



19 Manchester

Community Overview

Manchester is a fully suburban community of over 58,000 covering about 27.3 square miles. Elevation ranges from about 80 to 500 feet above sea level. Manchester’s land area drains primarily to the Hockanum River and its watershed. Small areas along the southern border of the town drain to the main stem of the Connecticut River Watershed. Other major waterways in Manchester include: Bigelow, Birch Mountain, Lydall and Porter Brooks. Regionally significant transportation routes in Manchester include Interstates 84, 384 and 291, as well as state routes 44/6 and 83. Principal industries include: engineered fibers, steel metal fabrication, plastics, machine tool companies, printing, warehouse/distribution facilities, electronic equipment, aircraft and missile components. Manchester is also home to one of the largest regional retail concentrations in New England; the Buckland Hills area includes over 3 million square feet of retail and services anchored by the Buckland Hills Mall, over 300 hotel rooms, restaurants, and movie theaters. Historic resources include the Cheney Brothers National Register Historic District and the downtown Main Street National Historic Register district.

Little new development was noted since adoption of the 2014-2019 Capitol Region Natural Hazards Mitigation Plan Update (“2014 HMP”); most construction has consisted of redevelopment of retail buildings that has not increased the Town’s exposure to hazards.

Critical Facilities

Critical Facilities throughout the Capitol Region are listed in Appendix B. In Manchester, these facilities include the Wastewater Treatment Plant (WWTP), Police Department, and Senior Center and High School (both shelters).

Table 19-1: Critical Facilities, Manchester

Facility	Shelter	Generator
Police Department		X
Fire Department		
Senior Center	X	X
High School	X	X
Wastewater Treatment Plant		X
Facilities Management Building (EOC)		
Department of Public Works Facility		

Since the 2014 Plan, the WWTP has been upgraded, a generator was installed at the Senior Center and the Police Department generator was updated to run on natural gas.

Capabilities

Hazard mitigation is addressed specifically in Manchester’s Plan of Conservation and Development.

Manchester owns and operates its own water company. The protection and management of significant forested watershed land and the multiple stratified-drift aquifers relied upon by the residents of Manchester is paramount. In addition, Manchester has a significant open space recreation area of regional importance.

Since 2008, Manchester Public Works has received Flood Plain Zone and Wetlands Permit approval for five projects including structural improvements to stormwater drainage infrastructure in Special Flood Hazard Areas (SFHA) that help mitigate flood risks. No new construction of primary residential or commercial structures has been permitted in the SFHA. The Planning and Zoning Commission and Inland Wetlands and Watercourses Agency has approved several minor structural renovations, installation of accessory structures and site improvements in regulated areas in accordance with the flood hazard reduction and resource compensation standards outlined in the Zoning and Inland Wetlands and Watercourses Regulations. Manchester revised its Flood Plain Zone regulations in 2008 to meet National Flood Insurance Program standards. In accordance with these standards, encroachments in the floodway are prohibited and any reduction of water holding capacity in the SFHA caused by filling or construction must be compensated for elsewhere.

The Town addresses tree maintenance on an as-needed basis and does not currently have the capacity to proactively manage its trees. Eversource currently performs the majority of tree maintenance activities in Manchester.

New Capabilities

Since adoption of the 2014 HMP, Manchester has migrated to a new storm mix for road treatment that uses less sand and therefore reduces drainageway-clogging issues.

A previously breached dam has been removed in the last five years.

Challenges

Challenges Overview

The Manchester Fire Chief has determined that wildfire is of minimal concern in Town, due mostly to the community's built-out nature. The majority of the Town is on public water with hydrants. No additional fire suppression capabilities are needed. The vast and rugged forested landscape of the Case Mountain Recreation Area poses some fire risk, especially at the natural/residential interface.

Flood-risk areas in Manchester are well known and have not changed in recent years. There is some hazard potential to Manchester if there is a failure of an impoundment in towns upstream.

Damage to the power grid from falling trees and branches is a problem.



Hazard Losses

The economic losses faced by the community from natural hazards can be estimated by reviewing historic, and modeling future, loss figures. Loss estimates are summarized below.

Historic FEMA Payments

FEMA reimburses communities for hazard losses through programs including Public Assistance (PA) and the National Flood Insurance Program (NFIP). Combining PA and private flood insurance payments can give an estimate for total losses to a community.

The NFIP has paid 27 property damage claims in Manchester totaling \$118,082 to-date. Manchester has had four Repetitive Loss (RL) Property claims on two properties totaling \$43,204 to-date.

Total PA reimbursements to the community were as follows:

- Flood Events: \$74,618 (\$3,927 annually)
- Hurricane Events: \$101,157 (\$5,324 annually)
- Winter Storm Events: \$7,236,430 (\$380,865 annually)

These are summarized in the tables below.

Table 19-2: Flood Event PA Reimbursements, Manchester

Incident	Sep 1999	Oct 2005
Declaration	9/23/1999	12/16/2005
Disaster No.	1302	1619
Entity	FEMA PA Reimbursement	
State	\$2,701	\$3,349
Municipal	\$0	\$68,568
Nonprofit	\$0	\$0
Total	\$2,701	\$71,917
Annualized	\$142	\$3,785



Table 19-3: Hurricane Wind Event PA Reimbursements, Manchester

Incident	Aug - Sep 2011 (T.S. Irene)
Declaration	9/2/2011
Disaster #	4023
Entity	FEMA PA Reimbursement
State	\$3,106
Municipal	\$98,052
Nonprofit	\$0
Total	\$101,157
Annualized	\$5,324

Table 19-4: Winter Storm PA Reimbursements, Manchester

Incident	Mar 2003	Dec 2003	Jan 2005	Feb 2006	Jan 2011	Oct 2011	Feb 2013
Declaration	3/11/03	1/15/04	2/17/05	5/2/06	3/3/11	11/17/11	3/21/13
Disaster #	3176	3192	3200	3266	1958	4046	4106
Entity	FEMA PA Reimbursement						
State	\$55,715	\$49,783	\$65,225	\$76,956	\$70,323	\$40,275	\$129,965
Municipal	\$136,596	\$167,112	\$202,915	\$179,688	\$195,625	\$5,499,155	\$277,249
Nonprofit	\$0	\$0	\$2,830	\$3,380	\$16,606	\$61,727	\$5,304
Total	\$192,311	\$216,896	\$270,969	\$260,024	\$282,554	\$5,601,157	\$412,518
Annualized	\$10,122	\$11,416	\$14,262	\$13,685	\$14,871	\$294,798	\$21,711

National Centers for Environmental Information Losses

The table below summarizes events in the National Centers for Environmental Information (NCEI) severe storm database that were specifically noted as having impacted the community since 2012.



Table 19-5: NCEI Database Losses since 2012, Manchester

Date	Event	Property Damage
6/22/2012	Thunderstorm Wind	\$5,000
6/22/2012	Flood	\$0
7/28/2012	Flood	\$0
8/10/2012	Thunderstorm Wind	\$10,000
9/18/2012	Thunderstorm Wind	\$10,000
5/21/2013	Hail	\$0
6/17/2013	Thunderstorm Wind	\$5,000
8/11/2016	Thunderstorm Wind	\$25,000
8/11/2016	Flood	\$0
6/27/2017	Hail	\$0
8/2/2017	Hail	\$0
8/2/2017	Flash Flood	\$10,000
Total Thunderstorm		\$55,000
Total Flood		\$10,000

NCEI losses under other event categories (such as drought, high wind, flooding, and winter storms) were not specifically noted as impacting this community, though they did impact Hartford County and nearby towns. NCEI losses are reported in Section II of this Plan.

HAZUS-MH Losses

CRCOG used FEMA’s Hazus-MH model to analyze the risks that the community might face from flooding, hurricanes, and earthquakes. The model estimates economic losses due to damage to buildings and building contents, as well as other economic disruptions. Both residential and commercial structures are addressed. Losses from different hazards are summarized below. Where available, estimates from the previous and current versions of the HMP are provided side-by-side; differences between the two may have been caused by a combination of the following:

- Changes in methodology: such as hazard zone mapping
- Changes in data: such as population and property values
- Changes in the model: this HMP utilized Hazus-MH version 4.0 rather than 2.1
- Other factors: inherent in a complex software like Hazus-MH

More details are available in the Multi-Jurisdictional HMP. Ultimately, changes in the loss estimates reflect the reality that small differences in hazard event features can have a significant impact on losses incurred.



Table 19-6: Estimated Damages to Manchester from a 1% Annual-Chance Flood

Loss Type	2014 Results	2018 Results
Households Displaced	542	219
People Needing Shelter	983	277
Buildings at Least Moderately Damaged	11	0
Economic Losses		
Residential Building & Content Losses	\$16,900,000	\$8,730,809
Other Building & Content Losses	\$47,180,000	\$22,958,483
Total Building & Content Loss	\$64,080,000	\$31,689,292
Total Business Interruption Losses	\$280,000	\$1,465,406
TOTAL	\$64,350,000	\$33,154,698

Table 19-7: Estimated Damages to Manchester from a 1% Annual-Chance Hurricane

Loss Type	2014 Results (1938 event)	2018 Results (1% track)
Buildings at Least Moderately Damaged	2,475	4
Buildings Completely Damaged	132	1
Total Debris Generated (tons)	70,116 tons	13,094 tons
Truckloads (at 25 tons/truck) of building debris	1,357	524
Economic Losses		
Residential Building & Content Losses	\$226,970,000	\$44,626,987
Other Building & Content Losses	\$54,870,000	\$2,282,716
Total Building & Content Loss	\$281,840,000	\$46,909,703
Total Business Interruption Losses	\$37,900,000	\$2,549,480
TOTAL LOSSES	\$319,740,000	\$49,459,183

Losses were calculated from a modeled probabilistic earthquake (1% annual-chance of occurrence), as well as for four specific scenarios with epicenters around Connecticut.

Table 19-8: Estimated Damages to Manchester from a Probabilistic Earthquake

Loss Type	2018 Results
Wage Loss	\$10,644
Rent Loss	\$8,897
Relocation Loss	\$13,755
Income Loss	\$8,091
Inventory Loss	\$895
Total Business Disruption	\$42,281
Structural Loss	\$26,272
Non-Structural Loss	\$84,518
Total Building Loss	\$110,790
Total Content Loss	\$33,259
TOTAL LOSSES	\$186,330



Table 19-9: Estimated Damages to Manchester from Modeled Earthquake Scenarios

Epicenter Location	Magnitude	Estimated Total Losses
East Haddam	6.4	\$1,532,205.00
Haddam	5.7	\$348,228.77
Portland	5.7	\$1,175,637.21
Stamford	5.7	\$17,387.13

Average Annualized Losses

Average Annualized Loss (AAL) figures are useful tools for comparison of the risks faced from different hazards with different likelihoods of occurring in a given time period. AAL estimates were prepared for the community based on the methodologies discussed in Section II of the Multi-Jurisdictional HMP. Dam failure, drought, tornado, and wildfire losses were sourced from the 2014 Connecticut Natural Hazard Mitigation Plan Update, with dam failure data supplemented by the National Performance of Dams Program and the Connecticut Department of Energy & Environmental Protection. Earthquake and hurricane losses were calculated in HAZUS-MH. Losses for flooding came from NFIP claims, for winter storms from Public Assistance Reimbursements, and for thunderstorms from the NCEI database. These are presented in the table below.

Table 19-10: Average Annualized Losses, Manchester

Dam Failure	Drought	Earthquakes	Flooding	Hurricanes and Tropical Storms	Severe Winter Storms	Thunderstorms	Tornadoes	Wildfires	Total
\$104	\$0	\$186,330	\$7,035	\$3,651,044	\$380,865	\$7,735	\$854,504	\$5,093	\$5,092,710

Losses Summary

A review of the above loss estimates demonstrates that the Town of Manchester has experienced significant expenses as a result of natural hazards, and is at risk for additional losses if some of the less-frequent events were to occur. These actual and potential losses justify hazard mitigation actions to reduce losses in the future.

Mitigation Strategies and Actions

Noted Hazard Mitigation Needs

During the course of this Plan development, hazard mitigation needs of Manchester were noted, including:

- Town Staff wish to know the locations of RL properties.
- The Police Chief believes the EOC requires hardening or other actions to make it more resilient to natural hazards.



Status of Previous Mitigation Strategies and Actions

The Town of Manchester reviewed the mitigation actions proposed in the 2014 HMP and determined the status of each. That information is included in the table below.

Table 19-11: Status of Previous Mitigation Strategies and Actions, Manchester

Action #	Action	Notes	Status
GOAL: MINIMIZE LOSS TO CRITICAL INFRASTRUCTURE DUE TO FLOODING, WINTER STORMS, HURRICANES AND HIGH WINDS			
Objective 1: To reinforce, renovate and upgrade existing critical town facilities.			
1.1	Implement needed improvements to build a new Emergency Operations Center, when funding is available, at the Department of Public Works facility to withstand hurricanes and other disasters.	A new EOC was put into facilities management building. It was placed there but the building was not retrofitted or hardened. This work should be a new strategy in the plan update.	Carry Forward with Revisions
1.2	Implement needed upgrades to electrical system at the Senior Center, which is the primary emergency shelter to allow year-round use.	Action complete.	Complete
1.3	Install operating generators at all primary and tertiary shelters and designated alternate care sites.	Action complete.	Complete
Objective 2: To upgrade existing transportation infrastructure in order to allow for continuity of operations.			
2.1	Upgrade identified flood prone roadways to reduce potential for access being blocked due to flooding.	Ongoing activity but needs metrics for plan update.	Carry Forward with Revisions
2.2	Maintain list of on-call consultant engineers who can provide necessary assistance for structural and other specialized engineering assistance in response to impacts from natural disasters.	Existing capability / ongoing activity.	Capability
2.3	Upgrade bridge and/or other structure replacements based upon potential impact from flood hazards.	Keep - there are easement issues being worked through. Construction is expected in next year. Update strategy to reflect current status.	Carry Forward with Revisions
Objective 3: To upgrade existing communication system in order to facilitate efficient emergency response in a natural disaster.			
3.1	Upgrade Emergency Operations Center communications system, including any necessary building upgrades.	Action completed.	Complete
GOAL: REDUCE THE LIKELIHOOD OF FLOODING DAMAGES THROUGH MONITORING AND INCREASED PUBLIC AWARENESS			
Objective 1: Coordinate with the Town of Vernon to monitor dams and potential flooding along Hockanum River.			
1.1	Continue communications with Vernon emergency management personnel.	Existing capability / ongoing activity.	Capability
Objective 2: Raise awareness of flooding risks among property owners.			
2.1	Determine real estate disclosure practices in high risk areas.	Current state-required disclosure is sufficient.	Drop



Action #	Action	Notes	Status
2.2	Implement an educational system for property owners, including appropriate materials and means for information dissemination. (Include information on importance of properly maintaining private trees).	Not completed. Revisit and select realistic and measurable tactics.	Carry Forward with Revisions
Objective 3: Raise awareness of public health concerns from flooding of private wells and/or on-site septic systems.			
3.1	Continue to update identified private properties including businesses, food service establishments, daycares and group homes served by private wells and/or on-site septic systems located within known flood risks.	Summer intern mapped septic systems and wells to some extent. This work was started, but Manchester would like to add a strategy to complete it and potentially add new items, again using an intern.	Carry Forward with Revisions
3.2	Implement an educational program for private owners including materials and recommendations for appropriate remediation of private utilities that have been subjected to flooding, for health protection and promotion.	Deferred.	Carry Forward

Active Mitigation Strategies and Actions

The Town proposed to initiate several new mitigation actions for the upcoming five years. Additionally, a number of actions from the previous planning period are being carried forward or replaced with revised actions. These are listed below.

Each of the following actions has been prioritized based on FEMA guidelines, listed from highest to lowest priority, and numbered.

<i>Action #1</i>	
Consider and document the labor resource needs and benefits of participation in the Sustainable CT program.	
Goal	4. Increase the use of natural, “green,” or “soft” hazard mitigation measures, such as open space preservation and green infrastructure.
Category	Natural Resources Protection
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	01/2019 - 12/2019
Priority	High



Action #2

Require Elevation Certificates for all new development permits in or near floodplains and filing them both in the building department and with land records.

Goal	2. Ensure Municipal Codes and Regulations support hazard mitigation
Category	Property Protection
Lead	Building Department
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	07/2019 - 06/2020
Priority	High

Action #3

Develop a prioritized list of flood prone roadways to be upgraded to reduce potential for access being blocked due to flooding.

Goal	5. Improve the resilience of local and regional utilities and infrastructure using strategies including adaptation, hardening, and creating redundancies.
Category	Structural Projects
Lead	Public Works
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	07/2019 - 06/2020
Priority	High

Action #4

Assess needs of the new EOC in the facilities management building to determine its resilience to natural hazards, and to identify needs to make it more resilient.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Preparedness & Emergency Response
Lead	Emergency Management
Cost	\$10,000 - \$25,000
Funding	Town Operating Budget / DEMHS
Timeframe	07/2019 - 06/2021
Priority	High



Action #5

Conduct outreach to local small businesses with the aim of preventing the accidental release and pollution from chemicals stored and used at their facilities during or following natural hazard events.

Goal	6. Improve public outreach, education, and warning systems
Category	Education & Awareness
Lead	Planning, in coordination with DEEP
Cost	\$0 - \$10,000
Funding	Materials & Resources Provided by CT DEEP
Timeframe	01/2019 - 12/2019
Priority	Medium

Action #6

Coordinate with NEMO and CRCOG to share resources and gain technical support for hazard mitigation actions involving stormwater management and public outreach, which have parallel benefits related to MS4 stormwater permit compliance.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Prevention
Lead	Public Works
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	01/2020 - 12/2020
Priority	Medium

Action #7

Participate in EMI courses or the seminars and annual conference held by the Connecticut Association of Flood Managers.

Goal	3. Improve institutional awareness and understanding of natural hazard impacts and mitigation within municipal governments and other decision-making bodies
Category	Education & Awareness
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget
Timeframe	07/2019 - 06/2024
Priority	Medium



Action #8

Address easement issues being worked through with regards to a bridge upgrade, and complete construction.

Goal	5. Improve the resilience of local and regional utilities and infrastructure using strategies including adaptation, hardening, and creating redundancies.
Category	Structural Projects
Lead	Public Works
Cost	\$25,000 - \$50,000
Funding	Town Operating Budget / Grants
Timeframe	07/2021 - 06/2023
Priority	Medium

Action #9

Implement an educational system for property owners, including appropriate materials and means for information dissemination. (Include information on importance of properly maintaining private trees).

Goal	6. Improve public outreach, education, and warning systems
Category	Education & Awareness
Lead	Emergency Management
Cost	\$25,000 - \$50,000
Funding	Town Operating Budget / Grants
Timeframe	01/2021 - 12/2023
Priority	Medium

Action #10

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.

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Property Protection
Lead	Planning
Cost	\$0 - \$10,000
Funding	Town Operating Budget / DEMHS
Timeframe	07/2021 - 06/2022
Priority	Low



Action #11

Complete and add on to identification of private properties served by private wells and/or on-site septic systems located within known flood risk zones.

Goal	3. Improve institutional awareness and understanding of natural hazard impacts and mitigation within municipal governments and other decision-making bodies
Category	Property Protection
Lead	Emergency Management
Cost	\$10,000 - \$25,000
Funding	Town Operating Budget
Timeframe	07/2021 - 06/2023
Priority	Low

Action #12

Coordinate with CT SHPO to conduct historic resource surveys, focusing on areas within natural hazard risk zones (such as flood or wildfire hazard zones and areas near steep slopes), to support identification of vulnerable historic properties and preparation of resiliency plans across the state. This action leverages existing resources and best practices for protection of historic and cultural resources through an ongoing statewide initiative by CT SHPO.

Goal	8. Ensure community character and social equity are addressed in mitigation activities
Category	Property Protection
Lead	Planning, in coordination with SHPO
Cost	\$10,000 - \$25,000
Funding	SHPO
Timeframe	07/2021 - 06/2023
Priority	Low

Action #13

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

Goal	1. Minimize the impact of natural hazards on physical buildings and infrastructure
Category	Property Protection
Lead	Planning
Cost	\$10,000 - \$25,000
Funding	Town Operating Budget / CT DEEP / DEMHS
Timeframe	07/2021 - 06/2023
Priority	Low



Action #14

Conduct outreach to owners of properties identified as being served by private wells and/or on-site septic systems located within known flood risk zones to educate them about strategies for protecting their properties. Include materials and recommendations for appropriate remediation of private utilities that have been subjected to flooding, for health protection and promotion.

Goal	6. Improve public outreach, education, and warning systems
Category	Education & Awareness
Lead	Emergency Management
Cost	\$10,000 - \$25,000
Funding	Town Operating Budget
Timeframe	01/2021 - 12/2023
Priority	Low












Capitol Region Natural Hazards Mitigation Plan Update




Manchester, Connecticut

Flood Plains, Dams & Critical Facilities




Critical Facilities

-  Fire Station
-  Police Station
-  School
-  Healthcare Facility
-  State Facility
-  Town Facility
-  Waste Water Facility
-  Emergency Center
-  NRHP Buildings/Sites

Dam Hazard Class

-  BB, A, AA OR Unclassified
-  Class B - Significant Hazard
-  Class C - High Hazard

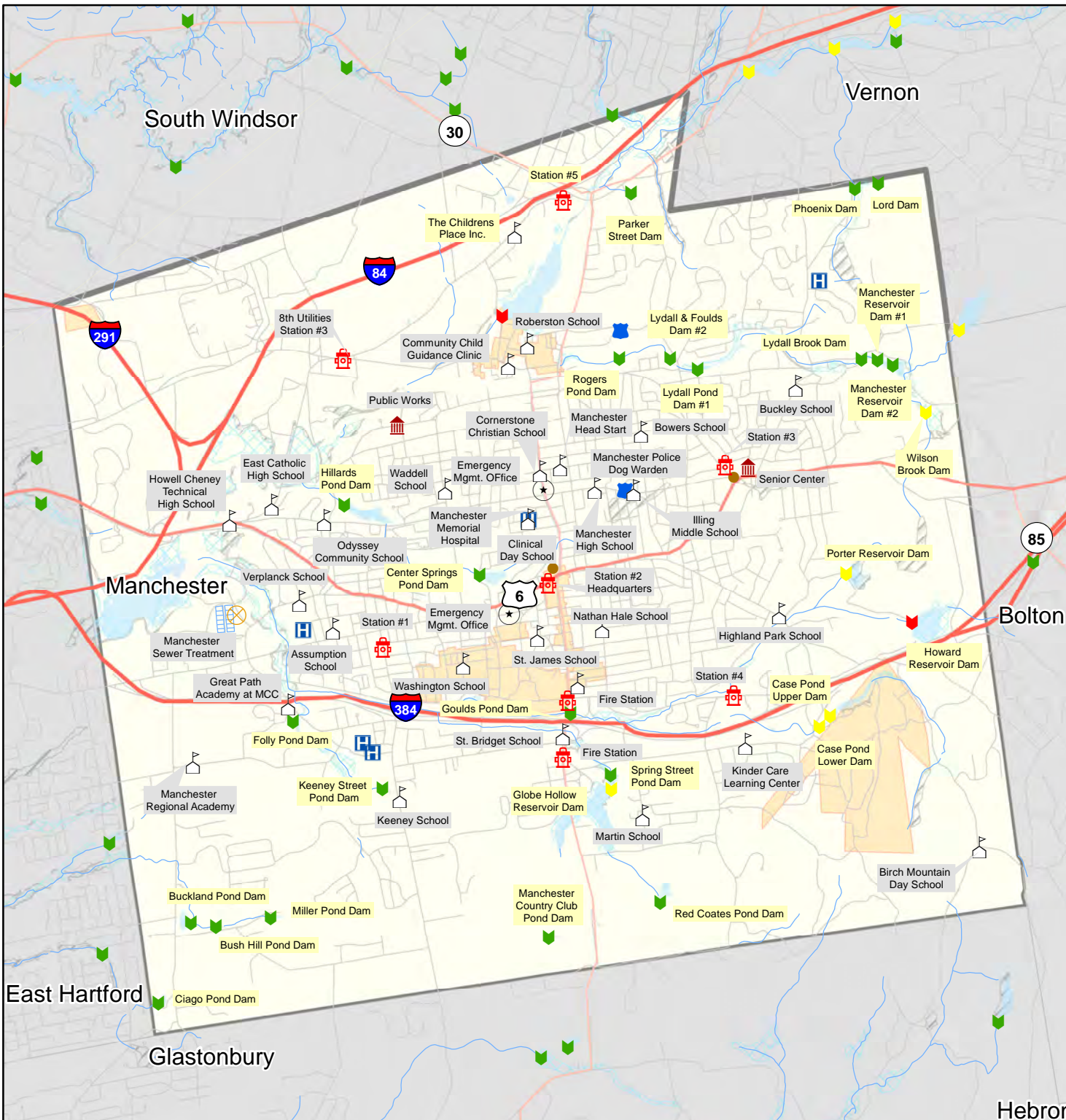
FEMA Flood Hazard Area

-  100 Year Flood Zone
-  500 Year Flood Zone
-  NRHP Districts/Areas

Data Sources: FEMA, National Register of Historic Places, CT DEEP, CRCOG, ESRI



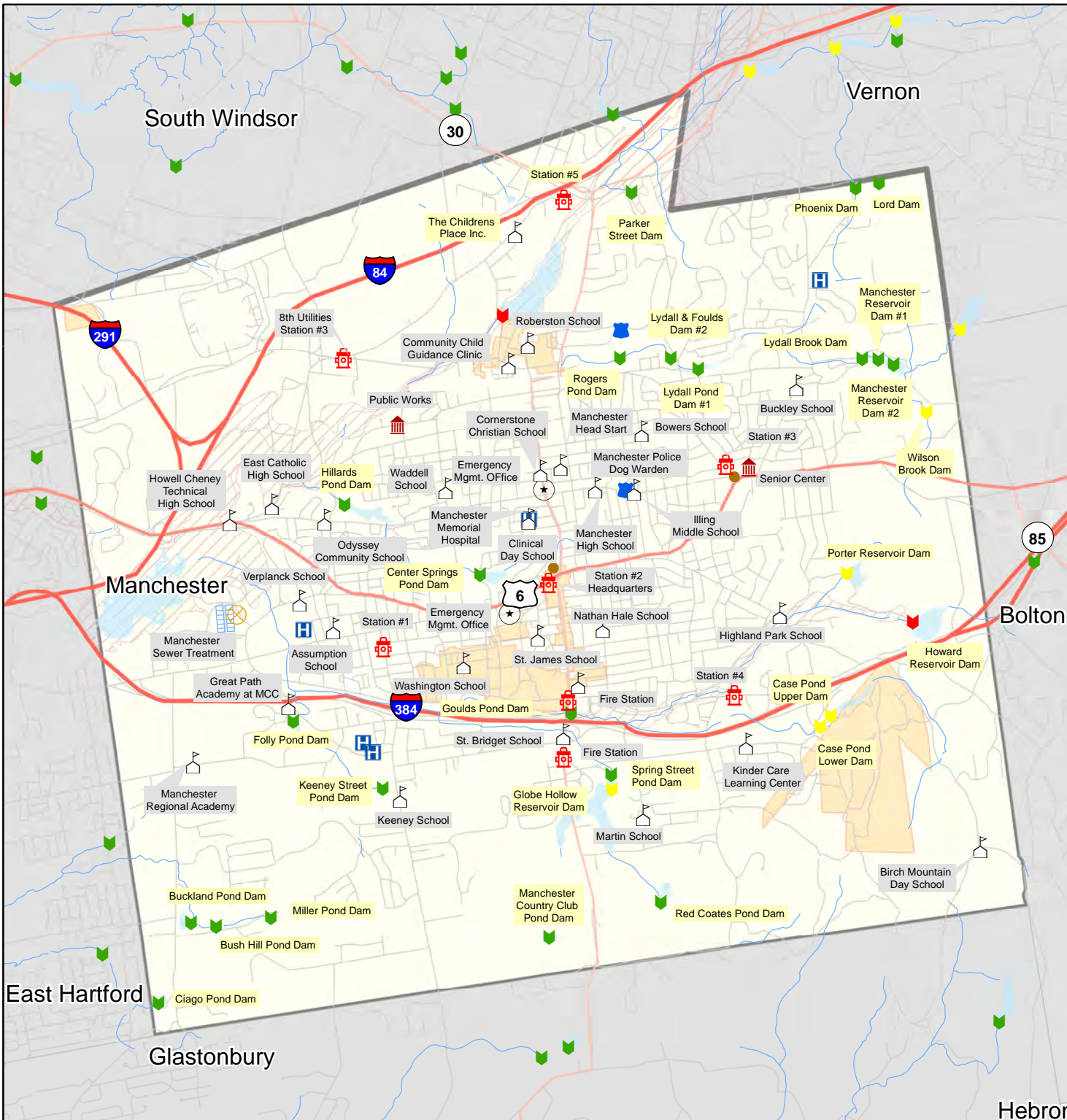
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






Capitol Region Natural Hazards Mitigation Plan Update

Manchester, Connecticut






Dam Breach Inundation Area & Critical Facilities



Critical Facilities

-  Fire Station
-  Police Station
-  School
-  Healthcare Facility
-  State Facility
-  Town Facility
-  Waste Water Facility
-  Emergency Center
-  NRHP Buildings/Sites

Dam Hazard Class

-  BB, A, AA OR Unclassified
-  Class B - Significant Hazard
-  Class C - High Hazard
-  Dam Breach Inundation Areas
-  NRHP Districts/Areas

Data Sources: FEMA, National Register of Historic Places, CT DEEP, CRCOG, ESRI



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