS,PW	The building is not believed at risk.
Ri31	Provide town wide tree limb inspection and maintenance programs to ensure that the potential for downed power lines is diminished.	PW	Complete and ongoing. Annual budget is $400,000 plus additional as needed.

#	Description	Responsible Party	Notes
Ri32	Pursue roof mitigation projects for critical facilities, such as improved roof coverings, roof shape or roof to wall connections.	PW	Roofs currently meet all state building codes.
Ri33	Encourage the use of structural techniques related to mitigation of wind damage in new residential and commercial structures to protect new buildings to a standard greater than the minimum building code requirements. Require such improvements for new municipal critical facilities.	Building Official, EMS	Drop; the Town administers the State Building Code, and new municipal facilities are not planned.
Ri34	Work with Eversource to strengthen utilities to minimize power outages during storm events.	PW	Ongoing capability.
Ri35	Work with Eversource to determine the feasibility of placing non-conducting steel cables above the power lines to protect them from falling branches and trees.		Bracing has been considered but the Town and Eversource decided to focus on trimming. This can be dropped.
Ri36	Pursue funding for the installation of hurricane-rated windows at the Yanity Gymnasium to facilitate its use as a shelter for emergency personnel.	PW	It has been recommended that the windows be removed completely as they are not necessary. Drop action.
Ri37	The Building Department should provide literature regarding appropriate design standards for wind.	Building Official, EMS	Ongoing capability.
Ri38	Review and update the currently enacted EOP, evacuation plans, supply distribution plans, and other emergency planning documents for the Town as appropriate. Post general evacuation and shelter information on the Town website and in municipal buildings	EMS	Ongoing capability.
Ri39	Post the snow plowing routes in Town buildings each winter to increase public awareness.	EMS,PW	WestCOG evaluated plowing routes for the region recently. The Town does not wish to notify residents of route priorities, as this may be confusing.
Ri40	Emergency personnel should continue to identify areas that are difficult to access during winter storm events and devise contingency plans to access such areas during emergencies.	EMS	Ongoing

#	Description	Responsible Party	Notes
Ri41	The Building Department should provide literature regarding appropriate design standards for mitigating icing, insulating pipes, and retrofits for flat-roofed buildings such as heating coils.	Building Official	Ongoing
Ri42	Stringently regulate new residential development in areas prone to collapse.	P&Z	Ongoing
Ri43	Ensure that municipal departments have adequate backup facilities in case earthquake damage occurs to municipal buildings.	EMS,PW	Backup plans are in place for the loss of a structure.
Ri44	The town may consider bracing systems and assets inside critical facilities. This could help protect IT systems, important records and files.	EMS,PW	Redundancies are in place, and records are backed up to the cloud and other servers. Drop action.
Ri45	File EOPs/EAPs with town departments and emergency personnel	EMS	Complete. Also, EAPs were filed with DEEP for town-owned dams two years ago and the Town has not received feedback.
Ri46	Include dam failure innundation areas in the CT Alert emergency notification system contact database	EMS	This may be considered after feedback from DEEP. Revise or carry forward.
Ri47	Refer private dam owners to State and federal resources regarding effective maintenance strategies.	EMS	Ongoing; this is DEEP responsibility.
Ri48	Coordinate with the owners of Mamanasco Lake Dam and Shadow Lake Dam to keep abreast of progress toward necessary maintenance activities.	EMS	These dams are Town-owned. Maintenance plans have been developed for these dams. The action is complete.
Ri49	Increase the availability of water sources in the town's area of high risk areas.	Fire Department	Complete and ongoing. Aquarion Water Company has been extending its system and consolidating small systems in the northern part of the town. The Town is working with Aquarion to get fire hydrants installed where they were not previously installed. Cisterns are required by the fire marshal for new developments that do not have access to the Aquarion system.

#	Description	Responsible Party	Notes
Ri50	The Fire Departments should coordinate with the water company to identify areas where fire-fighting capacity may be limited due to lack of water pressure or storage. Deficiencies should be addressed as they are identified and funding allows.	Fire Department	Complete and ongoing. Aquarion Water Company has been extending its system and consolidating small systems in the northern part of the town. The Town is working with Aquarion to get fire hydrants installed where they were not previously installed. The former Rural Water and Topstone Water systems (now owned by Aquarion) are being upgraded to larger-diameter water mains. A water main may be extended to Branchville School, which would allow retirement of the school water system.
Ri51	Require source of fire protection water, such as cisterns or dry wells when municipal water service is not available for residential or commercial building development.	Fire Department	Complete and ongoing. Cisterns are required by the fire marshal for new developments that do not have access to the Aquarion system.
Ri52	Provide outreach programs on how to properly manage burning and campfires on private property.	EMS, Fire Department	Ongoing. The Town requires a permit for open burning and outreach is continuous.
Ri53	Patrol Town-owned open space and parks to prevent unauthorized campfires.	Fire Department	Ongoing. The Conservation Commission runs a ranger program to accomplish this.

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	4/27/2020	**ATTENDEES**	Jim Reilly – OEM Director
PROJECT:	WestCOG HMP Update		Don Lowe – First Selectman
MMI #:	3101-22		Noah Slovin – MMI
SUBJECT:	Town of Sherman		
LOCATION	Virtual/Remote		
	Zoom		

Noah Slovin met with Town of Sherman representatives on April 27, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. Attendees followed an open discussion format.

Discussion topics are grouped below.

Critical Facilities

Meeting attendees discussed the critical facilities list to be included in the HMP.

The table below lists critical facilities included in the previous version of Sherman's HMP:

Facility	Address or Location	Comment	Emergency Power	Shelter	In 1% Floodplain	Notes / Changes
Emergency Services Facility	Route 39 North	Fire / EMT / Shelter	X	X		
Mallory Town Hall	9 Route 39 North	Police / Town Hall / EOC				
Highway Department Garage	43 Route 39 North	Public Works / Fire	X			
Sherman Consolidated School	2 Route 37 East	School / Shelter	X	X		
Sherman Renaissance Senior Center	8 Route 37 Center	Shelter		X		
Holy Trinity Church	15 Route 37 Center	Shelter/Distribution				
Sherman Congregational Church	6 Church Road	Shelter/Distribution				
Jewish Community Center	9 Route 39 South	Shelter/Distribution				

Town staff reported that this list continues to be up to date. They considered whether or not to add cell towers to the list, as they are important to communication during and following disaster events. Ultimately, it was decided not to include cell towers as, given improvements to emergency communication capabilities in recent years, loss of cell towers would not significantly hamper emergency response.

Development Trends

The Town discussed development trends in Sherman. There has been no significant new development in Sherman since 2017, and the Town does not project any significant new development in the next five years.

Recent Events

Meeting attendees reviewed recent events. The microburst in May of 2018 was the only hazard event of note that has occurred since adoption of the previous HMP in 2017. The storm knocked down many

trees, causing damage to houses and blocking roadways. Extensive power outages occurred in the south end of town, lasting for about four days.

Noah asked about the incidence of brush fires or wild fires. The Town reported that small brush fires occur seasonally, but the Town has not experienced any fires that burned over an acre in recent years.

Repetitive Loss Properties

No Repetitive Loss Properties (RLP) are located in Town.

Hazards Discussion

Hazard concerns were discussed. The primary challenge Sherman faces is isolation of neighborhoods due to downed trees and debris or flooding.

Primary neighborhoods of concern with regard to isolation are:

- Barlow Farm Road *(listed in previous HMP)*
- Beaver Creek Lane *(listed in previous HMP)*
- Candlewood Echos Association *(listed in previous HMP)*
- Candlewood Lake Estates *(listed in previous HMP)*
- Church Road Near Babbling Brook Drive *(listed in previous HMP)*
- Coote Hill *(listed in previous HMP)*
- Farm Road *(listed in previous HMP)*
- Old Greenwoods Road *(listed in previous HMP)*
- Old Greenwoods Road Extension *(listed in previous HMP)*
- Sawmill Road *(listed in previous HMP)*
- Wagon Wheel Road *(listed in previous HMP)*
- *Wanzer Hill Road (added to this list during meeting)*
- *Coburn Road East (added to this list during meeting)*

Town staff reported that dead ash trees are becoming a problem for Sherman. The Town performed an evaluation and found over 500 dead ash trees in town rights-of-way. This quantity of dead trees is beginning to get out of the scope of the Town tree maintenance budget.

Dam failure is not a major concern for Sherman. There are many small dams in Town that would cause local flooding and some damage if they failed, but there no high hazard dams in Town, and few significant hazard dams.

Capabilities

Meeting attendees identified hazard mitigation capabilities that the Town has, and changes or improvements to those capabilities since the previous HMP.

- Sherman has implemented Nixle, an Everbridge public alert program. The tool allows the Town to send alerts to residents by text, voice call, and social media. Residents must opt-in. *How many residents have subscribed?*
- All new subdivisions and development are required to place utilities underground, if feasible.
- The Town reports having a very strong relationship with local utility service providers, especially Eversource.
- Sherman has retained a structural engineer to perform an examination of all bridges in Town, allowing the Town to meet state requirements for bridge inspection and maintenance. The Town plans to complete any bridge repairs recommended by the engineer with town funds.
- The Fox Run detention basin was upgraded in 2018 to allow it to accommodate a larger quantity of runoff.
- Sherman has a tree warden, and prioritizes funding its tree management program.
- The Fire Department has upgraded its portable radios with a grant from FEMA.
- The Sherman Consolidated School has enhanced its security capabilities in response to concerns about school safety. While not directly related to natural hazards, security improvements have included adding an emergency radio system and placing trained security personnel at the school; these actions may additionally help with response to a natural hazard event.
- The Sherman Social Services Department and Senior Center have instituted an Emergency Support System to check on elderly residents in case of natural disasters, storms, or widespread power outages. This is an improvement over past emergency wellness check protocols.
- Town has been working diligently to educate residents about the danger of coming into contact with power lines, either those knocked down during a storm event or those near trees and limbs that residents may be trimming. The First Selectman has sent out Nixle notifications about this danger, written columns about it in the local weekly paper, and has generally been working to increase awareness.
- Sherman attends roundtable meetings about Candlewood Lake dam safety every couple of years when they occur.

<u>Actions:</u>

New actions to include in the plan were identified during the meeting. Additionally, Noah has listed a number of suggested new actions based on challenges and issues identified during the meeting. *The Town will review Noah's suggestions for inclusion in the plan.*

- Upgrade radio communication capabilities at the EOC
- Staff indicated that the Wanzer Hill neighborhood may be an area at risk of isolation that needs to be addressed. *Following the meeting Noah proposed the following actions for staff consideration:*
    - *Develop an emergency access route into the Wanzer Hill neighborhood in case Wanzer Hill Road is rendered impassible during a disaster (options may include: creating an emergency route via the access road to the Candlewood Fishing Camp by way of Camp*

Candlewood; creating an agreement with private homeowners allowing access through properties between Candle Hill Road and Inglenook Drive)

- *Create an emergency plan for the Wanzer Hill neighborhood in case Wanzer Hill Road is rendered impassible during a disaster and the neighborhood becomes isolated. Aspects of the plan may include:*
  - *Evacuation procedures*
  - *Designating assembly points*
  - *Stationing emergency equipment and personnel in the neighborhood prior to forecast storm events*

- Install a permanent generator, or a tie-in for a portable generator, to provide emergency power to the Town Hall in case of a power outage.
- Offer the grocery store near Town Hall assistance in acquiring and installing a permanent generator, or a tie-in for a portable generator, to provide emergency power to this important community resource in case of a power outage.

<u>Local Coordinator</u>

- Jim Reilly, the OEM director, will be the local coordinator

Status of Previous Actions

#	Action	Responsible Party	Status	Notes
Sh1	Add pages to *town* website dedicated to citizen education and preparation for natural hazard events	OEM	Complete	The Town has added an Office of Emergency Management page to the Town webpage, which provides information about how the Town prepares for disasters, and contact information for the Sherman OEM. The Town also has the ability to post updates about specific disasters on the Town website, or to create specific pages dedicated to information about a disaster event (this is being done currently for the Corona Virus). *Recommend new action to add links to State and Federal websites with information about personal preparedness (eg: https://portal.ct.gov/DPH/Communications/Emergency-Preparedness--Response/Home, https://www.ready.gov/)*
Sh2	Implement the Everbridge emergency notification system	OEM	Complete	Town has implemented the Everbridge program "Nixle."
Sh3	Upgrade the unpaved portions of Jericho Road North to provide additional egress north from the Town Center	DPW	Complete	This action has been completed
Sh4	Modify the Plan of Conservation and Development and Subdivision Regulations to encourage two modes of egress into new neighborhoods	PZC	Drop	Sherman has not experienced any new subdivisions in many years, and does not expect significant new development in the future based on growth projections and geography; the town no longer believes that pursuit of this action will accomplish hazard mitigation goals.
Sh5	Pursue funding to place utilities underground in existing developments	DPW	Carry Forward	Town has not succeeding in securing funding for this effort, as it has placed a higher priority on working with the local energy utility Eversource to improve communication and outage response procedures. Action is carried forward.
Sh6	Post emergency shelter information on the new, overhauled website	OEM	Capability	Town posts, and otherwise communicates, information about emergency shelters on the Town Website, as well as via other outlets, as needed.
Sh7	Pressure local cellular providers to improve resilience of the local network after events	First Selectman	Completed	Town has good relationships and communication pathways with its local utility providers, including telecommunication companies. Additionally, the Town is working on improving cellular coverage; a Town committee has been assembled and meets monthly to work on this. Additional cell towers are expected to be installed in coming years as a result of these efforts. This action is considered completed.
Sh8	Complete construction of a new Public Works wash-station	DPW	Completed	This action has been completed.
Sh9	Determine and implement a means of lowering sodium levels in the water at the Town Center	DPW	Completed	Sherman retained a consultant to perform a groundwater analysis and help the Town identify strategies for mitigating sodium levels in its water. As a result of this work, the Town has implemented a series of best practices to minimize sodium inputs, and has installed a second well at the emergency services building. Groundwater studies and monitoring are ongoing. This action is completed.

#	Action	Responsible Party	Status	Notes
Sh10	Amend Town regulations to explicitly require new developments to create a zero-increase in stormwater runoff from sites	PZC	Completed	A zero runoff increase requirement has been added to the Town regulations.
Sh11	Pursue/allocate funding to repair the bridge over Tollgate Brook on Old Greenwoods Road	DPW	Capability	Bridge has been repaired.
Sh12	Repair or upgrade the Wagon Wheel Road culvert at Glen Brook	DPW	Completed	Culvert has been repaired.
Sh13	Perform a bridge evaluation of Old Greenwoods Road Extension where it crosses Tollgate Brook	DPW	Completed	Evaluation completed, bridge repaired.
Sh14	Perform a bridge evaluation of George Road	DPW	Drop	There is no George Road in Sherman – action seems to be an error.
Sh15	Conduct engineering studies on Town culverts that are suspected of being undersized	DPW		The Department of Public Works examines all culverts annually to identify repair or upgrade needs. These examinations are not engineering studies. *Check on details with DPW.*
Sh16	Reevaluate the drainage computations for public dead-end roads in town that span a watercourse, evaluating the dead-end roads with the most structures at risk first	DPW		*Check on details with DPW.*
Sh17	Upgrade Town culverts found to be undersized through engineering studies or reevealuated drainage computations. Focus on dead-end roads	DPW		*Check on details with DPW.*
Sh18	Designate an additional shelter within Sherman, or direct residents to alternate shelters outside of Sherman, south of the Town Center so that residents who live in that area aren't cut off from the shelter during flood events	OEM	Carry Forward	*Town has not yet identified a location to serve as a shelter in the southern part of shelter, and no hazard events have occurred since adoption of the previous HMP in 2017 that would prevent residents in the southern part of shelter to access the Town's shelters. This action is carried forward.*
Sh19	Collaborate with the Stormwise project, participate in education, management, and research efforts, and implement the Stormwise framework on forests adjacent to key roads.	DPW	Drop	Sherman has a tree warden and an active tree management program. Tree management is consistently a challenge, but the Town has increased its tree management budget over the years and feels its capabilities are generally adequate. *The Town would support a regional action related to mitigating the high quantity of dead Ash trees in town rights-of-way due to the impacts of the Emerald Ash Borer.*

#	Action	Responsible Party	Status	Notes
Sh20	Determine whether development of a microgrid that encompasses the Town Hall, the Library, and the nearby grocery store is feasible.	DPW	Drop	The Fire House / EOC has a generator, and the Town is pursuing installation of a permanent generator or portable generator hook-up at the Town Hall. The Town helped the nearby grocery store upgrade its power source and transformer through Eversource, which makes it less susceptible to outages. These actions have and continue to improve the emergency power capabilities of this area; the Town does not believe pursuit of a microgrid is the best path forward at this time. *This action is dropped and replaced by two new actions: to install emergency power at the Town Hall and to offer assistance to the grocery store in acquisition of a backup generator.*
Sh21	Educate property owners on increasing tree-throw radiuses and encourage them to trim or cut trees that are tall enough to damage property, roads, or powerlines, even if branches are not directly above those assets.	DPW	Carry Forward with Revisions	Subdivision property owners are responsible for maintaining trees along subdivision roads. Downed trees can block access to subdivisions and hinder emergency response. The Town does not believe that the specific issue identified in this action needs to be addressed, but does believe action is needed generally with regard to educating residents about the importance of maintaining trees on their properties, and especially along subdivision roads. Action is carried forward with revisions.
Sh22	Develop an official protocol with Eversource with regards to responding to outages, given the distance between the base location of their crew trucks and Sherman.	First Selectman	Completed	Town has a very good relationship with Eversource, has held several meetings with the company about outage response, and has developed protocols. This is complete.
Sh23	Develop an emergency response plan for the Timber Trails area that addresses the risk of isolation.	OEM	Carry Forward	Town has not yet completed this action as it has focused on more generally improving its emergency response capabilities. Action is carried forward.
Sh24	Evaluate the cost-effectiveness of performing a GPS study of roads in order to prioritize plowing routes, increase efficiency and efficacy of plowing efforts, and help plan evacuation routes.	DPW	Drop	Sherman's snow removal capabilities are sufficient and well organized; the Town does not believe this action is necessary. *Check with DPW*
Sh25	Review cold-weather firefighting protocols, and determine if improvements are needed to address the unique challenges of fighting fires at sub-freezing temperatures.	Fire Department	Capability	The Fire Department continuously reviews its protocols, and completes a cold-weather training every year. As an example, in 2019 the department completed an advanced training on firefighter rehabilitation following a firefight, which included cold-weather specific protocols.
Sh26	Purchase a backup generator and have it installed at the Town Hall	First Selectman	Carry Forward with Revisions	The Town has had an electrician assess the Town Hall for emergency power suitability, and determined that installation of a transfer switch to allow for tie-in to a portable generator was the best path forward. This action is carried forward with revisions. *Town will check whether a transfer switch has already been installed.*

#	Action	Responsible Party	Status	Notes
Sh27	Purchase a backup generator and have it installed at the Town Garage	DPW	Completed	This action has been completed
Sh28	Purchase a backup generator and have it installed at the Old Town Hall/Senior Center	First Selectman	Carry Forward	Town has not yet completed this action due to lack of funding. Carry Forward.
Sh29	Purchase a backup generator and have it installed at either the Catholic Church or the Jewish Community Center	First Selectman	Carry Forward	Town has not yet completed this action due to lack of funding. Carry Forward.
Sh30	Include dam failure areas in the Everbridge emergency notification system, once that system is implemented	OEM	Drop	Town does not believe limiting alerts to specific areas is necessary; in case of a dam failure emergency, Sherman would send a Nexle alert with the relevant information to all subscribers.
Sh31	Place copies of EAP documents in a location that is known to all relevant officials, and ensure those officials continue to be informed as to that location	First Selectman	Carry Forward	Town has EAP documents on file but has not reviewed the locations of these documents to ensure all relevant officials are aware of them, as the relative low risk from dam failure in Sherman, and State programs to monitor dam safety, have not made such an action a high priority. Action is carried forward.
Sh32	Institute a program for monitoring and addressing beaver dams throughout Town	DPW	Capability	The Town monitors and addresses beaver dams on a case-by-case basis as needed through the DPW.
Sh33	Consider the use of beaver deterrent devices such as beaver stops or beaver bafflers.	DPW	Capability	The DPW implements a variety of beaver deterrent devices as appropriate, and has found them to be successful in many cases.
Sh34	Add additional supplies of firefighting water where adequate water supplies do not currently exist. These areas include Briggs Hill Road, Route 37 South between Briggs Hill Road and Wakeman Road, and Wakeman Road near Bridgeworth Lane.	PZC / Fire Dept.	Partially Completed Carry Forward	Progress has been made on this action, and efforts are ongoing. The Town has been and continues to be exploring opportunities for installing dry hydrants in existing ponds. Sherman installed 13 dry hydrants off of Wakeman Road and Chapel Hill Road in the Deer Pond Farm area (Connecticut Audubon Society property). Carry forward for areas listed in action.
Sh35	Improve the Town's hydrant and tank maintenance program	Fire Department	Capability	Town explored adding a line item related to hydrant and tank maintenance in its annual budget, but determined that it wasn't necessary. Instead, a committee was formed to address hydrant and tank maintenance issues. Additionally, the Fire Department is continuously exploring improvements to its program.
Sh36	Send out a Townwide mailer about indoor fire safety, including the safe use of furnaces, boilers, wood stoves, and fireplaces.	Fire Department	Drop	The Fire Department runs a fire prevention program annually through the high school. Open burning information is posted on the Town website seasonally. A townwide mailer is not believed to be necessary.
Sh37	Implement other fire protection solutions when water main extensions are not feasible, such as the use of fire ponds.	Fire Department	Capability	This is a capability.
SH38	Perform prescribed burning on municipal land when and where appropriate.	Fire Department	Drop	The Fire Department does not believe performing prescribed burning on municipal land is appropriate for Sherman. Open burning permits may be obtained by private residents by submitting a permit application to the Fire Marshal.

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	May 28, 2020	**ATTENDEES:**	Erin McKenna, Associate Planner
PROJECT:	WestCOG HMP Update		Richard Talamelli, Environmental Planner
MMI #:	3101-22		Victoria Brudz, MMI
SUBJECT:	City of Stamford		
LOCATION	Virtual/Remote		
	Zoom		

Victoria Brudz met with City of Stamford representatives on May 28, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. Attendees followed an open discussion format, and an information presentation was sent to participants after the meeting. Discussion topics are grouped below.

Critical Facilities

- There is a new police station, however, the address may still be the same as the previous facility.

Recent Events

- The recent flood events for the City have been primarily coastal, with few riverine instances.

Hazards Discussion

- Coastal flood events are of concern as there are RL areas and coastal infrastructure in flood zones.
- Some flooding events challenge the capacity of certain bridges.

Capabilities

- The City currently participates in the FEMA CRS program and has stringent floodplain regulations and freeboard requirements.
- The MS4 coordinator is continuously tracking plant infiltration.
- Many projects have been permitted, and others have been constructed, including the River Bank Road bridge was recently upgraded.
- Upgrades are currently being done to the Greenwich Avenue pump station including elevating various components. Generator restoration efforts were recently completed.

Goals, Objectives, and New Actions

- The town would like to conduct an extensive flood and coastal risk assessment to evaluate risks in RL areas, to critical facilities, and to infrastructure.

Local Coordinator

- The City Associate Planner will continue to be the local coordinator.

Stamford Critical Facilities

Facility	Address	Facility Type	Source
Stamford Hospital			State HMP
~~Stamford Leaf Compost Fac (Scofield.)~~			State HMP
~~Stamford Leaf Compost Facility~~			State HMP
Scri Bulk Waste Vol Red Facility			State HMP
J. M. Wright Technical High School	1 Bridge St.	School	WestCOG GIS
Sacred Heart School	1 Schuyler Avenue	School	WestCOG GIS
Viewpoint Recovery Program	104 Richmond Hill Ave	Care Facility	WestCOG GIS
Long Ridge Services	1095 Long Ridge Rd		State HMP
Mead School	1095 Riverbank Road	School	WestCOG GIS
Cloonan Middle School	11 W North Street	Shelter	WestCOG GIS
Jewish Family Service, Inc.	111 Prospect Street	Care Facility	WestCOG GIS
Springdale School	1127 Hope St.	School	WestCOG GIS
Main Street Clinic	117 Main Street	Care Facility	WestCOG GIS
Turn of River School	117 Vine Rd.	School	WestCOG GIS
Our Lady Star of The Sea	1170 Shippan Avenue	School	WestCOG GIS
St Cecilia Elementary School	1186 Newfield Avenue	School	WestCOG GIS
Liberation House	119 Main Street	Care Facility	WestCOG GIS
The Children's School	12 Gary Road	School	WestCOG GIS
Edgehill Health Center	122 Palmers Hill Road	Care Facility	WestCOG GIS
Toquam Magnet School	123 Ridgewood Ave.	School	WestCOG GIS
Liberation Clinic	125 Main Street	Care Facility	WestCOG GIS
Westhill High School	125 Roxbury Rd.	Shelter	WestCOG GIS
School Based Health Ctr At Westhill H.S.	125 Roxbury Road	Care Facility	WestCOG GIS
The Stamford Rehabilitation Hospital	128 Strawberry Hill Avenue	Care Facility	WestCOG GIS
Stamford Surgical Center	1290 Summer Street	Care Facility	WestCOG GIS
Davenport Ridge School	1300 Newfield Ave.	School	WestCOG GIS
Yeshiva Bais Binyomin	132 Prospect Street	School	WestCOG GIS
Stamford Community Health Center	137 Henry Street	Care Facility	WestCOG GIS
Families in Recovery Program	141 Franklin Avenue	Care Facility	WestCOG GIS
Connecticut Renaissance, Inc.	141 Franklin St, Franklin Commons	Care Facility	WestCOG GIS
Stamford Health Department	141 Franklin Street	Care Facility	WestCOG GIS
King & Low-Heywood Thomas School	1450 Newfield Avenue	School	WestCOG GIS
William And Sally Tandent Center for Continuing Care, The	146 W Broad St	Care Facility	WestCOG GIS
All Care Medical Training	1492 High Ridge Road	School	WestCOG GIS
Meridian Center	159 Colonial Road	Care Facility	WestCOG GIS
Stamford Youth Options	159 Colonial Road	Care Facility	WestCOG GIS
University of Connecticut - Stamford Campus Police Sub-Station	16 Broad Street	Police	WestCOG GIS

Facility	Address	Facility Type	Source
Homestead Health Center	160 Glenbrook Rd	Care Facility	WestCOG GIS
Stamford Fire and Rescue Department Station 5	1600 Washington Boulevard	Fire	WestCOG GIS
Stamford Fire and Rescue Department Station 5	1600 Washington Boulevard	Fire and Rescue Service	State HMP
Villa Maria Education Center	161 Sky Meadow Drive	School	WestCOG GIS
Stamford Health System	166 W Broad St	Hospital	WestCOG GIS
Stamford Fire and Rescue Department Station 6	17 Arthur Pl	Fire/Shelter	WestCOG GIS
K. T. Murphy School	19 Horton St.	School	WestCOG GIS
Hillandale School Based Health Center	195 Hillendale Avenue	Care Facility	WestCOG GIS
Sacred Heart Academy Stamp	200 Strawberry Hill Avenue	School	WestCOG GIS
Stamford Fire and Rescue Department Station 2	215 Washington Boulevard	Fire	WestCOG GIS
Bi-Cultural Day School	2186 High Ridge Road	School	WestCOG GIS
Stamford Academy	229 North Street	School	WestCOG GIS
Turnpike Shell	243 West Ave		State HMP
Sunrise Assisted Living of Stamford	251 Turn of River Rd	Care Facility	WestCOG GIS
Atria Assisted Living, Town Center	26 Mill River St	Care Facility	WestCOG GIS
Ct Inst For Paralegal Studies	26 Sixth St, Suite 253	School	WestCOG GIS
Long Ridge Fire Company Incorporated Station 2	2619 High Ridge Road	Ambulance and Fire Service Combined	WestCOG GIS
Turn of River Fire Dept 1	268 Turn of River Road	Shelter	WestCOG GIS
Fairfield Family Care	27 5th Street	Care Facility	WestCOG GIS
Conn Inst For Real Est & Appr	27 Strawberry Hill Ave, Suite 200	School	WestCOG GIS
The Canaan Ridge School Inc	2810 Long Ridge Road	School	WestCOG GIS
Stamford Dialysis Center	30 Commerce Road	Care Facility	WestCOG GIS
Catholic Family Services	30 Myano Lane	Care Facility	WestCOG GIS
Dagostino Bros Foreigh Car Service	316 Long Ridge Rd		State HMP
Newfield School	349 Pepper Ridge Rd.	School	WestCOG GIS
Stamford Fire and Rescue Department Station 4	364 Shippan Avenue	Fire	WestCOG GIS
Long Ridge Fire Company Incorporated Station 1	366 Old Long Ridge Rd	Fire	WestCOG GIS
Rippowam Middle School	381 High Ridge Rd.	Shelter	WestCOG GIS
Julia A. Stark School	398 Glenbrook Rd.	School	WestCOG GIS
Holy Spirit School	403 Scofieldtown Rd	School	WestCOG GIS
Westover School	412 Stillwater Ave.	School	WestCOG GIS
The Long Ridge School	478 Erskine Road	School	WestCOG GIS
St Camillus Center	494 Elm Street	Care Facility	WestCOG GIS
Turn of River Station 2	50 Roxbury Road	Fire	WestCOG GIS
Dolan School	51 Toms Rd.	School	WestCOG GIS
A & K Service	524 Newfield Ave		State HMP
Courtland Gardens Health Center, Inc.	53 Courtland Ave	Care Facility	WestCOG GIS
Stamford High School	55 Strawberry Hill Ave	School	WestCOG GIS
School Based Hlth Ctr At Stamford High	55 Strawberry Hill Avenue	Care Facility	WestCOG GIS

Facility	Address	Facility Type	Source
Dental Center of Stamford, Inc.	587 Elm Street	Care Facility	WestCOG GIS
Atria Assisted Living, Stamford	59 Courtland Avenue	Care Facility	WestCOG GIS
Brighton Gardens of Stamford Alsa	59 Roxbury Rd	Care Facility	WestCOG GIS
Family Centers Inc.	60 Palmer's Hill Rd	Care Facility	WestCOG GIS
Grace Christian School	602 High Ridge Road	School	WestCOG GIS
Hart School	61 Adams Ave.	School	WestCOG GIS
Scofield Manor	614 Scofieldtown Rd	Care Facility	WestCOG GIS
Stamford Fire and Rescue Department Station 1 - Headquarters	629 Main St	Fire	WestCOG GIS
Our Lady of Grace Nursery School	635 Glenbrook Road	School	WestCOG GIS
Scofield Middle Magnet	641 Scofield Road	Shelter	WestCOG GIS
Stamford Emergency Medical Services Incorporated	684 Long Ridge Road	Ambulance Services, Air or Ground	WestCOG GIS
Long Ridge Post-Acute Care	710 Long Ridge Rd	Care Facility	WestCOG GIS
Mediplex Of Stamford	710 Long Ridge Road	Care Facility	WestCOG GIS
Westlawn Inst Of Marine Technology	733 Summer Street	School	WestCOG GIS
Roxbury School	751 Westhill Rd.	School	WestCOG GIS
Atria Stamford	77 3rd St	Care Facility	WestCOG GIS
Sterling Glen Assisted Living Services Agency, Llc	77 Third Street	Care Facility	WestCOG GIS
Belltown Fire Department	8 Dorlen Rd	Fire/Shelter	WestCOG GIS
Stamford Fire and Rescue Department Station 3	80 Fairfield Avenue	Fire	WestCOG GIS
Stillmeadow School	800 Stillwater Rd.	School	WestCOG GIS
Stamford Police Department	**725 Bedford Street**	Police	WestCOG GIS
Northeast School	82 Scofieldtown Rd.	School	WestCOG GIS
Rogers School	83 Lockwood Ave.	School	WestCOG GIS
Beauty Tech Academy	848 High Ridge Road	School	WestCOG GIS
Leon Institute of Hair Design	87-91 Atlantic Street	School	WestCOG GIS
Smith House Skilled Nursing Facility	88 Rock Rimmon Rd	Care Facility	WestCOG GIS
The Smith House Skilled Nursing Facility	88 Rockrimmon Rd	Care Facility	WestCOG GIS
St. John Lutheran's Church	884 Newfield Avenue	Shelter	WestCOG GIS
Stamford Government Center	888 Washington Blvd	Shelter	WestCOG GIS
Preschool Team	888 Washington Boulevard	School	WestCOG GIS
Town Hall	888 Washington Boulevard	Town Hall/Eoc	WestCOG GIS
Stamford Government Center stamford Division of Emergency Management Command Center	888 Washington Boulevard	Eoc	WestCOG GIS
Career Blazers Learning Center	9 West Broad Street	School	WestCOG GIS
Stamford Community Health Center	90 Fairfield Avenue	Care Facility	WestCOG GIS
Highways Department	90 Magee Ave	Public Works	WestCOG GIS
Trinity Catholic High School	926 Newfield Avenue	School	WestCOG GIS
Meridian House	929 Newfield Avenue	Care Facility	WestCOG GIS
St Gabriel Middle School	948 Newfield Avenue	School	WestCOG GIS
Springdale Fire Company	987 Hope Street	Fire	WestCOG GIS

Facility	Address	Facility Type	Source
Stamford Fire and Rescue Department Station 7	987 Hope Street	Fire	WestCOG GIS
Springdale Fire Department	987 Hope Street	Shelter	WestCOG GIS
Connecticut Renaissance, Inc.	Franklin Commons, 141 Franklin St	Care Facility	WestCOG GIS
Ems Institute/Stamford Hospital	P.O. Box 9317	School	WestCOG GIS
Trailblazers Academy	Park Square St	School	WestCOG GIS
Stamford Hspt Schl Radiologic	Shelburne Road, Box 9317	School	WestCOG GIS
Stormwater pumping station – cummings park	500 Shippan Avenue	Pump Station	
Stormwater pumping station	71 Dyke Lane	Pump Station	
Stormwater pumping station – Halloween Blvd	90 Magee Avenue	Pump Station	
Stormwater pumping station – Wampanaw	800 Shippan Avenue	Pump Station	
Water Pollution Control Facility	111 Harbor View Avenue	WPCA	

Status of Previous Actions, Stamford

#	Description	Responsible Party	Status	Notes from Meeting	Notes from City Follow Up
1	Explore adding clerical and/or technical support staff to EOC.	EM, Operations	Unsure	Follow up with EM on status and whether action should be carried forward.	
2	Work to develop a direct communications link between the EOC and 911 communications center.	EM, Operations	Unsure	Follow up with EM on status and whether action should be carried forward.	Complete
3	Identify ways to improve the use of GIS for use in identifying areas and facilities (including transportation assets) vulnerable to disasters and for use to enhance emergency management. Ensure that all critical systems maps are easily accessible to 911 and the EOC, including sewer and drainage system maps.	TMS, EM, Operations, GIS	Ongoing	The City does do updates as part of CRS, for example, they added the LIMWA to maps. Updates are done at least once a year. Significant progress has been made with stormwater discharge outfall mapping. Follow up with GIS whether this should be carried forward.	Ongoing
4	Explore and develop a regional communications plan. Includes communications, sharing resources, identifying common strengths, weaknesses, and vulnerabilities. Identify opportunities to mitigate weaknesses and vulnerabilities.	EM, TMS, Operations, DEMHS, WCCOG	Unsure	Follow up with EM on status and whether action should be carried forward.	Ongoing, city is moving onto the State radio core as November
5	Develop a coordinated evacuation and preparedness plan. Plan should address impacts to transportation corridors. Explore the use of color coded evacuation signs in vulnerable areas.	EM, Operations, LU, Engineering, WCCOG	Unsure	Follow up with EM on status and whether action should be carried forward.	Ongoing Done by the state
6	Evaluate current sheltering location's ability to handle large scale evacuations.	EM, Operations, LU, Engineering	Unsure	DEMHS Region 1 was recently collaborating on a regional evacuation plan. Follow up with EM on status and whether action should be carried forward.	Health Dept. manages shelters Ongoing effort
7	Develop a sheltering/evacuation process to improve collaboration between the Health Department, Operations, Fire and Police and review the process regularly to ensure each department knows their responsibilities and where resources are located.	EM, Operations, Fire, Police, Red Cross	Unsure	Follow up with EM on status and whether action should be carried forward.	Ongoing
8	Provide pre-recorded messages for a variety of scenarios for use by the City's Reverse 911 system, including in additional languages. Work to educate citizens on registration and use of system.	EM, DoEC	Unsure	Follow up with EM on status and whether action should be carried forward.	Underway
9	Acquire snow melting machines to melt excess snow from severe winter storms.	Operations	Remove	Remove – City no longer wants to pursue	
10	Acquire the site at 128 Magee Avenue as a staging area for excess snow and large wood waste.	Operations	Remove	Remove – City no longer wants to pursue	
11	Continue to incorporate recommendations from the Mill River Corridor Plan. Specifically, the following actions are planned: Acquisition and demolition of additional structures.	~~LU, Grants, MRC~~	Ongoing	Downtown phase is done, working on Phase 3 underway.	Ongoing

#	Description	Responsible Party	Status	Notes from Meeting	Notes from City Follow Up
				Carry forward as is.	
12	Perform an infiltration assessment to reduce inflows to the sewage treatment plant	~~Operations, Engineering,HD, LU~~ WPCA	Ongoing	~~The City adopted a drainage manual and is continuously doing infiltration analysis. The MS4 coordinator spends tracking infiltration into the plant.~~ Carry forward	This is a WPCA function, not an MS4 function. Detail regarding status and implementation of I&I work to be provided by WPCA
13	Review the Mill River Corridor Project and identify projects that may be eligible for FEMA natural hazard mitigation grants.	LU, Grants	Ongoing	Combine this action #11	Ongoing
14	Move forward with plans to rebuild the West Main Street Bridge for use by pedestrians and emergency vehicles only. Plans shall include elevating the bridge deck above the 100-year flood plain and removing several piers.	LU, City of Stamford	Carry forward with revision	City would like to remove the current bridge and do fully compliant pedestrian bridge to withstand 100 year event.	Ongoing
15	Encourage acquisition of wetlands, waterfront land, and drainage easements beneficial to the City.	LU, Grants, engineering bureau	Ongoing	Carry forward. Past example: Parcels at 108 and 172 Greenwich Ave were recently purchased and became greenway open space.	• Ongoing • Numerous MS4 storm pipes located in private property with no filed easement maps. Example: 4 drainage easements acquired on Auldwood Rd. and Lanark Rd. 2019
16	Encourage the preservation of undeveloped lands within the 100-year flood zone with the use of Open Space purchase, donation or conservation easement.	LU, Grants	Ongoing	With conservation easements, money is tight, encumbering properties is often an easier thing to work with	Ongoing
17	Work with Aquarion and the state to evaluate and monitor conditions of all dams and to identify properties that may be impacted by a dam failure for all high risk dams in Stamford.	Engineering, DEEP, Aquarion	Unsure	Follow up with engineering. Aquarion should already be evaluating dam condition and areas of concern should be identified in their EAPs. Should this action be removed?	
18	Conduct a detailed flood/coastal risk assessment to improve resiliency efforts to key assets and vulnerable populations	LU, Engineering, Operations, EM, GIS	Carry forward	Carry forward.	LU tried to get capital funds to conduct initial phases of coastal flood/risk assessment with concentration on Stamford's repetitive loss areas for current fiscal year – denied.
19	Assess the integrity of the Hurricane barrier and dykes to withstand increased flooding and storm intensity (including storm surge). Explore opportunities to retrofit as needed.	USACOE, EM, Engineering, Operations, LU, Fire	Unsure	Follow up as to who is responsible for maintenance and inspections, and where the City's responsibilities lie.	
20	Work with the City Operations, Parks and Highways Dept. staff, and Connecticut Light and Power staff, to maintain and update a plan for clearing debris in the event of a severe storm.	EM, Operations Parks, Engineering, Utilities	Unsure	Follow up with park and highways as to whether they want this carry forward.	

#	Description	Responsible Party	Status	Notes from Meeting	Notes from City Follow Up
21	Work with utility companies to improve communications during a storm event and identify a direct contact.	Operations, Parks, Utilities		Possibly remove	
22	Explore methods to improve and enhance telecommunications, including county wide radio.	EM	Unsure	Follow up with EM on status and whether to carry forward.	Ongoing, city is moving onto the state radio core as of November
23	Encourage the study of alternative systems for delivering reliable power to residents.	LU	Unsure	Follow up	
24	Conduct a town-wide inventory and assessment of street trees; consider conducting the inventory in conjunction with other municipalities in the region.	Parks, GIS	Carry forward	Carry forward. City has been trying to coordinate with power companies to	
25	Increase the funding for public tree maintenance and plantings.	Parks, BOF	Carry forward	Capital funding has been requested numerous times for this task. Carry forward	

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	April 27, 2020	**ATTENDEES:**	Chris Spaulding, First Selectman
PROJECT:	WestCOG HMP Update		Jonathan Luiz, Town Administrator
MMI #:	3101-22		Joe Miceli, Emergency Management Director
SUBJECT:	Town of Weston		Tracy Kulikowski, Land Use Director
LOCATION	Virtual/Remote		John Conte, Public Works Director
	Zoom		Victoria Brudz, MMI

Victoria Brudz met with Town of Weston representatives on April 27, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A brief synopsis of the planning process was given during the meeting, and a PowerPoint presentation will be distributed after the meeting to explain the planning process further. Attendees followed an open discussion format. Discussion topics are grouped below.

Critical Facilities

- The Town Library should be added as it often used as a comfort/warming center. The town is working to install a backup power supply at the library.
- Facilities to add to the list include:
    - Communication Center – 56 Norfield Road
    - Town Hall Annex and Board of Education Building – 24 School Road
- It was noted that the high school is the primary shelter, and the middle school and Hurlburtt Elementary are secondary shelters.

Development Trends

- Recent municipal development includes an extensive sidewalk system throughout the town center area to connect town facilities, upgrades to the firehouse, and renovations to the library.
- Residential development has been scattered throughout the town with no major subdivision projects.

Recent Events

- A winter storm event in March 2018 resulted in roughly 220 road closures due to down trees and powerlines. Getting snow out of impacted areas was not an issue, however access was an issue during this event.
- A microburst event in 2017 blocked several roads in town and left many residents without access for several days. There was extensive tree damage, downed power lines, and wire fires.

RL Properties

- RL properties are not a primary concern for the town as there are not many and they seem to be scattered throughout the town. There have also been very few damages reported, therefore pursuing

actions such as elevation or acquisition may not be necessary. Town infrastructural upgrades are the highest priority.

- The town did attempt a project on Deepwood Road; however, the costs outweighed the benefit and the project was not complete.

Hazards Discussion

- Icing is a concern along Georgetown Road near Samuelson Road, Steep Hill Road, Lords Highway near the Davis Hill Road intersection. Georgetown Road is a state road which presents challenges when discussing mitigation.
- Flooding is also a concern in many of the areas where icing is an issue. Flooding is also a concern on Slumber Corners (a private road), and Newtown Turnpike at Dillon Pass. The state did clean a culvert in the area of Dillon Pass, however, maintenance does not appear to be regular enough to mitigate flooding, and the culvert is due to be cleaned again.
- Route 53 has sections that flood along its entirety from Weston north to Bethel.
- Slumber Corners, a private road, has had flooding issues in the past which resulted in high water rescues, however, property damage tends to be minimal. Residents have had discussions with engineers on mitigation strategies. The town believes the financial aspect of a project has prevented implementation.
- Emergency access is a concern in most areas throughout the town during any event type as many roadways do not have multiple access routes. Therefore, downed trees or power lines limit access to many residents.
- The town sought funding for a culvert replacement in the past on Deepwood Road along Jennings Brook. It is believed that due to Superstorm Sandy, funds were reallocated, and the project did not get addressed.
- There is a large metal culvert on Timber Mill Lane that is deteriorating and needs to be replaced.
- There is a privately owned dam in town at Cobbs Mill Pond that has not been maintained in the past few years as the property is now vacant. While there is no immediate concern regarding dam failure, it appears the dam may fail due to excessive sediment build up, and the pond may need to be dredged.
- Some drainage systems need to be upgraded. There are several open pits and culverts that will need to be closed and replaced with catch basins in the next few years.
- The town is concerned with tree damage and wind throughout the entire town.
- There is a specific concern regarding the northern entrance to School Road, where several critical facilities are located, and loss of access during a storm due to several pine trees on a residential property. The town has attempted to work with the resident to remove these trees to mitigate road closures, however, the attempts have been unsuccessful.
- A culvert was replaced several years ago on Route 57 by the State, which has lead to numerous complaints from residents stating that this replacement has shifted drainage patterns and is resulting in flooding on their properties.

Capabilities

- The town has been proactively upgrading and replacing bridge infrastructure over the past few years.
    - In the process of replacing Cavalry Road, River Road and Davis Hill Road
    - Recently replaced Cartbridge Road, Pent Road, and Valley Forge Road.
- The town has a tree warden, a maintenance budget, and the warden actively tracks the maintenance and need throughout town.

- The town has backup generators at the Town Hall, EOC, and Shelter.
- Currently, the town uses the Code Red system to disseminate emergency messages, however, the system is being upgraded to Everbridge to allow for more robust alert capabilities during all types of events.

Goals, Objectives, and New Actions

- The town would like to install a natural gas back up generator in the Town Library, which is a critical facility.
- Multiple bridges and culverts need to be upgraded and replaced.
- There is a need to address the icing concerns along multiple roads, however, some are state owned, and coordination needs to be done.

Local Coordinator

- The Land Use Director will be the local coordinator.

Status of Previous Actions

#	Description	Responsible Party	Status	Notes
1	Institute water volume monitoring program. This could take the form of an irrigation/sprinkler reduction program.	BOS	Incomplete	Last plan was adopted during drought, so this was a specific recommendation at the time. There may be some language in the POCD update regarding this action. Carry Forward.
2	Examine possible regulation requiring engineered storm water management systems to control runoff from new subdivision roads and parking lots.	P&Z, Engineering	Ongoing	Work with property owners on storm water management. remove – capability
3	Reach out to owners of properties with flood risk to discuss the potential for elevation or acquisition.	BOS	Incomplete	No action taken; town infrastructure is higher priority. Remove.
4	Consider a town-wide investigation of culverts or bridges that may need to be replaced or repaired. Conduct necessary repairs or replacement as needed.	DPW	Ongoing	Ongoing program of assessing infrastructure. Valley forge, Pent Rd, Cartbridge Rd, were all replaced. Carry forward to identify those bridges that need to be replaced.
5	Assess vulnerability of existing critical facilities to earthquakes, hurricanes, tornadoes	EM, Building	Carry forward with revision	Tree removal surrounding critical facilities is a greater concern. This action may have been geared toward upgrading generator capacity.
6	Consider participation in an inter-municipal tree condition inventory.	CC, P&Z, BOS, WCCOG	Incomplete	The town was unaware of any type of plan or discussion regarding this action. Possible regional action.
7	Implement strategies identified in vulnerability assessment.	EM, Building Dept.		Participants were unsure of the status of this action. Will follow up with the Land Use Director on this action.
8	Develop a Capital Plan for Fire Ponds and Hydrants	FM, P&Z, Engineer, BOS, DPW, CC	Incomplete	Carry this forward. The town is all volunteer, and most properties are served by wells and septic systems, and the FD often works directly with property owners. There are a variety of maintenance agreements, and many actions have happened organically. Carry forward. Include Fire Marshall in responsible party.

#	Description	Responsible Party	Status	Notes
9	Maintain existing fire ponds. Work with home owners in the vicinity of Cobs Mill Pond and Beaver Brook to remove silt and debris and consider use as fire ponds. Explore additional areas for new fire ponds, cisterns, and hydrants.	DPW, FM	incomplete	Carry forward.
10	Investigate ways to enhance/improve telecommunication infrastructure and emergency communication throughout the town.	P&Z, DPW, CC, EM, Private	Carry forward with revision	There is currently a radio project underway, however, the town is looking to modernize the entire system within the next year or two.
11	Identify and upgrade critical facilities (public and private) to ensure resiliency against natural hazards	BOS, EM, Private	Carry forward	Revise to identify the library needs – natural gas generator.
12	Enhance Community preparedness programs: Develop educational materials and brochures promoting emergency preparedness and 'best management practices' for natural hazards, targeted to homeowners.	EM	Carry forward with revision	May fall under CERT teams. Some may fall under new communication system where informing more robustly. Combine with #13
13	Enhance Community preparedness programs: Provide "welcome kits" to new home owners for properties located within the floodplain, or with a significant risk of flooding.	EM	Carry forward with revision	Not sure if this is happening. GIS makes it easier to identify flood hazards for owners. Homeowners purchasing older houses, want to renovate with substantial improvements. Education occurs case by case.
14	Maintain and explore options for the procurement of emergency backup power (e.g. micro grid, fuel cell).	EM	Incomplete; Potentially Carry Forward	This action was specifically made by the fire Marshall regarding the town center. The town would be interested in implementing mircrogrid if funding were available. Follow up with the Marshall regarding this action.

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	April 9, 2020	**ATTENDEES:**	Michele Onofrio, Building Assistant
PROJECT:	WestCOG HMP Update		Michelle Perillie, Planner & CRS Coordinator
MMI #:	3101-22		Rob Yost, Fire Chief
SUBJECT:	Town of Westport		Keith Wilberg, Town Engineer
LOCATION	Virtual/Remote		Alicia Mozian, Conservation Director
	Zoom		Victoria Brudz, MMI

Victoria Brudz met with Town of Westport representatives on April 9, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A PowerPoint presentation was used to explain the planning process and guide the meeting. Attendees followed an open discussion format. Discussion topics are grouped below.

Critical Facilities

- There have been no major changes to critical facilities

Facility	Address	Type
Burr School		Shelter
Ems		Ems
Dpw		Public Works
Westport Leaf Compost Facility		
Westport Transfer Station		
Mediplex Of Westport	1 Burr Rd	Care Facility
Landmark Academy	11 Burr Road	School
Town Hall	110 Myrtle Avenue	Town Hall
King's Highway Elementary School	125 Post Rd. West	School
Long Lots School	13 Hyde Ln.	Shelter
Green's Farms School	17 Morningside Drive	School
Saugatuck Elementary School	170 Riverside Ave.	School
Westport Weston Health District	180 Bayberry Lane	Community Health Programs Administration
Westport Senior Center	21 Imperial Ave	Shelter
Ct Center For Massage Therapy	25 Sylvan Road South	School
Coleytown Middle School	255 North Ave.	Shelter
Temenos Institute Inc	29 E Main St	Care Facility
Highway Division	300 Sherwood Island Connector	Public Works
Greens Farms Academy	35 Beachside Avenue	School
Alcoholism & Drug Dependency Council,Inc	420 Post Road West	Care Facility

Jewish Family Service	431 Post Road East	Care Facility
Hall-Brooke Hospital	47 Long Lots Rd	Care Facility
Seton Academy	47 Long Lots Road	School
Westport Police Department	50 Jesup Road	Police
Westport Fire Department Headquarterswestport Emergency Operations Center	515 Post Road East	Eoc, Ambulance And Fire
Westport Fire Department - Saugatuck	555 Riverside Avenue	Ambulance And Fire Service Combined
Coleytown Elementary School	58 Easton Rd.	Shelter
Westport Fire Department - Coleytown	61 Easton Road	Ambulance And Fire Service Combined
Westport Fire Department - Greens Farms	66 Center Street	Ambulance And Fire Service Combined
Staples High School	70 North Ave.	Shelter
Bedford Middle School	88 North Ave.	School
The Learning Community Day Sch	90 Hillspoint Road	School

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- The town has acquired 2 portable generators if built in stand-by power fails at any critical facilities, including shelters or pump stations. The generators utilize standard outlets, and the town is continuing to upgrade facilities to accommodate these portable generators if necessary.

Development Trends

- There has been continuous development in town, including large scale multi-use and multi-family development. It is believed that some of this development is occurring in areas of flood risk. To alleviate flooding concerns, some structures are floodproofing, and stormwater conveyance regulations are enforced.
- Houses along the coastline are continuing to elevate.

Recent Events

- The September 2018 flood event impacted the town greatly with 5.4" of rain in total. The storm resulted in the loss of the Hillandale Bridge. An emergency repair was conducted on the bridge; however, it is still in need of replacement.
- There was no major snow, ice, or windstorm event that resulted in notable damage in the last five years.
- There was brief discussion about the 2013 blizzard which resulted in access concerns and snow removal issues. Meeting attendees noted that snow was dumped into the sound with permission from the State.

RL Properties

- Many RL and SRL properties have been elevated or completely rebuilt. Many of these efforts occurred after Superstorm Sandy.
- There are still several RL properties that are a concern, with a select few on the radar for future acquisition by the Town.

Hazards Discussion

- The town is seeing more frequent high intensity rainstorms resulting in heavy rainfall in short periods of time, which results in stress on drainage and conveyance systems.
- Riverine flooding is a concern along several streams in town.
    - Muddy Brook – several culverts are undersized and need to be upgraded
    - Dead Man Brook – several culverts along the stream are undersized and need to be upgraded.
- Other culverts of concern are in the area of Violet Lane, Myrtle Avenue, and Boston Post Road.
- Most brooks in town present a flooding concern, and most associated culverts need to be upgraded.
- It was noted that some areas in town have a very high water table, and as development continues, this water is shifting presenting another type of flooding concern.
- Nuisance flooding is becoming a more notable problem in town, especially in the area of Saugatuck Shores and Canal Road. The town continues to monitor water levels and these nuisance flooding events. While it has had minimal impact on emergency services access, there is concern that there may be access issues in the near future.
- Flooding is also an issue along some private roads in town, however, the town has no capabilities along these roadways and finds it challenging to incentivize associations to mitigate or address these flooding problems.
- There is concern with several DOT owned culverts under Interstate 91 and the railroad.
- Some roadways and areas with flooding concerns include:
    - Hiawatha Lane
    - Berkeley Road
    - Black Birch Road
    - Compo Mill Cove
    - Saugatuck Shores

Capabilities

- Current stormwater regulations require on-site control of the 25-year rain event, or 6.4", according to NOAA Atlas. However, it was noted that at times during the short timeframe, heavy precipitation events, systems are challenged in managing the water.
- A flood study was conducted on 8 to 9 streams in town to assess for flooding concerns and infrastructure.
- The town owns a high water rescue truck and is looking to acquire a second. This vehicle allows for easier access during flooding events, as well as snow events if necessary.
- There is a part-time tree warden that works to mitigate the hazards presented by dead trees.
- When working with Eversource there is a community liaison, as well a Subject Matter Expert (SME) that is employed by the town. This SME is a former electric employee and has extensive knowledge on the system in town and electric infrastructure. The SME assists in power restoration efforts during an event. Notably, during and after Superstorm Sandy, the town has strong coordination with Eversource and believes that they can cooperate on that same level during future events.
- The town conducts outreach before a storm to warn residents of flooding concerns and urges them to relocate vehicles to higher ground to minimize losses.
- Recent upgrades to the train station parking lot have provided high ground parking. These upgrades included elevating some parking areas, regrading and repaving, and a new drainage system.

Goals, Objectives, and New Actions

- The town would like to focus on specific properties for acquisitions.
- The town is looking to acquire a second high water emergency response vehicle.
- To assist in zoning regulatory changes, P&Z would like to develop a new committee to focus on flood hazard area regulations.
- While many culverts need upgrading and replacement, the town would like to begin pursuing funding to assist with necessary upgrades.

Local Coordinator

- The town planner and building assistant will continue to be the local coordinators.

Status of Previous Actions

#	Description	Responsible Party	Status	Notes
1	Incorporate a Natural Hazards Awareness Week and conduct corresponding outreach the community and all interested parties. Activities will focus on flooding and other natural hazards, including associated hazard functions, governing laws/regulations, mitigation strategies and precautions. Outreach will also be conducted throughout the year, wherever possible	EM, P&Z, CC, Buildings	Carry forward	This was not achieved due to staffing limitations. It was noted some similar outreach is already conducted during some town events.
2	Acquire properties within the floodplain as funding becomes available.	P&Z, CC, DPW	Carry forward with revisions	
3	Review the Westport Plan of Conservation and Development and other relevant plans to identify open space projects that preserve or restore the functions of natural systems and may be eligible for funding under mitigation grants.	CC, P&Z	Carry forward with revisions	Condense actions 2 and 3 as the town would like to pursue specific property acquisitions for flood storage and open space preservation.
4	Identify and publicize regulations that will preserve and protect watercourses, waterbodies, wetlands, steep slopes, and floodplains, and those that will conserve floodplain fringe areas, wellhead areas, areas of high groundwater availability, and unique/special habitat areas.	P&Z	Remove	Capability. This is an ongoing action.
5	Minimize the amount and intensity of development in “V” flood zones, new non-water dependent development from “V” zones .	P&Z	Remove	The town believes this action needs to be addressed by way of other regulations. Possibly incorporate V-zone acquisitions into actions 2 & 3.
6	Change the floodplain regulations to require at least one foot of freeboard for new or substantially improved homes.	P&Z, Town	Complete	
7	Study the use of V-Zone standards for coastal A-Zones.	P&Z, Building	Complete	Regulations have been changed to clearly state the standards.
8	Adopt an ordinance that would place responsibility for stream channel maintenance on the property owner and give Westport enforcement power. Such ordinances would include stream dumping, channel maintenance, and land clearing disturbances. These ordinances would reduce the likelihood of localized flooding and could lead to additional points toward CRS reclassification.	CC, DPW	Carry forward	The town believes this is an achievable action and would like to pursue it under the development of a new committee.
9	Evaluate the zoning regulations for ways to reduce land coverage and building size, including in flood zones.	P&Z, Town	Carry forward with revisions	The P&Z representative would like to form a working group or committee that is capable of evaluating, developing and pursuing zoning regulations changes associated with flood hazard areas. This includes actions 9-13
10	Modify Zoning Regulations to change the time horizon for work that is to be included in substantial improvement from 5 years to life of structure.	P&Z	Carry forward with revisions	

#	Description	Responsible Party	Status	Notes
11	Modify Zoning Regulations to require that any building or structure even if only a portion of which lies in a flood hazard zone is designed to be fully protected as if the entire structure were in the zone.	P&Z	Carry forward with revisions	
12	Modify Zoning Regulations to require that any building or structure even if only a portion of which lies in a more restrictive flood hazard zone that the building be designed to be fully protected as if the entire structure were in the more restrictive zone	P&Z	Carry forward with revisions	
13	Modify Zoning Regulations to prohibit structures entirely or partially over water unless water dependent uses	P&Z	Carry forward with revisions	
14	Regularly review subdivision regulations and make appropriate changes to encourage alternatives to placing lots in flood prone areas and to minimize impermeable ground coverings, if necessary.	P&Z		
15	Undertake preparation of an update to the 1970 master drainage plan (the "Jackson" study).	DPW, RTM		
16	Westport will encourage the Aspetuck Land Trust to initiate a maintenance program for Sasco Creek as it passes through their property, in an attempt to foster an understanding that maintaining a clear channel in the northern section of the parcel will reduce flooding occurrences on Gristmill Lane. If necessary, Westport can pursue clearing rights on these parcels.	DPW, CC Aspetuck Land Trust		
17	Pursue and support comprehensive studies that recommend specific strategies for effective erosion abatement.	CC, DPW		
18	Investigate and pursue the purchase of an automated sand bagger.	EM		
19	Obtain FEMA training on post disaster single-family dwelling assessments and other flood related issues.	EM, P&Z, CC, Buildings		
20	Make FEMA's Emergency Management Institute classes available to Town Employees, including Rapid Visual Screening Techniques, designed to teach skills necessary for inventorying disaster-susceptible buildings. Skills acquired by attending this course could be utilized in implementing the Hazard Mitigation Plan.	Town, EM		Complete? Town employees have been participating in training events and the annual conference of the Connecticut Association of Flood Managers since 2014, meeting the intent of this action.
21	Request that FEMA continue to work to improve the accuracy of the updated FIRM maps, with special attention paid to unnumbered A-zones.	DPW, P&Z		
22	Obtain and update town GIS with Coastal AE Zones (Limit of Moderate Wave Action [LiMWA]) due to new Building Code requirements for properties within this area	DPW, GIS, Buildings		

#	Description	Responsible Party	Status	Notes
23	Provide the Building Department with database of properties within Coastal AE Zones (Limit of Moderate Wave Action [LiMWA])	P&Z, GIS		
24	Encourage elevations of existing homes to comply with Floodplain Regulations	EM, P&Z		
25	Promote the use of functional shutters for properties located along the coast to guard against window breakage which can result in structural failure. Investigate funding sources to promote this relatively inexpensive type of retrofitting on a large scale.	EM, Building		
26	Retrofit existing above ground utility structures to make them more disaster resilient.	Town, DPW, EM, P&Z, Utilities		
27	Determine how to reuse disposed brush within the community to reduce costs of exporting from Westport (chips, firewood, composting).	Public Works		
28	Encourage moving as many utility lines underground as possible.	P&Z, DPW		
29	Place deflectors on key utility lines to reduce accumulation of ice or snow.	Utilities		
30	Encourage appropriate streetscaping and planting, particularly around utilities.	DPW, P&Z		
31	Identify additional sites for yard waste and storm debris.	DPW		
32	Evaluate municipality's sheltering and evacuation needs for a variety of storm scenarios.	EM, WWHD, Human Services		
33	Improve coordination with CL&P and NU	EM, Police, Fire, DPW		
34	Identify opportunities for cooperation and coordination with private road associations	EM, DPW, Private		
35	Improve (bridge) access to Saugatuck Shores community	EM, DPW, CC		
36	Implement specific physical actions that help protect public critical facilities against wind damage as funds become available.	EM, DPW		
37	Encourage private marinas and yacht clubs to develop management plans that address pollution prevention and hazard mitigation.	CC, P&Z, EM, Boating Advisory Committee		
38	Begin to evaluate and work to harden the structural integrity of Town-owned Critical Facilities and buildings and their ability to withstand earthquakes.	Building, EM		
39	Encourage privately owned critical facilities to evaluate the ability of the buildings to withstand earthquakes and tornadoes, and to address and deficiencies identified.	Building, EM		

#	Description	Responsible Party	Status	Notes
40	During the Natural Hazards Awareness Week include activities, workshops and materials about all natural hazards.	EM, CC, Buildings, P&Z		
41	Provide the earthquake-related publications to the public library for inclusion with the other natural hazard publications.	EM, Library		
42	Request that the Town, including the Board of Education, if applicable, retain the services of a professional engineer to survey all municipally owned buildings for their ability to withstand earthquake and wind loading. Prioritize any retrofitting, giving those buildings to be used as shelters the highest priority. If analysis reveals that a particular building is better suited as a shelter than one that is currently being used, then consider relocating the shelter to that location.	EM, BOE		
43	Update drought management plan to be in alignment with State of Connecticut Drought Management plan.	WWHD		
44	Work with the State Department of Energy and Environmental Protection, local conservation officials and dam owners to identify which dams are no longer serviceable and could be removed. Work to coordinate and identify funding opportunities.	EM, DEEP, DPW, CC		
45	Continue to install and maintain warning gauges on local dams as the opportunity or need arises.	DPW		
46	Ensure Emergency Operations Plans are updated and on file with local emergency management officials. Local emergency management officials will assist dam owners as needed.	EM, Police, Fire		Dam EOPs are now called Emergency Action Plans (EAPs). Most EAPs have been completed. Does the town have copies?
47	Work with dam owners to ensure that maintenance and inspections are conducted as required and documented with local and state emergency management officials.	EM, DPW, CC, DEEP		
48	Develop and conduct a Dam Failure Exercise that involve all stakeholders and encourages preparedness through practice using public notifications systems. Assess and practice evacuation and response plans. Practice communication and coordination of local and state emergency response personnel	EM, DPW, CC, P&Z, DEEP		
49	Develop public awareness information material to distribute to property owners/occupants in the dam failure inundation zones.	EM, DPW, CC, P&Z, Buildings		
50	Evaluate how to best prepare for the implications of global sea level rise to best balance public health, safety, and welfare.	P&Z, EM, DPW, CC		

MILONE & MACBROOM

MEETING MINUTES

MEETING DATE:	June 11, 2020	**ATTENDEES:**	Mike Conklin, Director of Environmental Affairs
PROJECT:	WestCOG HMP Update		Mike Wrinn, Director of Planning and Land Use Management
MMI #:	3101-22		Frank Smergilio, Assistant Director of Public Works/Town Engineer
SUBJECT:	Town of Wilton		Victoria Brudz, MMI
LOCATION	Virtual/Remote Zoom		

Victoria Brudz met with Town of Wilton representatives on June 11, 2020 to begin the local planning process for the hazard mitigation plan update. The meeting was held as a video conference using the Zoom platform. A PowerPoint presentation was sent to representatives prior to the meeting to explain the planning process and guide the meeting. Discussion topics are grouped below.

Critical Facilities

- The town hall roof was recently replaced.
- There is a new senior care facility at 211 Danbury Road, Sunrise of Wilton.
- Miller-Driscoll school was fully renovated within the past few years. This likely included a new backup generator.
- Add the Comstock Community Center to the list. The center was recently renovated and was identified as a shelter during the COVID-19 pandemic; indicating it would likely be a shelter for future events if need be. It is located at 180 School Road.

Recent Events

- Recent events have not resulted in major damages. Riverine flooding has also been minimal.
- Other departments may be able to provide additional information.

Hazards Discussion

- The Dana Dam on the Naugatuck River is currently a concern. An engineering study is currently being done for the removal of this dam. The town is working with Save the Sound on the beginning stages of permitting.
- Northern Wilton typically experiences more snowfall. The town and residents are aware and are diligent during winter storms.
- Two bridges in town, Arrowhead Road and Lovers Lane, are currently in design phase for replacement or reconstruction. Arrowhead road is often overtopped by the 100-year flood. The town would like to elevate this bridge above the 100-year flood level.

Capabilities

- The town is currently implementing an aggressive tree maintenance program. The town has a tree warden and an assistant tree warden. The assistant is designated to work directly with utility companies.
- For the past 3 years, the town has paved roughly 13 miles of roadways per year. During the process, culverts and catch basins are inspected for necessary repairs, replacement, or cleaning.
- The town uses See Click Fix for reporting tree damages throughout town.
- An asset management system is currently in place for tracking infrastructure. The town has about 70% of storm drains mapped in GIS. This system allows for easy tracking of damages and necessary repairs throughout town.

Goals, Objectives, and New Actions

- The town is looking to address the high priority bridges identified in the engineering study.
- Elevate Arrowhead Road bridge above the 100-year flood elevation.

Local Coordinator

- The participants identified Chief Lynch as the best option for local coordinator, or to delegate the role.

Wilton Critical Facilities

Name	Address	Type	Notes
Public Works	238 Danbury Road	Public Works	
Wilton Transfer Station	Mather Street	Public Works	
Middlebrook School	131 School Rd.	School	
Miller-Driscoll School	217 Wolfpit Road	School / Shelter	
Our Lady Of Fatima Regional Sc	225 Danbury Road	School	
Wilton Volunteer Ambulance Corps	234 Danbury Road	Ambulance Services, Air Or Ground	
Wilton Fire Department Station 1 - Headquarters	236 Danbury Rd	Fire	
Town Hall	238 Danbury Road	Town Hall	
Wilton Health Department	238 Danbury Road	Community Health Programs Administration	
Wilton Police Department	240 Danbury Road	Police / Eoc	
Lourdes Health Care Center, Inc.	345 Belden Hill Road	Care Facility	
Wilton High School	395 Danbury Rd.	School / Shelter	
Witon YMCA	404 Danbury Road	Shelter	
The Greens At Cannondale	435 Danbury Road	Care Facility	
Wilton Meadows Health Care Center	439 Danbury Rd Rt 7	Care Facility	
Catholic Family Services Of Wilton	44 Old Ridgefield Road	Care Facility	
Wilton Fire Department Station 2	707 Ridgefield Road	Fire	
Brookdale Wilton	96 Danbury Rd	Care Facility	

- Add: Comstock Community Center and Sunrise of Wilton

MILONE & MACBROOM

Wilton Previous Actions

Red text – could benefit from input from other municipal staff.

Yellow highlight – revisions for action are to be made, any additional comments or input will help to further develop this action.

Strategy	Description	Responsible Party	Status	Notes
Wi1	Work with telecommunications entities to strengthen mobile network telecommunications to increase resiliency.	P&Z, Utilities	Ongoing/carry forward	Constantly working with carriers to see where additional towers are necessary. 5G installation in the near future
Wi2	Work with assisted living facilities in town to ensure preparedness and resiliency to natural hazards, including providing the town a better understanding of needs and vulnerabilities for each facility.	EM	Carry forward	Recent high levels of high communication, so this is possible.
Wi3	Encourage the study of alternative systems for delivering reliable power to residents.	EM, P&Z, Utilities	Remove	No longer a priority. The Town has determined that other redundancies are in place.
Wi4	Continue to provide education materials on preparing for natural disasters. Including exploring template guides for EOC operators.	EM		Follow up with EM on status and whether to carry forward
Wi5	Develop a GIS application to assist personnel in the event of an emergency or natural disaster.	EM, Police, Fire	Carry forward with revisions	Residents can use See Click Fix now, and trees can be mapped and identified. Could be used for flooding/electrical/even in a pandemic
Wi6	Implement a town-wide GIS.	IT	Carry forward with revision	There is online GIS where residents have access. The GIS that is available needs to be continually updated.
Wi7	Inventory and update conditions of town owned significant culverts and bridges. and consider repairs or replacement as necessary or as funding becomes available.	DPW	Carry forward with revision	28 bridges/culverts as part of list. Engineers developed priority and cost. Include/address the plan specifically.
Wi8	Continue to work to implement recommendations from the current storm water management plan.	DPW, P&Z, CC	Ongoing	MS4 revisions updates done annually.
Wi9	Enhance storm drain maintenance activities: Maintain records for storm drain maintenance.	DPW	Complete/ Remove	Complete. Asset management software exists.
Wi10	Enhance storm drain maintenance activities: Continue to work to increase frequency of storm drain clean out.	DPW	Carry forward with revision	Progress impeded due to lack of funding.
Wi11	Continue to assess the ecological and health implications of winter road salting and investigate alternatives.	BOS, DPW,CC	Carry forward with revision	Water company was looking to have discussions on some areas of

Strategy	Description	Responsible Party	Status	Notes
				concern/priority areas. Revise Include coordination, include drinking water supply areas.
Wi12	Ensure that Fire Station 2 continues to serve western Wilton and analyze options for meeting expansion needs of Fire Station 2 on-site, on other sites, or by sharing services with neighboring communities.	BOS, Fire		Follow up with BOS/Fire
Wi13	Explore opportunities to add cisterns where fire protection is lacking.	EM, P&Z	Carry forward with revision	There is a subdivision that was going to put in own private cistern.
Wi14	Consider options for Merwin Meadows dam removal as identified in the engineering study.	DPW, DEEP	Carry forward with revision	Dana dam removal project. Engineering study currently underway. Another study was done and approved in 2008/2010.
Wi15	Conduct a Town-wide inventory and assessment of street trees, consider conducting the inventory in conjunction with other municipalities in the region.	Tree Committee, CC	Carry forward	Trees being tracked through See Click Fix, but there is little to no coordination with other municipalities. Recommend for Regional action
Wi16	Budget appropriate money necessary to maintain and remove dead, dying, dangerous or diseased trees in rights-of-way and on other town land.	DPW	Carry forward	Have a line item for this action, there is an ongoing program. Tree warden and assistant tree warden, both are part time.
Wi17	Seek financial assistance to manage tree debris in the Norwalk River.	DPW, CC	Carry forward	Still a concern, funding has not been acquired.
Wi18	Ensure that the Town is up-to-date in its storm water management planning (NPDES) requirements.	DPW	Complete and ongoing	Yearly submission. Ongoing.
Wi19	Prepare an assessment of bridges/overpasses along Route 7 to determine susceptibility to flooding and corresponding mitigation measures (natural and engineered).	CTDOT, WCCOG		Follow up with WestCOG

Appendix B

Regional Workshops

MILONE & MACBROOM

Agenda
Presentation and Workshop About Hazards and Risks
June 29, 2020
3:00 PM to 4:30 PM

WestCOG and its consultant, Milone & MacBroom, Inc. will conduct a 1-hour presentation and workshop to review the profiles of natural hazards and the associated risks posed by these hazards. Topics to be covered include findings from the local planning team meetings conducted in spring 2020, review of the goals and objectives of the existing SWRPA and HVCEO hazard mitigation plans, and updates to the risk profiles and estimated losses attributed to hazard events and disasters.

- Required Attendance: Local Coordinators or their designee
- Optional Attendance: Additional members of local planning teams such as public works, engineering, planning, building, and emergency management

Segment	Time	Presenters
Logins and Personal Set-up	2:55 PM	--
Welcome and Logistics	3:00 PM	David Murphy
Main Presentation	3:05 PM	Victoria Brudz, David Murphy, and Noah Slovin
Breakout Sessions	3:40 PM	--
Coastal flood risks		David Murphy
Riverine flood risks		Noah Slovin
Wind, snow, and power outages		Victoria Brudz
Report from Sessions and Wrap Up	3:55 PM	Victoria Brudz, David Murphy, and Noah Slovin
Adjourn	4:00 PM	David Murphy

WestCOG Update of Hazard Mitigation Plan

June 29, 2020

Workshop:
Hazard Identification and Risk Assessment

Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM
MILONE & MACBROOM

WORKSHOP LOGISTICS

- 3:00 – Welcome & Logistics
- 3:05 to 3:40 – Main Presentation
- 3:40 to 3:55 – Breakout Sessions
  - **Coastal Flood Risks**
  - **Riverine Flood Risks**
  - **Wind, Snow, and Power Outages**
  - **Please comment in the chat back box which group you would like to be placed in**
- 3:55 – Report from Sessions & Wrap Up

ITEMS FOR DISCUSSION

- Purpose and Need for Hazard Mitigation Planning
- Review of Hazards to be Addressed
- Report from Municipal Meetings – What Did We Hear?
- Effects of Climate Change
- Characterizing Hazard Loss Estimates
- Mitigation Success Stories
- Next Steps

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

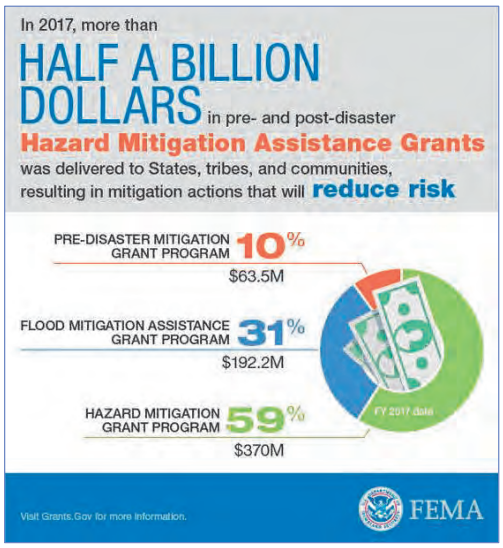
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

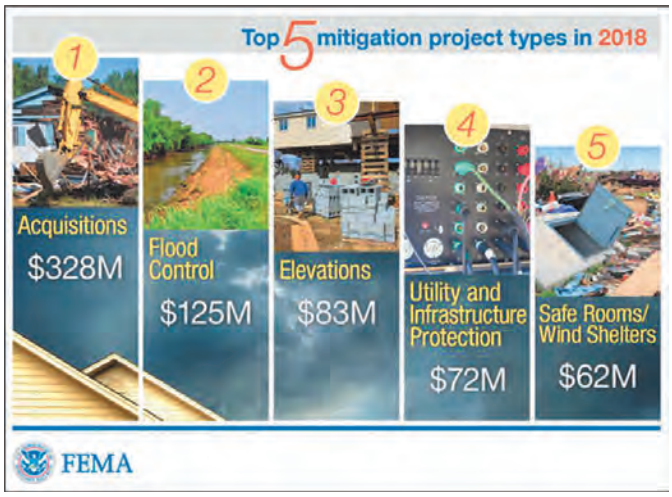
Mitigation Grant Programs

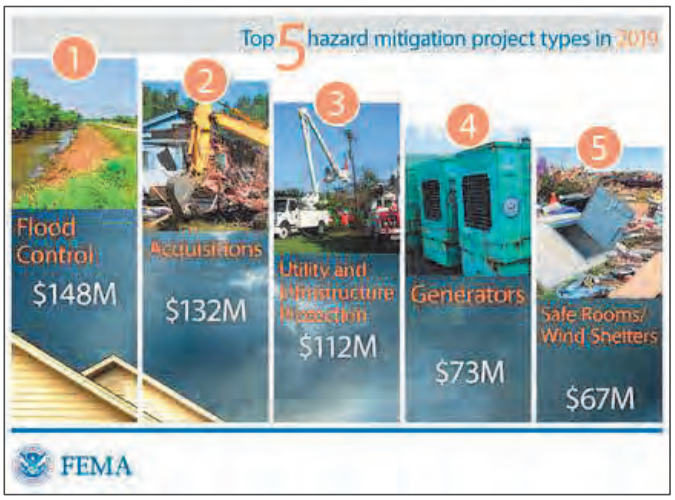
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC)
  - Replace the existing PDM
  - Shift from reactive disaster spending to research-supported investment
  - **First round of grant applications scheduled for Fall 2020**



Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN





PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Status of Plans in Connecticut

- Most initial plans developed 2005-2011
- Local plans are updated every five years

Status of Former HVCEO Plans

- The ten individual plans were approved in sequence from 11/2014 through 3/2017
- Three were updates (Danbury, Sherman, New Fairfield) and seven were initial plans

Status of Former SWRPA Plan

- The Southwest Region HMP Update was approved in May 2016

LOCAL PLAN EXPIRATIONS

- Submit plan to FEMA prior to 2021 expirations
- Submit plan to FEMA prior to availability of mitigation funds in 2021

Municipality	Plan Expiration
Brookfield	11/13/2019
Bridgewater	3/24/2020
Redding	8/4/2020
Newtown	8/5/2020
New Milford	1/3/2021
Bethel	1/11/2021
Ridgefield	1/31/2021
Stamford	5/11/2021
Greenwich	5/11/2021
Darien	5/11/2021
New Canaan	5/11/2021
Norwalk	5/11/2021
Wilton	5/11/2021
Westport	5/11/2021
Weston	5/11/2021
New Fairfield	1/29/2022
Danbury	3/7/2022
Sherman	3/12/2022

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

CLIMATE CHANGE

HAZARDS TO INCLUDE IN THE PLAN

- **Floods**
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
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- Dam Failure
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- Terrorism & Related

Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

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Ice jams along the Housatonic River
Photos newstimes

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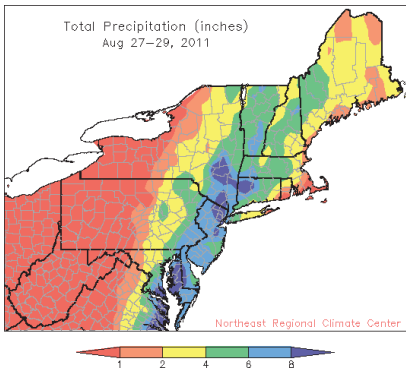
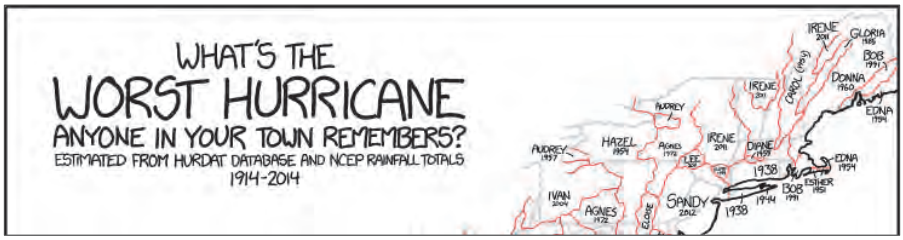
Courtesy of Northeast Climate Data Center





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Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

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Norwalk March
2018
Photo
ctpost

Bethel gym and
fitness center
Photo
newstimes

HAZARDS TO INCLUDE IN THE PLAN

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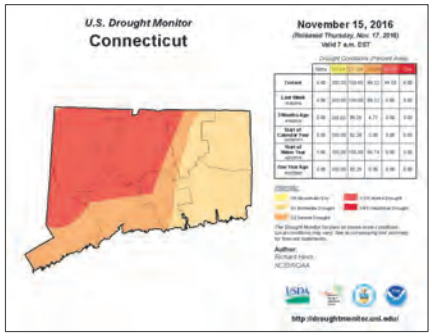

U.S. Drought Monitor

Laurel Reservoir in 2016 Courtesy of Courant.com

HAZARDS TO INCLUDE IN THE PLAN

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Brush fire in New Fairfield (2016)
Photo ctpost

HAZARDS TO INCLUDE IN THE PLAN

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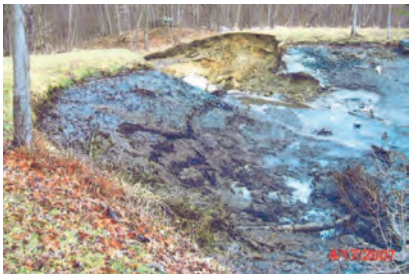
Flood control dam in Ridgefield
Photo
The Ridgefield Press



Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

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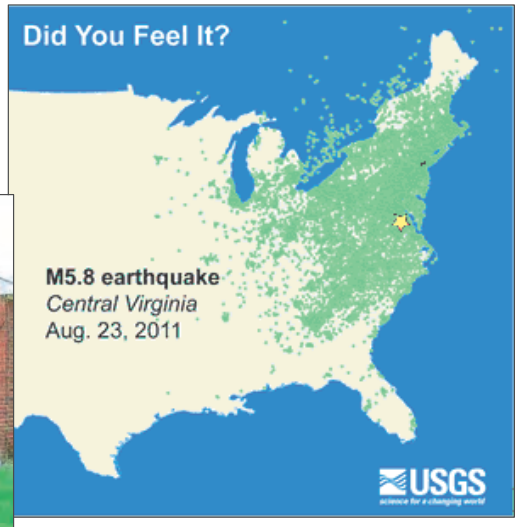

Courtesy of USGS

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Photos by MMI, Town of New Milford

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Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

REPORT FROM MUNICIPAL MEETINGS

Topics Discussed

- Critical facilities and standby power
- Changes in capabilities
- Changes in risk
- Events of note in the last 4-5 years
- Repetitive loss properties
- Review of prior mitigation actions
- Potential new mitigation actions
- Designation of the local coordinator

Let's focus on these

REPORT FROM MUNICIPAL MEETINGS

Changes in Capabilities

- Most municipalities have not changed shelters or emergency operation centers
- Addition of standby power has continued for most municipalities, with some microgrid interest
- Most municipalities are working to aggressively address tree trimming to mitigate outages and blocked roadways
- Communities are continuously making headway with drainage improvements

REPORT FROM MUNICIPAL MEETINGS

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
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Flooding often occurs as a result of poor drainage.

Tree damage and power outages is a concern region wide. Downed trees result in outages and blocked roads.

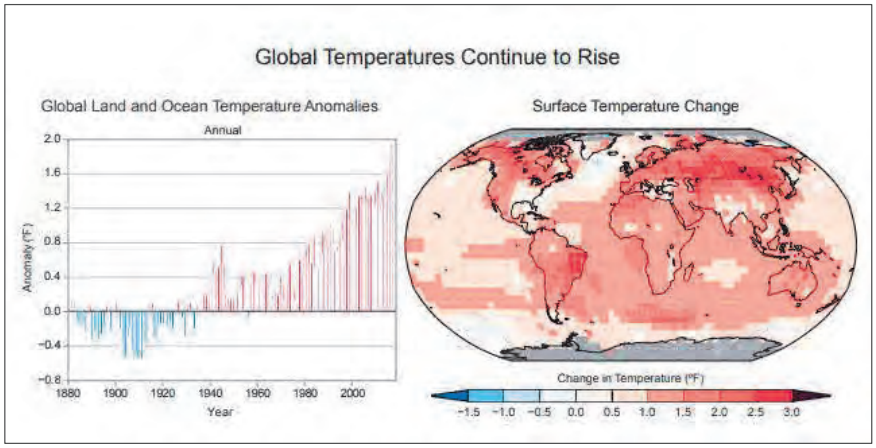
Brush fires can be a concern. While towns have strong firefighting capabilities, remote events may be a concern.

Coastal towns experience some “sunny day” flooding. Larger events are still a concern.

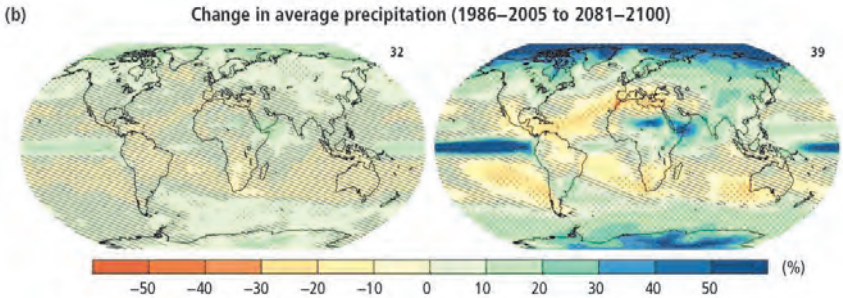
While snow removal is not always an issues, sometimes heavy snow events and winter storms present access challenges.

EFFECTS OF CLIMATE CHANGE

- Global average temperatures are increasing
- Drought occurrences may increase
- Growing seasons may fluctuate
- Extreme heat episodes may increase



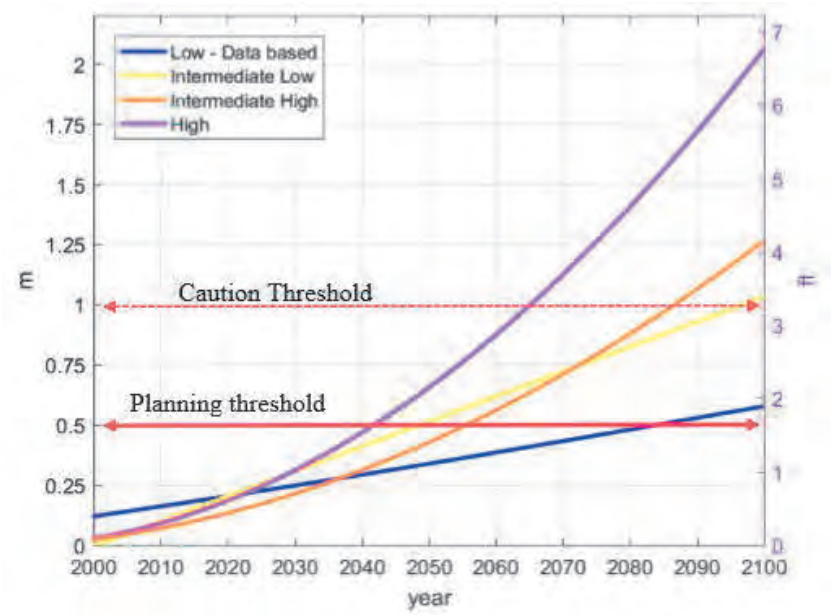
EFFECTS OF CLIMATE CHANGE



- Precipitation is expected to increase throughout the higher latitude regions
- Winter precipitation may increase, but may not always be snow

EFFECTS OF CLIMATE CHANGE

- Sea level rise projections adopted by Public Act 18-82 and incorporated into Statutes for planning
- Other Climate Change impacts as well



VULNERABILITIES, RISKS, AND LOSS ESTIMATES

Methods of Characterizing Risk

- State Hazard Mitigation Plan
- FEMA maps
- National Climate Data Center, or NCDC (now National Centers for Environmental Information, or NCEI)
- FEMA Public Assistance (PA) reimbursements after disasters
- National Flood Insurance Program (NFIP) claims
- Repetitive Loss property lists
- Meetings with local planning teams!

VULNERABILITIES, RISKS, AND LOSS ESTIMATES

Methods of Quantifying Losses

- NCEI
- FEMA PA reimbursements after disasters
- NFIP claims
- Downscaling from countywide losses in the State Hazard Mitigation Plan
- HAZUS-MH
- Asking local planning teams for typical losses from:
  - Severe Winter Storms
  - Severe Thunderstorm
  - Typical Wildfire

LOSSES FROM NATURAL HAZARDS (NCEI)

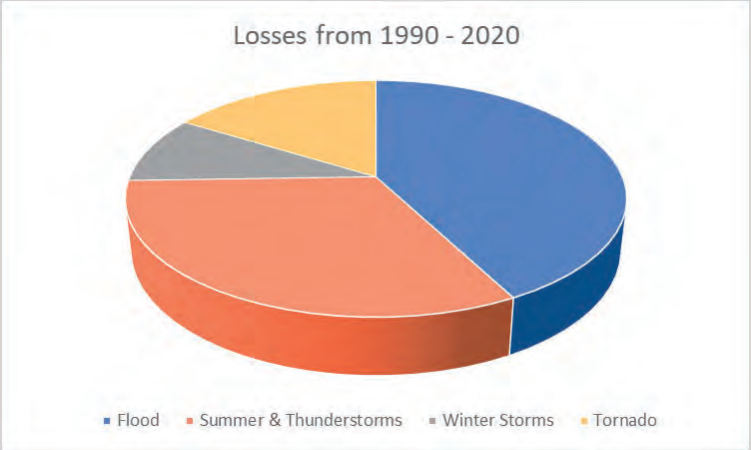
NCEI: Reported data for the Western Region since 2014

	Events Since 2014	Costs Since 2014	Average 6-year Cost	Injuries Since 2014	Deaths Since 2014	Episodes
Flood	20	Not Reported	Not Reported	0	0	Flood: 1 Coastal Flood: 6 Flash Flood: 15
Summer Storms & Thunderstorms	110	$917,000	$152,833	0	1	Extreme Heat: 16 High Winds: 94 Lightning: 4
Winter Storm	146	$1,227,000	$204,500	2	1	Blizzard: 5 Extreme Cold/Wind Chill: 17 Hail: 6 Heavy Snow: 28 High Winds: 131 Winter Storm: 24 Winter Weather: 49
Tornado	1	$50,000	$8,333	0	0	Tornado: 1

LOSSES FROM NATURAL HAZARDS (NCEI)

NCEI: Reported data for the Western Region

	Total losses 1990 – 2020	Average Annual Cost
Flood	$8,516,237	$283,874
Summer Storms & Thunderstorms	$6,485,190	$216,173
Winter Storm	$1,867,928	$62,264
Tornado	$3,269,254	$108,975



LOSSES FROM NATURAL HAZARDS (NCEI)

In summary – based on 2014 to 2020:

- Coastal floods occur once a year
- Flash floods occur about twice a year
- High winds (winter or summer) occur about 37 days a year
- Extreme heat or cold are each a concern about 2 to 3 days a year
- Heavy snow episodes occur about 4 to 5 days a year

FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS

One Declared Natural Disaster in this Region (2014-2020)

- 2018 Tornadoes

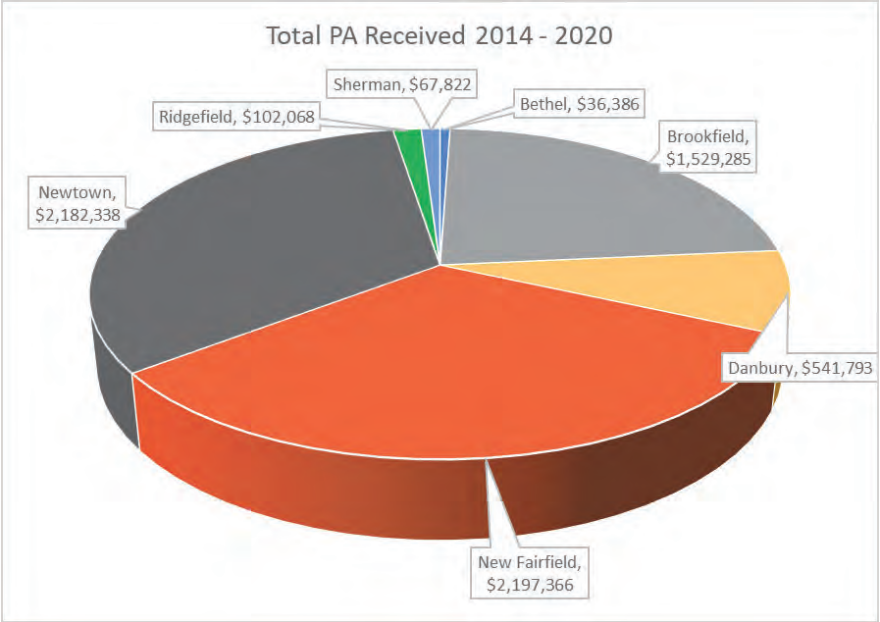
Three Declared Natural Disasters in Connecticut (2014-2020)

- 2015 Snow Storm
- 2018 Tornadoes
- 2018 Flooding

Also…

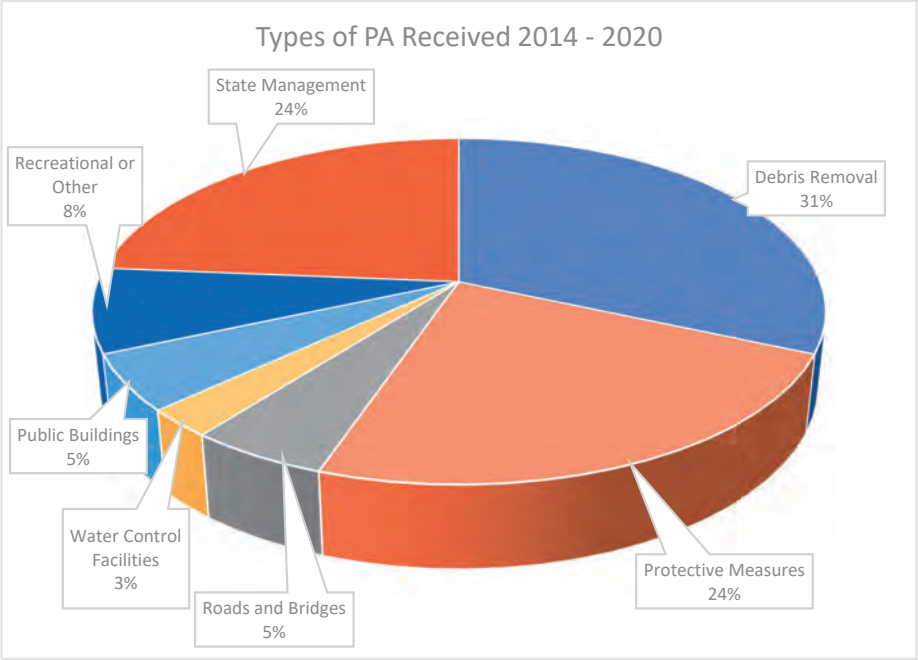
- 2020 COVID-19

FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS



PA Received attributed to tornado events – no flooding or snow

FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS



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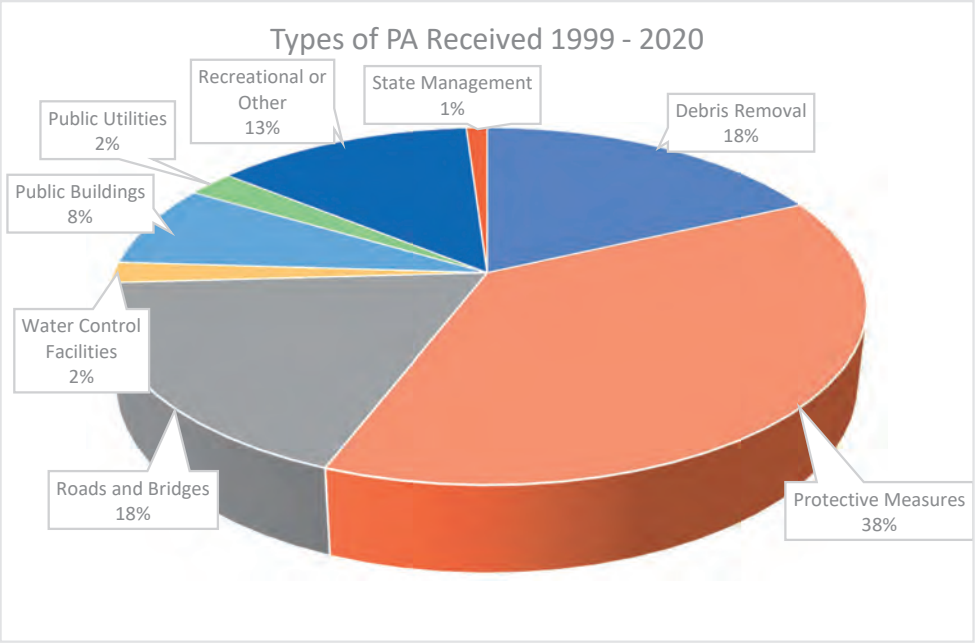


HAZUS LOSS ESTIMATES FROM STATE HMP

100-year flood loss estimations

County	Actual Replacement Value	Building Loss	Contents Loss	Business Interruption	Total Loss
Fairfield	$221,118,675	$1,727,377	$2,458,298	$110,802	$4,274,167
Litchfield	$46,324,195	$576,982	$792,744	$47,610	$1,408,816

Estimated State-wide direct losses of earthquake scenario events

Epicenter	Magnitude	Estimated Total Capital Losses	Estimated Total Income Losses	Estimated Total Losses
Stamford	5.7	$26,034,390,000	$4,635,220,000	$374,382,622,244
Haddam	5.7	$13,714,610,000	$2,667,110,000	$175,758,678,251
Portland	5.7	$21,796,420,000	$5,034,860,000	$610,757,561,304
East Haddam	6.4	$31,551,170,000	$7,875,450,000	$479,293,444,345

HAZUS LOSS ESTIMATES FROM STATE HMP

Estimated total losses for hurricane return periods

County	10-yr	20-yr	50-yr	100-yr	200-yr	500-yr	1,000-yr	Total
Fairfield	$0	$5,381	$0	$494,016	$795,624	$3,511,912	$1,998,134	$6,805,067
Litchfield	$0	$862	$0	$70,962	$56,906	$168,713	$678,390	$975,833

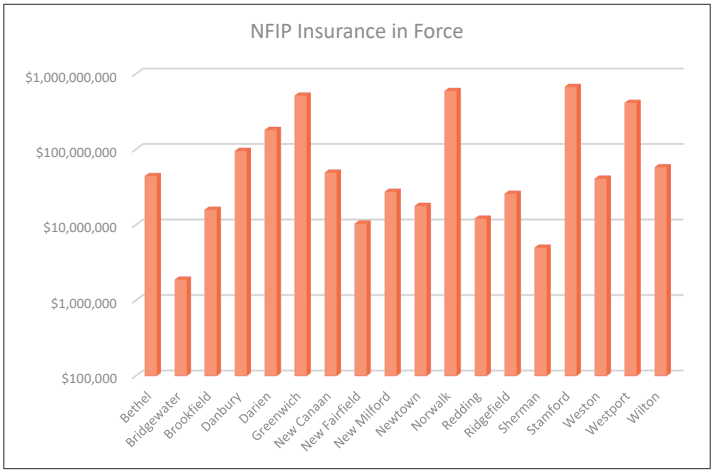
Estimated building damager per storm scenario statewide

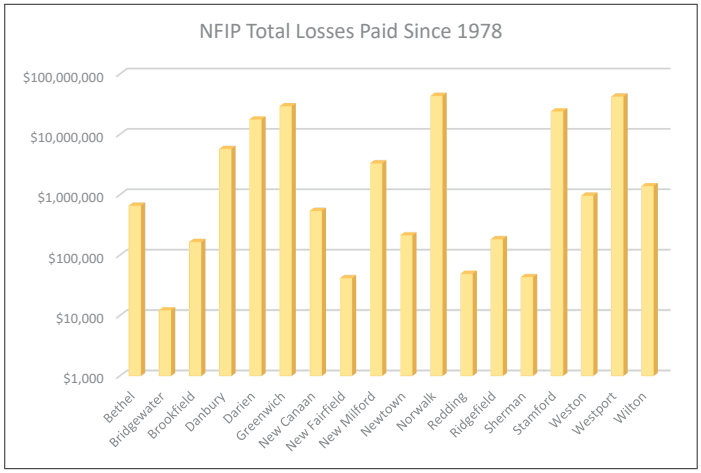
Storm Scenario	None	Minor	Moderate	Severe	Destruction
1938 Unnamed	961,438	201,970	48,961	4,502	2,091
1944 Unnamed	1,218,434	507	27	1	0
Carol	1,217,357	1,503	104	4	1
Donna	1,211,128	7,142	668	26	5
Gloria	1,002,924	17,521	800	38	5

NFIP POLICIES

Municipality	Policies in Force	Total Coverage ($)
Bethel	202	36,501,400
Bridgewater	9	2,067,800
Brookfield	53	17,635,300
Danbury	318	86,023,400
Darien	590	178,701,100
Greenwich	1,705	503,960,100
New Canaan	154	49,176,800
New Fairfield	36	9,695,400
New Milford	113	21,905,200
Newtown	65	17,775,800
Norwalk	2,164	546,205,800
Redding	42	10,960,400
Ridgefield	89	23,793,200
Sherman	17	5,236,100
Stamford	2,696	547,046,100
Weston	135	36,455,600
Westport	1,338	394,868,800
Wilton	201	53,145,000

NFIP POLICIES AND LOSSES PAID





WHAT IS AT RISK?

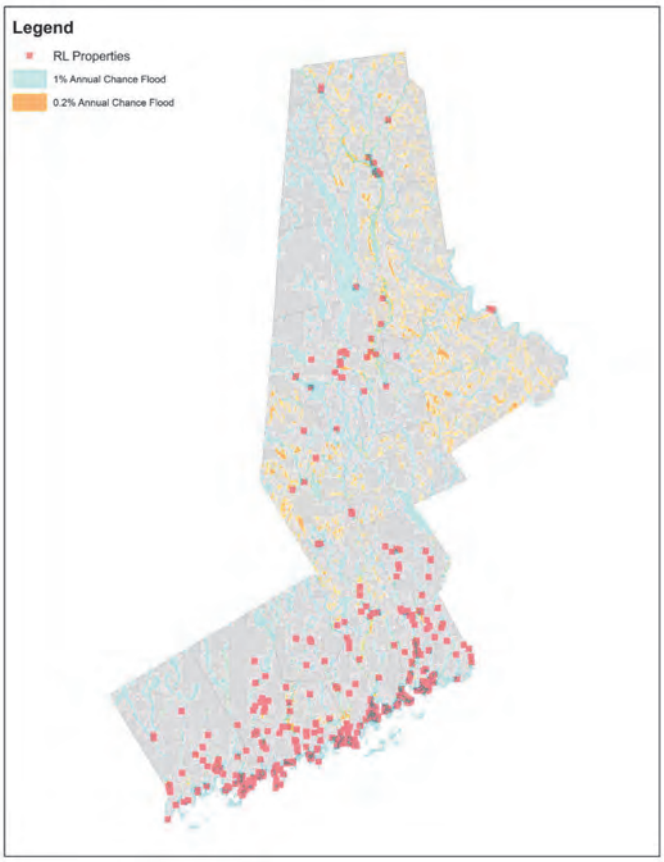
- Repetitive Loss (RL) properties
- Historic Resources
- Critical Facilities
- *As well as the built environment and people at large*

Source: FEMA, Local Hazard Mitigation Handbook

Overall – infrastructure, residential and commercial properties, utilities

REPETITIVE LOSS PROPERTIES

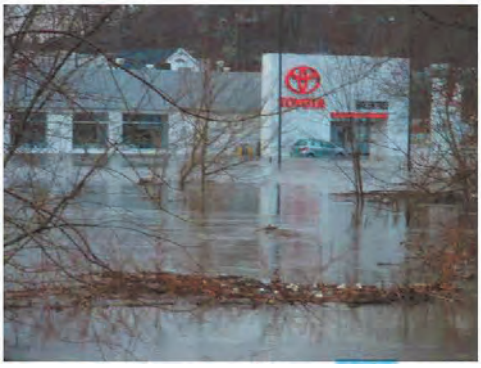
- Bethel – 5 properties
- Brookfield – 3 properties
- Danbury – 29 properties
- Darien – 58 properties
- Greenwich – 127 properties
- New Canaan – 6 properties
- New Milford – 15 properties
- Newtown – 3 properties
- Norwalk – 238 properties
- Ridgefield – 6 properties
- Stamford – 113 properties
- Weston – 15 properties
- Westport – 229 properties
- Wilton – 16 properties



WHAT HAVE WE SEEN AT RL PROPERTIES?

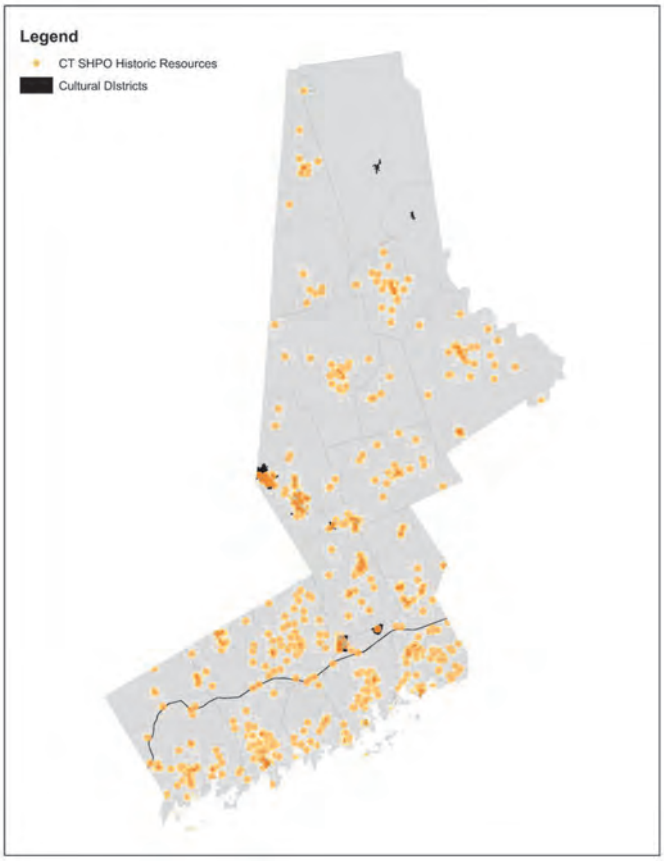
Constricted flows impacting adjacent properties

Riverine flooding



HISTORIC RESOURCES

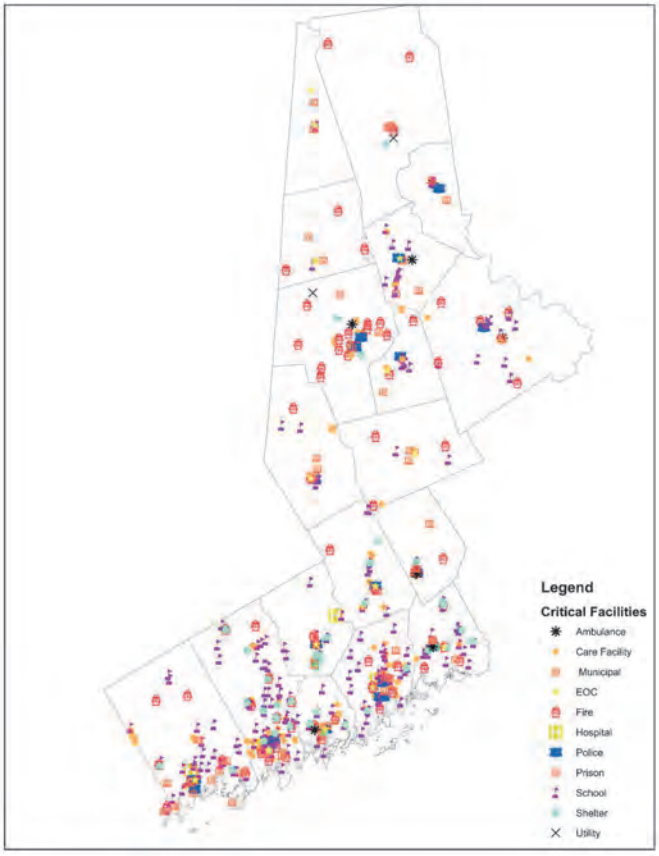
Norwalk Town House
Photo Norwalk Historical Society



CRITICAL FACILITIES

Critical facility updates and changes are made based on feedback during municipal meetings. These include

- EOC
- Police
- Fire
- Shelters
- Municipal buildings
- Care facilities
- Hospitals
- Schools
- Other facilities that are critical to emergency response



TERRORISM & SABOTAGE

Chemical

Commercial Facilities

Communications

Critical Manufacturing

Dams

Defense Industrial Base

Emergency Services

Energy

Financial Services

Food and Agriculture

Government Facilities

Healthcare and Public Health

Information Technology

Nuclear Reactors, Materials & Waste

Transportation Systems

Water and Wastewater Systems

TERRORISM & SABOTAGE

Chemical
Commercial Facilities
Communications
Critical Manufacturing
Dams
Defense Industrial Base
Emergency Services
Energy
Financial Services
Food and Agriculture
Government Facilities
Healthcare and Public Health
Information Technology
Nuclear Reactors, Materials & Waste
Transportation Systems
Water and Wastewater Systems

TERRORISM & SABOTAGE

Chemical → Manufacturer or storage: King Chemical
Commercial Facilities → Diverse sector, large crowds: Danbury Mall
Communications → Interconnected system: Satellites & towers
Dams → Irrigation or supply: Shepaug Dam
Emergency Services → EMS, police, fire
Government Facilities → Federal, state, local, or tribal: town hall, court
Healthcare and Public Health → Hospitals, emergency clinics, & care facility
Transportation Systems → Major routes: Stamford train, Danbury Airport
Water and Wastewater Systems → Supply sources, pumping stations, WWTP: Aquarion, Danbury Water, Norwalk districts

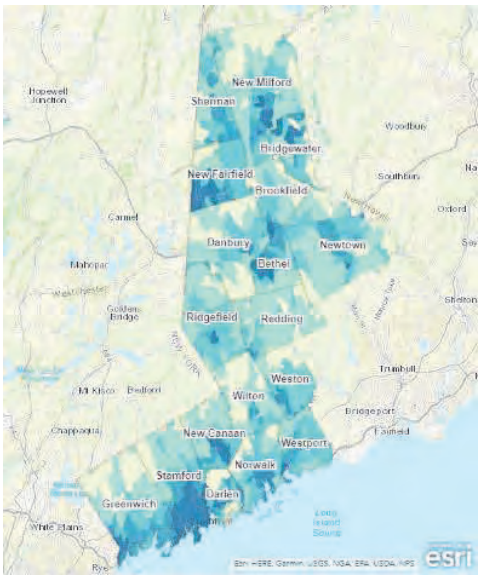
TERRORISM & SABOTAGE

- Low potential for an attack in CT due to lack of internationally-recognized targets
  - Cities with high concentrations of courts/ gov't buildings/transportation could be vulnerable
  - Sources could be outsiders (large organizations), insiders (contractors or employees), hackers (insiders or outsiders)
  - Statewide resources might include Bradley International, Casinos, military stations in Groton-New London

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- MS4 Priority Mapping
- Regional action (WestCOG)
- **Type: Prevention**



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- Sustainable CT
- State, regional, and local action
- WestCOG Sustainable CT Fellowship
- Municipal Sustainable CT participation:
  - Brookfield
  - New Milford
  - Greenwich
  - Stamford
  - Darien
  - Wilton
  - Weston
  - Westport
  - Ridgefield
- **Type: Public Education / Prevention**

2019 Sustainable CT Fellowship Report
www.westcog.org

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.
- **Type: Structural**

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project
- Type: Structural

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- New Milford Squire Hill Road and Long Mountain Road Repairs
- Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road
- **Type: Structural Protection**

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

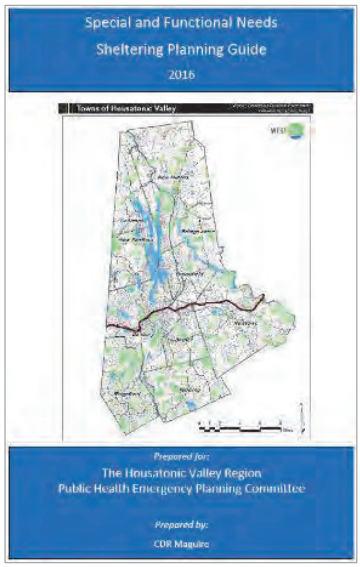
- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"
- Type: Property Protection

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016
- Regional Action
- **Type: Emergency Services**

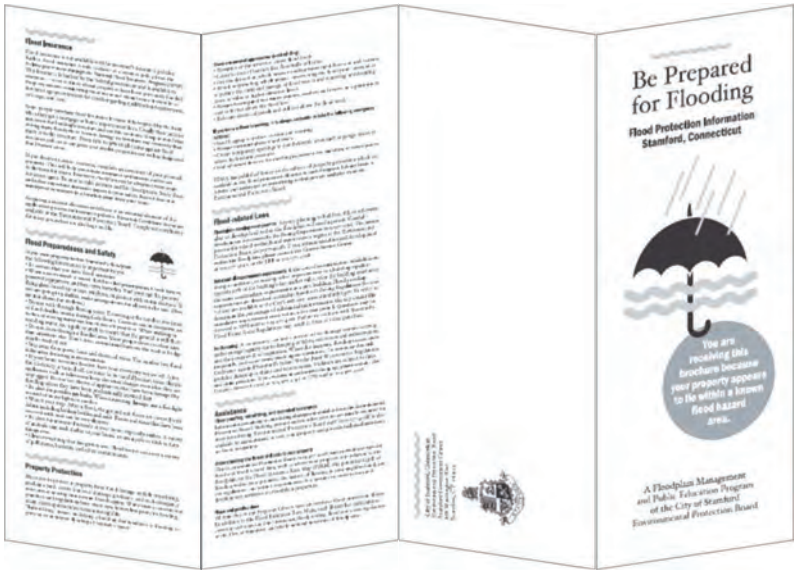


Special and Functional Needs Sheltering Planning Guide, 2016

REVIEW MITIGATION SUCCESSES

Think about mitigation in the Region that is already happening

- Stamford
  - Be Prepared for Flooding
  - Annual brochure sent to residents within known flood hazard areas
- Type: Public Education



January 2020 Flood Preparedness Brochure

Breakout Sessions

NEXT STEPS

- Complete any outstanding municipal planning meeting or coordination
- Review meeting notes as they have been distributed and provide edits to notes, previous actions or critical facilities list
- Outreach and public involvement
  - **Online Survey is OPEN**
  - **Conduct public meetings in July and August**
- Workshop to discuss mitigation strategies and actions
  - **August or September 2020**

NEXT STEPS

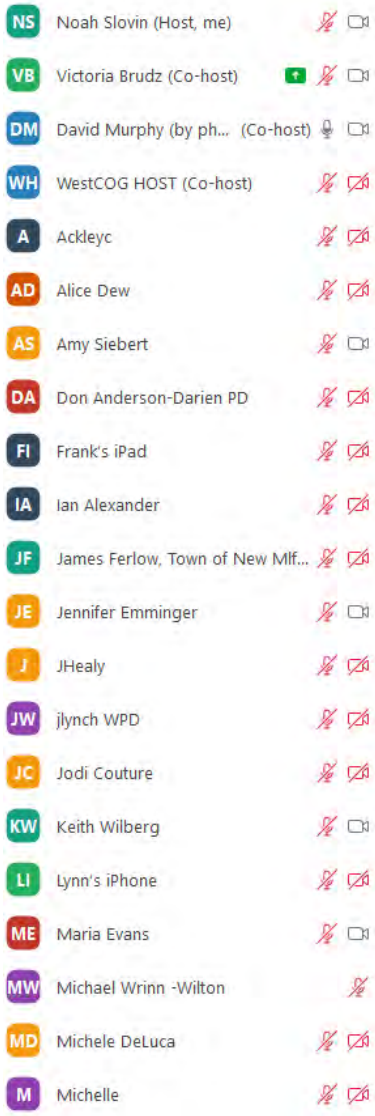
	Task	Mar. 2020	April 2020	May 2020	June 2020	July 2020	Aug. 2020	Sept. 2020	Oct. 2020	Nov. 2020	Dec. 2020	Jan 2021	Feb 2021
1	Planning Process	X	X	X	X	X	X						
2	Hazard Analysis and Risk Assessment		X	X	X	X	X						
3	Update Mitigation Strategies			X	X	X	X	X					
4	Draft Plan							X	X				
5	DEMHS and FEMA Review and Coordination								X	X	X		
6	Adoption, Approval, and Distribution of Plan											X	X

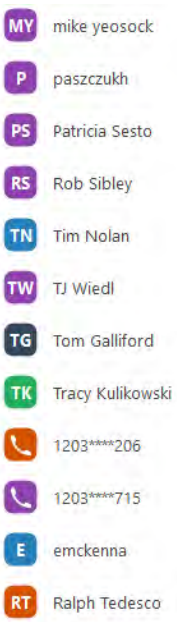
Workshop About Hazards and Risks
June 29, 2020

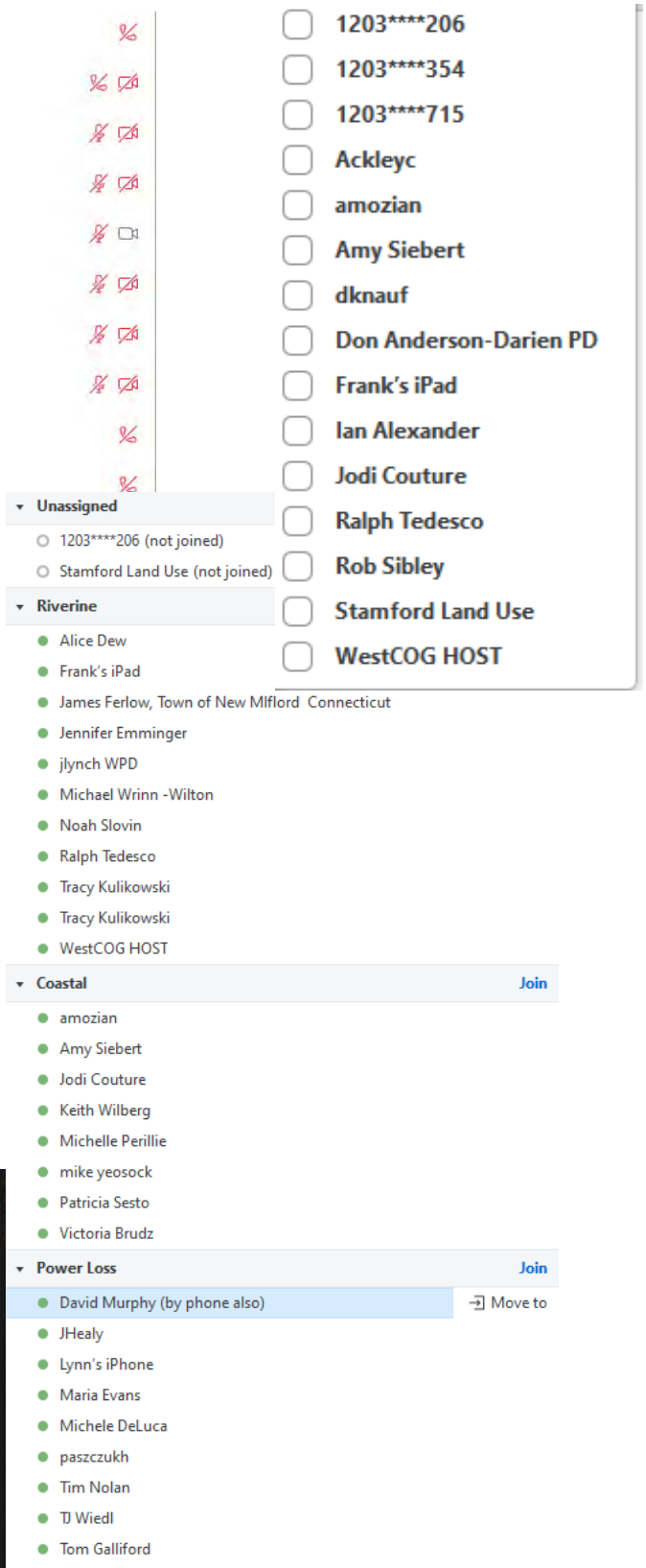
Meeting Attendees listed by breakout room

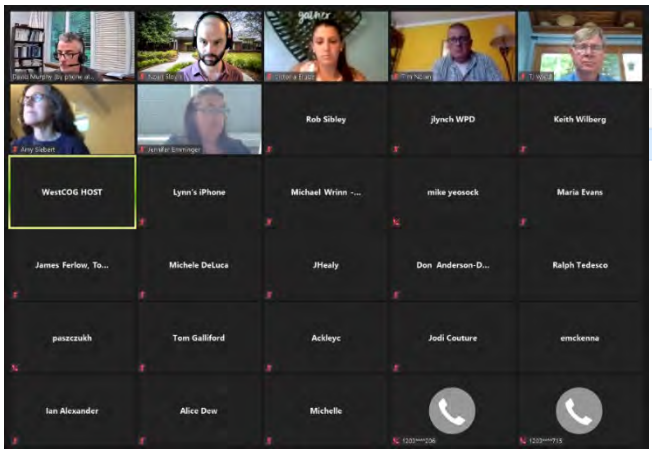
Riverine	Coastal	Power Loss	Unassigned
Alice Dew	A Mozian	J Healy	203****206
Frank	Amy Siebert	Lynn	Stamford Land Use
James Ferlow	Jodi Couture	Maria Evans	203***715
Jennifer Emminger	Keith Wilberg	Michele DeLuca	203***354
J Lynch	Michelle Perillie	Paszczukh	Ackleyc
Michael Wrinn	Mike Yeosock	Tim Nolan	D Knauf
Ralph Tedesco	Patricia Sesto	TJ Wiedl	Don Anderson
Tracy Kulikowski		Tom Galliford	Ian Alexander
Noah Slovin	Victoria Brudz	David Murphy	Rob Sibley
Nicole Sullivan			

Screen Captures









Notes from Riverine Flooding breakout session
WestCOG HMP Update Regional Workshop
June 29, 2020

- One attendee reported that flash storm events seem to be occurring more and more often.
- Noah asked whether changing weather patterns are causing flooding in new areas, or just more frequent / severe flooding in the same areas. Town staff answered that the events are more intense/frequent, but flooding is not occurring in new areas.
- One attendee reported that flash flooding can take out infrastructure, like roads. Dirt roads in his community are particularly problematic.
- Flash flooding is a problem within the route 7 corridor. There is a host of RL properties located within that system.
- James Ferlow brought up the following:
    - Ice jamming is a problem in some areas in the northern part of the region
    - Mitigating flooding is challenge: if you change the size of a culvert or pipe in one location, you potentially push the flood problem downstream.
    - His community has experienced problems with landslides
    - The town has implemented some bridge improvements that have reduced flood risks; he has not seen any downstream effects
    - There is an undersized culvert under a railroad – on Butter Brook into Housatonic. The railroad is not pursuing an upgrade to the culvert. This will be a problem at some point, but there isn't much the Town can do.
    - In the northern region, the utility companies are completely redoing their High Tension systems. Expecting another 5-10 years of replacement.
    - It is important to get input from Algonquin Gas, Iroqois Gas, and the other gas companies running pipelines through the region.
- Frank from Wilton brought up the following
    - He has only been in his position for a year
    - He has not seen any big flood events here in that year
    - Utilities have been doing a good job with tree trimming – he is sure that their efforts are helping reduce outages, but it's hard to measure. Definitely doing a lot of trimming.

Notes from coastal flooding breakout session
WestCOG HMP Update Regional Workshop
June 29, 2020

Victoria started by opening to flood to see if anyone had any questions or comments on the presentation pertaining to coastal flood issues. With no response, participants were asked about the CRS program and whether they felt this was, or would be, a significantly useful too regarding coastal flood mitigation.

- Municipalities found it challenging just to partake in the program because of a lack of resources. Even when part of the program it is a challenge to convey risks to residents.
- One participant mentioned they felt the CRS allowed for more grant funding opportunities for mitigation actions and elevations.

Participants were asked about Coastal Resilience Plans and if these have been useful tools for mitigation.

- There were not notable pros to the plans.
- The one community without a CRP did note that this plan was something the town has discussed in the past.

Participants were then asked about nuisance and sunny day flooding events and what their communities are experiencing.

- Westport noted that this is becoming an increasing concern, with three neighborhoods of concern.
- Greenwich finds that a high intensity storm system is a cause of flooding in some areas.
- Solutions for nuisance and other flooding events appear to be slim to none as these areas are heavily developed private properties. It is always a challenge when discussing road elevations and drainage upgrades as to where to move the water.

Participants were asked if there have been any small scale mitigation projects that other communities would replicate.

- One of the main successes has been the elevation of sewage pump stations along the coast.
- To market some of the actions, the community frames upgrades as “something to come home to”. This lets residents know that even though they may have to evacuate during a storm, by implementing these strategies, they are more resilient, and something will be standing when they return home.

Notes from Power Loss Breakout Session
WestCOG HMP Update Regional Workshop
June 29, 2020

David noted that power loss is a secondary hazard resulting from events like snow, ice, and wind events. This can make it challenging to address. He asked participants to describe causes, effects, and implications of power loss; and to note any specific areas where risks are unusual or extensive.

- Maria Evans from New Fairfield notes that the town is very hilly and ice storms are a significant concern for the Town. Ice can bring down power lines and also lead to accidents that bring down power lines.
- Michelle DeLuca noted that the financial challenges associated with preparing for, and responding to, sustained outages are a problem for many people. This is especially the case for vulnerable populations that have underlying health concerns. Public education and messaging need to be improved so people know which investments are best for protecting themselves, whether supplies or standby power or food, etc. Maria responded with some examples for how New Fairfield communicates with its residents through newsletters and the Community Center.
- Maria noted that New Fairfield was very hard hit by the tornado a few years ago.
- Ledge and high bedrock can be an impediment to burying utilities below-ground.
- Tom Galliford from Bethel noted that rural parts of Bethel lose power frequently in wind events. The Town struggles with the legal aspects of tree and tree limb maintenance. Eversource can only maintain a certain distance from its power lines. The Town needs guidance and ideas for how it can get access to wider areas to reduce risks.

WestCOG
Mitigation Strategy and Action Workshop
October 1, 2020

Item	Presenter	Start Time
Brief Review of Risk Assessment	David Murphy	2:30 PM
Review of Public Comments Received to Date	Noah Slovin	2:35 PM
Mitigation Goals and Objectives	Victoria Brudz	2:40 PM
Common Local Mitigation Strategies	Noah Slovin	2:45 PM
Sustainable CT – co-benefits with hazard mitigation strategies	Jessica LeClair, Sustainable CT	2:50 PM
Resilient Connecticut – a driver for creative mitigation strategies	Joanna Wozniak-Brown, Resilient CT	3:00 PM
Statewide Mitigation Strategies	David Murphy	3:10 PM
Breakout Sessions* • Coastal flooding • Inland flooding • Wind/snow and power outages	 Victoria Brudz Noah Slovin David Murphy	3:20 PM
Report Out from Breakout Sessions	All	3:50 PM
Wrap-Up	Victoria Brudz	3:55 PM

*Sample facilitation questions

- **Coastal Flooding Breakout Room**
  - Identify examples of prevention and property protection actions that you would like to see for flood risks
  - Identify examples of structural projects and natural resource protection actions that you would like to see for flood risks
  - Identify examples of emergency service and public information actions that you would like to see for flood risks
  - Can you think of any actions that might address historic resources affected by flooding?
  - Can you think of any actions that might address small businesses affected by flooding?
  - Can you think of any actions that might address repetitive loss properties affected by flooding?
  - Can you think of any actions that might address critical facilities affected by flooding?
  - Can you think of any flood-related actions that might fit with Sustainable CT?
  - Can you think of any flood-related actions that might fit with Resilient CT?

- **Inland Flooding Breakout Room**
  - Identify examples of prevention and property protection actions that you would like to see for flood risks
  - Identify examples of structural projects and natural resource protection actions that you would like to see for flood risks
  - Identify examples of emergency service and public information actions that you would like to see for flood risks
  - Can you think of any actions that might address historic resources affected by flooding?
  - Can you think of any actions that might address small businesses affected by flooding?
  - Can you think of any actions that might address repetitive loss properties affected by flooding?
  - Can you think of any actions that might address critical facilities affected by flooding?
  - Can you think of any flood-related actions that might fit with Sustainable CT?
  - Can you think of any flood-related actions that might fit with Resilient CT?
- **Wind/Snow and Power Outage Breakout Room**
  - Identify examples of prevention and property protection actions that you would like to see for wind/snow events that cause power outages.
  - Identify examples of structural projects and natural resource protection actions that you would like to see for wind/snow events that cause power outages.
  - Identify examples of emergency service and public information actions that you would like to see for wind/snow events that cause power outages.
  - Can you think of any actions that might address historic resources affected by wind and snow and an associated loss of power?
  - Can you think of any actions that might address small businesses affected by wind and snow and an associated loss of power?
  - Can you think of any actions that might address critical facilities affected by wind and snow and an associated loss of power??
  - Can you think of any wind or snow-related actions, or power outages, that might fit with Sustainable CT?
  - Can you think of any wind or snow-related actions, or power outages, that might fit with Resilient CT?

WestCOG Update of Hazard Mitigation Plan

Workshop: Mitigation Strategies and Actions
October 1, 2020

Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM
MILONE & MACBROOM

Talking Points

- Risk Assessment Update
- Public Comments Received to Date
- Hazard Mitigation Goals, Objectives, and Strategies
- Guest Presentations
  - *Sustainable CT*
  - *Resilient Connecticut*
- Regional and Statewide Initiatives
- Breakout Sessions
- Wrap Up and Next Steps

Workshop Logistics

- Breakout Sessions at 3:20 PM:

  Groups will be Hazard Mitigation Actions for:

  1. ***Coastal*** *Flood Risks*
  2. ***Riverine*** *Flood Risks*
  3. ***Other****: Wind, Snow, and Power Outages*
- Please comment in the chat back box which group you would like to be placed in.

Risk Assessment Update

Risk Assessment Update

- Hazards were profiled and losses were characterized in our workshop of June 29, 2020
- Public meetings in July and August 2020 did not result in changes to loss estimates or the risk assessment in general
- WestCOG provided CAMA data in September 2020
  - This allowed an exposure analysis to be conducted to augment the risk assessment
  - The exposure analysis characterizes the maximum at-risk property counts and property values per municipality in regard to certain hazards
  - Two examples are provided today – one coastal and one inland

Exposure Analysis

Westport

Hazard	Number of Parcels	Value of At-Risk Parcels	Number of Buildings	Value of At-Risk Buildings	Number of Critical Facilities	Value of At-Risk Critical Facilities	Number of Historic Assets	Value of At-Risk Historic Assets
Dam Failure								
Earthquake	10084	$ 17,056,912,347	40183		29		713	
Flooding								
1% Annual	2553	$ 6,061,223,128	5048		2			
0.2% Annual	877	$ 1,887,855,411	919				24	
Storm Surge								
Category 1	1275	$ 3,626,339,698	1936				228	
Category 2	1461	$ 4,228,924,131	3060		2		156	
Category 3	1142	$ 3,616,039,708	1837				26	
Category 4	1243	$ 3,440,574,996	1984		1		29	
Hurricane/ Tropical Storm	10084	$ 17,056,912,347	40183		29		713	
Sea Level Rise	698	$ 2,086,888,259	483				18	
Thunderstorm	10084	$ 17,056,912,347	40183		29		713	
Tornado	10084	$ 17,056,912,347	40183		29		713	
Winter Storm	10084	$ 17,056,912,347	40183		29		713	
Wildfire	1918	$ 4,274,431,912	5838				64	

Exposure Analysis

Danbury

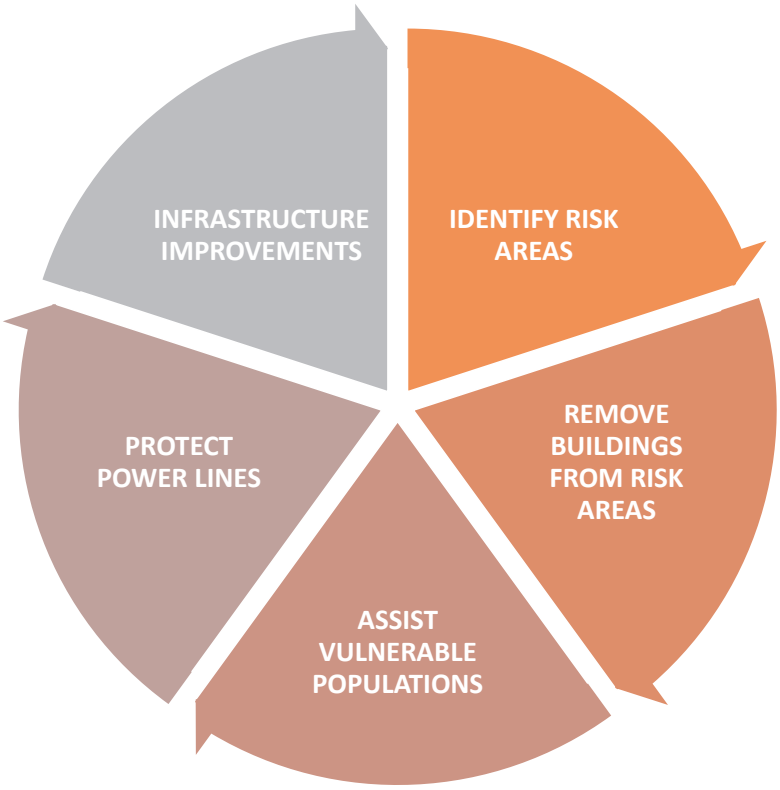
Hazard	Number of Parcels	Value of At-Risk Parcels	Number of Buildings	Value of At-Risk Buildings	Number of Critical Facilities	Value of At-Risk Critical Facilities	Number of Historic Assets	Value of At-Risk Historic Assets
Dam Failure	3031	$ 2,587,265,593	8744		11		121	
Earthquake	19020	$ 9,839,597,223	79743		37		177	
Flooding								
1% Annual	1268	$ 1,785,739,811	1994		3			
0.2% Annual	514	$ 911,257,881	804		1		24	
Hurricane/ Tropical Storm	19020	$ 9,839,597,223	79743		37		177	
Thunderstorm	19020	$ 9,839,597,223	79743		37		177	
Tornado	19020	$ 9,839,597,223	79743		37		177	
Winter Storm	19020	$ 9,839,597,223	79743		37		177	
Wildfire	9279	$ 5,644,771,769	34388		2		14	

Public Comments

Public Input Opportunities

- **Public Survey:** 17 Responses
- **Virtual Public Workshops:** 9 Attendees
- **Youtube Video:** 86 Views
- **Patch.com:** 1 public comment
- **Social Media:** Number of views cannot be determined

Priority Objectives



Recovery Actions

1

Top Priority

- Restore Utilities
- Address Injuries & Casualties
- Re-Open Roads

2

Medium Priority

- Resume Business & Economy
- Clean/Repair Homes
- Re-open Schools

3

Low Priority

- Restore Parks, Beaches, & other Natural Resources

Actions to Reduce Risks

Public Input Takeaways

- Energy Reliability and Resilience is Key
- Protect Infrastructure and Utilities
- Local Economy is Important
- Openness to Asset Relocation
- Emergency Services & Alerts

Hazard Mitigation Goals, Objectives, and Strategies

What are We Talking About?

Goal

Broad, intangible, abstract: what do you want to achieve to reduce losses from hazards?

Objective

Specific, tangible, measurable targets that reduce losses from hazards

Strategy/Action

Steps toward achieving the objective to reduce losses from hazards; a Strategy could be a set of similar actions that help reduce losses from hazards

What are We Talking About?

Goal

Broad, intangible, abstract: what do you want to achieve to reduce losses from hazards?

Create a reliable utility system

Objective

Specific, tangible, measurable targets that reduce losses from hazards

Reduce the frequency of power outages caused by severe storms

Strategy/Action

Steps toward achieving the objective to reduce losses from hazards; a Strategy could be a set of similar actions that help reduce losses from hazards

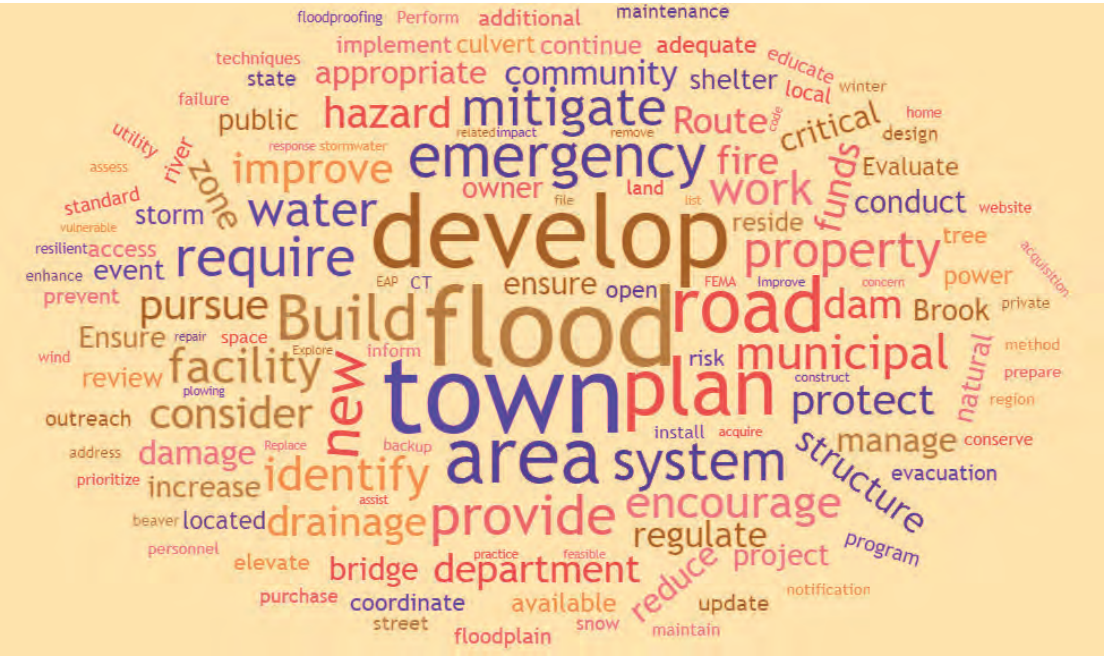
- **Trim trees near power lines**
- **Install backup power**
- **Build microgrids**
- **Coordinate with utility provider**

PRIOR MITIGATION GOALS, STRATEGIES, ACTIONS

Typical Municipal Mitigation Goals, 2014-2017

PRIOR MITIGATION GOALS, STRATEGIES, ACTIONS

Typical Municipal Mitigation Actions, 2014-2017



PRIOR MITIGATION GOALS, STRATEGIES, ACTIONS

Typical Municipal Mitigation Actions, 2014-2019

- Outreach, communications, regulatory upgrades
- Improving GIS capabilities and usage
- Conduct studies and evaluations
- Standby power needs
- Reducing power outages through tree maintenance, etc.
- New bridges, culverts, drainage

NEW ACTIONS IDENTIFIED TO DATE

PREVENTION

- Consider HMP recommendations during POCD update
- Flood studies to determine BFE in A zones
- Implement living shoreline study recommendations
- Address “lessons learned” from COVID-19 response and at-risk populations
- Use FEMA ECs to formally record elevations for compliance
- Street tree inventories
- Flood or coastal risk assessments

PROPERTY PROTECTION

- Flood mitigation at public works, and other critical facilities
- Wastewater treatment plant mitigation efforts

STRUCTURAL PROJECTS

- Replace/upgrade bridges and culverts
- Drainage upgrades and maintenance
- Dam repair projects, or scour issue projects
- Moving utilities underground

NEW ACTIONS IDENTIFIED TO DATE

NATURAL RESOURCE PROTECTION

- Property acquisitions in flood prone areas
- Debris removal programs and projects
- Participate in FEMA Community Rating System (CRS)
- Bristow Bird Sanctuary Project to include restoration and dredging

PUBLIC EDUCATION

- Educate volunteer shelter staff and fire departments
- BMPs for maintaining and protecting tidal wetlands
- Importance of elevation projects
- Educate on CT Alert

EMERGENCY SERVICES

- Provide remote works areas and remote file access capabilities
- Designate shelters and comfort stations
- Pursue microgrids for critical facilities
- Communication and alert system upgrades

Guest Presentation: Sustainable CT

A program that promotes sustainability and may provide credit for some hazard mitigation actions

Guest Presentation: Resilient Connecticut

A driver for creative mitigation strategies that collectively lead to community resilience

CIRCA Presents:

Resilient Connecticut

Joanna Wozniak-Brown, Ph.D.
Assistant Director of Resilience Planning
Connecticut Institute for Resilience and Climate Adaptation
University of Connecticut

CIRCA Mission

Increase the resilience and sustainability of vulnerable communities in Connecticut coastal and inland areas to severe storms and the growing impacts of climate change on the natural, built, and human environment in response to critical, identified needs and priorities.

HUD National Disaster Resilience Competition

RESILIENT BRIDGEPORT

$46M

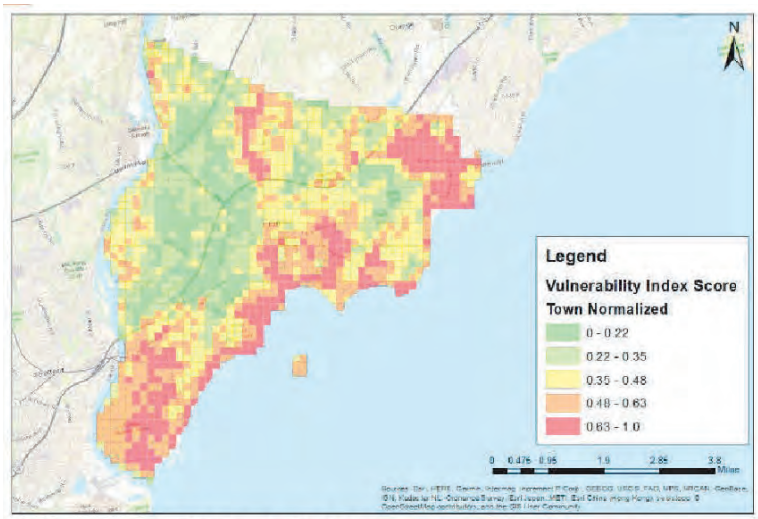
- **Coastal Flood Defense System**
- **Resilience Center**
- **Energy Study**
- **Floodplain Design Guidelines**

Resilient Connecticut

$8.3M

- **Regional Resilience Planning**
- **Technical Support & Capacity Building**
- **Pilot Projects in Fairfield & New Haven Counties**

Resilient Connecticut, One Vision

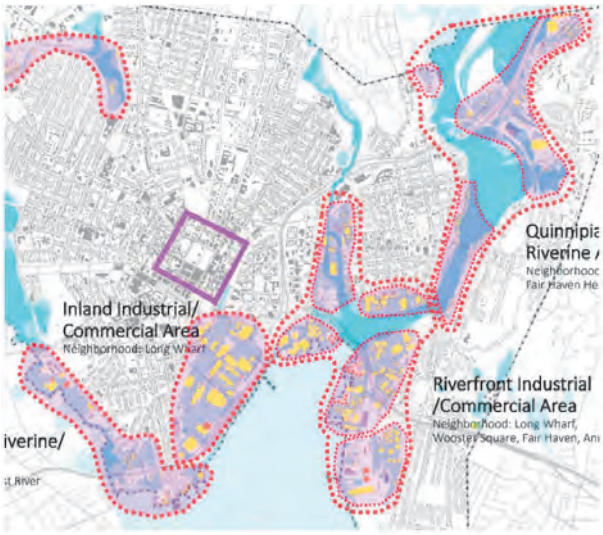


Milford Coastal Vulnerability Map

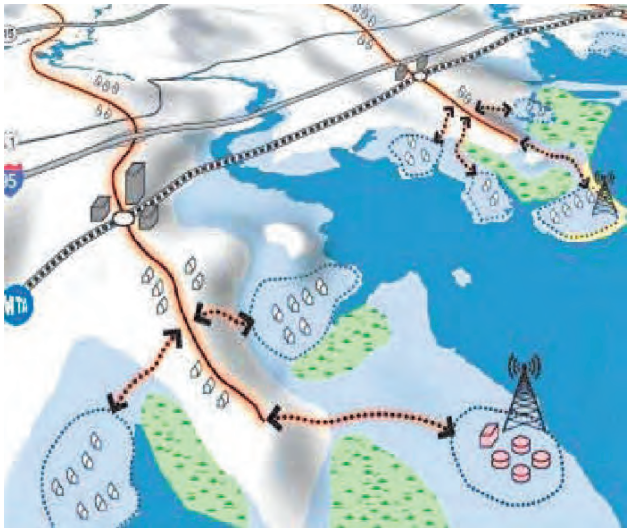
- Identify projects that towns can't address alone
- Assess regional infrastructure challenges & opportunities
- Identify "resilience corridors", "zones of shared risk" & resilient TOD opportunities
- Develop implementable plans & pilot projects with broad co-benefits

Resilient Connecticut, Two Concepts

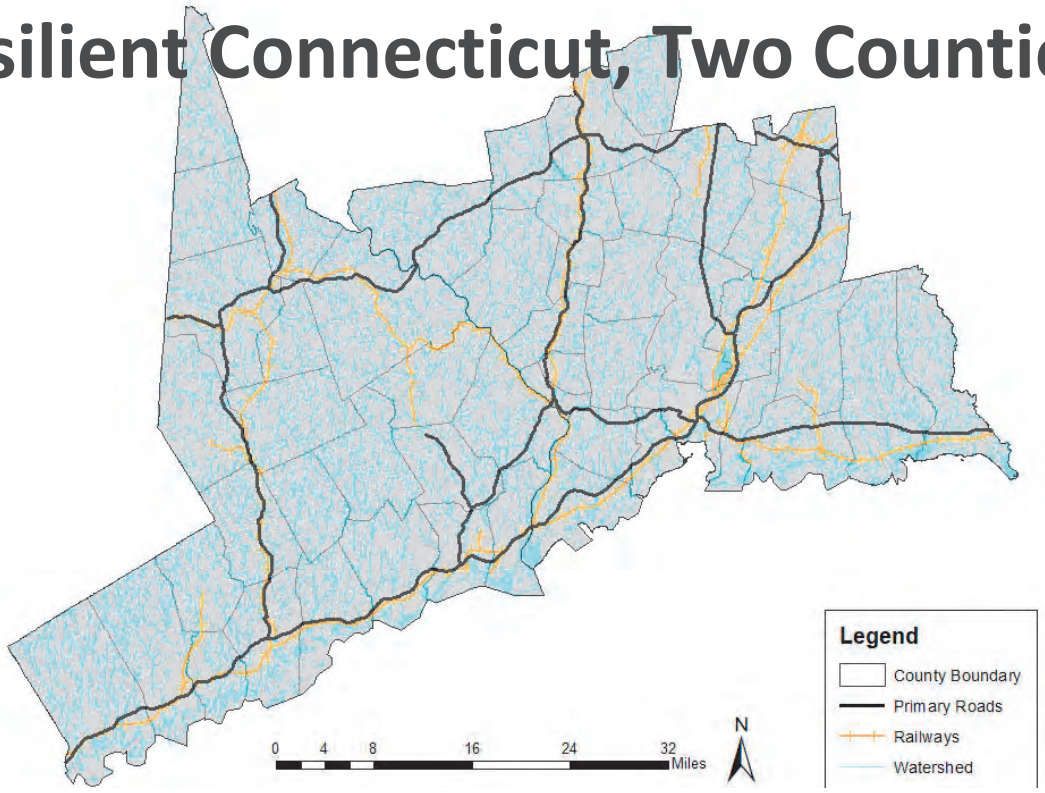
Zones of shared risk



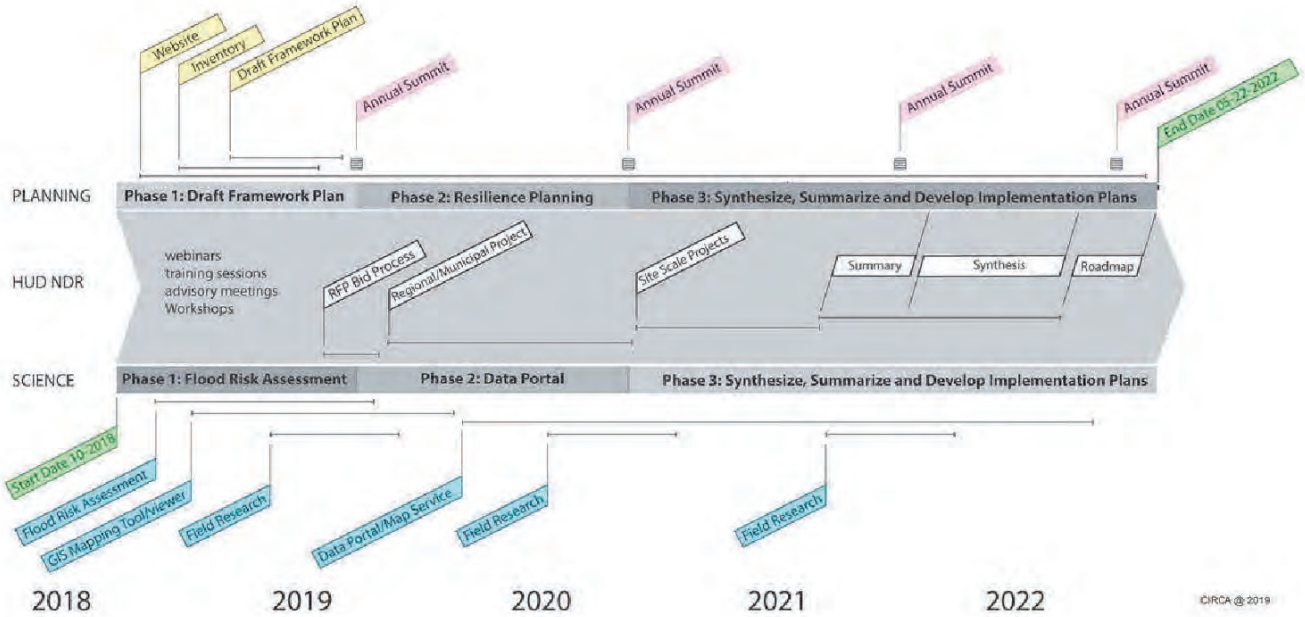
Resilience Corridors



Resilient Connecticut, Two Counties



Resilient Connecticut, Three Phases



Resilient Connecticut, Four Approaches

Planning

- Resilient Connecticut Planning Framework
- Regional Resilience Planning
- Implementation Planning for Pilot Projects

Technical Support

- Flood Risk and Vulnerability Assessment
- Climate Impact Modeling
- Adaptation Option Evaluation & Data Collection

Research Capacity Building

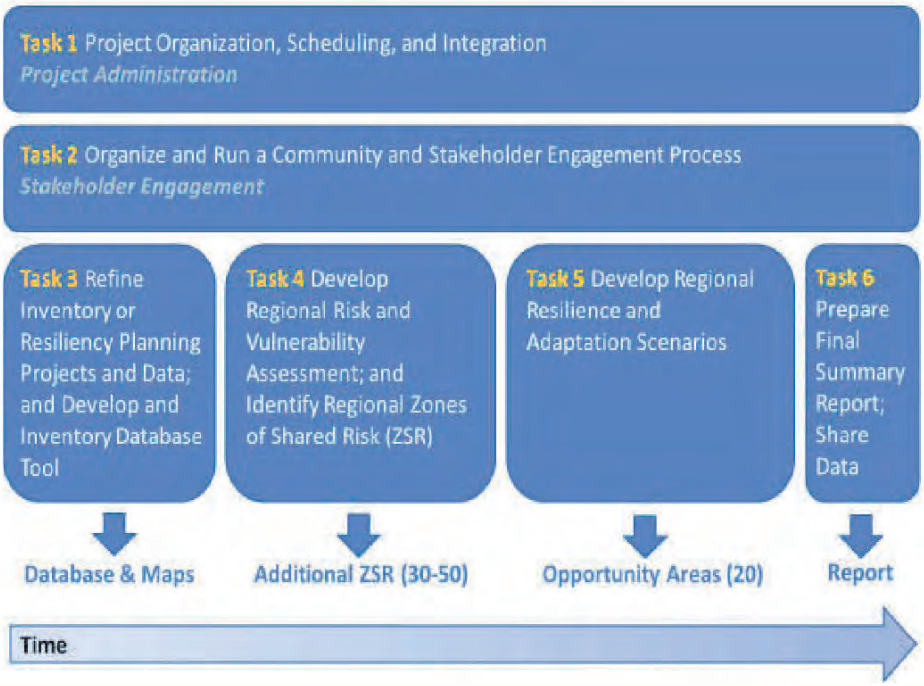
- Applied Field Research
- Climate Impacts to Public Health in CT
- Economics & Cost/Benefit Development
- Legal & Policy Recommendations

Engagement

- State – COGs – Towns – NGOs - Researchers
- Resilient Connecticut Annual Summit
- Webinar Series
- Resilient Connecticut Collaborative and Working Groups
- Workshop Series

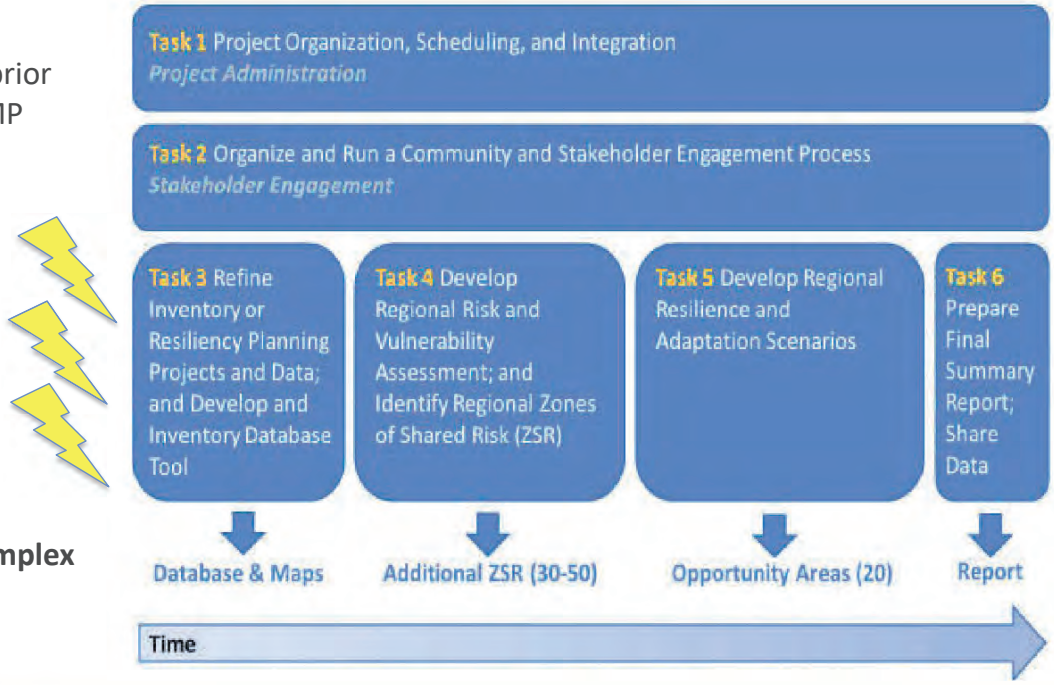
Resilient Connecticut Phase II Planning

Planning team – Milone & MacBroom/Dewberry, CIRCA, West, Metro, Naugatuck Valley, and South Central COGs



Resilient Connecticut Phase II Planning

Aligning with prior and NEW NHMP actions….



Share your complex risk-reduction projects!

Thank you!

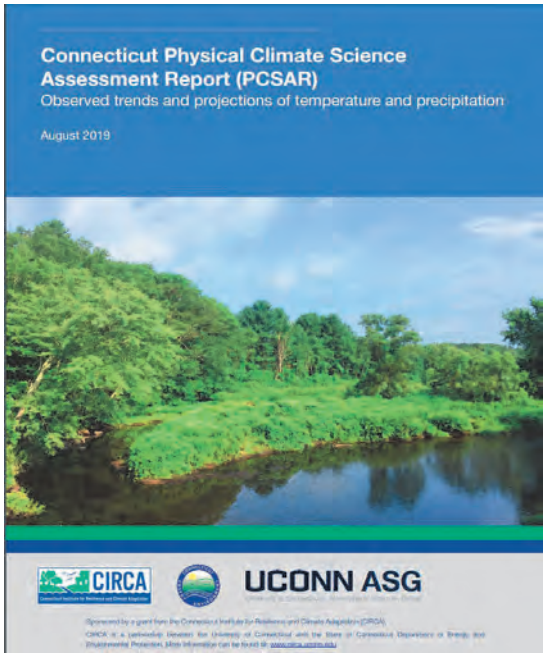
Project: resilientconnecticut.uconn.edu
CIRCA: circa.uconn.edu

Joanna Wozniak-Brown, PhD
Joanna@uconn.edu

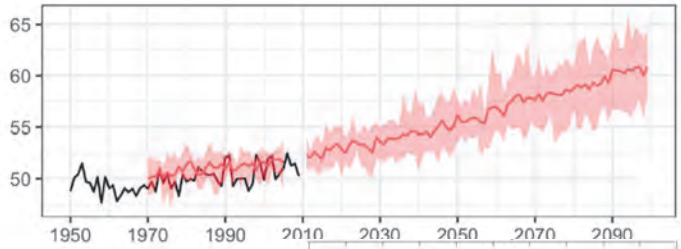
@UConnCIRCA

Sign up for our e-newsletter, "Resilient Roundup," at https://bit.ly/3bDuwch

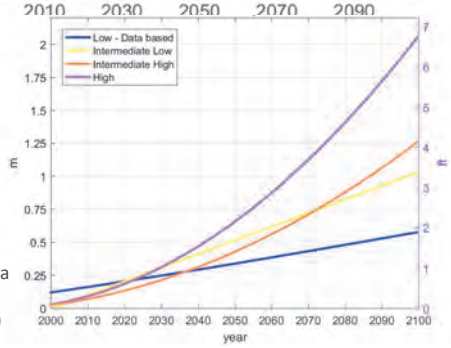
"This publication does not express the views of the Department of Housing or the State of Connecticut. The views and opinions expressed are those of the authors. Funding for this project was provided by the United States Department of Housing and Urban Development through the Community Development Block Grant National Disaster Recovery Program, as administered by the State of Connecticut, Department of Housing."



Measurements and model projections (with no CO2 reductions) of annual mean temperature in CT – CIRCA's PSCAR report (Seth et al, 2019)



Plan for:
Sea level rise up to 20 inches (0.5m) by 2050
Air warming UP TO 5°F (3°C) by 2050



Four projections of annual mean sea level at the CT shore – CIRCA's Sea Level Rise Report (O'Donnell, 2018)

UCONN | CONNECTICUT Department of Housing | U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT | CIRCA Connecticut Institute for Resilience and Climate Adaptation | CONNECTICUT ENERGY ENVIRONMENT

Regional and State Mitigation Initiatives

REGIONAL AND STATE INITIATIVES

- Historic & Cultural Resources
- Repetitive Loss Properties
- State Building Code & Flood Regulations
- Small Businesses Chemical Management
- “Sustainable CT”
- Resilient Connecticut
- Regional CRS
- Inclusions of Terrorism & Sabotage Mitigation Actions

STATE INITIATIVE

Historic& Cultural Resources

REGIONAL AND STATE INITIATIVES

Historic & Cultural Resources

Historic & Cultural Resources Action 1

Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (flood zones, wildfire hazard zones, steep slopes) to support the preparation of resiliency plans across the state.

All towns

Historic & Cultural Resources Action 2

Coordinate with CT SHPO to conduct outreach to owners of historic properties to educate them on methods of retrofitting historic properties to be more hazard-resilient while maintaining historic character.

Towns with known, listed historic resources in flood zones

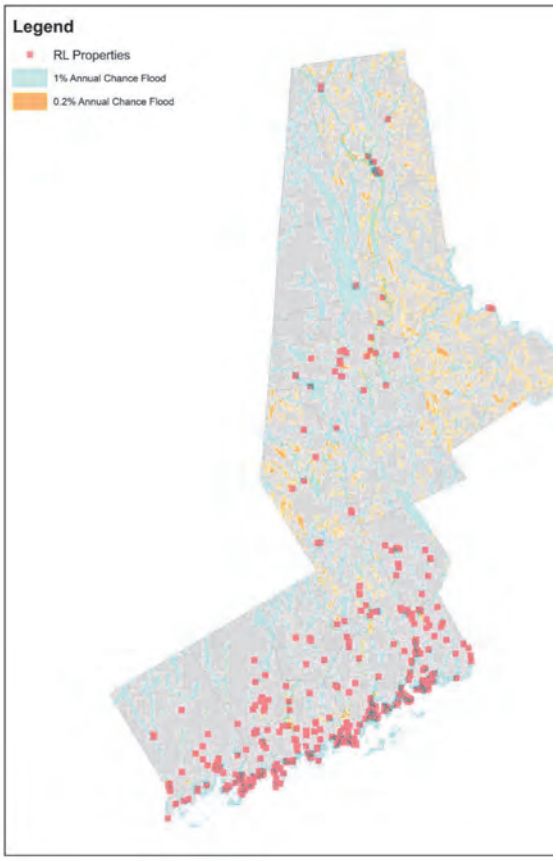
STATE INITIATIVE

Repetitive Loss Properties

STATE INITIATIVE

Repetitive Loss Properties

Community	RLPs
Bethel	5
Brookfield	3
Danbury	29
Darien	58
Greenwich	127
New Canaan	6
New Milford	15
Newtown	3
Norwalk	238
Ridgefield	6
Stamford	113
Weston	15
Westport	229
Wilton	16



REGIONAL AND STATE INITIATIVES

Repetitive Loss Properties

Repetitive Loss Properties Action 1

Work with CT DEEP to complete a formal validation of the Repetitive Loss Property list and update the mitigation status of each listed property.

Towns with potential RL list problems and need for updates

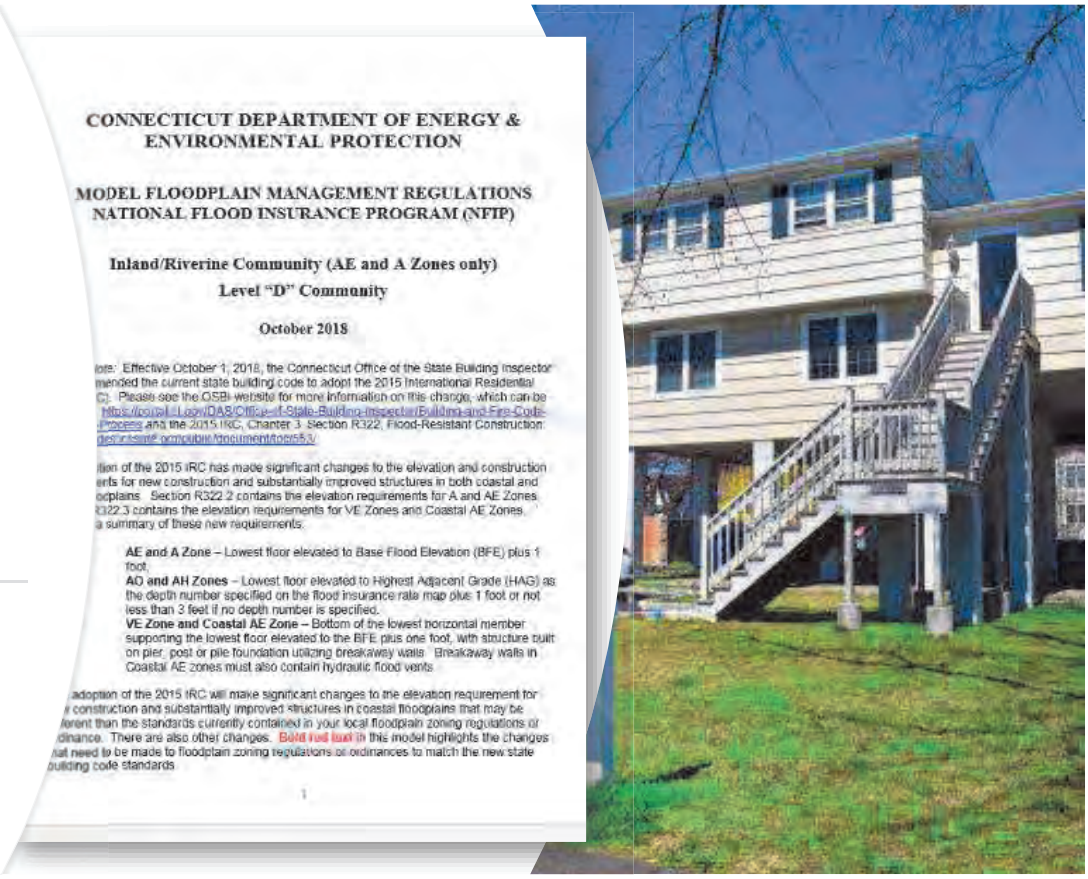
Repetitive Loss Properties Action 2

Contact the owners of Repetitive Loss Properties and nearby properties at risk to inquire about mitigation undertaken and suggest options for mitigating flooding in those areas. This should be accomplished with a letter directly mailed to each property owner.

Towns with RL properties

STATE INITIATIVE

State Building Code & Flood Regulations



CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION

MODEL FLOODPLAIN MANAGEMENT REGULATIONS
NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

Inland/Riverine Community (AE and A Zones only)
Level "D" Community

October 2018

ote: Effective October 1, 2018, the Connecticut Office of the State Building Inspector mended the current state building code to adopt the 2015 International Residential C). Please see the OSBI website for more information on this change, which can be https://portal.ct.gov/DAS/Office-of-State-Building-Inspector/Building-and-Fire-Code-Process and the 2015 IRC, Chapter 3, Section R322, Flood-Resistant Construction: des/ctcore/f complete/document/doc55.3/

tion of the 2015 IRC has made significant changes to the elevation and construction ents for new construction and substantially improved structures in both coastal and oplains. Section R322.2 contains the elevation requirements for A and AE Zones. R322.3 contains the elevation requirements for VE Zones and Coastal AE Zones. a summary of these new requirements.

AE and A Zone – Lowest floor elevated to Base Flood Elevation (BFE) plus 1 foot.
AO and AH Zones – Lowest floor elevated to Highest Adjacent Grade (HAG) as the depth number specified on the flood insurance rate map plus 1 foot or not less than 3 feet if no depth number is specified.
VE Zone and Coastal AE Zone – Bottom of the lowest horizontal member supporting the lowest floor elevated to the BFE plus one foot, with structure built on pier, post or pile foundation utilizing breakaway walls. Breakaway walls in Coastal AE zones must also contain hydraulic flood vents.

adoption of the 2015 IRC will make significant changes to the elevation requirement for construction and substantially improved structures in coastal floodplains that may be ferent than the standards currently contained in your local floodplain zoning regulations or dinance. There are also other changes. **Bold red text** in this model highlights the changes at need to be made to floodplain zoning regulations or ordinances to match the new state uilding code standards.

1

REGIONAL AND STATE INITIATIVES

State Building Code & Flood Regulations

Revised State Building Code Action 1

Revise floodplain zoning regulations to reflect the new State Building Code requirements for one foot of freeboard for construction in the 1% annual-chance flood zone.

Towns with floodplain regulations that do not require freeboard.

Revised State Building Code Action 2

Increase Substantial Damage and Substantial Improvement lookback periods to two or more years.

Towns with SD/SI lookback periods of 1 year or less.

Revised State Building Code Action 3

Compare local foodplain regulations with Revised State Model Flood Regulations to identify any remaining opportunities for improvement

All other Towns

STATE INITIATIVE

Small Business Chemical Management

REGIONAL AND STATE INITIATIVES

Small Business Chemical Management

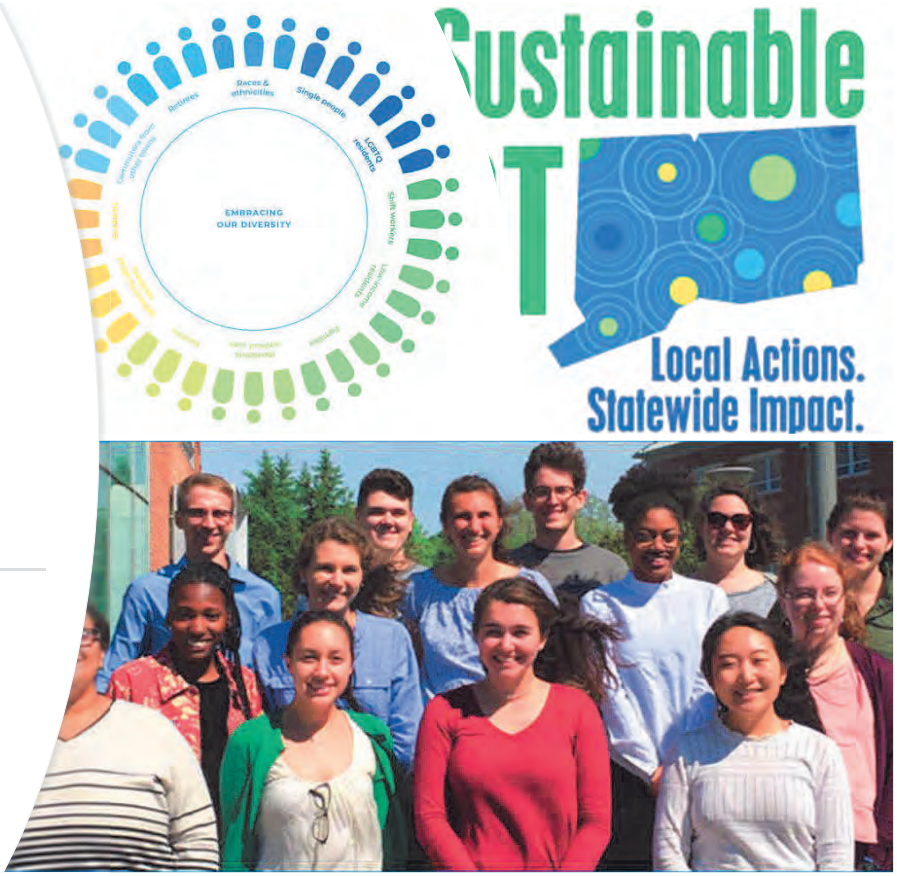
Small Business Chemical Management Action 1
Provide information on the Town website about CT DEEP training and information around small business chemical management for hazard resilience.

Small Business Chemical Management Action 2
Use the CT Toxics Users and Climate Resilience Map to identify toxic users located in hazard zones within your community. Contact those users to inform them about the CT DEEP small business chemical management initiative.

Small Business Chemical Management Action 3
Host a CT DEEP presentation for municipal staff and local businesses about business chemical management for hazard resilience.

STATE INITIATIVE

Sustainable CT



REGIONAL AND STATE INITIATIVES

Sustainable CT

Sustainable CT Action 1

Register as a Sustainable CT community and make progress with the hazard mitigation goals associated with registration.

Towns not currently in the program

Sustainable CT Action 2

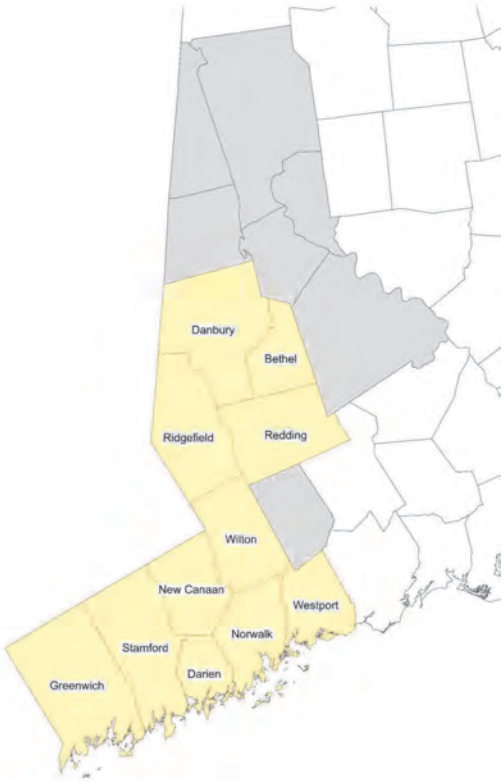
Take one of the following actions that will mitigate natural hazard risks while also meeting Sustainable CT objectives:

1. Disseminate a toolkit for pre-disaster business preparedness.
2. Revise regulations to promote Low Impact Development.
3. Include the goals of this Hazard Mitigation Plan, and at least three other sustainability concepts, in your next POCD update.

Registered and Certified Towns

REGIONAL INITIATIVE

Resilient Connecticut



Map showing which communities are addressed by the focused planning in Phase II of Resilient CT

- Communities with major highways and passenger rail lines
- Communities with transit-oriented development (TOD) potential
- Therefore able to accommodate the resilient corridor concept linking shoreline “zones of shared risk” with inland areas

REGIONAL INITIATIVE

Regional CRS Support

REGIONAL INITIATIVE

Inclusion of Terrorism and Sabotage Mitigation Actions

DETER

DETECT

DEVALUE

DELAY

RESPOND

REGIONAL AND STATE INITIATIVES

Inclusion of Terrorism and Sabotage Mitigation Actions

Mitigation Action	Relevance	
	Terrorism & Sabotage	Natural Hazards
Risk and resilience assessment	X	X
Utility system emergency response plan	X	X
Integrate emergency plans	X	X
Back up documents & records off-site	X	X
Enable remote operation	X	X
Increased IT security	X	
Response training (municipal and public)	X	X
Evacuation planning & routing	X	X
Emergency power	X	X
Increased physical security / barriers	X	
Private/public partnerships	X	X

Breakout Rooms

- Coastal Flood Mitigation
- Inland Flood Mitigation
- Wind/Snow and Power Loss Mitigation

Reports from Breakout Rooms

- Coastal Flood Mitigation
- Inland Flood Mitigation
- Wind/Snow and Power Loss Mitigation

Wrap Up

Next Steps

- Contact Noah and Victoria if you have any comments about mitigation actions
  - *What do you like? This will work for us…*
  - *What do you dislike? This won't work for us…*
- Individual annexes will be provided for review in late October
- Multi-jurisdiction document can be reviewed after your annex
- Post a link for public comments in late November (we will provide the link)

WestCOG Workshop #2 Hazard Mitigation Actions
October 1, 2020

Attendance:

Noah Slovin	Nicole Sullivan	Victoria Brudz
David Murphy	Chris Ackley	Amy Siebert
Don Anderson	Erin McKenna	Evan G White
Henry Paszczuk	Jack Healy	James Ferlow
James Michel	Jeffrey Hanson	Jennifer Emminger
Jessica LeClair	Joanna Wozniak Brown	John Lynch
Jayme Stevenson	Keith Wilberg	Kevin Reynolds
L Regan	Lynn Vanderslice	Matthew Cassavechia
Michael Wrinn	Michelle Perillie	Mike Conklin
Patricia Sesto	Robert Yost	rtalemelli
Ralph Tedesco	TJ Wiedl	Tom Galliford

WestCOG Workshop #2 Hazard Mitigation Actions
October 1, 2020

Attendance Screen Shots

NS Noah Slovin (Host, me) Unmute

NS Nicole Sullivan (WestCOG) (Co-host)

VB Victoria Brudz (Co-host)

DM David Murphy

A Ackleyc

AS Amy Siebert, Greenwich DPW

DA Don Anderson-Darien PD

EM Erin McKenna

EG Evan G. White

H Henry

JH Jack Healy

JF James Ferlow, Town of New Mlflord Connecticut

JM James Michel

J jeffreyhanson

JE Jennifer Emminger

JL Jessica LeClair, Sustainable CT

JW Joanna Wozniak-Brown

JL John Lynch Wilton

KW Keith Wilberg

KR Kevin Reynolds

L LRegan

LI Lynn's iPhone

MC Matthew Cassavechia

MW Michael Wrinn Wilton

MP Michelle Perillie

M mike.conklin@wiltonct.org

PS Patricia Sesto

RY Robert Yost

R rtalamelli

R rtedesco

TW TJ Wiedl

TG Tom Galliford

Chat Box Comment:

Mike Conklin: I was saying that the Town of Wilton tree committee is developing a strategy and policy so that future trees are not planted in the town right of way underneath powerlines or where they may blow over and become a hazard in the roadways

WestCOG Workshop #2 Hazard Mitigation Actions
October 1, 2020

Riverine Breakout Room Notes

Participants:
Patricia Sesto
Michael Wrinn
James Ferlow
Jessica LeClair
Joanna Wozniak-Brown
Jennifer E.
Nicole Sullivan
Noah Slovin

Notes:

- Inland flooding prevention can occur through early communication, strategy, data and maps.
- What can towns do through regulation to prevent new development in flood zones?
- Are there programs or grants for long term riverine maintenance?
- Debris in streams and rivers can cause issues with who is responsible for cleaning it up.
- Communication between property owners, banks, and the towns could be improved through mapping and data. Especially regarding flood insurance.
- A potential study for long term maintenance of riverine flooding could be beneficial.
- When relocating or building a critical facility, it is important to be aware of the flood plain.
- **Actions/needs**
    - Long term maintenance plans/capabilities (clearing debris, cleaning, etc)
    - Improved mapping, public access to mapping
    - Public education about risks
    - Stormwater management guidelines – homeowner responsibilities
        - Opportunities or information to get feedback about how well homeowners do with these guidelines. Long term maintenance? Is it making a difference?

WestCOG Workshop #2 Hazard Mitigation Actions
Coastal Hazard Breakout Room Notes

Attendees:
Victoria Brudz – MMI/moderator
Amy Seibert – Greenwich
Keith Wilberg – Wesport
Jayme Stevenson – Darien
Erin McKenna – Stamford
Michele Deluca – Norwalk

Victoria started off the discussion by asking if anyone had any specific questions regarding the presentation.

Amy had a question regarding repetitive loss property (RLP) data, and the lack of available data. Amy stated that with this data the town could better target outreach and continue the work to make residents aware of the flooding risks.

Victoria stated that there are currently challenges in receiving updated RLP data, and that we could work with the town in obtaining slightly dated information to help better understand their risk areas.

To begin specific hazard mitigation action discussion, Victoria asked if there were any specific structural or property protection projects anyone would like to see regarding coastal flooding, or any other hazard that would be discussed in the plan.

Amy noted the challenges in finding and obtaining funding for the elevation of pump stations and wastewater treatment infrastructure. The Town of Greenwich is lucky in that taxpayers are more amenable to the idea of these upgrades; however, many surrounding communities are note as lucky. It appears that funding for infrastructure like bridge and culverts is relatively easier to come by than funding for these projects. Greenwich has been successful in the pat few years elevating 3 pump stations.
Jayme agreed with this and wanted to echo these challenges. The Town of Darien has several vulnerable pump stations and funding necessary upgrades is a challenge.

Another question raised by Amy was “what happens to our roadways?”. There are numerous low-lying roads that are at risk or already experiencing nuisance flooding. How long until residents begin questioning the town on why, say, emergency vehicles cannot get down a road during a flood, even though there was opposition to road elevations?

Victoria noted that unfortunately there is not immediate solution when faced with these challenges. Some of the best mechanisms is education so residents understand the need for elevation, or retreat.

In addition, there are concerns throughout several shoreline towns regarding the challenges that private roads pose. The homeowners Associations that own these roads do not always perform the

maintenance or upgrades necessary for adequate drainage or flood control. Often times this lack of upkeep results in a town resources being used for a rescue during an event. This appeared to be an issue in Greenwich, Darien, and Westport.

On tactic take by Keith is to keep track of when news articles and other media outlets mention retreat from flooding; he then tries to work this into conversation with at risk residents, citing these sources to convey the widespread issue.

Victoria asked if anyone had a specific action that has helped some of these issues that other towns could possibly adopt.

Greenwich noted that heigh restriction regulation changes and substantial improvement lookback periods have allowed and required residents to make necessary upgrades to homes in order to be in compliance. The town is starting to see more elevation by way of homes and mechanical systems. They also promote this along side the slogan "something to come home to" to convey the fact that many strategies may not prevent you from evacuating but can prevent extensive damage. Katie Deluca, the town planner of Greenwich, may have additional information on how the regulations promoted and prompted home elevations after Sandy.

Jayme noted concerns regarding FEMA flood regulation updates that may occur in the future, and that residents who were in compliance, especially after Sandy, may no longer be in compliance due to regulation changes.

There were some challenges mentioned regarding special permitting challenges as well when residents were applying for necessary upgrades, like rebuild and repair, after events.

Jayme noted challenges the town is currently facing when trying to elevate the parking lot of Pear Tree Beach. When the lot is flooded, residents are unable to access the park. The town is working with DEEP to elevate the lot, however, she would like to see more streamlining during the permitting process.

Keith noted a similar with residents inquiring about additional parking for cars during an event to remain dry. Currently the town has identified Saugatuck Shores as a source. Victoria asked if there would be additional need to identify locations for parking. Keith said that residents are beginning to inquire more frequently about this issue, in addition to an influx of out of state home purchases and questions FEMA regulations all together.

Victoria noted that this sounds like a possible action: to identify and plan these locations to direct resident to during a storm; Keith agreed.

Victoria then asked about a potential scenario in relation to the Resilient Connecticut project. Jayme said there was one scenario in Darien. The Boston Post Road and Leroy Ave lie on either side of the Darien Train Station, and flood during heavy rains and drainage appears to be related to the tides. The town has begun to permanently station barricades along the roadways for deployment because the

issue has become that frequent. Boston Post Road is the town's main emergency route, and ConnDOT has reportedly been uninterested in assisting the town with actions.

Wind, Snow, and Power Outage Breakout Room
October 1, 2020

Facilitator:

- David Murphy, MMI

Attendees:

- Henry Paszczuk, DEMHS Region 5
- Jack Healy, New Milford
- James Michel, Greenwich
- Lynne Vanderslice, Wilton
- Matthew Cassavechia, Danbury
- Don Anderson, Darien
- Mike Conklin, Wilton
- Ralph Tedesco, Brookfield
- TJ Wiedl, Danbury
  Jayme Stevenson, Darien

David set the context for the discussion. He noted that the local meetings and the previous workshop were helpful for discussing the damage caused by storms, even though they occurred prior to Tropical Storm Isaias. The focus of this breakout room is to identify sustained actions that reduce losses associated with these storms and the resulting power outages.

- Ralph responded by explaining that Brookfield has been very aggressive with tree removal in the rights-of-way. The Town works to coordinate Eversource's efforts with their own, also focusing on the Rights-of-way.
- Jack noted that New Milford focuses on areas that were hardest hit, under the assumption that these areas will be at the highest risk in the next event. The Town has its own crews to respond.
- TJ explained that the City's approach is to make sure generators are located where needed and that outreach to the public is effective. He noted that the City keeps up with tree maintenance, but prior tree maintenance has not been as ideal or effective as needed for the storms that are occurring. He summarized by stating that the public needs to be informed and prepared for storms.
- Matt noted that many vulnerable people, including people with durable medical equipment, are home during storms. Emergency services personnel work hard to keep people safe, but communities need to get ahead of this issue.
- Ralph noted that one helpful approach for the municipalities would be to have contracts in place that can be accessed quickly following storms. These contracts would be secured ahead of time with organizations that are compliant with the criteria that FEMA requires for

storm recovery and accounting, which can later be used for reimbursement. Ralph explained that a regional contract for multiple towns would be ideal.

David asked participants to think about other approaches that could reduce losses associated with power outages. He asked for opinions about microgrids.

- Ralph noted that Brookfield has not yet considered microgrids.
- Matt explained that more information is needed.

David asked participants for ideas that could dovetail with Resilient Connecticut. He noted that an example would be a collection of projects that makes the power grid more resilient in an area that supports transit-oriented development (TOD) and building resilient corridors.

- Ralph explained that burying utilities is simply too expensive when compared to the response costs. He noted that Eversource will not place lines underground when it's cheaper to respond to storms.
- TJ explained that communities need to understand how the grids work. People do not know which transmission lines serve specific areas. More information from the utilities would be helpful.

David asked for thoughts about terrorism and sabotage.

- Matt referred to the slide in the presentation that related specific actions to addressing both human-caused incidents and natural hazards. He said this slide should be revisited because almost all of the actions provide benefits to both. He also explained that natural hazards can worsen or lead to some human-caused incidents.
- Mike noted that emergency management people should be engaged with this question.

Additional discussions included:

- Mike explained that Wilton is looking closely at tree planting practices. A committee has been charged with this effort. Because his audio connection was shaky, he provided the following in the chat box: "I was saying that the Town of Wilton tree committee is developing a strategy and policy so that future trees are not planted in the town right of way underneath powerlines or where they may blow over and become a hazard in the roadways."

Appendix C

Public Outreach

Record of Public Outreach

YOUR INPUT IS NEEDED!

Natural hazards impact Connecticut every year, causing:

property destruction ◆ power outages ◆ blocked roads ◆ injuries and fatalities

Natural Hazards Include

- Severe Storm
- Flood
- Hurricane
- Tornado
- Snow
- Wildfire
- Drought
- Earthquake
- Ice-Jams
- Landslides
- Climate Change

A **Hazard Mitigation Plan** helps a community understand risks and take steps to reduce natural hazard impacts.

The Western Connecticut Council of Governments (WestCOG), along with its member municipalities, is developing its first regional Hazard Mitigation Plan for all 18 communities.

WE WANT TO HEAR FROM YOU!

- Have you been impacted by a natural hazard?
- How is your community preparing?
- What steps do you think should be taken?

HOW TO PARTICIPATE

- **Take the online survey**
  surveymonkey.com/r/WestCOGHMP

- **Attend a Virtual Meeting**
  You are encouraged to attend the meeting designated for your community, but you are welcome at any meeting that fits your schedule.
  Meetings will run from **6:00 to 7:00 pm** on Zoom. No download is needed.
  Please access the meeting through this link:
  sites.google.com/view/westcogHMP

Thursday, July 9 ❖ Bridgewater ◆ New ◆ Fairfield ◆ New Milford ◆ Sherman
Tuesday, July 14 ❖ Bethel ◆ Brookfield ◆ Newtown
Thursday, July 23 ❖ Danbury
Tuesday, July 28 ❖ Redding ◆ Ridgefield ◆ Weston ◆ Wilton
Thursday, August 6 ❖ Greenwich
Tuesday, August 11 ❖ Stamford
Thursday, August 20 ❖ Darien ◆ New Canaan ◆ Westport
Tuesday, August 25 ❖ Norwalk

- **Send an email:** westcogHMP@gmail.com

WESTCOG

For language assistance or other accommodations, contact WestCOG at:
Para asistencia con el idioma y otras adaptaciones, por favor póngase en contacto con WestCOG al:
Para obter assistência língua ou outras acomodações, entre em contato com WestCOG em:
Pour obtenir de l'aide linguistique ou d'autres mesures d'adaptation, contactez WestCOG à:
Aby uzyskać pomoc językową lub inne zakwaterowanie, skontaktuj się z firmą WestCOG pod adresem:

help@westcog.org / 475-323-2060

Jul 9 | Input Needed for Natural

patch.com/connecticut/newmilford/calendar/event/20200709/853165/input-needed-for-natural-hazard-mitigation-plan?re

project flyer:

https://westcog.org/wp-content/uploads/2020/06/Public-Meeting-Flyer-Final.pdf

Interested Reply (1) Share

RobinHohorst, Neighbor
Wilton, CT | 7h

Hello - Please note that I am an Easton resident and am very interested in learning more, as well as sharing my knowledge of such. Thank you.
Please keep me posted and advise as to which date I should join, as Easton IS NOT listed which to me is rather appalling, as THE TOWN most certainly should be participating , as well as , working toward ~ IT'S MetroCOG Certification ranking. Boy .....have I a story and footage .....to share!

See less

Thank Reply (1)

David Murphy, Neighbor
Greater Hartford, CT | now

RobinHohorst Hi Robin - thanks for your interest. Easton developed a hazard mitigation plan with the other MetroCOG towns in 2018-2019. You can find it here:
http://www.ctmetro.org/projects/environment-sustainability-2/nhmp/#.Xwhh6UBFw5g

Also: Please feel free to join our Zoom-based meeting for Redding and Weston (July 28, 6 PM).

See less

Thank Reply

Write your reply Reply

Write your reply Reply

Neighbors — please be mindful of social distancing guidelines while you do your part to slow the spread of the new coronavirus. See the latest guidance from the CDC here.

This event was added by a community member. The views expressed here are the author's own.

Stamford | Featured Event

AUG 11

Input Needed for Natural Hazard Mitigation Plan

David Murphy, Neighbor

Event Details

Like 0 | Share

Tue, Aug. 11, 2020 at 6:00 PM | Add to Calendar

Virtual Public Meeting via Zoom

More info: https://sites.google.com/view/westcogHMP

Natural disasters like flooding, heavy snow, wind, wildland fires, earthquakes, landslides, and droughts cause damage to property, disrupt our daily routines, close our schools and businesses, and jeopardize the health and safety of citizens.

What can be done to minimize risks from natural hazards? The Western Connecticut Council of Governments (WestCOG) is developing a regional hazard mitigation plan to make sure its 18 member communities -- from New Milford to Greenwich -- remain resilient to

Featured Events

Aug 11
Curb Your Anxiety- A Live, Outdoor Relaxation Workshop!

Aug 11
Walker's Upper School Virtual Open House

Aug 11
Armonk NY, Single Owner Downsizing Auction

+ Add your event

AUG 11 See More Events Near You >

Featured Classifieds

Nearby in Rye...!
Added by Sarah Kaye

Bookkeeping/Accounti

Community	Facebook Group	Link	Members (1,000)	Contacted
Bethel	The Bethel, CT Forum - A Social, Economic, and Political Discussion	https://www.facebook.com/groups/615946511795955/	7.1	8/26/2020
Bridgewater	NONE			
Brookfield	Brookfield CT Business & Happenings	https://www.facebook.com/groups/BrookfieldConnecticut/	5.6	8/26/2020
Danbury	The REAL Danbury, CT Group	https://www.facebook.com/groups/1407006486150717/	1.8	8/26/2020
Darien	You know you are from DARIEN CT	https://www.facebook.com/groups/34149521300/	3.9	8/26/2020
Greenwich	IN Greenwich	https://www.facebook.com/groups/INGreenwich/	4.1	8/26/2020
	Greenwich CT Community and Events - GC&E	https://www.facebook.com/groups/GreenwichCTCommunit	1.7	8/26/2020
New Canaan	If you're from New Canaan (CT)....	https://www.facebook.com/groups/191443284249284/	4.7	8/26/2020
New Fairfield/Sherman	New Fairfield/Sherman - Our Town	https://www.facebook.com/groups/405764119538823/	6.3	8/26/2020
New Milford	New Milford, CT - A Wonderful Place to Live, Work and Visit!	https://www.facebook.com/groups/1410124595891142/	4	8/26/2020
	New Milford, CT	https://www.facebook.com/groups/new.milford/	15	8/26/2020
	New Milford Ct *Residents Only*	https://www.facebook.com/groups/376534456636705/	1.8	8/26/2020
Newtown	Newtown Neighbors Unite	https://www.facebook.com/groups/111084768990006/	6.8	8/26/2020
Norwalk	I Love Norwalk CT!	https://www.facebook.com/groups/242155439696850/	4.5	8/26/2020
Redding	Redding 411	https://www.facebook.com/groups/836984466464967/	2.8	8/26/2020
Ridgefield	Ridgefield, CT	https://www.facebook.com/groups/RidgefieldConn/	13.3	8/26/2020
Stamford	If you're really from Stamford (CT) you'd know.....	https://www.facebook.com/groups/107263082650602/	15.2	8/26/2020
Weston	WESTON - a small town with a big heart.	https://www.facebook.com/groups/110535035629726/	3.2	8/26/2020
	Weston Connecticut Bulletin Board	https://www.facebook.com/groups/WestonBulletinBoard/	2.3	8/26/2020
Westport	Westport Front Porch	https://www.facebook.com/groups/WestportFrontPorch/	7.7	8/26/2020
Wilton	Wilton Community Info Board	https://www.facebook.com/groups/786383155173656/	1.3	
	Wilton CT 412	https://www.facebook.com/groups/806083666123087/	6.7	8/26/2020
	Wilton CT 411	https://www.facebook.com/groups/askwilton2/	5.6	8/26/2020

Public Posts at Glenbrook Neighborhood Association

Victoria Brudz ▸ Glenbrook Neighborhood Association
5h ·

The City of Stamford is currently working on their Hazard Mitigation Plan update. As part of this process, the public is invited to learn more about what the City is doing to prepare and to provide any comments you may have.

Please join the Stamford public meeting this evening, 8/11, at 6:00 pm on Zoom. To join, please follow the link below. No Zoom download is necessary.

https://sites.google.com/view/westcogHMP

Like Comment Share

Public Meeting Presentations

WESTCOG UPDATE OF THE HAZARD MITIGATION PLAN

Public Information Meeting

Focus on
Bridgewater, New Fairfield, New Milford, and Sherman

Presented by:
Milone & MacBroom, Inc.
Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM

July and August 2020

DISCUSSION TOPICS

- Purpose and Need for Hazard Mitigation Plan
- Long Term Goals of Hazard Mitigation
- How Can the Plan be Used?
- Hazards to Include in the Plan
- Hazards of Concern in Bridgewater, New Fairfield, New Milford, and Sherman
- Typical Hazard Mitigation Strategies and Actions
- Mitigation Examples from the Region
- How to Participate
- Next Steps

Test Poll
(to make sure it is working for you)

Poll #1: Tell us a little about you

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

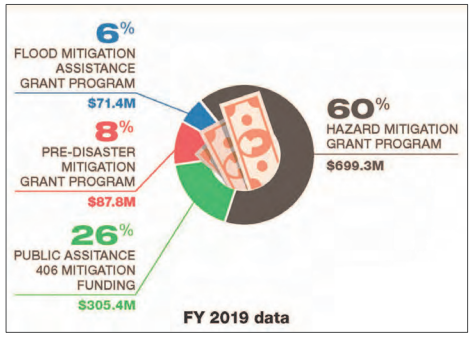
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC) – ***will replace PDM in 2021***

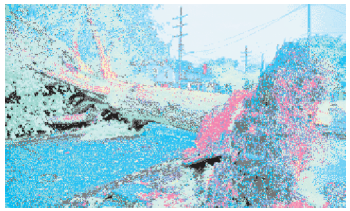


Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.



PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

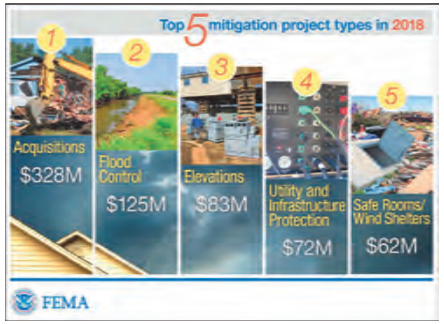
Connect

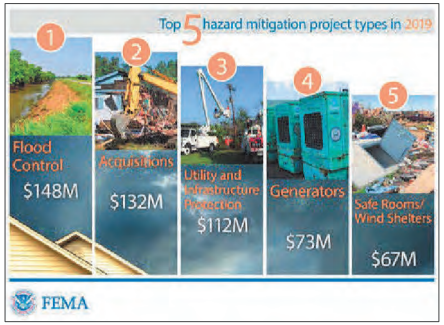
- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

HOW CAN A PLAN BE USED?





HOW CAN A PLAN BE USED?

Grants can be used for:

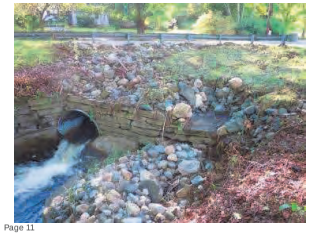
- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities

This home in Trumbull was acquired and demolished using a FEMA grant

HOW CAN A PLAN BE USED?

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA

Floyd 1999



Irene 2011

HOW CAN A PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011

Post-Irene 9/2011

Construction August 2017

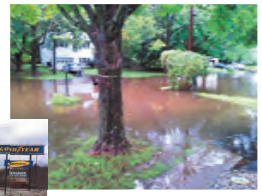
HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

CLIMATE CHANGE

HAZARDS TO INCLUDE IN THE PLAN

- **Floods**
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related


Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

HAZARDS TO INCLUDE IN THE PLAN

- **Floods**
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
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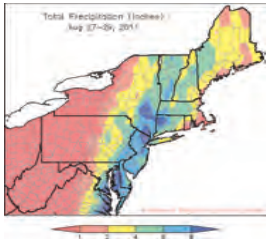
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

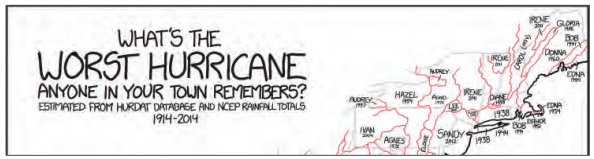
Ice jams along the Housatonic River
Photos newstimes

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- **Hurricanes and Tropical Storms**
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Courtesy of Northeast Climate Data Center





HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- **Tornadoes and High Winds**
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

HAZARDS TO INCLUDE IN THE PLAN

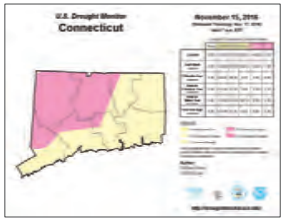
- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- **Severe Winter Storms**
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Norwalk March
2018
Photo
ctpost

Bethel gym
and fitness
center
Photo
newstimes

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- **Drought**
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related



U.S. Drought
Monitor

Laurel
Reservoir in
2016
Courtesy of
Courant.com

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- **Forest and Wildland Fires**
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Brush fire in New Fairfield (2016)
Photo ctpost

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- **Dam Failure**
- Earthquakes
- Landslides
- Terrorism & Related

Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- **Earthquakes**
- Landslides
- Terrorism & Related

Courtesy of USGS

HAZARDS TO INCLUDE IN THE PLAN

- Floods
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- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- **Landslides**
- Terrorism & Related

Photos by MMI, Town of New Milford

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- **Terrorism & Related**

Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Bridgewater

- Numerous streams crossing under roads
- Stream channel erosion
- Heavily forested which presents power loss and wildfire risks
- Unique critical facilities due to rural nature of town

Photos by MMI

HAZARDS OF CONCERN

New Fairfield

- Downtown is in a flood zone and dam failure inundation area
- Small culverts lead to flooding at streams
- Significant rural/suburban interface which can lead to wildfire risks and power loss

Photos by MMI

HAZARDS OF CONCERN

New Milford

- Floods
- Ice jams
- Landslides
- Significant rural/suburban interface which can lead to wildfire risks and power loss

Photos by MMI, Town of New Milford

HAZARDS OF CONCERN

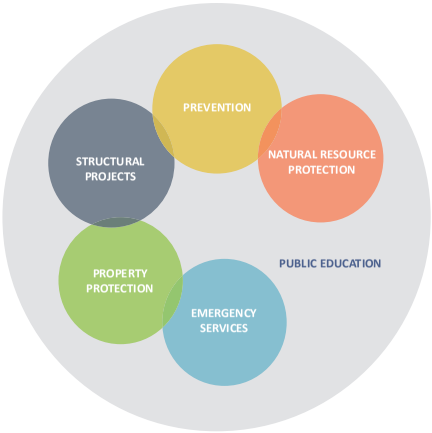
Sherman

- Numerous streams crossing under long dead-end roads, causing concerns about egress
- Heavily forested which presents power loss and wildfire risks
- Unique critical facilities due to rural nature of town

Photos by MMI

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

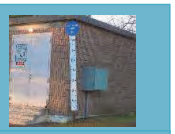
- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION



NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

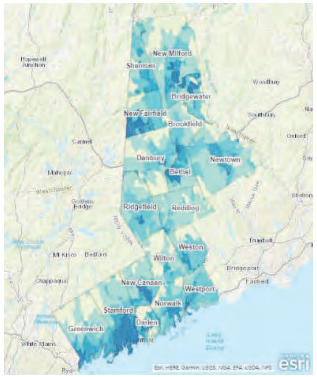
- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

STRUCTURAL PROJECTS

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

STRUCTURAL PROJECTS

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

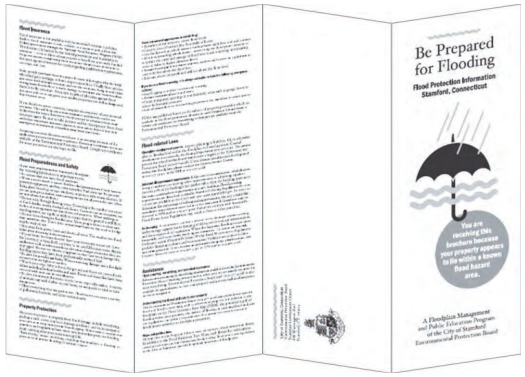
PROPERTY PROTECTION

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES

- Stamford
  - "Be Prepared for Flooding"
  - Annual brochure sent to residents within known flood hazard areas

PUBLIC EDUCATION



January 2020 Flood Preparedness Brochure

REVIEW MITIGATION SUCCESSES

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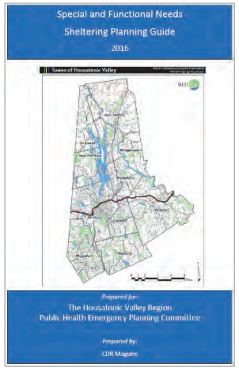

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EMERGENCY SERVICES

Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

- State, regional, and local action
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  - WestCOG Sustainable CT Fellowship
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Greenwich	Weston
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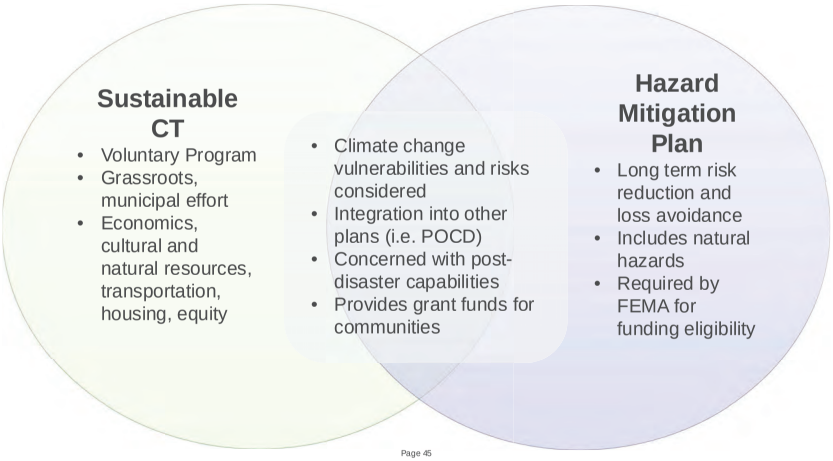
Darien	Ridgefield
Wilton	Brookfield

2019 Sustainable CT Fellowship Report
www.westcog.org

PREVENTION

PUBLIC EDUCATION

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

HOW TO PATTICIPATE

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NEXT STEPS

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Focus on
Bethel, Brookfield, Newtown

Presented by:
Milone & MacBroom, Inc.
Victoria Brudz, CFM
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July and August 2020

WESTCOG

MILONE & MACBROOM

DISCUSSION TOPICS

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PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

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Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

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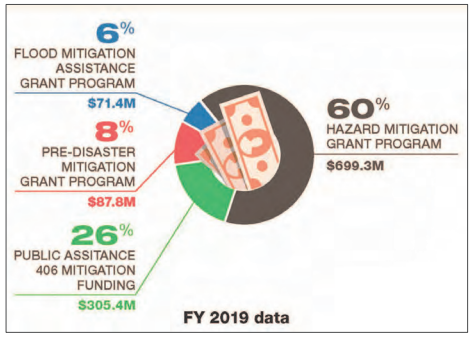

Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

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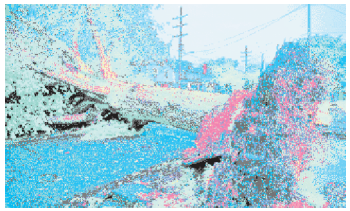

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New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

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- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
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Enhance

- And preserve natural resource systems in the community

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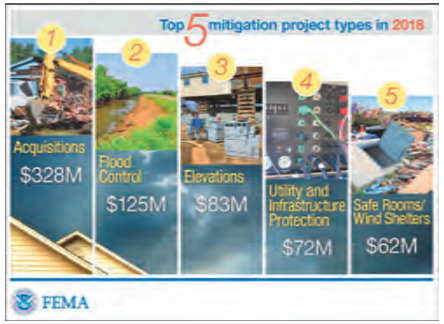

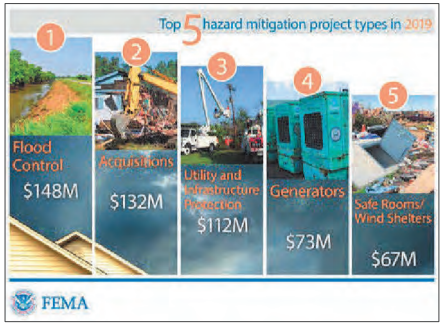

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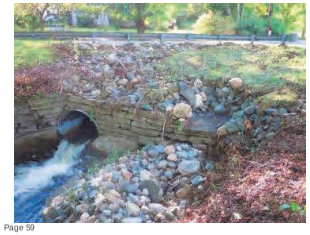
This home in Trumbull was acquired and demolished using a FEMA grant

HOW CAN A PLAN BE USED?

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA

Floyd 1999



Irene 2011

HOW CAN A PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011

Post-Irene 9/2011

Construction August 2017

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
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CLIMATE CHANGE

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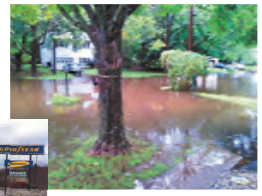
Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

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Ice jams along the Housatonic River
Photos newstimes

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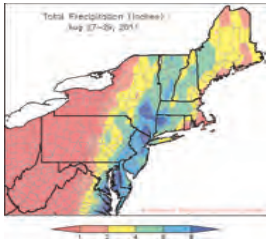
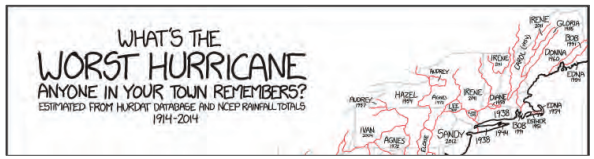

Courtesy of Northeast Climate Data Center



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Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

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Norwalk March
2018
Photo
ctpost

Bethel gym
and fitness
center
Photo
newstimes

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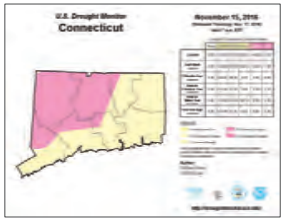

U.S. Drought
Monitor

Laurel
Reservoir in
2016
Courtesy of
Courant.com

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Brush fire in New Fairfield (2016)
Photo ctpost

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Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

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Courtesy of USGS

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Photos by MMI, Town of New Milford

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- Landslides
- **Terrorism & Related**

Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Bethel

- High winds & outages
- Flooding along several brooks in town: Terehaute, Sympaug, East Swamp
- Wildfires in Bald Rock and Huntington State Park
- Heavy snow

Fox61

HAZARDS OF CONCERN

Brookfield

- Flooding along the Still River, Candlewood Plaza Shopping Center, other roadways
- Heavy precipitation & localized flooding
- Microbursts and other wind events
- Historic resources & hazards

Photo by MMI

CT Insider

HAZARDS OF CONCERN

Newtown

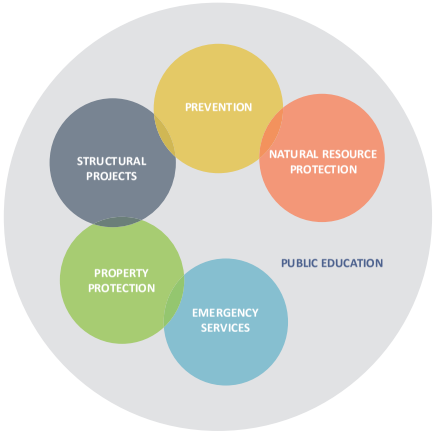
- Heavy winds, trees, and outages
- Flooding along Glenn Road – Mill buildings
- Other severe storms

Photo by MMI

Twitter, Matt McFarland

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

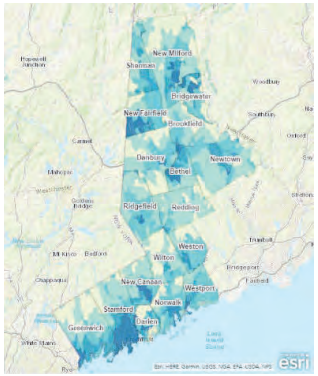
- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

STRUCTURAL PROJECTS

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

STRUCTURAL PROJECTS

REVIEW MITIGATION SUCCESSES

- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

PROPERTY PROTECTION

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

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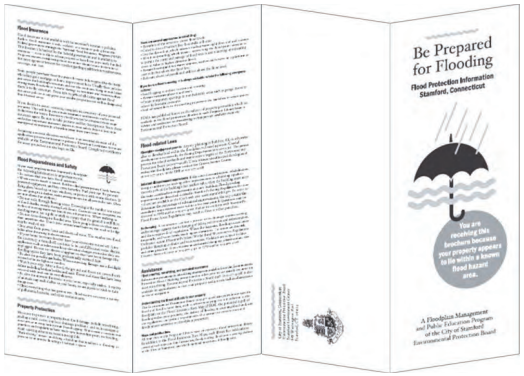

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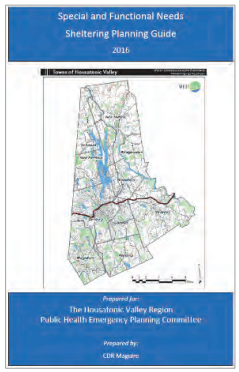

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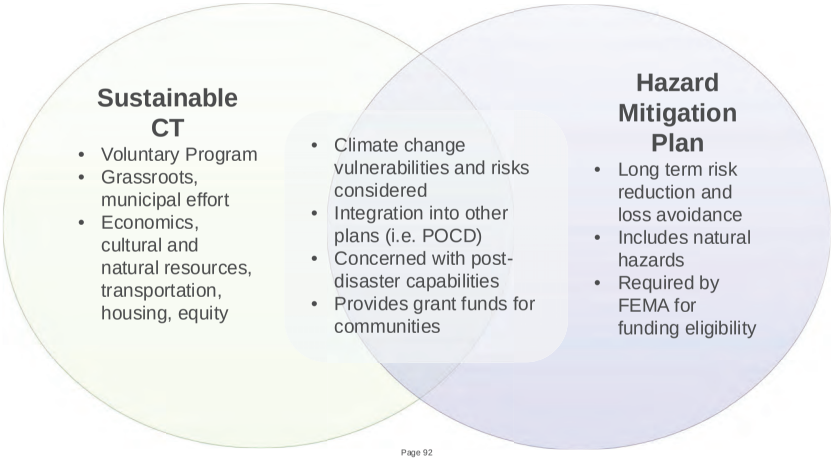

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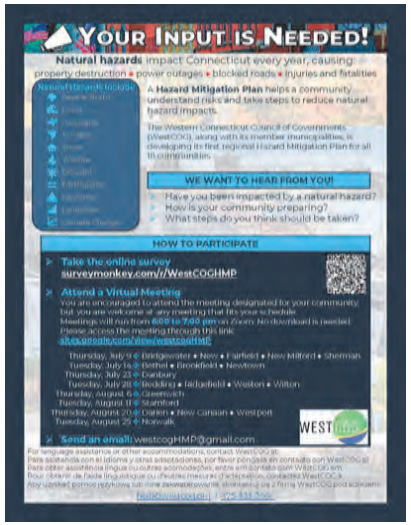

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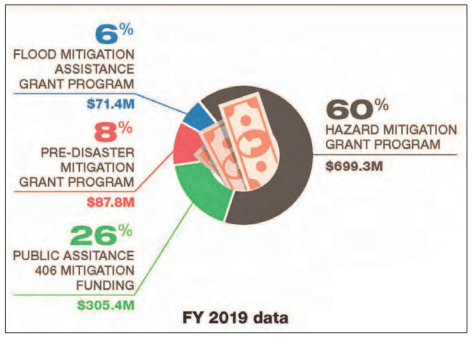

Graphic courtesy of FEMA

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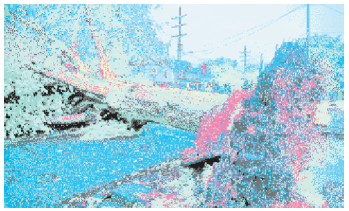

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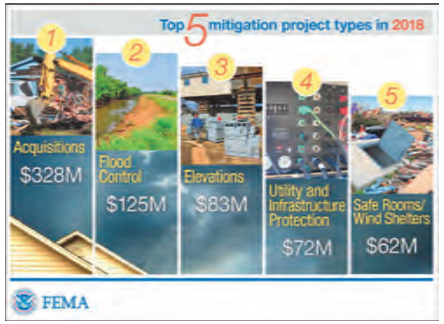

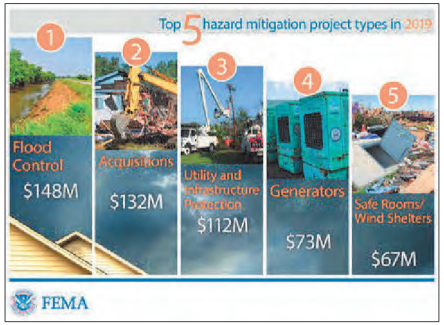

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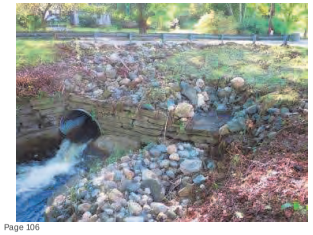
CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA

Floyd 1999



Irene 2011

HOW CAN A PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011

Post-Irene 9/2011

Construction
August 2017

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

CLIMATE CHANGE

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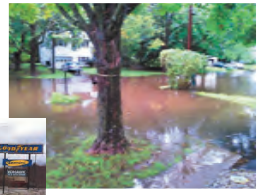

Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

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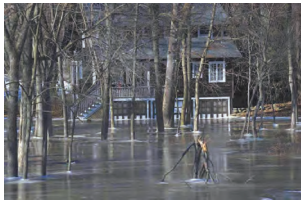

Ice jams along the Housatonic River
Photos newstimes

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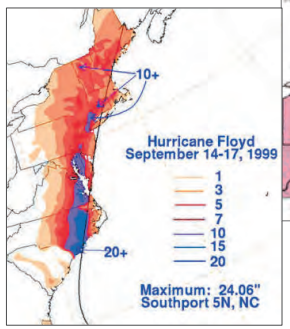
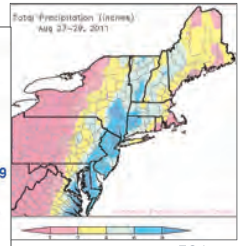


T.S. Floyd precipitation
courtesy of weather.gov



T.S. Irene
precipitation courtesy
of Northeast Climate
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Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

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Norwalk March 2018 Photo ctpost

Bethel gym and fitness center Photo newstimes

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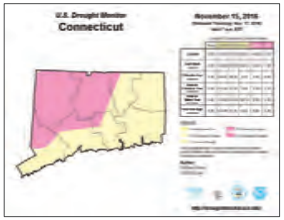

U.S. Drought Monitor

Laurel Reservoir in 2016 Courtesy of Courant.com

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Brush fire in New Fairfield (2016)
Photo ctpost

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Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

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Courtesy of USGS

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- Terrorism & Related

Photos by MMI, Town of New Milford

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- **Terrorism & Related**

Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Redding

- Flooding from Norwalk River near Georgetown
- Flooding on Saugatuck River near Route 53, including at Middle School
- Flooding on Little River near Route 58
- Beaver Dams
- Downed Trees

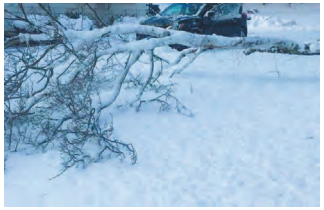
1955 Flood washes out overpass in Georgetown.
Photo: HistoryofRedding.net

HAZARDS OF CONCERN

Ridgefield

- Inadequate Drainage Systems and Related Flooding
- Power Outages
- Dam-managed Flood Control and Safety

Fox Hill Lake Dam
Macklin Reid / Hearst Media Connecticut



Downed tree from 2018 snowstorm in Ridgefield
Photo: Sophia Kunthara

HAZARDS OF CONCERN

Weston

- Downed trees and powerlines blocking roads and cutting power
- Winter storm events and high wind events
- Icing on roads
- Emergency access to dead-ends
- Flooding at Slumber Corners, Dillon Pass, Route 53
- Condition of culverts

Downed tree in Weston from 2018 Snow Storm
Photo: Cathy Zuraw

HAZARDS OF CONCERN

Wilton

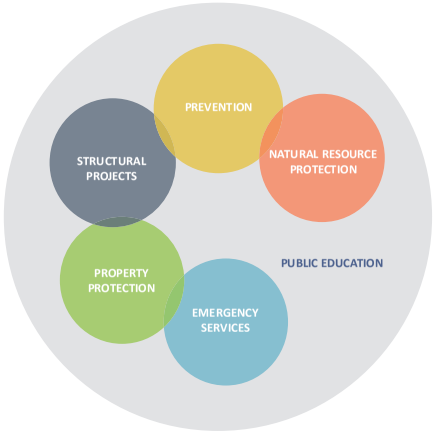
- Dam Safety on the Naugatuck River
- Snowfall in Northern Wilton
- Flood damage to bridges

Repairing damaged power line - 2018 Snow Storm
Photo: Alex Von Kleydorff

Drainage issue reported through Wilton's "SeeClickFix" platform

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

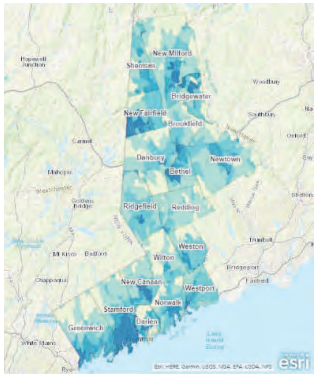
- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

STRUCTURAL PROJECTS

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

STRUCTURAL PROJECTS

REVIEW MITIGATION SUCCESSES

- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

PROPERTY PROTECTION

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES

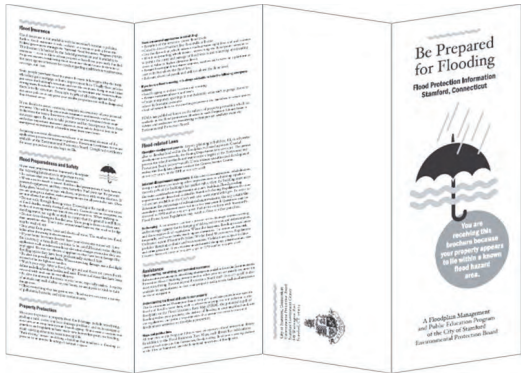
- Danbury
  - Multi-family home elevations
  - Single-family home elevations

Residential Elevations in Danbury. Photos by MMI

PROPERTY PROTECTION

REVIEW MITIGATION SUCCESSES

- Stamford
  - "Be Prepared for Flooding"
  - Annual brochure sent to residents within known flood hazard areas



PUBLIC EDUCATION

January 2020 Flood Preparedness Brochure

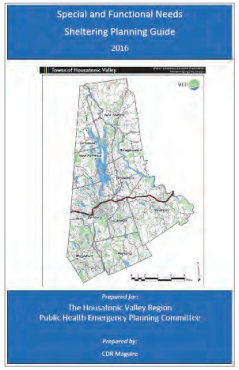
REVIEW MITIGATION SUCCESSES

- Stamford
  - Mill River Park and Greenway
  - Dam removal and river restoration reduced flood elevations
  - Adjacent lands have been acquired and designated as open space

NATURAL RESOURCE PROTECTION

REVIEW MITIGATION SUCCESSES

- Regional Action
  - Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016



Special and Functional Needs Sheltering Planning Guide, 2016

EMERGENCY SERVICES

Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

- State, regional, and local action
  - Sustainable CT
  - WestCOG Sustainable CT Fellowship
  - Municipal Sustainable CT participation:

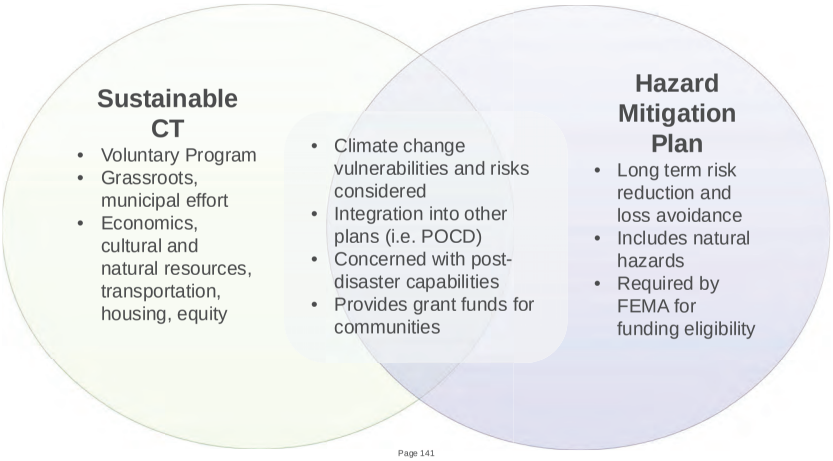
Greenwich	Weston
Stamford	Westport
Darien	Ridgefield
Wilton	Brookfield
New Milford	

2019 Sustainable CT Fellowship Report
www.westcog.org

PREVENTION

PUBLIC EDUCATION

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

HOW TO PARTICIPATE

- Visit https://westcog.org/emergency-management/hazard-mitigation/
- Comments may be sent to westcogHMP@gmail.com
- Survey available at https://www.surveymonkey.com/r/WestCOGHMP

NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
- Seek hazard mitigation funds

WESTCOG UPDATE OF THE HAZARD MITIGATION PLAN

Public Information Meeting

Focus on City of Danbury

Presented by:
Milone & MacBroom, Inc.
Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM

July and August 2020

WESTCOG

MILONE & MACBROOM

DISCUSSION TOPICS

- Purpose and Need for Hazard Mitigation Plan
- Long Term Goals of Hazard Mitigation
- How Can the Plan be Used?
- Hazards to Include in the Plan
- Hazards of Concern in Bethel, Brookfield, and Newtown
- Typical Hazard Mitigation Strategies and Actions
- Mitigation Examples from the Region
- How to Participate
- Next Steps

Test Poll
(to make sure it is working for you)

Poll #1: Tell us a little about you

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

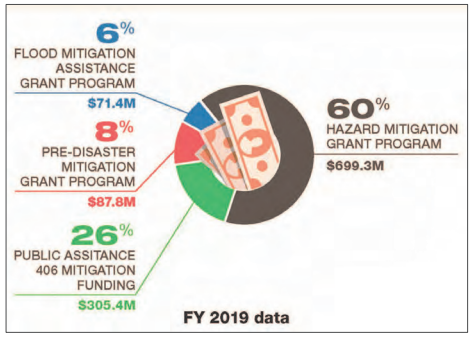
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC) – ***will replace PDM in 2021***

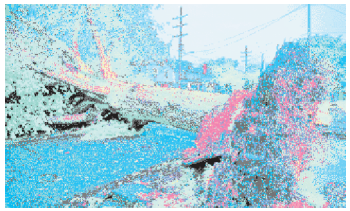


Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.



PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

Connect

- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

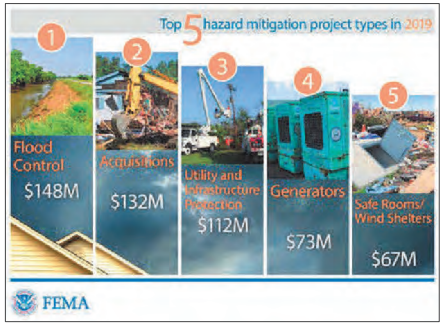
HOW CAN A PLAN BE USED?

Grants can be used for:

- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities

This home in Trumbull was acquired and demolished using a FEMA grant

HOW CAN A PLAN BE USED?



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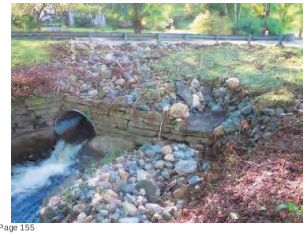

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Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

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Photos newstimes

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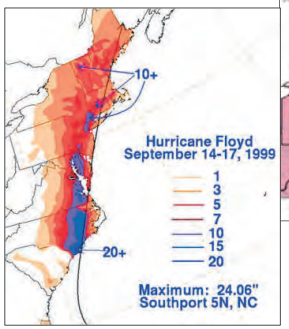

T.S. Floyd precipitation
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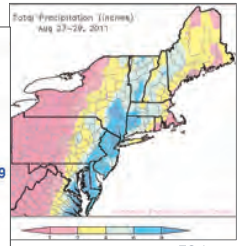
T.S. Irene
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Bethel gym
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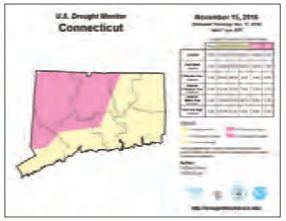

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Brush fire in New Fairfield (2016)
Photo ctpost

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- **Dam Failure**
- Earthquakes
- Landslides
- Terrorism & Related

Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

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Courtesy of USGS

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Photos by MMI, Town of New Milford

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Terrorism, Sabotage, and Mass Casualty Events

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- FEMA typically will not review or provide comments if included in plan
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- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Danbury

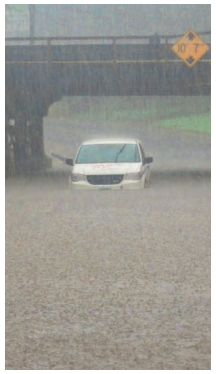
- Flooding in Lake Kenosia Area

Photos by MMI

HAZARDS OF CONCERN

Danbury

- Flooding along Still River near West Street



Photos courtesy of City of Danbury and various news outlets

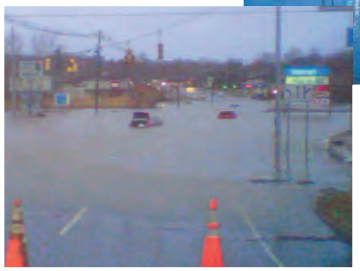
Photo by MMI

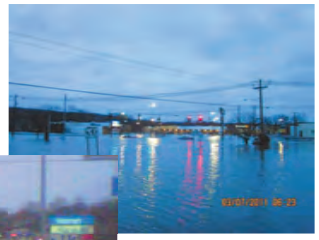
HAZARDS OF CONCERN

Danbury

- Flooding near Still River and Limekiln Brook

Photo by MMI





Photos courtesy of City of Danbury and various news outlets

HAZARDS OF CONCERN

Danbury

- Flooding in the vicinity of Parks Pond Brook

Photos courtesy of City of Danbury

HAZARDS OF CONCERN

Danbury

- Flooding at Kohanza Brook

Photos courtesy of City of Danbury

HAZARDS OF CONCERN

Danbury

- Flooding and erosion along Blind Brook

Photos by MMI

HAZARDS OF CONCERN

Danbury

- Flooding associated with East Ditch

Photos by MMI

HAZARDS OF CONCERN

Danbury

- Droughts

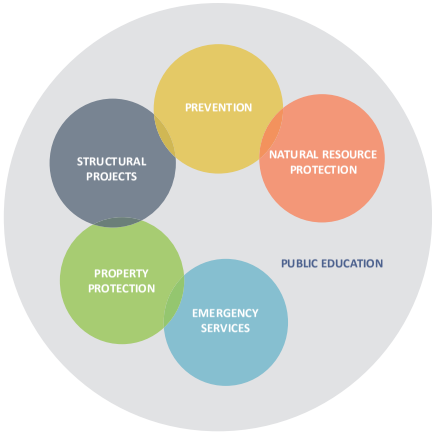
HAZARDS OF CONCERN

Danbury

- Winter Storms
- High Wind Events

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

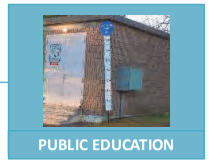
FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation



PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

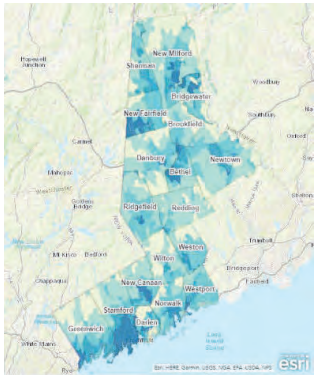
Hurricane Shutters

Dry Hydrants

PREVENTION

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

STRUCTURAL PROJECTS

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

STRUCTURAL PROJECTS

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

PROPERTY PROTECTION

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES

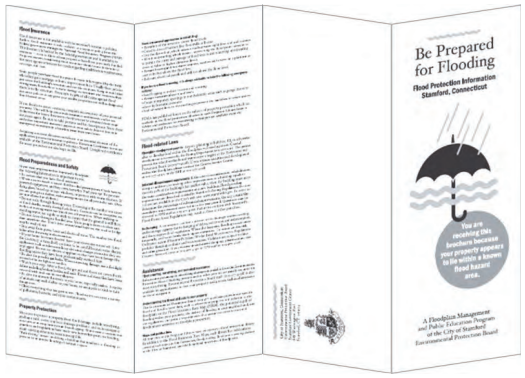
- Danbury
  - Multi-family home elevations
  - Single-family home elevations

Residential Elevations in Danbury. Photos by MMI

PROPERTY PROTECTION

REVIEW MITIGATION SUCCESSES

- Stamford
  - "Be Prepared for Flooding"
  - Annual brochure sent to residents within known flood hazard areas



January 2020 Flood Preparedness Brochure

PUBLIC EDUCATION

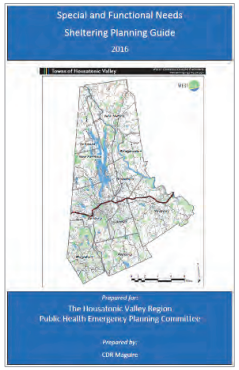
REVIEW MITIGATION SUCCESSES

- Stamford
  - Mill River Park and Greenway
  - Dam removal and river restoration reduced flood elevations
  - Adjacent lands have been acquired and designated as open space

NATURAL RESOURCE PROTECTION

REVIEW MITIGATION SUCCESSES

- Regional Action
  - Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016



Special and Functional Needs Sheltering Planning Guide, 2016

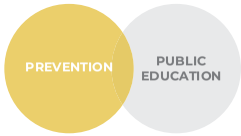
EMERGENCY SERVICES

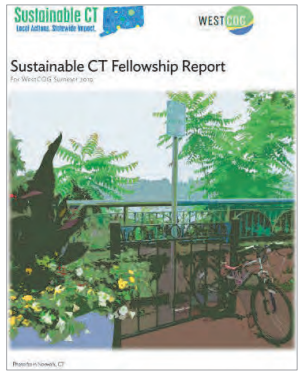
Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

- State, regional, and local action
  - Sustainable CT
  - WestCOG Sustainable CT Fellowship
  - Municipal Sustainable CT participation:

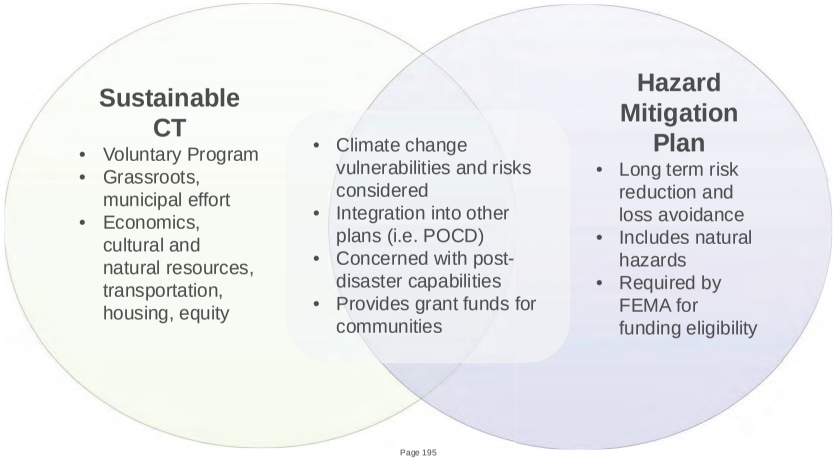
Greenwich	Weston
Stamford	Westport
Darien	Ridgefield
Wilton	Brookfield
New Milford	





2019 Sustainable CT Fellowship Report
www.westcog.org

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

HOW TO PARTICIPATE

- Visit https://westcog.org/emergency-management/hazard-mitigation/
- Comments may be sent to westcogHMP@gmail.com
- Survey available at https://www.surveymonkey.com/r/WestCOGHMP

NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
- Seek hazard mitigation funds

WESTCOG UPDATE OF THE HAZARD MITIGATION PLAN

Public Information Meeting

Focus on Town of Greenwich

Presented by:
Milone & MacBroom, Inc.
Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM

July and August 2020

WESTCOG

MILONE & MACBROOM

DISCUSSION TOPICS

- Purpose and Need for Hazard Mitigation Plan
- Long Term Goals of Hazard Mitigation
- How Can the Plan be Used?
- Hazards to Include in the Plan
- Hazards of Concern in Greenwich
- Typical Hazard Mitigation Strategies and Actions
- Mitigation Examples from the Region
- How to Participate
- Next Steps

Test Poll
(to make sure it is working for you)

Poll #1: Tell us a little about you

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

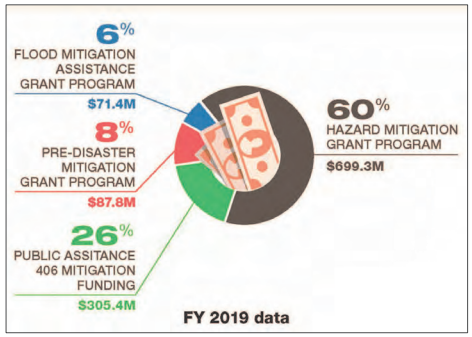
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC) – ***replaced PDM in 2020***

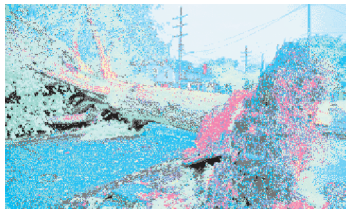


Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.



PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

Connect

- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

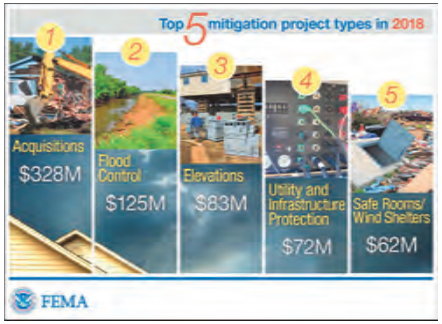
HOW CAN A PLAN BE USED?

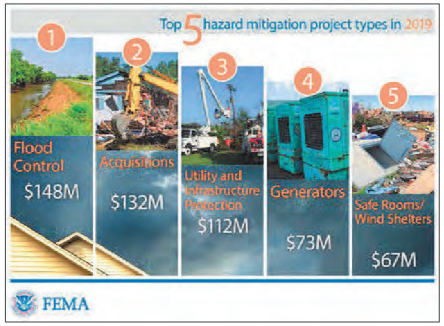
Grants can be used for:

- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities

This home in Trumbull was acquired and demolished using a FEMA grant

HOW CAN A PLAN BE USED?

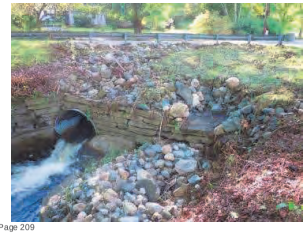




HOW CAN A PLAN BE USED?

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA

Floyd 1999



Irene 2011

HOW CAN A PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011

Post-Irene 9/2011

Construction
August 2017

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CLIMATE CHANGE

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Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

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Ice jams along the Housatonic River
Photos newstimes

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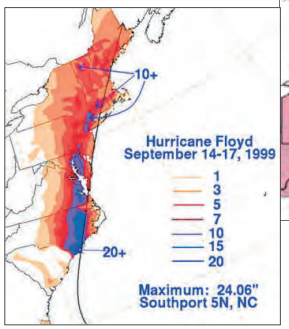
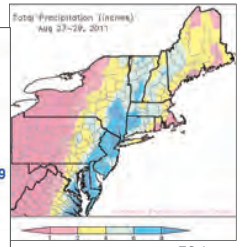


T.S. Floyd precipitation
courtesy of weather.gov



T.S. Irene
precipitation courtesy
of Northeast Climate
Data Center

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Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

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Norwalk March
2018
Photo
ctpost

Bethel gym
and fitness
center
Photo
newstimes

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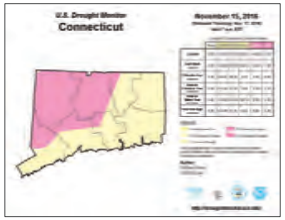

U.S. Drought Monitor

Laurel Reservoir in 2016 Courtesy of Courant.com

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Brush fire in New Fairfield (2016)
Photo ctpost

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Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

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Photos by MMI, Town of New Milford

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HAZARDS OF CONCERN

Greenwich

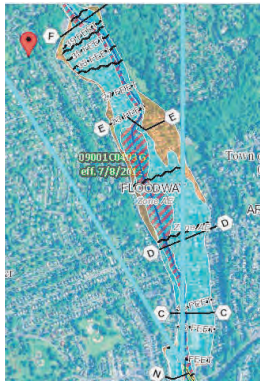
- Localized flooding along roadways and on private properties
  - Sound Beach Avenue

Photos by Greenwich Time

HAZARDS OF CONCERN

Greenwich

- Flooding along Byram River, especially in the Pemberwick Neighborhood
- Greenwich Creek near Greenwich High School



Photos courtesy Greenwich Time

HAZARDS OF CONCERN

Greenwich

- Coastal and nuisance flooding
  - South Beach Avenue (coastal), Shore Road (nuisance)

Photos by Greenwich Time

HAZARDS OF CONCERN

Greenwich

- Drought was a serious issue in 2015-2017

Putnan Reservoir
Photo courtesy
CT Post

Laurel Reservoir
Photo courtesy
Stamford Advocate

HAZARDS OF CONCERN

Greenwich

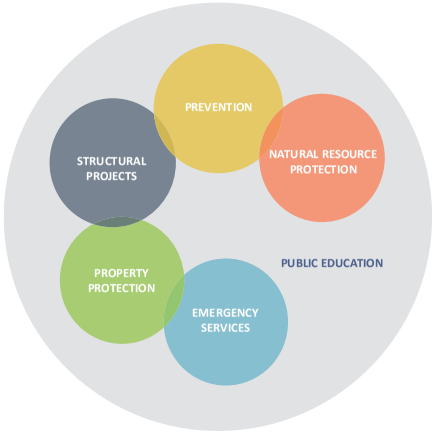
- Winter Storms
- High Wind Events

Photo CT Post

Photo News 12
Connecticut

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



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- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
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FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
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- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
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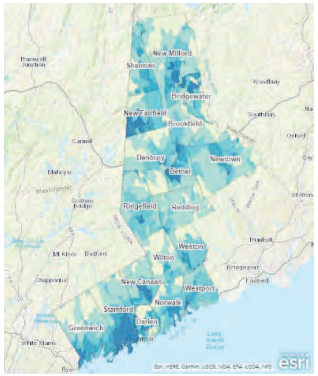
Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

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  - Meadowbrook Manor
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Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

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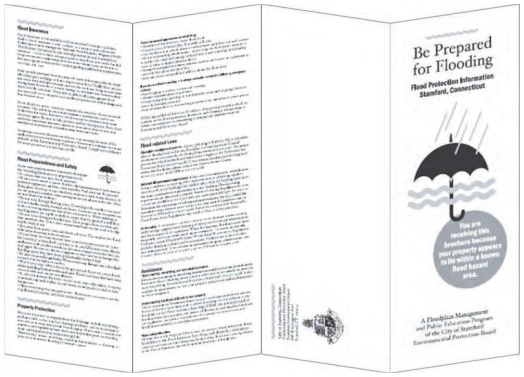

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January 2020 Flood Preparedness Brochure

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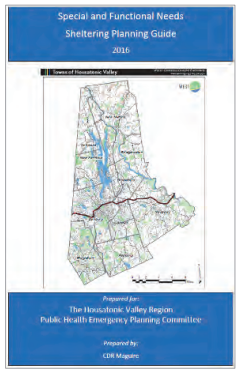

Special and Functional Needs Sheltering Planning Guide, 2016

EMERGENCY SERVICES

Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

- State, regional, and local action
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  - WestCOG Sustainable CT Fellowship
  - Municipal Sustainable CT participation:

Greenwich	Weston
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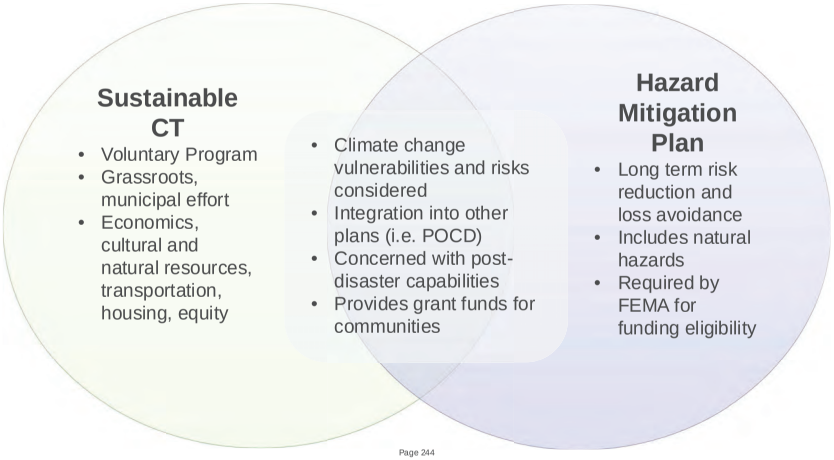
Darien	Ridgefield
Wilton	Brookfield
New Milford	

2019 Sustainable CT Fellowship Report
www.westcog.org

PREVENTION
PUBLIC EDUCATION

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
- Seek hazard mitigation funds

HOW TO PARTICIPATE

- Visit https://westcog.org/emergency-management/hazard-mitigation/
- Comments may be sent to westcogHMP@gmail.com
- Survey available at https://www.surveymonkey.com/r/WestCOGHMP

WESTCOG UPDATE OF THE HAZARD MITIGATION PLAN

Focus on City of Stamford

Public Information Meeting

Presented by:
Milone & MacBroom, Inc.
Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM

July and August 2020

WESTCOG

MILONE & MACBROOM

DISCUSSION TOPICS

- Purpose and Need for Hazard Mitigation Plan
- Long Term Goals of Hazard Mitigation
- How Can the Plan be Used?
- Hazards to Include in the Plan
- Hazards of Concern in Greenwich
- Typical Hazard Mitigation Strategies and Actions
- Mitigation Examples from the Region
- How to Participate
- Next Steps

Test Poll
(to make sure it is working for you)

Poll #1: Tell us a little about you

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

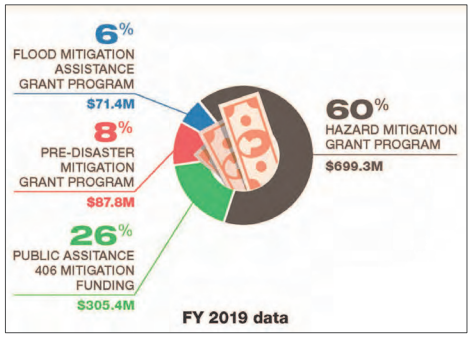
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC) – ***replaced PDM in 2020***

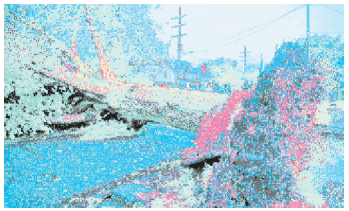


Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.



PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

Connect

- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

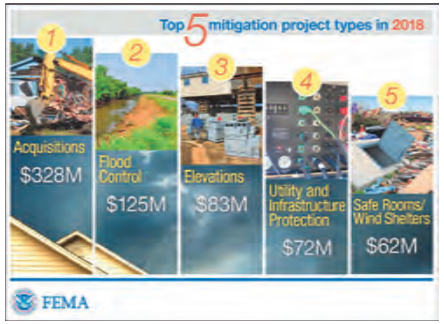
HOW CAN A PLAN BE USED?

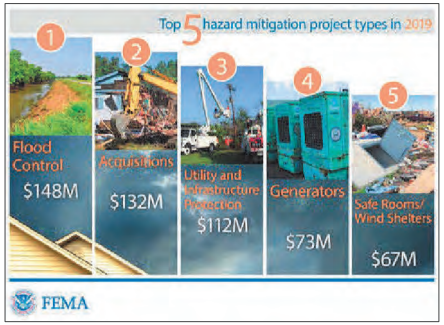
Grants can be used for:

- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities

This home in Trumbull was acquired and demolished using a FEMA grant

HOW CAN A PLAN BE USED?

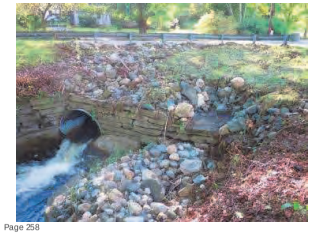




HOW CAN A PLAN BE USED?

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA

Floyd 1999



Irene 2011

HOW CAN A PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011

Post-Irene 9/2011

Construction
August 2017

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

CLIMATE CHANGE

HAZARDS TO INCLUDE IN THE PLAN

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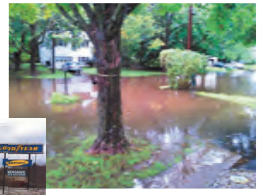

Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

HAZARDS TO INCLUDE IN THE PLAN

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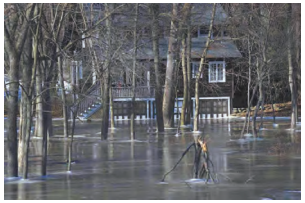

Ice jams along the Housatonic River
Photos newstimes

HAZARDS TO INCLUDE IN THE PLAN

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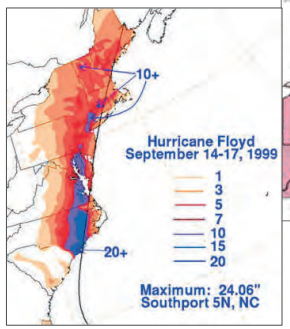
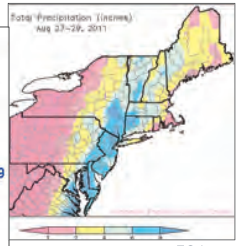


T.S. Floyd precipitation
courtesy of weather.gov



T.S. Irene
precipitation courtesy
of Northeast Climate
Data Center

HAZARDS TO INCLUDE IN THE PLAN

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Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

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Norwalk March 2018 Photo ctpost

Bethel gym and fitness center Photo newstimes

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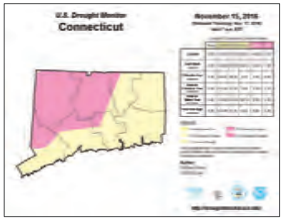

U.S. Drought Monitor

Laurel Reservoir in 2016 Courtesy of Courant.com

HAZARDS TO INCLUDE IN THE PLAN

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Brush fire in New Fairfield (2016)
Photo ctpost

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Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

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Courtesy of USGS

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Photos by MMI, Town of New Milford

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- **Terrorism & Related**

Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Stamford

- Flash floods
  - Heavy precipitation and not enough drainage

Photo: Stamford Advocate

Photo: Stamford Fire

HAZARDS OF CONCERN

Stamford

- Riverine Flooding
  - Noroton River
  - Rippowam River
  - Mianus River

Photo Daily Voice

Photo Greenwich Time

HAZARDS OF CONCERN

Stamford

- Coastal flooding

Photo: Gairid

Photo: YouTube, Dante Treglio

HAZARDS OF CONCERN

Stamford

- Drought was a serious issue in 2015-2017

Laurel Reservoir
Photo courtesy
Stamford Advocate

Putnan Reservoir
Photo courtesy
CT Post

HAZARDS OF CONCERN

Stamford

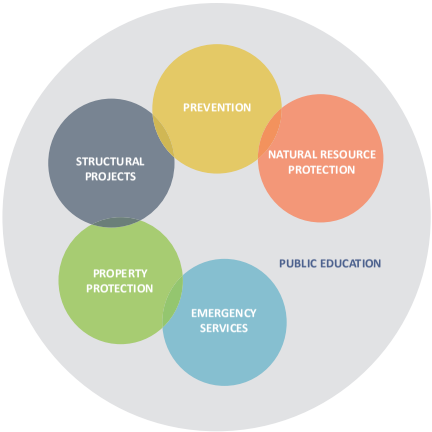
- Winter Storms
- High Wind Events
  - Tropical Storms & Hurricanes

Photo Stamford Advocate

Photo: Matthew Brow/Hearst Connecticut Media

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

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- Wet Floodproofing
- Dry Floodproofing
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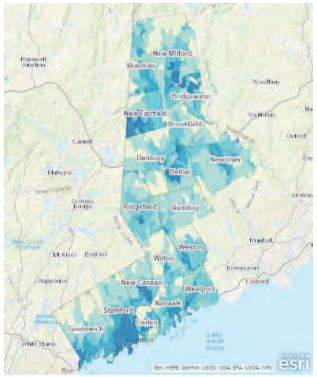

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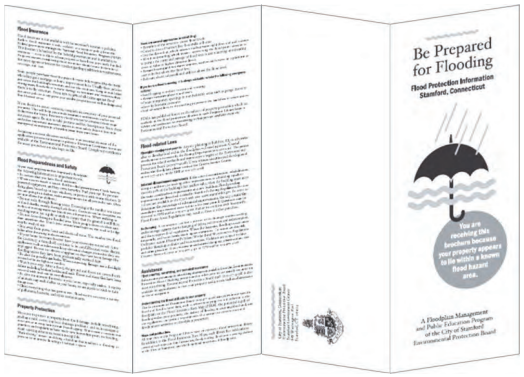

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Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

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Photos Courtesy of Milone & MacBroom

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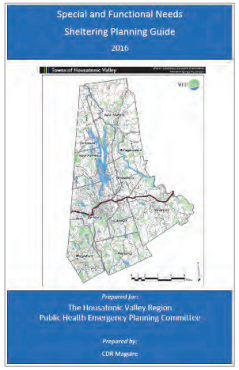

EMERGENCY SERVICES

Special and Functional Needs Sheltering Planning Guide, 2016

Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

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  - WestCOG Sustainable CT Fellowship
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Darien	Ridgefield
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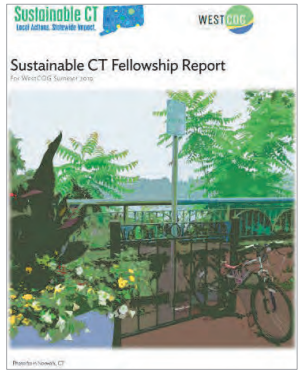
New Milford	

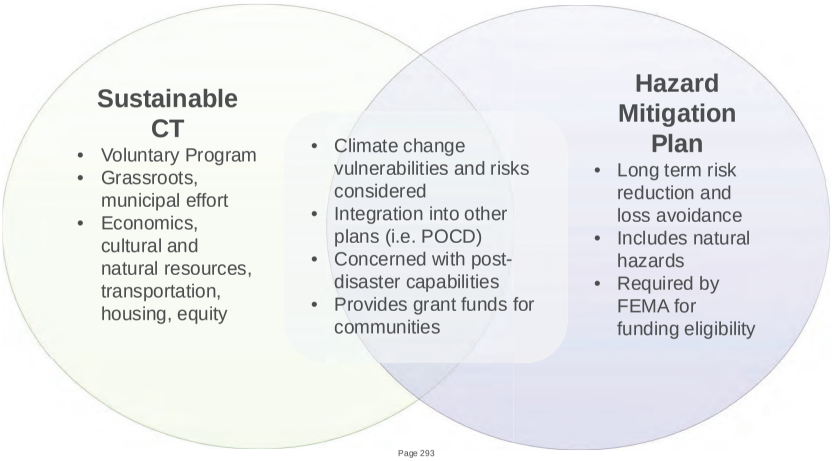


2019 Sustainable CT Fellowship Report
www.westcog.org

PREVENTION

PUBLIC EDUCATION

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
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HOW TO PARTICIPATE

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WESTCOG UPDATE OF THE HAZARD MITIGATION PLAN

Public Information Meeting

Focus on Darien, New Canaan, and Westport

Presented by:
Milone & MacBroom, Inc.
Victoria Brudz, CFM
David Murphy, PE, CFM
Noah Slovin, CFM

July and August 2020

WESTCOG

MILONE & MACBROOM

DISCUSSION TOPICS

- Purpose and Need for Hazard Mitigation Plan
- Long Term Goals of Hazard Mitigation
- How Can the Plan be Used?
- Hazards to Include in the Plan
- Hazards of Concern in Greenwich
- Typical Hazard Mitigation Strategies and Actions
- Mitigation Examples from the Region
- How to Participate
- Next Steps

Test Poll
(to make sure it is working for you)

Poll #1: Tell us a little about you

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

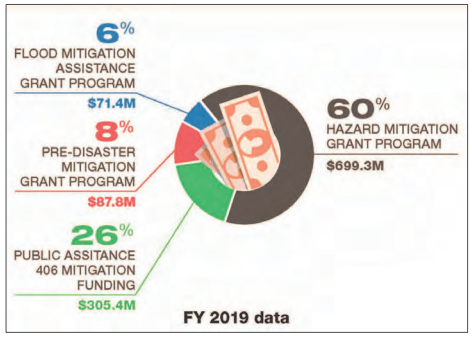
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)
- Building Resilient Infrastructure and Communities (BRIC) – ***replaced PDM in 2020***

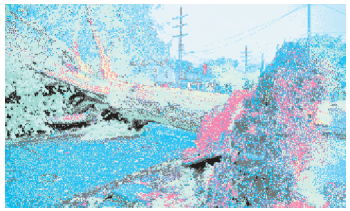


Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.



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- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

Connect

- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

HOW CAN A PLAN BE USED?

Grants can be used for:

- Building acquisitions or elevations
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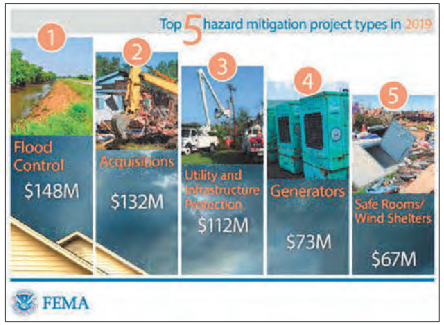

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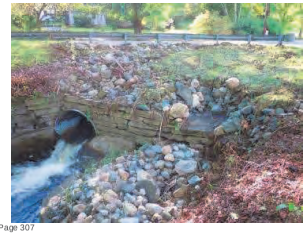

Irene 2011

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Construction August 2017

HAZARDS TO INCLUDE IN THE PLAN

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- Landslides
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CLIMATE CHANGE

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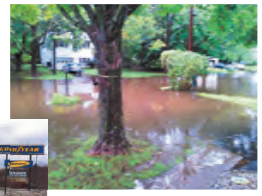
Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

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Ice jams along the Housatonic River
Photos newstimes

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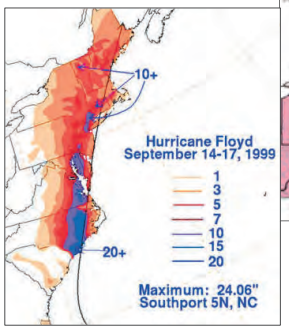
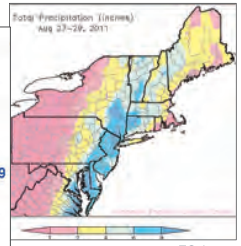


T.S. Floyd precipitation
courtesy of weather.gov


T.S. Irene
precipitation courtesy
of Northeast Climate
Data Center

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Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

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Norwalk March
2018
Photo
ctpost

Bethel gym
and fitness
center
Photo
newstimes

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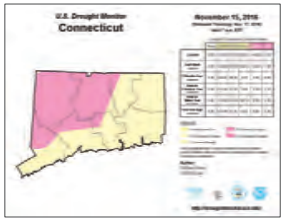

U.S. Drought
Monitor

Laurel
Reservoir in
2016
Courtesy of
Courant.com

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Brush fire in New Fairfield (2016)
Photo ctpost

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Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

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Courtesy of USGS

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Photos by MMI, Town of New Milford

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- **Terrorism & Related**

Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Darien

- Coastal Flooding
- Sea Level Rise
- Insufficient Drainage Flooding
  - Boston Post Rd, Hecker Ave, Leroy Ave, Raymond St, RR Underpasses
- Icing
- Power Loss

Photo: The Darien Times

Photo: patch.com

HAZARDS OF CONCERN

New Canaan

- Insufficient Drainage Flooding
- Power Loss
- Tree Damage

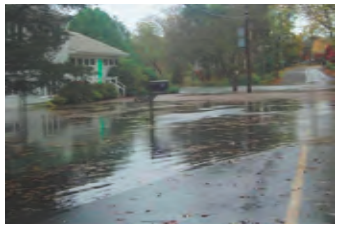


Photo: New Canaan Daily Voice

Photo: New Canaanite

HAZARDS OF CONCERN

Westport

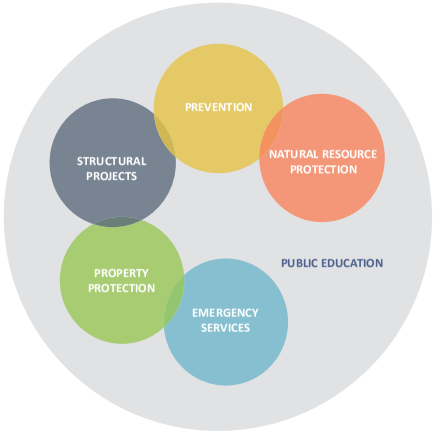
- High Intensity Rainstorms
- Insufficient Drainage Flooding
- Riverine Flooding
  - Muddy Brook
  - Dead Man Brook
  - Others
- High-Tide Flooding
  - Saugatuck Shores
  - Canal Road

Photo: Eric Sugerman / Westport News

Photo: News 12 Connecticut

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

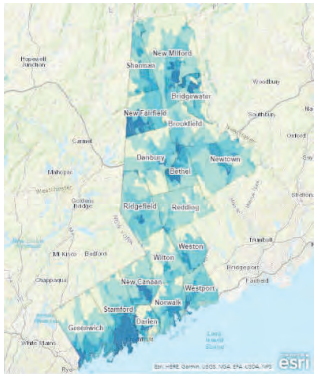
- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

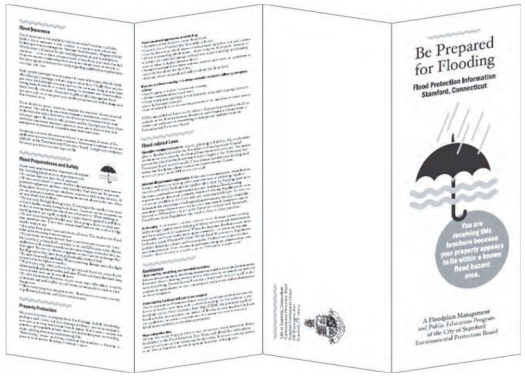
REVIEW MITIGATION SUCCESSES

- Stamford
  - Mill River Park and Greenway
  - Dam removal and river restoration reduced flood elevations
  - Adjacent lands have been acquired and designated as open space

NATURAL RESOURCE PROTECTION

REVIEW MITIGATION SUCCESSES

- Stamford
  - "Be Prepared for Flooding"
  - Annual brochure sent to residents within known flood hazard areas



January 2020 Flood Preparedness Brochure

PUBLIC EDUCATION

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

PROPERTY PROTECTION

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

STRUCTURAL PROJECTS

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

STRUCTURAL PROJECTS

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

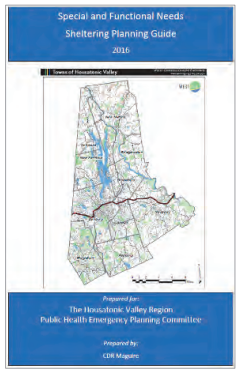
- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Regional Action
  - Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016



Special and Functional Needs Sheltering Planning Guide, 2016

EMERGENCY SERVICES

Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

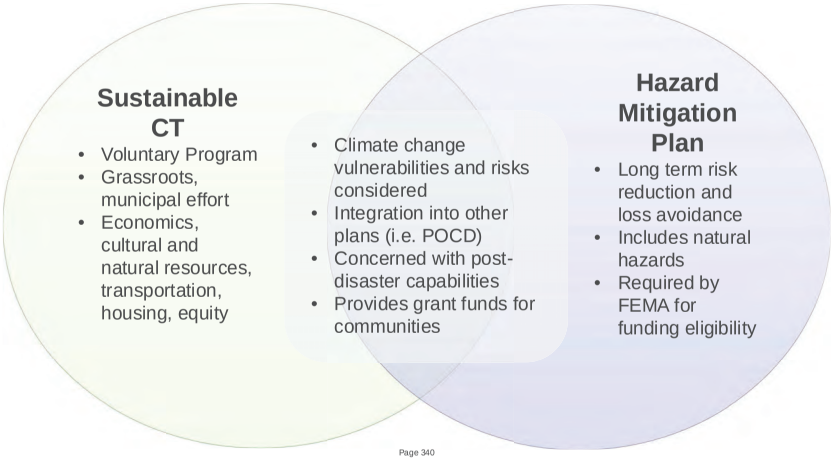
- State, regional, and local action
  - Sustainable CT
  - WestCOG Sustainable CT Fellowship
  - Municipal Sustainable CT participation:

Greenwich	Weston
Stamford	Westport
Darien	Ridgefield
Wilton	Brookfield
New Milford	

2019 Sustainable CT Fellowship Report
www.westcog.org

PREVENTION
PUBLIC EDUCATION

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
- Seek hazard mitigation funds

HOW TO PARTICIPATE

- Visit https://westcog.org/emergency-management/hazard-mitigation/
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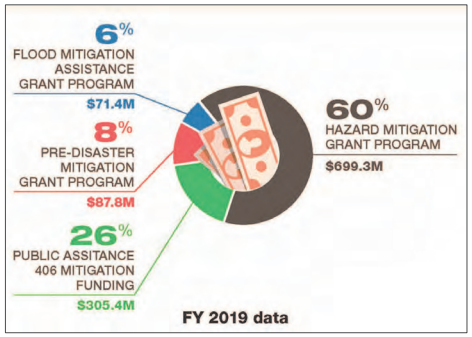

Graphic courtesy of FEMA

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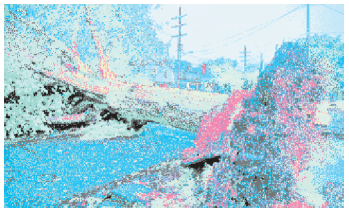

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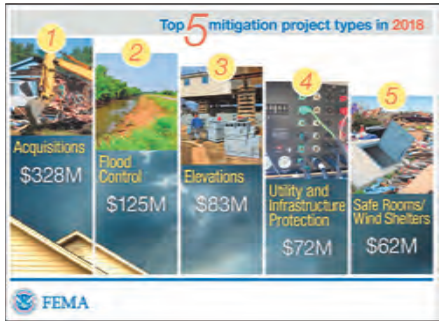

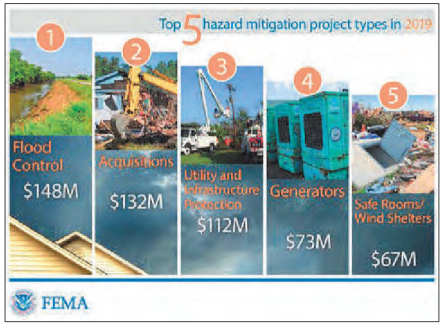

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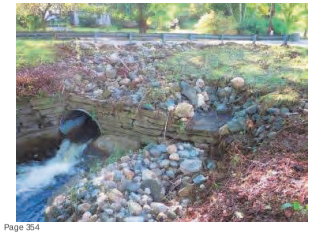

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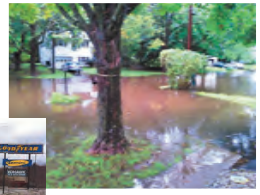

Courtesy of Town of Brookfield

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Photo Patch.com

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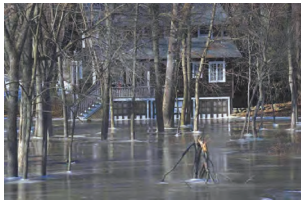
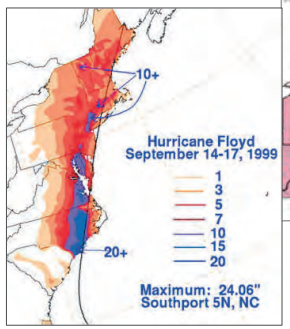


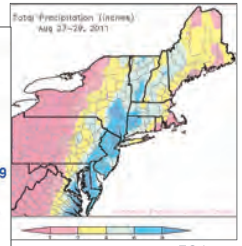
Ice jams along the Housatonic River
Photos newstimes

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- **Hurricanes and Tropical Storms**
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related



T.S. Floyd precipitation
courtesy of weather.gov



T.S. Irene
precipitation courtesy
of Northeast Climate
Data Center

HAZARDS TO INCLUDE IN THE PLAN

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- Earthquakes
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- Terrorism & Related

Brookfield (2018)
Newstimes

New Canaan
(2018)
ctpost

HAZARDS TO INCLUDE IN THE PLAN

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- **Severe Winter Storms**
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- Terrorism & Related

Norwalk March 2018 Photo ctpost

Bethel gym and fitness center Photo newstimes

HAZARDS TO INCLUDE IN THE PLAN

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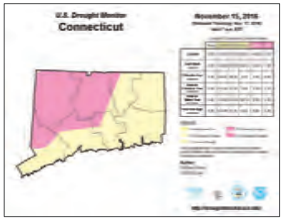

U.S. Drought Monitor

Laurel Reservoir in 2016 Courtesy of Courant.com

HAZARDS TO INCLUDE IN THE PLAN

- Floods
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- Severe Winter Storms
- Drought
- **Forest and Wildland Fires**
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Brush fire in New Fairfield (2016)
Photo ctpost

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- **Dam Failure**
- Earthquakes
- Landslides
- Terrorism & Related

Flood control dam in Ridgefield Photo The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

- Floods
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- Severe Winter Storms
- Drought
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- Dam Failure
- **Earthquakes**
- Landslides
- Terrorism & Related

Courtesy of USGS

HAZARDS TO INCLUDE IN THE PLAN

- Floods
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- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- **Landslides**
- Terrorism & Related

Photos by MMI, Town of New Milford

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- **Terrorism & Related**

Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective
- We will look at this further in a few minutes

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARDS OF CONCERN

Norwalk

- High Tide and "King Tide" Flooding
  - Water Street
  - Harborview
  - Other areas
- Sea Level Rise will make it more frequent over the long-term

Photo: Erik Trautmann / Hearst Connecticut Media

HAZARDS OF CONCERN

Norwalk

- Drainage-Related and Riverine Flooding
  - Keeler Brook
  - Norwalk River
  - Silvermine River
  - Specific neighborhoods like Pogany Street and Fodor Farm

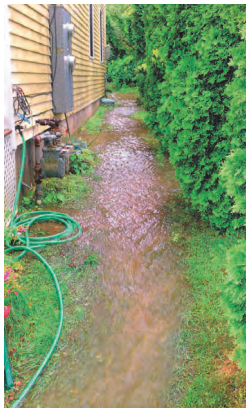


Photo: City of Norwalk

Photo: Hearst Connecticut Media

HAZARDS OF CONCERN

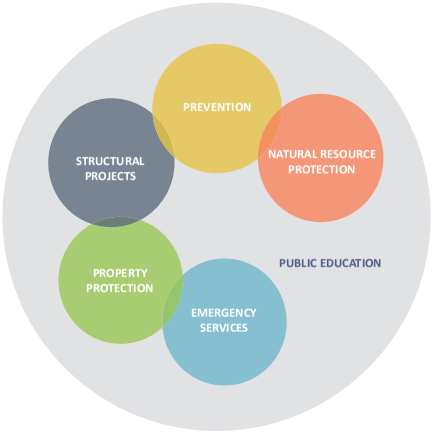
Norwalk

- Power Reliability
  - SuperStorm Sandy outage was 7 days
  - Tropical Storm Isaias outage was several days

Photos: Erik Trautmann / Hearst Connecticut Media

Poll #2: Hazards of Concern

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

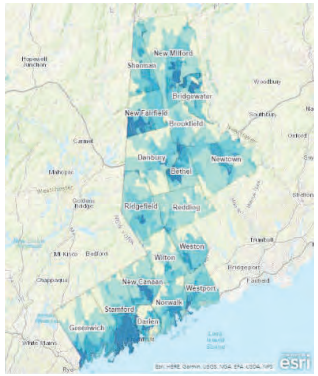
- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

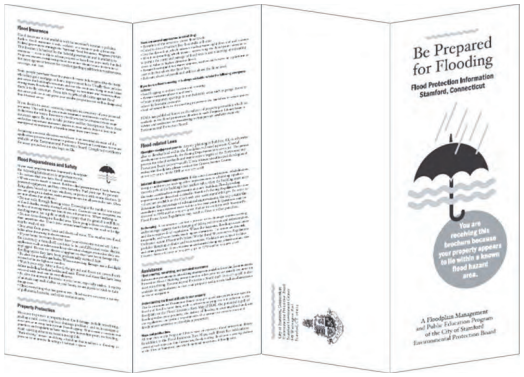
REVIEW MITIGATION SUCCESSES

- Stamford
  - Mill River Park and Greenway
  - Dam removal and river restoration reduced flood elevations
  - Adjacent lands have been acquired and designated as open space

NATURAL RESOURCE PROTECTION

REVIEW MITIGATION SUCCESSES

- Stamford
  - "Be Prepared for Flooding"
  - Annual brochure sent to residents within known flood hazard areas



January 2020 Flood Preparedness Brochure

PUBLIC EDUCATION

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

PROPERTY PROTECTION

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

STRUCTURAL PROJECTS

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

STRUCTURAL PROJECTS

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

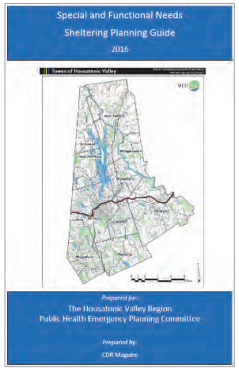
STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Regional Action
  - Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016

EMERGENCY SERVICES



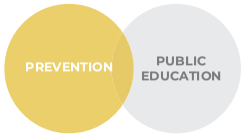
Special and Functional Needs Sheltering Planning Guide, 2016

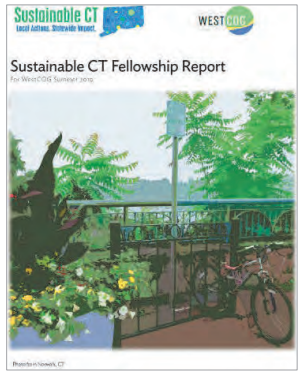
Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

- State, regional, and local action
  - Sustainable CT
  - WestCOG Sustainable CT Fellowship
  - Municipal Sustainable CT participation:

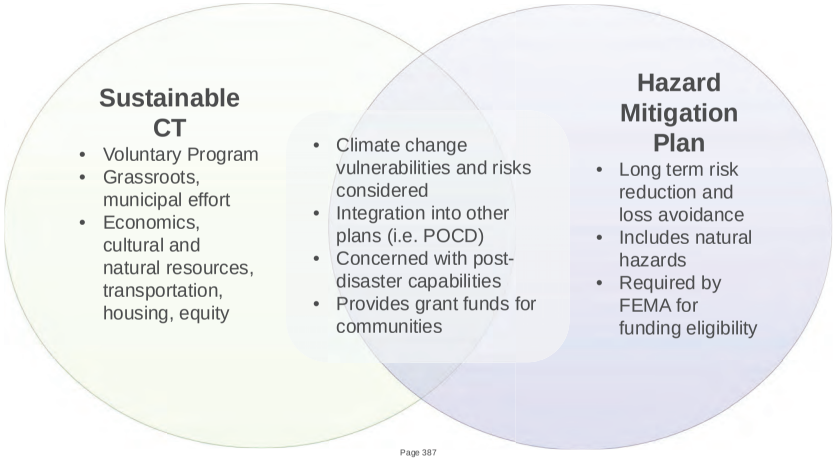
Greenwich	Weston
Stamford	Westport
Darien	Ridgefield
Wilton	Brookfield
New Milford	





2019 Sustainable CT Fellowship Report
www.westcog.org

SUSTAINABE CT & HAZARD MITIGATION PLANS



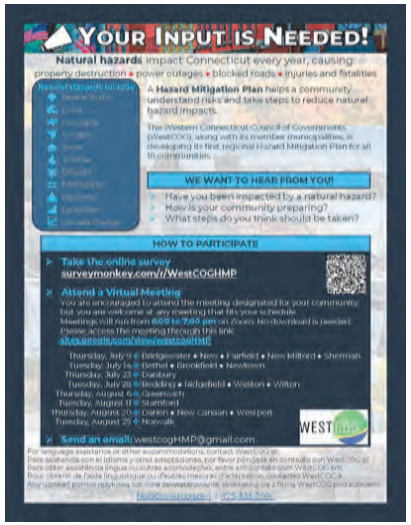
Poll #4: Sustainable CT

NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
- Seek hazard mitigation funds

HOW TO PARTICIPATE

- Visit https://westcog.org/emergency-management/hazard-mitigation/
- Comments may be sent to westcogHMP@gmail.com
- Survey available at https://www.surveymonkey.com/r/WestCOGHMP



WestCOG Public Meeting Polling Questions

Initial Poll: About you

1. What number am I thinking of? (Single Choice)
    - Answer 1: 1
    - Answer 2: 2
    - Answer 3: 3
    - Answer 4: 4
    - Answer 5: 5
    - Answer 6: 6
    - Answer 7: 7
    - Answer 8: 8
    - Answer 9: 9
    - Answer 10: 10
2. What community do you live in? (Single Choice)
    - Answer 1: Bridgewater, New, Fairfield, New Milford, or Sherman
    - Answer 2: Bethel, Brookfield, or Newtown
    - Answer 3: Danbury
    - Answer 4: Redding, Ridgefield, Weston, or Wilton
    - Answer 5: Greenwich
    - Answer 6: Stamford
    - Answer 7: Darien, New Canaan, or Westport
    - Answer 8: Norwalk
    - Answer 9: None of the Above
3. What brought you here tonight? (Multiple Choice)
    - Answer 1: I want to learn more about Natural Hazards and Mitigation
    - Answer 2: I have Natural Hazard concerns I want to share
    - Answer 3: I have ideas for Hazard Mitigation I want to share
    - Answer 4: I thought this was a link to watch Hamilton on Disney+

Poll 1: Hazards of Concern

#1 Which Natural Hazards are you MOST concerned about in YOUR community? (Multiple Choice)
- Answer 1: Coastal Flooding
- Answer 2: River Flooding
- Answer 3: Flash Flooding
- Answer 4: High Wind Events
- Answer 5: Snow/Ice Events
- Answer 6: Dam Failure
- Answer 7: Earthquakes
- Answer 8: Landslides
- Answer 9: Wildfire
- Answer 10: Extreme Temperatures (hot or cold)

#2 How concerned are you about Climate Change impacts on natural hazards (Single Choice)
- Answer 1: Very Concerned
- Answer 2: Somewhat Concerned
- Answer 3: A Little Concerned
- Answer 4: Not At All Concerned

#3 How have you been impacted by Natural Hazards in the past? (Multiple Choice)
- Answer 1: Injury / Fatality
- Answer 2: Property Damage
- Answer 3: Displacement (had to move or stay in a shelter)
- Answer 4: Lost Work or Income
- Answer 5: Minor Delays or Inconveniences

Poll 2: Mitigation Actions

#1 What types of mitigation actions have you seen implemented in your community? (Multiple Choice)

Answer 1: Public Education & Awareness
Answer 2: Emergency Alerts and Notifications
Answer 3: Electric Grid Resilience (tree trimming, burying wires, backup generators, etc.)
Answer 4: Prevention (zoning regulations, building codes, etc.)
Answer 5: Structural Projects (floodwalls, increased bridge sizes, etc.)
Answer 6: Property Protection (elevation, storm shutters/windows, etc.)
Answer 7: Emergency Services (improvements to shelters, emergency facilities, etc.)
Answer 8: Natural Resource Protection (open space, wetlands, etc.)

#2 What types of mitigation actions would you most LIKE to see implemented in your community? (Multiple Choice)

Answer 1: Public Education & Awareness
Answer 2: Emergency Alerts and Notifications
Answer 3: Electric Grid Resilience
Answer 4: Prevention
Answer 5: Structural Projects
Answer 6: Property Protection
Answer 7: Emergency Services
Answer 8: Natural Resource Protection

Poll 3: Sustainable CT

#1 Which of the 10 Sustainable CT Action Categories do you believe is an existing strength of your community? (Multiple Choice)

Answer 1: Local Economy
Answer 2: Land and Natural Resources
Answer 3: Culture
Answer 4: Planning Capabilities
Answer 5: Transportation
Answer 6: Infrastructure and Operations
Answer 7: Public Services
Answer 8: Housing
Answer 9: Equity and Inclusivity
Answer 10: Action

#2 Which of the 10 Sustainable CT Action Categories do you believe should be a top priority for your community (where could your community most improve)? (Single Choice)

Answer 1: Local Economy
Answer 2: Land and Natural Resources
Answer 3: Culture
Answer 4: Planning Capabilities
Answer 5: Transportation
Answer 6: Infrastructure and Operations
Answer 7: Public Services
Answer 8: Housing
Answer 9: Equity and Inclusivity
Answer 10: Action

WESTCOG UPDATE OF THE HAZARD MITIGATION PLAN

Public Information Meeting

Presented by:
Milone & MacBroom, Inc.
Noah Slovin, CFM

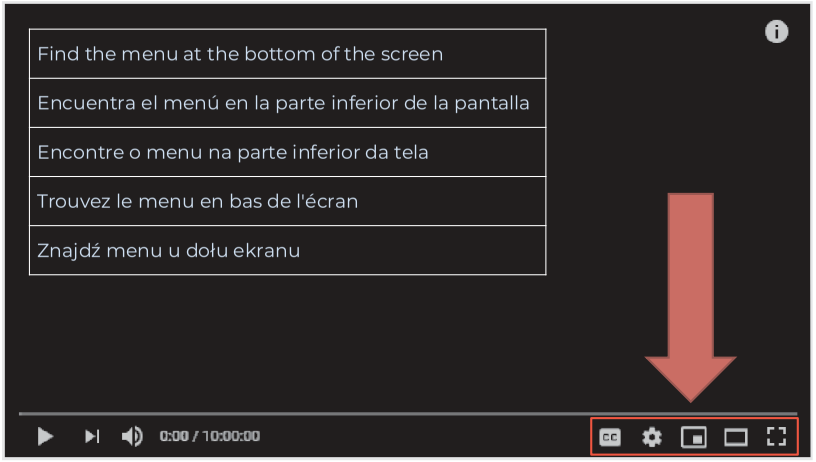
WESTCOG

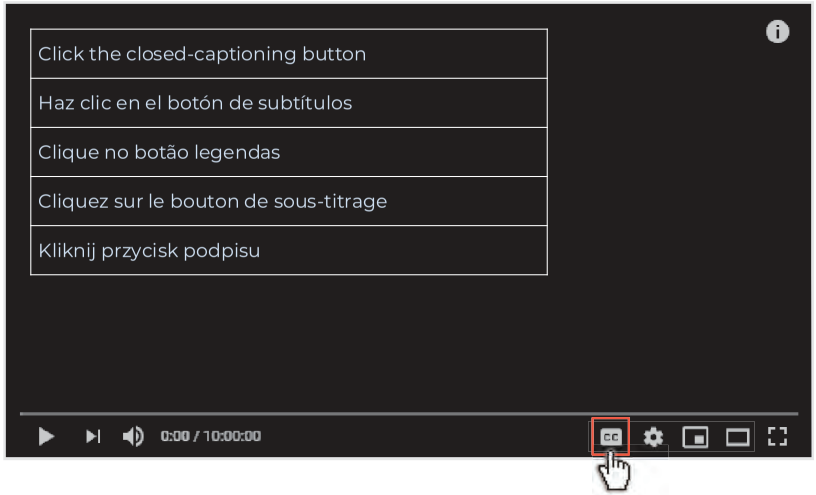
July and August 2020

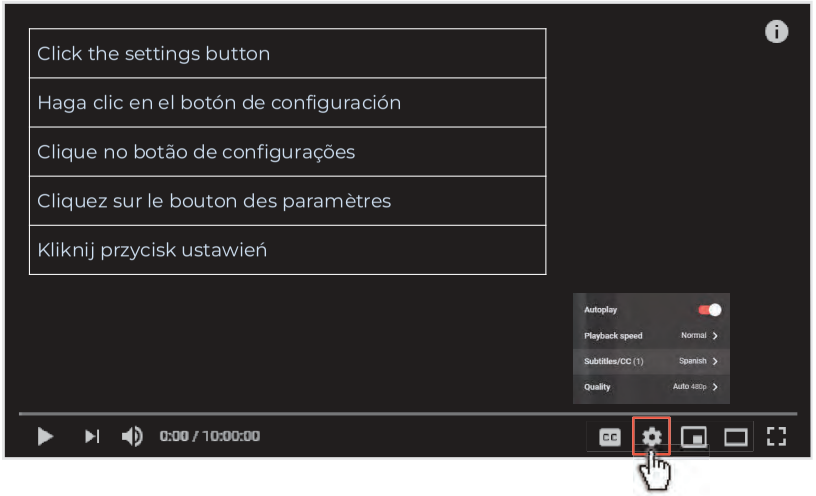
MILONE & MACBROOM

Translated Closed Captioning

The following instructions will show you how to turn on closed captioning in English
Las siguientes instrucciones le mostrarán cómo activar los subtítulos en Español.
As instruções a seguir mostram como habilitar legendas em Português
Les instructions suivantes vous montreront comment activer le sous-titrage codé en Français.
Poniższe instrukcje pokażą Ci, jak włączyć Polskie napisy.



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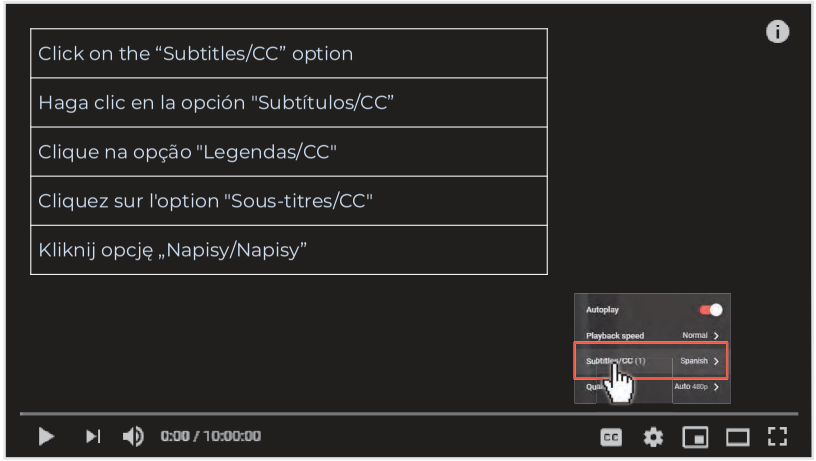
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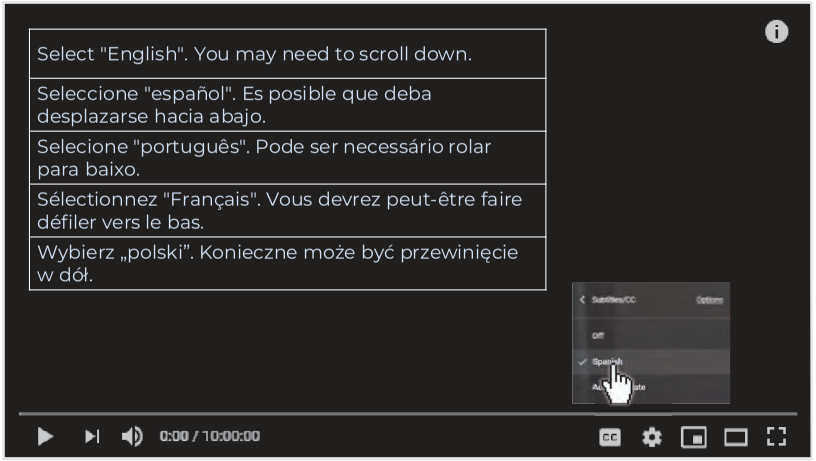
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Selecione "português". Pode ser necessário rolar para baixo.
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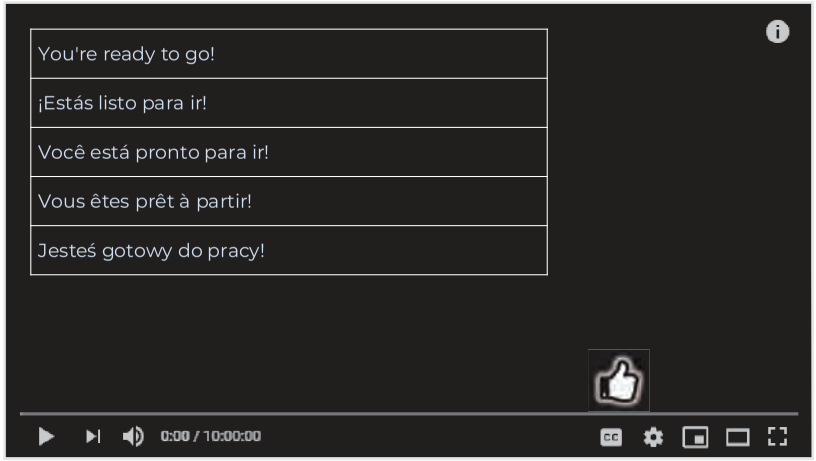
You're ready to go!
¡Estás listo para ir!
Você está pronto para ir!
Vous êtes prêt à partir!
Jesteś gotowy do pracy!
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DISCUSSION TOPICS

- Purpose and Need for Hazard Mitigation Plan
- Long Term Goals of Hazard Mitigation
- How Can the Plan be Used?
- Hazards to Include in the Plan
- Hazards of Concern in the Region
- Typical Hazard Mitigation Strategies and Actions
- Mitigation Examples from the Region
- How to Participate
- Next Steps

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

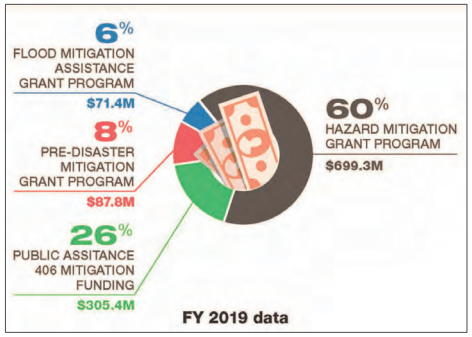
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

Mitigation Grant Programs

- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC) – ***will replace PDM in 2021***



Graphic courtesy of FEMA

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.

New Elevated Construction

Removal of Structures from Floodplain

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

LONG-TERM GOALS OF HAZARD MITIGATION

Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

Educate

- Residents
- Policy-makers

Connect

- Hazard mitigation planning to other community planning efforts

Enhance

- And preserve natural resource systems in the community

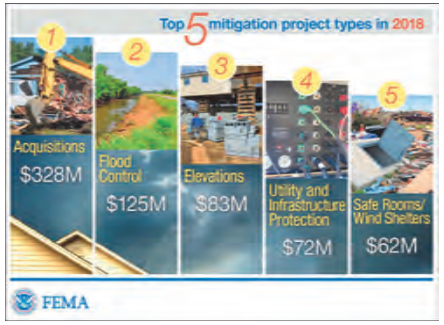
HOW CAN A PLAN BE USED?

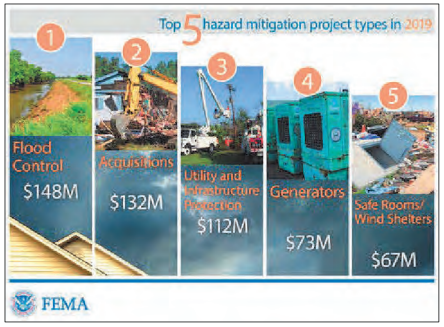
Grants can be used for:

- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities

This home in Trumbull was acquired and demolished using a FEMA grant

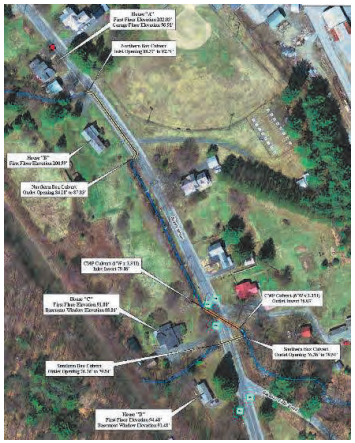
HOW CAN A PLAN BE USED?





HOW CAN A PLAN BE USED?

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA



Floyd 1999

Irene 2011

HOW CAN A PLAN BE USED?

RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA

Irene 8/2011

Post-Irene 9/2011

Construction
August 2017

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

CLIMATE CHANGE

HAZARDS TO INCLUDE IN THE PLAN

- **Floods**
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Courtesy of Town of Brookfield

Flooding in Danbury
Photo Patch.com

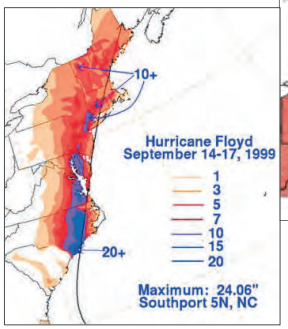
HAZARDS TO INCLUDE IN THE PLAN

- **Floods**
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

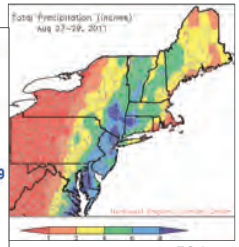
Ice jams along the Housatonic River
Photos newstimes

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- **Hurricanes and Tropical Storms**
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related



T.S. Floyd precipitation courtesy of weather.gov



T.S. Irene precipitation courtesy of Northeast Climate Data Center

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- **Tornadoes and High Winds**
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Brookfield (2018) Newstimes

New Canaan (2018) ctpost

HAZARDS TO INCLUDE IN THE PLAN

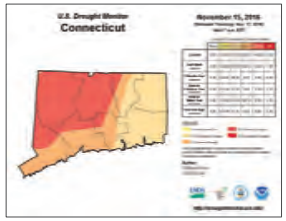
- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- **Severe Winter Storms**
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Norwalk March 2018 Photo ctpost

Bethel gym and fitness center Photo newstimes

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- **Drought**
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related



U.S. Drought Monitor

Laurel Reservoir in 2016 Courtesy of Courant.com

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- **Forest and Wildland Fires**
- Dam Failure
- Earthquakes
- Landslides
- Terrorism & Related

Brush fire in New Fairfield (2016)
Photo ctpost

HAZARDS TO INCLUDE IN THE PLAN

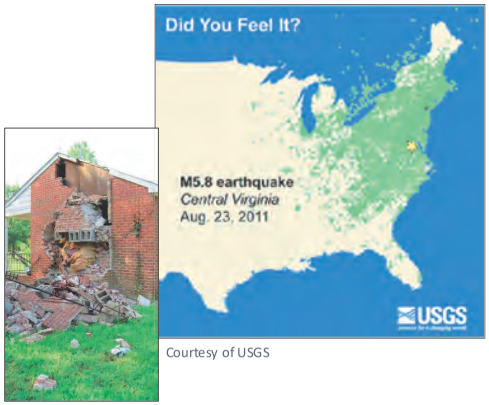
- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- **Dam Failure**
- Earthquakes
- Landslides
- Terrorism & Related

Flood control dam in Ridgefield
Photo
The Ridgefield Press

Dam failure aftermath, courtesy of Town of Sherman

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- **Earthquakes**
- Landslides
- Terrorism & Related



Courtesy of USGS

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- **Landslides**
- Terrorism & Related

Photos by MMI, Town of New Milford

HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- Tornadoes and High Winds
- Severe Winter Storms
- Drought
- Forest and Wildland Fires
- Dam Failure
- Earthquakes
- Landslides
- **Terrorism & Related**

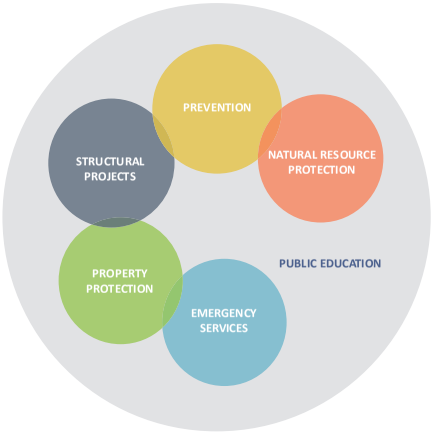
Terrorism, Sabotage, and Mass Casualty Events

- Not required for inclusion in hazard mitigation plans developed in accordance with the Disaster Mitigation Act
- FEMA typically will not review or provide comments if included in plan
- Mitigation funds are not awarded for actions that address only terrorism, sabotage, and mass casualty
- The WestCOG Hazard Mitigation Plan should address the hazard from a mitigation perspective rather than response perspective

WHAT ABOUT IMPACTS OF A CHANGING CLIMATE?

- Heat-related hazards will increase in intensity
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events
- Flashy droughts will become more frequent
- Snow may be heavier, although the snow season will be shorter
- Riverine flood risks will increase, even where we have flood control that prevents the largest floods
- Sea level is rising, and the rate of rise may increase
- Nuisance flood risks and drainage-related flood risks will increase

HAZARD MITIGATION STRATEGIES AND ACTIONS



Structural Project

Property Protection

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION

STRUCTURAL PROJECTS

- Replace Bridges and Culverts
- Remove In-Stream Dams
- Remove Obstructions
- Upstream Detention
- Install Stormwater Systems
- Create Floodways
- Enlarge Channels
- Reduce Flow Resistance
- Install Levees
- Install Flood Walls

PROPERTY PROTECTION

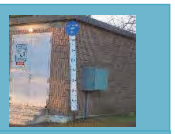
- Wet Floodproofing
- Dry Floodproofing
- Elevate Buildings
- Relocate Buildings
- Secure Utilities
- Anchor Floatables
- Remove Hazardous Materials
- Re-Grade Properties
- Purchase Flood Insurance
- Join the Community Rating System (CRS)

PREVENTION

- Modify Zoning
- Modify Plan of Conservation and Development
- Stormwater Regulations
- Increase Flood Damage Prevention Standards
- Freeboard
- Low Impact Development
- Minimize Impervious Cover

FLOOD MITIGATION STRATEGIES

FLOOD MITIGATION



NATURAL RESOURCES

- Acquire or Preserve Floodplain Land
- Acquire and Remove Structures from Floodplains and Convert to Open Space
- Acquire or Preserve Other Lands
- Increase Wetland Storage
- Re-Connect Streams to Floodplains

EMERGENCY SERVICES

- Build Local Capacities to Respond
- Move Critical Facilities from Flood Risk Areas
- Establish Emergency Shelters
- Elevate Roads or Bridges to Ensure Egress
- Develop Community Evacuation Plans
- Develop Site-Specific Evacuation Plans
- Establish Satellite Facilities in Areas Subject to Isolation

PUBLIC EDUCATION

- Newsletters
- Community Meetings
- Information Kiosks
- Web Site with Flood Risk Maps
- Education of Municipal Staff
- Leverage State and FEMA Education Programs
- Establish a Standing Committee or Board to Oversee Outreach

OTHER HAZARD MITIGATION STRATEGIES

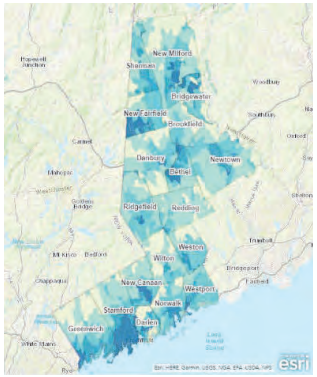
- Strengthen or reinforce shelters and critical facilities
- Create backup critical facilities
- Bury utilities
- Harden utilities
- Expand and fund tree maintenance programs
- Snow removal plans and programs
- Shutters, load path, and roof projects
- Enhance fire suppression capabilities with dry hydrants, cisterns, etc.
- Bracing for potential earthquake damage
- Public education programs and resources

Hurricane Shutters

Dry Hydrants

REVIEW MITIGATION SUCCESSES

- Regional action (WestCOG)
  - MS4 Priority Mapping



ArcGIS Online
Map of WestCOG Basins
Prioritized by Impervious Surface %

PREVENTION

REVIEW MITIGATION SUCCESSES

- Brookfield
  - Meadowbrook Manor
  - $1.3 M
  - New storm sewer system to alleviate drainage problems from Lime Kiln Brook. Flooding has led to contaminated septic water and flooded homes.

Construction begins on Meadowbrook Road.
Photo: Carol Kaliff / newstimes (Hearst Connecticut Media)

STRUCTURAL PROJECTS

REVIEW MITIGATION SUCCESSES

- New Fairfield
  - Candlewood Corners Drainage Improvement
  - Pipe capacity increased
  - $500,000 Project

STRUCTURAL PROJECTS

November Ribbon-Cutting Ceremony Upon Project Completion. Photo: newstimes

REVIEW MITIGATION SUCCESSES

- New Milford
  - Squire Hill Road and Long Mountain Road Repairs
  - Hazard mitigation not a specific goal, but project addresses natural hazard risks to road, and emergency access via the road

STRUCTURAL PROJECTS

Photos Courtesy of Milone & MacBroom

REVIEW MITIGATION SUCCESSES

- Greenwich
  - Home elevations partially funded through FEMA
  - Damage from Sandy and a change to municipal codes encouraged elevations
    - Substantial damage cumulative since "noncompliance"

PROPERTY PROTECTION

Home Elevation In Greenwich. Photo: Helen Neafsey / ctpost

REVIEW MITIGATION SUCCESSES

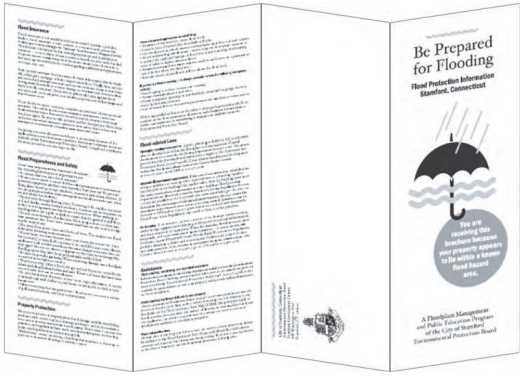
- Danbury
  - Multi-family home elevations
  - Single-family home elevations

PROPERTY PROTECTION

Residential Elevations in Danbury. Photos by MMI

REVIEW MITIGATION SUCCESSES

- Stamford
  - "Be Prepared for Flooding"
  - Annual brochure sent to residents within known flood hazard areas



January 2020 Flood Preparedness Brochure

PUBLIC EDUCATION

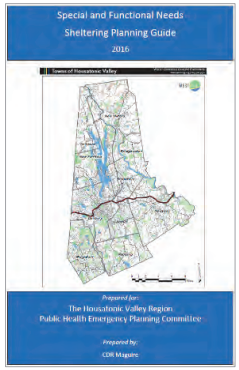
REVIEW MITIGATION SUCCESSES

- Stamford
  - Mill River Park and Greenway
  - Dam removal and river restoration reduced flood elevations
  - Adjacent lands have been acquired and designated as open space

NATURAL RESOURCE PROTECTION

REVIEW MITIGATION SUCCESSES

- Regional Action
  - Housatonic Valley Region Special and Functional Needs Sheltering Planning Guide, 2016



Special and Functional Needs Sheltering Planning Guide, 2016

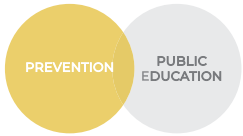
EMERGENCY SERVICES

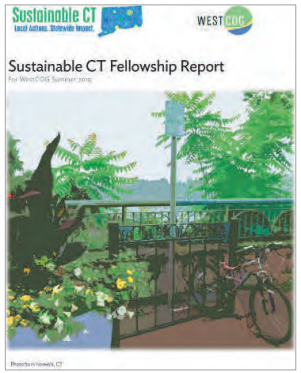
Poll #3: Mitigation Actions

REVIEW MITIGATION SUCCESSES

- State, regional, and local action
  - Sustainable CT
  - WestCOG Sustainable CT Fellowship
  - Municipal Sustainable CT participation:

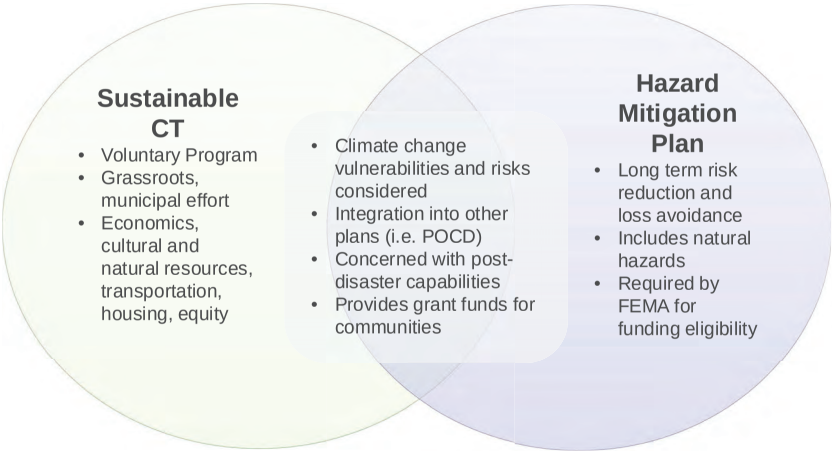
Greenwich	Weston
Stamford	Westport
Darien	Ridgefield
Wilton	Brookfield
New Milford	





2019 Sustainable CT Fellowship Report
www.westcog.org

SUSTAINABE CT & HAZARD MITIGATION PLANS



Poll #4: Sustainable CT

HOW TO PARTICIPATE

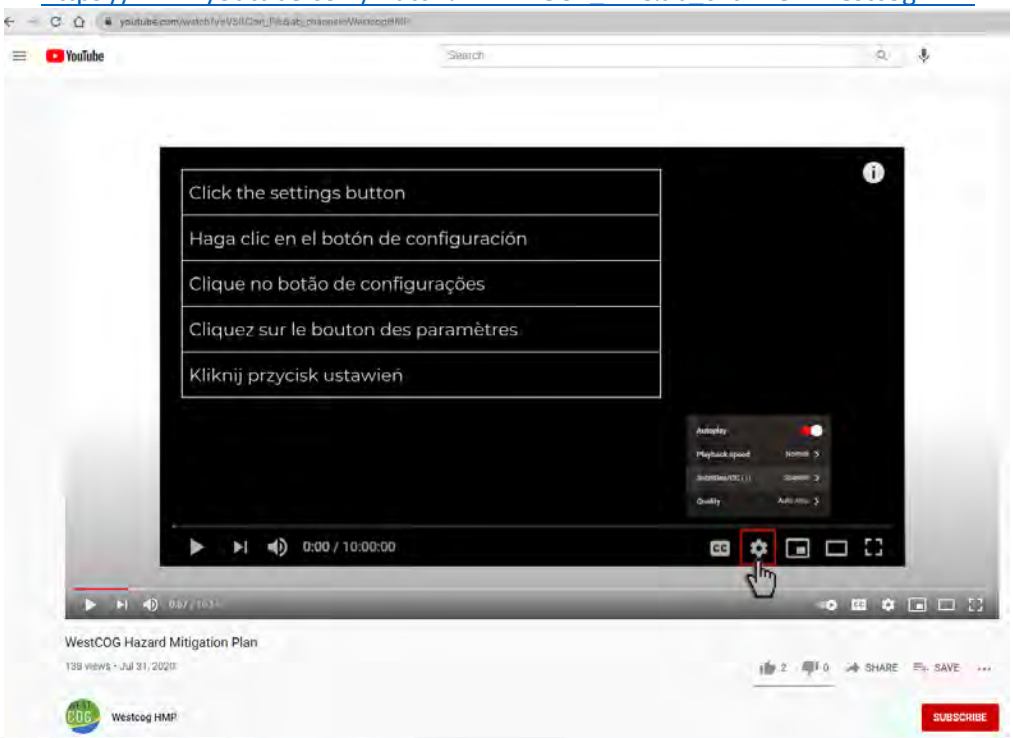
- Visit https://westcog.org/emergency-management/hazard-mitigation/
- Comments may be sent to westcogHMP@gmail.com
- Survey available at https://www.surveymonkey.com/r/WestCOGHMP

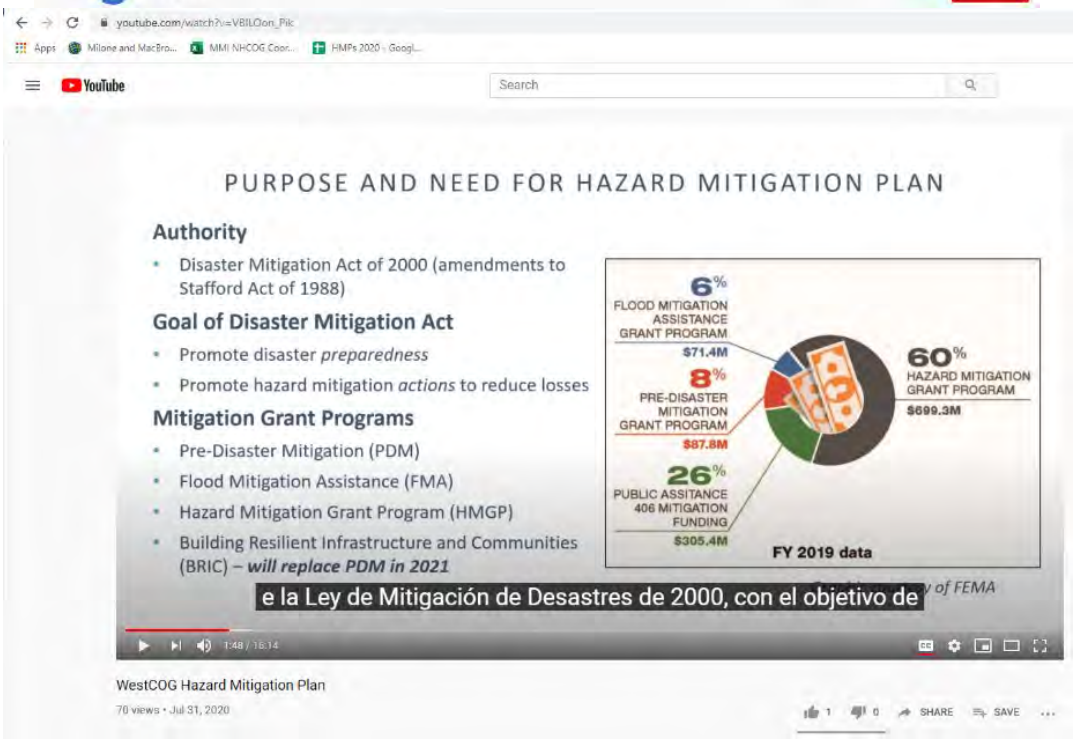
NEXT STEPS

- Incorporate input from residents, business owners, and the public at large
- Develop mitigation strategies and actions
- Prepare draft plan for review by the municipalities and the public
- Adopt and implement the plan
- Seek hazard mitigation funds

WestCOG Public Meeting
Online video of public presentation with multilingual subtitles.

https://www.youtube.com/watch?v=VBILOon_Pik&ab_channel=WestcogHMP





Notes from Public Meetings

WestCOG Hazard Mitigation Plan
Public Meeting #1
Date: July 9, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
David Murphy, MMI
Victoria Brudz, MMI

Attendees:
Nicole Sullivan, WestCOG
Diane Knight
Mary Esposito
Republican-American

David Murphy and Victoria Brudz from Milone and MacBroom (MMI) conducted the meeting specifically targeted for the towns of Bridgewater, New Fairfield, New Milford, and Sherman. While this meeting was targeted for these towns, residents from all WestCOG municipalities were invited to attend. There was a total of four attendees including two assumed residents, a WestCOG representative and a media representative. Various topics were presented to the public by MMI including:

- The need for hazard mitigation
- How the plan can be used
- Hazards that will be addressed in the plan
- Specific hazards for the targeted communities
- The next steps of the plan

Throughout the presentation attendees were asked a total of eight polling questions to gain additional insight for plan development. The questions corresponded with the topic being discussed and were asked after information on the subject was presented to the public. Questions and responses can be found in table 1.

Table 1: July 9, 2020 polling results

Poll #1 Tell us about you										
		Bridgewater, New Fairfield, New Milford, or Sherman	Bethel, Brookfield, or Newtown	Danbury	Redding, Ridgefield, Weston, or Wilton	Greenwich	Stamford	Darien, New Canaan, or Westport	Norwalk	None of the Above
#1	What community do you live in?	**2/2**								
		I want to learn more about Natural Hazards and Mitigation		I have Natural Hazards concerns and I want to share		I have ideas for Hazard Mitigation I want to share			I thought this was a link to watch Hamilton on Disney+	
#2	What brought you here tonight?	**2/2**								

Poll #2 Hazard Concerns											
		Coastal Flooding	Riverine Flooding	Flash Flooding	High Wind Events	Snow/Ice Events	Dam Failure	Earthquakes	Landslides	Wildfire	Extreme Temperatures (hot or cold)
#1	Which Natural Hazard are you most concerned with?		**1/3**	**1/3**	**2/3**	**2/3**					**2/3**
		Very Concerned		Somewhat Concerned		A Little Concerned			Not At All Concerned		
#2	How Concerned are you about Climate Change impacts on Natural Hazards?			**2/3**		**1/3**					

		Injury	Property Damage	Displacement (had to move or stay in a shelter)	Lost Work or Income	Minor Delays or Inconvenience
#3	Have you been impacted by Natural Hazard in the Past?		**1/3**	**1/3**	**1/3**	**2/3**

Poll #3 Mitigation Actions

		Public Education & Awareness	Emergency Alerts & Notification	Electric Grid Resilience (tree trimming, burying wires, backup generators, etc.)	Prevention of Damages (zoning regulation, building codes, etc.)	Structural Protection (floodwalls, increased bridge sizes, etc.)	Property Protection (elevation, storm shutters or windows, etc.)	Emergency Services (improvements to shelters, emergency facilities, etc.)	Natural Resource Protection (open space, wetlands, etc.)
#1	What types of mitigation actions have you seen implements in your community?	**2/3**	**3/3**	**2/3**	**1/3**	**1/3**	**1/3**	**2/3**	
		Public Education & Awareness	Emergency Alerts and Notifications	Electric Grid Resilience	Prevention of Damages	Structural Projects	Property Protection	Emergency Services	Natural Resource Protection
#2	What type of mitigation actions would you most like to see implemented in your community?					**1/3**	**1/3**	**1/3**	**2/3**

Poll #4 Sustainable CT

		Sea Level Rise	More Frequent and Intense RAIN storms	More frequent and intense WIND storms	More Extreme heat events	More severe droughts	Increased wildfire risk	Increased risk of insect-borne illnesses
#1	Which of the following climate change impacts are you most concerned about within your community?		**1/3**	**3/3**	**1/3**	**1/3**	**1/3**	**2/3**

At the conclusion of the presentation, participants were asked if there were any questions. One question and two comments were made:

Comment #1: Nicole Sullivan commented on wind events and trees in the town of New Milford.

- Note was taken of this comment

Question #1: Are all the meetings the same as this one?

- Victoria explained that the foundation of the meeting will be the same to explain the purpose of the plan, the hazards addressed in the plan, and the mitigation successes, however each meeting will include specific hazard concerns for the specific communities being targeted during that meeting.

Comment #2: Participant stated that the wind is getting worse in New Milford.

- Note was taken of this point

To conclude the meeting, participants were informed of the remaining meetings, and were encouraged to join again if any questions or comments arose after the conclusion of the meeting.

WestCOG Hazard Mitigation Plan
Public Meeting #2
Date: July 14, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
Victoria Brudz, MMI
Noah Slovin, MMI

Attendees:
Thomas Galliford (Bethel)
Nicole Sullivan (WestCOG)
Charles Zukowski

Victoria Brudz and Noah Slovin from Milone and MacBroom (MMI) conducted the meeting specifically targeted for the towns of Bethel, Brookfield, Newtown. While this meeting was targeted for these towns, residents from all WestCOG municipalities were invited to attend. There was a total of 3 attendees. Various topics were presented to the public by MMI including:

- The need for hazard mitigation
- How the plan can be used
- Hazards that will be addressed in the plan
- Specific hazards for the targeted communities
- The next steps of the plan

Throughout the presentation attendees were asked a total of eight polling questions to gain additional insight for plan development. The questions corresponded with the topic being discussed and were asked after information on the subject was presented to the public. Questions and responses can be found in table 1.

Table 1: July 14, 2020 polling results (2 voters)

Poll #1 Tell us about you										
		Bridgewater, New Fairfield, New Milford, or Sherman	Bethel, Brookfield, or Newtown	Danbury	Redding, Ridgefield, Weston, or Wilton	Greenwich	Stamford	Darien, New Canaan, or Westport	Norwalk	None of the Above
#1	What community do you live in?	**1**	1							
		I want to learn more about Natural Hazards and Mitigation		I have Natural Hazards concerns and I want to share		I have ideas for Hazard Mitigation I want to share			I thought this was a link to watch Hamilton on Disney+	
#2	What brought you here tonight?	**2**								

Poll #2 Hazard Concerns											
		Coastal Flooding	Riverine Flooding	Flash Flooding	High Wind Events	Snow/Ice Events	Dam Failure	Earthquakes	Landslides	Wildfire	Extreme Temperatures (hot or cold)
#1	Which Natural Hazard are you most concerned with?		**1**		**2**						
		Very Concerned		Somewhat Concerned		A Little Concerned			Not At All Concerned		
#2	How Concerned are you about Climate Change impacts on Natural Hazards?	**1**		**1**							
		Injury		Property Damage		Displacement (had to move or stay in a shelter)		Lost Work or Income		Minor Delays or Inconvenience	

#3	Have you been impacted by Natural Hazard in the Past?			1			1		1
Poll #3 Mitigation Actions									
		Public Education & Awareness	Emergency Alerts & Notification	Electric Grid Resilience (tree trimming, burying wires, backup generators, etc.)	Prevention of Damages (zoning regulation, building codes, etc.)	Structural Protection (floodwalls, increased bridge sizes, etc.)	Property Protection (elevation, storm shutters or windows, etc.)	Emergency Services (improvements to shelters, emergency facilities, etc.)	Natural Resource Protection (open space, wetlands, etc.)
#1	What types of mitigation actions have you seen implements in your community?		2	1	1	1		1	
		Public Education & Awareness	Emergency Alerts and Notifications	Electric Grid Resilience	Prevention of Damages	Structural Projects	Property Protection	Emergency Services	Natural Resource Protection
#2	What type of mitigation actions would you most like to see implemented in your community?			1			1		1
Poll #4 Sustainable CT									

		Sea Level Rise	More Frequent and Intense RAIN storms	More frequent and intense WIND storms	More Extreme heat events	More severe droughts	Increased wildfire risk	Increased risk of insect-borne illnesses
#1	Which of the following climate change impacts are you most concerned about within your community?		**2**	**2**				**1**

At the conclusion of the presentation, participants were asked if there were any questions.

- Participant stated:
    - Concern about storms and grid. Grid is controlled by Eversource. What goes into their decisions about cost and resilience?
    - What is our connection to Eversource?
    - Answer: We encourage liaising. Improved communication with utility companies is often an action identified by municipalities.
- Participant stated:
    - Road blockage – solution is to build multiple entrances or have emergency access routes that are blocked off except in emergencies. How come people don't do this? How can we get them to?
    - Newtown has an area where the town owns a strip of land but won't build the access route, and they do not maintain it.
    - Answer: It's often a recommendation but it's difficult to implement.

To conclude the meeting, participants were informed of the remaining meetings, and were encouraged to join again if any questions or comments arose after the conclusion of the meeting.

WestCOG Public Meeting #3
Date: July 23, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
Victoria Brudz, MMI
David Murphy, MMI

Attendees:
No one in attendance

WestCOG Hazard Mitigation Plan
Public Meeting #4
Date: July 28, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
Victoria Brudz, MMI
Noah Slovin

Attendees:
John Lynch
John Pokorny

Noah Slovin and Victoria Brudz from Milone and MacBroom (MMI) conducted the meeting specifically targeted for the towns of Redding, Ridgefield, Weston, and Wilton. There were a total of 2 attendees at the meeting and that also participated in the polling. Various topics were presented to the public by MMI including:

- The need for hazard mitigation
- How the plan can be used
- Hazards that will be addressed in the plan
- Specific hazards for the targeted communities
- The next steps of the plan

Throughout the presentation attendees were asked a total of eight polling questions to gain additional insight for plan development. The Questions corresponded with the topic being discussed and were asked after information on the subject was presented to the public. Questions and responses can be found in table 1.

Table 1: July 28, 2020 polling results (2 voters)

Poll #1 Tell us about you										
		Bridgewater, New Fairfield, New Milford, or Sherman	Bethel, Brookfield, or Newtown	Danbury	Redding, Ridgefield, Weston, or Wilton	Greenwich	Stamford	Darien, New Canaan, or Westport	Norwalk	None of the Above
#1	What community do you live in?				**2**					
		I want to learn more about Natural Hazards and Mitigation		I have Natural Hazards concerns and I want to share		I have ideas for Hazard Mitigation I want to share			I thought this was a link to watch Hamilton on Disney+	
#2	What brought you here tonight?	**2**								

Poll #2 Hazard Concerns											
		Coastal Flooding	Riverine Flooding	Flash Flooding	High Wind Events	Snow/Ice Events	Dam Failure	Earthquakes	Landslides	Wildfire	Extreme Temperatures (hot or cold)
#1	Which Natural Hazard are you most concerned with?		**2**	**1**	**2**	**2**				**1**	
		Very Concerned		Somewhat Concerned		A Little Concerned			Not At All Concerned		
#2	How Concerned are you about Climate Change impacts on Natural Hazards?	**1**		**1**							
		Injury		Property Damage		Displacement (had to move or stay in a shelter)		Lost Work or Income		Minor Delays or Inconvenience	
#3	Have you been impacted by			**1**						**2**	

	Natural Hazard in the Past?								
Poll #3 Mitigation Actions									
		Public Education & Awareness	Emergency Alerts & Notification	Electric Grid Resilience (tree trimming, burying wires, backup generators, etc.)	Prevention of Damages (zoning regulation, building codes, etc.)	Structural Protection (floodwalls, increased bridge sizes, etc.)	Property Protection (elevation, storm shutters or windows, etc.)	Emergency Services (improvements to shelters, emergency facilities, etc.)	Natural Resource Protection (open space, wetlands, etc.)
#1	What types of mitigation actions have you seen implements in your community?	**1**	**2**	**2**	**2**	**1**		**2**	
		Public Education & Awareness	Emergency Alerts and Notifications	Electric Grid Resilience	Prevention of Damages	Structural Projects	Property Protection	Emergency Services	Natural Resource Protection
#2	What type of mitigation actions would you most like to see implemented in your community?	**1**	**1**	**2**		**2**			

Poll #4 Sustainable CT							
	Sea Level Rise	More Frequent and Intense RAIN storms	More frequent and intense WIND storms	More Extreme heat events	More severe droughts	Increased wildfire risk	Increased risk of insect-borne illnesses

#1	Which of the following climate change impacts are you most concerned about within your community?		**1**	**2**		**1**	**1**	**2**

At the conclusion of the presentation, participants were asked if there were any questions. No questions or comments were made.

To conclude the meeting, participants were informed of the remaining meetings, and were encouraged to join again if any questions or comments arose after the conclusion of the meeting.

WestCOG Hazard Mitigation Plan
Public Meeting #5- Town of Greenwich
Date: August 6, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
Victoria Brudz, MMI
Noah Slovin, MMI

Attendees:
No one in attendance

WestCOG Hazard Mitigation Plan
Public Meeting #6
Date: August 11, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
David Murphy, MMI
Victoria Brudz, MMI

Attendees:
Deb Denfeld

David Murphy and Victoria Brudz from Milone and MacBroom (MMI) conducted the meeting specifically targeted for the City of Stamford. There was a total of one attendee. Various topics were presented to the public by MMI including:

- The need for hazard mitigation
- How the plan can be used
- Hazards that will be addressed in the plan
- Specific hazards for the targeted communities
- The next steps of the plan

Throughout the presentation attendees were asked a total of eight polling questions to gain additional insight for plan development. The Questions corresponded with the topic being discussed and were asked after information on the subject was presented to the public. Questions and responses can be found in table 1.

Table 1: August 11, 2020 polling results
1 respondent

Poll #1 Tell us about you									
	Bridgewater, New Fairfield, New Milford, or Sherman	Bethel, Brookfield, or Newtown	Danbury	Redding, Ridgefield, Weston, or Wilton	Greenwich	Stamford	Darien, New Canaan, or Westport	Norwalk	None of the Above

#1	What community do you live in?										1

	I want to learn more about Natural Hazards and Mitigation	I have Natural Hazards concerns and I want to share	I have ideas for Hazard Mitigation I want to share	I thought this was a link to watch Hamilton on Disney+
#2 What brought you here tonight?	**1**			

Poll #2 Hazard Concerns

		Coastal Flooding	Riverine Flooding	Flash Flooding	High Wind Events	Snow/Ice Events	Dam Failure	Earthquakes	Landslides	Wildfire	Extreme Temperatures (hot or cold)
#1	Which Natural Hazard are you most concerned with?				**1**	**1**				**1**	**1**

		Very Concerned	Somewhat Concerned	A Little Concerned	Not At All Concerned
#2	How Concerned are you about Climate Change impacts on Natural Hazards?		**1**		

		Injury	Property Damage	Displacement (had to move or stay in a shelter)	Lost Work or Income	Minor Delays or Inconvenience
#3	Have you been impacted by Natural Hazard in the Past?					**1**

Poll #3 Mitigation Actions

	Public Education & Awareness	Emergency Alerts & Notification	Electric Grid Resilience (tree trimming, burying	Prevention of Damages (zoning regulation,	Structural Protection (floodwalls, increased	Property Protection (elevation, storm shutters	Emergency Services (improvements to shelters,	Natural Resource Protection (open space, wetlands, etc.)

				wires, backup generators, etc.)	building codes, etc.)	bridge sizes, etc.)	or windows, etc.)	emergency facilities, etc.)	
#1	What types of mitigation actions have you seen implements in your community?	**1**	**1**	**1**				**1**	**1**
		Public Education & Awareness	Emergency Alerts and Notifications	Electric Grid Resilience	Prevention of Damages	Structural Projects	Property Protection	Emergency Services	Natural Resource Protection
#2	What type of mitigation actions would you most like to see implemented in your community?	**1**		**1**					**1**

Poll #4 Sustainable CT								
		Sea Level Rise	More Frequent and Intense RAIN storms	More frequent and intense WIND storms	More Extreme heat events	More severe droughts	Increased wildfire risk	Increased risk of insect-borne illnesses
#1	Which of the following climate change impacts are you most concerned about within your community?			**1**	**1**	**1**		**1**

During the presentation the attendee made a comment, and posed a question in the chat box; both were acknowledged at the conclusion of the presentation. In addition to these comments, the attendee was then allowed to unmute for further discussion.

Chat Comment #1: The attendee stated that recent events, Tropical Storm Isaias may have played a role in the mitigation poll response.

- It was then discussed that this is understandable given this was a very fresh event and the storms damage was very extensive.

Chat Question #1: Is the term resilience equivalent to Hazard Mitigation?

- David explained that hazard mitigation is a fraction of resilience, and that resilience also includes the ability to recover and adapt to a situation, as well as mitigate.

Verbal comment #1: The attendee was interested in hearing additional information regarding the FEMA grant programs available.

- David discussed a little more background information on recent projects that were mentioned in the presentation. In addition, Flood Mitigation Assistance is a program geared more toward structural resilience; and HMGP is for other infrastructure such as roadways or drainage. BRIC, the newest program, will hopefully allow for a wider range of projects including possibly green infrastructure and more sustainable mitigation actions.

Verbal comment #2: The attendee stated her recent work in regard to MS4, and trying to disconnect stormwater from drainage systems. She felt this type of work aligns closely with hazard mitigation.

- David agreed in that this is a mitigation effort, and that MS4 work often coincides with hazard mitigation.

WestCOG Hazard Mitigation Plan
Public Meeting #7 – Towns of Darien, New Canaan, Westport
Date: August 20, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
Noah Slovin, MMI
Victoria Brudz, MMI

Attendees:
Call-in participant
HollaK

Noah Slovin and Victoria Brudz from Milone and MacBroom (MMI) conducted the meeting specifically targeted for the Towns of Darien, New Canaan, and Westport. There was a total of two attendees. Various topics were presented to the public by MMI including:

- The need for hazard mitigation
- How the plan can be used
- Hazards that will be addressed in the plan
- Specific hazards for the targeted communities
- The next steps of the plan

Throughout the presentation attendees were asked a total of eight polling questions to gain additional insight for plan development. The Questions corresponded with the topic being discussed and were asked after information on the subject was presented to the public. Questions and responses can be found in table 1.

Because of the inability of a call-in attendee to participate in the workshop polls, it was noted that there would be an opportunity for comments at the conclusion of the presentation.

Table 1: August 11, 2020 polling results

1 respondent

Poll #1 Tell us about you										
		Bridgewater, New Fairfield, New Milford, or Sherman	Bethel, Brookfield, or Newtown	Danbury	Redding, Ridgefield, Weston, or Wilton	Greenwich	Stamford	Darien, New Canaan, or Westport	Norwalk	None of the Above
#1	What community do you live in?									
		I want to learn more about Natural Hazards and Mitigation		I have Natural Hazards concerns and I want to share		I have ideas for Hazard Mitigation I want to share			I thought this was a link to watch Hamilton on Disney+	
#2	What brought you here tonight?									

Poll #2 Hazard Concerns											
		Coastal Flooding	Riverine Flooding	Flash Flooding	High Wind Events	Snow/Ice Events	Dam Failure	Earthquakes	Landslides	Wildfire	Extreme Temperatures (hot or cold)
#1	Which Natural Hazard are you most concerned with?		**1**		**1**						
		Very Concerned		Somewhat Concerned		A Little Concerned			Not At All Concerned		
#2	How Concerned are you about Climate Change impacts on Natural Hazards?	**1**									
		Injury		Property Damage		Displacement (had to move or stay in a shelter)		Lost Work or Income		Minor Delays or Inconvenience	
#3	Have you been impacted by			**1**						**1**	

	Natural Hazard in the Past?								
Poll #3 Mitigation Actions									
		Public Education & Awareness	Emergency Alerts & Notification	Electric Grid Resilience (tree trimming, burying wires, backup generators, etc.)	Prevention of Damages (zoning regulation, building codes, etc.)	Structural Protection (floodwalls, increased bridge sizes, etc.)	Property Protection (elevation, storm shutters or windows, etc.)	Emergency Services (improvements to shelters, emergency facilities, etc.)	Natural Resource Protection (open space, wetlands, etc.)
#1	What types of mitigation actions have you seen implements in your community?	**1**	**1**	**1**	**1**			**1**	**1**
		Public Education & Awareness	Emergency Alerts and Notifications	Electric Grid Resilience	Prevention of Damages	Structural Projects	Property Protection	Emergency Services	Natural Resource Protection
#2	What type of mitigation actions would you most like to see implemented in your community?		**1**	**1**			**1**	**1**	**1**

Poll #4 Sustainable CT							
	Sea Level Rise	More Frequent and Intense RAIN storms	More frequent and intense WIND storms	More Extreme heat events	More severe droughts	Increased wildfire risk	Increased risk of insect-borne illnesses

#1	Which of the following climate change impacts are you most concerned about within your community?		**1**	**1**	**1**	**1**		**1**

At the conclusion of the presentation participants were asked if there were any questions or comments they would like to share.

An attendee asked if we could review the timeframe for the plan again.

- Victoria explained that we were in the phase of public participation and that draft plans would be submitted to towns within the coming weeks, the plans would be available for public comment, the plans would then be finalized late fall, and ultimately submitted to DEMHS and FEMA for review and approval by the end of the year.

There were no other questions or comments from attendees.

WestCOG Hazard Mitigation Plan
Public Meeting #8 – City of Norwalk
Date: August 25, 2020
Time: 6:00pm – 7:00pm
Location: Zoom

Panelists:
David Murphy, MMI
Noah Slovin, MMI

Attendees:
No one in attendance

Public Survey and Results

WestCOG Hazard Mitigation Plan Update

Introduction

Natural hazards like floods, high winds, lightning, tornadoes, earthquakes, drought, and wildfires, impact Connecticut every year. These events destroy property, cause power outages, block roads, and can even cause injury and death.

A Hazard Mitigation Plan is a tool that helps a community to understand risks and to take specific steps to reduce property damage, injury, and loss of life.

The Western Connecticut Council of Governments (WestCOG), along with each of the 18 member municipalities, is in the process of developing its first multi-jurisdictional Hazard Mitigation Plan for all 18 communities. This plan will be based on the existing hazard mitigation plans covering the ten Housatonic Valley and eight Southwestern Region municipalities.

Please share your ideas for the plans using the following survey.

ENGLISH: For language assistance or other accommodations, contact Western Connecticut Council of Governments at help@westcog.org.
ESPAÑOL: Para asistencia con el idioma y otras adaptaciones, por favor póngase en contacto con WestCOG al help@westcog.org.
PORTUGUÊS: Para obter assistência língua ou outras acomodações, entre em contato com WestCOG em help@westcog.org.
FRANÇAIS: Pour obtenir de l'aide linguistique ou d'autres mesures d'adaptation, contactez WestCOG à help@westcog.org.
POLSKI: Aby uzyskać pomoc językową lub inne zakwaterowanie, skontaktuj się z firmą WestCOG pod adresem help@westcog.org.

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WestCOG Hazard Mitigation Plan Update

Basics

* 1. In which community do you live or own property?

* 2. In which community do you work?

3. Please enter your street of residence or place of business, or both (optional, can be approximate)

Residence (Street Name, Town/City)

Place of Business (Street Name, Town/City)

4. For how many years have you lived or worked in the Region?

- N/A
- Less than 1 year
- 1-2 years
- 2-5 years
- 5-10 years
- 10-30 years
- More than 30 years

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WestCOG Hazard Mitigation Plan Update

Awareness and Vulnerability

5. Did you know that the community where you live or work is covered by a Hazard Mitigation Plan?

- ◯ Yes
- ◯ No

6. Which of the following natural hazards have impacted you?

- ☐ River Flooding
- ☐ Coastal Flooding
- ☐ Flooding caused by Poor Drainage or Ponding on Streets
- ☐ Potential Failure of Dams
- ☐ Hurricanes and Tropical Storms
- ☐ Severe Thunderstorms (including wind, hail, and lightning)
- ☐ Winter Storms (including snow or ice) and Blizzards
- ☐ Extreme Cold or Heat
- ☐ Drought
- ☐ Wildfires and Brush Fires
- ☐ Landslides
- ☐ Other

Please provide details if you wish:

7. How concerned are you about each of those hazards happening in the future?

	Low Concern	Moderate Concern	High Concern
River Flooding	○	○	○
Coastal Flooding	○	○	○
Flooding caused by Poor Drainage or Ponding on Streets	○	○	○
Potential Failure of Dams	○	○	○
Hurricanes and Tropical Storms	○	○	○
Severe Thunderstorms (including wind, hail, and lightning)	○	○	○
Winter Storms (including snow or ice) and Blizzards	○	○	○
Extreme Cold or Heat	○	○	○
Drought	○	○	○
Wildfires and Brush Fires	○	○	○
Landslides	○	○	○
Other	○	○	○

Please provide details if you wish:

8. Are any specific areas of your community vulnerable to any of the above hazards? If so, please list them by location. Please use street intersections or landmarks to describe locations, and INCLUDE THE TOWN/CITY.

Location 1

Location 2

Location 3

Location 4

Additional Locations

Planning and Mitigating

9. Have you taken any actions to protect your family, home, or business?

- ☐ **Elevated** or **floodproofed** to reduce flood damage
- ☐ Installed **storm shutters** or **structural braces** to reduce wind damage
- ☐ Taken measures to **reduce snow build-up** on roofs
- ☐ Cut back or **removed vegetation** from my overhead utility lines or roof
- ☐ Replaced my overhead utility lines with **underground lines**
- ☐ **Managed vegetation** to reduce risk of wildfire reaching my home or business
- ☐ Developed a **disaster plan** for my family, home, or business
- ☐ Maintain a **disaster supply kit** for my family, home, or business
- ☐ Participated in **public meetings** to discuss relevant plans and regulations
- ☐ Purchased hazard **insurance** (like flood insurance)

Other (please specify)

10. For each of the following natural hazard mitigation tools, check the columns that you feel are true. Specifically consider your own community.

	Important to mitigate hazards	Has been used successfully in the past	Should be a priority moving forward
Identification of areas with risk from hazards	☐	☐	☐
Ordinances and regulations that reduce risks from hazards	☐	☐	☐
Flood insurance	☐	☐	☐
Removal of buildings from areas of risk	☐	☐	☐
Protecting power lines from trees and wind	☐	☐	☐
Back-up power for critical facilities	☐	☐	☐
"Hardening" critical facilities to make them less vulnerable	☐	☐	☐
Infrastructure improvements	☐	☐	☐
Infrastructure inspection & maintenance	☐	☐	☐
Public outreach & education	☐	☐	☐
Emergency information and alerts	☐	☐	☐
Maintaining Disaster plans & kits	☐	☐	☐
Assisting vulnerable populations	☐	☐	☐
Emergency response training for municipal staff	☐	☐	☐
Improve firefighting capabilities	☐	☐	☐

Other (please specify)

WestCOG Hazard Mitigation Plan Update

Recovery

11. What local resources are available to support or assist with hazard preparation, response, or recovery? What resources are or would be useful or important?

	Available	Useful/Important
State Government	☐	☐
Local Government	☐	☐
Local Schools	☐	☐
Emergency Responders	☐	☐
Nonprofit Organizations	☐	☐
Community Groups or Neighborhood Associations	☐	☐
Higher Education Institutions	☐	☐
Religious Institutions	☐	☐
Individual Community Members or Neighbors	☐	☐

Comments

12. How important is each of the following activities to recovering from a hazard event?

	Lowest Priority	Somewhat Important	Important	Very Important	Top Priority
Re-open Roads	◯	◯	◯	◯	◯
Clean/Repair Homes	◯	◯	◯	◯	◯
Restore Utilities (electric, water, wastewater, communication)	◯	◯	◯	◯	◯
Resume Business/Local Economy	◯	◯	◯	◯	◯
Restore Parks, Beaches, and other Natural Resources	◯	◯	◯	◯	◯
Address Injuries and Casualties	◯	◯	◯	◯	◯
Re-open Schools	◯	◯	◯	◯	◯

13. Scientists expect rain and storm events may increase in this area due to Climate Change. Which of the following statements about planning for future changes in precipitation do you most agree with?

- ◯ It is appropriate to plan for storm events to occur more frequently.
- ◯ It is appropriate to plan for storm events to become more severe.
- ◯ It is appropriate to plan for storm events to become more severe and more frequent.
- ◯ It is appropriate to plan for storm events to occur at a similar frequency and severity as in the past.
- ◯ Other (please specify)

14. Scientists expect sea level will continue to increase in Connecticut due to Climate Change. Which of the following statements about planning for future sea level change do you most agree with?

- ◯ It is appropriate to plan for sea level rise to continue at the current rate, with about **one foot** of rise by 2050.
- ◯ It is appropriate to plan for sea level rise to accelerate, with about **1.8 feet** (1/2 meter) of rise by 2050.
- ◯ It is appropriate to plan for sea level rise to accelerate dramatically, with **over two feet** of rise by 2050.

Other (please specify)

WestCOG Hazard Mitigation Plan Update

Conclusion

15. If you could choose one action to reduce risks from natural hazards in your community, what would it be?

16. Please provide any additional comments or questions to be addressed as this Hazard Mitigation Plan is updated.

17. If you wish to be notified of the progress in updating the Hazard Mitigation Plan, please provide your name and email address.

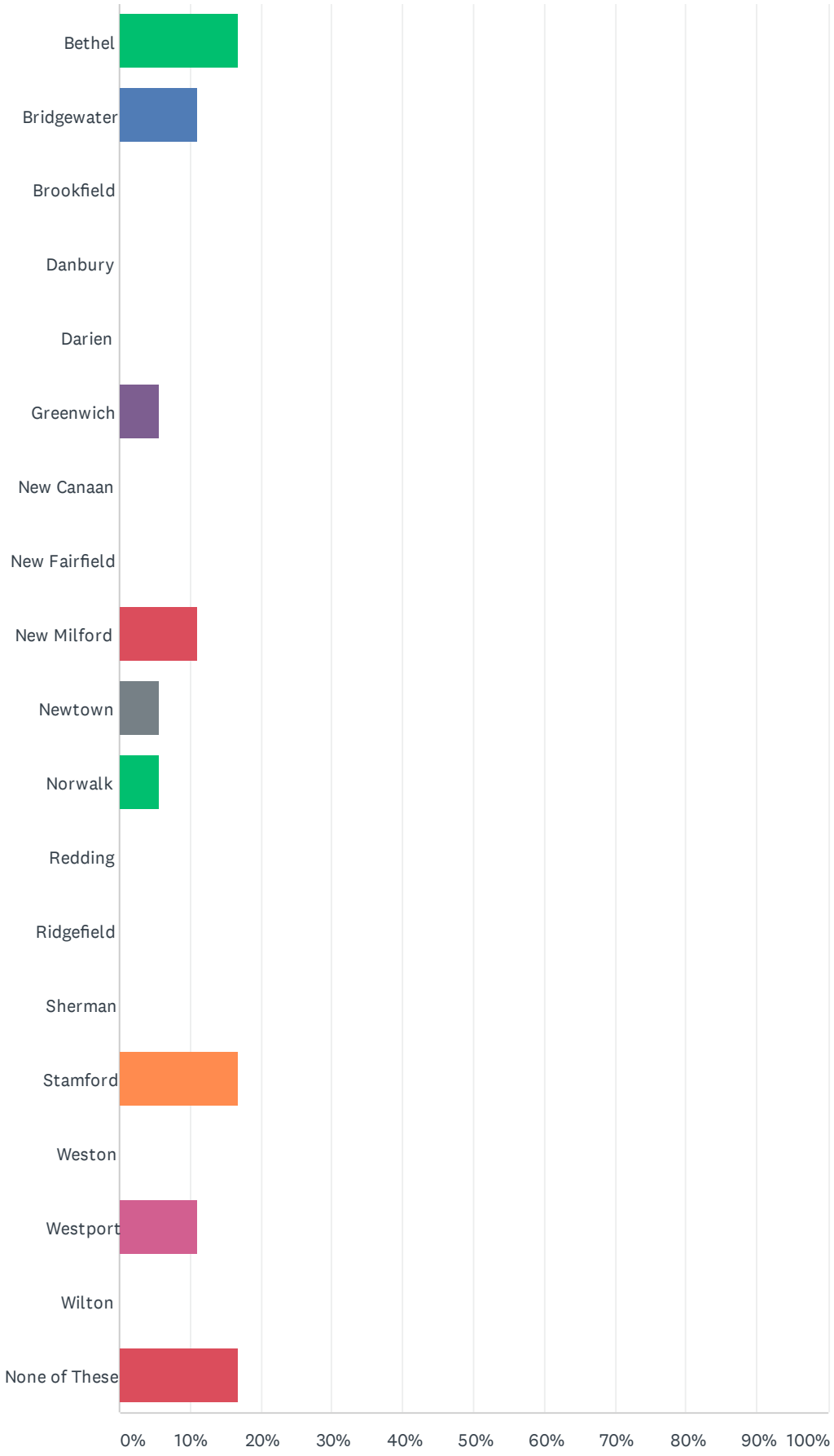
Name

Email Address

westcog.org

Q1 In which community do you live or own property?

Answered: 18 Skipped: 0

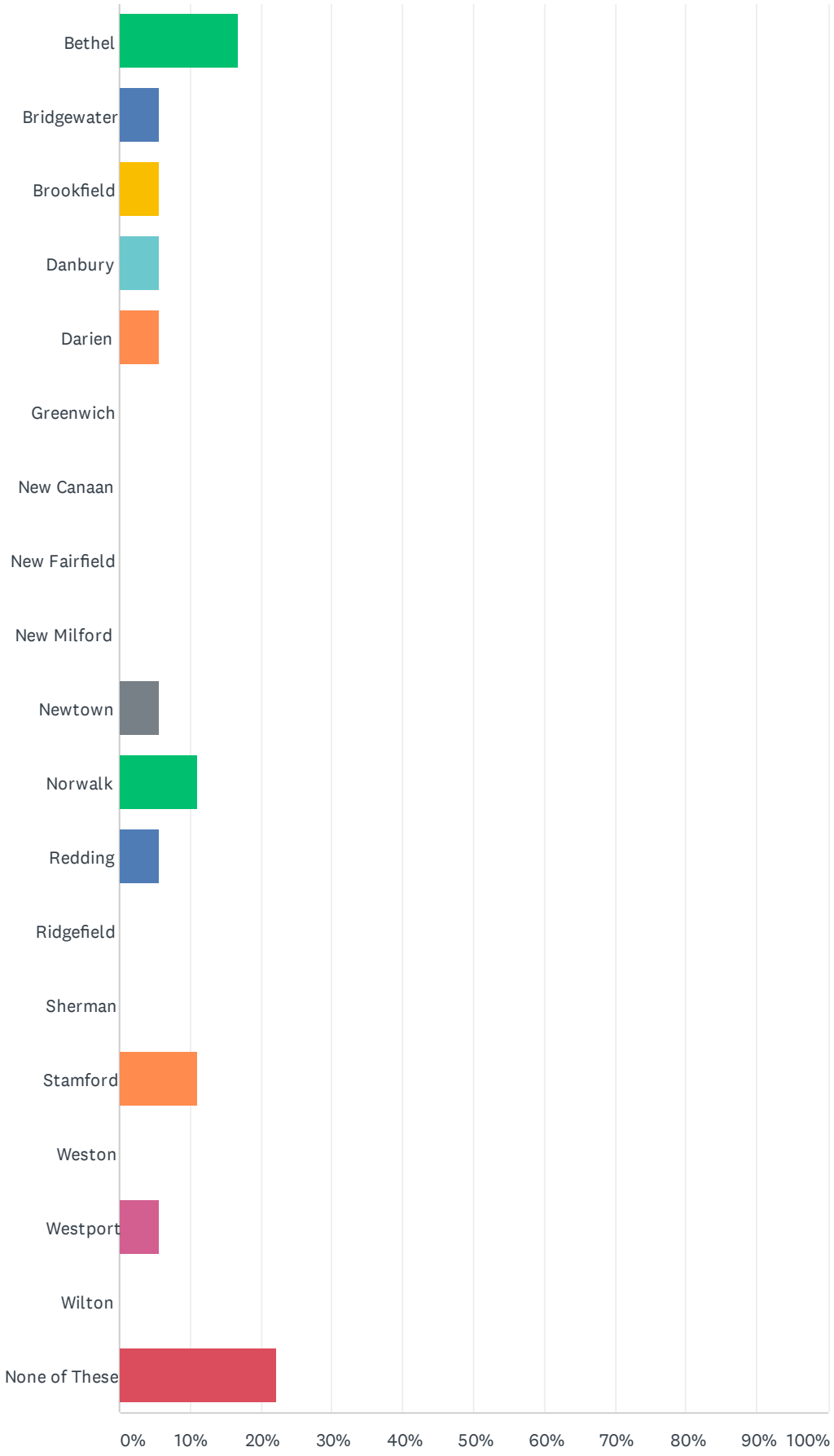

Bethel
Bridgewater
Brookfield
Danbury
Darien
Greenwich
New Canaan
New Fairfield
New Milford
Newtown
Norwalk
Redding
Ridgefield
Sherman
Stamford
Weston
Westport
Wilton
None of These
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

ANSWER CHOICES	RESPONSES	
Bethel	16.67%	3
Bridgewater	11.11%	2
Brookfield	0.00%	0
Danbury	0.00%	0
Darien	0.00%	0
Greenwich	5.56%	1
New Canaan	0.00%	0
New Fairfield	0.00%	0
New Milford	11.11%	2
Newtown	5.56%	1
Norwalk	5.56%	1
Redding	0.00%	0
Ridgefield	0.00%	0
Sherman	0.00%	0
Stamford	16.67%	3
Weston	0.00%	0
Westport	11.11%	2
Wilton	0.00%	0
None of These	16.67%	3
TOTAL		18

#	NONE OF THESE	DATE
1	Stratford	10/9/2020 12:44 PM
2	Greenburgh, NY	6/29/2020 4:12 PM
3	Chappaqua, NY	6/23/2020 11:18 AM

Q2 In which community do you work?

Answered: 18 Skipped: 0


Bethel
Bridgewater
Brookfield
Danbury
Darien
Greenwich
New Canaan
New Fairfield
New Milford
Newtown
Norwalk
Redding
Ridgefield
Sherman
Stamford
Weston
Westport
Wilton
None of These
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

ANSWER CHOICES	RESPONSES	
Bethel	16.67%	3
Bridgewater	5.56%	1
Brookfield	5.56%	1
Danbury	5.56%	1
Darien	5.56%	1
Greenwich	0.00%	0
New Canaan	0.00%	0
New Fairfield	0.00%	0
New Milford	0.00%	0
Newtown	5.56%	1
Norwalk	11.11%	2
Redding	5.56%	1
Ridgefield	0.00%	0
Sherman	0.00%	0
Stamford	11.11%	2
Weston	0.00%	0
Westport	5.56%	1
Wilton	0.00%	0
None of These	22.22%	4
TOTAL		18

#	NONE OF THESE	DATE
1	Retired	8/5/2020 9:17 AM
2	I'm not working right now	7/20/2020 4:44 PM
3	Portland, Oregon	7/7/2020 9:30 AM
4	Retired	7/6/2020 9:15 PM

Q3 Please enter your street of residence or place of business, or both (optional, can be approximate)

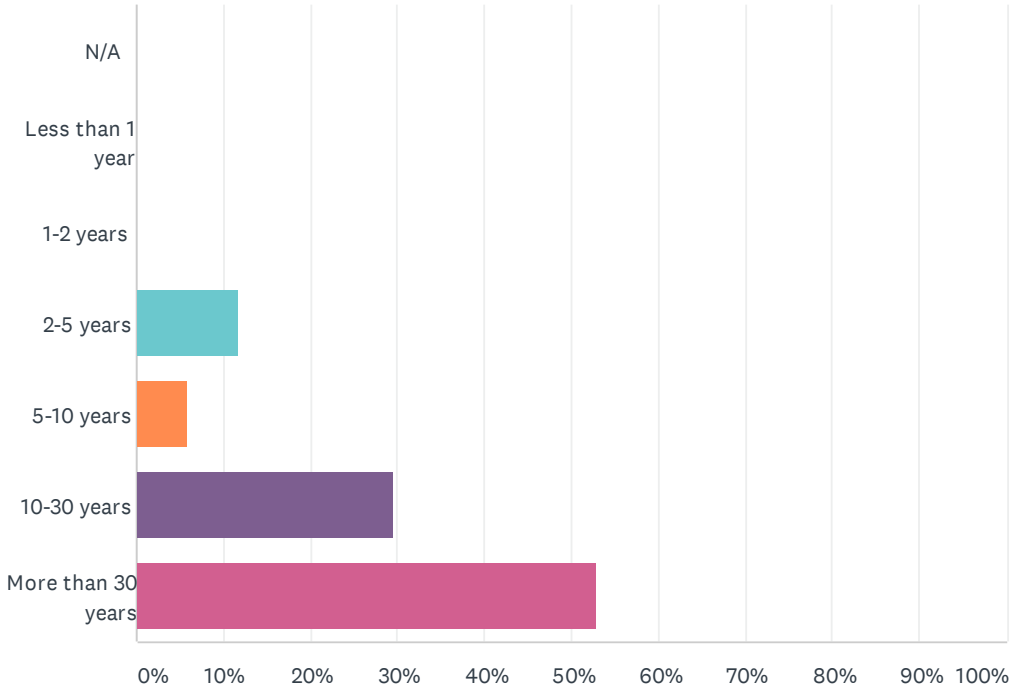
Answered: 15 Skipped: 3

ANSWER CHOICES	RESPONSES	
Residence (Street Name, Town/City)	93.33%	14
Place of Business (Street Name, Town/City)	66.67%	10

#	RESIDENCE (STREET NAME, TOWN/CITY)	DATE
1	Summer St	8/11/2020 2:41 PM
2	35 W Broad Street	8/5/2020 10:05 AM
3	17 Livingston Pl, Greenwich Ct 06803	8/5/2020 9:17 AM
4	9 Greenbrier Rd, Westport	7/20/2020 4:44 PM
5	Taunton Lane, Newtown	7/16/2020 12:45 PM
6	Pequot Trail, westport	7/11/2020 2:50 PM
7	5th Street, Norwalk	7/7/2020 9:30 AM
8	Merryall, New Milford	7/6/2020 9:15 PM
9	Willow Rd	7/6/2020 8:17 PM
10	54 Taylor Avenue	7/6/2020 5:28 PM
11	Fawn Rd, Bethel, CT	7/6/2020 10:21 AM
12	125 East Avenue	6/29/2020 4:12 PM
13	Hut Hill Road, Bridgewater	6/23/2020 4:38 PM
14	Hut Hill Road	6/23/2020 3:23 PM
#	PLACE OF BUSINESS (STREET NAME, TOWN/CITY)	DATE
1	Tresser Blvd	8/11/2020 2:41 PM
2	888 Washington Boulevard	8/5/2020 10:05 AM
3	Lonetown Road, Redding	7/16/2020 12:45 PM
4	East Ave, Norwalk	7/11/2020 2:50 PM
5	Clapboard Ridge Rd	7/6/2020 8:17 PM
6	School St, Bethel, CT	7/6/2020 10:21 AM
7	Norwalk, CT	6/29/2020 4:12 PM
8	Federal Road, Brookfield	6/23/2020 4:38 PM
9	Hut Hill Road	6/23/2020 3:23 PM
10	WestCOG, 1 Riverside Rd, Newtown CT	6/23/2020 11:18 AM

Q4 For how many years have you lived or worked in the Region?

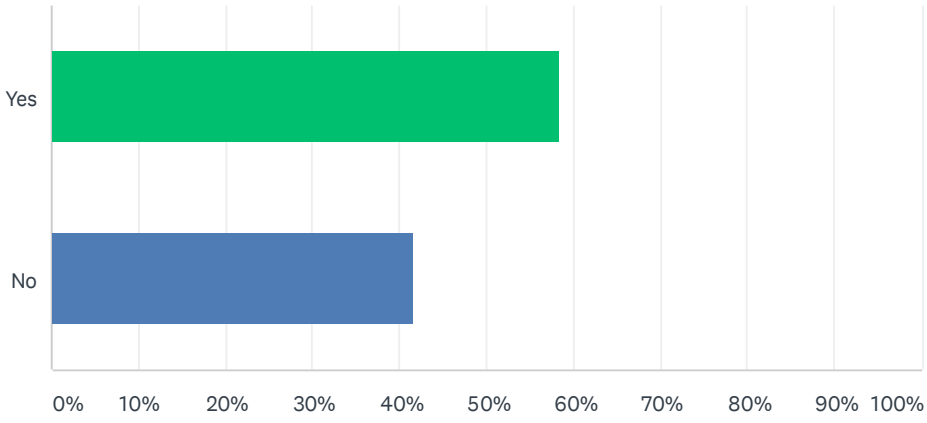
Answered: 17 Skipped: 1



ANSWER CHOICES	RESPONSES	
N/A	0.00%	0
Less than 1 year	0.00%	0
1-2 years	0.00%	0
2-5 years	11.76%	2
5-10 years	5.88%	1
10-30 years	29.41%	5
More than 30 years	52.94%	9
TOTAL		17

Q5 Did you know that the community where you live or work is covered by a Hazard Mitigation Plan?

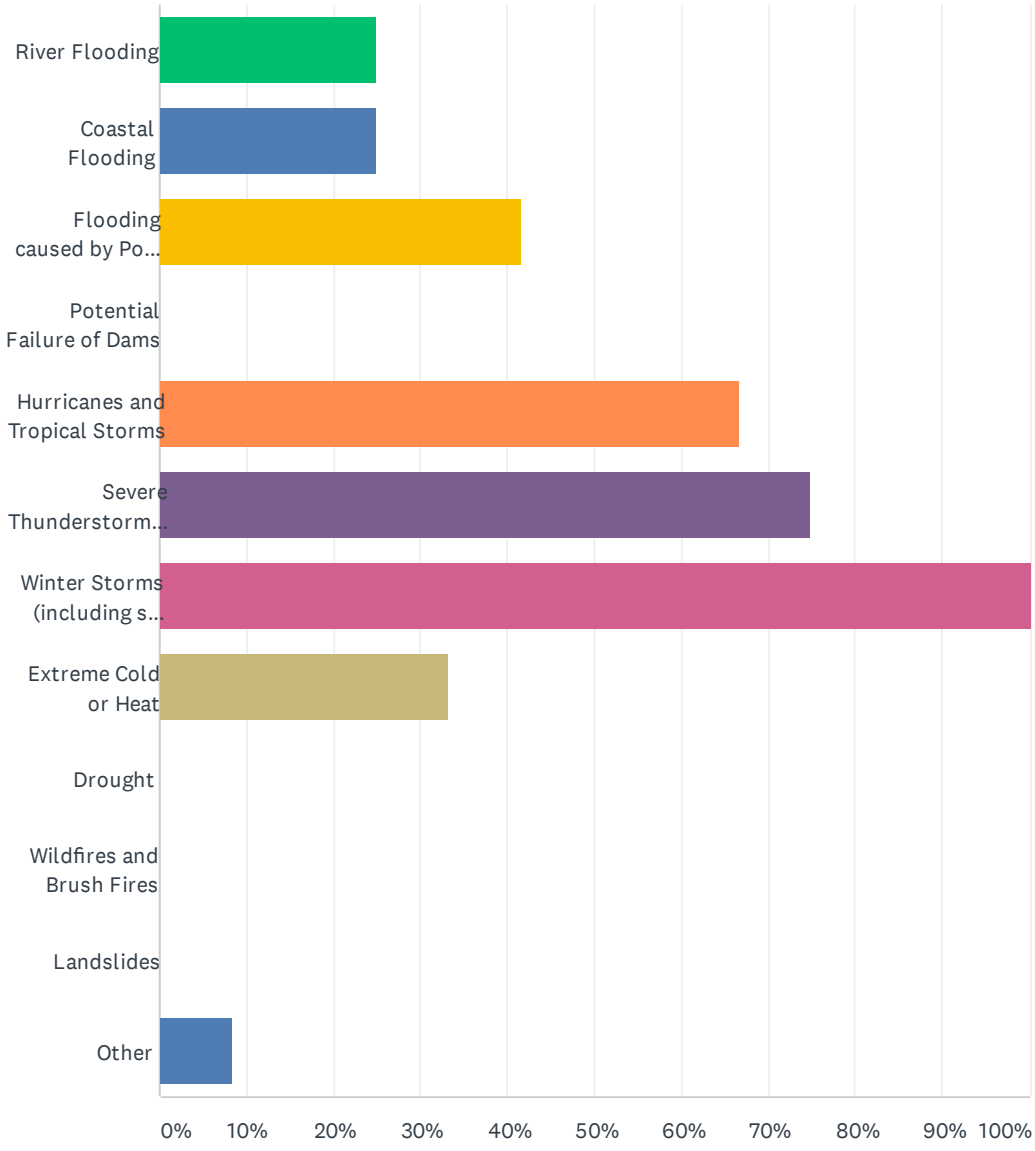
Answered: 12 Skipped: 6



ANSWER CHOICES	RESPONSES	
Yes	58.33%	7
No	41.67%	5
TOTAL		12

Q6 Which of the following natural hazards have impacted you?

Answered: 12 Skipped: 6

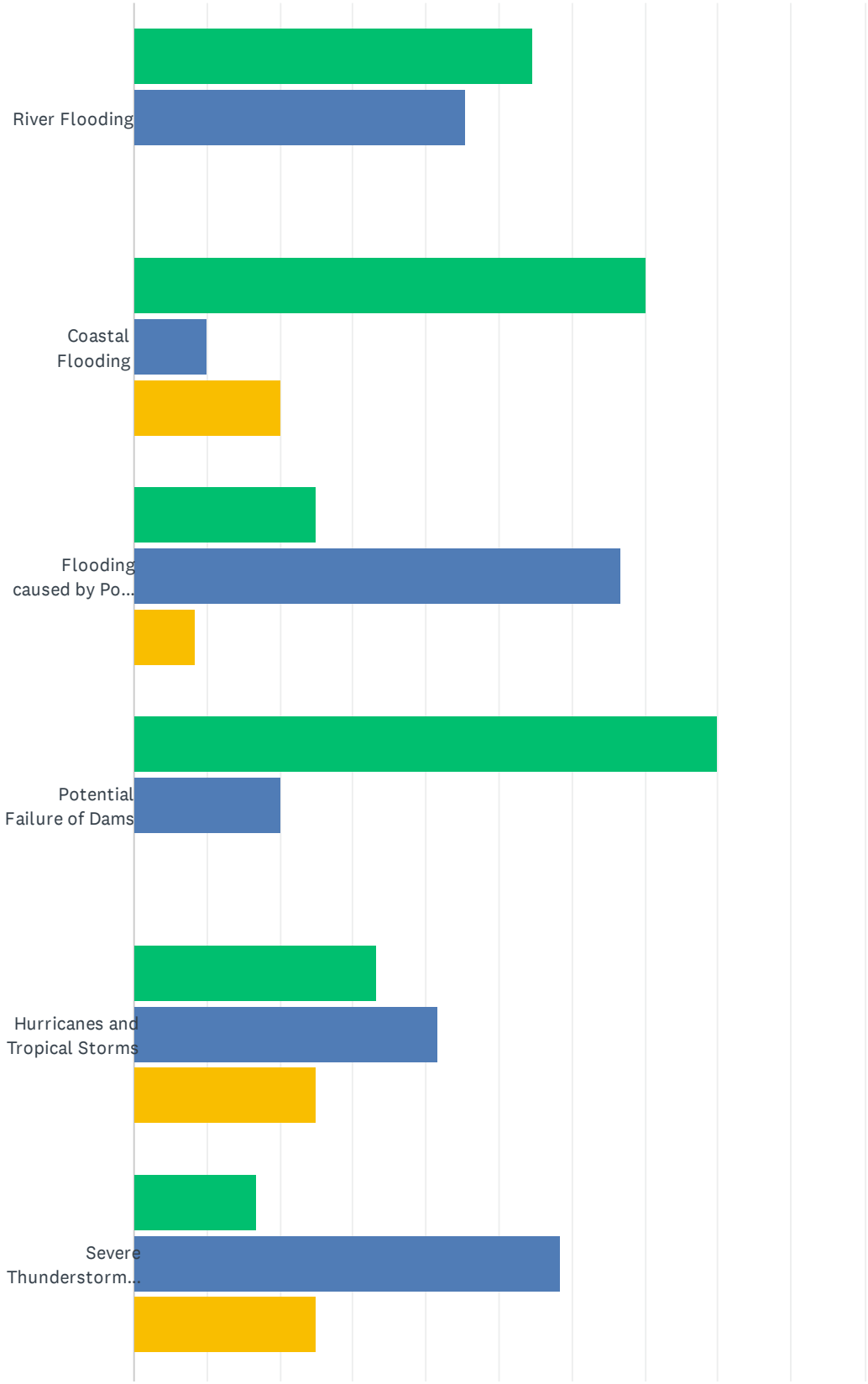


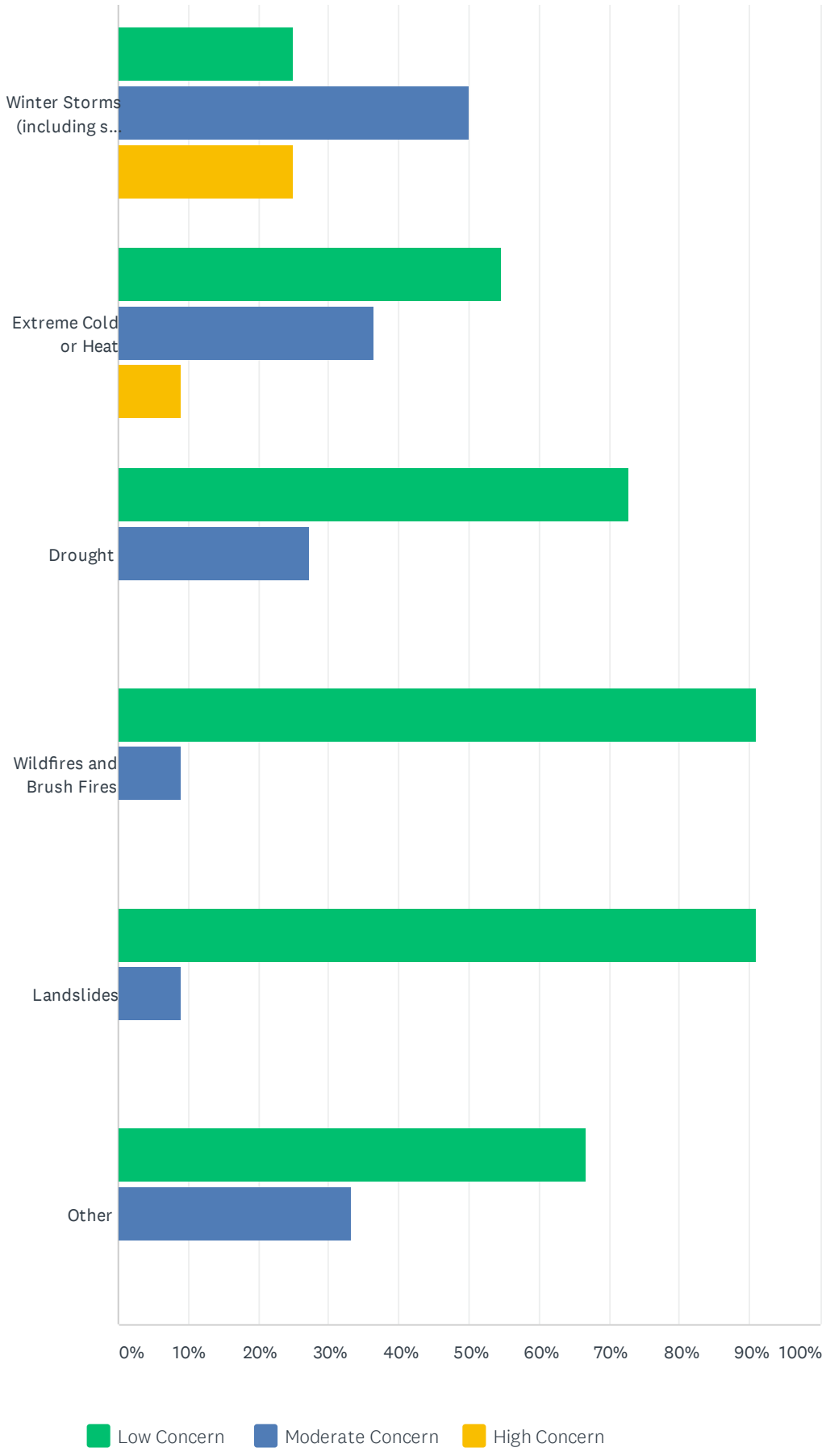
ANSWER CHOICES	RESPONSES	
River Flooding	25.00%	3
Coastal Flooding	25.00%	3
Flooding caused by Poor Drainage or Ponding on Streets	41.67%	5
Potential Failure of Dams	0.00%	0
Hurricanes and Tropical Storms	66.67%	8
Severe Thunderstorms (including wind, hail, and lightning)	75.00%	9
Winter Storms (including snow or ice) and Blizzards	100.00%	12
Extreme Cold or Heat	33.33%	4
Drought	0.00%	0
Wildfires and Brush Fires	0.00%	0
Landslides	0.00%	0
Other	8.33%	1
Total Respondents: 12		

#	PLEASE PROVIDE DETAILS IF YOU WISH:	DATE
1	Loss of power	7/6/2020 5:38 PM
2	wind events- not related to TS or Hurricanes	7/6/2020 10:23 AM

Q7 How concerned are you about each of those hazards happening in the future?

Answered: 12 Skipped: 6




Winter Storms (including s...
Extreme Cold or Heat
Drought
Wildfires and Brush Fires
Landslides
Other
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Low Concern
Moderate Concern
High Concern

	LOW CONCERN	MODERATE CONCERN	HIGH CONCERN	TOTAL	WEIGHTED AVERAGE
River Flooding	54.55% 6	45.45% 5	0.00% 0	11	1.45
Coastal Flooding	70.00% 7	10.00% 1	20.00% 2	10	1.50
Flooding caused by Poor Drainage or Ponding on Streets	25.00% 3	66.67% 8	8.33% 1	12	1.83
Potential Failure of Dams	80.00% 8	20.00% 2	0.00% 0	10	1.20
Hurricanes and Tropical Storms	33.33% 4	41.67% 5	25.00% 3	12	1.92
Severe Thunderstorms (including wind, hail, and lightning)	16.67% 2	58.33% 7	25.00% 3	12	2.08
Winter Storms (including snow or ice) and Blizzards	25.00% 3	50.00% 6	25.00% 3	12	2.00
Extreme Cold or Heat	54.55% 6	36.36% 4	9.09% 1	11	1.55
Drought	72.73% 8	27.27% 3	0.00% 0	11	1.27
Wildfires and Brush Fires	90.91% 10	9.09% 1	0.00% 0	11	1.09
Landslides	90.91% 10	9.09% 1	0.00% 0	11	1.09
Other	66.67% 2	33.33% 1	0.00% 0	3	1.33

#	PLEASE PROVIDE DETAILS IF YOU WISH:	DATE
1	Power outages	7/6/2020 5:38 PM
2	We can work remotely, so natural hazards don't impede much on that front.	6/23/2020 11:20 AM

Q8 Are any specific areas of your community vulnerable to any of the above hazards? If so, please list them by location. Please use street intersections or landmarks to describe locations, and INCLUDE THE TOWN/CITY.

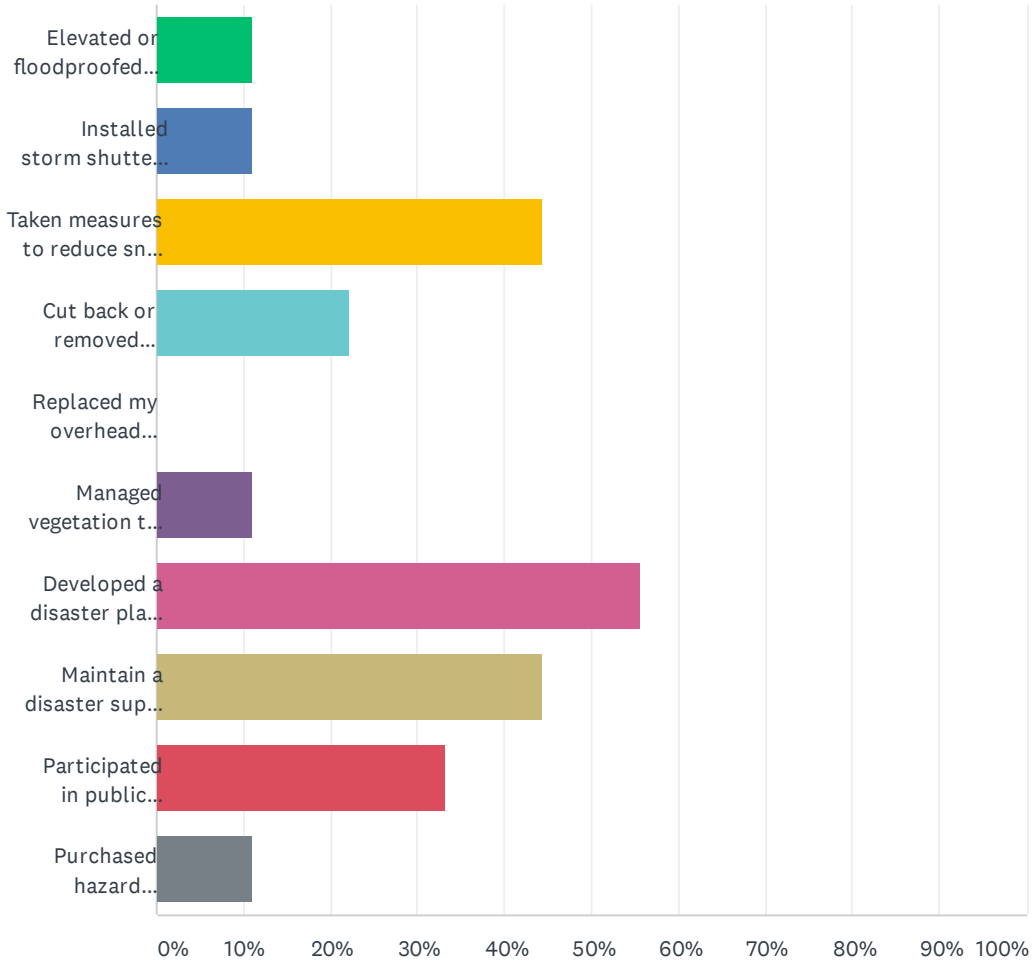
Answered: 5 Skipped: 13

ANSWER CHOICES	RESPONSES	
Location 1	100.00%	5
Location 2	60.00%	3
Location 3	60.00%	3
Location 4	0.00%	0
Additional Locations	0.00%	0

#	LOCATION 1	DATE
1	Ponding -lower Taylor Avenue-Bethel, CT	7/6/2020 5:38 PM
2	Saxon Rd	7/6/2020 10:23 AM
3	Water Street Norwalk, CT	6/29/2020 4:14 PM
4	Route 202, New Milford (flooding)	6/23/2020 4:41 PM
5	Main Street South Bridgewater in the glen heading toward bridge	6/23/2020 3:27 PM
#	LOCATION 2	DATE
1	All storms- dead or poorly trimmed trees taking out power on upper Taylor avenuee	7/6/2020 5:38 PM
2	Codfish HIll rd area	7/6/2020 10:23 AM
3	Route 133 Bridgewater and Brookfield	6/23/2020 3:27 PM
#	LOCATION 3	DATE
1	All storms - constant power losses downtown area	7/6/2020 5:38 PM
2	Long Meadow Rd	7/6/2020 10:23 AM
3	Wewauka Brook Rd Bridgewater	6/23/2020 3:27 PM
#	LOCATION 4	DATE
	There are no responses.	
#	ADDITIONAL LOCATIONS	DATE
	There are no responses.	

Q9 Have you taken any actions to protect your family, home, or business?

Answered: 9 Skipped: 9

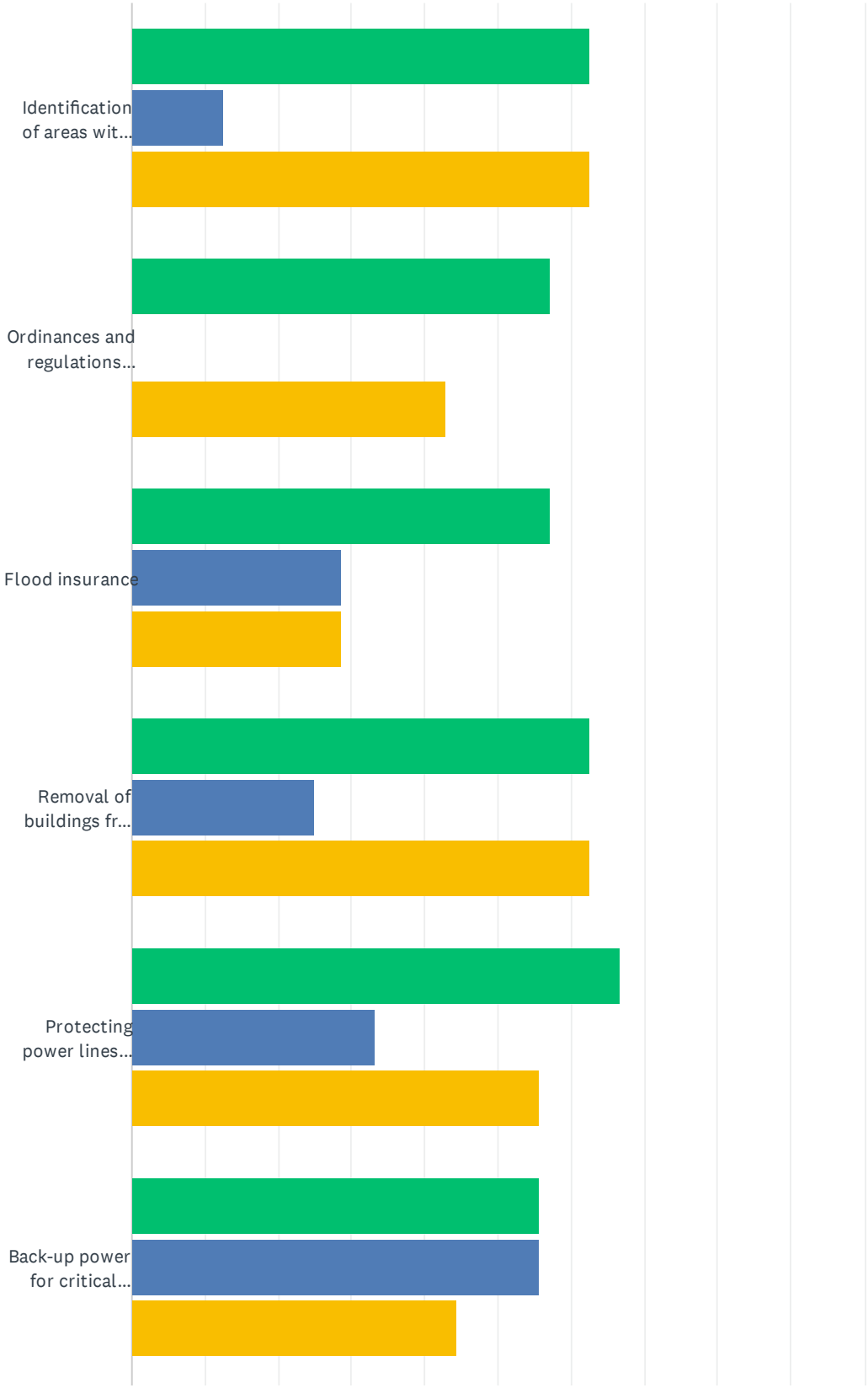


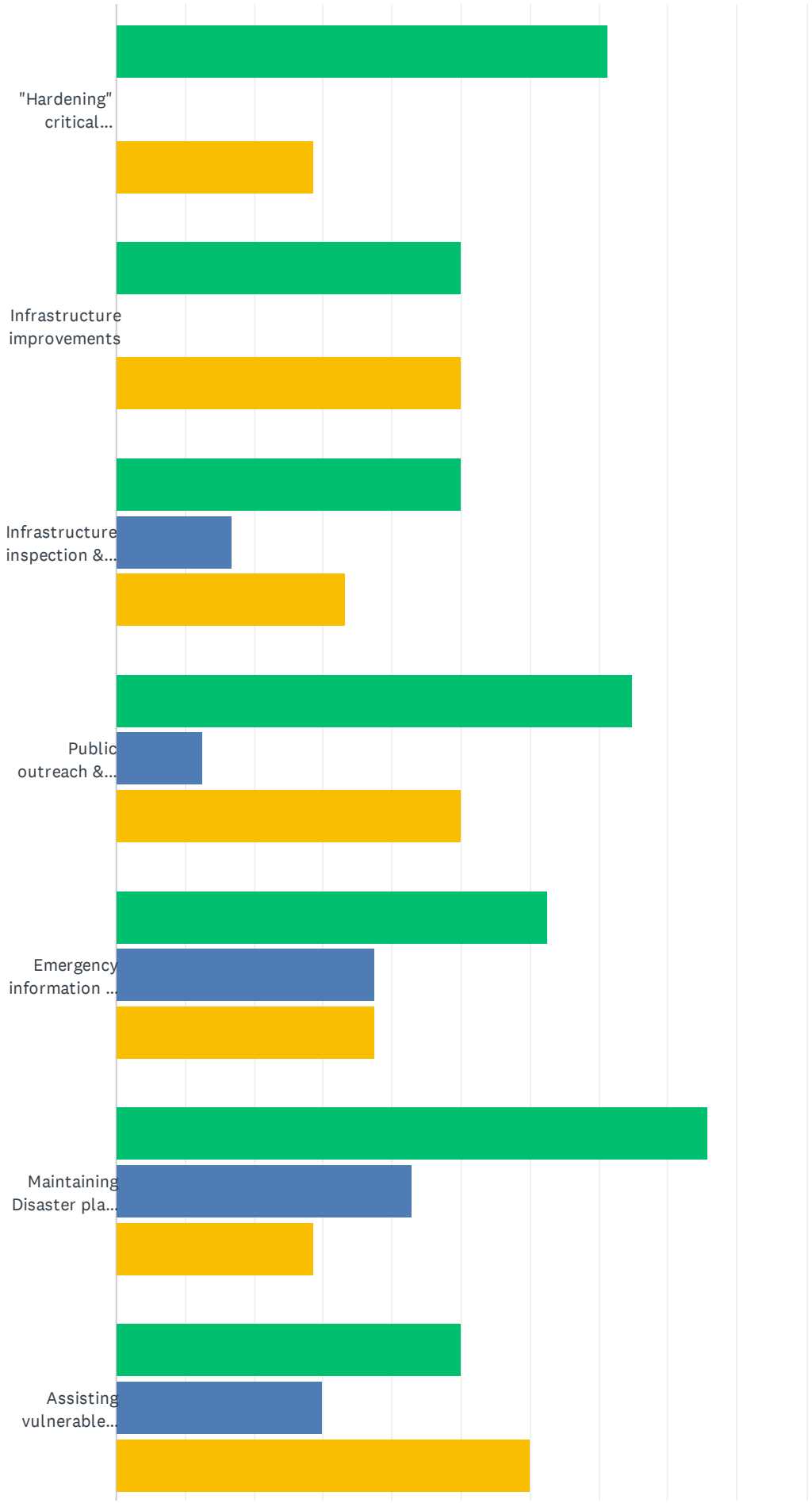
ANSWER CHOICES	RESPONSES	
Elevated or floodproofed to reduce flood damage	11.11%	1
Installed storm shutters or structural braces to reduce wind damage	11.11%	1
Taken measures to reduce snow build-up on roofs	44.44%	4
Cut back or removed vegetation from my overhead utility lines or roof	22.22%	2
Replaced my overhead utility lines with underground lines	0.00%	0
Managed vegetation to reduce risk of wildfire reaching my home or business	11.11%	1
Developed a disaster plan for my family, home, or business	55.56%	5
Maintain a disaster supply kit for my family, home, or business	44.44%	4
Participated in public meetings to discuss relevant plans and regulations	33.33%	3
Purchased hazard insurance (like flood insurance)	11.11%	1
Total Respondents: 9		

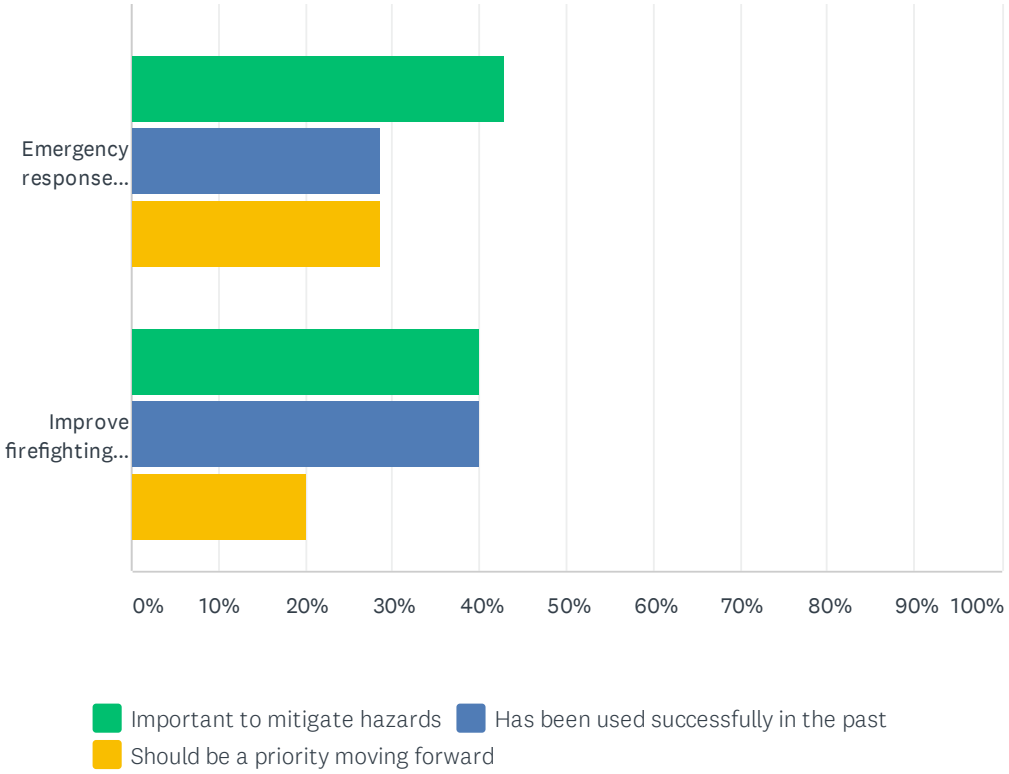
#	OTHER (PLEASE SPECIFY)	DATE
1	The overhead lines that need vegetation removed are on town property.	7/6/2020 5:43 PM
2	Bought winter tires for my car.	6/23/2020 11:22 AM

Q10 For each of the following natural hazard mitigation tools, check the columns that you feel are true.Specifically consider your own community.

Answered: 10 Skipped: 8




"Hardening" critical...
Infrastructure improvements
Infrastructure inspection &...
Public outreach &...
Emergency information ...
Maintaining Disaster pla...
Assisting vulnerable...

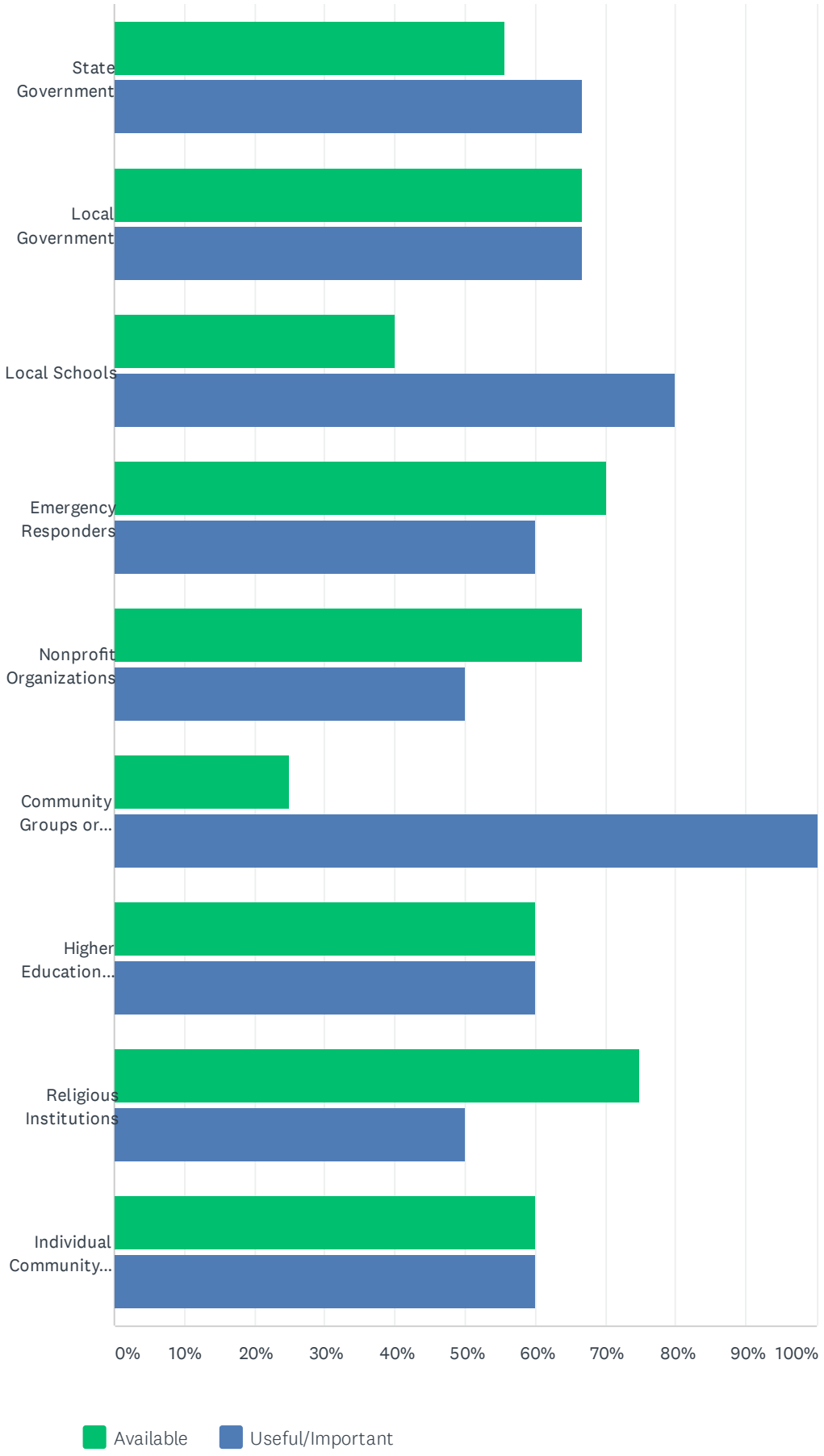

Emergency response...
Improve firefighting...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Important to mitigate hazards
Has been used successfully in the past
Should be a priority moving forward

	IMPORTANT TO MITIGATE HAZARDS	HAS BEEN USED SUCCESSFULLY IN THE PAST	SHOULD BE A PRIORITY MOVING FORWARD	TOTAL RESPONDENTS
Identification of areas with risk from hazards	62.50% 5	12.50% 1	62.50% 5	8
Ordinances and regulations that reduce risks from hazards	57.14% 4	0.00% 0	42.86% 3	7
Flood insurance	57.14% 4	28.57% 2	28.57% 2	7
Removal of buildings from areas of risk	62.50% 5	25.00% 2	62.50% 5	8
Protecting power lines from trees and wind	66.67% 6	33.33% 3	55.56% 5	9
Back-up power for critical facilities	55.56% 5	55.56% 5	44.44% 4	9
"Hardening" critical facilities to make them less vulnerable	71.43% 5	0.00% 0	28.57% 2	7
Infrastructure improvements	50.00% 3	0.00% 0	50.00% 3	6
Infrastructure inspection & maintenance	50.00% 3	16.67% 1	33.33% 2	6
Public outreach & education	75.00% 6	12.50% 1	50.00% 4	8
Emergency information and alerts	62.50% 5	37.50% 3	37.50% 3	8
Maintaining Disaster plans & kits	85.71% 6	42.86% 3	28.57% 2	7
Assisting vulnerable populations	50.00% 5	30.00% 3	60.00% 6	10
Emergency response training for municipal staff	42.86% 3	28.57% 2	28.57% 2	7
Improve firefighting capabilities	40.00% 2	40.00% 2	20.00% 1	5

#	OTHER (PLEASE SPECIFY)	DATE
1	Better utilize volunteer first responders that live in the community	8/11/2020 2:45 PM
2	Securing open space along the coast is a way to mitigate the effects of climate change on coastal flooding	7/7/2020 9:38 AM

Q11 What local resources are available to support or assist with hazard preparation, response, or recovery? What resources are or would be useful or important?

Answered: 10 Skipped: 8

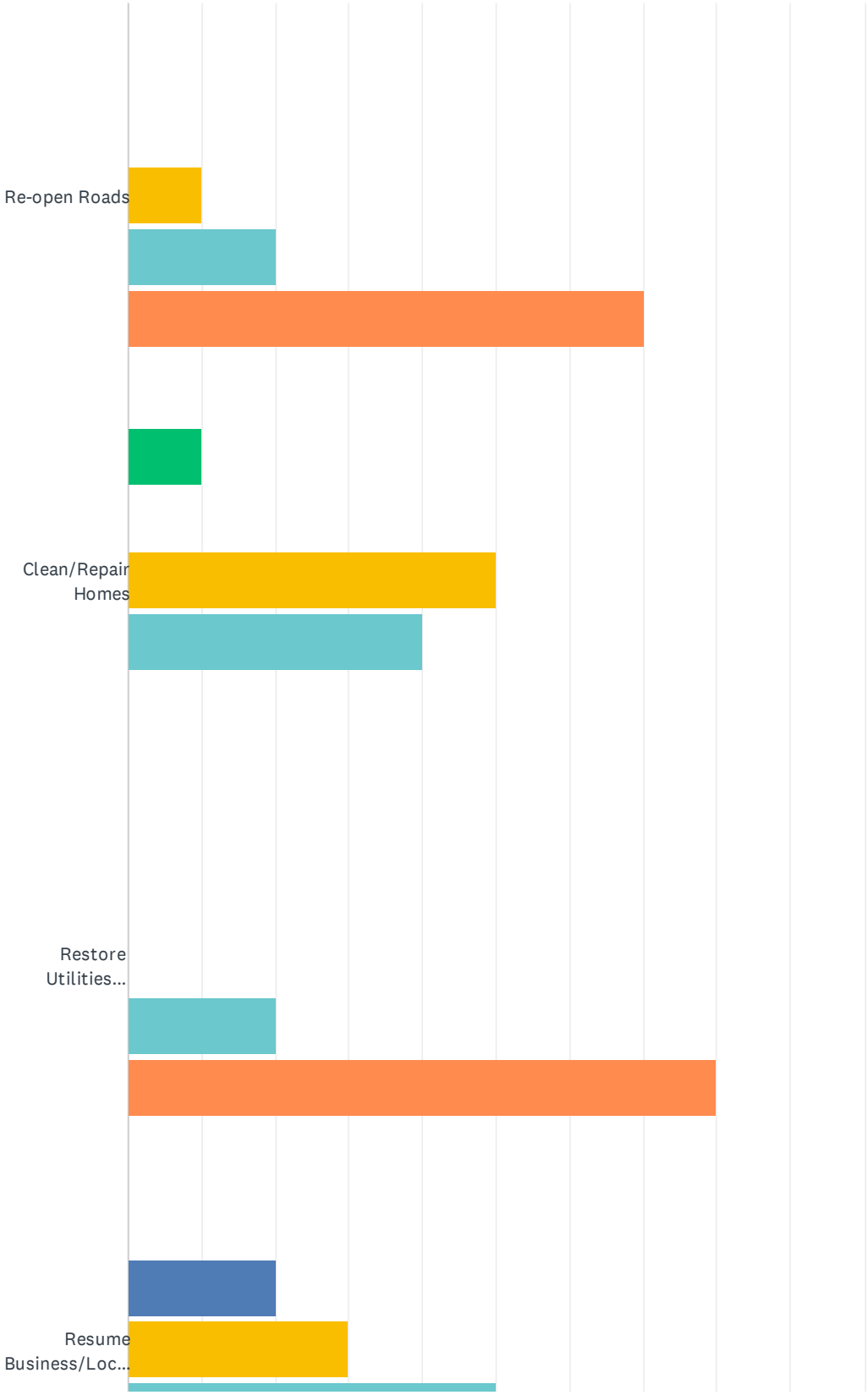

State Government
Local Government
Local Schools
Emergency Responders
Nonprofit Organizations
Community Groups or...
Higher Education...
Religious Institutions
Individual Community...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Available
Useful/Important

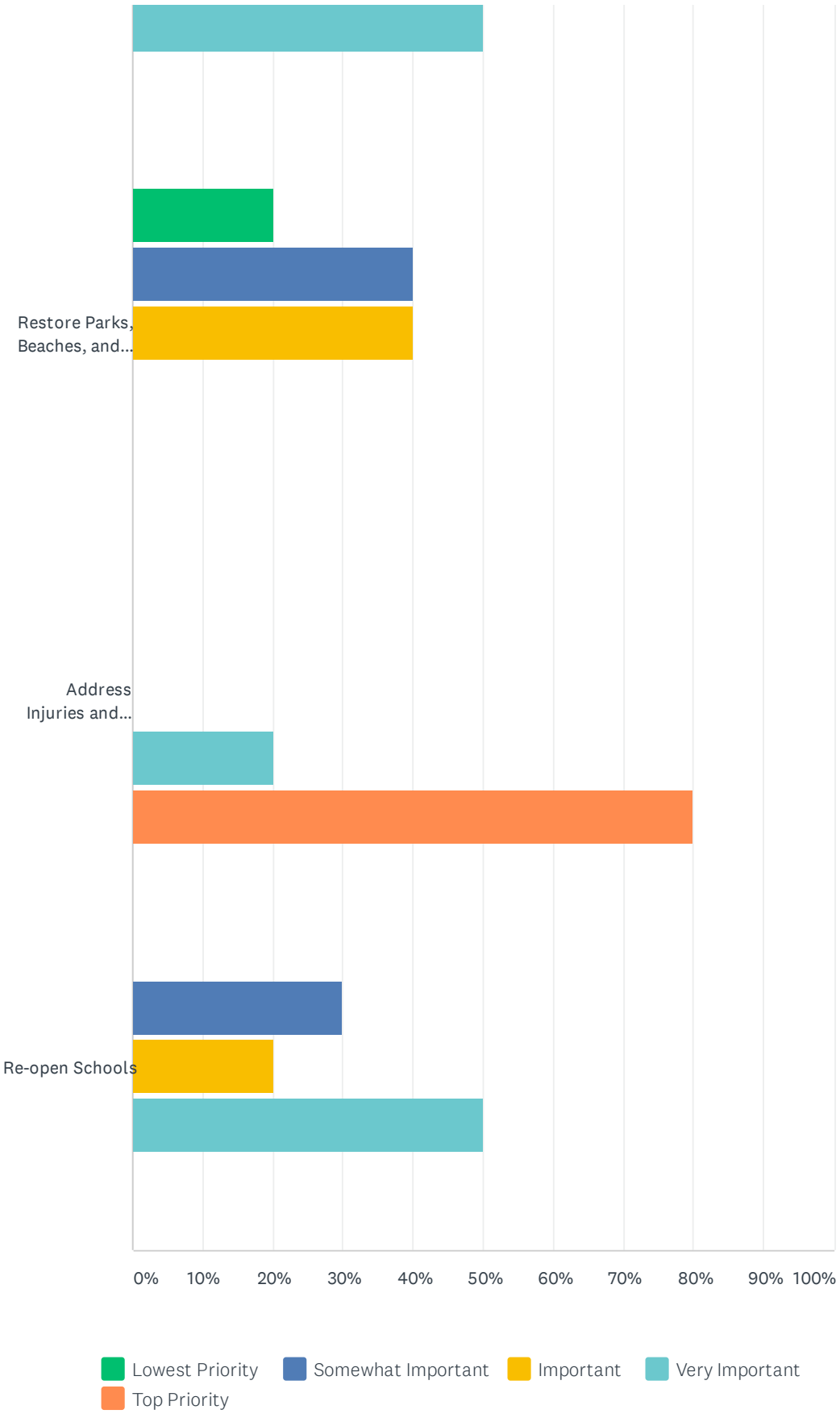
	AVAILABLE	USEFUL/IMPORTANT	TOTAL RESPONDENTS
State Government	55.56% 5	66.67% 6	9
Local Government	66.67% 6	66.67% 6	9
Local Schools	40.00% 2	80.00% 4	5
Emergency Responders	70.00% 7	60.00% 6	10
Nonprofit Organizations	66.67% 4	50.00% 3	6
Community Groups or Neighborhood Associations	25.00% 1	100.00% 4	4
Higher Education Institutions	60.00% 3	60.00% 3	5
Religious Institutions	75.00% 3	50.00% 2	4
Individual Community Members or Neighbors	60.00% 3	60.00% 3	5

#	COMMENTS	DATE
1	Unclear question.	7/6/2020 5:46 PM

Q12 How important is each of the following activities to recovering from a hazard event?

Answered: 10 Skipped: 8

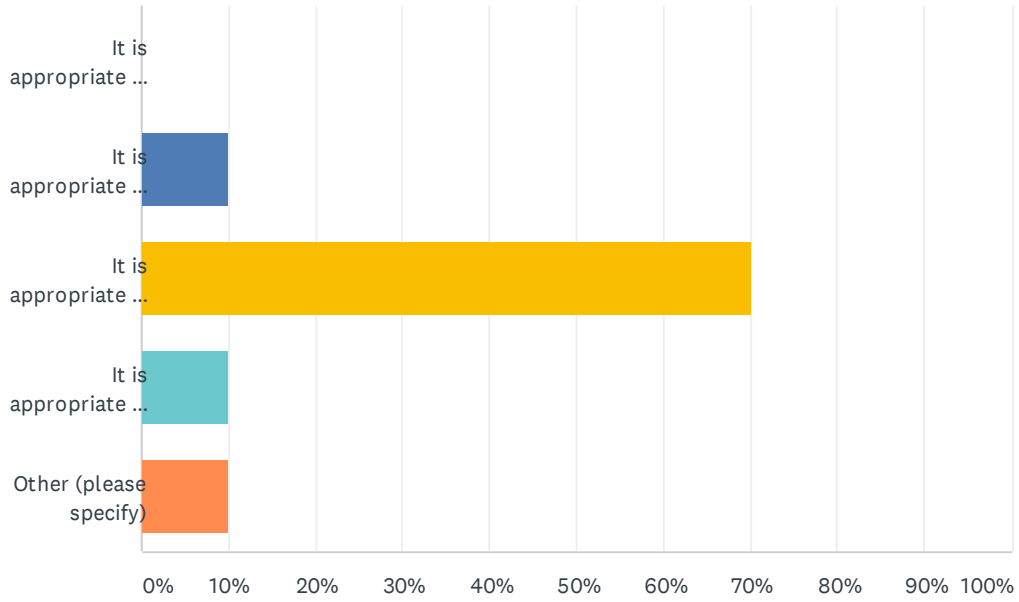



Restore Parks, Beaches, and...
Address Injuries and...
Re-open Schools
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Lowest Priority
Somewhat Important
Important
Very Important
Top Priority

	LOWEST PRIORITY	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT	TOP PRIORITY	TOTAL	WEIGHTED AVERAGE
Re-open Roads	0.00% 0	0.00% 0	10.00% 1	20.00% 2	70.00% 7	10	4.60
Clean/Repair Homes	10.00% 1	0.00% 0	50.00% 5	40.00% 4	0.00% 0	10	3.20
Restore Utilities (electric, water, wastewater, communication)	0.00% 0	0.00% 0	0.00% 0	20.00% 2	80.00% 8	10	4.80
Resume Business/Local Economy	0.00% 0	20.00% 2	30.00% 3	50.00% 5	0.00% 0	10	3.30
Restore Parks, Beaches, and other Natural Resources	20.00% 2	40.00% 4	40.00% 4	0.00% 0	0.00% 0	10	2.20
Address Injuries and Casualties	0.00% 0	0.00% 0	0.00% 0	20.00% 2	80.00% 8	10	4.80
Re-open Schools	0.00% 0	30.00% 3	20.00% 2	50.00% 5	0.00% 0	10	3.20

Q13 Scientists expect rain and storm events may increase in this area due to Climate Change. Which of the following statements about planning for future changes in precipitation do you most agree with?

Answered: 10 Skipped: 8

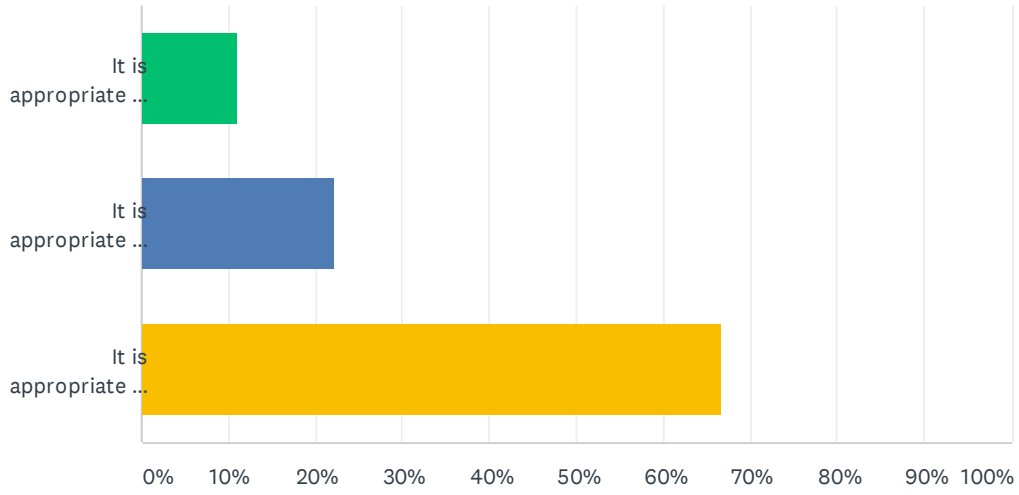


ANSWER CHOICES	RESPONSES	
It is appropriate to plan for storm events to occur more frequently.	0.00%	0
It is appropriate to plan for storm events to become more severe.	10.00%	1
It is appropriate to plan for storm events to become more severe and more frequent.	70.00%	7
It is appropriate to plan for storm events to occur at a similar frequency and severity as in the past.	10.00%	1
Other (please specify)	10.00%	1
TOTAL		10

#	OTHER (PLEASE SPECIFY)	DATE
1	Climate change is a myth	8/11/2020 2:48 PM

Q14 Scientists expect sea level will continue to increase in Connecticut due to Climate Change. Which of the following statements about planning for future sea level change do you most agree with?

Answered: 9 Skipped: 9



ANSWER CHOICES	RESPONSES	
It is appropriate to plan for sea level rise to continue at the current rate, with about one foot of rise by 2050.	11.11%	1
It is appropriate to plan for sea level rise to accelerate, with about 1.8 feet (1/2 meter) of rise by 2050.	22.22%	2
It is appropriate to plan for sea level rise to accelerate dramatically, with over two feet of rise by 2050.	66.67%	6
TOTAL		9

#	OTHER (PLEASE SPECIFY)	DATE
1	Climate change is a myth	8/11/2020 2:48 PM

Q15 If you could choose one action to reduce risks from natural hazards in your community, what would it be?

Answered: 7 Skipped: 11

#	RESPONSES	DATE
1	Better coordinating of utility response	8/11/2020 2:48 PM
2	Move utilities underground.	7/16/2020 12:51 PM
3	Reclaim coastal areas as public open space to mitigate the expected effect of increased coastal flooding	7/7/2020 9:56 AM
4	Put maximum effort into assuring power is available.	7/6/2020 5:51 PM
5	Reduce power outages with extreme tree cutting near power lines	7/6/2020 10:27 AM
6	cut back trees from power lines - better than currently doing	6/23/2020 3:33 PM
7	Remove properties within the flood zone	6/23/2020 11:29 AM

Q16 Please provide any additional comments or questions to be addressed as this Hazard Mitigation Plan is updated.

Answered: 3 Skipped: 15

#	RESPONSES	DATE
1	This survey is a good effort to gather input from residents, but some questions assume high level of knowledge by survey takers (resources available through various entities, increased level of severity in flooding). I would suggest options for mitigation actions that indicate lack of effectiveness rather than only degrees of positive effectiveness. For example, although this study is funded by FEMA, I don't believe that flood insurance is an effective mitigation measure. It in fact allows continued development of high value real estate in high risk areas for flooding such as the Compo Beach area of Westport, but may limit property improvements in lower value areas such as neighborhoods in South Norwalk. I encourage you to evaluate mitigation actions that focus on reducing development and investment on coastal properties by repurposing coastal property to open space uses. A tall order in CT I know. As a Hazard Planner in Oregon, my perspective may be unique among your respondents.	7/7/2020 9:56 AM
2	Plan on a method for quick and accurate dissemination of information before, during and after an occurrence.	7/6/2020 5:51 PM
3	Communities should consider real implementable goals within their plan, and assign someone to pursue those goals.	6/23/2020 11:29 AM

Q17 If you wish to be notified of the progress in updating the Hazard Mitigation Plan, please provide your name and email address.

Answered: 4 Skipped: 14

ANSWER CHOICES	RESPONSES	
Name	75.00%	3
Email Address	100.00%	4

#	NAME	DATE
1	Katherine Daniel	7/7/2020 9:56 AM
2	Frances O'Neill	7/6/2020 5:51 PM
3	Mike Towle	6/23/2020 11:29 AM

#	EMAIL ADDRESS	DATE
1	katherinelouisedaniel@gmail.com	7/7/2020 9:56 AM
2	xfgildea@yahoo.com	7/6/2020 5:51 PM
3	agaal@charter.net	6/23/2020 3:33 PM
4	mtowle@westcog.org	6/23/2020 11:29 AM

Appendix D

HAZUS-MH Output

HAZUS Flood Damage Results

Hazus: Flood Global Risk Report

Region Name: CT_WestCOG_R1p5

Flood Scenario: PROBABILISTIC

Print Date: Friday, February 12, 2021

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Building Stock	4
Essential Facility Inventory	5
Flood Scenario Parameters	6
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General Building Stock	7
Essential Facilities Damage	9
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Building-Related Losses	
Appendix A: County Listing for the Region	15
Appendix B: Regional Population and Building Value Data	16

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 2 county(ies) from the following state(s):

- Connecticut

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 551 square miles and contains 9,625 census blocks. The region contains over 218 thousand households and has a total population of 589,135 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 198,753 buildings in the region with a total building replacement value (excluding contents) of 102,465 million dollars. Approximately 88.35% of the buildings (and 74.29% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 198,753 buildings in the region which have an aggregate total replacement value of 102,465 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	76,125,793	74.3%
Commercial	18,914,927	18.5%
Industrial	4,199,754	4.1%
Agricultural	350,908	0.3%
Religion	1,311,764	1.3%
Government	444,806	0.4%
Education	1,117,301	1.1%
Total	**102,465,253**	**100%**

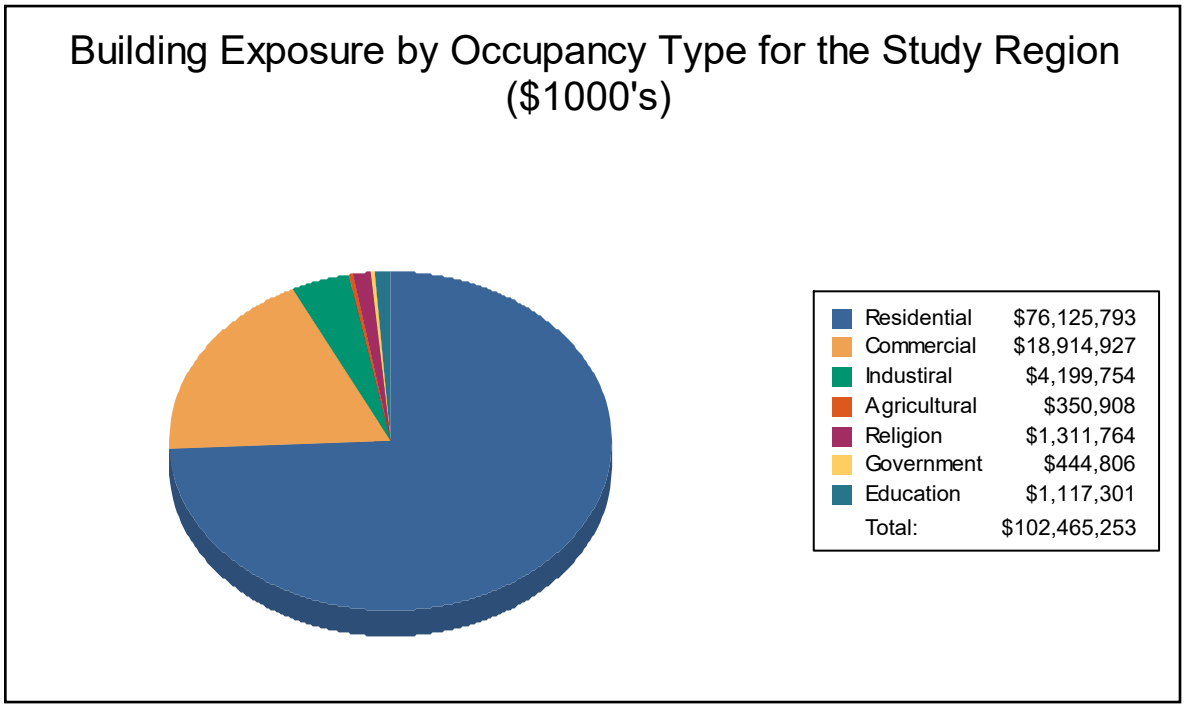
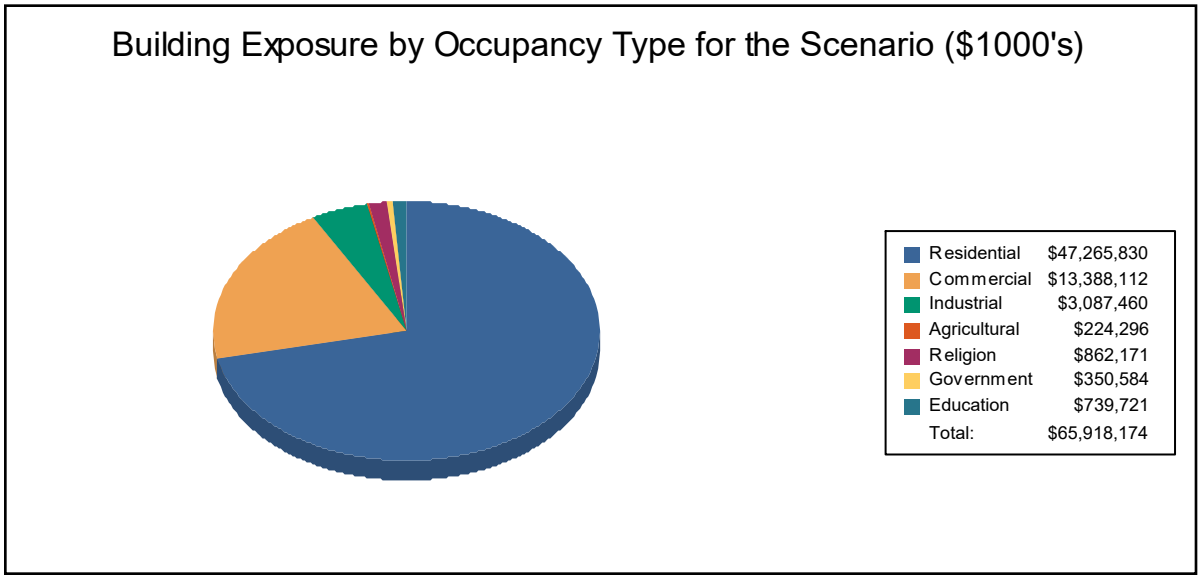


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	50,385,355	72.0%
Commercial	14,019,636	20.0%
Industrial	3,269,004	4.7%
Agricultural	248,993	0.4%
Religion	901,762	1.3%
Government	357,469	0.5%
Education	776,011	1.1%
Total	**69,958,230**	**100%**



Essential Facility Inventory

For essential facilities, there are 9 hospitals in the region with a total bed capacity of 1,295 beds. There are 257 schools, 80 fire stations, 21 police stations and 18 emergency operation centers.

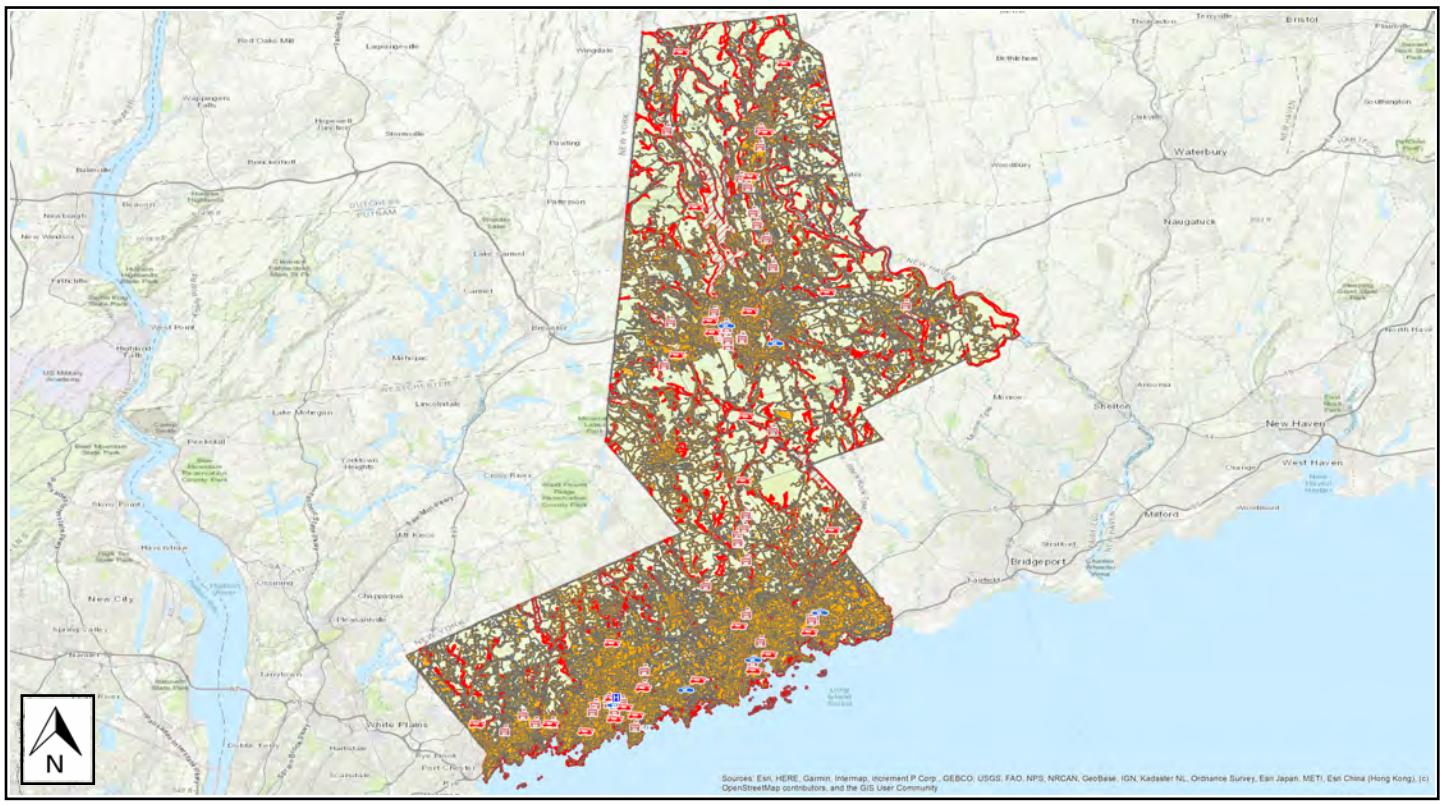
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	CT_WestCOG_R1p5
Scenario Name:	PROBABILISTIC
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 9,312 buildings will be at least moderately damaged. This is over 72% of the total number of buildings in the scenario. There are an estimated 1,441 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map

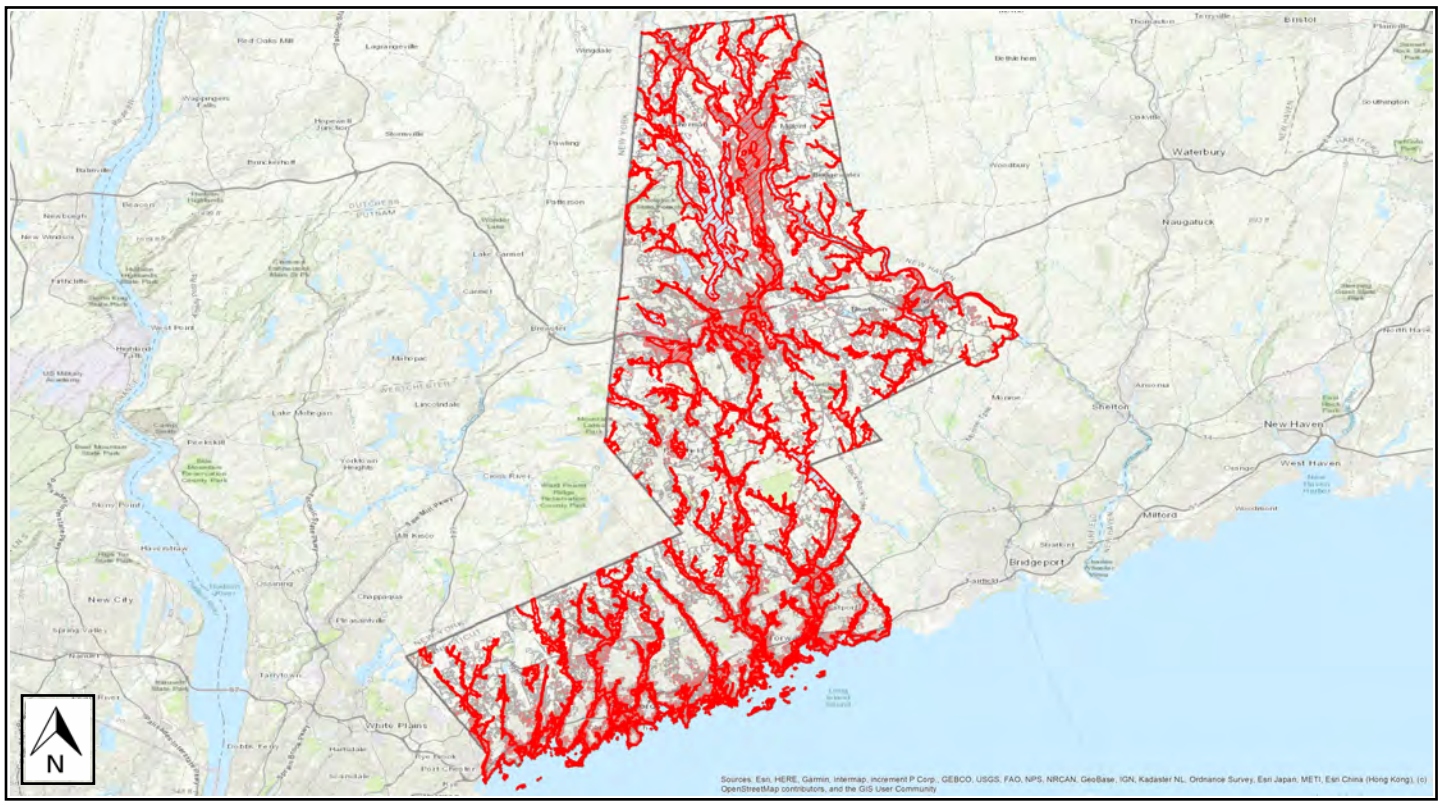


Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	1	100
Commercial	131	35	197	52	30	8	13	3	5	1	1	0
Education	0	0	1	100	0	0	0	0	0	0	0	0
Government	18	78	4	17	0	0	0	0	0	0	1	4
Industrial	5	8	41	62	9	14	6	9	1	2	4	6
Religion	0	0	7	100	0	0	0	0	0	0	0	0
Residential	4,677	34	4,071	30	1,942	14	976	7	568	4	1,434	10
Total	**4,831**		**4,321**		**1,981**		**995**		**574**		**1,441**	

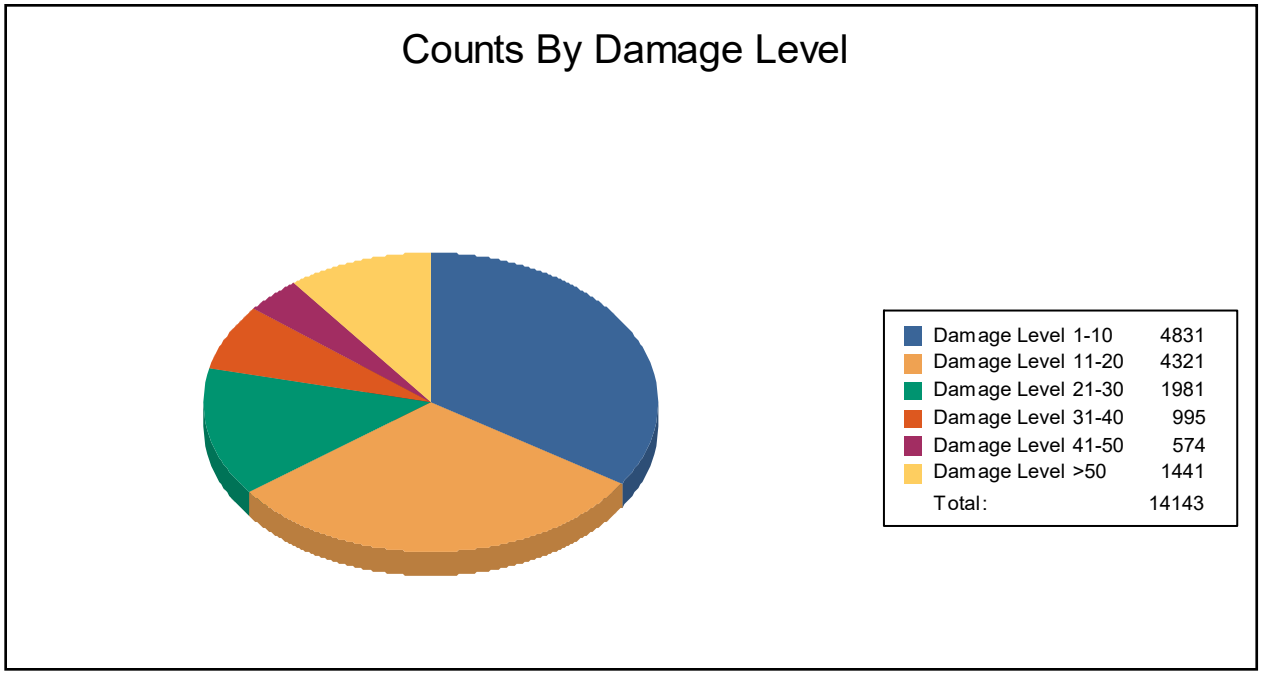


Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	9	47	9	47	1	5	0	0	0	0	0	0
ManufHousing	1	17	1	17	0	0	0	0	0	0	4	67
Masonry	173	37	147	32	67	14	31	7	27	6	19	4
Steel	89	35	133	52	20	8	6	2	3	1	4	2
Wood	4,523	34	3,996	30	1,876	14	946	7	540	4	1,411	11

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 1,295 hospital beds available for use. On the day of the scenario flood event, the model estimates that 1,295 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	18	2	0	2
Fire Stations	80	22	1	23
Hospitals	9	1	0	0
Police Stations	21	4	0	3
Schools	257	35	0	28

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

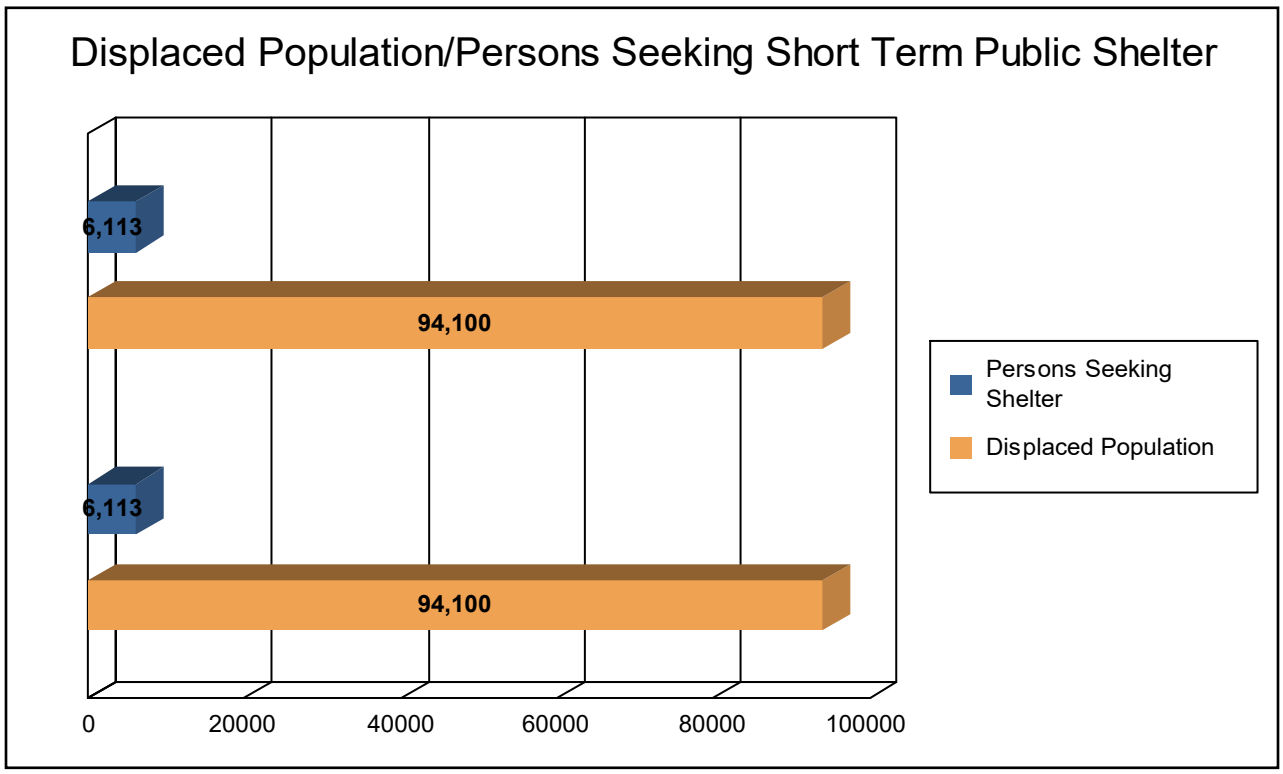
Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 31,367 households (or 94,100 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 6,113 people (out of a total population of 589,135) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 14,292.41 million dollars, which represents 20.43 % of the total replacement value of the scenario buildings.

Building-Related Losses

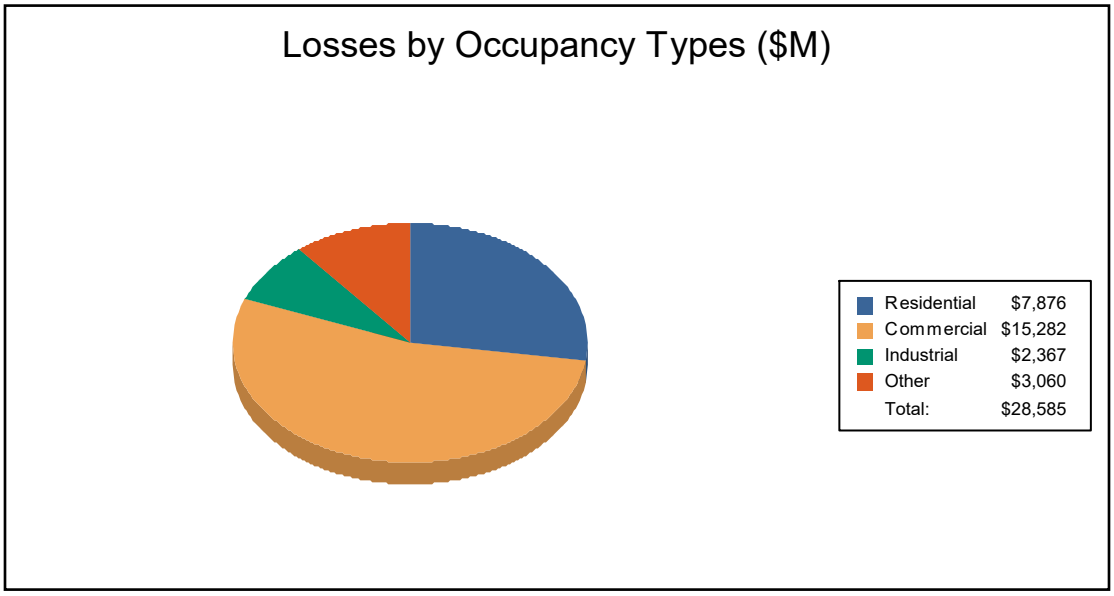
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 7,892.06 million dollars. 45% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 27.55% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	4,178.68	1,855.58	603.13	150.81	6,788.19
	Content	2,132.38	4,472.96	1,426.90	679.84	8,712.07
	Inventory	0.00	84.74	189.35	9.77	283.86
	Subtotal	**6,311.06**	**6,413.27**	**2,219.37**	**840.43**	**15,784.12**
Business Interruption						
	Income	35.30	3,714.81	35.94	237.07	4,023.12
	Relocation	945.20	1,080.61	43.68	135.45	2,204.94
	Rental Income	500.90	789.91	9.21	18.99	1,319.00
	Wage	83.21	3,282.99	59.25	1,828.18	5,253.64
	Subtotal	**1,564.61**	**8,868.32**	**148.07**	**2,219.70**	**12,800.70**
ALL	**Total**	**7,875.66**	**15,281.59**	**2,367.44**	**3,060.13**	**28,584.82**



Appendix A: County Listing for the Region

Connecticut

- Fairfield
- Litchfield

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Connecticut				
Litchfield	29,869	4,025,150	1,030,625	5,055,775
Fairfield	559,266	72,100,643	25,308,835	97,409,478
Total	**589,135**	**76,125,793**	**26,339,460**	**102,465,253**
Total Study Region	**589,135**	**76,125,793**	**26,339,460**	**102,465,253**

Damages by Return Period

						Residential	Residential	Commercial	Commercial	Other	Other	
	COG	RETURN_PER	Total Loss		Content Loss	Building Loss	Content Loss	Building Loss	Content Loss	Building Loss	Content Loss	Business Disruption
1	WestCOG	10	$ 13,399,709,000	$ 2,775,521,000	$ 3,891,047,000	$ 1,663,631,000	$ 828,872,000	$ 788,824,000	$ 2,082,590,000	$ 323,066,000	$ 979,585,000	$ 12,890,552,000
3	WestCOG	25	$ 15,535,810,000	$ 3,336,285,000	$ 4,599,717,000	$ 2,012,064,000	$ 999,182,000	$ 940,072,000	$ 2,441,401,000	$ 384,149,000	$ 1,159,134,000	$ 14,560,910,000
4	WestCOG	50	$ 18,424,487,000	$ 4,214,641,000	$ 5,580,361,000	$ 2,599,438,000	$ 1,309,999,000	$ 1,154,167,000	$ 2,900,287,000	$ 461,036,000	$ 1,370,075,000	$ 16,522,050,000
2	WestCOG	100	$ 20,838,287,000	$ 4,987,893,000	$ 6,416,036,000	$ 3,108,400,000	$ 1,578,041,000	$ 1,350,363,000	$ 3,288,769,000	$ 529,130,000	$ 1,549,226,000	$ 18,066,375,000
5	WestCOG	500	$ 26,748,229,000	$ 6,923,286,000	$ 8,459,129,000	$ 4,370,868,000	$ 2,198,320,000	$ 1,848,765,000	$ 4,255,734,000	$ 703,653,000	$ 2,005,075,000	$ 21,763,623,000
6	WestCOG	Average Annual	$ 1,647,824,932	$ 366,367,398	$ 492,924,603	$ 223,583,868	$ 111,875,714	$ 101,825,962	$ 258,771,370	$ 40,957,568	$ 122,277,519	$ 1,510,162,823

Damages Counts

ScenID	COG	ReturnPeriodId	TotalBldg	NoDmg	1%-10%	11%-20%	21%-30%	31-40%	41-50%	51%-60%	61%-70%	71%-80%	81%-90%	91%-100%
0	WestCOG	10	18774	1988	7901	5757	1589	625	304	246	226	65	73	0
0	WestCOG	100	27358	1930	9992	8667	3025	1290	763	565	532	361	231	2
0	WestCOG	25	21751	2194	8858	6764	1913	781	381	312	270	155	123	0
0	WestCOG	50	24986	2018	9562	7993	2592	961	633	421	393	243	170	0
0	WestCOG	500	34008	2041	11024	10617	4186	1969	1209	798	796	861	500	7

NAME10	ReturnPeriodId	TotalBldg	NoDmg	1%-10%	11%-20%	21%-30%	31-40%	41-50%	51%-60%	61%-70%	71%-80%	81%-90%	91%-100%
Bethel	10	763	71	396	269	23	4	0	0	0	0	0	0
Bethel	25	1013	84	442	408	68	9	2	0	0	0	0	0
Bethel	50	1126	87	464	458	97	16	4	0	0	0	0	0
Bethel	100	1206	81	473	468	145	31	7	1	0	0	0	0
Bethel	500	1484	78	462	528	286	83	36	9	2	0	0	0
Bridgewater	10	15	0	5	8	2	0	0	0	0	0	0	0
Bridgewater	25	15	0	8	6	1	0	0	0	0	0	0	0
Bridgewater	50	21	0	11	8	2	0	0	0	0	0	0	0
Bridgewater	100	25	0	14	9	1	0	0	1	0	0	0	0
Bridgewater	500	51	2	25	17	3	0	0	1	1	1	1	0
Brookfield	10	328	13	113	112	51	19	14	3	3	0	0	0
Brookfield	25	433	25	162	131	57	28	10	14	2	4	0	0
Brookfield	50	482	23	168	140	64	29	22	21	7	8	0	0
Brookfield	100	542	25	182	156	69	35	25	22	18	6	4	0
Brookfield	500	797	29	204	183	97	81	53	42	54	29	25	0
Danbury	10	1690	213	799	581	84	11	2	0	0	0	0	0
Danbury	25	2197	245	989	772	155	28	8	0	0	0	0	0
Danbury	50	2483	244	1073	906	201	49	9	1	0	0	0	0
Danbury	100	2693	236	1108	1005	249	74	15	6	0	0	0	0
Danbury	500	3479	269	1180	1288	502	151	61	14	10	4	0	0
Darien	10	885	98	382	323	69	10	3	0	0	0	0	0
Darien	25	984	114	418	353	82	14	2	1	0	0	0	0
Darien	50	1110	80	432	413	134	34	9	7	1	0	0	0
Darien	100	1188	78	440	424	158	58	12	9	7	2	0	0
Darien	500	1563	116	586	474	221	97	30	15	12	12	0	0
Greenwich	10	2142	191	880	686	235	90	35	18	4	3	0	0
Greenwich	25	2320	178	913	777	257	120	40	23	8	4	0	0
Greenwich	50	2684	168	943	896	330	181	81	54	22	9	0	0
Greenwich	100	2941	173	965	953	353	228	131	75	43	20	0	0
Greenwich	500	3463	164	981	1128	412	267	220	140	85	56	10	0
New Canaan	10	446	30	226	166	23	1	0	0	0	0	0	0
New Canaan	25	533	33	262	200	35	3	0	0	0	0	0	0
New Canaan	50	588	42	275	220	47	4	0	0	0	0	0	0
New Canaan	100	663	42	299	253	62	6	1	0	0	0	0	0
New Canaan	500	847	55	369	299	96	25	2	1	0	0	0	0
New Fairfield	10	190	19	119	49	3	0	0	0	0	0	0	0
New Fairfield	25	252	27	145	73	6	1	0	0	0	0	0	0
New Fairfield	50	300	29	164	96	10	1	0	0	0	0	0	0
New Fairfield	100	323	30	169	111	12	1	0	0	0	0	0	0
New Fairfield	500	515	40	253	181	37	3	1	0	0	0	0	0
New Milford	10	1521	15	179	318	261	193	157	150	151	46	51	0
New Milford	25	1627	14	178	236	226	214	191	196	185	104	83	0
New Milford	50	1739	19	187	217	157	169	213	246	249	163	119	0
New Milford	100	1894	26	218	225	129	128	188	270	303	236	169	2
New Milford	500	2354	35	240	233	128	98	148	184	413	484	384	7
Newtown	10	501	16	157	106	24	26	33	40	61	16	22	0
Newtown	25	661	24	218	165	34	16	29	34	59	42	40	0
Newtown	50	738	25	247	184	42	13	26	30	60	60	51	0

NAME10	ReturnPeriodId	TotalBldg	NoDmg	1%-10%	11%-20%	21%-30%	31-40%	41-50%	51%-60%	61%-70%	71%-80%	81%-90%	91%-100%
Newtown	100	835	35	277	214	53	15	20	26	63	74	58	0
Newtown	500	1118	56	342	301	88	33	25	28	36	133	76	0
Norwalk	10	3182	490	1446	860	248	92	29	12	5	0	0	0
Norwalk	25	3693	566	1671	987	293	108	42	16	9	1	0	0
Norwalk	50	4236	490	1776	1146	514	163	96	29	20	2	0	0
Norwalk	100	4715	450	1939	1218	571	289	128	69	40	11	0	0
Norwalk	500	5675	366	2127	1629	636	384	276	118	83	55	1	0
Redding	10	194	8	109	65	12	0	0	0	0	0	0	0
Redding	25	219	9	113	79	18	0	0	0	0	0	0	0
Redding	50	243	9	118	93	21	2	0	0	0	0	0	0
Redding	100	275	11	131	101	27	5	0	0	0	0	0	0
Redding	500	326	11	140	123	38	12	2	0	0	0	0	0
Ridgefield	10	643	64	393	174	11	1	0	0	0	0	0	0
Ridgefield	25	721	67	421	210	20	3	0	0	0	0	0	0
Ridgefield	50	791	70	444	244	28	5	0	0	0	0	0	0
Ridgefield	100	871	74	460	294	38	4	1	0	0	0	0	0
Ridgefield	500	1082	75	518	416	61	8	4	0	0	0	0	0
Sherman	10	130	9	55	48	13	3	2	0	0	0	0	0
Sherman	25	147	8	65	57	8	7	1	1	0	0	0	0
Sherman	50	157	9	66	61	10	6	2	1	2	0	0	0
Sherman	100	178	10	75	68	12	5	4	1	3	0	0	0
Sherman	500	219	9	80	86	23	6	4	5	2	3	1	0
Stamford	10	3455	442	1647	1022	275	53	16	0	0	0	0	0
Stamford	25	3909	461	1785	1215	341	79	23	5	0	0	0	0
Stamford	50	4795	466	2049	1591	460	132	76	16	5	0	0	0
Stamford	100	5190	427	2047	1768	575	192	106	55	14	6	0	0
Stamford	500	6515	501	2248	2223	801	354	198	112	50	26	2	0
Weston	10	339	17	141	140	30	9	1	1	0	0	0	0
Weston	25	390	16	148	160	47	14	4	1	0	0	0	0
Weston	50	422	18	148	163	64	17	10	1	1	0	0	0
Weston	100	488	21	166	180	77	25	15	3	1	0	0	0
Weston	500	596	25	186	209	81	50	21	18	4	2	0	0
Westport	10	1583	236	546	498	165	103	11	22	2	0	0	0
Westport	25	1802	270	609	567	180	121	27	21	7	0	0	0
Westport	50	2163	187	680	768	292	116	79	14	26	1	0	0
Westport	100	2360	159	710	810	349	159	101	26	40	6	0	0
Westport	500	2795	163	743	890	454	238	105	103	43	56	0	0
Wilton	10	767	56	308	332	60	10	1	0	0	0	0	0
Wilton	25	835	53	311	368	85	16	2	0	0	0	0	0
Wilton	50	908	52	317	389	119	24	6	1	0	0	0	0
Wilton	100	971	52	319	410	145	35	9	1	0	0	0	0
Wilton	500	1129	47	340	409	222	79	23	8	1	0	0	0

NAME10	RETURN_PER	Total Loss	Building Loss	Content Loss	Residential Building Loss	Residential Content Loss	Commercial Building Loss	Commercial Content Loss	Other Building Loss	Other Content Loss	Business Disruption
Bethel	10	$ 299,900,000	$ 52,362,000	$ 71,863,000	$ 34,619,000	$ 16,058,000	$ 12,003,000	$ 38,779,000	$ 5,740,000	$ 17,026,000	$ 329,015,000
Bethel	25	$ 420,990,000	$ 81,501,000	$ 112,706,000	$ 53,877,000	$ 24,889,000	$ 18,968,000	$ 61,899,000	$ 8,656,000	$ 25,918,000	$ 419,503,000
Bethel	50	$ 482,086,000	$ 96,910,000	$ 134,189,000	$ 64,020,000	$ 29,636,000	$ 22,699,000	$ 73,707,000	$ 10,191,000	$ 30,846,000	$ 463,494,000
Bethel	100	$ 542,274,000	$ 113,317,000	$ 156,944,000	$ 74,785,000	$ 34,672,000	$ 26,592,000	$ 86,172,000	$ 11,940,000	$ 36,100,000	$ 500,518,000
Bethel	500	$ 741,797,000	$ 173,106,000	$ 234,441,000	$ 116,105,000	$ 53,738,000	$ 39,140,000	$ 125,399,000	$ 17,861,000	$ 55,304,000	$ 612,618,000
Bethel	Average Annual	$ 42,399,138	$ 8,343,039	$ 11,496,107	$ 5,523,645	$ 2,556,316	$ 1,933,463	$ 6,272,877	$ 885,931	$ 2,666,914	$ 41,783,350
Bridgewater	10	$ 13,824,000	$ 5,546,000	$ 3,828,000	$ 4,784,000	$ 2,050,000	$ 481,000	$ 1,045,000	$ 281,000	$ 733,000	$ 8,531,000
Bridgewater	25	$ 14,755,000	$ 5,037,000	$ 3,466,000	$ 4,401,000	$ 1,863,000	$ 400,000	$ 913,000	$ 236,000	$ 690,000	$ 11,950,000
Bridgewater	50	$ 19,344,000	$ 6,273,000	$ 4,325,000	$ 5,484,000	$ 2,332,000	$ 469,000	$ 1,048,000	$ 320,000	$ 945,000	$ 17,013,000
Bridgewater	100	$ 22,562,000	$ 7,526,000	$ 5,052,000	$ 6,621,000	$ 2,818,000	$ 545,000	$ 1,186,000	$ 360,000	$ 1,048,000	$ 19,215,000
Bridgewater	500	$ 34,369,000	$ 12,000,000	$ 7,951,000	$ 10,494,000	$ 4,454,000	$ 842,000	$ 1,772,000	$ 664,000	$ 1,725,000	$ 27,785,000
Bridgewater	Average Annual	$ 1,704,352	$ 601,689	$ 411,529	$ 524,373	$ 223,086	$ 47,422	$ 104,896	$ 29,894	$ 83,547	$ 1,328,770
Brookfield	10	$ 408,915,000	$ 78,498,000	$ 146,451,000	$ 42,560,000	$ 18,701,000	$ 19,846,000	$ 65,629,000	$ 16,092,000	$ 62,121,000	$ 432,656,000
Brookfield	25	$ 494,698,000	$ 100,676,000	$ 178,307,000	$ 55,901,000	$ 24,718,000	$ 24,690,000	$ 79,249,000	$ 20,085,000	$ 74,340,000	$ 503,765,000
Brookfield	50	$ 553,572,000	$ 120,452,000	$ 200,696,000	$ 68,951,000	$ 30,446,000	$ 28,698,000	$ 88,564,000	$ 22,803,000	$ 81,686,000	$ 540,760,000
Brookfield	100	$ 616,801,000	$ 141,417,000	$ 223,280,000	$ 82,973,000	$ 36,498,000	$ 33,163,000	$ 98,379,000	$ 25,281,000	$ 88,403,000	$ 581,244,000
Brookfield	500	$ 925,203,000	$ 240,321,000	$ 330,897,000	$ 148,050,000	$ 63,991,000	$ 57,339,000	$ 150,921,000	$ 34,932,000	$ 115,985,000	$ 800,290,000
Brookfield	Average Annual	$ 51,461,377	$ 10,903,439	$ 18,531,152	$ 6,182,162	$ 2,718,868	$ 2,655,951	$ 8,258,227	$ 2,065,326	$ 7,554,057	$ 51,274,616
Danbury	10	$ 1,398,536,000	$ 220,885,000	$ 467,498,000	$ 88,685,000	$ 54,943,000	$ 84,341,000	$ 267,092,000	$ 47,859,000	$ 145,463,000	$ 1,406,530,000
Danbury	25	$ 1,755,985,000	$ 295,732,000	$ 593,534,000	$ 129,418,000	$ 78,740,000	$ 107,125,000	$ 333,545,000	$ 59,189,000	$ 181,249,000	$ 1,712,233,000
Danbury	50	$ 1,955,016,000	$ 341,754,000	$ 673,167,000	$ 152,806,000	$ 92,055,000	$ 122,214,000	$ 376,599,000	$ 66,734,000	$ 204,513,000	$ 1,870,678,000
Danbury	100	$ 2,174,749,000	$ 393,343,000	$ 759,297,000	$ 179,522,000	$ 107,523,000	$ 138,617,000	$ 421,806,000	$ 75,204,000	$ 229,968,000	$ 2,042,040,000
Danbury	500	$ 2,917,273,000	$ 578,072,000	$ 1,049,369,000	$ 278,759,000	$ 165,861,000	$ 195,315,000	$ 567,968,000	$ 103,998,000	$ 315,540,000	$ 2,594,477,000
Danbury	Average Annual	$ 178,597,099	$ 30,590,659	$ 60,993,692	$ 13,417,612	$ 8,141,588	$ 11,067,883	$ 34,207,607	$ 6,105,164	$ 18,644,497	$ 172,690,612
Darien	10	$ 461,497,000	$ 90,670,000	$ 105,712,000	$ 65,695,000	$ 29,693,000	$ 18,094,000	$ 50,063,000	$ 6,881,000	$ 25,956,000	$ 471,163,000
Darien	25	$ 499,490,000	$ 102,122,000	$ 117,849,000	$ 74,589,000	$ 33,632,000	$ 19,995,000	$ 55,600,000	$ 7,538,000	$ 28,617,000	$ 495,809,000
Darien	50	$ 587,194,000	$ 135,850,000	$ 146,536,000	$ 104,186,000	$ 50,015,000	$ 23,032,000	$ 63,997,000	$ 8,632,000	$ 32,524,000	$ 541,318,000
Darien	100	$ 651,440,000	$ 160,886,000	$ 169,064,000	$ 125,346,000	$ 61,610,000	$ 26,017,000	$ 71,774,000	$ 9,523,000	$ 35,680,000	$ 570,098,000
Darien	500	$ 796,546,000	$ 215,626,000	$ 214,621,000	$ 172,463,000	$ 85,180,000	$ 31,757,000	$ 86,679,000	$ 11,406,000	$ 42,762,000	$ 649,532,000
Darien	Average Annual	$ 53,274,656	$ 11,584,460	$ 12,892,662	$ 8,680,092	$ 4,051,865	$ 2,112,795	$ 5,851,885	$ 791,573	$ 2,988,912	$ 51,115,094
Greenwich	10	$ 876,823,000	$ 240,105,000	$ 252,566,000	$ 180,873,000	$ 87,208,000	$ 37,897,000	$ 97,242,000	$ 21,335,000	$ 68,116,000	$ 734,659,000
Greenwich	25	$ 979,379,000	$ 275,958,000	$ 288,342,000	$ 207,682,000	$ 99,468,000	$ 44,325,000	$ 112,942,000	$ 23,951,000	$ 75,932,000	$ 794,959,000
Greenwich	50	$ 1,290,468,000	$ 384,874,000	$ 382,636,000	$ 296,184,000	$ 143,759,000	$ 59,847,000	$ 147,058,000	$ 28,843,000	$ 91,819,000	$ 1,009,515,000
Greenwich	100	$ 1,519,177,000	$ 473,391,000	$ 453,647,000	$ 368,296,000	$ 179,569,000	$ 72,357,000	$ 171,942,000	$ 32,738,000	$ 102,136,000	$ 1,142,444,000
Greenwich	500	$ 1,996,816,000	$ 654,843,000	$ 601,167,000	$ 513,083,000	$ 249,344,000	$ 100,059,000	$ 225,844,000	$ 41,701,000	$ 125,979,000	$ 1,429,807,000
Greenwich	Average Annual	$ 110,490,359	$ 32,204,157	$ 32,540,025	$ 24,569,392	$ 11,863,530	$ 5,059,182	$ 12,543,352	$ 2,575,583	$ 8,133,143	$ 87,841,693
New Canaan	10	$ 131,064,000	$ 38,942,000	$ 27,737,000	$ 34,640,000	$ 15,284,000	$ 3,321,000	$ 9,100,000	$ 981,000	$ 3,353,000	$ 136,995,000
New Canaan	25	$ 164,184,000	$ 47,768,000	$ 35,318,000	$ 42,074,000	$ 18,609,000	$ 4,303,000	$ 11,567,000	$ 1,391,000	$ 5,142,000	$ 182,856,000
New Canaan	50	$ 187,293,000	$ 55,540,000	$ 41,631,000	$ 48,677,000	$ 21,525,000	$ 5,195,000	$ 14,022,000	$ 1,668,000	$ 6,084,000	$ 201,461,000
New Canaan	100	$ 216,862,000	$ 64,503,000	$ 48,850,000	$ 56,275,000	$ 24,931,000	$ 6,252,000	$ 16,768,000	$ 1,976,000	$ 7,151,000	$ 229,737,000
New Canaan	500	$ 288,655,000	$ 90,710,000	$ 69,854,000	$ 78,606,000	$ 34,913,000	$ 9,213,000	$ 24,730,000	$ 2,891,000	$ 10,211,000	$ 277,975,000
New Canaan	Average Annual	$ 16,992,363	$ 5,036,867	$ 3,728,069	$ 4,430,426	$ 1,959,612	$ 461,221	$ 1,245,302	$ 145,220	$ 523,155	$ 18,181,488
New Fairfield	10	$ 31,231,000	$ 10,544,000	$ 6,904,000	$ 9,739,000	$ 4,235,000	$ 498,000	$ 1,707,000	$ 307,000	$ 962,000	$ 24,121,000
New Fairfield	25	$ 43,769,000	$ 15,145,000	$ 10,316,000	$ 13,855,000	$ 6,000,000	$ 840,000	$ 2,937,000	$ 450,000	$ 1,379,000	$ 32,402,000
New Fairfield	50	$ 52,458,000	$ 18,667,000	$ 12,438,000	$ 17,107,000	$ 7,355,000	$ 1,005,000	$ 3,431,000	$ 555,000	$ 1,652,000	$ 37,480,000
New Fairfield	100	$ 59,704,000	$ 21,445,000	$ 14,361,000	$ 19,631,000	$ 8,424,000	$ 1,193,000	$ 4,100,000	$ 621,000	$ 1,837,000	$ 41,954,000
New Fairfield	500	$ 94,275,000	$ 35,635,000	$ 23,506,000	$ 32,665,000	$ 14,060,000	$ 1,928,000	$ 6,375,000	$ 1,042,000	$ 3,071,000	$ 60,803,000
New Fairfield	Average Annual	$ 4,577,546	$ 1,608,940	$ 1,076,615	$ 1,475,644	$ 637,551	$ 85,920	$ 295,305	$ 47,376	$ 143,759	$ 3,324,314
New Milford	10	$ 1,456,120,000	$ 483,071,000	$ 515,875,000	$ 322,526,000	$ 147,901,000	$ 100,992,000	$ 229,005,000	$ 59,553,000	$ 138,969,000	$ 920,287,000
New Milford	25	$ 1,670,646,000	$ 578,907,000	$ 585,729,000	$ 386,370,000	$ 175,861,000	$ 122,533,000	$ 255,312,000	$ 70,004,000	$ 154,556,000	$ 1,023,813,000
New Milford	50	$ 1,861,103,000	$ 669,836,000	$ 643,309,000	$ 446,204,000	$ 201,174,000	$ 144,013,000	$ 274,872,000	$ 79,619,000	$ 167,263,000	$ 1,113,648,000
New Milford	100	$ 2,055,237,000	$ 761,573,000	$ 700,693,000	$ 505,043,000	$ 225,564,000	$ 166,984,000	$ 294,764,000	$ 89,546,000	$ 180,365,000	$ 1,212,279,000
New Milford	500	$ 2,522,169,000	$ 1,006,607,000	$ 828,480,000	$ 659,436,000	$ 284,139,000	$ 231,091,000	$ 339,134,000	$ 116,080,000	$ 205,207,000	$ 1,404,085,000
New Milford	Average Annual	$ 172,056,132	$ 60,589,749	$ 59,832,162	$ 40,325,643	$ 18,223,990	$ 12,980,677	$ 25,893,390	$ 7,283,429	$ 15,714,782	$ 104,600,871

NAME10	RETURN_PER	Total Loss	Building Loss	Content Loss	Residential Building Loss	Residential Content Loss	Commercial Building Loss	Commercial Content Loss	Other Building Loss	Other Content Loss	Business Disruption
Newtown	10	$ 443,334,000	$ 120,012,000	$ 97,642,000	$ 100,520,000	$ 43,450,000	$ 12,122,000	$ 32,577,000	$ 7,370,000	$ 21,615,000	$ 337,723,000
Newtown	25	$ 546,554,000	$ 149,064,000	$ 117,387,000	$ 124,454,000	$ 53,306,000	$ 15,000,000	$ 39,231,000	$ 9,610,000	$ 24,850,000	$ 423,620,000
Newtown	50	$ 592,516,000	$ 167,202,000	$ 130,121,000	$ 138,824,000	$ 58,955,000	$ 17,293,000	$ 44,147,000	$ 11,085,000	$ 27,019,000	$ 451,312,000
Newtown	100	$ 641,550,000	$ 184,389,000	$ 142,937,000	$ 152,255,000	$ 64,222,000	$ 19,535,000	$ 49,303,000	$ 12,599,000	$ 29,412,000	$ 483,614,000
Newtown	500	$ 818,461,000	$ 246,234,000	$ 190,319,000	$ 200,678,000	$ 83,901,000	$ 27,657,000	$ 67,428,000	$ 17,899,000	$ 38,990,000	$ 599,949,000
Newtown	Average Annual	$ 54,734,636	$ 15,207,855	$ 12,004,902	$ 12,650,483	$ 5,401,469	$ 1,564,812	$ 4,057,050	$ 992,560	$ 2,546,383	$ 41,798,390
Norwalk	10	$ 2,112,819,000	$ 403,064,000	$ 641,450,000	$ 210,048,000	$ 114,364,000	$ 150,409,000	$ 404,223,000	$ 42,607,000	$ 122,863,000	$ 2,118,098,000
Norwalk	25	$ 2,456,197,000	$ 471,514,000	$ 743,623,000	$ 249,067,000	$ 135,875,000	$ 172,348,000	$ 461,260,000	$ 50,099,000	$ 146,488,000	$ 2,461,156,000
Norwalk	50	$ 3,084,024,000	$ 634,039,000	$ 948,271,000	$ 350,233,000	$ 194,561,000	$ 216,892,000	$ 561,028,000	$ 66,914,000	$ 192,682,000	$ 2,962,328,000
Norwalk	100	$ 3,560,996,000	$ 776,523,000	$ 1,113,861,000	$ 440,936,000	$ 247,715,000	$ 255,015,000	$ 638,849,000	$ 80,572,000	$ 227,297,000	$ 3,294,772,000
Norwalk	500	$ 4,549,650,000	$ 1,080,737,000	$ 1,472,559,000	$ 628,784,000	$ 346,463,000	$ 343,259,000	$ 823,099,000	$ 108,694,000	$ 302,997,000	$ 3,929,360,000
Norwalk	Average Annual	$ 267,239,674	$ 53,936,194	$ 82,072,588	$ 29,258,743	$ 16,092,548	$ 19,014,259	$ 49,680,745	$ 5,663,192	$ 16,299,295	$ 259,653,208
Redding	10	$ 100,702,000	$ 25,158,000	$ 28,054,000	$ 17,742,000	$ 7,984,000	$ 4,841,000	$ 12,318,000	$ 2,575,000	$ 7,752,000	$ 83,112,000
Redding	25	$ 114,806,000	$ 29,908,000	$ 32,676,000	$ 21,239,000	$ 9,543,000	$ 5,641,000	$ 14,091,000	$ 3,028,000	$ 9,042,000	$ 91,699,000
Redding	50	$ 125,508,000	$ 33,982,000	$ 36,356,000	$ 24,242,000	$ 10,880,000	$ 6,348,000	$ 15,483,000	$ 3,392,000	$ 9,993,000	$ 96,968,000
Redding	100	$ 139,024,000	$ 38,871,000	$ 40,561,000	$ 28,041,000	$ 12,580,000	$ 7,056,000	$ 17,039,000	$ 3,774,000	$ 10,942,000	$ 104,745,000
Redding	500	$ 172,582,000	$ 52,049,000	$ 51,140,000	$ 38,150,000	$ 17,085,000	$ 9,069,000	$ 20,607,000	$ 4,830,000	$ 13,448,000	$ 121,460,000
Redding	Average Annual	$ 11,782,628	$ 3,122,923	$ 3,365,889	$ 2,226,719	$ 1,000,170	$ 584,008	$ 1,442,418	$ 312,196	$ 923,301	$ 9,287,305
Ridgefield	10	$ 229,662,000	$ 47,516,000	$ 56,434,000	$ 35,638,000	$ 18,419,000	$ 8,822,000	$ 29,048,000	$ 3,056,000	$ 8,967,000	$ 256,822,000
Ridgefield	25	$ 262,102,000	$ 57,209,000	$ 66,939,000	$ 43,159,000	$ 21,862,000	$ 10,313,000	$ 34,080,000	$ 3,737,000	$ 10,997,000	$ 280,673,000
Ridgefield	50	$ 292,993,000	$ 65,557,000	$ 75,645,000	$ 49,692,000	$ 24,898,000	$ 11,657,000	$ 38,340,000	$ 4,208,000	$ 12,407,000	$ 305,933,000
Ridgefield	100	$ 326,642,000	$ 74,598,000	$ 85,379,000	$ 56,656,000	$ 28,130,000	$ 13,164,000	$ 43,138,000	$ 4,778,000	$ 14,111,000	$ 333,349,000
Ridgefield	500	$ 419,140,000	$ 102,418,000	$ 113,974,000	$ 78,351,000	$ 38,093,000	$ 17,674,000	$ 56,912,000	$ 6,393,000	$ 18,969,000	$ 405,650,000
Ridgefield	Average Annual	$ 27,223,453	$ 5,983,085	$ 6,957,510	$ 4,520,890	$ 2,282,248	$ 1,076,555	$ 3,539,454	$ 385,640	$ 1,135,808	$ 28,954,616
Sherman	10	$ 38,812,000	$ 16,941,000	$ 10,715,000	$ 15,523,000	$ 6,687,000	$ 680,000	$ 1,673,000	$ 738,000	$ 2,355,000	$ 25,055,000
Sherman	25	$ 41,695,000	$ 18,015,000	$ 11,245,000	$ 16,550,000	$ 7,075,000	$ 650,000	$ 1,575,000	$ 815,000	$ 2,595,000	$ 28,266,000
Sherman	50	$ 46,638,000	$ 20,430,000	$ 12,691,000	$ 18,752,000	$ 8,020,000	$ 762,000	$ 1,833,000	$ 916,000	$ 2,838,000	$ 30,354,000
Sherman	100	$ 53,953,000	$ 23,781,000	$ 14,787,000	$ 21,787,000	$ 9,317,000	$ 915,000	$ 2,159,000	$ 1,079,000	$ 3,311,000	$ 35,707,000
Sherman	500	$ 72,626,000	$ 33,236,000	$ 20,325,000	$ 30,384,000	$ 12,939,000	$ 1,384,000	$ 3,103,000	$ 1,468,000	$ 4,283,000	$ 42,894,000
Sherman	Average Annual	$ 4,453,063	$ 1,948,725	$ 1,216,648	$ 1,787,357	$ 765,397	$ 74,369	$ 178,734	$ 86,999	$ 272,517	$ 2,916,327
Stamford	10	$ 3,162,057,000	$ 485,799,000	$ 737,816,000	$ 259,584,000	$ 148,817,000	$ 173,423,000	$ 425,069,000	$ 52,792,000	$ 163,930,000	$ 3,569,987,000
Stamford	25	$ 3,605,823,000	$ 582,001,000	$ 895,535,000	$ 306,370,000	$ 174,667,000	$ 212,018,000	$ 518,738,000	$ 63,613,000	$ 202,130,000	$ 3,921,649,000
Stamford	50	$ 4,478,394,000	$ 814,572,000	$ 1,209,258,000	$ 439,585,000	$ 250,579,000	$ 289,440,000	$ 692,086,000	$ 85,547,000	$ 266,593,000	$ 4,513,109,000
Stamford	100	$ 5,117,143,000	$ 994,575,000	$ 1,445,874,000	$ 539,313,000	$ 308,633,000	$ 354,185,000	$ 822,473,000	$ 101,077,000	$ 314,768,000	$ 4,920,646,000
Stamford	500	$ 6,539,621,000	$ 1,397,124,000	$ 1,966,959,000	$ 767,048,000	$ 432,879,000	$ 496,181,000	$ 1,109,378,000	$ 133,895,000	$ 424,702,000	$ 5,839,763,000
Stamford	Average Annual	$ 391,562,553	$ 67,406,509	$ 100,909,370	$ 36,092,200	$ 20,584,846	$ 24,189,761	$ 57,941,405	$ 7,124,548	$ 22,383,119	$ 410,986,597
Weston	10	$ 121,900,000	$ 39,422,000	$ 27,768,000	$ 35,132,000	$ 15,198,000	$ 3,417,000	$ 10,244,000	$ 873,000	$ 2,326,000	$ 85,816,000
Weston	25	$ 144,269,000	$ 48,533,000	$ 33,862,000	$ 43,279,000	$ 18,753,000	$ 4,172,000	$ 12,100,000	$ 1,082,000	$ 3,009,000	$ 97,001,000
Weston	50	$ 163,336,000	$ 56,607,000	$ 39,236,000	$ 50,494,000	$ 21,971,000	$ 4,841,000	$ 13,687,000	$ 1,272,000	$ 3,578,000	$ 105,435,000
Weston	100	$ 194,957,000	$ 68,720,000	$ 48,127,000	$ 61,182,000	$ 26,710,000	$ 6,007,000	$ 17,029,000	$ 1,531,000	$ 4,388,000	$ 122,681,000
Weston	500	$ 254,667,000	$ 95,933,000	$ 64,992,000	$ 85,720,000	$ 37,367,000	$ 8,101,000	$ 21,570,000	$ 2,112,000	$ 6,055,000	$ 146,315,000
Weston	Average Annual	$ 15,160,415	$ 5,167,163	$ 3,599,155	$ 4,607,488	$ 2,000,217	$ 444,674	$ 1,279,306	$ 115,001	$ 319,632	$ 10,018,064
Westport	10	$ 1,258,542,000	$ 267,567,000	$ 389,996,000	$ 149,267,000	$ 71,751,000	$ 102,896,000	$ 260,883,000	$ 15,404,000	$ 57,362,000	$ 1,145,226,000
Westport	25	$ 1,368,778,000	$ 302,852,000	$ 423,843,000	$ 172,613,000	$ 82,439,000	$ 113,158,000	$ 278,881,000	$ 17,081,000	$ 62,523,000	$ 1,225,804,000
Westport	50	$ 1,614,036,000	$ 395,581,000	$ 502,276,000	$ 246,600,000	$ 124,338,000	$ 128,551,000	$ 305,815,000	$ 20,430,000	$ 72,123,000	$ 1,356,908,000
Westport	100	$ 1,815,018,000	$ 468,007,000	$ 566,044,000	$ 300,599,000	$ 154,876,000	$ 143,432,000	$ 329,764,000	$ 23,976,000	$ 81,404,000	$ 1,475,066,000
Westport	500	$ 2,219,829,000	$ 618,590,000	$ 692,873,000	$ 409,200,000	$ 210,516,000	$ 177,755,000	$ 381,107,000	$ 31,635,000	$ 101,250,000	$ 1,713,268,000
Westport	Average Annual	$ 146,372,056	$ 33,998,408	$ 45,439,374	$ 20,242,121	$ 9,972,140	$ 11,898,883	$ 28,823,473	$ 1,857,404	$ 6,643,761	$ 127,297,762
Wilton	10	$ 853,971,000	$ 149,419,000	$ 302,738,000	$ 56,056,000	$ 26,129,000	$ 54,741,000	$ 146,893,000	$ 38,622,000	$ 129,716,000	$ 804,756,000
Wilton	25	$ 951,690,000	$ 174,343,000	$ 349,040,000	$ 67,166,000	$ 31,882,000	$ 63,593,000	$ 167,481,000	$ 43,584,000	$ 149,677,000	$ 853,752,000
Wilton	50	$ 1,038,508,000	$ 196,515,000	$ 387,580,000	$ 77,397,000	$ 37,500,000	$ 71,211,000	$ 184,570,000	$ 47,907,000	$ 165,510,000	$ 904,336,000
Wilton	100	$ 1,130,198,000	$ 221,028,000	$ 427,278,000	$ 89,139,000	$ 44,249,000	$ 79,334,000	$ 202,124,000	$ 52,555,000	$ 180,905,000	$ 956,266,000
Wilton	500	$ 1,384,550,000	$ 290,045,000	$ 525,702,000	$ 122,892,000	$ 63,397,000	$ 101,001,000	$ 243,708,000	$ 66,152,000	$ 218,597,000	$ 1,107,592,000
Wilton	Average Annual	$ 97,743,432	$ 18,133,537	$ 35,857,154	$ 7,068,878	$ 3,400,273	$ 6,574,127	$ 17,155,944	$ 4,490,532	$ 15,300,937	$ 87,109,746

HAZUS Earthquake Damage Results

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	167505	6443	1525	117	7	8092
Portland – 5.7	167003	6828	1632	126	8	8594
Stamford – 5.7	167003	6828	1632	126	8	8594
East Haddam – 6.4	146541	20811	7406	757	82	29056

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	189593	7293	1727	132	8	9160
Portland – 5.7	189026	7729	1847	142	9	9727
Stamford – 5.7	61461	33815	40755	28196	34526	137292
East Haddam – 6.4	165865	23555	8383	857	93	32888

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (6)	Emergency Operations Centers (7)	Fire Stations (45)	Police Stations (22)	Schools (223)
Haddam – 5.7	87	86	87	87	87
Portland – 5.7	87	86	86	86	87
Stamford – 5.7	25	34	44	41	28
East Haddam – 6.4	73	71	72	72	72

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	40.5	16.6	57.1
Portland – 5.7	42.1	17.5	59.6
Stamford – 5.7	1870.6	3716.2	5586.9
East Haddam – 6.4	127.3	84.7	212.1

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	121	72
Portland – 5.7	126	75
Stamford – 5.7	20016	11826
East Haddam – 6.4	535	320

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	$110,487	$21,088	$9,197	$37,980	$178,752	$131,574	$70,641
Portland – 5.7	$118,537	$23,613	$9,622	$39,871	$191,643	$142,150	$76,857
Stamford – 5.7	$11,956,023	$3,821,832	$851,958	$2,926,993	$19,556,806	$15,777,856	$6,849,397
East Haddam – 6.4	$537,333	$132,096	$41,707	$166,028	$877,164	$669,429	$355,283
Probabilistic	$1,775	$633	$121	$475	$3,004	$2,408	$1,246

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	51 (Level 1); 6 (Level 2); 0 (Level 3); 1 (Level 4)	92 (Level 1); 12 (Level 2), 1 (Level 3), 2 (Level 4)	64 (Level 1); 8 (Level 2), 1 (Level 3), 1 (Level 4)
Portland – 5.7	54 (Level 1); 6 (Level 2); 1 (Level 3); 1 (Level 4)	97 (Level 1); 12 (Level 2); 1 (Level 3); 2 (Level 4)	68 (Level 1); 8 (Level 2); 1 (Level 3); 1 (Level 4)
Stamford – 5.7	5225 (Level 1); 1425 (Level 2); 219 (Level 3); 431 (Level 4)	16636 (Level 1); 4862 (Level 2); 758 (Level 3); 1479 (Level 4)	10370 (Level 1); 2993 (Level 2); 465 (Level 3); 895 (Level 4)
East Haddam – 6.4	51 (Level 1); 6 (Level 2); 0 (Level 3); 1 (Level 4)	92 (Level 1); 12 (Level 2), 1 (Level 3), 2 (Level 4)	64 (Level 1); 8 (Level 2), 1 (Level 3), 1 (Level 4)
Probabilistic	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	5761	253	60	5	0	319
Portland – 5.7	5733	276	66	5	0	347
Stamford – 5.7	3726	1353	815	153	33	2354
East Haddam – 6.4	4973	784	289	30	3	1107

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	6483	285	68	5	0	358
Portland – 5.7	6450	310	75	6	0	391
Stamford – 5.7	4192	1523	917	172	37	2649
East Haddam – 6.4	5595	882	326	34	4	1246

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (1)	Fire Stations (2)	Police Stations (2)	Schools (7)
Haddam – 5.7	-	71	71	71	71
Portland – 5.7	-	86	86	86	86
Stamford – 5.7	-	86	85	86	86
East Haddam – 6.4	-	61	63	61	62

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.3	0.6	1.9
Portland – 5.7	1.4	0.6	2.0
Stamford – 5.7	7.2	8.6	15.8
East Haddam – 6.4	4.1	3.0	7.1

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	16	8
Portland – 5.7	4	2
Stamford – 5.7	4	2
East Haddam – 6.4	38	19

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	3757.5619	780.4357	228.8489	1155.4562	5922.3	4537.9976	2412.678
Portland – 5.7	4156.8315	921.826	247.3222	1248.9467	6574.93	5078.6575	2703.8686
Stamford – 5.7	59365.1641	18484.0637	3320.7764	15894.1156	97064.1	77849.2278	39123.01
East Haddam – 6.4	17875.6999	4586.1299	1028.1174	5034.9721	28524.9	22461.8298	11779.346
Probabilistic	46.0519	15.9117	2.4305	11.8271	76.2212	61.9636	31.4577

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	15 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	49 (Level 1); 9 (Level 2); 1 (Level 3); 2 (Level 4)	32 (Level 1); 6 (Level 2); 1 (Level 3); 1 (Level 4)
East Haddam – 6.4	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	808	38	9	1	0	48
Portland – 5.7	792	50	13	1	0	64
Stamford – 5.7	707	108	37	4	0	149
East Haddam – 6.4	693	114	43	5	1	163

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	912	43	10	1	0	55
Portland – 5.7	895	57	14	1	0	72
Stamford – 5.7	799	122	42	4	0	168
East Haddam – 6.4	783	129	49	5	1	184

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (1)	Police Stations (1)	Schools (1)
Haddam – 5.7	-	-	86	86	86
Portland – 5.7	-	-	83	83	83
Stamford – 5.7	-	-	76	76	76
East Haddam – 6.4	-	-	71	71	71

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	0.1	0.0	0.1
Portland – 5.7	0.1	0.1	0.2
Stamford – 5.7	0.2	0.1	0.4
East Haddam – 6.4	0.3	0.2	0.5

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	0	0
Portland – 5.7	0	0
Stamford – 5.7	0	0
East Haddam – 6.4	0	0

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	381.8248	79.625	18.6005	92.3753	572.426	461.4498	308.951
Portland – 5.7	539.6466	122.8548	24.4068	122.4113	809.319	662.5014	445.7491
Stamford – 5.7	1835.487	519.1915	69.5428	347.7837	2772.01	2354.6785	1678.8079
East Haddam – 6.4	1752.9823	441.8247	82.6713	398.2162	2675.69	2194.807	1460.8062
Probabilistic	3.7005	1.2157	0.1702	0.787	5.8734	4.9162	3.1815

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	5596	251	60	5	0	315
Portland – 5.7	5543	291	71	6	0	368
Stamford – 5.7	4479	973	405	48	6	1432
East Haddam – 6.4	4824	769	285	30	3	1087

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	6289	282	67	5	0	355
Portland – 5.7	6231	327	80	6	0	413
Stamford – 5.7	5035	1094	455	54	7	1609
East Haddam – 6.4	5422	864	320	34	4	1222

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (1)	Police Stations (1)	Schools (7)
Haddam – 5.7	-	-	87	86	86
Portland – 5.7	-	-	86	85	85
Stamford – 5.7	-	-	69	70	69
East Haddam – 6.4	-	-	71	71	71

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.2	0.5	1.7
Portland – 5.7	1.4	0.6	2.0
Stamford – 5.7	4.2	3.2	7.4
East Haddam – 6.4	3.8	2.6	6.3

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	2	1
Portland – 5.7	2	1
Stamford – 5.7	11	5
East Haddam – 6.4	9	4

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	3953.2455	830.3195	316.1459	1259.4679	6359.18	4783.565	2586.5812
Portland – 5.7	4749.9504	1092.674	358.7005	1437.1536	7638.48	5842.6244	3207.8803
Stamford – 5.7	30537.5662	9399.9135	2159.6441	8191.0006	50288.1	39937.4797	22793.289
East Haddam – 6.4	18586.7606	4837.5699	1418.8144	5429.3574	30272.5	23424.3305	12610.783
Probabilistic	43.8922	15.098	3.1884	11.9917	74.1703	58.9902	30.513

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	6 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	19 (Level 1); 3 (Level 2); 0 (Level 3); 1 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	19878	821	195	15	1	1031
Portland – 5.7	19783	894	214	17	1	1126
Stamford – 5.7	13212	4510	2613	473	100	7697
East Haddam – 6.4	17247	2606	946	98	11	3662

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	22240	918	218	17	1	1154
Portland – 5.7	22135	1000	239	19	1	1259
Stamford – 5.7	14783	5046	2924	530	112	8611
East Haddam – 6.4	19297	2916	1059	110	12	4097

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (1)	Emergency Operations Centers (0)	Fire Stations (16)	Police Stations (3)	Schools (32)
Haddam – 5.7	87	-	87	87	87
Portland – 5.7	86	-	86	86	86
Stamford – 5.7	64	-	62	62	63
East Haddam – 6.4	71	-	72	71	72

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	6.0	2.6	8.6
Portland – 5.7	6.4	2.8	9.2
Stamford – 5.7	31.9	37.1	68.9
East Haddam – 6.4	18.5	13.4	31.9

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	24	16
Portland – 5.7	25	18
Stamford – 5.7	216	149
East Haddam – 6.4	103	71

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	14907.2323	3057.6048	1193.0703	5463.0567	24621	17964.8371	9094.847
Portland – 5.7	16454.882	3585.1683	1287.3437	5900.118	27227.5	20040.0503	10114.509
Stamford – 5.7	243701.8802	75443.7984	19428.696	80261.8266	418836	319145.6786	151713.56
East Haddam – 6.4	71910.2789	18429.5659	5519.5569	24183.8232	120043	90339.8448	44624.887
Probabilistic	200.881	69.1316	13.8856	60.3706	344.269	270.0126	130.3574

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	9 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	10 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	9 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	10 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	10 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	15 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	11 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	97 (Level 1); 17 (Level 2); 2 (Level 3); 3 (Level 4)	213 (Level 1); 41 (Level 2); 5 (Level 3); 9 (Level 4)	150 (Level 1); 28 (Level 2); 3 (Level 3); 6 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	6349	224	52	4	0	280
Portland – 5.7	6346	226	53	4	0	283
Stamford – 5.7	542	930	1661	1499	1998	6087
East Haddam – 6.4	5591	749	260	26	3	1038

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	7213	254	60	5	0	319
Portland – 5.7	7211	256	60	5	0	321
Stamford – 5.7	615	1056	1888	1703	2270	6917
East Haddam – 6.4	6352	851	296	30	3	1180

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (3)	Police Stations (1)	Schools (8)
Haddam – 5.7	-	-	88	88	88
Portland – 5.7	-	-	88	88	88
Stamford – 5.7	-	-	1	1	1
East Haddam – 6.4	-	-	73	73	73

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.0	0.4	1.3
Portland – 5.7	1.0	0.4	1.4
Stamford – 5.7	83.3	152.0	235.4
East Haddam – 6.4	3.2	1.9	5.1

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	1	1
Portland – 5.7	1	1
Stamford – 5.7	469	271
East Haddam – 6.4	6	4

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	3151.9545	552.1945	261.6108	979.3534	4945.11	3704.149	2192.0196
Portland – 5.7	3174.582	558.218	263.4357	985.2626	4981.5	3732.8	2207.6115
Stamford – 5.7	564577.9442	182849.4508	37120.7888	120494.8488	905043	747427.395	365950.19
East Haddam – 6.4	15947.981	3727.1885	1191.6718	4368.2371	25235.1	19675.1695	11720.315
Probabilistic	58.6259	21.5939	3.7017	13.4401	97.3616	80.2198	47.6105

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	172 (Level 1); 43 (Level 2); 6 (Level 3); 12 (Level 4)	967 (Level 1); 287 (Level 2); 45 (Level 3); 88 (Level 4)	504 (Level 1); 146 (Level 2); 23 (Level 3); 44 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	19440	610	142	11	1	763
Portland – 5.7	19432	616	143	11	1	771
Stamford – 5.7	1989	2993	5067	4349	5804	18214
East Haddam – 6.4	17314	2107	707	69	7	2889

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	22033	691	161	12	1	865
Portland – 5.7	22025	698	163	12	1	873
Stamford – 5.7	2255	3393	5743	4929	6578	20643
East Haddam – 6.4	19623	2388	801	78	8	3275

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (1)	Emergency Operations Centers (0)	Fire Stations (2)	Police Stations (1)	Schools (27)
Haddam – 5.7	89	-	89	89	89
Portland – 5.7	89	-	89	89	89
Stamford – 5.7	1	-	1	2	2
East Haddam – 6.4	74	-	74	74	74

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	4.1	1.6	5.7
Portland – 5.7	4.1	1.6	5.8
Stamford – 5.7	327.0	653.5	980.5
East Haddam – 6.4	13.4	8.2	21.5

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	11	5
Portland – 5.7	11	5
Stamford – 5.7	2801	1402
East Haddam – 6.4	48	24

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	10652.7022	1769.8249	1081.3879	3999.0571	17503	12422.5271	6441.3376
Portland – 5.7	10774.2896	1803.906	1091.0627	4032.4841	17701.7	12578.1956	2207.6115
Stamford – 5.7	2141230.582	689588.736	160767.53	512837.1766	3504424	2830819.318	1260851
East Haddam – 6.4	54074.0859	12507.1324	4853.8545	17485.0158	88920.1	66581.2183	34610.17
Probabilistic	255.3019	96.0638	18.5453	66.4419	436.353	351.3657	181.5314

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	8 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	8 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	8 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	713 (Level 1); 191 (Level 2); 29 (Level 3); 57 (Level 4)	2786 (Level 1); 825 (Level 2); 130 (Level 3); 253 (Level 4)	1615 (Level 1); 471 (Level 2); 73 (Level 3); 141 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	6437	234	55	4	0	294
Portland – 5.7	6431	239	56	4	0	300
Stamford – 5.7	279	631	1332	1583	2906	6452
East Haddam – 6.4	5653	776	272	27	3	1078

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	7153	260	61	5	0	326
Portland – 5.7	7146	265	63	5	0	333
Stamford – 5.7	310	701	1480	1759	3229	7169
East Haddam – 6.4	6281	862	302	30	3	1198

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (1)	Emergency Operations Centers (1)	Fire Stations (1)	Police Stations (1)	Schools (9)
Haddam – 5.7	87	88	88	88	88
Portland – 5.7	87	88	88	88	88
Stamford – 5.7	1	1	1	1	1
East Haddam – 6.4	72	73	73	73	73

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.1	0.4	1.4
Portland – 5.7	1.1	0.4	1.5
Stamford – 5.7	86.2	154.3	240.5
East Haddam – 6.4	3.4	2.0	5.4

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	2	1
Portland – 5.7	2	1
Stamford – 5.7	664	322
East Haddam – 6.4	10	5

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	3354.4222	594.343	279.8543	1076.7604	5305.38	3948.7652	2391.011
Portland – 5.7	3425.0491	615.2606	284.5042	1094.3963	5419.21	4040.3097	2447.151
Stamford – 5.7	797132.7026	257923.7696	50665.683	169796.9577	1275519	1055056.472	537332.36
East Haddam – 6.4	16837.0982	3955.826	1284.3336	4815.6528	26892.9	20792.9242	12629.832
Probabilistic	60.1636	21.9424	3.9436	14.5539	100.604	82.106	49.5994

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	291 (Level 1); 79 (Level 2); 12 (Level 3); 23 (Level 4)	1309 (Level 1); 401 (Level 2); 64 (Level 3); 125 (Level 4)	707 (Level 1); 213 (Level 2); 34 (Level 3); 65 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	5291	213	51	4	0	268
Portland – 5.7	5263	236	56	4	0	296
Stamford – 5.7	4133	954	414	51	7	1426
East Haddam – 6.4	4603	682	246	25	3	956

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	5607	226	54	4	0	284
Portland – 5.7	5577	250	60	5	0	314
Stamford – 5.7	4380	1011	439	55	7	1511
East Haddam – 6.4	4878	723	261	27	3	1013

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (1)	Police Stations (1)	Schools (7)
Haddam – 5.7	-	-	87	87	87
Portland – 5.7	-	-	87	86	86
Stamford – 5.7	-	-	67	67	67
East Haddam – 6.4	-	-	87	87	87

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	0.5	0.2	0.7
Portland – 5.7	0.5	0.2	0.7
Stamford – 5.7	1.9	1.0	2.8
East Haddam – 6.4	1.6	0.8	2.4

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	0	0
Portland – 5.7	0	0
Stamford – 5.7	2	1
East Haddam – 6.4	1	1

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	1963.956	334.7986	64.738	411.6283	2775.12	2298.7546	1822.125
Portland – 5.7	2204.7936	405.6274	70.8608	451.4817	3132.76	2610.421	2066.8509
Stamford – 5.7	19221.6733	5648.6646	490.9887	3035.5758	28396.9	24870.3379	20452.147
East Haddam – 6.4	9561.7566	2170.0552	288.3092	1837.1353	13857.3	11731.8118	9308.2377
Probabilistic	25.0377	8.2857	0.7251	4.3311	38.3796	33.3234	26.033

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	17 (Level 1); 3 (Level 2); 0 (Level 3); 1 (Level 4)	11 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	9253	399	95	7	0	502
Portland – 5.7	9148	480	117	9	1	607
Stamford – 5.7	8472	962	292	26	2	1283
East Haddam – 6.4	7997	1246	458	48	5	1758

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	10307	445	106	8	1	560
Portland – 5.7	10191	535	130	10	1	676
Stamford – 5.7	9438	1071	325	29	3	1429
East Haddam – 6.4	8909	1388	510	53	6	1958

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (1)	Emergency Operations Centers (0)	Fire Stations (2)	Police Stations (1)	Schools (7)
Haddam – 5.7	86	-	86	86	86
Portland – 5.7	85	-	84	85	85
Stamford – 5.7	78	-	80	79	78
East Haddam – 6.4	71	-	71	71	71

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.8	0.7	2.5
Portland – 5.7	2.1	0.9	2.9
Stamford – 5.7	3.4	1.7	5.1
East Haddam – 6.4	5.5	3.7	9.3

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	5	3
Portland – 5.7	7	3
Stamford – 5.7	12	6
East Haddam – 6.4	24	12

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	5320.14	1065.2931	381.8635	1667.9151	8435.21	6385.4331	3838.4102
Portland – 5.7	6698.8178	1500.1373	452.249	1985.5089	10636.7	8198.9551	4994.6526
Stamford – 5.7	18570.3331	5038.0754	1099.3082	4834.9472	29542.7	23608.4085	14820.811
East Haddam – 6.4	25398.594	6384.5947	1750.6678	7370.3054	40904.2	31783.1887	18839.273
Probabilistic	56.8052	18.3787	3.7941	15.6337	94.6117	75.1839	42.5937

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	6 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	6 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	14 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	9 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	8934	508	126	10	1	645
Portland – 5.7	8779	623	163	13	1	800
Stamford – 5.7	7108	1646	722	91	12	2471
East Haddam – 6.4	7628	1357	529	59	7	1951

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	9957	567	141	11	1	719
Portland – 5.7	9784	694	182	15	1	892
Stamford – 5.7	7922	1834	804	102	14	2754
East Haddam – 6.4	8501	1512	589	65	8	2175

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (2)	Fire Stations (3)	Police Stations (1)	Schools (13)
Haddam – 5.7	-	85	85	85	84
Portland – 5.7	-	82	82	83	82
Stamford – 5.7	-	68	68	67	67
East Haddam – 6.4	-	70	70	70	70

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.9	0.8	2.7
Portland – 5.7	2.2	1.1	3.3
Stamford – 5.7	5.8	4.7	10.4
East Haddam – 6.4	5.2	3.9	9.2

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	2	1
Portland – 5.7	3	2
Stamford – 5.7	10	6
East Haddam – 6.4	9	5

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	6994.6148	1635.1012	400.1216	1802.3151	10832.2	8629.716	5230.9465
Portland – 5.7	9161.3749	2277.0342	502.3382	2266.618	14207.4	11438.4091	6963.2832
Stamford – 5.7	44941.5428	13834.2695	2373.3664	10030.5392	71179.7	58775.8123	37557.992
East Haddam – 6.4	28554.4133	7595.642	1681.9262	7179.1318	45011.1	36150.0553	21577.74
Probabilistic	58.1666	19.829	3.282	13.7242	95.0018	77.9956	45.3811

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	6 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	6 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	7 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	5 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	11 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	34 (Level 1); 6 (Level 2); 1 (Level 3); 1 (Level 4)	21 (Level 1); 3 (Level 2); 0 (Level 3); 1 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	21768	823	194	15	1	1033
Portland – 5.7	21759	830	196	15	1	1042
Stamford – 5.7	3718	4513	6548	4221	3801	19083
East Haddam – 6.4	19036	2700	957	97	11	3765

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	25027	946	223	17	1	1188
Portland – 5.7	25017	955	225	17	1	1198
Stamford – 5.7	4274	5189	7529	4853	4370	21941
East Haddam – 6.4	21886	3105	1100	112	12	4329

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (1)	Emergency Operations Centers (1)	Fire Stations (1)	Police Stations (1)	Schools (22)
Haddam – 5.7	87	87	87	87	87
Portland – 5.7	87	87	87	87	87
Stamford – 5.7	2	2	2	3	5
East Haddam – 6.4	72	72	72	72	72

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	6.4	2.7	9.1
Portland – 5.7	6.5	2.7	9.2
Stamford – 5.7	381.6	792.9	1174.6
East Haddam – 6.4	20.2	13.6	33.8

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	25	16
Portland – 5.7	26	16
Stamford – 5.7	5073	3188
East Haddam – 6.4	113	71

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	15399.7157	2864.0682	1372.3583	5735.0201	25371.2	18263.7839	9232.9625
Portland – 5.7	15574.1483	2912.1102	1383.887	5781.1828	25651.3	18486.2585	9345.1253
Stamford – 5.7	1693769.868	527977.6462	127961.239	450601.8158	2800311	2221747.514	896529.68
East Haddam – 6.4	75775.5077	18447.0687	6224.8698	24921.9613	125369	94222.5764	47058.213
Probabilistic	248.0757	86.8861	17.3404	69.4229	421.725	334.9618	166.2405

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	8 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	10 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	8 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	10 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	8 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	10 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	742 (Level 1); 192 (Level 2); 29 (Level 3); 57 (Level 4)	2317 (Level 1); 645 (Level 2); 97 (Level 3); 190 (Level 4)	1520 (Level 1); 417 (Level 2); 63 (Level 3); 121 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	3225	138	33	3	0	174
Portland – 5.7	3215	146	35	3	0	184
Stamford – 5.7	1433	847	757	253	110	1966
East Haddam – 6.4	2788	433	159	17	2	611

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	3601	155	37	3	0	194
Portland – 5.7	3589	163	39	3	0	206
Stamford – 5.7	1600	945	845	282	123	2195
East Haddam – 6.4	3113	484	178	19	2	682

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (2)	Police Stations (1)	Schools (4)
Haddam – 5.7	-	-	86	86	86
Portland – 5.7	-	-	86	86	86
Stamford – 5.7	-	-	44	51	47
East Haddam – 6.4	-	-	71	71	71

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	0.5	0.2	0.6
Portland – 5.7	0.5	0.2	0.7
Stamford – 5.7	5.2	7.5	12.6
East Haddam – 6.4	1.5	0.9	2.4

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	1	0
Portland – 5.7	1	0
Stamford – 5.7	33	16
East Haddam – 6.4	4	2

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	1678.8608	313.467	110.631	411.5585	2514.52	1992.3278	1355.5252
Portland – 5.7	1792.9909	353.7266	116.3916	432.0117	2695.12	2146.7175	1460.8671
Stamford – 5.7	54546.8817	17098.7068	3800.5573	11945.9162	87392.1	71645.5885	45156.587
East Haddam – 6.4	8022.5499	1924.7435	510.1449	1813.3353	12270.8	9947.2934	6754.7222
Probabilistic	21.4883	7.3076	1.2323	4.3132	34.3414	28.7959	19.2352

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	14 (Level 1); 3 (Level 2); 0 (Level 3); 1 (Level 4)	68 (Level 1); 16 (Level 2); 2 (Level 3); 4 (Level 4)	40 (Level 1); 9 (Level 2); 1 (Level 3); 2 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	7952	307	72	6	0	385
Portland – 5.7	7934	321	76	6	0	403
Stamford – 5.7	2062	1914	2338	1190	833	6275
East Haddam – 6.4	6948	995	354	36	4	1389

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	8868	342	81	6	0	429
Portland – 5.7	8848	358	85	6	0	449
Stamford – 5.7	2300	2135	2608	1327	928	6997
East Haddam – 6.4	7748	1110	395	40	4	1549

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (1)	Police Stations (1)	Schools (11)
Haddam – 5.7	-	-	87	87	87
Portland – 5.7	-	-	87	87	87
Stamford – 5.7	-	-	33	33	40
East Haddam – 6.4	-	-	72	72	72

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.4	0.5	1.9
Portland – 5.7	1.4	0.6	2.0
Stamford – 5.7	23.7	41.3	65.0
East Haddam – 6.4	4.4	2.7	7.1

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	3	1
Portland – 5.7	3	2
Stamford – 5.7	151	73
East Haddam – 6.4	13	7

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	4452.3121	823.6436	359.3631	1365.4838	7000.8	5275.9557	3190.6531
Portland – 5.7	4727.743	899.2362	374.5075	1425.3528	7426.84	5626.9792	3408.9008
Stamford – 5.7	301883.8383	96375.4794	23827.4119	76442.6819	498529	398259.3177	205951.38
East Haddam – 6.4	21920.1003	5308.9306	1623.3915	5986.3607	34838.8	27229.0309	16432.446
Probabilistic	70.5473	25.315	4.549	16.6009	117.012	95.8623	57.0988

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	76 (Level 1); 16 (Level 2); 2 (Level 3); 4 (Level 4)	402 (Level 1); 105 (Level 2); 15 (Level 3); 30 (Level 4)	222 (Level 1); 57 (Level 2); 8 (Level 3); 16 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	1747	69	16	1	0	87
Portland – 5.7	1736	78	19	1	0	98
Stamford – 5.7	1559	204	65	6	1	275
East Haddam – 6.4	1522	223	80	8	1	312

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	1907	76	18	1	0	95
Portland – 5.7	1895	85	20	2	0	107
Stamford – 5.7	1702	222	71	7	1	300
East Haddam – 6.4	1661	244	87	9	1	341

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (0)	Fire Stations (1)	Police Stations (1)	Schools (1)
Haddam – 5.7	-	-	87	87	87
Portland – 5.7	-	-	86	86	86
Stamford – 5.7	-	-	78	77	77
East Haddam – 6.4	-	-	72	72	72

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	0.2	0.1	0.2
Portland – 5.7	0.2	0.1	0.2
Stamford – 5.7	0.4	0.1	0.5
East Haddam – 6.4	0.5	0.3	0.8

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	0	0
Portland – 5.7	0	0
Stamford – 5.7	0	0
East Haddam – 6.4	0	0

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	636.7436	108.4726	21.4572	121.2561	887.929	745.2162	584.8552
Portland – 5.7	729.4159	135.6891	23.9109	134.617	1023.63	865.105	677.8488
Stamford – 5.7	3154.4434	827.0009	77.6024	443.6883	4502.74	3981.4443	3269.9585
East Haddam – 6.4	3115.5236	706.87	98.4871	549.493	4470.37	3822.3936	2999.1202
Probabilistic	7.469	2.3995	0.2335	1.2092	11.3112	9.8685	7.5652

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	26372	888	207	16	1	1112
Portland – 5.7	26360	898	210	16	1	1124
Stamford – 5.7	1636	3142	6101	6360	10245	25848
East Haddam – 6.4	23327	3012	1032	102	10	4157

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	30688	1034	241	18	1	1294
Portland – 5.7	30674	1044	244	18	1	1308
Stamford – 5.7	1904	3656	7099	7401	11921	30078
East Haddam – 6.4	27145	3505	1201	119	12	4837

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (1)	Emergency Operations Centers (1)	Fire Stations (5)	Police Stations (2)	Schools (41)
Haddam – 5.7	88	88	88	88	88
Portland – 5.7	88	88	88	88	88
Stamford – 5.7	1	1	1	1	1
East Haddam – 6.4	74	74	73	74	73

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	9.2	3.7	12.9
Portland – 5.7	9.2	3.7	13.0
Stamford – 5.7	787.9	1599.3	2387.2
East Haddam – 6.4	29.2	18.8	48.0

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	36	22
Portland – 5.7	36	22
Stamford – 5.7	10141	6172
East Haddam – 6.4	160	98

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	21011.5866	3690.0825	1911.0794	8218.8742	34831.6	24701.6691	12095.736
Portland – 5.7	21251.0619	3753.0092	1928.2502	8291.1027	35223.4	25004.0711	12252.707
Stamford – 5.7	5082999.365	1623930.771	341809.789	1219064.524	8267804	6706930.136	2758150.2
East Haddam – 6.4	104744.8296	24811.4087	8663.3511	35800.4492	174020	129556.2383	62672.546
Probabilistic	435.1165	156.6214	29.7075	122.1626	743.608	591.7379	284.0472

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	12 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	18 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	12 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	18 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	12 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	18 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)	13 (Level 1); 2 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	2900 (Level 1); 843 (Level 2); 134 (Level 3); 264 (Level 4)	7477 (Level 1); 2262 (Level 2); 359 (Level 3); 700 (Level 4)	5001 (Level 1); 1501 (Level 2); 239 (Level 3); 459 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	3436	145	35	3	0	183
Portland – 5.7	3430	150	36	3	0	189
Stamford – 5.7	1209	918	949	365	176	2410
East Haddam – 6.4	2972	459	168	18	2	647

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	3783	160	38	3	0	201
Portland – 5.7	3776	165	39	3	0	208
Stamford – 5.7	1331	1011	1045	402	194	2653
East Haddam – 6.4	3272	505	185	19	2	712

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (1)	Fire Stations (1)	Police Stations (1)	Schools (4)
Haddam – 5.7	-	86	87	87	87
Portland – 5.7	-	86	87	87	86
Stamford – 5.7	-	37	28	27	29
East Haddam – 6.4	-	71	71	71	71

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	0.5	0.2	0.6
Portland – 5.7	0.5	0.2	0.6
Stamford – 5.7	8.0	12.2	20.2
East Haddam – 6.4	1.5	0.8	2.3

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	0	0
Portland – 5.7	0	0
Stamford – 5.7	19	10
East Haddam – 6.4	2	1

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	1826.9603	339.1087	137.0303	450.2205	2753.32	2166.069	1502.9216
Portland – 5.7	1895.774	360.9721	141.1057	463.9428	2861.79	2256.7461	1563.9112
Stamford – 5.7	77019.798	24802.0291	6365.5917	17447.7412	125635	101821.8271	64100.053
East Haddam – 6.4	8851.6555	2131.2764	637.0309	2015.9187	13635.9	10982.9319	7609.4715
Probabilistic	23.8781	8.3458	1.5483	4.7956	38.5678	32.2239	22.0373

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	16 (Level 1); 3 (Level 2); 0 (Level 3); 1 (Level 4)	109 (Level 1); 26 (Level 2); 4 (Level 3); 7 (Level 4)	56 (Level 1); 13 (Level 2); 2 (Level 3); 3 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	9430	382	91	7	0	480
Portland – 5.7	9427	385	91	7	0	483
Stamford – 5.7	3226	2476	2611	1051	547	6684
East Haddam – 6.4	8183	1230	446	46	5	1727

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	10795	437	104	8	0	549
Portland – 5.7	10791	440	104	8	0	553
Stamford – 5.7	3693	2834	2989	1203	626	7651
East Haddam – 6.4	9367	1408	510	53	6	1977

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (1)	Fire Stations (1)	Police Stations (1)	Schools (13)
Haddam – 5.7	-	-	87	87	87
Portland – 5.7	-	-	87	87	87
Stamford – 5.7	-	-	27	23	29
East Haddam – 6.4	-	-	87	87	87

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	2.1	0.9	3.0
Portland – 5.7	2.1	0.9	3.0
Stamford – 5.7	56.6	119.3	175.8
East Haddam – 6.4	6.6	4.6	11.2

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	2	1
Portland – 5.7	2	1
Stamford – 5.7	169	82
East Haddam – 6.4	8	4

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	6695.5357	1326.9959	676.3998	2358.0518	11057	8022.5316	3969.2342
Portland – 5.7	6751.8152	1348.5375	680.6314	2373.0727	11154.1	8100.3527	4006.917
Stamford – 5.7	330210.0874	104204.7136	34023.9766	104052.2989	572491	434414.801	179850.01
East Haddam – 6.4	32877.3288	8352.8907	3100.2275	10506.8796	54837.3	41230.2195	20324.572
Probabilistic	92.2932	33.3313	7.7974	26.1449	159.567	125.6245	60.4353

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	4 (Level 1); 1 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	10 (Level 1); 3 (Level 2); 1 (Level 3); 2 (Level 4)	67 (Level 1); 26 (Level 2); 9 (Level 3); 18 (Level 4)	35 (Level 1); 13 (Level 2); 5 (Level 3); 9 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

Number of Residential Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total Damaged
Haddam – 5.7	5720	224	53	4	0	281
Portland – 5.7	5713	229	54	4	0	288
Stamford – 5.7	794	1080	1686	1212	1230	5207
East Haddam – 6.4	4987	725	260	27	3	1014

Total Number of Buildings Damaged						
Epicenter Location and Magnitude	No Damage	Slight Damage	Moderate Damage	Extensive Damage	Complete Damage	Total
Haddam – 5.7	6620	259	61	5	0	325
Portland – 5.7	6612	265	63	5	0	333
Stamford – 5.7	918	1250	1951	1403	1423	6027
East Haddam – 6.4	5771	839	300	31	3	1174

Essential Facilites - Average Percent Functionality on Day 1 After Earthquake					
Epicenter Location and Magnitude	Medical Facilities (0)	Emergency Operations Centers (1)	Fire Stations (1)	Police Stations (1)	Schools (11)
Haddam – 5.7	-	-	87	87	87
Portland – 5.7	-	-	87	87	87
Stamford – 5.7	-	-	11	11	14
East Haddam – 6.4	-	-	72	72	72

Debris Generation (tons)			
Epicenter Location and Magnitude	Brick, Wood & Others	Concrete & Steel	Total
Haddam – 5.7	1.4	0.6	2.0
Portland – 5.7	1.4	0.6	2.1
Stamford – 5.7	56.3	127.4	183.7
East Haddam – 6.4	4.4	3.4	7.8

Shelter Requirements		
Epicenter Location and Magnitude	Number of Displaced Households	Short Term Sheltering Need (Number of People)
Haddam – 5.7	1	1
Portland – 5.7	2	1
Stamford – 5.7	206	103
East Haddam – 6.4	7	3

Estimated Direct Economic Losses							
Epicenter Location and Magnitude	Building Loss	Content Loss	Income Loss	Other Losses (Inventory, Relocation, Rental, Wage Losses)	Total Losses	Property Losses	Residential Property Losses
Haddam – 5.7	4347.251	922.4063	382.1084	1412.577	7064.34	5269.6573	2390.1978
Portland – 5.7	4474.18	966.9415	391.1951	1445.4525	7277.77	5441.1215	2464.4983
Stamford – 5.7	491324.331	167886.1793	36595.2522	121269.2145	817075	659210.5103	244115.51
East Haddam – 6.4	21525.983	5777.5001	1749.3345	6331.269	35384.1	27303.4831	12270.122
Probabilistic	67.3922	25.8171	4.7334	17.2976	115.24	93.2093	41.1312

Casualty Estimates			
Epicenter Location and Magnitude	2:00 AM	2:00 PM	5:00 PM
Haddam – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Portland – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
Stamford – 5.7	1 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	3 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	2 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)
East Haddam – 6.4	104 (Level 1); 25 (Level 2); 3 (Level 3); 7 (Level 4)	579 (Level 1); 165 (Level 2); 25 (Level 3); 50 (Level 4)	316 (Level 1); 88 (Level 2); 13 (Level 3); 26 (Level 4)
Probabilistic	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)	0 (Level 1); 0 (Level 2); 0 (Level 3); 0 (Level 4)

HAZUS Hurricane Damage Results

Quick Assessment Report

January 20, 2021

Study Region : HUR_CT_WestCOG

Scenario : Probabilistic

Regional Statistics

Area (Square Miles)	551
Number of Census Tracts	131
Number of People in the Region	589,135

General Building Stock

Occupancy	*Building Count*	*Dollar Exposure ($ K)*
Residential	175,597	76,125,793
Commercial	15,332	18,914,927
Other	7,824	7,424,533
Total	198,753	102,465,253

Scenario Results

Number of Residential Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	0	0	0	0	0
20	72	4	0	0	75
50	294	19	1	0	314
100	1,939	136	4	0	2,079
200	6,242	658	15	2	6,917
500	20,567	3,182	111	56	23,917
1000	31,604	6,574	418	246	38,842

Number of Buildings Damaged

Return Period	*Minor*	*Moderate*	*Severe*	*Destruction*	*Total*
10	0	0	0	0	0
20	113	4	0	0	117
50	387	20	1	0	408
100	2,187	150	5	0	2,342
200	6,903	733	24	2	7,662
500	22,608	3,656	186	58	26,508
1000	34,830	7,700	641	254	43,425

Shelter Requirements

Return Period	*Displaced Households (#Households)*	*Short Term Shelter (#People)*
10	0	0
20	0	0
50	0	0
100	26	19
200	263	168
500	1,123	692
1000	2,302	1,391

Economic Loss (x 1000)

	Property Damage (Capital Stock) Losses		***Business Interruption***
ReturnPeriod	***Residential***	***Total***	***(Income) Losses***
10	0	0	0
20	1,190	1,190	10
50	54,789	57,570	785
100	201,593	210,446	5,027
200	465,738	497,985	27,558
500	1,152,936	1,292,436	102,434
1000	2,001,263	2,329,910	215,299
Annualized	10,910	12,355	918

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

huOccResultsT

(1938) Historical Hurricane Event Damage by Building Type (thousands of dollars)								
Towns	Residential	Commercial	Industrial	Agricultural	Religious/NGO	Education	Government	Total
Bethel	10684.127	539.83601	175.554	15.0269	55.63879961	20.3392	11.8084999	11502.3301
Bridgewater	1496.346	23.272601	8.1924	4.0872	2.580899954	3.1776	1.99950004	1539.65622
Brookfield	11522.348	510.6477	106.468	9.3482	124.6222018	18.8077	8.77669986	12301.0189
Danbury	41192.04	2271.8767	589.612	27.4053	132.5598981	72.9182	26.6134999	44313.0259
Darien	22200.439	407.2131	35.3311	9.0791	23.21099973	20.0963	10.4977001	22705.8669
Greenwich	36773.358	1161.5322	141.327	13.6209	77.47720021	53.3438	6.43300002	38227.0912
New Canaan	15034.299	401.9351	25.4799	7.5731	22.17380071	35.2961	1.15999997	15527.917
New Fairfield	7062.5931	90.297702	13.5501	3.2900001	9.234399915	4.0444	1.90579996	7184.91554
New Milford	15753.435	423.3385	160.96	24.4937	28.50440055	18.0275	1.81560005	16410.574
Newtown	21816.297	878.0279	325.259	46.289199	47.75190043	35.8046	24.5590999	23173.9887
Norwalk	68622.89	3946.9576	749.268	131.0808	290.8270009	124.0872	48.1736006	73913.2842
Redding	6483.7285	194.7645	28.1272	16.6275	20.10640019	3.3658	2.80339998	6749.52326
Ridgefield	16297.329	445.9393	60.2153	11.9553	28.14169967	23.8233	2.99869997	16870.403
Sherman	2036.77	23.612299	5.9989	2.1224999	3.09100008	1.8376	0.1902	2073.62248
Stamford	64199.399	3636.5505	546.207	51.5114	202.0411006	97.1576	46.0854006	68778.952
Weston	7382.3409	233.1901	20.1274	7.0016	11.51530018	9.3697	4.62139994	7668.16644
Westport	45974.906	2211.2113	212.456	50.848501	97.30010077	50.9662	17.5634001	48615.2519
Wilton	10964.487	783.96387	363.173	16.0527	49.25979823	25.0202	9.78069982	12211.7379
Total	405497.13	18184.167	3567.31	447.4139	1226.036902	617.483	227.786201	429767.326

huOccResultsT

(1938) Historical Hurricane damage by town				
Towns	Building	Content	Other	Total
Bethel	10734.823	767.5074	412.566	11914.896
Bridgewater	1474.9866	64.6696	34.17	1573.8262
Brookfield	11524.848	776.1705	423.763	12724.782
Danbury	39745.46	4567.5659	1503.95	45816.976
Darien	16006.277	6699.5896	297.424	23003.29
Greenwich	29541.025	8686.0662	275.281	38502.373
New Canaan	12446.842	3081.0755	306.834	15834.751
New Fairfield	6819.1311	365.78441	215.607	7400.5228
New Milford	15634.505	776.0694	444.47	16855.044
Newtown	21282.944	1891.0446	658.263	23832.252
Norwalk	62182.981	11730.303	2754.91	76668.197
Redding	6296.4707	453.0526	223.019	6972.5422
Ridgefield	14214.007	2656.3961	382.336	17252.739
Sherman	1963.5876	110.0349	69.4417	2143.0642
Stamford	60971.695	7807.2571	2943.91	71722.859
Weston	7174.0613	494.10509	214.601	7882.7674
Westport	34776.332	13838.92	1065.69	49680.943
Wilton	11379.863	831.8749	505.672	12717.41
Total	364169.84	65597.487	12731.9	442499.23

huOccResultsT

(1938) Historical Hurricane Event Damage by Building Type (thousands of dollars)								
Towns	Residential	Commercial	Industrial	Agricultural	Religious/NGO	Education	Government	Total
Bethel	31.2362	0	0	0	0	0	0	31.2362
Bridgewater	0	0	0	0	0	0	0	0
Brookfield	10.554	0	0	0	0	0	0	10.5539999
Danbury	224.2352	0	0	0	0	0	0	224.235201
Darien	2028.0208	37.5428	4.6434	0	2.256999969	2.5751	2.58970001	2077.62881
Greenwich	2410.9568	49.7618	10.685	0	3.048300028	0.9225	0.35030001	2475.72471
New Canaan	595.04701	0	0	0	0	0	0	595.047011
New Fairfield	0	0	0	0	0	0	0	0
New Milford	0	0	0	0	0	0	0	0
Newtown	720.364	27.679599	12.342	0	1.07540004	0.4849	1.86949998	763.815401
Norwalk	4678.1509	281.473	64.4601	0.1174	20.05450001	13.6854	5.80849999	5063.74978
Redding	93.316599	8.7236996	1.613	0	1.026100039	0.3878	0.31569999	105.382899
Ridgefield	334.00789	0	0	0	0	0	0	334.007892
Sherman	0	0	0	0	0	0	0	0
Stamford	2552.5469	59.652299	12.5623	0	2.005200028	1.6425	0.42799999	2628.83719
Weston	244.435	19.3304	2.6875	0	0.948100001	1.3367	0.8911	269.628803
Westport	5416.8465	177.018	16.7051	1.0148	7.218099803	6.2913	2.51449994	5627.60828
Wilton	223.2088	13.2593	16.8387	0	0.183200002	0.0919	0.0687	253.650599
Total	19562.927	674.4409	142.537	1.1322	37.81589992	27.4181	14.8359999	20461.1068

huOccResultsT

(1938) Historical Hurricane damage by town				
Towns	Building	Content	Other	Total
Bethel	31.2362	0	0.1957	31.431898
Bridgewater	0	0	0.00236	0.0023582
Brookfield	10.554	0	0.11005	10.664053
Danbury	138.785	85.450199	1.92381	226.15901
Darien	1309.6502	767.97861	0.14108	2077.7699
Greenwich	1567.119	908.6057	1.1725	2476.8972
New Canaan	365.17801	229.869	0.1526	595.19961
New Fairfield	0	0	0.00766	0.0076605
New Milford	0	0	0.11414	0.1141359
Newtown	763.3132	0.5022	0.14902	763.96442
Norwalk	4166.1907	897.55911	30.1135	5093.8633
Redding	105.3829	0	0.06754	105.45044
Ridgefield	193.1359	140.87199	0.2126	334.2205
Sherman	0	0	0	0
Stamford	2233.1207	395.7165	18.8266	2647.6638
Weston	269.5451	0.0837	0.02641	269.65521
Westport	3772.7868	1854.8215	4.17385	5631.7821
Wilton	253.3714	0.2792	0.10373	253.75433
Total	15179.369	5281.7377	57.4932	20518.6

huOccResultsT

(1938) Historical Hurricane Event Damage by Building Type (thousands of dollars)								
Towns	Residential	Commercial	Industrial	Agricultural	Religious/NGO	Education	Government	Total
Bethel	0.1956984	0	0	0	0	0	0	0.19569835
Bridgewater	0	0	0	0	0	0	0	0
Brookfield	0.0859996	0	0	0	0	0	0	0.08599962
Danbury	1.8348892	0	0	0	0	0	0	1.8348892
Darien	1267.6073	0	0	0	0	0	0	1267.60733
Greenwich	2225.9341	0	0	0	0	0	0	2225.93409
New Canaan	188.8943	0	0	0	0	0	0	188.894304
New Fairfield	0.0076605	0	0	0	0	0	0	0.00766052
New Milford	0	0	0	0	0	0	0	0
Newtown	0.0824834	0	0	0	0	0	0	0.08248343
Norwalk	2312.7272	4.2116036	3.3956	0.0007587	0.190879837	0.0224	0	2320.54843
Redding	0.0663632	0	0	0	0	0	0	0.06636316
Ridgefield	112.91061	0	0	0	0	0	0	112.910605
Sherman	0	0	0	0	0	0	0	0
Stamford	2193.359	0	0	0	0	0	0	2193.359
Weston	0.0139133	0	0	0	0	0	0	0.01391326
Westport	2350.0869	38.919401	4.3562	0	0.99969998	1.5079	0.7368	2396.60685
Wilton	1.0276456	0	0	0	0	0	0	1.02764557
Total	10654.834	43.131005	7.7518	0.0007587	1.190579817	1.5303	0.7368	10709.1753

huOccResultsT

(1938) Historical Hurricane damage by town				
Towns	Building	Content	Other	Total
Bethel	0	0	0.1957	0.1956984
Bridgewater	0	0	0	0
Brookfield	0	0	0.086	0.0859996
Danbury	0.1192	0.0593	1.65639	1.8348892
Darien	725.25059	542.2726	0.08414	1267.6073
Greenwich	1341.8126	883.06731	1.05417	2225.9341
New Canaan	96.794097	91.947601	0.1526	188.8943
New Fairfield	0	0	0.00766	0.0076605
New Milford	0	0	0	0
Newtown	0	0	0.08248	0.0824834
Norwalk	1724.0622	589.1428	4.68036	2317.8853
Redding	0	0	0.06636	0.0663632
Ridgefield	56.349201	56.348801	0.2126	112.91061
Sherman	0	0	0	0
Stamford	1808.3666	378.9298	6.0626	2193.359
Weston	0	0	0.01391	0.0139133
Westport	1474.6178	921.84799	0.14107	2396.6069
Wilton	0.943	0	0.08465	1.0276456
Total	7228.3153	3463.6162	14.5807	10706.512

huSummaryDamage

Number of Residential Buildings Damaged (thousands of dollars)							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		175597	0	0	0	0	0
20		175597	0	0	0	0	0
50		175476	115	6	0	0	121
100		168350	6536	693	16	2	7247
200		165020	9461	1085	26	5	10577
500		165955	8612	999	25	6	9642
1000		118959	42861	11823	1213	741	56638
Sandy (2012)		175496	97	5	0	0	101
Gloria (1985)		175463	127	6	0	0	175597
Unnamed (1938)		169304	5758	523	11	1	175597

huSummaryDamage

Total Number of Buildings Damaged (thousands of dollars)						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	198753	0	0	0	0	0
20	198753	0	0	0	0	0
50	198572	175	6	0	0	0
100	190731	7224	771	25	2	8022
200	187073	10414	1218	42	6	11680
500	188082	9498	1126	41	6	10671
1000	134963	47246	13997	1788	759	63790
Sandy (2012)	198599	149	5	0	0	154
Gloria (1985)	198556	190	7	0	0	198753
Unnamed (1938)	191842	6314	579	17	1	198753

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	1%	1%	0%	1%	1%
200	1%	1%	0%	1%	1%
500	1%	1%	0%	1%	1%
1000	3%	6%	3%	6%	6%
Sandy (2012)	1%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	1%	1%	0%	1%	1%

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	617	0	2721	27182.34264	30520.343
100	37780	1	133822	1338239.945	1509842.9
200	50004	5	174152	1741508.969	1965670
500	45872	8	144987	1449872.664	1640739.7
1000	280855	1214	468264	4682612.467	5432945.5
Sandy (2012)	443	0	1902	19006.64166	21351.642
Gloria (1985)	715	0	3020	30158.20795	33893.208
Unnamed (1938)	29754	0	146974	1469791.928	1646519.9

huDebrisResultsT

0
0
29,903
1,472,062
1,915,661
1,594,860
5,150,876
20,909
33,178
1,616,766

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	283	180
200	425	265
500	381	240
1000	4609	2750
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	162	108

Economic Losses (thousands of dollars)					
Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses

10	$0	$0	$0	$0	$0
20	$0	$0	$0	$0	$0
50	$15,508	$566	$16,074	$0	$16,074
100	$480,685	$33,781	$514,465	$2,618	$517,083
200	$608,821	$48,977	$657,798	$4,244	$662,042
500	$572,160	$45,470	$617,630	$3,690	$621,320
1000	$3,465,311	$719,812	$4,185,123	$28,414	$4,213,537
Average Annual	$10,910	$1,428	$12,338	$79	$12,417
Sandy (2012)	$10,638	$54	$10,692	$0	$10,692
Gloria (1985)	$5,282	$15,179	$20,461	$0	$20,461
Unnamed (1938)	$405,497	$24,270	$429,767	$1,815	$431,582

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		6080	0	0	0	0	0
20		6080	0	0	0	0	0
50		6077	3	0	0	0	3
100		5932	138	10	0	0	148
200		5821	239	20	0	0	259
500		5854	209	17	0	0	226
1000		4686	1172	207	10	5	1394
Sandy (2012)		6078	2	0	0	0	2
Gloria (1985)		6077	3	0	0	0	6080
Unnamed (1938)		6563	255	22	1	0	6841

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	6841	0	0	0	0	0
20	6841	0	0	0	0	0
50	6837	4	0	0	0	4
100	6678	151	12	0	0	163
200	6559	258	23	1	0	282
500	6595	227	19	1	0	246
1000	5312	1271	236	18	5	1529
Sandy (2012)	6837	4	0	0	0	4
Gloria (1985)	6837	4	0	0	0	6841
Unnamed (1938)	5824	236	19	0	0	6080

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	0%
1000	0%	4%	2%	4%	4%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	4	0	0	0	4
100	574	0	4174	41741.6792	46489.7
200	901	0	4906	49069.45068	54876.5
500	808	0	4653	46531.79053	51992.8
1000	4292	6	11916	119172.4404	135386
Sandy (2012)	0	0	0	0	0
Gloria (1985)	5	0	0	0	5
Unnamed (1938)	880	0	4906	49069.45068	54855.5

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	1	0
200	4	2
500	3	2
1000	43	23
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	4	2

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	27.755201	0	27.755201	0	27.7552
100	7842.837242	464.923001	8307.760243	0	8307.76
200	10779.61247	851.990202	11631.60267	57.014675	11688.6
500	9849.226844	728.728393	10577.95524	41.125643	10619.1
1000	47390.59204	7195.06113	54585.65317	429.691458	55015.3
Average Annual	181.046864	22.446261	203.493125	0.895557	204.389
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	31.23620003	31.23620003	0	31.2362
Unnamed (1938)	10684.12707	818.203003	11502.33007	57.07959446	11559.4

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		856	0	0	0	0	0
20		856	0	0	0	0	0
50		856	0	0	0	0	0
100		839	17	0	0	0	17
200		822	33	1	0	0	34
500		834	22	1	0	0	22
1000		681	155	19	1	0	175
Sandy (2012)		856	0	0	0	0	0
Gloria (1985)		856	0	0	0	0	856
Unnamed (1938)		811	43	2	0	0	856

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	967	0	0	0	0	0
20	967	0	0	0	0	0
50	967	0	0	0	0	0
100	948	19	0	0	0	19
200	930	35	1	0	0	37
500	943	24	1	0	0	24
1000	778	167	21	1	0	189
Sandy (2012)	967	0	0	0	0	0
Gloria (1985)	967	0	0	0	0	967
Unnamed (1938)	918	47	2	0	0	967

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	0%
500	0%	0%	0%	0%	0%
1000	0%	3%	1%	3%	3%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	43	0	2214	22144.73242	24401.7
200	75	0	4429	44289.46484	48793.5
500	53	0	3875	38753.28125	42681.3
1000	326	0	8304	83042.75	91672.8
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	89	0	4983	49825.64844	54897.6

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	0	0
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	29.745701	0	29.745701	0	29.7457
100	894.387678	19.0826	913.470278	0	913.47
200	1285.210861	34.5854	1319.796261	0	1319.8
500	1029.41579	22.125	1051.54079	0	1051.54
1000	4485.766174	255.2446	4741.010774	26.174727	4767.19
Average Annual	21.213399	0.98323	22.196629	0.047783	22.2444
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	1496.34602	43.31020057	1539.65622	0	1539.66

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		5911	0	0	0	0	0
20		5911	0	0	0	0	0
50		5910	1	0	0	0	1
100		5795	110	6	0	0	116
200		5705	194	12	0	0	206
500		5767	136	8	0	0	144
1000		4780	984	139	5	3	1131
Sandy (2012)		5910	1	0	0	0	1
Gloria (1985)		5910	1	0	0	0	5911
Unnamed (1938)		5674	223	15	0	0	5911

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	6644	0	0	0	0	0
20	6644	0	0	0	0	0
50	6641	3	0	0	0	3
100	6517	121	7	0	0	127
200	6420	210	14	0	0	224
500	6486	149	9	0	0	158
1000	5408	1067	157	9	3	1236
Sandy (2012)	6641	2	0	0	0	3
Gloria (1985)	6641	3	0	0	0	6644
Unnamed (1938)	6386	241	17	0	0	6644

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	0%
500	0%	0%	0%	0%	0%
1000	0%	3%	1%	3%	3%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	2	0	0	0	2
100	460	0	3661	36603.32715	40724.3
200	692	0	5410	54099.43457	60201.4
500	528	0	4634	46339.85254	51501.9
1000	3178	3	10827	108271.748	122280
Sandy (2012)	0	0	0	0	0
Gloria (1985)	2	0	0	0	2
Unnamed (1938)	769	0	5534	55343.70508	61646.7

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	1	0
500	0	0
1000	18	9
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	1	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	12.7894	0	12.7894	0	12.7894
100	7754.890297	425.156304	8180.046601	0	8180.05
200	10486.70543	703.434199	11190.13963	64.813379	11255
500	8805.635643	496.1975	9301.833143	0	9301.83
1000	41554.98267	4729.430988	46284.41365	503.629554	46788
Average Annual	181.105075	17.807286	198.912361	1.048142	199.961
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	10.5539999	10.5539999	0	10.554
Unnamed (1938)	11522.34845	778.6704992	12301.01895	78.05707322	12379.1

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		20909	0	0	0	0	0
20		20909	0	0	0	0	0
50		20890	18	1	0	0	19
100		20360	491	56	2	0	549
200		20051	760	95	3	0	858
500		20326	520	61	2	0	583
1000		16312	3732	814	36	16	4597
Sandy (2012)		20892	16	1	0	0	17
Gloria (1985)		20891	18	1	0	0	20909
Unnamed (1938)		20135	687	85	2	0	20909

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	23394	0	0	0	0	0
20	23394	0	0	0	0	0
50	23370	24	1	0	0	24
100	22796	537	60	2	0	598
200	22461	827	102	3	0	933
500	22757	569	65	2	0	637
1000	18337	4072	915	54	17	5057
Sandy (2012)	23372	21	1	0	0	22
Gloria (1985)	23370	23	1	0	0	23394
Unnamed (1938)	22551	749	91	3	0	23394

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	1%	0%	0%	0%	0%
100	2%	1%	0%	1%	0%
200	3%	1%	0%	1%	1%
500	3%	1%	0%	1%	0%
1000	6%	5%	2%	5%	5%
Sandy (2012)	1%	0%	0%	0%	0%
Gloria (1985)	1%	0%	0%	0%	0%
Unnamed (1938)	3%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	31	0	120	1191.553619	1342.55
100	3491	0	9419	94188.6601	107099
200	4971	0	11936	119370.2219	136277
500	3655	0	8434	84349.79541	96438.8
1000	21366	22	27435	274340.0869	323163
Sandy (2012)	0	0	0	0	0
Gloria (1985)	22	0	120	1191.553619	1333.55
Unnamed (1938)	4557	0	10884	108845.2544	124286

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	23	17
200	41	31
500	27	21
1000	320	222
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	36	27

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	309.581	0	309.581	0	309.581
100	32948.98867	2196.729195	35145.71786	35.910522	35181.6
200	44011.64394	3558.467193	47570.11113	207.672884	47777.8
500	34144.12863	2385.186305	36529.31494	35.761517	36565.1
1000	180700.2266	32409.08091	213109.3075	2031.491468	215141
Average Annual	719.484061	102.951991	822.436052	4.480024	826.916
Sandy (2012)	0.1785	0	0.1785	0	0.1785
Gloria (1985)	85.45019913	138.7850018	224.2352009	0	224.235
Unnamed (1938)	41192.0401	3120.98578	44313.02588	72.71252453	44385.7

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		6629	0	0	0	0	0
20		6629	0	0	0	0	0
50		6627	1	0	0	0	2
100		6267	340	22	0	0	362
200		6121	471	36	1	0	508
500		6161	435	32	0	0	468
1000		3857	2071	562	80	58	2772
Sandy (2012)		6628	1	0	0	0	1
Gloria (1985)		6627	2	0	0	0	6629
Unnamed (1938)		6459	162	7	0	0	6629

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	7532	0	0	0	0	0
20	7532	0	0	0	0	0
50	7528	4	0	0	0	4
100	7136	371	25	1	0	396
200	6975	513	42	1	0	557
500	7019	475	37	1	0	513
1000	4422	2280	668	103	59	3110
Sandy (2012)	7528	4	0	0	0	4
Gloria (1985)	7528	4	0	0	0	7532
Unnamed (1938)	7344	180	9	0	0	7532

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	1%	0%	1%	1%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	1%
1000	0%	10%	5%	10%	10%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	4	0	342	3413.596436	3759.6
100	1007	0	5383	53823.43213	60213.4
200	1361	0	6437	64370.76172	72168.8
500	1268	0	6126	61255.02539	68649
1000	10508	86	20496	204960.3555	236050
Sandy (2012)	4	0	342	3413.596436	3759.6
Gloria (1985)	7	0	386	3852.377197	4245.38
Unnamed (1938)	562	0	4174	41741.59912	46477.6

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	3	2
200	5	3
500	4	3
1000	127	73
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	1740.592095	7.0339	1747.625995	0	1747.63
100	32755.89488	959.673603	33715.56849	83.631715	33799.2
200	40055.97266	1376.71052	41432.68318	106.729014	41539.4
500	38029.1871	1309.602211	39338.78931	107.208898	39446
1000	226762.0439	19499.51841	246261.5624	757.514835	247019
Average Annual	725.233528	37.804302	763.03783	2.183182	765.221
Sandy (2012)	1267.52319	0	1267.52319	0	1267.52
Gloria (1985)	767.9789886	1309.650488	2077.629477	0	2077.63
Unnamed (1938)	22200.43857	505.428297	22705.86687	0	22705.9

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		20203	0	0	0	0	0
20		20203	0	0	0	0	0
50		20191	11	0	0	0	12
100		19179	933	89	2	0	1024
200		19040	1055	104	3	1	1163
500		19358	773	71	2	0	845
1000		12286	5856	1723	206	131	7917
Sandy (2012)		20191	12	0	0	0	12
Gloria (1985)		20191	12	1	0	0	20203
Unnamed (1938)		19879	303	21	1	0	20203

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	22898	0	0	0	0	0
20	22898	0	0	0	0	0
50	22880	18	0	0	0	18
100	21770	1026	99	3	0	1128
200	21617	1159	117	4	1	1281
500	21967	850	79	2	0	931
1000	13981	6456	2042	285	133	8917
Sandy (2012)	22879	19	0	0	0	19
Gloria (1985)	22879	18	1	0	0	22898
Unnamed (1938)	22536	339	23	1	0	22898

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	2%	0%	0%	0%	0%
100	7%	1%	0%	1%	1%
200	7%	1%	0%	1%	1%
500	7%	1%	0%	1%	1%
1000	11%	10%	5%	10%	9%
Sandy (2012)	3%	0%	0%	0%	0%
Gloria (1985)	2%	0%	0%	0%	0%
Unnamed (1938)	6%	0%	0%	0%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	36	0	471	4708.671936	5215.67
100	4433	0	15328	153294.7523	173056
200	4885	0	16156	161565.8058	182607
500	3623	0	11991	119928.3588	135542
1000	38228	200	53561	535591.5649	627581
Sandy (2012)	38	0	391	3909.975494	4338.98
Gloria (1985)	41	0	532	5320.211365	5893.21
Unnamed (1938)	1701	0	3232	32324.4254	37257.4

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	24	12
200	30	15
500	16	9
1000	556	282
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	3	2

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	2153.881605	40.097201	2193.978806	0	2193.98
100	72040.71533	4733.553963	76774.2693	438.800451	77213.1
200	78103.42407	5343.715568	83447.13964	454.432685	83901.6
500	64792.7184	3603.544842	68396.26324	237.475301	68633.7
1000	546824.9304	101316.9384	648141.8688	3730.371561	651872
Average Annual	1583.876886	180.96087	1764.837756	11.13849	1775.98
Sandy (2012)	2224.87993	0	2224.87993	0	2224.88
Gloria (1985)	908.6064997	1567.119429	2475.725929	0	2475.73
Unnamed (1938)	36773.35755	1453.733691	38227.09124	0	38227.1

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		6731	0	0	0	0	0
20		6731	0	0	0	0	0
50		6729	2	0	0	0	2
100		6496	221	14	0	0	235
200		6373	334	24	1	0	358
500		6411	298	21	0	0	320
1000		4595	1721	366	31	18	2136
Sandy (2012)		6729	2	0	0	0	2
Gloria (1985)		6729	2	0	0	0	6731
Unnamed (1938)		6570	153	8	0	0	6731

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	7479	0	0	0	0	0
20	7479	0	0	0	0	0
50	7475	4	0	0	0	4
100	7224	240	15	0	0	255
200	7091	360	27	1	0	388
500	7133	322	23	1	0	346
1000	5134	1866	420	40	19	2345
Sandy (2012)	7476	3	0	0	0	3
Gloria (1985)	7475	4	0	0	0	7479
Unnamed (1938)	7303	167	9	0	0	7479

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	1%	0%	1%	1%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	1%
1000	3%	8%	4%	8%	8%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	0%	0%	0%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	4	0	81	813.0899658	898.09
100	822	0	6089	60888.05176	67799.1
200	1149	0	7139	71384.58203	79672.6
500	1027	0	6976	69758.40234	77761.4
1000	7100	29	23530	235300.6641	265960
Sandy (2012)	1	0	0	0	1
Gloria (1985)	6	0	81	813.0899658	900.09
Unnamed (1938)	607	0	5317	53172.43848	59096.4

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	4	2
200	6	3
500	6	3
1000	76	38
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	2	1

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	390.5061	0	390.5061	0	390.506
100	18235.04185	705.253201	18940.29505	58.131455	18998.4
200	23358.39928	1033.952688	24392.35197	79.318354	24471.7
500	21873.02944	909.934688	22782.96413	79.942986	22862.9
1000	122833.7205	11488.84362	134322.5641	763.522861	135086
Average Annual	399.207601	25.469326	424.676927	1.70302	426.38
Sandy (2012)	188.7416984	0	188.7416984	0	188.742
Gloria (1985)	229.8690033	365.177794	595.0467973	0	595.047
Unnamed (1938)	15034.29895	493.6180033	15527.91695	0	15527.9

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		5559	0	0	0	0	0
20		5559	0	0	0	0	0
50		5559	0	0	0	0	0
100		5475	82	2	0	0	84
200		5430	125	4	0	0	129
500		5499	58	1	0	0	60
1000		4757	725	73	2	2	802
Sandy (2012)		5559	0	0	0	0	0
Gloria (1985)		5559	0	0	0	0	5559
Unnamed (1938)		5426	129	4	0	0	5559

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	5891	0	0	0	0	0
20	5891	0	0	0	0	0
50	5890	1	0	0	0	1
100	5802	86	2	0	0	89
200	5756	131	4	0	0	135
500	5827	62	2	0	0	64
1000	5056	752	78	3	2	835
Sandy (2012)	5890	1	0	0	0	1
Gloria (1985)	5890	1	0	0	0	5891
Unnamed (1938)	5752	135	5	0	0	5891

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	0%	0%	0%	0%
500	0%	0%	0%	0%	0%
1000	0%	2%	1%	2%	2%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	0%	0%	0%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	228	0	3326	33258.39014	36812.4
200	307	0	6374	63730.96777	70412
500	185	0	1222	12218.00195	13625
1000	1523	1	11403	114029.0332	126956
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	308	0	6758	67578.26563	74644.3

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	3	2
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	5587.450813	88.448502	5675.899315	0	5675.9
200	6976.75753	119.479602	7096.237132	0	7096.24
500	4411.938668	65.030899	4476.969567	0	4476.97
1000	24651.5697	761.600305	25413.17001	76.944364	25490.1
Average Annual	119.17229	3.434168	122.606458	0.19672	122.803
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	7062.59314	122.3224021	7184.915542	0	7184.92

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		9755	0	0	0	0	0
20		9755	0	0	0	0	0
50		9752	3	0	0	0	3
100		9580	165	10	0	0	175
200		9460	277	18	0	0	295
500		9608	139	8	0	0	147
1000		8174	1389	186	4	3	1581
Sandy (2012)		9755	0	0	0	0	0
Gloria (1985)		9752	3	0	0	0	9755
Unnamed (1938)		9343	383	28	0	0	9755

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	10867	0	0	0	0	0
20	10867	0	0	0	0	0
50	10861	6	0	0	0	6
100	10677	180	10	0	0	190
200	10549	297	20	0	0	318
500	10707	151	8	0	0	160
1000	9164	1487	205	7	3	1703
Sandy (2012)	10867	0	0	0	0	0
Gloria (1985)	10862	5	0	0	0	10867
Unnamed (1938)	10426	410	31	0	0	10867

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	0%
500	0%	0%	0%	0%	0%
1000	2%	3%	1%	3%	3%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	608	0	3688	36880.78687	41176.8
200	920	0	13413	134136.667	148470
500	527	0	2381	23805.45825	26713.5
1000	3942	4	24397	243971.6543	272315
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	1171	0	16226	162273.7549	179671

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	21	9
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	9398.737522	298.810901	9697.548423	0	9697.55
200	13162.57103	478.430898	13641.00192	0	13641
500	8341.148968	245.358702	8586.50767	0	8586.51
1000	45176.25247	4070.840612	49247.09308	320.842575	49567.9
Average Annual	232.105448	20.041832	252.14728	0.808554	252.956
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	15753.43484	657.1392043	16410.57404	0	16410.6

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		9579	0	0	0	0	0
20		9579	0	0	0	0	0
50		9577	2	0	0	0	2
100		9353	216	10	0	0	226
200		9119	434	26	0	0	460
500		9040	505	33	0	0	539
1000		7248	1976	328	17	10	2331
Sandy (2012)		9578	1	0	0	0	1
Gloria (1985)		9576	3	0	0	0	9579
Unnamed (1938)		9009	534	36	0	0	9579

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	10676	0	0	0	0	0
20	10676	0	0	0	0	0
50	10671	5	0	0	0	5
100	10430	235	11	0	0	246
200	10180	465	30	1	0	496
500	10096	541	38	1	0	580
1000	8139	2131	369	26	11	2537
Sandy (2012)	10672	4	0	0	0	4
Gloria (1985)	10670	6	0	0	0	10676
Unnamed (1938)	10062	572	41	1	0	10676

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	1%
1000	0%	4%	2%	4%	5%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	6	0	0	0	6
100	696	0	16082	160817.7227	177596
200	1208	0	18831	188306.5303	208346
500	1364	0	20209	202086.8438	223660
1000	5841	12	47963	479632.8604	533449
Sandy (2012)	0	0	0	0	0
Gloria (1985)	7	0	0	0	7
Unnamed (1938)	1428	0	20721	207210.8516	229360

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	1	1
500	1	1
1000	34	20
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	1	1

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	223.113402	32.5834	255.696802	0	255.697
100	12956.65066	586.9465	13543.59716	0	13543.6
200	18986.34248	1120.403691	20106.74617	70.972005	20177.7
500	21058.17098	1297.573304	22355.74429	81.320867	22437.1
1000	86170.20886	8695.109971	94865.31883	620.530753	95485.8
Average Annual	337.832281	28.112409	365.94469	1.334175	367.279
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0.502199993	763.3123997	763.8145997	0	763.815
Unnamed (1938)	21816.29673	1357.692007	23173.98874	86.65984376	23260.6

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		22801	0	0	0	0	0
20		22801	0	0	0	0	0
50		22768	31	2	0	0	33
100		21262	1350	184	5	1	1539
200		20443	2032	315	8	2	2358
500		20335	2116	337	10	3	2466
1000		12258	7307	2705	327	204	10543
Sandy (2012)		22777	23	1	0	0	24
Gloria (1985)		22765	34	2	0	0	22801
Unnamed (1938)		21622	1039	136	3	1	22801

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	26215	0	0	0	0	0
20	26215	0	0	0	0	0
50	26171	41	2	0	0	44
100	24505	1499	204	7	1	1710
200	23586	2259	355	14	3	2629
500	23461	2354	381	16	3	2754
1000	14161	8132	3230	483	208	12054
Sandy (2012)	26181	32	1	0	0	34
Gloria (1985)	26167	45	2	0	0	26215
Unnamed (1938)	24906	1155	149	5	1	26215

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	3%	0%	0%	0%	0%
100	7%	1%	1%	2%	1%
200	8%	2%	1%	3%	2%
500	8%	2%	1%	3%	2%
1000	14%	10%	7%	14%	11%
Sandy (2012)	3%	0%	0%	0%	0%
Gloria (1985)	3%	0%	0%	0%	0%
Unnamed (1938)	7%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	221	0	555	5536.896233	6312.9
100	8040	0	8065	80656.31482	96761.3
200	11576	2	10374	103734.0753	125686
500	12171	4	10885	108844.3956	131904
1000	60685	345	34599	345985.2402	441614
Sandy (2012)	127	0	298	2965.54071	3390.54
Gloria (1985)	241	0	555	5536.896233	6332.9
Unnamed (1938)	6508	0	7086	70850.76318	84444.8

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	72	50
200	127	82
500	137	91
1000	1169	740
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	52	36

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	3820.095684	283.914598	4104.010282	0	4104.01
100	82714.08552	6963.329448	89677.41497	642.858283	90320.3
200	114180.4193	11726.07612	125906.4954	1143.711919	127050
500	118051.9576	12710.38499	130762.3426	1186.577922	131949
1000	694710.4664	162659.8787	857370.3451	4661.968309	862032
Average Annual	2027.200471	325.318666	2352.519137	17.365527	2369.88
Sandy (2012)	2305.406687	7.798299856	2313.204987	0	2313.2
Gloria (1985)	897.5592088	4166.19054	5063.749749	0	5063.75
Unnamed (1938)	68622.89043	5290.39381	73913.28424	465.9199713	74379.2

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		3399	0	0	0	0	0
20		3399	0	0	0	0	0
50		3398	1	0	0	0	1
100		3306	86	7	0	0	93
200		3243	143	13	0	0	156
500		3239	147	13	0	0	160
1000		2578	683	129	5	3	821
Sandy (2012)		3398	1	0	0	0	1
Gloria (1985)		3398	1	0	0	0	3399
Unnamed (1938)		3256	132	11	0	0	3399

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	3795	0	0	0	0	0
20	3795	0	0	0	0	0
50	3793	2	0	0	0	2
100	3694	93	8	0	0	101
200	3627	153	14	0	0	168
500	3623	158	14	0	0	172
1000	2904	738	143	8	3	891
Sandy (2012)	3793	2	0	0	0	2
Gloria (1985)	3793	2	0	0	0	3795
Unnamed (1938)	3641	141	12	0	0	3795

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	1%
1000	0%	4%	2%	4%	5%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	2	0	0	0	2
100	310	0	10254	102543.5117	113108
200	451	0	11279	112797.8633	124528
500	447	0	11874	118741.8203	131063
1000	2199	3	28712	287121.8359	318036
Sandy (2012)	0	0	0	0	0
Gloria (1985)	4	0	0	0	4
Unnamed (1938)	409	0	11279	112797.8633	124486

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	1	0
200	2	1
500	2	1
1000	21	10
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	1	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	12.2857	0	12.2857	0	12.2857
100	5196.63678	180.919001	5377.555781	0	5377.56
200	6956.278367	287.059997	7243.338364	32.428066	7275.77
500	7096.797684	289.240396	7386.03808	32.420192	7418.46
1000	31925.81055	2103.672628	34029.48318	209.3783	34238.9
Average Annual	119.577746	6.576802	126.154548	0.470917	126.625
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	105.3828985	105.3828985	0	105.383
Unnamed (1938)	6483.728455	265.7948033	6749.523258	32.55649925	6782.08

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		8337	0	0	0	0	0
20		8337	0	0	0	0	0
50		8335	2	0	0	0	2
100		8153	175	9	0	0	184
200		8055	265	16	0	0	282
500		8137	189	11	0	0	200
1000		6574	1516	233	10	5	1763
Sandy (2012)		8335	2	0	0	0	2
Gloria (1985)		8335	2	0	0	0	8337
Unnamed (1938)		8147	180	10	0	0	8337

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	9297	0	0	0	0	0
20	9297	0	0	0	0	0
50	9293	4	0	0	0	4
100	9096	191	10	0	0	201
200	8992	287	18	0	0	305
500	9079	206	12	0	0	218
1000	7380	1640	259	13	5	1917
Sandy (2012)	9293	4	0	0	0	4
Gloria (1985)	9293	4	0	0	0	9297
Unnamed (1938)	9090	196	11	0	0	9297

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	0%
500	0%	1%	0%	1%	0%
1000	0%	4%	1%	4%	4%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	0%	0%	0%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	4	0	170	1697.193604	1871.19
100	757	0	11050	110508.3955	122315
200	1036	0	12341	123406.8467	136784
500	808	0	10547	105470.5498	116826
1000	5311	6	26621	266219.0352	298157
Sandy (2012)	0	0	0	0	0
Gloria (1985)	4	0	170	1697.193604	1871.19
Unnamed (1938)	757	0	11380	113806.2822	125943

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	2	1
200	3	1
500	2	1
1000	44	23
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	2	1

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses	huSummary Loss
10	0	0	0	0	0	
20	0	0	0	0	0	
50	274.729196	0	274.729196	0	274.729	
100	16143.12436	564.560812	16707.68517	0	16707.7	
200	20095.6456	837.118903	20932.7645	82.361187	21015.1	
500	17089.24919	615.029306	17704.2785	8.02079	17712.3	
1000	82899.07422	6122.206376	89021.28059	686.594533	89707.9	
Average Annual	332.040211	19.57706	351.617271	1.425493	353.043	
Sandy (2012)	112.6980019	0	112.6980019	0	112.698	
Gloria (1985)	140.871994	193.1358979	334.007892	0	334.008	
Unnamed (1938)	16297.32935	573.0736047	16870.40296	0	16870.4	

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		1834	0	0	0	0	0
20		1834	0	0	0	0	0
50		1834	0	0	0	0	0
100		1816	17	0	0	0	18
200		1805	28	1	0	0	29
500		1825	8	0	0	0	9
1000		1649	172	13	0	0	185
Sandy (2012)		1834	0	0	0	0	0
Gloria (1985)		1834	0	0	0	0	1834
Unnamed (1938)		1802	31	1	0	0	1834

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	2002	0	0	0	0	0
20	2002	0	0	0	0	0
50	2002	0	0	0	0	0
100	1983	19	0	0	0	19
200	1971	30	1	0	0	31
500	1992	10	0	0	0	10
1000	1806	181	14	0	0	196
Sandy (2012)	2002	0	0	0	0	0
Gloria (1985)	2002	0	0	0	0	2002
Unnamed (1938)	1968	33	1	0	0	2002

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	0%	0%	0%	0%
500	0%	0%	0%	0%	0%
1000	0%	1%	1%	1%	1%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	0%	0%	0%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	59	0	749	7485.950195	8293.95
200	83	0	4492	44915.70313	49490.7
500	31	0	0	0	31
1000	350	0	9732	97317.35156	107399
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	83	0	5240	52401.65234	57724.7

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	0	0
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	0	0	0	0	0
100	1429.171814	21.8035	1450.975314	0	1450.98
200	1893.791222	34.6534	1928.444622	0	1928.44
500	964.429215	13.1051	977.534315	0	977.534
1000	5865.578247	181.7651	6047.343347	21.408524	6068.75
Average Annual	31.388306	0.942013	32.330319	0.054618	32.3849
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0	0	0	0	0
Unnamed (1938)	2036.769981	36.85249934	2073.622481	0	2073.62

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		27484	0	0	0	0	0
20		27484	0	0	0	0	0
50		27450	32	2	0	0	34
100		25871	1379	227	6	1	1613
200		25438	1739	298	8	1	2046
500		25716	1508	253	6	1	1768
1000		16158	7945	2947	287	147	11326
Sandy (2012)		27451	32	2	0	0	33
Gloria (1985)		27448	34	2	0	0	27484
Unnamed (1938)		26695	692	94	3	0	27484

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	31982	0	0	0	0	0
20	31982	0	0	0	0	0
50	31936	44	2	0	0	46
100	30165	1558	250	9	1	1817
200	29677	1962	330	12	1	2305
500	29995	1700	278	10	1	1987
1000	18798	8986	3582	464	153	13184
Sandy (2012)	31937	43	2	0	0	45
Gloria (1985)	31934	46	2	0	0	31982
Unnamed (1938)	31097	780	101	3	0	31982

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	1%	0%	0%	0%	0%
100	4%	1%	0%	1%	1%
200	4%	1%	1%	1%	1%
500	4%	1%	0%	1%	1%
1000	12%	12%	6%	11%	10%
Sandy (2012)	1%	0%	0%	0%	0%
Gloria (1985)	1%	0%	0%	0%	0%
Unnamed (1938)	3%	1%	0%	1%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	258	0	251	2496.871002	3005.87
100	13555	1	11828	118271.4645	143655
200	16247	2	13137	131365.3232	160751
500	14514	1	12194	121932.336	148641
1000	86740	294	44727	447261.208	579022
Sandy (2012)	263	0	229	2282.609161	2774.61
Gloria (1985)	292	0	269	2675.38707	3236.39
Unnamed (1938)	7217	0	6567	65674.86783	79458.9

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	150	94
200	195	122
500	168	101
1000	1885	1153
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	58	37

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	2237.309691	18.3648	2255.674491	0	2255.67
100	109892.8523	11316.50743	121209.3597	1015.09186	122224
200	130239.8853	14363.77339	144603.6587	1270.63	145874
500	117362.2845	11759.09958	129121.384	1032.405056	130154
1000	812511.0889	255129.3417	1067640.431	7366.970961	1075007
Average Annual	2308.556632	448.496356	2757.052988	23.880144	2780.93
Sandy (2012)	2187.296384	0	2187.296384	0	2187.3
Gloria (1985)	395.7164974	2233.119659	2628.836156	0	2628.84
Unnamed (1938)	64199.39869	4579.553297	68778.95198	567.9404888	69346.9

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		3619	0	0	0	0	0
20		3619	0	0	0	0	0
50		3619	0	0	0	0	0
100		3512	103	3	0	0	107
200		3426	184	9	0	0	193
500		3393	214	11	0	0	226
1000		2587	866	149	11	6	1032
Sandy (2012)		3619	0	0	0	0	0
Gloria (1985)		3619	0	0	0	0	3619
Unnamed (1938)		3472	141	6	0	0	3619

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	3984	0	0	0	0	0
20	3984	0	0	0	0	0
50	3983	1	0	0	0	1
100	3869	111	4	0	0	115
200	3778	196	10	0	0	206
500	3743	227	13	0	0	241
1000	2871	927	166	14	6	1113
Sandy (2012)	3983	1	0	0	0	1
Gloria (1985)	3982	2	0	0	0	3984
Unnamed (1938)	3827	151	7	0	0	3984

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	0%	0%	0%	0%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	1%
1000	0%	5%	2%	5%	5%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	1	0	0	0	1
100	279	0	6157	61577.79102	68013.8
200	454	0	7275	72741.07031	80470.1
500	519	0	7936	79353.89453	87808.9
1000	2600	5	22854	228535.0469	253994
Sandy (2012)	0	0	0	0	0
Gloria (1985)	2	0	0	0	2
Unnamed (1938)	368	0	6612	66128.24414	73108.2

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	14	8
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	170.642395	8.5309	179.173295	0	179.173
100	6234.656281	212.805199	6447.46148	14.723241	6462.18
200	8829.08844	354.5152	9183.60364	36.744406	9220.35
500	9727.089416	403.093404	10130.18282	41.991176	10172.2
1000	47832.9375	2731.578169	50564.51567	268.985781	50833.5
Average Annual	159.414274	7.869779	167.284053	0.631297	167.915
Sandy (2012)	0	0	0	0	0
Gloria (1985)	0.083700001	269.5454082	269.6291082	0	269.629
Unnamed (1938)	7382.340942	285.8254954	7668.166438	32.45545866	7700.62

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		9910	0	0	0	0	0
20		9910	0	0	0	0	0
50		9904	6	0	0	0	6
100		9338	537	35	0	0	572
200		8967	867	73	1	1	943
500		8754	1048	103	3	2	1156
1000		5487	3178	962	164	120	4423
Sandy (2012)		9908	2	0	0	0	2
Gloria (1985)		9899	10	0	0	0	9910
Unnamed (1938)		9372	507	30	0	0	9910

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	11344	0	0	0	0	0
20	11344	0	0	0	0	0
50	11333	11	0	0	0	11
100	10706	595	42	1	0	638
200	10294	957	88	3	1	1050
500	10053	1158	124	6	2	1291
1000	6294	3521	1173	234	122	5050
Sandy (2012)	11338	6	0	0	0	6
Gloria (1985)	11327	16	0	0	0	11344
Unnamed (1938)	10746	560	37	1	0	11344

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	1%	0%	1%	1%
200	0%	1%	1%	2%	2%
500	0%	2%	1%	2%	2%
1000	0%	8%	7%	11%	11%
Sandy (2012)	0%	1%	0%	1%	1%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	1%

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	40	0	731	7324.469849	8095.47
100	1739	0	8510	85102.91016	95351.9
200	2677	1	11172	111712.5	125563
500	3301	2	11899	118990.3418	134192
1000	20925	179	33832	338306.7129	393243
Sandy (2012)	10	0	642	6434.919861	7086.92
Gloria (1985)	76	0	907	9071.498901	10054.5
Unnamed (1938)	1618	0	7884	78834.99414	88337

huDebrisResultsT

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	3	2
200	9	4
500	14	7
1000	243	120
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	2	1

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	4001.579479	175.550101	4177.12958	0	4177.13
100	48014.08612	2957.016215	50971.10234	296.231176	51267.3
200	65383.16168	4928.102467	70311.26415	496.267029	70807.5
500	75281.36511	6698.363059	81979.72817	656.025993	82635.8
1000	384710.5195	82698.76669	467409.2862	4908.396247	472318
Average Annual	1179.639946	135.01677	1314.656716	8.733899	1323.39
Sandy (2012)	2349.945786	46.52000113	2396.465787	0	2396.47
Gloria (1985)	1854.821392	3772.787741	5627.609133	0	5627.61
Unnamed (1938)	45974.90591	2640.345999	48615.25191	299.5012869	48914.8

huSummary Loss

huSummaryDamage

Number of Residential Buildings Damaged							
Return Period or Storm	Peak Wind Gust (mph)	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10		6001	0	0	0	0	0
20		6001	0	0	0	0	0
50		6000	1	0	0	0	1
100		5817	175	10	0	0	184
200		5700	282	19	0	0	301
500		5697	285	19	0	0	304
1000		4292	1414	268	18	9	1709
Sandy (2012)		6000	1	0	0	0	1
Gloria (1985)		5999	2	0	0	0	6001
Unnamed (1938)		5808	183	10	0	0	6001

huSummaryDamage

Total Number of Buildings Damaged						
Return Period or Storm	No Damage	Minor Damage	Moderate Damage	Severe Damage	Total Destruction	Total Damage
10	6945	0	0	0	0	0
20	6945	0	0	0	0	0
50	6941	4	0	0	0	4
100	6738	195	12	0	0	207
200	6610	312	22	1	0	335
500	6606	315	23	1	0	339
1000	5017	1573	318	27	10	1928
Sandy (2012)	6942	3	0	0	0	3
Gloria (1985)	6941	4	0	0	0	6945
Unnamed (1938)	6728	204	12	0	0	6945

huResultsCareFlty huResultsEmergCtr huResultsFireStation huResultsPoliceStation huResultsSchool

Essential Facility Damage (Average Percent Damaged)					
Return Period or Storm	Care Facility	Emergency Operations Center	Police Stations	Fire Station	Schools
10	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%
50	0%	0%	0%	0%	0%
100	0%	1%	0%	1%	0%
200	0%	1%	0%	1%	1%
500	0%	1%	0%	1%	1%
1000	0%	5%	2%	5%	6%
Sandy (2012)	0%	0%	0%	0%	0%
Gloria (1985)	0%	0%	0%	0%	0%
Unnamed (1938)	0%	1%	0%	1%	0%

huDebrisResultsT

Debris Generation (Tons)					
Return Period or Storm	Brick / Wood	Reinforced Concrete / Steel	Eligible Tree Debris	Other Tree Debris	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	4	0	0	0	4
100	679	0	7845	78452.07227	86976.1
200	1011	0	9051	90511.7002	100574
500	1043	1	9151	91512.51563	101708
1000	5741	19	27355	273552.8789	306668
Sandy (2012)	0	0	0	0	0
Gloria (1985)	6	0	0	0	6
Unnamed (1938)	722	0	8191	81911.8667	90824.9

huShelterResultsT

Shelter Requirements		
Return Period or Storm	Number of Displaced Households	Short Term Sheltering Need (Number of People)
10	0	0
20	0	0
50	0	0
100	0	0
200	1	0
500	1	0
1000	35	18
Sandy (2012)	0	0
Gloria (1985)	0	0
Unnamed (1938)	0	0

Economic Losses (thousands of dollars)

Return Period or Storm	Residential Property Damage Losses	Other Property Damage Losses	Total Property Damage Losses	Business Interruption (Income) Losses	Total Losses
10	0	0	0	0	0
20	0	0	0	0	0
50	103.030398	0	103.030398	0	103.03
100	10644.39666	1085.344024	11729.74068	32.488381	11762.2
200	14036.05545	1824.500308	15860.55576	140.578144	16001.1
500	14252.09084	1918.728604	16170.81944	149.310646	16320.1
1000	78305.66504	17762.73428	96068.39932	1029.085708	97097.5
Average Annual	251.934067	44.122655	296.056722	2.296812	298.354
Sandy (2012)	0.943000019	0	0.943000019	0	0.943
Gloria (1985)	0.279199988	253.3713993	253.6505993	0	253.651
Unnamed (1938)	10964.48743	1247.250475	12211.73791	122.085155	12333.8

huSummary Loss

Appendix E

Sustainable CT Climate Vulnerability Analysis

Climate Vulnerability Assessment
A Component of Sustainable CT Action 5.4

Introduction

The municipalities within the WestCOG region share common climate change vulnerabilities based on geographic location, community composition, and infrastructural characteristics. The municipalities in the region can be characterized as coastal or inland, and urban, rural, or suburban. Given this general classification, some municipalities have innate vulnerabilities; a clear example being coastal towns are more vulnerable to sea level rise than inland communities. These vulnerabilities, along with secondary impacts of these hazards, are outlined below. Also, as part of the initial planning meetings with each municipality, participants were asked to discuss their communities hazard concerns, and to identify any vulnerabilities to these hazards. These specific community vulnerabilities can be reviewed in section 2.2 of individual municipal annexes.

Region-wide, most communities can be considered increasingly more vulnerable to severe thunderstorms, snowstorms, extreme temperatures, and changing precipitation patterns. However, certain characteristic of each municipality may leave it more vulnerable than a neighboring community. For the purpose of this climate Vulnerability Assessment (CVA) each municipality in the WestCOG region has been categorized based on certain characteristics.

Drought risk varies throughout the region based upon private well usage. Municipalities with a higher percentage of private well usage may be more vulnerable than those that rely on public water supply. Public water supply is typically monitored for drought related triggers and therefore supply can be monitored given specific conditions. A private well owner will have a more challenging time monitoring water usage and available supply, resulting in increased vulnerability regarding water supply and potentially water scarcity. In addition to drinking water, several communities in the region have significant agricultural operations within their municipality. These operations are also vulnerable to drought and extreme temperatures as these operations rely on adequate water supply for crop irrigation or herd maintenance.

As temperatures begin to overall warm, and with increasing potential for drought periods, wildfire risk may increase leaving some communities more vulnerable than others. The evaluate wildfire risk throughout the region, Wildland-Urban Interface (WUI) data developed by the United States Department of Agriculture (USDA) was used to identify more vulnerable communities. In general, developed communities can be defined as *intermix* or *interface* which refers to the distribution of houses in relation to vegetation. An intermix community is comprised of housing intermingled with wildland vegetation, while and interface community is a housing community with less vegetation intermingled but is situated in close vicinity to densely vegetated areas. Communities that are identified as interface indicate communities with slightly less vegetation than an intermix, however, close enough to wildland vegetation that there is potential for damage during a wildfire event. For this evaluation, it is assumed that a low-density intermix community is more vulnerable than a low-density interface community. However, this analysis does not take into account other factors including, community firefighting capabilities, and is based solely on development and vegetation presence.

Municipality Category Types

Coastal Urban

The cities of Stamford and Norwalk are considered coastal urban communities under this vulnerability analysis. Because of this classification, there are vulnerabilities the two communities share. Both cities are vulnerable to sea level, which includes increased nuisance flooding and storm surge. Along the coastline there is heavy development in the form of residential and commercialized operations. Some of this commercial activity is water dependent and some is not. Both residents and business may experience more frequent "sunny day" flooding in some areas are high tides begin to inundate farther inland.

These coastal urban communities are also concerned with extreme temperatures as a result of climate change. In general, temperatures are expected to increase over the coming decades, therefore increasing the likelihood of the communities facing challenges due to high temperatures. Because these are urbanized areas there are large swaths of impervious surface throughout the cities. Impervious surface contributes to several climate change factors, with one specific one being urban heat island effect. Rising temperatures may increase ambient temperatures throughout the city which may also impact air quality and public health.

Hurricanes and tropical storms are predicted to become more intense as a result of climate change, and coastal urban communities have certain innate vulnerabilities. Both wind and storm surge associated with these storms are a concern for coastal urban communities as surge can inundate neighborhoods and commercial zones, and winds from these storms will be strongest along the coast. With a potentially higher economic risk along the coastline than a rural suburban town, due to uses and commercial development, these cities may face greater economic impact, which, depending upon the operation type affected, can have a region-wide impact.

Flooding may also be a concern for coastal urban communities. Flooding can occur due to high tides, because of poor drainage and high levels of runoff, or riverine flooding in less urbanized areas where rivers are flowing naturally. Flooding poses a risk to both infrastructure and public health, and often the economic impact from a flood is very high. Typically, an urban community has large variation in their demographic, ultimately leaving some populations more vulnerable than others. Often the lower income and elderly populations within urban communities are more vulnerable due to health concerns or inability to evacuate, or financial constraints that make recovery more challenging.

Coastal Suburban

The WestCOG region has three coastal suburban communities, Darien, Greenwich, and Westport. Similar to the urbanized communities, these three towns are vulnerable to sea level rise. The coastlines of these communities are developed with a higher ratio of residential to commercial. These residential communities may experience an increase of "sunny day" flooding due to high tides inundating properties or roadways. There is potential economic impact to both residents and municipalities. Residents may have to address concerns and mitigate their properties, while municipalities may have to mitigate coastal infrastructure. There is also potential for tax base shifts if multiple properties retreat from the risk, leaving those parcels unoccupied. Sea level rise also presents a challenge of saltwater intrusion into private wells. As sea levels rise groundwater levels may become more saline as pumping

activity draws in sea water into the aquifer. While much of the coastline is serviced by a public water supply, there is potential for some coastal residents to still rely on a private well which is vulnerable to this intrusion.

Inland areas of these coastal towns may be at risk of drought impacts as temperatures begin to rise and precipitation patterns change. Certain areas of these coastal suburban towns rely on private wells for their primary drinking water source which can potentially become impacted during drought periods. Without the similar mechanisms that public water supply systems have, residents may find it challenging to monitor their water levels and gauge usage and available supply during dry periods. However, it is important to note that areas within these municipalities that are served by public water supply may still be impacted by drought as usage restrictions may be cut. This notable difference is there are mechanisms in place to aid in water level monitoring and acquiring additional supply during these times.

Coastal municipalities are also concerned about flooding impacts. Many rural and suburban communities have noted concerns with undersized infrastructure, poor drainage along main roadways, riverine flooding, and isolated occurrences of ice jamming. Many culverts and bridges were constructed before increased levels of development, leaving infrastructural capacities across towns insufficient in handling floodwaters.

Inland Urban

The City of Danbury is considered an inland urban community in the WestCOG region. The vulnerabilities of this community are like those of coastal urban municipalities, apart from sea level rise. Extreme temperatures, especially extreme heat, is a large concern for inland urban areas. With higher ratios of impervious surfaces, urban heat island effect is a concern. Heat island effect may impact vulnerable populations, such as low-income residents or elderly, who may not have the means or access to air conditioning or other comfort amenities.

Another concern is inland flooding. Flooding events may occur as a result of poor drainage or riverine. Urban communities often experience an increased amount of runoff due to large amounts of impervious surface. This runoff may pool and flood in areas that are poorly drained, or potentially over inundate drainage systems causing backups into neighborhoods and along roadways. Riverine flooding is also a concern as there is often higher levels of development along rivers in urbanized communities, whether it is residential or commercial. Therefore, damage to property and economic impacts can potentially be larger than more urban communities.

Inland Rural and Suburban

A majority of the WestCOG region is comprised of inland suburban communities, with a small percentage or rural communities. Many of these communities have little to no public water supply, leaving residents vulnerable to drought conditions. With private wells being the primary drinking water source for many of these towns, well owners typically lack the means to monitor consumption and available supply, presenting challenges during dry periods. Without the capability of knowing water levels and available supply, residents may see a reduction in water supply, or even loss of supply, depending upon the aquifer conditions and the severity of the drought. In addition to drinking water supply, some inland rural or suburban municipalities have multiple large-scale agricultural operations which are reliant upon consistent water supply for irrigation or heard maintenance.

These inland communities are also vulnerable to flooding whether it is insufficient infrastructure, riverine, or poor drainage. Like that of the coastal towns, infrastructure is sometimes found to be insufficient for handling certain flood levels, resulting in washed out roadways and culverts and damaged properties. Also, as annual precipitation patterns are expected to increase, riverine flooding may occur more frequently as a result of heavier, more intense rainstorms. Development along riverbanks may become increasingly vulnerable as precipitation levels and flood levels increase.

Severe thunderstorms, hurricanes, and tropical storms all bring the threat of high winds. With many inland towns having dense tree coverage, and many towns throughout the state reporting high tree mortality, there is a level of vulnerability these inland rural and suburban towns must face to downed trees during severe storms. High winds can result is trees and limbs taking down power lines, damaging buildings and other infrastructure, and impeding emergency roadway access.

Secondary Impacts

As a result of these vulnerabilities, municipalities are likely to experience secondary impacts of these climate change hazards. These impacts may be in the form of economic, social, or health, and severity will vary as all towns and cities have unique characteristics.

Economic Impacts

The economic impacts associated with climate change hazards can be experienced at the municipal level down to the residential level. Municipalities face the challenge of upgrade or mitigating facilities, developing, and maintaining emergency response plans, ensuring emergency supplies are sufficient, continued tree maintenance, among many other actions. Residents may find that recovering from an event presents a financial burden that they may be unable to fulfill or find themselves responsible for certain mitigation actions or upgrades. For example, a homeowner who has been impacted by drought may face the economic burden of having to drill a deeper well or having to hook up to public water supply to ensure reliable drinking water. This may not be feasible for all property owners. Businesses can also be impacted economically. Hazard mitigation efforts may be costly but necessary to ensure disruptions during an evet are minimal. In addition to mitigation, there is also potential for loss of business and revenue. For example, poor drainage flooding may prohibit site access, resulting in revenue loss for the duration of the event.

Social Impacts

Each municipalities demographic varies and therefore impacts to these populations will also vary. To better understand the potential impacts and societal vulnerability of the WestCOG region the Center the Center for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) was used to identify any vulnerable populations within the town. This index was developed to supplement a community's natural hazard preparation actions. To evaluate social vulnerability, the CDC incorporates 15 factors (Fig. 1) into the overall calculation under the categories, or themes, of: socioeconomic status, household composition and disability, minority status and language, and housing type and transportation. These themes and their ranking are based on census statistics. By evaluating these factors and determining a level of social vulnerability, a community can identify specific needs for before, during, and after an event. Such needs may include sheltering capacity, evacuation routes, or to decide how many emergency personnel may be required to respond after an event.

Each municipalities' census tracts were ranked for overall vulnerability, and theme vulnerability, in comparison to other Connecticut municipalities. This rank, 0 to 1, is based on the percentile rank among all tracts within the State of Connecticut. A value closer to 0 indicates a lower vulnerability, while a value closer to 1 indicates a higher vulnerability. Table 1 outlines the overall vulnerability and theme rankings for all municipalities in the region.

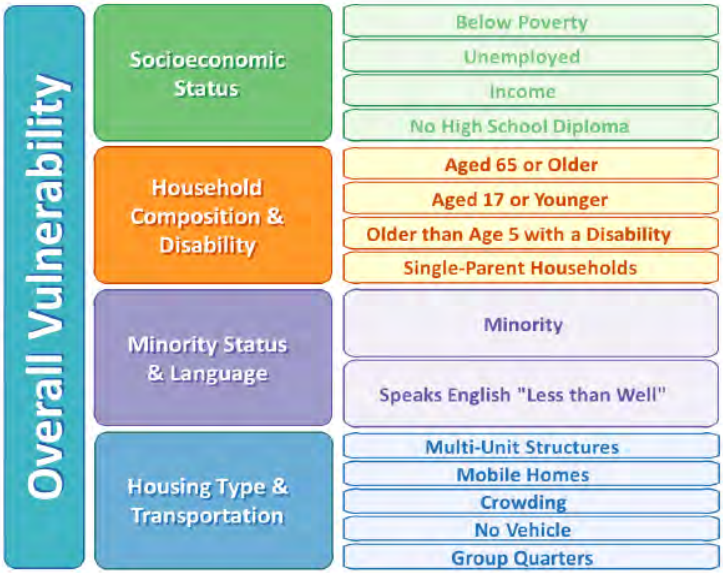


Figure 1: The CDC SVI Index Factors. Graphic: svi.cdc.com

Table 1 CDC SVI Overall and Theme Rankings

	OVERALL SVI	SOCIOECONOMIC	HOUSEHOLD COMPOSITION & DISABILITY	MINORITY STATUS & LANGUAGE	HOUSING TYPE & TRANSPORTATION
BETHEL	.27	.32	.24	.39	.28
BRIDGEWATER	.06	.11	.15	.14	.16
BROOKFIELD	.26	.27	.50	.37	.22
DANBURY	.62	.62	.32	.75	.62
DARIEN	.08	.11	.18	.23	.11
GREENWICH	.36	.30	.41	.53	.37
NEW CANAAN	.15	.08	.37	.23	.20
NEW FAIRFIELD	.13	.21	.29	.21	.14
NEW MILFORD	.33	.42	.20	.35	.41
NEWTOWN	.22	.20	.48	.28	.27
NORWALK	.49	.42	.34	.63	.51
REDDING	.21	.04	.34	.18	.45
RIDGEFIELD	.14	.04	.43	.18	.22
SHERMAN	.01	.01	.18	.05	.07
STAMFORD	.48	.44	.29	.70	.53
WESTON	.01	.02	.15	.30	.01
WESTPORT	.19	.11	.44	.28	.28
WILTON	.20	.04	.43	.32	.33

Communities with a high socioeconomic vulnerability may find it challenging in assisting lower income residents with recovery efforts, dispersing information, or keeping residents and families housed after a

large event. It is important for municipalities to identify and locate these populations to ensure they are aware of hazards and can access the necessary resources for response and recovery.

Those with vulnerable populations in relation to composition and disability may find challenges in evacuating populations, maintaining adequate shelters for those with special needs, and ensuring family support services are available for single-parent households during and in the wake of an event.

Municipalities with vulnerable populations who identify as a minority and speak English “less than well” may face the issue of information distribution or access to resources. Non-English speaking resources and emergency notifications should be developed to disseminate to those communities. In addition, some minority populations may also face other socioeconomic issues which ultimately results in challenges such as access to evacuation transportation, safe sheltering during an event, and the financial means for property recovery and repairs.

Vulnerabilities associated with housing type and transportation capabilities can present challenges due to high density housing and evacuation efforts or emergency response, lack of transportation for preparation and evacuation, or vulnerability in constructions type such as mobile homes.

With all these populations’ types come certain preparations to ensure climate change hazard preparedness. Communities should identify their specific vulnerable populations and their location and identify the resources necessary to support the populations before, during and after events.

Appendix F

Adoption Resolutions

CERTIFICATE OF ADOPTION
TOWN OF BETHEL BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Bethel has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Bethel Board of Selectmen approved the previous version of the Plan in 2015; and

WHEREAS, the Town of Bethel and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Bethel; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Bethel, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Bethel eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Bethel;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 17th day of 8, 2021 by the Board of Selectmen of Town of Bethel, Connecticut

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Bethel this 18 day of Aug., 2021.

Lisa Bergh

Town Clerk

TOWN of BETHEL SEAL CONNECTICUT

CERTIFICATE OF ADOPTION
TOWN OF BRIDGEWATER BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Bridgewater has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Bridgewater Board of Selectmen approved the previous version of the Plan in 2015; and

WHEREAS, the Town of Bridgewater and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Bridgewater; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Bridgewater, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Bridgewater eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Bridgewater;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 12th day of October, 2021 by the Board of Selectmen of Town of Bridgewater, Connecticut

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Bridgewater this 13 day of Oct, 2021.

Town Clerk

CHERYL L. PINKOS
NOTARY PUBLIC
MY COMMISSION EXPIRES APRIL 30, 2025

CERTIFICATE OF ADOPTION
TOWN OF BROOKFIELD BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Brookfield has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Brookfield Board of Selectmen approved the previous version of the Plan in 2014; and

WHEREAS, the Town of Brookfield and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Brookfield; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Brookfield, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Brookfield eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Brookfield;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 13th day of September, 2021 by the Board of Selectmen of Town of Brookfield, Connecticut

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Brookfield this 16th day of September 2021.

Town Clerk

RESOLUTION

CITY OF DANBURY, STATE OF CONNECTICUT

Sept. 9 A.D. 2021

RESOLVED BY THE CITY COUNCIL OF THE CITY OF DANBURY

WHEREAS, the City of Danbury has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the Plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Danbury City Council approved the previous version of the Plan in 2017; and

WHEREAS, the City of Danbury and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 regarding the development and review of the Natural Hazard Mitigation Plan Update 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the City of Danbury; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the City of Danbury, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the City of Danbury eligible for funding to alleviate the impacts of future hazards.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Plan is hereby adopted as an official plan of the City of Danbury.

2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them.

3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.

4. An annual report on the progress of the implementation elements of the Plan shall be presented to the City Council.

CITY OF DANBURY
OFFICE OF THE CITY COUNCIL
THIS DOCUMENT IS A CERTIFIED COPY OF THE ORIGINAL ON FILE IN THE OFFICE OF THE CITY COUNCIL

10-4-21

LEGISLATIVE ASSISTANT **DATED**

JAYME J. STEVENSON
FIRST SELECTMAN

CHARLES A KOONS
DAVID R. MARTIN
MONICA M. McNALLY
SARAH D. NUEMANN

TOWN OF DARIEN

OFFICE OF THE SELECTMEN

CERTIFICATE OF ADOPTION

TOWN OF DARIEN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS

MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Darien has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Darien Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Darien and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Darien; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Darien, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Darien eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Darien;

2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;

3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.

An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 16th day of August, 2021 by the Board of Selectmen of Town of Darien, Connecticut

Jayme J. Stevenson Jayme J. Stevenson

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Darien this 17 day of August, 2021.

Christa S. McNamara

Town Clerk

TOWN OF
GREENWICH

Office of the First Selectman · 203.622.7710 · Fax: 203.622.3793
Town Hall · 101 Field Point Road · Greenwich, CT 06830
Email: Fred.Camillo@GreenwichCT.org

Fred Camillo
First Selectman

CERTIFICATE OF ADOPTION
TOWN OF GREENWICH BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Greenwich has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Greenwich Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Greenwich and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Greenwich; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Greenwich, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Greenwich eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Greenwich;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented by the designated local coordinator to the Board of Selectmen.

Adopted this 9th day of September, 2021 by the Board of Selectmen of Town of Greenwich, Connecticut.

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Greenwich this 22nd day of Oct., 2021.

Town Clerk

CERTIFICATE OF ADOPTION
TOWN OF NEW CANAAN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of New Canaan has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of New Canaan Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of New Canaan and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 by WestCOG regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of New Canaan; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of New Canaan, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of New Canaan eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of New Canaan;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 7 day of Sept, 2021 by the Board of Selectmen of Town of New Canaan, Connecticut

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of New Canaan this 22 day of OCT, 2021.

Claudia A Weber

Town Clerk

Town of New Fairfield

Selectmen's Office
4 Brush Hill Road
New Fairfield, Connecticut 06812

CERTIFICATE OF ADOPTION
TOWN OF NEW FAIRFIELD BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of New Fairfield has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of New Fairfield Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of New Fairfield and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of New Fairfield; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of New Fairfield, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of New Fairfield eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of New Fairfield;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 12th day of August, 2021 by the Board of Selectmen of Town of New Fairfield, Connecticut

Patricia del Monaco

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of New Fairfield this 17th day of August 2021.

Pamela J. Dohan

Town Clerk

TOWN OF NEW MILFORD

Roger Sherman Town Hall
10 Main Street
New Milford, Connecticut 06776
Telephone 860-355-6010 • Fax 860-355-6002
Office of the Mayor
Pete Bass

CERTIFICATE OF ADOPTION
TOWN OF NEW MILFORD TOWN COUNCIL

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of New Milford has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of New Milford Board of Selectmen approved the previous version of the Plan in 2015; and

WHEREAS, the Town of New Milford and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of New Milford; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of New Milford, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of New Milford eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of New Milford;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 9th **day of** Aug**, 2021 by the Town Council of the Town of New Milford, Connecticut**

Mayor

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of New Milford this 12th day of August 2021.

Town Clerk

SEAL

CERTIFICATE OF ADOPTION
TOWN OF NEWTOWN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Newtown has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Newtown Board of Selectmen approved the previous version of the Plan in 2015; and

WHEREAS, the Town of Newtown and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Newtown; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Newtown, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Newtown eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Newtown;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 9th day of September, 2021 by the Board of Selectmen of Town of Newtown, Connecticut

Daniel C. Rosenthal, First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Newtown this 13th day of Sept, 2021.

Debbie Aurelia Hatstead

Town Clerk

Date: August 5, 2021
Subject: *Adoption of the WestCOG Multi-Jurisdiction Hazard Mitigation Plan Update, 2021-2026".*

Resolution:
Authorize the Mayor, Harry W. Rilling, to adopt the 'Western CT Council of Governments (WestCOG)) Multi-Jurisdiction Hazard Mitigation Plan Update 2021-2026' as prepared by the WestCOG and approved by the Federal Emergency Management Agency (FEMA)

Background
Municipalities and States are required to have a FEMA approved Hazard Mitigation Plan on file. This plan enables municipalities to apply for additional funding streams following disasters. The Western CT Council of Governments (WestCOG) receives funds to update and maintain this plan for the jurisdictions it serves. Once adopted by all municipalities, the plan will be in place until 2026.

FEMA Region 1 has completed its review of the *WestCOG Multi-Jurisdiction Hazard Mitigation Plan Update, 2021-2026* and found it meets the requirements under 44 CFR 201. The WestCOG HMP has received conditional approval pending adoption by each individual municipality.

The final documents that were approved by FEMA are on the WestCOG website: Hazard Mitigation | Western Connecticut Council of Governments (westcog.org), and below for download:

Plan: https://filetransfer.slrconsulting.com/link/0kXzVXIK3x4B65hXj6DiKC
Appendices: https://filetransfer.slrconsulting.com/link/2TmffvEu4DzuiXTaYn7ZN0
Municipal Annexes: https://filetransfer.slrconsulting.com/link/86xtZHyOqjrEzZUIFFPhrH

Below is the Norwalk resolution that should be placed on City letterhead:

CERTIFICATE OF ADOPTION
CITY OF NORWALK COMMON COUNCIL

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the City of Norwalk has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the City of Norwalk Common Council approved the previous version of the Plan in 2016; and

WHEREAS, the City of Norwalk and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management

Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the City of Norwalk; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the City of Norwalk, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the City of Norwalk eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Common Council:

1. **The Plan is hereby adopted as an official plan of the City of Norwalk;**
2. **The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;**
3. **Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.**
4. **An annual report on the progress of the implementation elements of the Plan shall be presented to the City Council.**

Adopted this 25th day of October, 2021 by the Common Council of City of Norwalk, Connecticut

Harry W. Rilling

Mayor

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the City of Norwalk this 25th day of October, 2021.

Donna L. Ring

City Clerk

Julia Pemberton
First Selectman

Phone: 203-938-2002
Fax: 203-938-8816

Town of Redding

CERTIFICATE OF ADOPTION
TOWN OF REDDING BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Redding has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Redding Board of Selectmen approved the previous version of the Plan in 2015; and

WHEREAS, the Town of Redding and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Redding; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Redding, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Redding eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Redding;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;

100 Hill Road, PO Box 1028, Redding, CT 06875
www.townofreddingct.org

Julia Pemberton
First Selectman

Phone: 203-938-2002
Fax: 203-938-8816

Town of Redding

3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 27TH day of OCT., 2021 by the Board of Selectmen of Town of Redding, Connecticut

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Redding this 27TH day of OCT, 2021.

Town Clerk MICHELE R. GRANDE

100 Hill Road, PO Box 1028, Redding, CT 06875
www.townofreddingct.org

CONNECTICUT
JOHN G. ROWLAND

TOWN OF RIDGEFIELD
Office of the First Selectman

CERTIFICATE OF ADOPTION
TOWN OF RIDGEFIELD BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Ridgefield has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Ridgefield Board of Selectmen approved the previous version of the Plan in 2015; and

WHEREAS, the Town of Ridgefield and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Ridgefield; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Ridgefield, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Ridgefield eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Ridgefield;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 22 **day of** September **, 2021 by the Board of Selectmen of Town of Ridgefield, Connecticut**

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Ridgefield this 24th day of Sept., 2021.

Town Clerk

400 Main Street • Ridgefield, CT 06877
Phone: (203) 431-2774 • Fax: (203) 431-2311 • selectman@ridgefieldct.org

www.ridgefieldct.org

CERTIFICATE OF ADOPTION
TOWN OF SHERMAN BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Sherman has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Sherman Board of Selectmen approved the previous version of the Plan in 2017; and

WHEREAS, the Town of Sherman and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Sherman; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Sherman, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Sherman eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Sherman;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 26th **day of** August**, 2021 by the Board of Selectmen of Town of Sherman, Connecticut**

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Sherman this 7th day of Sept, 2021.

Town Clerk

30TH BOARD OF REPRESENTATIVES
CITY OF STAMFORD

President
MATTHEW QUINONES

Clerk of the Board
SUSAN NABEL

Majority Leader
RODNEY PRATT

Minority Leader
MARY L. FEDELI

RESOLUTION NO. 4108
ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the City of Stamford has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the City of Stamford Board of Representatives approved the previous version of the Plan in 2016; and

WHEREAS, the City of Stamford and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026 (the "Plan"); and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the City of Stamford; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the City of Stamford, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the City of Stamford eligible for funding to alleviate the impacts of future hazards.

NOW THEREFORE BE IT RESOLVED by the 30TH Board of Representatives that:

1. The Natural Hazard Mitigation Plan Update, 2021-2026, is hereby adopted as an official plan of the City of Stamford;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.

GOVERNMENT CENTER, 888 WASHINGTON BLVD P O BOX 10152, STAMFORD, CT 06904
TEL: (203) 977-4024 • FAX: (203) 977-5503 • E-MAIL: BDREPS@CI STAMFORD CT US

4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Representatives.

This resolution was approved on the Consent Agenda at the Regular Meeting of the 30th Board of Representatives held on Monday, October 4, 2021.

Matthew Quinones, President
30th Board of Representatives

Susan Nabel, Clerk
30th Board of Representatives

cc: Mayor David R. Martin
Kathryn Emmett, Esq., Law Department
Lyda Ruijter, Town & City Clerk
Jay Fountain, Director of OPM
Sandra L. Dennies, Director of Administration
Mark McGrath, Director of Operations
Ted Jankowski, Director of Public Safety, Health & Welfare
Thomas Madden, Director of Economic Development
Erin McKenna, Senior Planner

CERTIFICATE OF ADOPTION
TOWN OF WESTON BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Weston has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Weston Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Weston and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44.CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Weston; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Weston, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Weston eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Weston;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 28 **day of** Oct**, 2021 by the Board of Selectmen of Town of Weston, Connecticut**

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Weston this 28th day of Oct, 2021.

Town Clerk

CERTIFICATE OF ADOPTION
TOWN OF WESTPORT BOARD OF SELECTMEN

Notice is hereby given that the Westport Board of Selectmen, at its regular meeting of August 11, 2021 held at 9:00 am in Westport Town Hall Auditorium, upon motion by James Marpe, seconded by Melissa Kane and passing by a vote of 3-0, did unanimously approve the following:

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Westport has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g., *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Westport Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Westport and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Westport; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Westport, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Westport eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Westport.
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them.
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 11th day of August, 2021 by the Board of Selectmen of Town of Westport, Connecticut

James S. Marpe, First Selectman

IN WITNESS WHEREOF, the undersigned has affixed their signature and the corporate seal of the Town of Westport this 12 day of August, 2021.

~~Jeffrey Dunkerton, Town Clerk~~ Deputy Town Clerk

CERTIFICATE OF ADOPTION
TOWN OF WILTON BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE WESTERN CONNECTICUT COUNCIL OF GOVERNMENTS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE, 2021-2026

WHEREAS, the Town of Wilton has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in the plan (e.g. *flooding, high wind, thunderstorms, winter storms, earthquakes, droughts, dam failure, and wildfires)*, resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Wilton Board of Selectmen approved the previous version of the Plan in 2016; and

WHEREAS, the Town of Wilton and Western Connecticut Council of Governments developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for the Natural Hazard Mitigation Plan Update, 2021-2026 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held and public input was sought in 2020 and 2021 regarding the development and review of the Natural Hazard Mitigation Plan Update, 2021-2026; and

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Wilton; and

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Wilton, with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this Plan will make the Town of Wilton eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Board of Selectmen:

1. The Plan is hereby adopted as an official plan of the Town of Wilton;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen.

Adopted this 13th **day of** Sept**, 2021 by the Board of Selectmen of Town of Wilton, Connecticut**

First Selectman

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Wilton this 14th day of Sept., 2021.

Town Clerk

Appendix G

FEMA Mitigation Strategy Worksheets

Mitigation Action Progress Report Form

Progress Report Period	From Date:	To Date:
Action/Project Title		
Responsible Agency		
Contact Name		
Contact Phone/Email		
Project Status	❏ Project completed ❏ Project canceled ❏ Project on schedule ❏ Anticipated completion date:_____ ❏ Project delayed Explain _____	

Summary of Project Progress for this Report Period

1. What was accomplished for this project during this reporting period?

_____

_____

2. What obstacles, problems, or delays did the project encounter?

_____

_____

3. If uncompleted, is the project still relevant? Should the project be changed or revised?

_____

_____

4. Other comments

_____

_____

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Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Planning Process	Should new jurisdictions and/or districts be invited to participate in future plan updates?	
	Have any internal or external agencies been invaluable to the mitigation strategy?	
	Can any procedures (e.g., meeting announcements, plan updates) be done differently or more efficiently?	
	Has the Planning Team undertaken any public outreach activities?	
	How can public participation be improved?	
	Have there been any changes in public support and/or decision- maker priorities related to hazard mitigation?	
Capability Assessment	Have jurisdictions adopted new policies, plans, regulations, or reports that could be incorporated into this plan?	
	Are there different or additional administrative, human, technical, and financial resources available for mitigation planning?	
	Are there different or new education and outreach programs and resources available for mitigation activities?	
	Has NFIP participation changed in the participating jurisdictions?	
Risk Assessment	Has a natural and/or technical or human-caused disaster occurred?	
	Should the list of hazards addressed in the plan be modified?	
	Are there new data sources and/or additional maps and studies available? If so, what are they and what have they revealed? Should the information be incorporated into future plan updates?	
	Do any new critical facilities or infrastructure need to be added to the asset lists?	
	Have any changes in development trends occurred that could create additional risks?	
	Are there repetitive losses and/or severe repetitive losses to document?	

Worksheet 7.2

Plan Update Evaluation Worksheet

Plan Section	Considerations	Explanation
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimates accurate?	
	Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or eliminated from the plan?	
	Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update?	
	Are there new funding sources to consider?	
	Have elements of the plan been incorporated into other planning mechanisms?	
Plan Maintenance Procedures	Was the plan monitored and evaluated as anticipated?	
	What are needed improvements to the procedures?	