City of Attleboro, Massachusetts

Hazard Mitigation Update Project

Final Draft for Adoption
Hazard Mitigation Plan and
Municipal Vulnerability Preparedness Report

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EXECUTIVE SUMMARY

Hazard Mitigation planning is a proactive process used to systematically identify policies, actions and tools that can be used to reduce the dangers to life and property from natural hazard events. Amongst the communities of Bristol County, hazard mitigation planning tends to focus on flooding, the most likely natural hazard to impact these communities. The Federal Disaster Mitigation Act of 2000 requires all municipalities to adopt a local multi-hazard mitigation plan (HMP) and update their plan every five years in order to be eligible for FEMA funding for hazard mitigation grants.

The Massachusetts Executive Office of Energy and Environmental Affairs, Municipal Vulnerability Preparedness (MVP) grant program helps communities plan and take action towards becoming more resilient to the impacts of climate change. The program provides MVP Planning Grants to assist municipalities in preparing for the impacts of climate change through participation in a community climate vulnerability workshop and development of a climate change action plan and MVP Action Grants to fund the implementation of priority climate change adaptation actions.

This plan provides for both a hazard mitigation planning approach, as well as incorporating MVP provisions for Attleboro that are related to increasing resiliency associated with climate change impacts. This provides Attleboro with a holistic assessment and implementation plan for both hazard mitigation and climate change resiliency.

Planning Process

Planning for the Hazard Mitigation Plan and Municipal Vulnerability Preparedness Plan (HMP-MVP) was led by Attleboro's Municipal Vulnerability Preparedness/Hazard Mitigation Core Committee ("Core Committee"). This Core Committee was composed of staff from a number of different Attleboro Departments along with members from local non-profits and City residents. The Core Committee met on September 30, October 28, and December 16, 2019, and a Municipal Vulnerability Preparedness Workshop was held on January 11, 2020. During these meetings, the group planned for the Workshop reviewed public comments, discussed where the impacts of natural hazards most affect the City, what the goals are for addressing these impacts, developed the mitigation plan, and transitioned to implementation of the plan's mitigation strategies

Attleboro's Core Committee held a public meeting/listening session on November 4, 2020. Additionally, the draft plan was posted on Attleboro's website for public review. Key Attleboro stakeholders and neighboring communities were notified of the public meetings and invited to submit comments.

Risk Assessment

The Attleboro HMP-MVP assesses the potential impacts to Attleboro from a variety of natural disasters including flooding, high winds, winter storms, brush fire, geologic hazards, extreme temperatures, and drought. These are shown in the map series located in Appendix B. Attleboro's Core Committee identified 127 Critical Facilities. These facilities are also shown in the map series and listed in Table 4-4, identifying which facilities are located within the mapped hazard zones.

Hazard Mitigation Goals

The following list of goals was endorsed by the Core Committee for Attleboro HMP-MVP 2020:

1. Prevent and reduce the loss of life, injury, public health impacts and property damages resulting from natural hazards.

2. Use best available data and management practices to prepare for and address the adverse effects of changing weather patterns (i.e., climate change).
3. Provide for effective hazard preparation and implementation through appropriate:

    - Funding.
    - Personal training and transfer of knowledge and skills.
    - Equipment and capital improvement (e.g., infrastructure).
    - Emergency systems.
    - Communication and notifications systems.

4. Educate the public about hazard mitigation and provide opportunities for the public to engage in hazard mitigation planning.
5. Encourage the business community, major institutions and nonprofits to work with Attleboro to develop, review, and implement the hazard mitigation plan.
6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation and mitigation for hazards that affect multiple jurisdictions.
7. Incorporate hazard mitigation, as appropriate, into Attleboro plans and policies to ensure effective preparedness and proper land development.

Hazard Mitigation Strategy

The Core Committee identified and discussed a number of mitigation measures that serve to reduce Attleboro's vulnerability to natural hazard events. Overall, the hazard mitigation strategy recognizes that mitigating hazards for Attleboro will be an ongoing process as natural hazards and the steps that can be taken to mitigate their damages evolve over time. Climate change and a variety of other factors impact Attleboro's vulnerability. In the future, local officials will need to work together across municipal lines, and with state and federal agencies, to understand and address these changes. The hazard mitigation strategy will be incorporated into Attleboro's other related plans and policies. The integration of the HMP-MVP with other City policies will ensure that all areas of planning and development within Attleboro will recognize and incorporate hazard mitigation measures.

Plan Development Process

The City of Attleboro's last Hazard Mitigation Plan was approved in 2004. The 2004 plan provided a starting point with respect to considering hazards, vulnerabilities, and mitigation strategies that were under consideration at that time. Moving forward into the next five-year plan implementation period there will be many more opportunities to incorporate hazard mitigation into Attleboro's decision-making processes. Although not formally documented in the 2004 plan, this update discusses the actions take, challenges met, and mitigation actions successfully adopted since that time. This accountability process will ensure ongoing plan maintenance by the Core Committee, as described in Section 9 Plan Adoption and Maintenance.

1.0 INTRODUCTION

1.1 What is a Hazard Mitigation Plan and Municipal Vulnerability Preparedness Plan?

Natural disasters such as earthquakes, hurricanes, and flooding can result in loss of life and property. Hazard mitigation is the effort to lessen the impact of these natural disasters. Hazard mitigation is the process of identifying potential threats, risks, and vulnerabilities that communities face with natural disasters and developing short-term actions and long-term strategies to protect human life and property. Hazard mitigation actions can be implemented before, during, or after a natural disaster, but are most beneficial when they are implemented *before* a natural hazard event occurs when they can prevent the adverse effects of impacts. Actions and long-term strategies may include infrastructure projects, policy changes, operational changes, community planning, education programs, and other activities.

According to the Federal Emergency Management Agency (FEMA), the purpose of mitigation planning is to identify local policies and actions that can be implemented to reduce risk and future losses from hazards.[1] Hazard mitigation planning uses a stepped process that includes an assessment of hazards, vulnerabilities, and risks, and the development of the policies, tools, and actions to mitigate those risks. This process benefits from the participation of a wide range of stakeholders and the public by creating awareness of potential threats, offering community-based information and feedback on the practicality of planning actions.

Mitigation planning offers a number of additional benefits, which may include:

- Actions that will reduce loss of life and property are identified by the community and stakeholders.
- A focus on populations and resources that are most vulnerable to natural hazards.
- Community education in hazard mitigation, which allows the public to better prepare for natural hazards.
- Cobenefits from alignment with other community goals, such as conserving natural resources.
- Well-defined priorities, which can be communicated to local, state, and federal government.[2]

Hazard mitigation actions can be categorized based on their intended benefit, such as natural resource protection. These approaches vary in terms of the types of actions taken and how those actions are administered at the local level. Measures are generally sorted into the following groups:

Table 1-1. Hazard Mitigation Measures

Measure	Action	Examples
Prevention	Regulations that impact development in the community, such as buildings, infrastructure and open space. Actions can also include public involvement to mitigate losses.	Updating zoning regulations, construction regulations, stormwater regulations, and Capital Improvement Plans
Property Protection	Improvements to existing infrastructure that increase the infrastructure's ability to resist damage from a natural hazard.	Moving the infrastructure from the hazard area, flood-proofing, putting buildings on stilts

[1] https://www.fema.gov/hazard-mitigation-planning

[2] FEMA Local Mitigation Handbook

Measure	Action	Examples
Public Awareness and Education	Education of citizens, local officials, and stakeholders about potential natural hazards and efforts to mitigate their effects.	School and adult education classes, information centers, community outreach projects
Natural Resource Protection	Preservation and restoration of natural systems and efforts to protect them in event of a natural hazard.	Restoration, management, and preservation of natural resources such as wetlands and forests
Structural	Building new structures or modifying existing structures to reduce negative impacts of natural hazards.	New or updated stormwater management infrastructure, such as culverts, drainage systems, and retaining walls
Emergency Services Protection	Emergency service protection to ensure that the service is functional before, during, and after a natural hazard event.	Protection of police, fire, and medical facilities, warning systems, and other emergency response facilities

Source: *FEMA Local Multi-Hazard Mitigation Planning Guidance*, MAPC

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act specifically addresses mitigation planning and requires state and local governments to prepare multi-hazard mitigation plans as a precondition for receiving FEMA mitigation project grants. The Stafford Act sets forth the criteria necessary for a state or local government to meet mitigation plan requirements. The standard mitigation plan must include the following components:

- Description of the planning process
- Risk assessment of natural hazards
- Mitigation strategy
- Process for coordination of local mitigation planning
- Plan maintenance process
- Plan adoption process
- Compliance assurances

Hazard mitigation plans increase public awareness of natural hazards that may affect the community. They allow state, local, and tribal governments to work together and combine hazard risk reduction with other community goals and plans. Hazard mitigation plans focus resources and attention on the community's greatest vulnerabilities, and allow potential funding sources to understand a community's priorities.

In 2017, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) initiated the Commonwealth's Municipal Vulnerability Preparedness (MVP) grant program to help communities plan and become more resilient to the impacts of climate change. The program provides MVP Planning Grants to assist municipalities in preparing for the impacts of climate change through participation in a community climate vulnerability workshop and development of a climate change action plan. Communities that complete the planning grant program receive a designation of "Certified MVP Community."

Certification provides a community with an increased standing in other state grant programs as well as eligibility for MVP Action Grants. MVP Action Grants fund the implementation of priority climate change adaptation actions that have been described in the municipality's MVP plan. The City of Attleboro received an MVP Planning Grant to prepare an MVP report. The City also received a FEMA grant to update its hazard mitigation plan (HMP).

Many of the required steps of the MVP process also satisfy requirements for updating the HMP. As a result, the City prepared this joint HMP-MVP in accordance with FEMA guidelines for hazard mitigation planning (Title 44 Code of Regulations (CFR) 201.6) and with the EEA requirements to follow the Community Resilience Building (CRB) Workshop Guidance, developed by The Nature Conservancy. By combining the planning efforts for the HMP and the MVP, the City of Attleboro is able to consider the impacts of climate change along with hazard mitigation, following the lead established by the Commonwealth when it adopted the first-ever *Massachusetts State Hazard Mitigation and Climate Adaptation Plan* (2018).

1.2 Previous Federal/State Disasters

Federal hazard mitigation assistance as well as statewide hazard mitigation assistance, provides funding for both structural and non-structural activities. For example, funding assistance can be used for modificarions to a facility or for the development of new design standards, as well as community planning initiatives such as developing land-use zoning plans. By participating in hazard mitigation initiatives, a community can minimize damages from a disaster, potentially saving lives, personal property, public resources, and reducing financial losses for residents, businesses and government agencies. To understand the importance of hazard mitigation, it is useful to know the types and frequencies of disasters that have occurred in Massachusetts historically.

Generally, natural hazards that affect Massachusetts are storm-related, including flooding, blizzards, and hurricanes. Since 1991, there have been 22 storms in Massachusetts that resulted in federal or state disaster declarations. Ten of those disaster declarations occurred in Bristol county, where Attleboro is located. Many of these storms caused severe flooding. These disasters and the related assistance from FEMA are described in Table 1-2.

Table 1-2. Previous Federal and State Disaster Declarations

Disaster Name and Date of Event	Disaster Number	Type of Assistance	Counties Under Declaration
Hurricane Bob August 19, 1991	DR-914	FEMA Hazard Mitigation Grant Program	Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
Severe Coastal Storm October 30-November 2, 1991	DR-920	FEMA Hazard Mitigation Grant Program	Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
Blizzard January 7-13, 1996	DR-1090	No funding reported	All 14 Massachusetts Counties, including Bristol

Table 1-2. Previous Federal and State Disaster Declarations

Disaster Name and Date of Event	Disaster Number	Type of Assistance	Counties Under Declaration
Severe Storms/Flooding October 20-25, 1996	DR-1142	FEMA Hazard Mitigation Grant Program	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
Heavy Rain and Flooding June 13-July 6, 1998	DR-1224	FEMA Hazard Mitigation Grant Program	Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
Severe Storms & Flooding March 5-April 16, 2001	DR-1364	FEMA Hazard Mitigation Grant Program	Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
Flooding April 1-30, 2004	DR-1512	FEMA Individual & Households Program; FEMA Hazard Mitigation Grant Program	Essex, Middlesex, Norfolk, Suffolk, Worcester
Severe Storms and Flooding October 7-16, 2005	DR-1614	FEMA Public Assistance; FEMA Individual & Households Program; FEMA Hazard Mitigation Grant Program	All 14 Massachusetts Counties, including Bristol
Severe Storms and Flooding May 12-23, 2006	DR-1642	FEMA Public Assistance; FEMA Individual & Households Program; FEMA Hazard Mitigation Grant Program	Middlesex, Essex, Suffolk
Severe Winter Storm and Flooding December 11-18, 2008	DR-1813	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	All 14 Massachusetts Counties, including Bristol
Severe Storm and Flooding March 12-April 26, 2010	DR-1895	FEMA Public Assistance; FEMA Individual & Households Program; FEMA Hazard Mitigation Grant Program	Bristol, Essex, Middlesex, Suffolk, Norfolk, Plymouth, Worcester

Table 1-2. Previous Federal and State Disaster Declarations

Disaster Name and Date of Event	Disaster Number	Type of Assistance	Counties Under Declaration
Severe Winter Storm and Snowstorm January 11-12, 2011	DR-1959	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	Berkshire, Essex, Hampden, Hampshire, Middlesex, Norfolk, Suffolk
Severe Storm and Snowstorm October 29-30, 2011	DR-4051	FEMA Public Assistance; FEMA Public Assistance Snow Removal; FEMA Hazard Mitigation Grant Program	Berkshire, Franklin, Hampden, Hampshire, Middlesex, Worcester
Severe Winter Storm, Snowstorm, and Flooding February 8-9, 2013	DR-4110	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	All 14 Massachusetts Counties, including Bristol
Severe Winter Storm, Snowstorm, and Flooding January 26-28, 2015	DR-4214	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, Worcester
Severe Winter Storm and Snowstorm March 13-14, 2018	DR-4379	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	Essex, Middlesex, Norfolk, Suffolk, Worcester

Source: MEMA 2019; FEMA 2018b; EEA and EOPSS 2018, 6-24 and Appendix B

1.3 FEMA Funded Mitigation Projects

Attleboro participates in the National Flood Insurance Program (NFIP).[3] The NFIP is a Federal program administered by FEMA enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. NFIP offers flood insurance to communities that comply with the minimum standards for floodplain management.

NFIP uses a Community Rating System (CRS) to award communities that go beyond the minimum standards with lower flood insurance premiums for property owners. Incentives are awarded upon a credit system for various activities. Points are awarded to communities that prepare, adopt, implement, and update a comprehensive flood hazard mitigation plan using a standard planning process. Attleboro is not currently eligible to participate in the CRS Program, but the City may wish to consider volunteering for the CRS in the future.[4]

[3] https://www.fema.gov/national-flood-insurance-program

[4] https://www.fema.gov/national-flood-insurance-program-community-rating-system

2.0 COMMUNITY PROFILE, LAND USE AND DEVELOPMENT TRENDS

2.1 Geography, Topography, Geology and Climate

Attleboro sits on the border between Massachusetts and Rhode Island and is 12 miles north of Providence. Attleboro is considered part of the Providence metropolitan area. The city also has close ties to the Boston metropolitan area because of its proximity and direct access via train and highway. The city is bordered by North Attleboro to the north, Mansfield and Norton to the east, Rehoboth, Seekonk and Pawtucket, RI to the south, and Cumberland, RI to the west.

Topographically, Attleboro's terrain is generally level with low hills as well as many wetlands, lakes, rivers, and ponds. Elevations range from 100 to 140 feet above sea level. An environmental inventory and soils analysis was completed as part of the *Attleboro's Open Space and Recreation Plan* (2009). In summary, when glaciers receded from the area thousands of years ago, they left behind thick deposits of sand and gravel lying over bedrock, and boulders of various rock types. Geologically, the area consists of highly porous soils, deposits of sand and gravel, and a high water table. The most common soils include:

- Glacial Till - clays, silt, sand and boulders transported and deposited by glacial ice. Soils of this type are less permeable, meaning that they do not drain well and are hard for roots to penetrate. Glacial till is found in the areas of Highland Avenue, Walnut Grove Hill, Ides Hill, Locust Street, and Manchester Reservoir. Each of these areas are characterized by bedrock outcrops and may have slopes greater than 15%. Other soils associated with glacial till are located in varying degrees throughout the Attleboro area. Whitman soils, consisting of a loamy till material, are often used for agricultural purposes. Whitman soils are usually found in depressions and drain ways with slopes of less than three percent. In Attleboro, these soils are found in the areas of Richardson Avenue, Read Street and lower County Street.

- Glacial Outwash Plains – even-sized gravel, sand and silt deposited by melt water which flowed from retreating glacial ice. Soils associated with glacier outwash are the most common types found in Attleboro. Hinkley and Windsor soils, found throughout Attleboro, are commonly utilized for sand and gravel mining operations such as those found along Read Street, lower County Street, Handy Street and Thurber Avenue. Glacial outwash plains are often associated with groundwater.

- Organic and Hydric soils - contain high organic content (mainly of decomposing vegetative materials) and are often saturated with water. These soils are poorly to very poorly drained and are often found in low areas. Medisaprist soils are the most common type of organic soils found in Attleboro. These soils are low-lying soils with organic material that range from 16 inches to more than 10 feet of thickness. The water table is commonly located near or at the ground surface for more than nine months of the year in these areas. Medisaprist soils are found along river basins and associated wetlands such as those in the vicinity of the Bungay River basin, the Seven Mile River basin, Chartley Brook, and the Locust Valley area.

Attleboro features a number of rivers. For example, the Ten Mile River, which flows from North Attleboro towards Attleboro's downtown, where it converges with the Bungay River. The River then flows southerly into Seekonk on its way to Narragansett Bay. The Ten Mile River is channelized and impounded at Falls Pond in North Attleboro, and again in Attleboro's core area, where the river historically supported industries. Parts of the Seven Mile River are also located in Attleboro.

Surface water accounts for 0.79 square miles of Attleboro in the form of nine ponds: Manchester Pond (253.8 acres), Orrs Pond (59.6 acres), Dodgeville Pond (52.9 acres), Chartley Pond (30.1 acres), Hebronville Pond (24 acres), Mechanics Pond (19 acres), Luther Reservoir (16.5 acres), Cooper's Pond (13.2 acres), and Cranberry Pond (12.4 acres). The Massachusetts Bureau of Dam Safety (BDS), a division of DCR, reports that Attleboro has 16 dams, of which the City of Attleboro owns 11. Four of these dams are classified as high risk—an indication that failure of these dams could do considerable damage to person and property. Those dams are Manchester Pond Dam, Hebronville Pond Dam, Manchester Reservoir South Dike, and Manchester Reservoir East Dike.

The National Climatic Data Center provides climate data summaries for each state. Massachusetts is separated into three climatic divisions—the Coastal Division (10 - 20 miles from the Atlantic Coast), the Western Division (including about one-fourth of the western portion of the state), and the Central Division (comprising about 50% of the state).[5] The average annual temperature in the Central Division, where Attleboro is located, is 40 degrees Fahrenheit. Long-term averages for summer temperatures (July) are generally 67-70 degrees, with an average 5-15 days with temperatures over 90 degrees. Although this can vary from year to year and from place to place. The Central Division averages in the mid-upper 20s in the winter, with 5-15 days of subzero temperatures.[6]

In terms of precipitation, Massachusetts usually receives a relatively consistent depth of precipitation throughout the year (two to six inches monthly) and does not have a particular rainy or dry season. Attleboro experiences occasional thunderstorms bringing heavy, concentrated rainfall that can create flooding and erosion. Most precipitation occurs in longer, steady storms; however, extreme events such as hurricanes and Nor'easters also contribute to Attleboro's precipitation.[7] Short-lived droughts occur periodically, however, extensive droughts only occur once every few decades.

Winter weather varies dramatically from the coastal division westward, and winter precipitation in the form of rain or snow varies as result of the direction of each storm, elevation, and other factors. Snowfall also varies considerably from year to year. Coastal areas of Massachusetts may receive 25-30 inches in a year, while the Western Division receives 60-80 inches annually. In the Central Division, the average number of days with over one-inch of snowfall is about 10-20 days.

The prevailing wind comes from a westerly direction, although topography factors in greatly. Easterly winds tend to occur in May. Coastal storms, or Nor'easters, which typically thought of as winter storms, can actually occur any time of year with very strong winds and heavy rain or snow.[8] Attleboro's specific climate history and vulnerabilities are detailed in section 4 of this plan.

2.2 Population and Political Structure

Attleboro is an urban community with a population of 44,326.[9] The City encompasses a total land area of 27.5 square miles, with an average population density of 1,594 persons per square mile. Attleboro has an age-diverse population with 23% of the population under the age of 18 and 14.1% of the population over the age of 65.[10] Attleboro has experienced a steady population increase over the past

[5] NOAA, National Climate Data Center, Climates of the States, Climatography of the United States No. 60, p. 2.
[6] Ibid, p. 3.
[7] Ibid.
[8] Ibid, p. 5.
[9] American Community Survey, 2017
[10] Ibid.

30 years and is expected to continue to grow slightly.[11] Consistent with national trends, Attleboro is seeing a rise in the number of residents over 65 years of age. Table 2-1 below shows the increase in the 65 and older population in Attleboro from 2010 - 2017.

Table 2-1: Attleboro's Population, 65 Years of Age and Older 2010-2017

Year	Population Age 65 Years and Older	Percent of Total Population
2010	5,166	11.9%
2011	5,338	12.3%
2012	5,528	12.7%
2013	5,709	13.1%
2014	5,774	13.2%
2015	5,814	13.2%
2016	6,051	13.7%
2017	6,245	14.1%

Source: US Census Bureau and Policy Map.com

Attleboro's population of people under the age of 18 declined 2.4% between 2000 and 2010 but then remained relatively constant at 23% of the total population through 2017.[12]

The overall percentage of people in Attleboro with a reported disability has remained consistent at 12.9% for the last decade; however, the number of people over the age of 65 with a disability has increased from 34% in 2008 to 39.8% in 2017. Other age groups remained constant or declined slightly. The number of individuals who also lived in poverty declined from 1,248 in 2008 to 1,008 in 2017.[13]

2.3 Transportation Network

Attleboro has an estimated total of 271 miles of roadway based on MassDOT data in MASSGIS. Route 152, which includes Main Street, serves as the major north/south route and Route 123 serves as the major east/west route. Thirteen miles of Interstate 95 runs through the western portion of the City. According to the MassDOT, Attleboro has 64 bridges, of which three have been deemed deficient and another two are in unknown condition.[14] Deficient bridges include:

- Route152 (S. Main Street) where the road spans Thatcher Brook west of Dodgeville Pond;
- Interstate 95 South where the road spans Route 123 (South Avenue);
- Interstate 295 ramp where the road spans the Ten Mile River.

[11] University of Massachusetts Institute, Summary of U.S. Census Bureau's 2018 Population Estimates for Massachusetts Cities and Towns
[12] American Community Survey, 2017
[13] Ibid.
[14] Massachusetts Department of Transportation Bridge Inspection Management System (BIMS)

Attleboro has a rail system the includes Amtrak service and the MBTA Providence/Stoughton Commuter Rail Line. Attleboro is home to two MBTA commuter rail stations, one in the downtown area and the other in the South Attleboro district, near the Rhode Island border, at 1315 Newport Avenue. Attleboro is also served by the Greater Attleboro Taunton Regional Transit Authority (GATRA), which provides bus transit for parts of the City and the surrounding region.

2.4 Land Use

It is important to understand existing land-use patterns and uses when considering vulnerability and preparedness related to natural hazards. Table 2-2 below identifies the various types of land uses and the percentage of Attleboro's land mass within each category as classified by the Massachusetts Department of Revenue. These statistics were compiled by the Attleboro Tax Assessor's Office. Roadways and water bodies were not part of this evaluation and constitute additional land area within the City.

Table 2-2. Attleboro's Land Use

Attleboro Land Use	Acres	% of Total Acreage
Forest	61	<1%
Water	100	<1%
Residential (improved and developable)	7,295	41%
Recreational, Open Space, and Conservation (inc. Municipal Vacant)	3,203	18%
ROW (public and private)	1,649	9%
Industrial/Manufacturing/Warehouse/Mining	916	6%
Commercial (Developed and Vacant)	464	3%
Public Service/Institutional/Educational/Religious	289	2%
Utility	266	1%
Agricultural/Pasture	213	1%
Rail and Rail ROW	128	<1%
Vacant Not Developable (Residential, Commercial, Industrial)	120	<1%
Office	55	<1%
Other	3,033	17%
TOTAL	**17,792**	**100%**

Source: Attleboro Tax Assessor Data

Using MassGIS data layers, it is estimated that approximately 1,760 acres of land are within the 100-year floodplain. This land is neither permanently protected nor under the River's Protection Act. Some of this land may be wetlands or portions of developed lots.

According to the 2017 American Community Survey, Attleboro has a total of 18,448 housing units of which 55.9% are single-family detached units. 34.7% of the remaining units are two-family or multi-family structures and 3.5% as mobile home units. Of the total number of housing units, 41.8% were constructed

prior to 1960. Attleboro housing includes to eight mobile home parks, of which six are for residents over the age of 55. The eight mobile home parks, their locations, and type of residency are listed in Table 2-4, below:

Table 2-3. Mobile Home Parks in Attleboro

Park Name	Location	Type
Birchwood	1340 County Street	Family
Oak Hill	1003 Oak Hill Avenue	Family
Libert Estates	County Street	Over 55
Eastlande	1346 Newport Avenue	Over 55
Tripp	Colvin Street	Over 55
Case Mobile Home	Colvin Street	Over 55
Red Oak	Collin Street	Over 55
Sandcastle	500 Mendon Road	Over 55

Mobile home parks with residents 55 and older represent higher concentrations of elderly that may need additional services during natural disaster related events.

2.5 Cultural and Historical Sites

Attleboro has nine individual historic properties and two historic districts on the National Register of Historic Places. The districts are Blackinton House and Park, located on North Main Street, and Hebronville Mill Historic District near Knight Avenue, Read and Phillip Streets. Together these districts include 45 structures. In addition, numerous cemeteries, stonewalls, and archeological sites throughout the City represent significant cultural, heritage, and historical resources. Capron Park is a 40-acre facility located in the central part of the city. The park includes the six-acre Capron Park Zoo, which is home to approximately 110 animals. Sweet Memorial Forest, a tot-lot, softball fields and open recreation areas are also located within the park.

2.6 Utilities

Utilities are especially critical during hazard events, as they supply emergency services and support other activities required for post-storm cleanup and recover. Furthermore, utilities are essential for residents dependent on electrical medical devices. Utility services are often susceptible to disruption during windstorms, and outages can hinder response and recovery efforts. Throughout Attleboro, electrical service is provided by National Grid, which maintains a web page showing outages throughout Massachusetts and by county.[15] Residents without power (but with a mobile phone) can report outages through National Grid's website or via text. Residents who require electricity for life sustaining equipment can notify National Grid by completing a form.[16]

Natural gas is provided by Columbia Gas. Gas line disruption occurs when lines are damaged or service work is being performed. Like National Grid, Columbia Gas provides information on outages on its website.[17]

Drinking Water

[15] https://www.nationalgridus.com/MA-Home/Storms-Outages/Outage-Map

[16] https://www.nationalgridus.com/MA-Home/Storms-Outages/Life-Sustaining-Equipment

[17] https://www.columbiagasma.com/services/alert-center

The City of Attleboro Water Department oversees the City's water supply. Municipal water comes from the upper reaches of the Seven Mile River including Luther Reservoir, Manchester Reservoir, and Orrs Pond. The water is treated at the Russell F. Tennant Water Treatment Plan. The City of Attleboro maintains the Orrs Pond Water Resource Protection District (covering lands around and including the Manchester Pond Reservoir, Luther Reservoir and Orrs Pond) and the Bungay River Water Resource Protection District.

As a whole, residents and industry in Attleboro withdraw between 3 and 6 million gallons of water each day, depending on the season. In 2019, Attleboro pursued a back-up connection to the Pawtucket Reservoir as an emergency back-up.

Wastewater Treatment
Attleboro has a municipal water sewer system serving approximately two-thirds of the City. The remainder of the City is serviced by individual septic systems and private wells.

2.7 Observations

The following general characteristics are relevant to the design and implementation of disaster mitigation strategies for the City of Attleboro:

- Historical development patterns have concentrated development along the waterways. The core downtown area contains many buildings constructed at or very near the edge of the Ten Mile River. A significant number of buildings are located within close proximity to a channelized and dammed river. This creates a circumstance where many properties are located within flood zones.
- Attleboro is a growing community with a dense downtown area and—to varying degrees—densely populated outlying areas. A significant amount of development, taking the form of re-development and infill in the downtown area, is planned and anticipated with continued development expected to be built at the outskirts of the City. This pattern of development has been consistent since the 2004 HMP; therefore, there have been no changes in development pattern that are impacting the overall vulnerability of the City.
- Mobile homes are particularly vulnerable to natural hazards and according to the American Community Survey 2017, there are 613 mobile homes in Attleboro. The Council on Aging reports that many of the residents of these mobile homes are elderly.
- The Capron Park and Zoo presents a unique resource, which will require additional considerations during natural disaster events in order to protect the safety of the animals and the public.
- Attleboro's aging housing stock presents a circumstance where a majority of buildings pre-date current building codes.
- Many of Attleboro's bridges, roadways, and dams are beyond their intended design life and may be at risk of failure during natural hazard events.
- Privately owned dams present a particular problem as the City has little control over the condition of these facilities. In particular the Dodgeville, Mechanics Pond, and North Attleborough controlled Falls Pond dam are all concerns for Attleboro.

- Attleboro is home to easily accessible rail systems, which should be considered when planning for natural disasters.
- According to the EPA RCRA data available on the EPA Enviromapper, Attleboro has 216 users of potentially hazardous materials. Enforcement of regulations on storage and monitoring are important to prevent a hazardous materials release associated with natural hazard events.

3.0 PLANNING PROCESS & PUBLIC PARTICIPATION

Planning for hazard mitigation and climate change resilience requires a public process that involves stakeholders and the general public. This section describes the process Attleboro used to develop and approve the HMP-MVP 2019 Update.

3.1 Planning Process Summary

To prepare this HMP-MVP, the City of Attleboro followed the process described in the *Community Resilience Building Workshop Guidebook*, developed by The Nature Conservancy. The Guidebook presents a clear approach on how to organize the public process for reducing the impacts of, and increasing resilience against, natural hazards and climate change. An important aspect of the natural hazard and climate change impact mitigation planning process is the discussion it fosters among community residents about how to create a safer, more resilient community. Developing a plan that incorporates values and priorities of City residents is likely to garner more community support and result in greater success in implementing strategies that reduce overall risks to quality of life, public safety, property, and resources.

Community Resilience Building Workshop Guidebook

The Community Resilience Building Workshop Guidebook provides a process for developing resilience action plans. The process has been implemented and successful in over one-hundred communities. The process, outlined below, is rich in information and dialogue and results in actionable plans and strong collaboration.

The Community Resilience Building Workshop Guidebook's central objectives are to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengthen and vulnerabilities;
- Develop prioritized actions for the Community;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

Federal regulations for natural hazard mitigation plan approval require that stakeholders and the general public are provided with opportunities to be involved during the planning process and in the plan's maintenance and implementation. Community members can provide input that can affect the content and outcomes of the mitigation plan. The planning and outreach strategy used to develop the HMP-MVP focuses on three groups: 1) the **Core Committee**, with representation from municipal leadership at the City of Attleboro, 2) **Key stakeholders** who could be particularly vulnerable to, or provide defense against, natural hazards or climate change, and 3) the **public**, who live and work in Attleboro.

3.2 The Local Multiple Hazard Planning Committee

The City of Attleboro, with support from the Planning Department, convened a Core Committee to act to guide the development of the HMP-MVP. The Core Committee met on September 30, October 28, and December 16, 2019. Summaries of these meetings are included in Appendix A.

The Core Committee established goals for the plan, provided information on hazards affecting the City, identified critical infrastructure, identified key stakeholders, reviewed the status of existing mitigation measures, and developed proposed mitigation measures for this plan. The Core Committee developed the invitation list for the Community Resilience Building Workshop, at which key stakeholders were invited to help the City identify hazards, vulnerabilities, strengths, and proposed actions to mitigate the impact of natural hazards and climate change. The Core Committee sought to include municipal leaders as well as politicians, representative from local nonprofit organizations, neighboring jurisdictions, regional organizations, and state government. Table 3-1 provides a list of the members of Attleboro's Core Committee.

Table 3.1. Attleboro's HMP-MVP Core Committee

Name	Affiliation
Bobby Araujo	Public Works
Gary Ayrassian	Planning Department
Roy Belcher	Attleboro Land Trust
Steve Brasier	Water Department
Wayne Cobleigh	Public
Derek Corsi	Park & Forestry
Ben Cote	Friends of the Ten Mile
Mark Cuddy	FB Insurance
Paul Danesi	Planning Board
Stephanie Davies	Planning Department
David Denneno	Sturdy Memorial Hospital
Keith Gonsalves	Ten Mile River Watershed Council
Tom Hayes	Wastewater Department
Kyle Heagney	Police Department
Paul Heroux	Mayor
Kathleen Ilkowitz	Mayor (Exec Secretary)
William Johnson	Wastewater Department
Scott LaChance	Fire Department
Jim MacDonald	Police Department
Bill McDonough	Building Department
Madeleine McNielly	Council on Aging
Greg O'Brien	Water Department
John Staskiewicz	Health Department
Mike Tyler	Public Works
Kourtney Wunschel	Water Department
Nick Wyllie	Conservation Commission
Bertha Young	Public

During the planning process, the Core Committee assembled relevant reports, maps, and other pertinent information related to natural hazards and climate change impact in Attleboro. These included:

- *City of Attleboro Hazard Mitigation Plan* (2004)
- *City of Attleboro Open Space and Recreation Plan* (2009)
- Massachusetts Climate Change Projections (NECSC, 2018)
- *Massachusetts Climate Change Adaptation Report* (MA EEA, 2011)
- Massachusetts State Hazard Mitigation & Climate Change Adaptation (MEMA & EOEEA 2018)
- *Location Mitigation Plan Review Guide* (FEMA, 2011)
- Flood Insurance Rate Maps for Bristol County, MA (FEMA, 2010)
- National Center for Environmental Information (NOAA)
- National Water Information System (USGS)
- Decennial Census (US Census Bureau, 2010)
- *American Community Survey* (US Census Bureau, 2013-2017)

3.3 Stakeholder Involvement: Community Resiliency Building Workshop

A key part of the planning process is the Community Resilience Building Workshop. This workshop brought together stakeholders with subject matter expertise and local knowledge and experience, including public officials, regional organizations, neighboring communities, environmental organizations, and local institutions. Individuals were invited to engage in an 8-hour Community Resilience Building Workshop, held on January 11, 2020. During the workshop, Weston & Sampson provided information regarding natural hazards and climate change. Workshop participants identified top hazards and infrastructural, societal, and environmental features in the City that are vulnerable to, or provide resilience against, these challenges. Participants identified and prioritized key actions that would work to improve the City's resilience to the natural and climate-related hazards. Eight-seven invitations were sent by the City to members of the community for the CRB worshop. Community representatives who participated are presented in Table 3-2.

Table 3-2. Community Resilience Building Workshop Attendees List

Name	Title
Gary Ayrassian	Planning
Roy Belcher	Land Trust
Barbara Clark	Land Trust
Wayne Cobleigh	Resident
Rick Conti	City Council
Derek Corsi	Parks & Forestry
Stephanie Davies	Planning
Gary Demers	Resident
David Denneno	Sturdy Memorial
Judy DePue	Land Trust
Cathleen DeSimone	City Council
Don Doucette	Friends of Ten Mile River

Nancy Doucette	Friends of Ten Mile River
Joe Feroce	Council on Aging
Kathi Gariepy	Conservation Commission
Jim Hawkins	State Representative
Kathy Ilkowitz	Mayor's Office
Bill Lewis	Land Trust
Jackie O'Brien	Health Department
Jason Parenteau	School Department
Brad Pittman	Resident
Amy Rhilinger	Library
Dave Rolince	Land Trust
Danica Warns	Mass Audubon
Ty Waterman	City Council
Nick Wyllie	Planning
Bertha Young	Resident

Identification of Top Hazards – Workshop participants were asked to identify the top four hazards or climate change impacts facing Attleboro. The hazards that were identified were: 1) floods; 2) wind; 3) climate change; and 4) heat and drought. The group participated in an extensive discussion that lead to the selection of these top hazards.

Discussion of Infrastructure – Workshop participants were asked to identify key infrastructure features in Attleboro that are most vulnerable to, or provide resilience against, natural hazards and climate change impacts. In some cases, infrastructure features were identified as doing both. Table 3-3 below provides an overview of those infrastructure features identified.

Table 3-3. Infrastructural Features in Attleboro

Vulnerabilities	Strengths
• Low RR Arch Underpass (3) Peck/Park County St Bridge/S. Main • Natural Gas pipline system • Electrical Transm/Substations • Power/Utilities • Floodplain (developed) • Charging Stations • Energy System (Renewable) • Commuter Rail/Public Transportation • Packup/ Hydroelectric/ EV Charging/ Solar • Stormwater System • Water Supply Infrastructure (Manchester Reservoir • Roads/Lots/Paving	• Commuter Rail/Public Transportation • Packup/ Hydroelectric/ EV Charging/ Solar • Stormwater System • Water Supply Infrastructure (Manchester Reservoir • Roads/Lots/Paving • Munciipal Buildings • Public Transportation System (MBTA, Schools) • Geo Thermal • Communication System

• Munciipal Buildings • Public Transportation System (MBTA, Schools) • Geo Thermal • Communication System	

Note: Some features are noted as both vulnerabilities and strengths and are, therefore, listed in both columns.

Discussion of Society and Vulnerable Populations – Workshop participants were asked to identify key societal aspects of Attleboro that are most vulnerable to, or provide resilience against, natural hazards and climate change impacts. As with infrastructure, in some cases, features were identified as doing both. Table 3-4 provides an overview of those features identified.

Table 3-4. Societal Features in Attleboro

Vulnerabilities	Strengths
• Geo Thermal/ Climate Awareness • Language Barriers • Rising Elderly Population • Hospital Services • Homesless Pop in Flood Plain • Increasing Senior Pop/ Sr. Housing • Health impacts to citizens/ all ages • Communications to vulnerable populating Non-English • Education/awareness courses online, radio, TV YouTube • Mental Health support, stress due to storms • Aging Population • Vulnerable (Medical) • Vulnerable (Behavioral) • Homeless/Low-Income • Communication Modes/Cultural/Language	• Literacy Center/Library • Population Increase • Council on the Aging/Interfaith Coll.

Note: Some features are noted as both vulnerabilities and strengths and are, therefore, listed in both columns.

Discussion of the Environment – Workshop participants were asked to identify key environmental features in Attleboro that are most vulnerable to, or provide resilience against, natural hazards and climate change impacts. Table 3-5 provides an overview of those features identified.

Table 3-5. Environmental Features in Attleboro

Vulnerabilities	Strengths
• Ten Mile River • Contaminated properties • Water Quality (WQ) • Compressor Station • Undeveloped Private Land, flood storage • Wetlands Land use policies • Invasive & harmful species disease. Moths/ticks/mosquitos/algae • Buildings in Flood-Prone Areas • Policies-Development • Trees/Canopy/Street Trees • Wildlife Habitat Cooridors • Biking/Walkability and Trails	• City Ordinance Update • Protected Open Space • Water Quality (WQ) • Undeveloped Private Land, flood storage • Thatcher Brook Preservation • Robbins Park Green Infrastructure • Wetlands Land use policies • Open Space/Conservation Areas • Policies-Development • Trees/Canopy/Street Trees • Wildlife Habitat Cooridors • Biking/Walkability and Trails

Note: Some features are noted as both vulnerabilities and strengths and are, therefore, listed in both columns.

Identification of Hazard/Climate Change Mitigation Strategies – Workshop participants focused considerable time and attention to identifying priority actions to address natural hazards and climate change impacts. The priority actions were then ranked in the order presented below. The input from the workshops was integrated throughout the HMP-MVP.

High Priorities

Flood

- Strengthen the dam and look at others and ratings.
- Look at nature designs for schools, city hall plan, library.
- Help FM faith groups assess private homes vulnerable to flood/fire.
- Shelter with resources.
- "A place to be" Improve volunteers at stations.
- Connect churches, etc., Children at school--regional approach, needs emergency management.
- Expand green comm. [communication], review development policy, retrofit existing development, evacuation protocol for elderly/assisted living.
- Constant reevaluation to keep up with conditions.
- More trees/correct ones in right places.
- Culverts designed for migration.
- Upgrade infrastructure.
- Improve emergency mgmt systems, create separate department for Emergency Management.
- Implement hazard notification system.
- Prevent development within floodplain.

- Increase Wetlands Protection Zoning setbacks.
- Adopt Community Preservation Act.
- Implement stormwater utility.
- Restore Floodplain.
- Apply for grants to increase flood control.
- Flood-Retrofit road elevation.
- Flood & Wind Hazard in winter. Tree Planting & trimming coordinated w/ city & National Grid.
- Systemwide capactiy assessment & equipment vac truck & stormwater utility for feasibility study Capital Improvement Plan.
- Flood- more housing & shelter options, meals, security. Faith based organizations/non-profits & social services couseling.
- Study on affordable housing for seniors. Power backup blizzards, prescription services, meals, senior center.
- Implement council on aging special needs assessment.
- Adapt automatic comm system to emergency pop.
- Map the available land & resilience function & atlas adjacent to open land for acquisition.
- Assess Flood protection valve/buffer/upland review.

Wind

- More debris, trees, get cleaning equipment.
- Plan for emergency backup, proper tree maintenance, put trees in right place, underground utilities and transformers.
- Options for people without insurance, Look at shared renewable, Council on Aging HVAC needs power update.
- Connect churches, etc., Children at school--regional approach, Needs emergency management professional and resiliency professional.
- Public education, good landscape ordinance and codes.
- Maintenance policy.
- Replace trees, tree diversity.
- Avoid clear cutting.
- Address hazard trees quicker.
- Diversify Tree species.

Climate Change

- Advocacy at state level, new math, design for impacts of more and more intense storms, volume of runoff, frequency of cleanup, more renewable power.
- Address degradation (plastic).
- Definition for cooling center and other protocols.
- Correct planting methods.
- Public education on local ecology, emergency plan for animals.
- Implement landscape requirement for new developments.

- Promote awareness on city website. Implement climate change science in school curriculum.

Heat/Drought

- Backup supply, infiltration, rain barrels, increase reservoir capacity, control usage and education.
- Policy on power use, storage opportunities for peak use.
- Heat island effect.
- Ongoing education.
- Utility assistance programs.
- Getting the word out about the cooling center.
- Energy efficiency, Allow renewable, more air conditioning for (those), emergency plan for animals and elderly.
- Increase # of coding stations.
- Promote water conservation.
- Form permanent OSRP committee.
- Extreme Temp education awareness/ prevention/eco restoration enforcement of wetlands law/management.

Medium Priorities

Flooding

- Green roofs, implementation of lmaintenance, staffing.
- Regular maintenance, permeable pavement, study nature.
- Update zoning.
- S. Attleboro parking station plan w/ stormwater BMPs shuttle service GATRA bus required transit.

Wind

- Increase cleaning.
- look at roofs, energy efficiency, new systems, ride share sidewalks, bike lane, bike storage, electric busses, efficiency.

Climate Change

- Public education on benefits.
- Retrofit municipal facilities with renewable energy feasibility study.
- Increase communication. Update zoning, create bicycle and pedestrian friendly complete streets.
- Continue to monitor and improve water quality.

Heat/Drought

- Bike storage.
- Promote water conservations.

Additional Priorities

- Electric vehicle charging incentives for parking garages/lots/retail.
- FEMA.gov communications/social services. Social Networks & community emergency room Neighborhood loads.
- Indentify locations w/o web smart phone.
- Ecological restoration/Habit management for resilience.

3.3 Public Involvement: Listening Session

The City hosted a public listening session on November 4, 2020 in order to gather information from the general public, educate the public on hazard mitigation and climate change, present the findings from the Community Resilience Building Workshop, and receive comments on the draft HMP-MVP. The draft HMP-MVP was posted on the City's website and public comments were received from October 29, 2020 to November 4, 2020. The public listening session was posted and advertised in accordance with the Massachusetts Public Meeting Law (see public meeting notices in Appendix A). No questions or comments were raised during the listening session.

3.4 Continuing Public Participation

Following FEMA approval of the Attleboro HMP-MVP 2020 Plan Update, Attleboro will establish a Hazard Mitigation Implementation Committee (Implementation Committee). This Implementation Committee will ensure that the Plan remains current by making sure that the actions identified in the plan are achieved, that the mitigation strategies are working as intended, and updating the Plan with any new information. The Implementation Committee will provide residents, businesses, and other stakeholders with an opportunity to learn about natural hazard mitigation and climate change resilience planning and will advise City Officials of policies and programs that will reduce hazard threats. All updates and reviews of the Plan made by the Implementation Committee will be placed on the City's website and all meetings will be publicly noticed in accordance with city and state open meeting laws. The Implementation Committee's full responsibilities are further discussed in Section 7. The City anticipates including the membership of the HMP-MVP Committee listed in Table 3-1.

The HMP-MVP involved multiple opportunities for public outreach during its drafting and will require ongoing public outreach after its approval. This Plan provides detailed information about public outreach efforts, such as mailings, signs, and website updates.

3.5 Planning Timeline

The HMP-MVP planning process proceed according to the timeline below.

1. Local Hazard Mitigation Planning Team / Municipal Vulnerability Preparedness Core Committee

   Meeting 1: August 27, 2019—Project Kickoff
   Meeting 2: September 30, 2019—Review Existing Mitigation Measures
   Meeting 3: October 28, 2019—Review Hazard Profiles and Update HMP Actions
   Meeting 4: December 16, 2019—Confirm Actions and Goals

2. MVP Community Resilience Building Workshops

   8-Hour Meeting 1: January 11, 2020

3. Public Listening Session to Review Draft Plan

   Meeting: November 4, 2020
   Public Comment Period: October 29, 2020 – November 4, 2020

4. Draft HMP/MVP Plan to MEMA and EEA: November 19, 2020

4.0 RISK ASSESSMENT & VULNERABILITIES

This risk assessment examines the natural hazards that have the potential to impact Attleboro. This assessment includes a description of the type, location, and extent of natural hazards, along with information on previous occurrences of natural disasters. This section also includes an analysis of the vulnerability of existing buildings, infrastructure, and critical facilities as well as potential future development; an estimate of the potential dollar losses to vulnerable structures; and a description of land uses and development trends.

4.1 Update Process

To update Attleboro's hazard identification and risk assessment, Weston & Sampson researched and analyzed population density, land usage, and hazard data. Population density and Land Use are illustrated in Appendix B, Figures 1 and 2. A geographic information system (GIS) vulnerability analysis was also conducted. This analysis was supplemented by information supplied by meetings with municipal staff and by conducting a Municipal Vulnerability Preparedness (MVP) workshop. The purpose of the GIS vulnerability assessment is to estimate the extent of potential damages from natural hazards of varying types and intensities. A vulnerability assessment and estimation of damages were performed for flooding through a GIS-based exposure analysis that combined the City's Assessor data records with available hazard data layers. These layers were used to map and illustrate hazard risk.

4.2 Overview of Hazards and Impacts

The 2013 Massachusetts State Hazard Mitigation Plan (MEMA and DCR 2013) and the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) (MEMA and EOEEA 2018) examine the natural hazards that have the potential to impact the Commonwealth. These plans summarize the frequency and severity of hazards of greatest concern. The frequency classification ranges from very low to high. Severity classifications are listed as a range from minor severity to catastrophic. Table 4-1 Summarizes the frequency and severity of hazard risk in Attleboro and Massachusetts. These frequency and severity classifications will assist the City in prioritizing mitigation actions for each hazard.

Table 4-1. Hazard Risks Summary

Hazard	Frequency		Severity	
	Massachusetts	Attleboro	Massachusetts	Attleboro
Flooding	High (1 flood disaster declaration event every 3 years; 43 floods per year of lesser magnitude)	High	Serious to Catastrophic	Minor to Serious
Dam Failures	Very Low	Very Low	Extensive to Catastrophic	Minor to Catastrophic
High Wind	High (43.5 events per year)	High	Minor to Extensive	Minor to Extensive

Hurricane/Tropical Storm	High (1 storm every other year)	Medium	Serious to Catastrophic	Serious
Tornadoes	High	Low	Minor to Extensive	Minor
Thunderstorms	High (20 to 30 events per year)	High	Minor to Extensive	Minor to Extensive
Nor'easter	High (1 to 4 events per year)	High	Minor to Extensive	Minor to Extensive
Snow and Blizzard	High (1 per year)	High	Minor to Extensive	Minor to Extensive
Ice Storms	High (1.5 per year)	High	Minor to Extensive	Minor to Extensive
Earthquakes	Very Low (10-15% probability of magnitude 5.0 or greater in New England in 10 years)	Very Low	Minor to Catastrophic	Minor to Extensive
Landslides	Low (once every two years in western MA)	Low	Minor to Extensive	Minor
Brush Fires	High (at least 1 per year)	Medium	Minor to Extensive	Minor to Serious
Extreme Temperatures	High (1.5 cold weather and 2 hot weather events per year)	High	Minor to Serious	Minor to Serious
Drought	High (8% chance of "Watch" level drought per month [recent droughts in 2016 and 1960s])	High	Minor to Serious	Minor to Serious
Coastal Hazards	High (6 events per year over the past 10 years)	N/A (Not a coastal community)	Serious to Extensive	N/A (Not a coastal community)
Tsunami	Very Low	N/A	Extensive to Catastrophic	N/A

	(1 event every 39 years on East Coast, 0 in MA)	(Not a coastal community)		(Not a coastal community)

Source: Table adapted from 2018 SHMCAP and 2013 *Massachusetts State Hazard Mitigation Plan*, with assistance from the City of Attleboro.

Definitions Used in the Commonwealth of Massachusetts State Hazard Mitigation Plan

Frequency

- **Very low frequency:** events that occur less frequently than once in 100 years (less than 1% per year).
- **Low frequency:** events that occur from once in 50 years to once in 100 years (1% to 2% per year).
- **Medium frequency:** events that occur from once in 5 years to once in 50 years (2% to 20% per year).
- **High frequency**: events that occur more frequently than once in 5 years (Greater than 20% per year).

Severity

- **Minor**: Limited and scattered property damage; limited damage to public infrastructure and essential services not interrupted; limited injuries or fatalities.
- **Serious:** Scattered major property damage; some minor infrastructure damage; essential services are briefly interrupted; some injuries and/or fatalities.
- **Extensive:** Widespread major property damage; major public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and/or fatalities.
- **Catastrophic:** Property and public infrastructure destroyed; essential services stopped; numerous injuries and fatalities.

4.3 Flood Related Hazards

Flooding can be caused by natural events including hurricanes, extreme precipitation, thunderstorms, nor'easters, and winter storms. Flooding can be both riverine (topping the banks of streams, rivers, and ponds) and from stormwater that is not properly infiltrated into the ground. While Attleboro is already experiencing the impacts from these events, climate change will likely lead to increasingly severe storms, resulting in an increase in related impacts. The following sub-sections provide more information on historic flooding events, potential flood hazards, a vulnerability assessment, locally identified areas of flooding, and information on the risk of dam failures.

4.3.1 Previous Flood Occurrences

NOAA's National Centers for Environmental Information Storm Events Database provides information on previous flood events for Bristol County, which includes Attleboro. Table 4-2 Summarizes the 77 flood events that impacted this area between 1996 and 2018. Floods are considered:

> Any high flow, overflow, or inundation by water which causes damage. In general, this would mean the inundation of a normally dry area caused by an increased water

level in an established watercourse, or ponding of water, that poses a threat to life or property.

This does not include flash floods. Only two injuries and no deaths were reported, despite the numerous flood events since 1996. Property damages totaled $36,229,00 (not adjusted for inflation).

Table 4-2 Bristol County Flood Events, 1996-2018

Location	Date	Deaths	Injuries	Property Damages ($)
Northern Portions	09/18/1996	0	0	-
Northern Bristol (Zone)	3/29/2005	0	0	-
Northern Bristol (Zone)	10/15/2005	0	0	$200,000
Southern Bristol (Zone)	10/15/2005	0	0	$50,000
Northern Bristol (Zone)	10/15/2005	0	0	$60,000
South Dartmouth	5/14/2006	0	0	$50,000
Countywide	6/7/2006	0	0	$25,000
Taunton	10/28/2006	0	0	$5,000
Berkley	3/2/2007	0	0	$15,000
Rehoboth	3/17/2007	0	0	$10,000
New Bedford	2/13/2008	0	0	-
North Attleboro	2/13/2008	0	0	-
New Bedford	3/8/2008	0	0	$50,000
Seekonk	6/24/2008	0	0	-
New Bedford	8/12/2008	0	0	$30,000
Ocean Grove	9/27/2008	0	0	$25,000
North Bristol	9/27/2008	0	0	-
Assonet	12/12/2008	0	0	$5,000
North Dartmouth	7/1/2009	0	0	-
Somerset	8/29/2009	0	0	-
Attleboro	3/14/2010	0	0	$11,790,000
North Attleboro	3/29/2010	0	2	$23,580,000
North Attleboro	4/1/2010	0	0	-
Acushnet	6/5/2010	0	0	-
New Bedford	6/5/2010	0	0	-
Dodgeville	7/10/2010	0	0	$10,000
Taunton	7/13/2011	0	0	-
Acushnet	7/13/2011	0	0	-
South[a]	9/8/2011	0	0	$50,000
Fall River	6/23/2012	0	0	$15,000
Weir Village	6/25/2012	0	0	-

Location	Date	Deaths	Injuries	Property Damages ($)
Attleboro	8/15/2012	0	0	$5,000
South	8/15/2012	0	0	$15,000
South Dartmouth	8/15/2012	0	0	-
Taunton	8/15/2012	0	0	$10,000
Fall River	8/15/2012	0	0	-
New Bedford	12/10/2012	0	0	$15,000
Acushnet	5/11/2013	0	0	$5,000
South	6/7/2013	0	0	$50,000
Weir Village	6/7/2013	0	0	-
South Dartmouth	6/7/2013	0	0	$20,000
Dodgeville	7/11/2013	0	0	$35,000
North Bristol	9/3/2013	0	0	-
North Swansea	9/3/2013	0	0	-
New Bedford	9/3/2013	0	0	$15,000
South	9/3/2013	0	0	-
South	3/30/2014	0	0	-
Weir Village	3/30/2014	0	0	-
New Bedford	3/30/2014	0	0	$20,000
Raynham	10/22/2014	0	0	-
Fairhaven	11/17/2014	0	0	-
New Bedford	7/1/2015	0	0	$5,000
Fall River	7/1/2015	0	0	-
Fall River	7/8/2015	0	0	-
South	7/15/2015	0	0	-
South	7/28/2015	0	0	-
North Dartmouth	9/10/2015	0	0	$25,000
North Westport	9/30/2015	0	0	-
North Westport	10/29/2015	0	0	-
Attleboro	10/29/2015	0	0	-
Sherwood Forest	6/21/2016	0	0	-
Whittenton	4/1/2017	0	0	$5,000
Fall River	6/24/2017	0	0	$1,000
South	6/24/2017	0	0	$1,000
North Bristol	8/18/2017	0	0	$2,000
Attleboro	10/25/2017	0	0	-
South Easton	10/25/2017	0	0	-
Fall River	10/30/2017	0	0	-

Location	Date	Deaths	Injuries	Property Damages ($)
Norton	10/30/2017	0	0	-
North Dartmouth	1/12/2018	0	0	-
New Bedford	1/13/2018	0	0	-
Berryman Corner	1/13/2018	0	0	-
Fall River	8/4/2018	0	0	-
Fall River	8/4/2018	0	0	$10,000
Fall River	8/4/2018	0	0	$15,000
Attleboro	9/12/2018	0	0	$5,000
Head of Westport	11/10/2018	0	0	-
Totals:		**0**	**2**	**$36,229,000**

Source: NOAA 2018a

a. "South" refers to southern areas of Bristol County.

As Table 4-2 suggests, the costliest flooding event since 1996 occurred on March 29, 2010. During that event, rainfall totals reached 8 inches in Massachusetts.

4.3.2 Potential Flood Hazard Areas

FEMA designated flood zones from the National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRM) are depicted in Appendix A, Figure 3. The definitions of these flood zones are included below.

Flood Insurance Rate Map Zone Definitions

Zone A (1% chance of inundation in any year): Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations (BFEs) or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone AE and A1-A30 (1% chance of inundation in any year): Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone AH (1% chance of inundation in any year): Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between one and three feet. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Zone AO (1% chance of inundation in any year): Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet. Average flood depths derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements and floodplain management standards apply. Some Zone AO have been designated in areas with high flood velocities such as alluvial fans and washes. Communities are encouraged to adopt more restrictive requirements for these areas.

Zone X500 (0.2% chance of inundation in any year)**:** Zone X500 is the flood insurance rate zone that corresponds to the 500-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone VE (1% chance of inundation in any year): Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

4.3.3 GIS Flood Exposure Analysis

Hazard location and extent of riverine flooding were determined using the currently effective FEMA FIRM data for Attleboro. The FIRM is the official map on which FEMA has delineated both the special flood hazard areas and the risk premium zones applicable to the community under the NFIP. This includes

high-risk areas that have a 1 percent chance of being flooded in any year (often referred to as the "100-year floodplain"), which under the NFIP, is linked to mandatory purchase requirements for federally backed mortgage loans. It also identifies moderate- to low-risk areas, defined as the area with a 0.2 percent chance of flooding in any year (often referred to as the "500-year floodplain"). For the purposes of this exposure analysis, the following special flood hazard areas identified in Attleboro's current FIRMs include Zones A, AE, AH, and AO.

The City's existing tax parcel and property value data were used to estimate the number of parcels (developed and undeveloped) and buildings located in identified hazard areas along with their respective assessed values. The parcel dataset provides information about the parcel size, land-use type, and assessed value among other characteristics. The parcel data was also classified into various land-use types based on the Massachusetts Department of Revenue's Property Type Classification Code, as described in Table 2-3, below.

Table 4-3. Attleboro's Land Use Classification Based on Massachusetts Land Use Codes

Land Use Categories with Land Use Descriptions	Land Use Code
Commercial	
Auto Repair Facilities	3320
Automotive Vehicles Sales and Service	3300
Buildings for manufacturing operations	4000
Commercial Greenhouses	3180
Discount Stores, Junior Department Stores, Department Stores	3220
Eating and Drinking Establishments - restaurants, diners, fast food establishments, bars, nightclubs	3260
Electricity Regulating Substations	4240
Gas Pressure Control Stations	4280
General Office Buildings	3400
Improved, Selectmen or City Council (Municipal)	9310
Lumber Yards	3130
Mixed-Use (Primarily Industrial, some Other)	0400
Other Storage, Warehouse, and Distribution facilities (see also use code 401)	3160
Parking Lots - a commercial open parking lot for motor vehicles	3370
Sand and Gravel Mining/Quarry	4100
Shopping Centers/Malls	3230
Small Retail and Services stores (under 10,000 sq. ft.)	3250
Warehouses for storage of manufactured products	4010
Land (Other) -	
Accessory Land with Improvement	1060
Farm Buildings - barns, silo, utility shed, etc.	3170
Public Service -	
Elementary Level	9400
Medical Office Buildings	3420

Land Use Categories with Land Use Descriptions	Land Use Code
Residential -	
Apartments with Four to Eight Units	1110
Mobile Home (includes mobile home park land)	1030
Multiple Houses on one parcel	1090
Other Congregate Housing (includes non-transient shared living arrangements)	1250
Residential Condominium	1020
Single Family Residential	1010
Three-Family Residential	1050
Two-Family Residential	1040
Vacant Land (Developable) -	
Developable Industrial Land	4400
Developable Residential Land	1300
Potentially Developable Residential Land	1310
Vacant Land (Undevelopable) -	
Undevelopable Residential Land	1320

A GIS overlay analysis was conducted in which the flood-hazard-extent zones were overlaid with the parcel data and existing building footprint data in order to calculate the exposure of parcels and buildings to the flood hazards. Parcels with buildings that are located (completely or partially) within identified hazard zones using the GIS overlay analysis (i.e., select by location using the intersect function) were identified. The number of parcels and buildings for each land use category was then totaled, along with the value of buildings and real property values associated with those parcels. These figures provide a strong indication of current hazard vulnerability, as well as potential future vulnerability as it relates to vacant and potentially developable parcels. This information has been assembled in Appendix B, Figure 1). The analysis indicates that 2,513 parcels in Attleboro, representing about 16% of the City's total land area, lies within a hazard area. Buildings within the hazard areas are valued at $495,252,700, just over 17% of the total building value within Attleboro.

The types and numbers of critical facilities were identified for Attleboro and included in the exposure analysis (Table 4-4) Critical facilities were identified and mapped in GIS based on the confirmed physical location/address. Similar to the vulnerability analysis for parcels and buildings, each was then overlaid with the identified and mappable hazard zones (FEMA Flood Zones). For purposes of this analysis, it was assumed that the physical location of a critical facility within a hazard area (completely or partially) means that it is exposed and potentially vulnerable to that specific hazard; however, it is recognized that more site-specific evaluations may be required to confirm this assumption.

As can be seen on the Flood Zone Map (See Appendix A, Figure 3 of the Hazard Maps) and Table 4-4, below, 16 critical facilities are located within a flood zone.

Table 4-4. Critical Facilities in Attleboro

Critical Facilities	Total	In Flood Zone
Daycare	9	0
Large Group	1	0
Nursing Home	13	2
Family Child Care	22	0
Hospital	2	0
Assisted Living	1	0
Public Works	3	0
Wastewater Treatment Plant	1	0
Public College	1	0
Group Home	9	1
Hotel	2	0
Community Facility	4	0
Town Hall	1	0
School (Pre-K through High School)	24	0
Public Water Supply	4	2
Police Station	1	0
Long Term Care Residence	6	0
Library	3	0
Fire Station	5	0
Dam	15	11
Total	**127**	**16**

4.3.5 Repetitive Loss Structures

As defined by the National Flood Insurance Program (NFIP), a repetitive loss property is any property for which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978 (FEMA and NFIP 2018a).

The 2018 State Hazard Mitigation and Climate Adaptation Plan indicate that Bristol County has 196 repetitive loss structures and four severe repetitive loss structures. None of those structures are located in Attleboro.

Flooding events in Attleboro have been classified as a high-frequency event. As defined by the Massachusetts State Hazard Mitigation and Climate Adaptation Plan, this hazard may occur more frequently than once in five years (or a greater than 20% chance per year).

4.3.6 Dams and Dam Failure

Dam failure is defined as the collapse of an impounding structure resulting in an uncontrolled release of impounded water from a dam (DCR 2017a). Dam failure during flood events is of particular concern in Massachusetts, given the high density of dams constructed in the 19th century (MEMA and DCR 2013, 298).

Dams can fail for several reasons: overtopping by floods that exceed the capacity of the dam, deliberate acts of sabotage, structural failure of materials used in dam construction, movement and/or failure of the foundation supporting the dam, settlement and cracking of concrete or embankment dams, piping and internal erosion of soil in embankment dams and inadequate maintenance and upkeep (MEMA and DCR, 2013, 210).

Many dam failures in the United States have been secondary results of other disasters. The prominent causes are earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures and sabotage (MEMA and DCR, 2013, 210).

Although dam failure does not occur frequently in Attleboro, it has the potential to cause extensive property damage, injury, and potential fatalities. These impacts can be at least partially mitigated through advance warning systems, providing communities impacted by potential dam failure time to respond. In addition, the breach may result in erosion on the rivers and stream banks that become inundated.

Climate change can affect dam breaches in a variety of ways. Dams are typically designed based on historic water flows and known hydrology. Climate change projections indicate that the frequency, intensity, and amount of precipitation will increase in New England. Increased precipitation has the potential to push dams overcapacity and cause structural failures. For these reasons, it is necessary to monitor dams for safety. Several mechanisms are in place to manage increases in water, such as slowly releasing water over time. It is advised that these events are monitored as they can add seasonal stress on dam infrastructure.

According to municipal officials and the Massachusetts Department of Conservation and Recreation (DCR), 16 dams can impact Attleboro, of which the City owns 12. Four of these dams are considered high risk – an indication that the failure of these dams could do considerable damage to persons and property. Table 4-6 provides a list of dams and their characteristics.

Table 4-5. DCR Inventory of Dams in Attleboro

Dam Name	Ownership	Hazard Potential*
Luther's Dike	City of Attleboro	No Classification
Attleboro #1 Dam	City of Attleboro	No Classification
Attleboro #2 Dam	City of Attleboro	No Classification
Orr's Pond #1 Dam	City of Attleboro	No Classification
Orr's Pond #2 Dam	City of Attleboro	No Classification
Luther Reservoir Dam	City of Attleboro	Low
Orrs Pond Dam	City of Attleboro	Low
Dodgeville Pond Dam	Private	Significant
Mechanics Pond Dam	City of Attleboro	Significant
Mechanics Pond Dike	Private	Significant
Simmons Pond Dam	City of Attleboro	Significant
Farmers Pond Dam	City of Attleboro	Significant
Lake Como Dam	Private	Significant
Manchester Pond Reservoir South Dike	City of Attleboro	High

Manchester Pond Reservoir East Dike Embankment 3 & 4	City of Attleboro	High
Manchester Pond Reservoir Dam	City of Attleboro	High
Hebronville Pond Dam	Private	High

Source: MA Department of Conservation and Recreation Office of Dam Safety

*Hazard Potential:

High: Dams located where failure or improper operation may cause loss of life and serious damage to homes(s), industrial or commercial facilities, important public utilities, main highways(s) or railroad(s).

Significant: Dams located where failure or mis-operation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.

Low: Dams located where failure or mis-operation may cause minimal property damage to others. Loss of life is not expected.

According to the Association of State Dam Safety Officials, three dam failures have occurred in Massachusetts since 1984. These failures resulted in one fatality. Attleboro has not experienced a dam failure, and dam failure is classified as a low-frequency event. As defined by the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan, a low-frequency hazard may occur from once in 50 years to once in 100 years.

4.4 Wind-Related Hazards

High winds are a common occurrence throughout New England and can occur during hurricanes, tropical storms, tornadoes, nor'easters, and thunderstorms. Falling trees that result in downed power lines and power outages are the most common issue associated with wind events.

4.4.1 Hurricanes and Tropical Storms

Tropical cyclones (which includes tropical depressions, tropical storms, and hurricanes) form over the warm waters of the Atlantic, Caribbean, and Gulf of Mexico. A tropical storm is defined as having sustained winds from 39 to 73 mph. If sustained winds exceed 73 mph, it is categorized as a hurricane. The Saffir-Simpson scale ranks hurricanes based on sustained wind speeds – from Category 1 (74 to 95 mph) to Category 5 (156 mph or more). Category 3, 4 and 5 hurricanes are considered "Major' hurricanes. Wind gusts associated with hurricanes may exceed the sustained wind speed and cause more severe localized damage (MEMA and DCR 2013, 323). The Saffir-Simpson scale uses wind speed as a determining factor in the scale but does provide a description of anticipated damage due to wind speeds and storm surge. Table 4-6 demonstrates the scale and associated damage descriptions.

Table 4-6. Saffir-Simpson Scale

Category	Wind Speed (mph)	Potential Damage
1	74 – 95	Minimal: damage is primarily to shrubbery and trees, mobile homes, and some signs. No real damage is done to structures.
2	96 – 110	Moderate: some trees topple, some roof coverings are damaged, and major damage is done to mobile homes.
3	111 – 130	Extensive: large trees topple, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.
4	131 – 155	Extreme: extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail; and some curtain walls fail.
5	> 155	Catastrophic: roof damage is considerable and widespread, window and door damage are severe, large-scale glass failures occur, and entire buildings could fail.

Source: MEMA and DCR 2013, page 325 (table originally created by NOAA)

Hurricanes and tropical storms will impact the entire city and surrounding area (see Figure 5, Appendix A). In the case of a hurricane event, all of the City's existing and future development, including critical facilities, and the entirety of the City's population, including those more vulnerable to natural hazards, would be impacted. Hurricanes have a large spatial extent and would potentially affect Attleboro's infrastructure, buildings, and population. Impacts could include water damage to buildings, business interruption, loss of communication services, and power failures. Flooding is a major concern, as slow-moving hurricanes can discharge tremendous amounts of rain on an area. This can overburden infrastructure systems designed to handle rainwater and overtop the banks of rivers.

The official hurricane season runs from June 1 through November 30; however, hurricanes are most likely to occur in New England during August, September, and October (MEMA and DCR 2013, 324).

New England has been impacted by hurricanes throughout its recorded history, starting with the Great Colonial Hurricane of 1635. Between 1851 and 2010, Massachusetts experienced 11 hurricanes. This includes six category 1 hurricanes, two category 2 hurricanes, and three category 3 hurricanes (Blake, Landsea and Gibney 2011, 21). Hurricanes that have occurred in the region since 1938 are listed in Table 4-7:

Table 4-7. Hurricane Records for Eastern Massachusetts, 1938-2018

Hurricane Name	Date
Great New England Hurricane	September 21, 1938
Great Atlantic Hurricane	September 14-15, 1944
Hurricane Doug	September 11-12, 1950
Hurricane Carol	August 31, 1954
Hurricane Edna	September 11, 1954
Hurricane Diane	August 17-19, 1955
Hurricane Donna	September 12, 1960

Hurricane Gloria	September 27, 1985
Hurricane Bob	August 19, 1991
Hurricane Earl	September 4, 2010
Tropical Storm Irene	August 28, 2011
Hurricane Sandy	October 29-30, 2012
Hurricane Florence	September 18, 2018

Source: National Oceanic and Atmospheric Administration (NOAA)

Based on a HAZUS hurricane module, estimated damage in Attleboro from hurricanes was assessed (see Appendix C, Figure 1). According to the State HMP, the strongest hurricane that has impacted Massachusetts was a category 3 storm. The HAZUS assessment modeled the impacts of a category 2 hurricane and category 4 hurricane (which is a 500-year storm) passing through the City center. There has not been a storm with this force reported; this modeling reflects the worst-case scenario with the greatest damage. This is appropriate for planning purposes. Table 4-8 below provides damage and displacement estimates in Attleboro for category 2 and category 4 hurricane event.

Table 4-8. Estimated Damages in Attleboro from Category 2 and Category 4 Hurricanes

Type of Damage or Displacement	Category 2	Category 4[1]
Building Damages		
Number of buildings sustaining minor damage	1,060	3,602
Number of buildings sustaining moderate damage	130	966
Number of buildings sustaining severe damage	5	92
Household Displacement and Needs		
Number of households displaced	6	115
Number of people seeking public shelter	2	61
Debris		
Building debris generated (tons)	16,314	45,766
Tree debris generated	11,386	27,114
Number of 25-ton truckloads to clear building debris	197	746
Value of Damages		
Total property damages	$56,571,710	$231,251,300
Total losses due to business interruption	$3,647,870	$22,681,150

Notes

1. No category 4 or greater hurricane has been recorded in New England. However, a category 4 was included to assist the community in understanding the impacts of a hurricane beyond what has historically occurred in New England.
2. Damage estimates are made based on the existence of 41,000 buildings with a total estimated value of $6,111,000,000 as of 2002.

Hurricanes in Attleboro are considered a medium frequency event. As defined by the 2018 SHMCAP, this hazard occurs more frequently than once in 5 years (a greater than 20% chance per year).

4.4.2 Tornadoes

A tornado is a narrow, violently rotating column of air that extends from the base of a cloud to the ground. Tornadoes are the most violent of all atmospheric storms (MEMA and EOEEA 2018, 4-242). According to the 2018 SHMCAP, the following are common factors in tornado formation:

- Very strong winds in the middle and upper levels of the atmosphere
- Clockwise turning of the wind with height (i.e., from the southeast at the surface to west aloft)
- Increasing wind speed in the lowest 10,000 feet of the atmosphere (i.e., 20 mph at the surface and 50 mph at 7,000 feet)
- Very warm, moist air near the ground, with unusually cooler air aloft
- A forcing mechanism such as a cold front or leftover weather boundary from the previous shower or thunderstorm activity

Tornadoes can be spawned by tropical cyclones or the remnants thereof, and weak tornadoes can even form from little more than a rain shower if the air is converging and spinning upward. The most common months for tornadoes to occur are June, July, and August. Exceptions exist, including the Great Barrington, Massachusetts tornado in 1995 occurred in May; and the Windsor Locks, Connecticut tornado in 1979 occurred in October (MEMA and EOEEA 2018, 4-244).

The Fujita Tornado Scale measures tornado severity as a function of wind speed and damage. The National Weather Service began using the Enhanced Fujita Scale (EF-Scale) in 2007, which led to increasingly accurate estimates of tornado severity. Table 4-9 provides more detailed information on the EF-Scale.

Table 4.9 Enhanced Fujita Scale

Fujita Scale			Derived		Operational EF Scale	
F Number	Fastest ¼ mile (mph)	3-second gust (mph)	EF Number	3-second gust (mph)	EF Number	3-second gust (mph)
0	40 – 72	45 – 78	0	65 – 85	0	65 – 85
1	73 – 112	79 – 117	1	86 – 109	1	86 – 110
2	113 – 157	118 – 161	2	110 – 137	2	111 – 135
3	158 – 207	162 – 209	3	138 – 167	3	136 – 165
4	208 – 260	210 – 261	4	168 – 199	4	166 – 200
5	261– 318	262 – 317	5	200 – 234	5	Over 200

Source: MEMA and DCR 2013, page 416

Massachusetts experiences an average of 1.7 tornadoes per year. The most tornado-prone areas of the state are the central counties. Tornadoes are comparatively rare in eastern Massachusetts and Bristol County is not considered to be among the most at-risk locations (MEMA and EOEEA 2018, 4-243). The most devastating tornado in Massachusetts occurred in Worcester in 1953, killing 94 people, injuring more than 1,000, and causing more than $52 million in damages (more than $460 million in 2019 dollars). The most recent tornadoes in Massachusetts occurred in 2011 in Springfield, 2014 in Revere, and 2016 in Concord (Morrison 2014; Epstein 2016).

Although there have been no recorded tornadoes in Attleboro, there have been nine recorded tornado events in Bristol County since 1950. Table 4-10 provides further information on these events. No area of Attleboro is at a specifically higher risk than another area for tornadoes. The risk of tornadoes in Attleboro is considered low.

Table 4-10 Tornado Records for Bristol County, 1950-2018

Date	Fujita Scale Ranking	Deaths	Injuries	Property Damage ($)
6/9/1953	F3	0	1	$2,500,000
8/9/1968	F1	0	4	$25,000
8/9/1968	F1	0	0	$2,500
8/2/1970	F1	0	0	$25,000
8/28/1970	F2	0	0	$25,000
9/14/1972	F0	0	0	$2,500
8/6/1997	F0	0	0	-
7/23/2008	EF0	0	0	$15,000
10/23/2018	EF1	0	0	$20,000
		0	**5**	**$2,615,000**

Source: www.ncdc.noaa.gov/stormevents

4.4.3 Nor'easters

A nor'easter is characterized by large counterclockwise wind circulation around a low-pressure center that often results in heavy snow, high winds, waves and rain along the East Coast of North America. The term nor'easter refers to the associated strong northeasterly winds that blow in from the ocean. These

winter weather events are among the season's most ferocious storms, often causing beach erosion, flooding and structural damage (MEMA and EOEEA 2018, 4-225).

Nor'easters generally occur on at least an annual basis, typically in the late fall and early winter. Some years bring up to four nor'easter events. This is currently the most frequently occurring natural hazard in Massachusetts. The storm radius is often as much as 100 miles and sustained wind speeds of 20 to 40 mph are common, with short-term gusts of up to 50 to 60 mph. Nor'easters are often accompanied by a storm surge equal to or greater than two feet. High surge and winds during a hurricane can last from 6 to 12 hours, while these conditions during a nor'easter can last from 12 hours to three days (MEMA And EOEEA 2018, 4-224–4-226). Previous nor'easters include the events listed in Table 4-11 below.

Table 4-11. Nor'easter Events for Massachusetts, 1978 to 2015

Nor'easter Event	Date
Blizzard of 1978	February 1978
Severe Coastal Storm ("Perfect Storm")	October 1991
Great Nor'easter of 1992	December 1992
Blizzard, Nor'easter	January 2005
Coastal Storm, Nor'easter	October 2005
Severe Storms, Inland and Coastal Flooding	April 2007
Winter Storm and Nor'easter	January 2011
Severe Storm and Snowstorm	October 2011
Severe Winter Storm, Snowstorm, and Flooding	April 2013
Severe Winter Storm, Snowstorm, and Flooding	April 2015
Severe Winter Storm and Flooding	March 2018
Severe Winter Storm and Snowstorm	March 2018

Source: MEMA and DCR 2013, pages 402-406; MEMA and EOEEA 2018, Appendix B

Attleboro is vulnerable to high winds, snow, and extreme rain events. These impacts can lead to property damage, downed trees, power service interruptions, surcharged drainage systems, and localized flooding. These conditions can impact evacuation and transportation routes and complicate emergency response efforts. Attleboro is an inland community and is not subject to coastal hazards associated with nor'easters.

Nor'easters in Attleboro are considered a high-frequency event. As defined by the State Hazard Adaptation and Mitigation Plan, this hazard may occur more frequently than once in five years (greater than 20% chance per year).

4.4.4 Severe Thunderstorms

Thunderstorms can include lightning, strong winds, heavy rain, hail, and tornados. These storms typically last for about 30 minutes and can generate winds of up to 60 mph. Thunderstorms are typically somewhat less severe than other events discussed in this section.

Thunderstorms in Massachusetts are usually accompanied by rainfall, but thunderstorms with little or no rainfall have occurred in New England (MEMA and EOEEA 2018, 4-173). During periods of drought, lightning from thunderstorm cells can result in fire ignition.

NOAA's National Centers for Environmental Information provides thunderstorm data for Bristol County, specifically related to wind and associated damage. Between 1998 and 2018, 104 thunderstorm events caused $640,700 in property damages. There were no injuries or deaths reported associated with these events. Table 4-12 provides additional information on these events.

Table 4-12. Bristol County Thunderstorm Wind Events, 1998-2018

Location	Date	Magnitude (kts. EG)	Deaths	Injuries	Property Damage ($)
Westport	02/18/1998	56	0	0	-
Taunton	06/19/1998	50	0	0	-
North Dartmouth	06/26/1998	50	0	0	-
Acushnet	06/26/1998	60	0	0	-
Fairhaven	06/30/1998	70	0	0	-
Taunton	07/23/1999	50	0	0	-
Taunton	04/09/2000	51	0	0	-
Attleboro	06/02/2000	50	0	0	-
Easton Center	08/10/2000	50	0	0	-
Seekonk	08/13/2003	50	0	0	$10,000
South Dartmouth	05/29/2005	50	0	0	$5,000
Rehoboth	07/10/2005	50	0	0	$10,000
Fairhaven	07/22/2005	50	0	0	$5,000
Mansfield	08/05/2005	50	0	0	$10,000
Taunton	05/21/2006	50	0	0	$5,000
Taunton	05/21/2006	50	0	0	$5,000
Taunton	07/18/2006	50	0	0	$5,000
Westport	07/18/2006	50	0	0	$10,000
Taunton	08/02/2006	50	0	0	$10,000
New Bedford	08/02/2006	50	0	0	$25,000
Attleboro	08/20/2006	50	0	0	$10,000
Mansfield	06/22/2007	50	0	0	-
Attleboro	06/28/2007	60	0	0	-
Rehoboth	06/28/2007	62	0	0	-
Taunton	06/28/2007	50	0	0	-
Berkley	06/28/2007	50	0	0	-
New Bedford	07/06/2007	50	0	0	-
Attleboro	08/13/2007	50	0	0	-
Acushnet	08/18/2007	50	0	0	-
Somerset	3/5/2008	50	0	0	-
Somerset	3/5/2008	50	0	0	$3,000
Dodgeville	7/2/2008	50	0	0	$3,000

Location	Date	Magnitude (kts. EG)	Deaths	Injuries	Property Damage ($)
Dodgeville	7/2/2008	50	0	0	$1,000
North Attleboro	7/18/2008	50	0	0	$3,000
Somerset	7/23/2008	50	0	0	$6,000
Berkley	7/23/2008	50	0	0	$5,000
North Bristol	8/2/2008	50	0	0	$5,000
Pine Hill Acres	8/19/2008	50	0	0	$25,000
New Bedford	8/19/2008	50	0	0	$5,000
Norton	7/8/2009	50	0	0	$1,000
Taunton	7/8/2009	50	0	0	$1,000
Norton	6/1/2010	50	0	0	$10,000
Lakeside	6/5/2010	50	0	0	$10,000
North Bristol	6/28/2010	50	0	0	$1,000
Myricks	7/23/2010	50	0	0	$5,000
North Bristol	6/8/2011	50	0	0	$3,000
Watuppa	6/9/2011	50	0	0	$3,000
Attleboro	6/9/2011	50	0	0	$3,000
East Fairhaven	7/8/2011	50	0	0	$5,000
Dighton	7/18/2012	50	0	0	$10,000
Dighton	7/18/2012	50	0	0	$10,000
North Bristol	7/18/2012	50	0	0	$15,000
Acushnet	7/18/2012	50	0	0	$5,000
East Fairhaven	7/18/2012	50	0	0	$10,000
Taunton	8/10/2012	70	0	0	$10,000
Taunton	8/10/2012	40	0	0	$1,000
Taunton	8/10/2012	50	0	0	$3,000
Westport Pt	6/29/2013	40	0	0	$200
Rehoboth	7/20/2013	50	0	0	$500
Swansea	9/3/2013	50	0	0	$3,000
Mansfield	6/23/2015	50	0	0	$1,000
Furnace Village	6/23/2015	50	0	0	$5,000
Seekonk	8/4/2015	50	0	0	$5,000
Dighton	8/4/2015	50	0	0	$5,000
Fall River	8/4/2015	50	0	0	$5,000
Assonet	8/4/2015	50	0	0	$5,000
Kempton Croft	8/4/2015	50	0	0	$8,000
Dartmouth	8/4/2015	50	0	0	$5,000
Dighton	8/4/2015	50	0	0	$5,000
Raynham	8/4/2015	50	0	0	$15,000

Location	Date	Magnitude (kts. EG)	Deaths	Injuries	Property Damage ($)
Kempton Croft	8/4/2015	50	0	0	$5,000
Attleboro	2/25/2016	45	0	0	$5,000
North Attleboro	2/25/2016	50	0	0	$15,000
Easton Center	2/25/2016	50	0	0	$15,000
Easton Center	2/25/2016	45	0	0	$5,000
Norton	2/25/2016	40	0	0	$5,000
Norton	2/25/2016	50	0	0	$5,000
Norton	2/25/2016	50	0	0	$1,000
East Taunton	2/25/2016	50	0	0	$20,000
Westport	2/25/2016	40	0	0	$5,000
Dartmouth	6/21/2016	40	0	0	$1,000
Taunton	7/17/2016	50	0	0	$10,000
Taunton	7/22/2016	50	0	0	$20,000
Mansfield	7/22/2016	50	0	0	$15,000
Raynham Center	7/22/2016	50	0	0	$10,000
Easton Center	7/22/2016	50	0	0	$5,000
Dartmouth	7/22/2016	50	0	0	$20,000
Norton	7/23/2016	40	0	0	$5,000
Taunton	7/23/2016	40	0	0	$30,000
Easton Center	7/23/2016	40	0	0	$5,000
Raynham	7/23/2016	40	0	0	$15,000
Norton	7/23/2016	40	0	0	$5,000
North Bristol	7/23/2016	50	0	0	$35,000
Dartmouth	7/23/2016	50	0	0	$5,000
Attleboro	8/6/2016	50	0	0	$3,000
North Attleboro	8/6/2016	50	0	0	$5,000
Attleboro Falls	6/9/2017	45	0	0	$1,500
Mansfield	7/12/2017	50	0	0	$1,000
Rehoboth	7/12/2017	50	0	0	$15,000
North Dighton	7/12/2017	50	0	0	$1,500
Assonet	7/12/2017	50	0	0	$7,000
South	9/6/2017	50	0	0	$8,000
Hortonville	1/23/2018	52	0	0	$1,000
Winneconnet	9/18/2018	50	0	0	$1,000
Total			0	0	$615,700

Thunderstorm winds can knock down trees that cause power outages and block evacuation and transportation routes. Extreme rain during thunderstorms can cause inland flooding around waterbodies or surcharged drainage systems.

Severe thunderstorms are considered high-frequency events in Attleboro. As defined by the 2018 Massachusetts State Hazard Mitigation and Adaptation Plan, this hazard may occur more frequently than once in 5 years (greater than 20% chance per year). No area of Attleboro is at a specifically higher risk than another area for severe thunderstorms. The risk of severe thunderstorms in Attleboro is considered high.

4.5 Winter Storms

The planning area is vulnerable to the impacts of winter storm events. All current and future buildings are at risk from winter storm damage. Heavy snow loads can cause roof and tree damage, including collapse, which can lead to structural damage. Additional winter storm impacts can include road closures, power outages, business interruption, business loss (due to road closures), hazardous driving conditions, frozen pipes, fires due to improper heating, and secondhand health impacts caused by shoveling (such as heart attack). Public safety issues are also a concern, as streets and sidewalks can become difficult to pass. Attleboro's population is also vulnerable to injuries or death caused by traffic accidents or falling trees. Vulnerable populations, such as the elderly, are at greater risk during poor travel conditions and power outages. Impassible streets can also complicate emergency response efforts during an extreme event.

Winter storms are a citywide hazard in Attleboro. These events can include wind, heavy snow, blizzard conditions, and icing. Blizzards and ice storms in Massachusetts can range from an inconvenience to extreme events that cause significant impacts and require a large scale, coordinated response.

4.5.1 Heavy Snow and Blizzards

A blizzard is a winter snowstorm with sustained winds, or frequent wind gusts of 35 mph or more, accompanied by falling or blowing snow that reduces visibility to or below a quarter of a mile. These conditions must be the predominant conditions over a 3 or more-hour period. Extreme cold temperatures are often associated with blizzards but are not a formal part of the criteria. However, the hazard created by the combination of snow, wind, and low visibility increases significantly with temperatures below 20˚F. A severe blizzard is categorized as having temperatures near or below 10˚F, winds exceeding 45 mph, and snow reduced visibility to near zero (MEMA and EOEEA 2018, 4-223).

Heavy snow, often associated with winter storms and blizzards, is a significant hazard. The National Weather Service defines "heavy snow" as snowfall accumulating to 4" or more than 12 hours or less, or snowfall accumulating to 6" or more in 24 hours or less (NOAA 2019b). Winter storm can be combined with the phenomenon of nor'easters discussed previously in the "Wind-Related Hazards" section of this plan.

No widely used scale exists to classify snowstorms. The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact northeast storms. These storms typically have large areas of 10-inch snowfall accumulations or greater. NESIS has five categories, as shown in Table 4-13 below.

Table 4-13. Northeast Snowfall Impact Scale (NESIS) Categories

Category	NESIS	Value Description
1	1 – 2.499	Notable
2	2.5 – 3.999	Significant
3	4 – 5.999	Major
4	6 – 9.999	Crippling
5	10+	Extreme

Source: MEMA and EOEEA 2018

The index differs from other meteorological indices in that it uses population information, in addition to meteorological measurements in order to classify storms. Therefore, NESIS provides an indication of a storm's societal impacts. This scale was developed due to the impacts that northeast storms can have on the rest of the country in terms of transportation and economics. NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information are combined in an equation that calculates a NESIS score, which varies from 1 for smaller storms to over 10 for extreme storms. The raw score is then converted into one of the five NESIS categories. The largest NESIS values result from the storms producing heavy snowfall over large areas that include major metropolitan centers. NOAA began using the NESIS scoring system in 2005 to determine the impact of snow events (MEMA and DCR 2013, 400).

Sixty major winter storms occurred in Massachusetts between 1953 and 2018 (MEMA and EOEEA 2018, 4-227; FEMA 2018b). The "Blizzard of 1978" was a well-known winter storm that deposited more than three feet of snow and led to multi-day closures of roads, businesses, and schools. Noteworthy storms are included in Table 4-14 below.

Table 4-14. Massachusetts Noteworthy Winter Storms

Date	Winter Storm Type
February 1978	Blizzard of 1978
October 1991	Severe Coastal Storm ("Perfect Storm")
December 1992	Great Nor'easter of 1992
January 2005	Blizzard/Nor'easter
October 2005	Coastal Storm/Nor'easter
April 2007	Severe Storms, Inland & Coastal Flooding/Nor'easter
January 2011	Winter Storm/Nor'easter
October 2011	Severe Storm/Nor'easter
February 2013	Blizzard/Nor'easter
January 2015	Blizzard/Nor'easter
March 2015	March 2015 Nor'easter
March 2018	March 2018 Nor'easter

Snowfall in the winter of 2010-11 approached the record mark with 60.3 inches measured at Logan Airport for the season as of the end of January. Snow came in a series of severe storms, some of which caused serious flooding. The current winter snowfall record in Easter Massachusetts is 62.7 inches (MEMA and EOEEA 2018, 4-226). High snowfall amounts can lead to increased groundwater and

surface water amounts, contributing to spring flooding events in Attleboro and many other communities. Figure 6, Appendix A, illustrates average snowfall amounts in Attleboro.

According to NOAA's National Center for Environmental Information Storm Event Database, there were 36 winter storms in Bristol County between 1998 – 2018, which resulted in just over 1 million dollars of property damage. These winter storms are identified in Table 4-15 below.

Table 4-15. Winter Storm Events and Property Damage, Bristol County, 1998-2018

Location	Date	Deaths	Injuries	Property Damage ($)
Northern Bristol (Zone)	2/7/2003	0	0	-
Southern Bristol (Zone)	2/7/2003	0	0	-
Southern Bristol (Zone)	2/17/2003	0	0	-
Northern Bristol (Zone)	2/17/2003	0	0	-
Northern Bristol (Zone)	3/6/2003	0	0	$500,000
Southern Bristol (Zone)	3/6/2003	0	0	$250,000
Northern Bristol (Zone)	12/5/2003	0	0	-
Southern Bristol (Zone)	12/5/2003	0	0	-
Southern Bristol (Zone)	12/26/2004	0	0	-
Northern Bristol (Zone)	12/26/2004	0	0	-
Northern Bristol (Zone)	1/5/2005	0	0	-
Southern Bristol (Zone)	1/22/2005	0	0	-
Northern Bristol (Zone)	1/22/2005	0	0	-
Northern Bristol (Zone)	3/1/2005	0	0	-
Southern Bristol (Zone)	3/1/2005	0	0	-
Northern Bristol (Zone)	3/12/2005	0	0	-
Southern Bristol (Zone)	2/12/2006	0	0	$10,000
Northern Bristol (Zone)	2/12/2006	0	0	$10,000
Northern Bristol (Zone)	3/16/2007	0	0	-
Southern Bristol (Zone)	2/10/2010	0	0	$30,000
Southern Bristol (Zone)	12/26/2010	0	0	-
Northern Bristol (Zone)	12/26/2010	0	0	$75,000
Southern Bristol (Zone)	1/12/2011	0	0	$30,000
Northern Bristol (Zone)	2/1/2011	0	0	$50,000
Northern Bristol (Zone)	1/7/2017	0	0	-
Southern Bristol (Zone)	1/7/2017	0	0	-
Northern Bristol (Zone)	2/9/2017	0	0	-
Southern Bristol (Zone)	2/9/2017	0	0	-
Southern Bristol (Zone)	3/10/2017	0	0	-
Southern Bristol (Zone)	1/4/2018	0	0	$3,000
Northern Bristol (Zone)	1/4/2018	0	0	-
Northern Bristol (Zone)	1/30/2018	0	0	-
Southern Bristol (Zone)	1/30/2018	0	0	-
Southern Bristol (Zone)	3/13/2018	0	0	$65,000
Northern Bristol (Zone)	3/13/2018	0	0	$100,000
Total		0	0	$1,123,000

NOAA's National Center for Environmental Information also offers records of heavy snow events in Bristol County. Since 1996, Bristol County experienced 87 heavy snowfall events that caused almost $3 million dollars in property damage. No deaths or injuries were reported as a result of these events.

Blizzards and winter storms are considered to be high-frequency events in Attleboro. As defined by the 2018 Massachusetts State Hazard Mitigation and Adaptation Plan, this hazard occurs more than once in five years (a greater than 20% annual chance of occurring).

4.5.2 Ice Storms

Ice storm conditions are defined by liquid rain falling and freezing on contact with cold objects creating ice build-ups of ¼ inch or more that can cause severe damage. An ice storm warning, now included in the criterion for a winter storm warning, is for severe icing. This is issued when 1/2 inch or more of accretion of freezing rain is expected. This may lead to dangerous walking or driving conditions and the weighing down of power lines and trees. Icy roads can also complicate emergency response efforts during an extreme event. A warning is used for winter weather conditions posing a threat to life and property. Sleet occurs when raindrops fall into subfreezing air thick enough that the raindrops refreeze into ice before hitting the ground. Sleet differs from hail: sleet is a wintertime phenomenon, while hail usually falls during thunderstorms in the spring and summer (MEMA and DCR 2013, 462). Hail can cause significant damage if the size of the hail is large enough. A comparison of hail sizes shown in Table 4-16, below.

Table 4-16 Hail Size Comparisons

Description	Diameter (inches)
Pea	0.25
Marble or Mothball	0.50
Penny or Dime	0.75
Nickel	0.86
Quarter	1.00
Ping Pong Ball	1.50
Golf ball	1.75
Tennis Ball	2.50
Baseball	2.75
Teacup	3.00
Grapefruit	4.00
Softball	4.50

Source: NOAA 2019a

NOAA's National Center for Environmental Information provides information on hail events and ice storms for Bristol County. There were 71 hail events recorded in Bristol County from 1950 – 2018. Those events that occurred between 2000 and 2018 are detailed below in Table 4-17:

Table 4-17. Bristol County Hail Events, 2000-2018

Location	Date	Magnitude	Deaths	Injuries	Property Damage ($)
Dartmouth	5/10/2000	0.75	0	0	-
Westport	5/24/2000	0.75	0	0	-
Taunton	6/27/2000	0.75	0	0	-
Norton	8/10/2000	1.75	0	0	$5,000
Fairhaven	8/10/2000	0.75	0	0	-
Rehoboth	7/2/2004	0.75	0	0	-
Attleboro	7/2/2004	1	0	0	-
Taunton	5/29/2005	0.75	0	0	-
Attleboro	6/20/2006	0.75	0	0	-
Lakeside	7/6/2007	0.88	0	0	-
Winneconnet	6/17/2008	0.75	0	0	-
Seekonk	6/24/2008	0.75	0	0	-
Seekonk	6/24/2008	1	0	0	-
Seekonk	6/24/2008	0.75	0	0	-
North Bristol	6/24/2008	1	0	0	-
North Bristol	6/24/2008	1	0	0	-
North Attleboro	7/2/2008	0.75	0	0	-
Assonet	8/19/2008	0.88	0	0	-
Acushnet	8/19/2008	0.75	0	0	-
Sherwood Forest	8/19/2008	1.75	0	0	-
Mansfield	7/8/2009	0.88	0	0	-
Oakland	7/8/2009	0.75	0	0	-
Chartley	7/8/2009	1	0	0	-
Dartmouth	7/8/2009	0.75	0	0	-
Seekonk	6/20/2010	0.75	0	0	-
Fairhaven	2/18/2011	0.88	0	0	-
South Dartmouth	2/18/2011	0.75	0	0	-
Attleboro	5/7/2011	0.75	0	0	-
North Bristol	6/8/2011	0.75	0	0	-
Taunton	6/8/2011	0.75	0	0	-
Segreganset	7/18/2012	1	0	0	-
Rehoboth	7/18/2012	2	0	0	-
Attleboro	7/18/2012	1	0	0	-
North Rehoboth	7/18/2012	0.88	0	0	-
Dighton	7/18/2012	1.75	0	0	-
Seekonk	7/18/2012	1	0	0	-

Location	Date	Magnitude	Deaths	Injuries	Property Damage ($)
Rehoboth	7/18/2012	1	0	0	-
Weir Vlg	7/18/2012	1	0	0	-
Taunton	7/18/2012	0.75	0	0	-
Taunton	7/18/2012	1	0	0	-
Taunton	7/18/2012	0.88	0	0	-
Dighton	7/18/2012	2	0	0	-
North Rehoboth	7/18/2012	1.75	0	0	-
North Bristol	7/24/2012	0.75	0	0	-
Mansfield	8/7/2014	0.75	0	0	-
Fall River	8/4/2015	0.88	0	0	-
Dartmouth	6/21/2016	1	0	0	-
Dighton	7/12/2017	0.75	0	0	-
Myricks	7/12/2017	0.75	0	0	-
Totals:			**0**	**0**	**$5,000**

Ice storms are a citywide hazard in Attleboro, as these events can impact travel evacuation routes. Ice storms are considered medium-frequency events in Attleboro as defined by the 2018 Massachusetts State Hazard Mitigation and Adaptation Plan. This hazard is statistically expected once in every 5 to once in every 50 years (a 2% to 20% annual occurrence likelihood).

4.6 Geologic Hazards

Geologic hazards can include earthquakes, landslides, sinkholes, and subsidence. City officials did not identify any local areas particularly vulnerable to geological hazards.

4.6.1 Earthquakes

An earthquake is a vibration, sometimes violent, of the earth's surface that follows a release of energy in the earth's crust due to fault fracture and movement. The magnitude or extent of an earthquake is a seismograph-measured value of the amplitude of the seismic waves. The Richter magnitude scale (Richter scale) was developed in 1932 as a mathematical device to compare the sizes of earthquakes. The Richter scale is the most widely known scale that measures earthquake magnitude. It has no upper limit and is not an indication of damage. An earthquake in a densely populated area, which results in many deaths and considerable damage, can have the same magnitude as an earthquake in a remote area that causes no damage. Table 4-18 summarizes Richter scale magnitudes and corresponding earthquake effects (MEMA and DCR 2013, 220).

Table 4-18. Richter Scale Magnitude and Typical Effects

Richter Magnitude	Earthquake Effects
Less than 3.5	Generally, not felt, but recorded
3.5- 5.4	Often felt, but rarely causes damage
Under 6.0	At most slight damage to well-designed buildings. It can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 km. across where people live.
7.0- 7.9	Major earthquake. It can cause serious damage over larger areas.
8.0 or greater	Great earthquake. It can cause serious damage in areas several hundred meters across.

Source: Louie, 1996

Earthquakes do occur, although infrequently, in New England as compared with other parts of the country. The first recorded earthquake was noted by the Plymouth Pilgrims and other early settlers in 1638. Of the over 5,000 recorded earthquakes recorded in the Northeast Earthquake Catalog through 2008, 1,530 occurred within the boundaries of the six New England States, with 336 earthquakes recorded in Massachusetts between 1627 and 2008. Historically, moderately damaging earthquakes strike somewhere in the region every few decades, and smaller earthquakes are felt approximately twice per year (MEMA and DCR 2013, 228-232). A summary of historic earthquakes in the Boston area is included in Table 4-19 below.

Table 4-19. Earthquakes in Boston and Surrounding Area, 1727-2012

Location	Date	Magnitude
Cape Ann	11/10/1727	5
Cape Ann	12/29/1727	Unknown
Cape Ann	2/10/1728	Unknown
Cape Ann	3/30/1729	Unknown
Cape Ann	12/9/1729	Unknown
Cape Ann	2/20/1730	Unknown
Cape Ann	3/9/1730	Unknown
Boston	6/24/1741	Unknown
Cape Ann	6/14/1744	4.7
Salem	7/1/1744	Unknown
Off Cape Ann	11/18/1755	6
Off Cape Cod	11/23/1755	Unknown
Boston	3/12/1761	4.6
Off Cape Cod	2/2/1766	Unknown
Offshore	1/2/1785	5.4
Wareham/Taunton	12/25/1800	Unknown
Woburn	10/5/1817	4.3
Marblehead	8/25/1846	4.3
Brewster	8/8/1847	4.2
Boxford	5/12/1880	Unknown
Newbury	11/7/1907	Unknown

Table 4-19. Earthquakes in Boston and Surrounding Area, 1727-2012

Location	Date	Magnitude
Wareham	4/25/1924	Unknown
Cape Ann	1/7/1925	4
Nantucket	10/25/1965	Unknown
Boston	12/27/1974	2.3
Nantucket	4/12/2012	4.5

Source: City of Boston, Natural Hazard Mitigation Plan, page 68

Recent Earthquake in Buzzards Bay

Significant earthquakes are relatively rare in New England, but they do happen. On November 8, 2020 a 3.6-magnitude earthquake occurred with an epicenter in Buzzards Bay about seven miles off of New Bedford area. Although it caused no reported injuries, it was said to have left three New Bedford buildings uninhabitable, leaving a total of 22 people homeless.

Source: https://www.bostonglobe.com/2020/11/08/metro/usgs-reports-magnitude-40-earthquake-buzzards-bay-sunday-morning/

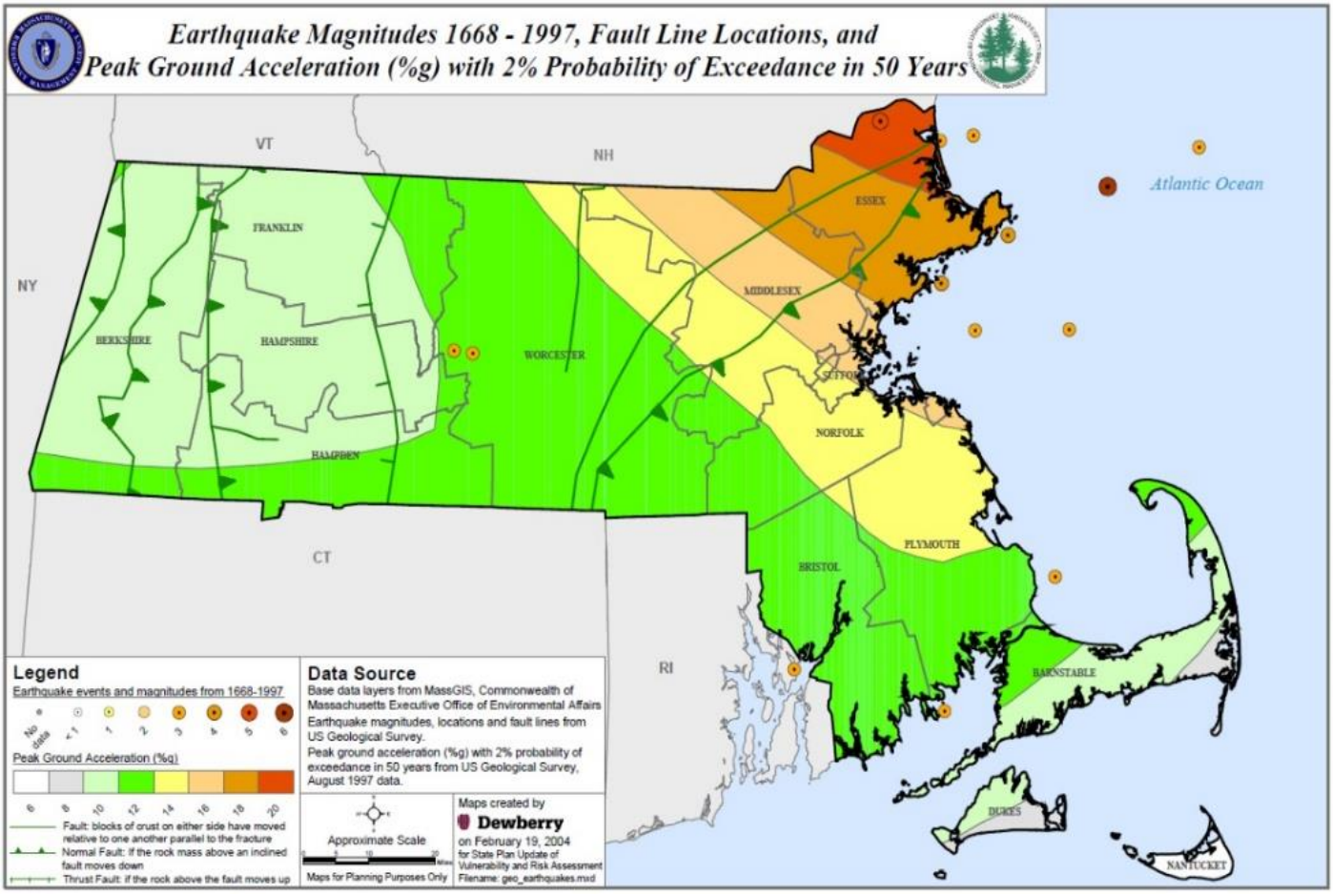
Earthquake risk can be measured in terms of ground motion. This metric is measured by maximum peak horizontal acceleration expressed as a percentage of gravity (%g). Peak ground acceleration in the state ranges from 10%g to 20%g, with a 2% probability of exceedance in 50 years. Please refer to Figure 4-1 for more information.

According to Figure 4-1, Attleboro is in an area with a PGA of 12%g. This classification is considered a moderate area of earthquake risk relative to the state, although the state as a whole is considered to have a low risk of earthquakes. Despite the fact that there have been no recorded earthquake epicenters in Attleboro, a major earthquake in Massachusetts is possible. Major earthquakes occur without warning and can have a devastating impact on infrastructure and buildings, especially those constructed prior to earthquake-resistant design.

It can be assumed that all existing and future buildings and populations are at risk of an earthquake hazard. Impacts from earthquakes can range from slight to moderate building damage, to catastrophic damage and fatalities. Small seismic events may cause minor damage such as cracked plaster and chimneys, broken windows, and minor structural damage. Major seismic activity can result in major structural damage, ultimatelyresulting in building collapse. According to the Massachusetts State Hazard Mitigation and Climate Adaptation Plan, the degree of exposure "depends on many factors,

Figure 4-1. Massachusetts Earthquake Peak Ground Acceleration Map

Source: Massachusetts State Hazard Mitigation Plan



including the age and construction type of the structure where people live, work, and go to school; the soil type these buildings are constructed on; and the proximity of these buildings to the fault location." Furthermore, the time of day exposes different sectors of the community to the hazard. Earthquakes

can lead to business interruptions, loss of utilities and road closures which may isolate populations. People who reside or work in unreinforced masonry buildings are vulnerable to liquefaction, the phenomenon that occurs when the strength and stiffness of soil are reduced by an earthquake.

Based on a HAZUS earthquake module, estimated damage in Attleboro from magnitude 5.0 and 7.0 earthquakes were assessed. An earthquake with a magnitude of 5.0 occurred in 1963. This assessment assumes an earthquake epicenter at the center of Attleboro, which represents the worst-case scenario. Table 4-20 provides the damage assessment based on the magnitude earthquakes discussed above.

Table 4-20. Estimated Damages from Magnitude 5.0 and Magnitude 7.0 Earthquakes

Type of Damage or Displacement	Magnitude 5.0	Magnitude 7.0
Building Damages		
Number of buildings sustaining slight damage	14	773
Number of buildings sustaining moderate damage	3	217
Number of buildings sustaining extensive damage	0	22
Number of buildings completely damaged	0	2
Household Displacement and Needs		
Number of households displaced	0	9
Number of people seeking public shelter	0	5
Debris		
Building debris generated (tons)	0	3000
Number of truckloads to clear building debris	0	120
Value of Damages		
Total property damage	$116,500	$31,984,900
Total losses due to business interruption	$75,100	$6,804,100

Notes

1. Damage estimates are made based on the existence of 41,000 buildings with a total estimated value of $6,111,000,000 as of 2002.

According to the Boston College Weston Observatory, in most parts of New England, a one in 500 chance exists that a potentially damaging earthquake will occur in any year (Kafka 2004). Earthquakes are classified as low-frequency events in Attleboro, as illustrated in Appendix A, Figure 4. As defined by the 2018 State Hazard Mitigation and Adaptation Plan, these events have a statistical likelihood of occurring from once in 50 years to once in 100 years (1% to 2% annual chance).

4.6.2 Landslides

Landslides involve a wide range of ground movement that includes rockfalls, deep failures of slopes, and shallow debris flows. Gravity acting on an over-steepened slope is the primary cause of a landslide, however, other factors can contribute to landslides. These include riverine or coastal erosion; rock and soil slopes weakened through saturation by snowmelt or heavy rains; stresses from an earthquake that causes weakened slopes to fail; excess weight from accumulated precipitation (rain or snow); and stockpiling of rock or ore from waste piles or man-made structures (USGS 2019a).

Landslides occur throughout the United States, causing an estimated $1 billion in damages and 25-50 deaths each year. Any area composed of very weak or fractured materials resting on a steep slope will likely experience landslides. Although the physical cause of many landslides cannot be removed,

geological investigations, good engineering practices, and effective enforcement of land-use management regulations can reduce the likelihood of landslide hazards (USGS 2019a). Landslides can damage buildings and infrastructure and cause sedimentation of water bodies. Landslides are considered a citywide hazard, although no records exist of past landslides occurring in Attleboro. Landslides are considered a low-frequency event. These events occur once in 50 to 100 years (a 1% to 2% annual chance of occurring). Landslide intensity can be measured in terms of overall destructiveness, as demonstrated by Table 4-21. As illustrated in Appendix A, Figure 4, Attleboro has a low landslide incidence (less than 1.5% is involved in landsliding).

Table 4-21. Landslide Volume and Intensity

Estimated Volume (cubic meters)	Expected Landslide Velocity		
	Fast Moving Landslide (rockfall)	Rapid-Moving Landslide (debris flow)	Slow-Moving Landslide (slide)
<0.001	Slight intensity	--	--
<0.5	Medium intensity	--	--
>0.5	High intensity	--	--
<500	High intensity	Slight intensity	--
500-10,000	High intensity	Medium intensity	Slight intensity
10,000 – 50,000	Very high intensity	High intensity	Medium intensity
>500,000	--	Very high intensity	High to very high intensity

Source: Cardinali et al. 2002

4.7 Fire Related Hazards

Fire risk is influenced by several key factors; the type of fuel or material, the terrain of the area, and the current weather conditions. Strong winds can greatly exacerbate fire conditions, especially wind events that persist for long periods, or those with significant sustained wind speeds that quickly promote fire spread through the movement of embers or exposure within tree crowns. Fires can spread quickly to developed areas and pose a hazard to life and property. According to the National Park Service, a wildland fire (or wildfire) is a general term describing any non-structure fire that occurs in vegetation such as trees, grasses, and shrubs. Wildfires can be caused by natural events (i.e. lightening), human activity or in an intentional controlled manner, as in the case of prescribed fire. Wildfires often begin unnoticed, but spread quickly, igniting brush, trees and sometimes homes (MEMA and DCR 2013, 252).

A number of sources map and describe wildland fires. The USGS GEOMAC site allows viewers to see any active wildland fires across the country. The USGS also maintains an online map portal called LandFire that illustrates vegetation cover conditions that may contribute to fire spread. This information is useful in predicting fire behavior and can inform fire management, particularly in light of the extensive forest fires experienced in California. The U.S. Fire Administration, a division of FEMA, receives reports through the National Fire Incident Reporting System (NFIRS) and complies this information into reports which offer perspective on the level of threat that wildland fires present.

Data on wildfires is compiled by a variety of sources, but they all indicate that Massachusetts (and the northeast generally) have not been impacted extensively by wildfire in recent years. According to the SHMCAP (Appendix B), the most recent large-scale wildfire in Massachusetts occurred on September 1995 in the Town of Russell in Hampden County. Recent data suggests scattered small fires throughout the state. For example, the Insurance Information Institute data (based on statistics from the National Interagency Fire Center) indicates that Massachusetts had 320 wildfires in 2018 which burned 210 acres. The 2017 Fire Data Analysis, Bristol County Profile, which is based on the Massachusetts Fire Incident Reporting System (MFIRS), states that Attleboro experienced 57 fires, of which 8 were reported as Severe Weather/Natural Disaster fires. Fires have the potential to occur throughout the City. Risk of brushfires is more prevalent outside of the downtown area as there is little or no brush in Attleboro's downtown; however, the downtown is more susceptible to urban fires. Figure 9 and 10 of Appendix B provides a map showing the City and Attleboro's downtown.

The National Fire Protection Agency (NFPA) offers also data on fire incidents by state by source. According to the NFPA Report on Brush, Grass, and Forest Fires in the Northeast between 2011-2015, the primary sources of fires that local fire departments responded to include:

- Intentional acts (20%)
- Open fires for waste disposal (16%)
- Smoking materials (13%)
- Electrical power or utility lines (7%)
- Agricultural/land management burns (4%)
- Playing with a heat source (3%)
- Rekindle (2%)
- Fireworks (2%)
- Open fire for warmth or cooking (2%)
- Chemical reaction (2%)
- Lightning (2%)
- Shop tools, industrial equipment, including torches (2%)

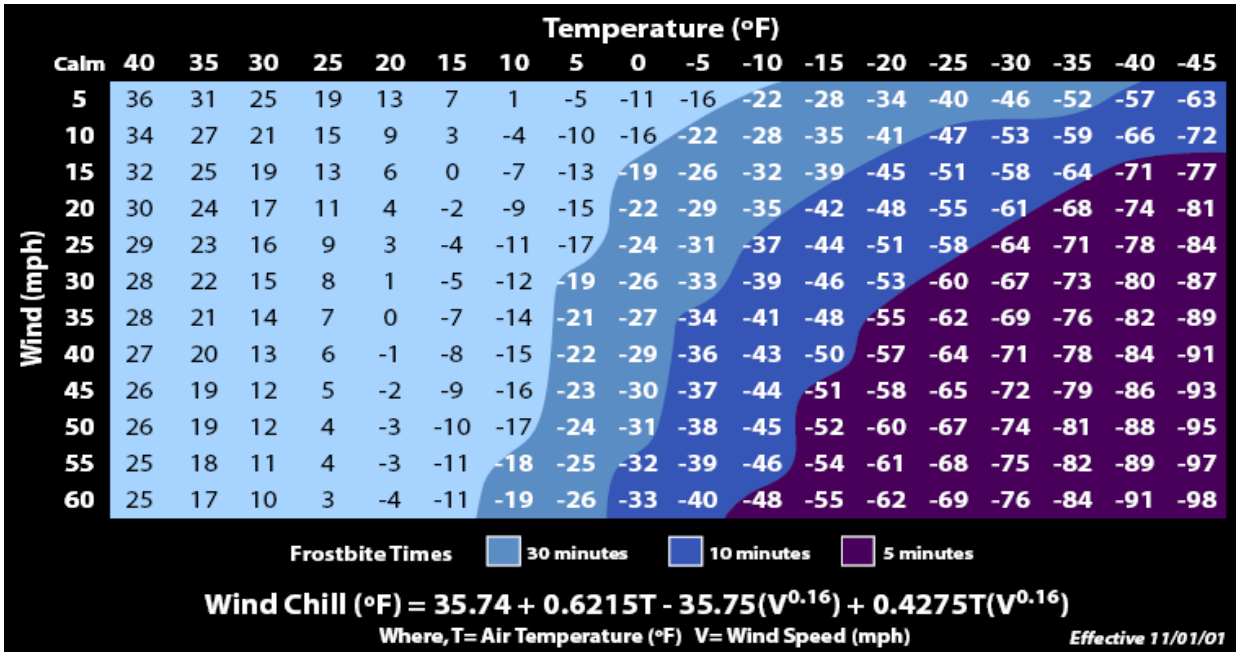
4.8 Extreme Temperatures

Extreme temperatures can include both temperatures over and under seasonal averages. These extreme weather events can range from brief to lengthy. The New England area has four clearly defined seasons. Extreme temperatures fall outside of the ranges typically experienced during these seasons. Boston's average winter temperature, from December to February, is 32.2˚F. Boston's average summer temperature, from June to August, is 73.8˚F (NOAA 2018b). At TF Green Airpoint in Warwick, Rhode Island, a few miles to the south, the average winter temperature is about 31.0 ˚F and the average summer temperature is 71.3 ˚F. Extreme temperature events affect the entire planning area and are considered a citywide hazard.

4.8.1 Extreme Cold

Extremely cold temperatures can present dangerous conditions for vulnerable populations, such as the homeless, stranded travelers, and residents without sufficient insulation or heating methods. Extremely cold temperatures are measured using the Wind Chill Temperature Index provided by the National Weather Service (NWS). The updated index was implemented in 2001 and helps explain the impact of cold temperatures on unexposed skin. Figure 4-22 provides more information.

Figure 4-22. Wind Chill Temperature Index and Frostbite Risk



Source: National Weather Service

In Attleboro, 14% of the population is over age 65 and 13% of the population has a disability (ACS 2017). Cold weather events can also have significant health impacts such as frostbite and hypothermia. Furthermore, power outages during cold weather may result in unsafe usage of combustion heaters, cooking appliances, and generators in poorly ventilated areas which can lead to increased risk of carbon monoxide poisoning.

NOAA's National Center for Environmental Information proves extreme cold event data for Bristol County, which includes Attleboro. Between 1998 and 2018, there was only one extreme cold event that caused no deaths, no injuries, and no reported property damage.

4.8.2 Extreme Heat

The National Weather Service issues a Heat Advisory when the Heat Index (Figure 4-3) is forecasted to reach 100˚ - 104˚F for two or more hours. The National Weather Service issues an Excessive Heat Warning if the Heat Index is forecasted to reach 105˚+F for two or more hours. Heatwaves cause more fatalities in the U.S. than the total of all other meteorological events combined. In Boston, over 50 people die each year due to heat-related illnesses. From 1979–2012, excessive heat exposure caused in excess of 8,000 deaths in the United States. During this period, more people in this country died from extreme heat than from hurricanes, lightning, tornadoes, floods, and earthquakes combined. Because most heat-related deaths occur during the summer, people need to be aware of who is at greatest risk and what actions can be taken to prevent a heat-related illness or death. The most vulnerable populations are the elderly, children, and people with certain medical conditions, such as heart issues. In Attleboro, 14% of the population is over 65 and 5.86% is under the age of 5. However, even middle aged and healthy individuals can succumb to heat if they do not take appropriate precautions during these events. Some behaviors also put people at greater risk: drinking alcohol, taking part in strenuous outdoor physical activities in hot weather, and taking medications that can impair the body's ability to regulate its temperatures that inhibit perspiration (MEMA and DCR 2013, 418; U.S. Census Bureau 2017).

Figure 4-3. Heat Index Chart

	Temperature (°F)																
Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Category	Heat Index	Health Hazards
Extreme Danger	130 °F – Higher	Heat Stroke or Sunstroke is likely with continued exposure.
Danger	105 °F – 129 °F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F – 105 °F	Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.
Caution	80 °F – 90 °F	Fatigue possible with prolonged exposure and/or physical activity.

NOAA's National Centers for Environmental Information collects data on extreme heat events for Bristol County. Between 1998 and 2018, there were two extreme heat events recorded for Bristol County. There were no reported deaths, injuries, or property damage.

Extreme temperatures are considered a medium frequency event in Massachusetts. As defined by the 2018 Massachusetts State Hazard Mitigation and Adaptation Plan, these events occur between once in five years to once in 50 years (a 2% to a 20% annual chance of occurring).

4.9 Drought

A drought is defined as an extended period of deficient precipitation. Droughts occur in nearly all climatic zones but vary significantly from one region to another since they are relative to the normal precipitation in that region. Droughts can negatively impact agriculture, water supply, aquatic ecology, wildlife, and plant life (MEMA and DCR 2013, 421).

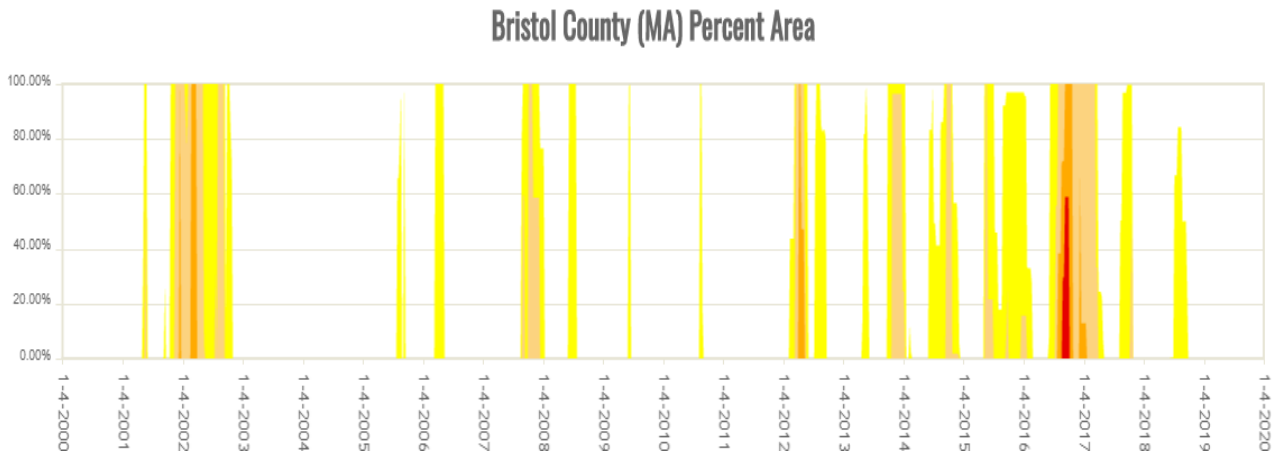
The average annual precipitation in the Boston area is 53.32 inches per year, with approximately a two to five-inch average amounts for each month of the year (NOAA 2019b). Although Massachusetts is relatively small, it has a number of distinct regions that experience significantly different weather patterns and react to precipitation in very different ways, depending on the amounts they receive. The DCR precipitation index divides the state into six regions: Western, Central, Connecticut River Valley, Northeast, Southeast, and Cape and Islands. Attleboro is located within the Southeast region (MEMA and DCR 2013, 423, 434).

A variety of drought indices are available to assess the various impacts of dry conditions. The Commonwealth uses a multi-index system to determine the severity of a drought or extended period of dry conditions. A determination of drought level is based on seven indices: Standardized Precipitation Index, Crop Moisture Index, Keetch-Byram Drought Index (KBDI), which describes fire danger, Precipitation, Groundwater levels, Streamflow levels, and Index Reservoir levels. Drought level is determined monthly based on the number of indices that have reached a given drought level. Most of the indices would need to be triggered in a region for a drought designation to move to a more severe level. Drought levels are declared on a regional basis for each of the six regions in Massachusetts. Drought levels may also be made county by county or be watershed specific. Once a drought level of warning and emergency has been reached for the precipitation index, conditions must improve to those of the previous level before a determination is made to reduce the warning or emergency (MEMA and DCR 2013, 424).

4.9.1 Previous Drought Occurrences

Assessing previous drought occurrences can assist in determining the likelihood of future events. Figure 4.4 illustrates statewide drought levels in Bristol County Massachusetts from 2000-2019, using the Standardized Precipitation Index (SPI).

Figure 4-4. Bristol County Drought Levels 2000-2019



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Richard Tinker
CPC/NOAA/NWS/NCEP

*The **Time Series Graph** above illustrates the severity of dry and drought conditions over several years. The U.S. Drought Monitor provides national, state, and county data updated weekly on its website. Statistics can be viewed, printed, and downloaded.*

4.9.2 *Drought Emergency*

Five emergency droughts were recorded in Massachusetts: 1883, 1911, 1957, and 1965-1966. The 1965-1966 drought is considered the most severe Massachusetts drought in modern times, given its length.

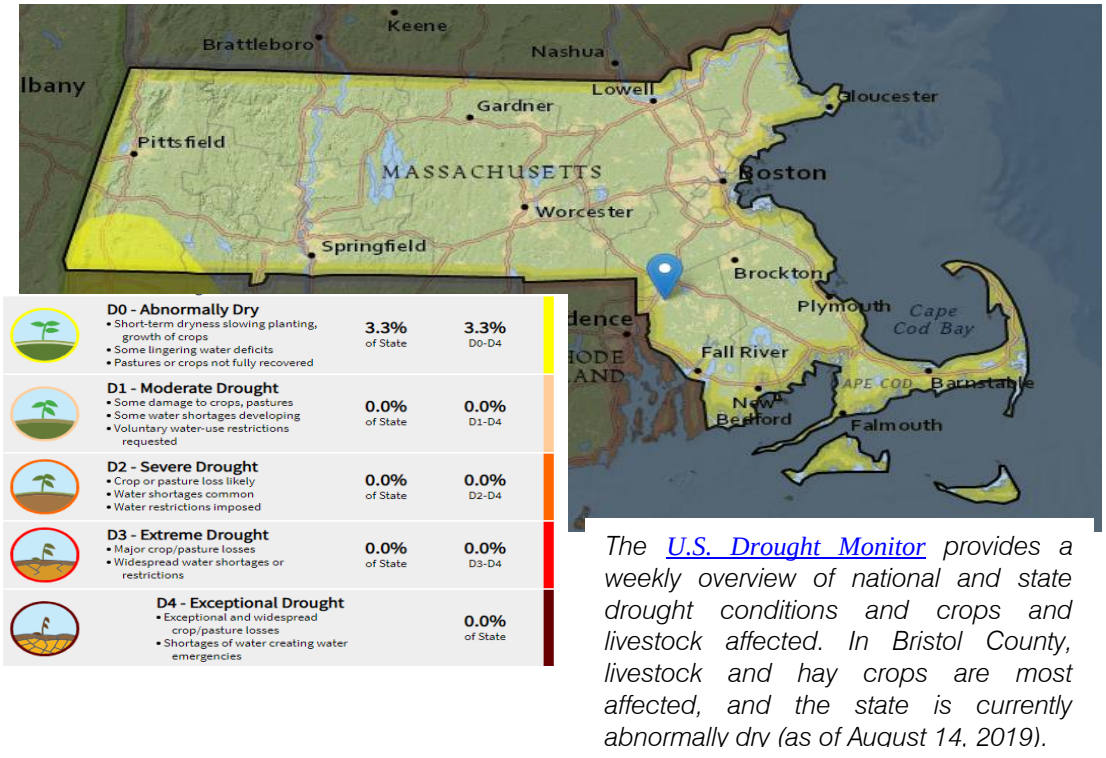
4.9.3 *Drought Warning*

Records indicate that drought warning levels, not associated with a drought emergency, occurred in Massachusetts in 1894, 1915, 1930, 1985, 2016, and 2017. On a monthly basis over the 162-year period of record, there is a two percent chance of a drought warning being declared (EEA and MEMA 2013, 36; DCR 2017b, 1).

Drought watches occurred at a rate of three times per decade in the 1990s (1995, 1998, and 1999). In the 2000s, drought watches occurred in 2001 and 2002. The overall frequency of being in a drought watch is eight percent on a monthly basis over the 162-year period of record (EEA and MEMA 2013, 36). There were six drought watches in Massachusetts in 2002, five drought watches in 2016, and two drought watches in 2017 (DCR 2017b, 1).

Drought is a potential citywide hazard for Attleboro. As temperatures are projected to rise, increased and exacerbated drought conditions are possible, especially in the summer and fall months. Droughts increase the risk of wildfires, and wildfires are often caused by lightning strikes. A 2014 study found that the frequency of lightning strikes could increase by more than 10% for every degree Celsius of warming (MEMA and EOEEA 2018, 4-45, 4-178). Figure 4-5 Provides an example of drought conditions in the six drought regions of Massachusetts.

Figure 4-5. Massachusetts Drought Conditions



The U.S. Drought Monitor provides a weekly overview of national and state drought conditions and crops and livestock affected. In Bristol County, livestock and hay crops are most affected, and the state is currently abnormally dry (as of August 14, 2019).

Source: NOAA 2018a

NOAA's National Center for Environmental Information provides drought data for Bristol County. This area has experienced 14 drought events since 1998, with no reported deaths, injuries, or property damage. Table 4-23 provides additional information on those occurrences.

Table 4-23. Droughts Recorded in Bristol County, MA

Date	Area Affected	Recurrence Interval (years)	Remarks
1879 to 1883	–	–	–
1908 to 1912	–	–	–
1929 to 1932	Statewide	10 to 50	Water-supply sources altered in 13 communities. Multistate.
1939 to 1944	Statewide	15 to 50	More severe in eastern and extreme western Massachusetts. Multistate.
1957 to 1959	Statewide	5 to 25	Record low water levels in observation wells, northeastern Massachusetts.
1961 to 1969	Statewide	35 to 50	Water-supply shortages were common. Record drought. Multistate.
1980 to 1983	Statewide	10 to 30	Most severe in Ipswich and Taunton River basins; minimal effect in the Nashua River basin. Multistate.
1985 to 1988	Housatonic River Basin	25	Duration and severity are unknown. Streamflow showed mixed trends elsewhere.
1995	–	–	Based on statewide average precipitation.
1998 to 1999	–	–	Based on statewide average precipitation.
2001 to 2003	Statewide	–	Level 2 drought (out of 4 levels) was reached statewide for several months.
2007 to 2008	Statewide except for West and Cape and Islands regions	–	Level 1 drought (out of 4 levels)
2010	Connecticut River Valley, Central and Northeast regions	–	Level 1 drought (out of 4 levels)
2014	Southeast and Cape and Islands regions	–	Level 1 drought (out of 4 levels)
2016-2017	Statewide	–	Level 3 drought (out of 4 levels)

Source: MEMA and EOEEA 2018, page 4-45

4.9.4 Probability of Future Drought Occurrences

It is important to consider the implications of possible future drought occurrences. Under moderate to severe long-term drought conditions, Attleboro could be vulnerable to restrictions on water supply. Severe drought and associated water bans can result in loss of plantings and landscaped areas, and limitations on water usage could negatively impact business operations and revenues. The economic impact, in terms of a dollar value associated with damages, is not known as this type of hazard has not occurred to a severe degree in Attleboro, but it would be reasonable to expect a range of potential damages from several hundred thousand to several millions of dollars. Another potential vulnerability created by droughts is increased risk of wildfires, as previously mentioned.

Drought is classified as low-frequency hazards in Attleboro. These events occur from once in 50 years to once in 100 years, or a 1% to 2% chance annually.

4.10 Climate Change Impacts

Climate chage has begun to play a key role in hazard mitigation planning and response. Figure 7, Appendix A, depicts a composite of all hazards identified in Attleboro, and Figure 8 shows where critical facilities are located in relation to hazard areas. Many of the hazards that Attleboro is currently experiencing could be significantly worsened by climate change. It is worth noting that drought and flooding are both likely to increase with climate change because the natural precipitation cycle will be disrupted. With climate change, the warmer atmosphere will retain precipitation longer so that it will fall in fewer, more intense events, rather than smaller, more periodic events. This will cause more flooding and longer periods with little to no rain.

4.10.1 Climate Change Impacts: Drought

According to the *MA Climate Change Adaptation Report* (2011), droughts lasting 1-3 months will become more frequent. From 1961-1999, 13 droughts were experienced. In the period between 2035-2064, the state will likely experience 18-20 droughts. For the years between 2070-2099, the state is expected to see 3-10 additional droughts. Estimates are variable and depend on a variety of factors, particularly the level of greenhouse gas emissions.

Populations vulnerable to the effects of drought include people with heightened sensitivity to water quality (the elderly, some low-income groups with higher exposure to poor water quality, and people with compromised immune systems), households dependent on private wells, and individuals and families lacking access to clean water recreational resources. Large and small businesses that rely on large amounts of water (such as power plants, manufacturing facilities, laundries and farms) are also particularly vulnerable.

Examples of the effects of drought include:

- Drought negatively affects agriculture/food systems and other water-dependent sectors, and places stress on drinking water supplies (surface and groundwater).
- When groundwater aquifers are overdrawn, large segments of rivers dry up and local vegetation and habitats are affected.[18] Vernal pools, which many animals rely upon during breeding and offspring growth season, will have lower water supplies in a drought. As a result, we may expect a reduction in the number of breeding wildlife and offspring.
- Drought increases the chances for forest fires (and subsequently threatens City infrastructure)
- Long periods of dryness cause soils to settle under infrastructure, creating paths for future moisture to penetrate foundations
- Droughts increase airborne particles, which irritate respiratory systems
- Erosion, particularly of agriculture areas, can occur with cycles of drought and heavy rain.

4.10.2 Climate Change Impacts: Extreme Temperatures

Based on current estimates, Massachusetts' average ambient temperature is expected to increase by 5-10 degrees Fahrenheit by the end of the century and has already increased by 1 degree.

Between 1961 and 1990, Boston experienced an average of one day per year in excess of 100˚F. That could increase to six days per year by 2070, and 24 days per year by 2099. Under these conditions, by the end of the centuray Massachusetts climate would more closely resemble that of Maryland or the Carolinas (refer to Figure 4-7 below). These changes in temperature would also have a detrimental impact on air quality and public health concerns, including asthma and other respitory conditions (Frumhoff et al. 2007).

[18] MA Climate Change Adaptation Report (2011), p. 18

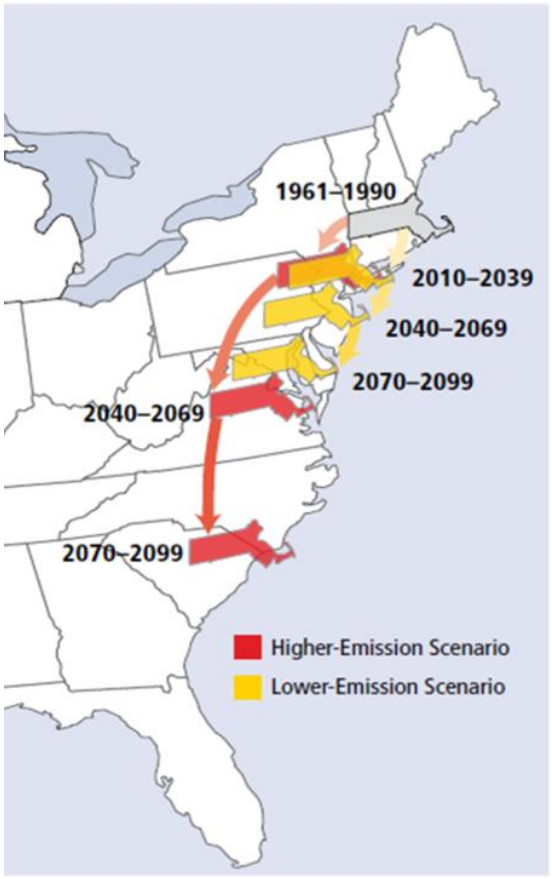


Figure 4-7. Massachusetts Extreme Heat Scenariros
Source: Frumhoff et al. 2007

4.10.3 Climate Change Impacts: Flooding

Boston's annual precipitation is 53.32 inches (NOAA 2019b). Over the last five years, Attleboro has averaged 48.18 inches of rain. Extreme rain and snow events are becoming increasingly common and severe, particularly in the Northeast Region of the country (Figure 4-6). Large rain or snow events that historically occurred once a year, now occur approximately every nine months. Additionally, the largest annual events now generage 10% more rain than in 1948. Regionally, New England has

experiences the greatest increase in frequency of extreme rain and snow events. These events now occur 85% more frequently than the did 60 years ago (Madsen and Wilcox 2012, 15-16).

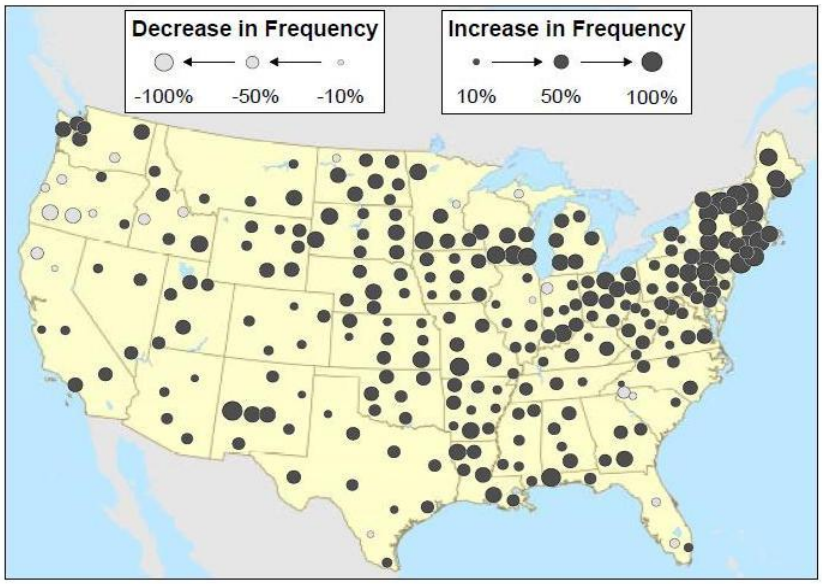


Figure 4-6. Changes in Frequency of Extreme Downpours

Source: Madsen and Wilcox 2012, page 194.10.4

4.10.4 Climate Change Impacts: Strong Winds

While Attelboro's current 100-year wind speed is 110 mph, climate change will likely increase the number of extreme wind events and their severity. Additionally, rising sea temperature could lengthen the hurricane season and fuel stronger hurricane events. The National Climate Assessment Report notes that hurricane "intensity, frequency, and duration have all increased since the early 1980s." This source predicts the continuing intensity and associated rainfall with rising temperatures. This would result in greater losses due to increased flooding, associated building damages and business interruption impacts (Walsh and Wuebbles, 2014). The anticipated increase in frequency and intensity of severe thunderstorms may also increase the risk of tornadoes (EEA and EOPSS 2018, ES).

4.10.5 Climate Change Impacts: Winter Storms

Evidence suggests that nor'easters along the Atlantic coast are increasing in frequency and intensity. Future nor'easters may become more concentrated during the coldest winter months when atmospheric temperatures are still low enough to result in snowfall rather than rain (EEA and EOPSS 2018, 4-224).

Climate projections indicate that climate change will result in more precipitation during the winter in the Northeast (EEA, 2018a). This trend may result in more frequent and severe winter storms.

4.11 Summary of Hazard Vulnerability

It is important to be aware of the location of critical infrastructure in relation to all potential hazard in the community. Table 4-4 provides details with regards to the name and type of each piece of critical instrastructure.

5.0 HAZARD MITIGATION GOALS

The following is a list of hazard mitigation goals that were developed for Attleboro's HMP:

1. Prevent and reduce the loss of life, injury, public health impacts and property damages resulting from natural hazards.

2. Use best available data and management practices to prepare for and address the adverse effects of changing weather patterns (i.e., climate change).

3. Provide for effective hazard preparation and implementation through approprite:

    - Funding.
    - Personell training and transfer of knowledge and skills.
    - Equipment and capital improvement (e.g., infrastructure).
    - Emergency systems.
    - Communication and notifications systems.

4. Educate the public about hazard mitigation and provide opportunities for the public to engage in hazard mitigation planning.

5. Encourage the business community, major institutions and nonprofits to work with Attleboro to develop, review, to implement the hazard mitigation plan.

6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation and mitigation for hazards that affect multiple jurisdiction.

7. Incorporate hazard mitigation, as appropriate, into Attleboro plans and policies to ensure effective preparedness and proper land development.

6.0 EXISTING MITIGATION MEASURES

The City of Attleboro currently implements several hazard mitigation measures. These measures are existing protections and capabilities that are based on the City's implementation of zoning, land use, and environmental regulations, infrastructure maintenance and drainage infrastructure improvement projects.

The City's existing (i.e., 2004 HMP) mitigation measures are summarized in Table 6-1. Measures are listed in the table by the type of protection measure. Table 6-1 is followed by a discussion of each measure, which are categorized by the type.

Table 6-1. Summary of Existing Hazard Mitigation Measures

Hazard	Mitigation Measures
Flood-Related	A. The City participates in the National Flood Insurance Program and adopted the FIRM maps. There are 253 policies in force. The City actively enforces floodplain regulations. B. Streets are swept at least annually. Some streets, such as in the downtown area, as swept weekly. C. City cleans its catch basins routinely based on prioritized need to prevent backup. About 25% of catch basins are cleaned each year; however, some are cleaned more frequently to address potential for backup and flooding. D. 25/75 sand/salt mix plus IceBan® is used for winter road treatments, which limits sand deposited on roadways and into catch basins. E. The City implements National Pollution Discharge Elimination System Phase II Stormwater Management Plan (SWMP) and actions. These include several quantity control and flood control measures F. The City makes drainage infrastructure improvements performed using, in part, Massachusetts Chapter 90 funds. G. Rules and Regulations Governing the Subdivision of Land addressing the City's Flood Plain District (s. 1.9), wetlands (s. 1.10), and drainage (s. 1.9(c)). These rules also requirement development of a stormwater management plan for each application (s. 5.4(h)), which must address PostConstruction Storrmwater Management Standards (s.6.3). H. Flood Plain Overlay District, which includes the objective of preserving flood control characteristics of floodplain (s. 17-12.3(c)) and protecting the public from hazard and loss (s. 17-12.3(d)). I. Local regulations require interdepartmental review related to floodplains and wetlands J. Site Plan Review that includes provisions for review of stormwater and erosion control (s. 17-15.0(K)). K. Flexible Developments allowed including cluster development (s. 17-10.11) and open space development (s. 17-10.5 and 17-10.6) L. Water Resource Protection District Ordinance, which establishes the purpose of protecting public health, safety, welfare by regulating development that might otherwise damage water resources (s. 17-13.0)

Table 6-1. Summary of Existing Hazard Mitigation Measures

Hazard	Mitigation Measures
	M. Attleboro has established a Stormwater Management Ordinance under Chapter 19 of its Code of Ordinances. Item 3 of the purpose statement notes the purpose of regulation and control of stormwater runoff quantity and quality. N. Open Space Plan which discusses flooding, flood hazard areas, and the flood mitigation benefits of wetlands and floodplains O. Dam repairs are made as funds are available (both private and public) and the City is proactively monitoring dams in the municipal area P. Increased storage at Manchester Pond by 1½ foot Q. Ongoing clearing of rivers and culverts in coordination with the Ten Mile River Alliance R. Monitoring of water and precipitation levels along major rivers by the Department of Water and Wastewater S. Ten Mile River Flood Warning Plan
Wind-Related	A. Tree maintenance completed by the Department of Parks and Forest. National Grid maintains trees within its power line corridors. B. The City enforces the Massachusetts State Building Code.
Winter-Related	A. Standard snow operations with 75/25 salt/sand mix, as well as IceBan® in icy or environmentally sensitive areas.
Brushfire Related	A. The Fire Department requires a written permit for outdoor burning. B. The Fire Department reviews all subdivision development plans.
Geologic Earthquake	A. The City enforces the MA State Building Code. B. Evacuation plans in the Comprehensive Emergency Management Plan (CEMP). C. Shelters and backup facilities available
Geologic-Landslide	A. Maximum slope for subdivision roads B. Earth Removal Ordinances
Multi-Hazard	A. The City enforces the MA State Building Code. B. The City has a CEMP. C. The City utilizes the MA Emergency Incident Command Unit. D. The City has a reverse 911 program. E. The City is a member of the Region One Boston Area Police Emergency Radio Network (BAPERN). F. The City has its own Local Emergency Planning Committee. G. The City Hall, Fire Station, DPW facility and Police facility have a fixed, natural gas generator. H. Multi department review of all developments. I. The Council on Aging has a list of everyone over 60 years old and has targeted homebound elderly and provided disaster preparedness information and some disaster kits.

6.1 Discussion of Existing Mitigation Measures

The following discussion provides additional detail on the status of mitigation measures in Table 6.1.

6.1.1 Multihazard

Multihazard measures are mitigation measures that address more than one hazard. These measures include the Comprehensive Emergency Management Plan (CEMP), the Massachusetts State Building Code and participation in local Emergency Planning Committees.

Comprehensive Emergency Management Plan – Every municipality in Massachusetts is required to have a Comprehensive Emergency Management Plan. These plans address mitigation, preparedness, and response and recovery from a variety of natural and manmade emergencies. These plans contain important information regarding response to flooding, dam failures, and winter storms; therefore, the CEMP is a mitigation measure that is relevant to many of the hazards discussed in this plan.

Enforcement of the State Building Code – The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, floodproofing and snow loads. All municipalities within the Commonwealth are required to enforce the State Code; therefore, enforcement of the State Code at the local level is considered a mitigation measure, as it addresses hazard related building issues with rehabilitation and new construction.

Attleboro's Core Team determined that the existing approach is effective but could be made more effective by through a variety of approaches. All mitigation measures listed in Table 8-1 will improve the City's multihazard mitigation capability. In particular this 2020 HMP-MVP brings a focus on climate change that is reflected in mitigation measures 13 – 15 and 26.

6.1.2 Flood

Attleboro recognizes that flooding is a relevant hazard and poses a serious threat. As such, the City takes measures to mitigate potential flood hazards. Mitigation measures include:

National Flood Insurance Program (NFIP) – Attleboro participates in the NFIP with 253 policies in force as of September 2018. Information regarding participation in the NFIP can be obtained from the Massachusetts Department of Conservation and Recreation and from FEMA's database on flood insurance policies and claims. Table 6-2 provides data related to Attleboro's participation in the NFIP.

Table 6-2. National Flood Insurance Program in Attleboro

Insurance Statistic	Measure
Flood insurance policies in force (as of September 30, 2018)	253
Coverage amount of flood insurance policies	$67,394,400
Written Premium in Force	$224,964
Total losses (all losses submitted regardless of the status)	68
Closed losses (Losses that have been paid)	46
Open losses (Losses that have not been paid in full)	0
CWOP losses (Losses that have been closed without payment)	22
Total payments (Total amount paid on losses)	$1,076,071

Source: FEMA

Floodplain Regulation – The City of Attleboro maintains up-to-date floodplain maps, enforces floodplain regulations, and provides information to property owners and builders regarding floodplains and building requirements, and thus complies with NFIP. Floodplain Regulations are incorporated into the Attleboro Zoning Ordinance at Section 17-12.

Massachusetts State Building Code – The City enforces the Massachusetts State Building Code, which regulates how buildings must be designed to accommodate specific wind loads, earthquake resistant design, flood-proofing, and snow loads.

Street Sweeping – Street sweeping is completed by contract around April of each year. Some streets are swept more frequently, such as in the downtown area, which is swept weekly.

Catch Basin Cleaning – (2019 Draft Stormwater Management Plan) The City's catch basins are cleaned out regularly to ensure prevention of drainage system backup and to address complaints when they occur. The City generally cleans about 25% of its catch basins annually. The City's standard operating procedures outline the methodology for cleaning catch basins (City of Attleboro, SOP 3).

Regulations/Ordinances and Codes – The City implements several mitigation measures through the enforcement of development regulations, ordinances, and codes. Those are explored in further detail below:

- Ordinance Section 17-12 requires review and comment by the Inspector of Buildings, Conservation Commission and the Zoning Board of Appeals on all proposed development within the 100-year floodplain.
- Ordinance Section 18-1 requires a 25-foot no-disturb zone associated with wetlands and floodplain areas.
- Ordinance Section 17-10.2 contains earth removal requirements.
- Ordinance Section 17-10.5 & 17-10.6 provides for the clustering of homes reducing impervious coverage and allows for clustering away from flood-prone areas.
- Ordinance Section 17-13 creates an overlay district for Water Resource Protection.
- The City has adopted and currently implements Phase II Stormwater Management Plan and Actions.

Attleboro's Core Team determined that the existing approach is effective but could be made more effective by adding several flood-specific mitigation measures. Table 8-1 summarizes the City's 2020 HMP-MVP mitigation measures. Flood-specific mitigation measures include 17 – 21, 25, 31, 32, and 46.

6.1.3 Wind

Massachusetts State Building Code – The City enforces the Massachusetts State Building Code which includes protection again most wind damage and is a cost-effective mitigation measure against tornado damage.

Tree-Trimming Program – The Tree Warden is responsible for the care of all trees in city parks, playgrounds, conservation areas, and other public property. Forestry Department employees trim or remove trees that is on public property and present a hazard. Forestry employees remove trees and fallen tree limbs on public roadways and sidewalks. Tree hazards and fallen trees and tree limbs within 10 feet of a live power line are reported to National Grid for advice and assistance. Whether on public or private property, National Grid may decide to remove the tree or limb from or below the power lines. Once National Grid has made efforts to help make-safe the potential danger, responsibility falls back to the Forestry Department if the tree or limb is on public property or to the homeowner if on private property.

Attleboro's Core Team determined that the existing approach is effective but could be made more effective by adding several wind-specific mitigation measures. Table 8-1 summarizes the City's 2020 HMP-MVP mitigation measures. Wind-specific mitigation measures include 25 and 33 – 37.

6.1.4 Winter

Roadway Treatments – Prior to a winter storm, MassDOT applies a liquid anti-ice (wet salt with Magnesium Chloride) solution to state-owned roadways, which prevents snow and ice accumulation from binding to the road. The state also uses rock salt and plows to de-ice the roadway throughout the duration of the storm. After the storm, the state spreads a post-storm treatment to prevent re-freezing during the night.

For local roads, the City of Attleboro uses a 25/75 mixture of sand and salt for roadway ice treatment. IceBan® (liquid ice melt) is used in addition to or in place of the sand and salt mixture in particularly icy or environmentally sensitive areas.

Attleboro's Core Team determined that the existing approach is effective but could be made more effective by adding several winter-specific mitigation measures. Table 8-1 summarizes the City's 2020 HMP-MVP mitigation measures. Winter-specific mitigation measures include 25 and 33 – 37.

6.1.5 Geologic

Massachusetts State Building Code – The Massachusetts State Building Code contains standards related to designing for earthquakes (780 CMR 1612.0). Section 1612.1 of the Building Code states that the purpose of this section is "to minimize the hazard to life to occupants of all buildings and non-building structures, to increase the expected performance of higher occupancy structures as compared to ordinary structures, and to improve the capability of essential facilities to function during and after an earthquake." This section further states that due to the complexity of seismic design, the criteria presented are the minimum considered to be "prudent and economically justified" for the protection of life safety. The code acknowledges that absolute safety and prevention of damage resulting from an earthquake event cannot be achieved economically for most buildings.

Section 1612.2.5 and Table 1612.2.5 of the Massachusetts State Building Code establish seismic hazard exposure groups and assign buildings to these groups. Group II includes buildings that present a substantial public risk due to occupancy or use. Group III includes buildings with essential facilities that are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

Attleboro's Core Team determined that the existing approach is effective and will continue its existing geologic-hazard mitigation approach.

6.1.6 Fire

Permits Required for Seasonal Outdoor Burning – The Fire Department requires a written permit for outdoor burning, which is allowed only from January 15 to May 1. The City may issue burning prohibitions even during the burn season; therefore, permit holders must call the Fire Department to ensure that burning is allowed on days they intend to burn. Failure to call and confirm is grounds for revocation of the permit.

Subdivision Review – The Fire Department is involved in reviewing all subdivision plans.

Attleboro's Core Team determined that the existing approach is effective and will continue its existing fire-related mitigation approach; however, the Core Team has included several climate chage mitigation approaches which are included in Table 8-1 as mitigation measures 13 – 15 and 26.

6.1.7 Extreme Temperature

The National Weather Advisory Service issues statements regarding extreme heat when outdoor temperatures become excessive and dangerous. NWS often issues such statements in collaboration with state and local authorities. In Massachusetts three types of statements may be issued: (a) excessive heat watch when conditions are favorable for a heat warning within the 24 – 72 hours; (b) heat advisory when daytime indices of 100°F – 104°F are predicted for two or more hours (c) excessive heat watches warning when daytime indices of 105°F are predicted for two or more hours. when temperatures exceed 90 degrees. The Attleboro Fire Department broadcasts that is informationheat statements (i.e., watches, advisories, warnings) along with contact numbers for emergency assistance. andThese broadcasts also include measures that residents can take to protect themselves, elderly residents, children, and pets as established by the American Red Cross and the National Safety Council.

City officials can authorize cooling stations (areas with air conditioning) and residents can use the public library as anfor air-conditioned space.

Attleboro's Core Team determined that the existing approach is effective and will continue its existing extreme temperature mitigation approach; however, the Core Team has included several climate chage mitigation approaches which are included in Table 8-1 as mitigation measures 13 – 15 and 26.

6.1.8 Drought

Water Department – The City's Water Department has adopted and implemented an emergency response plan and a drought plan.

The City of Attleboro is authorized to adopt and amend several local ordinances and regulations that support capabilities to mitigate natural hazards under the Massachusetts system of "Home Rule." Local ordinances include zoning ordinances, subdivision and site plan review regulations, wetlands ordinances, health regulations, Public Works Department regulations, and local enforcement of the State Building Code. Local ordinances may be amended—or new ordinances adopted—at a public hearing to improve the City's capabilities. Regulations, which are intended to help implement the ordinances, are updated through a public hearing and vote of the authorized board or commission, such as the Planning Board or Conservation Commission.

Attleboro's Core Team determined that the existing approach is effective and will continue its existing drought mitigation approach; however, the Core Team has included several climate chage mitigation approaches which are included in Table 8-1 as mitigation measures 13 – 15 and 26. Additionally, mitigation measure 28 has been included to evaluate options for bolstering reservoir capacity and drinking water backup supply.

7.0 STATUS OF MITIGATION MEASURES FROM THE 2004 PLAN

7.1 Implementation Progress on the Previous Plan

At a meeting of the Attleboro Core Committee, City staff reviewed the mitigation measures identified in the 2004 Attleboro Hazard Mitigation Plan Core Committee members felt it was important to determine which mitigation measures were still relevant and whether each measure had been implemented or deferred. Of those measures that had been deferred, the committee evaluated whether the measure should be deleted or carried forward into this 2020 HMP-MVP. The decision on whether to delete or retain a particular measure was based on the committee's assessment of the continued relevance or effectiveness of the measure and whether the deferral of action on the measure was due to the inability of the City to take action on the measure. Table 7-1 summarizes the status of the mitigation measures from the 2004 HMP. The 2004 HMP did not prioritize these measures.

Table 7-1. 2004 HMP Mitigation Measures

Mitigation Measure	Responsible Party	Status as of 2020 (Completed/In Progress/Not Completed)	Included in 2020 Plan
Correct drainage problems in the vicinity of Forest Street	City Council/Mayor/ DPW	In Progress	Yes
Correct drainage problems in the vicinity of Peck Street	City Council/Mayor/ DPW	In Progress	Yes
Acquire easements or property along the river in downtown that provides some flood protection and decreases impervious surface at the river's edge	Mayor/City Council	In Progress, several easements have been acquired including easements along Ten Mile River (e.g., to accommodate the Judith Robbins Parkand Dumas Walkaway)	Yes
Purchase generators for the Emergency Operations Center and Senior Center	Public Safety Officials working with Mayor/City Council	Completed	No
Study the potential for a new siren system that could be used as a means of getting the public to tune into Cable and radio stations for emergency information	Public Safety Officials working with Mayor/City Council	Discontinued. An alternative approach is now proposed.	No
Study the pros and cons of mandating underground utilities in new subdivisions	Planning Board/Planning Department	Not completed	Yes

Mitigation Measure	Responsible Party	Status as of 2020 (Completed/In Progress/Not Completed)	Included in 2020 Plan
Study the pros and cons of adopting an uplands requirement for new lots by district	Planning Board/Planning Department	Completed	No
Have revisions made to the National Flood Insurance Program (NFIP) maps for Attleboro. This is needed given the changes that have been made since 1981 maps were prepared including alterations to dams, increased impervious coverage, and other drainage pattern changes	Planning Department working with MA DCR and Army Corp of Engineers (ACOE)	Completed	No
Additional manpower is needed to undertake more detailed monitoring of hazardous waste users and storage practices, including the construction of a database and efforts to keep it up to date	Fire Department and Health Department	In Progress	Yes
Comprehensive Plan will integrate disaster mitigation	Planning Board/Planning Department	Completed	No
Update Pre-Disaster Mitigation Plan at least every 5 years, or as needed	Planning Department with Emergency Management Director	In Progress	Yes
Develop a direct mail piece for Attleboro households on disaster mitigation	Public Safety Officials working with Mayor/City Council	Discontinued. An alternative approach is now proposed (see Mitigation Measure 1 in Table 8-1).	No
Pursue Storm Ready Certification	Public Safety Officials working with Mayor/City Council	In Progress	Yes
Expand outreach to the 500 homebound seniors and	Council on Aging and	In Progress	Yes

Mitigation Measure	Responsible Party	Status as of 2020 (Completed/In Progress/Not Completed)	Included in 2020 Plan
others in the community that could use disaster preparedness assistance	Public Safety Officials, working with Mayor/City Council		

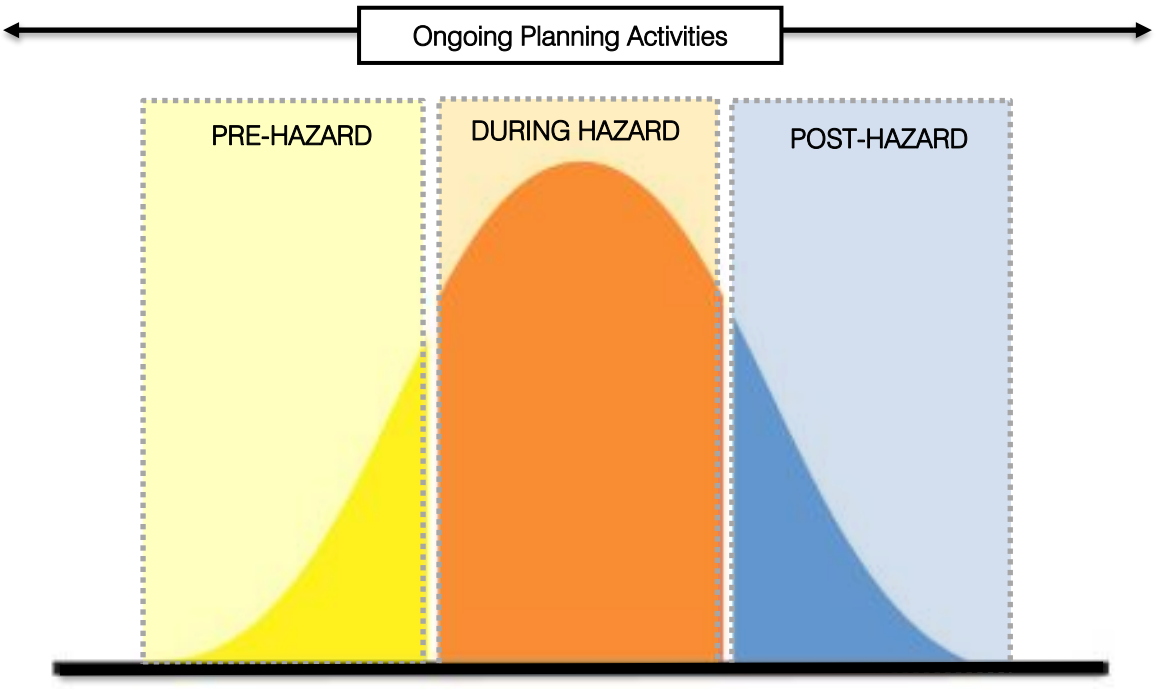
As the City moves forward into the next five-year plan implementation period; identifying and incorporating hazard mitigation into the City's decision-making process will be a high priority. Limited staffing and financial resources are the biggest challenges the City faces in implementing the mitigations measure identified in this plan. The plan is intended to assist the City in prioritizing the proposed measures, which will provide guidance on how to best allocate the City's limited resources.

8.0 HAZARD MITIGATION STRATEGY

8.1 Action Planning

During the Core Committee meetings, Attleboro officials and representatives reflected on past threats that have faced Attleboro, and focused on what actions have worked in the past and what have not, and where they see both threats and opportunities. Based on these reflections, the Committee then devised a preliminary list of actions that builds on their strengths and opportunities, and reduces their weaknesses. In addition, actions from the 2004 HMP were reviewed. Those actions which are still relevant but were not achieved have been included in this updated Action Strategy. Additionally, actions that are ongoing are also included. Table 8.1 represents the draft actions from this effort in the first column.

The second column of Table 8.1 is the **Hazard Phase**. City staff conceptualized an Action Plan that is organized by when the action takes place: before a hazard, during a hazard and after a hazard event. Figure 8-1 below illustrates this approach.



Bell curve graphic modified from www.vecteezy.com.

Figure 8-1: Hazard Phases

For each mitigation measure, the geographic benefit area is identified, as is a determination of overall benefit and the estimated cost associated with the measure. Each of the columns in Table 8-1 is described below:

> Estimated Cost – Cost estimates are given when cost data was available from the community. All cost data would need to be updated at the time of design and construction and is only provided as an estimate. Costs designated as "$$$" are estimated to be greater than $100,000.

Those designated as "$$" are estimated between $50,000 to $100,000. "$" costs are estimated to be less than $10,000.

Implementation – This column identifies additional parties beyond who is identified in the Iimplementation Responsibility column. Those identified in this column will serve as support to the lead responsible party.

Timeframe – The time frames represented below are assigned based on the complexity of the measure, the overall priority of the measure and at what stage of design and/or funding has been attained. Because the time frame for this plan is five years, the timing for all mitigation measures has been kept within this framework. The identification of timeframes is not meant to prevent a community from actively seeking out and taking advantage of funding opportunities as they arise. Timeframes are designated as "long term" are estimated to be more than five years. Those designated as "medium term" are estimated more than three but less than five years. "Short term" is estimated to be less than three years.

Priority – Designation of high, medium, or low priority is based on overall potential benefits, areas affected and estimated project costs. A "high priority" action is very likely to have political and public support and necessary maintenance can occur following the project, and the costs seem reasonable considering likely benefits from the measure. A "medium priority" action may have political and public support and necessary maintenance had potential to occur following the project. A "low priority" action may not have political and public support for implementation or the necessary maintenance support following the project.

Table 8-1. Proposed Mitigation Actions

	Mitigation Action	Hazard Phase	Estimated Cost	Responsibility	Timeframe	Priority	Funding Source
			$ = < $10,000 $$ = <$50,000 $$$ = <$100,000	Lead indicated in bold	S = Short Term M= Medium Term L = Long Term	H = High M = Medium L = Low	
1.	Provide enhanced public education through the City website, school curricula, as well as other means, related to: • how to reduce wind-related storm damage and implement best management practices • energy conservation, use reduction, and storage, and timing of use to address peaking • importance of wetlands • sustainable planting • climate change and ecology • reducing carbon footprint and increasing resiliency water conservation and use reduction extreme temperature conditions	O	$	**Planning Department**, Conservation Commission	M	M	Municipal/Grants (as available)
2.	Create an internal Citywide Emergency Response Plan that also captures institutional knowledge and protocols. The plan should include: • prepare detailed mitigation plan for each natural hazard • a communications system • training for new staff • mentoring of existing staff • updated contact lists of internal staff and on-call professionals • coordination among Department Heads. • Regular updates	PRE/O	$	**Mayor**, Department Heads Personnel Utility Representatives Contractors Shelters Non-Profits/Churches Hospital FEMA	M	H	Municipal/Grants (as available)
3.	Hire an Emergency/Management Director and create an Emergency Management Department reactivate the Emergency Management Committee	PRE	$$	**Mayor**	S	H	Municipal
4.	Create a dedicated location with required systems and equipment for Emergency Operations Center and ensure that training sessions are maintained.	PRE	$$	**Fire**, Police, Public Works, Health, Water, Wastewater	S	H	Municipal
5.	Create an Emergency Public Information Plan for various media (website, social media, direct mail) to keep the public informed before, during and after hazard events. Ensure that points of contact are continuously updated. Part of the plan should include deployment of a citywide multimedia hazard notification system	PRE	$$	**Fire**, Police, Public Works, Health, Water, Wastewater	S	H	Muncipal
6.	Maintain communication systems and protocols with neighboring towns	PRE/O	$	**Fire**, Police, DPW, Health, Water, Wastewater	S	H	Municipal/Intermunicipal
7.	Develop emergency plan, including evacuation, for elderly and other at-risk populations. Consider ways to coordinate with existing Council on Aging programs	PRE	$$	**Fire**, Police, DPW, Health, Water, Wastewater	M	H	Municipal/Grants (as available)

Mitigation Action		Hazard Phase	Estimated Cost	Responsibility	Timeframe	Priority	Funding Source
8.	Evaluate structural integrity of City-owned dams and repair/upgrade as needed	POST	$$	**Public Works**	M	H	Municipal/Grants (as available)
9.	Acquire Opt-In Systems software for weather conditions and alerts	PRE	$$	**Fire,** Police, Public Works	L	M	Municipal/Grants (as available)
10.	Invest in department vehicles and equipment to ensure adequate response and delivery of emergency services during a storm, such as trucks with sanding equipment	PRE/O	$$$	**Mayor**, Council	M	M	Municipal
11.	Invest in departmental vehicles and equipment to ensure adequate maintenance of municipal assets such as dams, dikes, and stormwater management systems (i.e., vactor truck)	PRE	$$$	**Public Works,** Mayor, Council, Parks and Forestry	M	H	Municipal
12.	Maintain a list of critical equipment including generators and supplies that will need replacing in the next 3-5 years and target grant applications to support replacements	PRE/O	NA	**Public Works**	S	M	Municipal
13.	Implement more renewable power technology and generation	O	$$$	**Mayor**, Department Heads	L	H	Municipal/Grants (as available)
14.	Conduct feasibility study on retrofitting municipal facilities with renewable energy	PRE/O	$$	**Mayor**, Council, Department Heads	M	M	Municipal/Public Utilities
15.	Encourage the use of energy efficient appliances , equipment, and vehicles	O	$	**Mayor**, Department Heads	M	H	Municipal
16.	Adopt the Community Preservation Act	PRE	$	**Planning,** Mayor, Council	L	H	Municipal
17.	Restore floodplains along the Ten Mile River that are municipally owned and encourage the same on private property through incentives. Analyze nuisance flood areas for corrective action and implement best management practices.	POST	$$$	**Planning,** Public Works, Mayor, Council	L	H	Municipal (through land-development ordinances and regulations
18.	Acquire and preserve green space to help with flood protection hazard mitigation and climate resilience	PRE/O	$$$	**Planning,** Mayor, Council	L	H	Municipal/Grants (as available)
19.	Evaluate opportunities to implement nature-based solutions for stormwater management systems onpublic properties as required by the MS4 General Permit	PRE/O	$	**Planning,** Public Works, Mayor, Council	M	H	Municipal
20.	Encourage infiltration of stormwater and use of rain barrels for water conservation	PRE/O	$	**Planning,** Public Works, Mayor, Council	S	H	Municipal/Grants (as available)
21.	Increase stormwater infrastructure maintenance.	PRE/O	$$$	**Public Works,** Mayor, Council	L	M	Municipal
22.	Hire additional Public Works staff to ensure maintenance in accordance with industry standards	PRE/O	$$$	**Public Works,** Mayor, Council	L	M	Municipal
23.	Implement stormwater management infrastructure upgrades as needed	PRE/O	$$$	**Public Works,** Mayor, Council	S	H	Municipal/Grants (as available)
24.	Create an asset management database that includes stormwater infrastructure and MS4 knowledge	PRE/O	$	**Planning**, Public Works, Wastewater	S	H-M	Municipal

	Mitigation Action	Hazard Phase	Estimated Cost	Responsibility	Timeframe	Priority	Funding Source
25.	Pursue Storm Ready Certification	PRE	$	**Mayor,** Fire Department, Police Department, Public Works, Planning	S	H	Municipal
26.	Advocate for the mitigation of climate change and improving resiliency with state legislators	PRE/O	$	**Mayor**, Council, Department Heads	S	H	Municipal, State, Federal, Private
27.	Expand outreach to homebound seniors and others in the community that could use disaster preparedness assistance	PRE/O	$	**Mayor**, Department Heads	S	H	Muncipal/Private
28.	Evaluate the options for increasing reservoir capacity and additional drinking water backup supply	PRE	$$	**Water,** Public Works, Planning, Mayor, Council	M	H	Municipal
29.	Explore options for permanent municipal cooling center locations during heat emergencies and publicize locations through the best available media	PRE	$$	**Fire,** Health, COA, Mayor, Council	M	H	Municipal
30.	Explore options for addressing heat island effect	PRE	$$	**Mayor**, Department Heads	L	H	Municipal/Grants (as available)
31.	Increase local wetland WPZ setback an additionals 25-50 feet and prevent minimize development in the floodplain	PRE	NA	**Planning Department**, Conservation Commission	M	M	Municipal
32.	Improve floodplain management by updating zoning and regulations as needed	O	$$	**Planning,** Mayor, Council	S	M	Municipal/Grants (as available)
33.	Adopt regulations to minimize/avoid clear cutting of forested areas and vegetation	O	$	**Planning,** Public Works	S	H	Municipal
34.	Explore and consider regulations standards for landscaping and vegetation management related to managing to address wind hazards	O	$	**Planning,** Public Works, Forestry	S	H	Municipal
35.	Explore and consider a tree preservation ordinance for new developments that preserves and protects existing forests and mature trees	O	$$	**Planning,** Public Works, Forestry	S	H	Municipal
36.	Better management of hazard trees, particularly as part of post-storm cleanup activities. When replacing trees use native species whenever possible. Hire more staff and procure better equipment to accomplish this.	POST	$$	**Forestry**, Public Works	S	H	Municipal/Grants (as available)
37.	Advocate for underground utilities and ground-level transformers. Planning Board should consider amending regulations.	PRE/O	$	**Planning,** Public Works, Mayor, Council	S	H	Municipal/Grants (as available)
38.	Replace existing culverts in order to meet Massachusetts stream-crossing standards and facilitate animal migration	O	$	**Planning,** Public Works	S	H	Grants (as available)
39.	Promote ecological restoration	O	$	**Planning,** Public Works	S	H	Municipal
40.	Increase frequency of cleanup in local water resources	O	$	**Water,** Planning, Public Works	S	H	Municipal
41.	Continue to monitor and improve water quality	O	$	**Water,** Planning, Public Works	S	H	Municipal
42.	Provide electric vehicle charging incentives for parking garages/lots/retail	PRE	$	**Planning,** Public Works, Mayor, Council	M	M	Municipal

	Mitigation Action	Hazard Phase	Estimated Cost	Responsibility	Timeframe	Priority	Funding Source
43.	Encourage the use of public transit (GATRA) and consider adding public transportation options with vehicles that use renewable energy	PRE	$	**Mayor,** Planning, Council	M	M	Regional/State
44.	Create bicycle and pedestrian friendly complete streets where feasible	O	$$$	**Planning,** Public Works, Mayor, Council	L	M	Municipal in partnership with the State
45.	Continue work on Green Communities. Evaluate and update local policies as needed.	PRE	$	**Planning,** Public Works, Mayor, Council	S	H	Municipal in partnership with the State
46.	Update City stormwater ordinance to require new development to mitigate the impact of higher intensity storms and greater volumes of runoff due to climate change	PRE	$	**Planning,** Public Works, Mayor, Council	S	H	Municipal
47.	Undertake more detailed monitoring of hazardous waste users and storage practices, including the construction of a database and efforts to keep it up to date	PRE	$$	**Fire Department** and Health Department	S	H	Municipal/Grants (as available)

Note:
a. The 2004 HMP did not prioritize actions; therefore, there were no changes in priority from the 2004 HMP.

9.0 PLAN ADOPTION AND MAINTENANCE

9.1 Plan Adoption

The Attleboro HMP-MVP 2020 was adopted by the City on *[ADD DATE]*. See Appendix D for documentation. The plan was approved by FEMA on [*ADD DATE*] for a five-year period that will expire on [*ADD DATE*].

9.2 Plan Maintenance

After approval of the plan by FEMA, and adoption of the plan by the City, the Core Committee that originally convened as the steering committee for establishing the Plan will transition its work to updating and keeping the Plan current. Coordinated by Attleboro Planning Director, Gary Ayrassian, the Core Committee will meet annually or on an as-needed basis, whichever is most frequent, to monitor plan implementation and may include additional members from local businesses, nonprofits, and institutions. The City will engage the public during the next 5-year planning cycle and encourage local participation whenever possible. All updates and accomplishments of the Core Committee and the City, related to mitigation measure and the plan itself, will be placed on the City web site. All public meetings to update the Plan will be publicly noticed in accordance with City and state open meeting laws and the public will be encouraged to attend and participate.

9.3 Implementation and Evaluation Schedule

Bi-Annual Survey on Progress – The coordinator of Core Committee, Gary Ayrassian, will prepare and distribute a survey halfway into the five-year plan. The survey will be made available to all Core Committee members and any other interested local stakeholders. The survey will assist in determining any necessary changes or revisions to the plan that may be needed. In addition, it will help provide information on progress and accomplishments for implementation and any new hazards or problem areas that have been identified since the plan drafting.

The information collected through the survey will be used to formulate a report and/or addendum to the plan. It will be important to evaluate the status of measures accomplished and initiated towards meeting the plan's goals. Additionally, identifying areas that need to be updated in the next plan will need to be an ongoing process. The Core Committee, led by the designated coordinator, will have primary responsibility for tracking progress, evaluating, and updating the plan during the next five years and beyond.

Preparation for the Plan – FEMA's initial approval of this plan is valid for five years. During that time the City will need to continue to track progress, amend hazards and identify additional hazards and mitigation measures. By doing so, the City will maintain a plan, which will secure eligibility for FEMA mitigation grants, and future updates will be relatively easy since information will have been collected and updated throughout the five-year life of this plan. Given the lead time needed to secure funding and conduct the planning process, the Core Committee will begin drafting the full update of the plan in year four. The group will use the information from the year four biannual review, in addition to any other data and information collected, to identify the needs and priorities for the plan update. This will help the City avoid a lapse in its approved plan status and grant eligibility when the current plan expires at the end of year five.

Potential sources of funding in the future may include FEMA Pre-Disaster Mitigation grants and the Hazard Mitigation Grant Program. Both grant programs are eligible to pay for 75% of a planning project, with a 25% local cost-share requirement.

Update Preparation and Adoption – Once the resources have been secured to update the plan, the Core Committee will need to determine whether to undertake the update itself or hire a consultant. If the Core Committee decides to update the plan itself, the group will need to review the current FEMA hazard mitigation plan guidelines for any change in the requirements. The Attleboro HMP-MVP Update will be forwarded to MEMA and DCR for review and to FEMA for ultimate approval.

9.4 Integration of the Plans with Other Planning Initiatives

Upon approval of the 2020 Attleboro HMP-MVP by FEMA, the Core Committee will make the plan available to all interested parties and all departments with an implementation responsibility. The group will initiate a discussion with those various departments regarding how the plan can be integrated into their ongoing work. At a minimum, the plan will be reviewed and discussed with the following departments:

- Fire Department/Emergency Management
- Police Department
- Public Works Department
- Planning
- Conservation Commission
- Parks and Recreation
- Board of Health
- Building

Coordination with large institutions, the Water District, the Chamber of Commerce, land conservation organizations and watershed groups will be required for successful implementation and continued updating. The adopted plan will be posted on the City's website. Any sections of the plan containing sensitive information that would be considered inappropriate for public posting will be removed prior to posting. The posting of the plan on the City's web site will provide a mechanism for citizen feedback, such as an e-mail address for interested parties to send comments.

Appropriate sections of the HMP-MVP will be integrated into other city plans, policies and documents as those are updated and renewed, including the Open Space and Recreation Plan, Comprehensive Emergency Management Plan, and Capital Investment Program.

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APPENDIX A

Core Team Meetings

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Tel: 508.698.3034

MEMORANDUM

TO:	Gary Ayrassian, Director of Planning & Development Nicholas Wyllie, Conservation Agent
FROM:	James Riordan, Senior Project Manager
DATE:	September 12, 2019
SUBJECT:	Hazard Mitigation Plan Update, Kickoff Meeting Summary

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A project kickoff meeting was held on August 27 at 6:00 p.m. The meeting was held with the core team for the purpose of introducing the process for update of the Hazard Mitigation Plan (HMP), project schedule, and next step in the process of updating the HMP. Below is a summary of the meeting by topics discussed. Meeting materials and a sign-in sheet are attached.

Introductions

Gary Ayrassian gave an overview of the HMP project and generally described the need for an update. Jim Riordan, who is the project manager for Weston & Sampson for this HMP update, added some details as well. Gary also led introductions of the meeting participants. Participants then introduced themselves around the table (i.e., names, departmental position, and relationship to hazard mitigation).

Below are some key points that Gary and Jim made during the overview:

- The HMP Update is being done on an $18,000 grant from the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). The City has been awarded a $32,000 Municipal Vulnerability Program (MVP) planning grant, which is in the process of being contracted with the Commonwealth and will be conducted concurrently with the HMP.
- The HMP was last updated in 2004.
- The focus of the 2004 HMP was natural hazard mitigation. That will be the case for this 2020[1] update as well. HMPs may also include address hazard mitigation related to public health (e.g., disease outbreak) and human activity (e.g., hazards related to terrorism, information

[1] The HMP update schedule shows expected approval of the plan in June 2020.

technology); however, municipal HMPs in New England generally focus on natural hazards since natural disasters are the most prevalent threat for local government.

- The 2020 HMP will address climate change and will include a section on climate resiliency as the science and mitigation practices around climate change have become a much more significant focus of hazard mitigation planning since the 2004 HMP. Localized flooding, intensity of severe weather, and urban heat effect are three examples of topics that the 2020 HMP will address.

Project Overview

Jim Riordan gave an overview of the project approach and scope of work. He distributed materials, including a scope of work and schedule (both attached, schedule is discussed below) and led the group through a discussion of the project approach.

Jim noted that Weston & Sampson would be able to update the list of natural disasters, weather patterns, and other elements that are related to publicly available state and federal data, but local information would need to come from the City and that some local data may be unpublished.

Jim said that it would be helpful to have members of the core team review the 2004 HMP to identify changes in critical facilities, actions and other local issues. Specifically, these can be found in sections 2 through 4 (specifically, pages 15 – 17) of the 2004 HMP. (Nick Wyllie sent an email notice regarding this to the meeting participants). Several participants noted issues to consider including the increase in the senior citizen population and potential to use churches as emergency shelters. Weather Station 801 was noted as a local station with a long and consistent record of weather data.

Gary asked Jim about timing and it was agreed to that September 13 would be an appropriate day to have this information sent to Nick so that it can be included in the first deliverable of the HMP project. Participants agreed to send information to Nick, who will then forward information to Jim.

Schedule

As noted above, Jim gave an overview of the project schedule in combination with the project scope of work. The schedule discussion included approximate end dates for tasks as well as timing of deliverables. Participants also discussed approximate dates for meetings of the core team to dovetail with completion of tasks. Meetings will be scheduled toward the end of the workday or in the evening for approximately 90 minutes each. As a starting point, participants agreed to meet on September 30 and October 28 (both being last Mondays). The group will revisit meeting days in November and December to avoid potential conflicts with Thanksgiving, Christmas, New Year's Day. Late afternoon and night meetings were generally preferred; however, there was not an apparent hour of the day that would always work easily for the full core team.

Public meetings will be planned for October, November, January, and February to introduce the project, discuss progress, and collect HMP comments.

Core Team

The core team will include the meeting participants others. A sign-in sheet with a list of core team members is attached. Participants of the kickoff signed in by checking their names on the sheet.

Wrap Up and Next Steps

The table below lists next steps for the HMP Update

Action Items	W&S	Town
9/13 the core team will provide recommended updates of vulnerabilities to Nick Wyllie. Nick will provide them to Jim Riordan for incorporation in the first project deliverable.		X
9/23 Weston & Sampson will provide a draft of sections 2 – 4 of the HMP update. This deliverable will address hazard profiles, the City's critical facility inventory, and the City's natural hazard vulnerability	X	
9/30 the next meeting of the core team will be held at 2:00 p.m. at Lawson Senior Center, 25 South Main Street, Attleboro, MA. The focus of the meeting will be the review and results of the first deliverable.	X	X

Attleboro
Local Hazard Mitigation Plan Update

Tuesday, August 27, 2019
6:00 pm – 7:00 pm

1. Introductions

2. Project Overview

3. Schedule

4. Core Team

5. Wrap Up and Next Steps

Action Items	W&S	Town

SCOPE & DELIVERABLES

Below we provide a task-by-task description of our proposed scope of work as well as deliverables for each task.

Task 1 – Coordinate with the City of Attleboro and the HMP Committee to Establish Framework for Planning Process

To support this task, we understand that the City will establish a committee (HMP Committee) that includes a cross–section of the community, such as residents, government officials, community leaders and business owners. Once the City of Attleboro has selected its HMP Committee, we will hold a kick-off meeting to introduce the project and facilitate communication. Weston & Sampson project team will provide facilitation and technical assistance to establish the framework for the HMP Plan. We understand that we will be responsible to work with the HMP Committee to:

- Develop a mission statement, review goals and roles for the planning process
- Develop a detailed schedule and set of milestones to achieve the HMP within the timeframe
- Hold four public meetings:
    - Two will be community public meetings during the planning process,
    - One will be a meeting held during the production of the plan.
    - One will be a meeting held during the review of the draft HMP plan.
- Establish and implement a local outreach communication strategy to gather input from the community. Specifically, the outreach strategy will target groups in the community including businesses, non–profit community groups/associations, local or regional institutions, schools/universities, residents and neighboring communities. We propose that the outreach plan include:
    - News releases for the City's local paper and cable access to be issued by the City to announce formation of the HMP Committee, at draft publication of the HMP, at posting of online surveys, and to announce the four public meetings.
    - Recommended postings for the City's Twitter account and Facebook page at key milestones during the development of the HMP.
    - Development of an online survey to encourage input from the general public on critical facilities, vulnerabilities, mitigation goals, and appropriate actions for the HMP. It is our understanding that
- Identify and provide input/recommendations regarding the feasibility and prioritization of mitigation measures.
- Prepare the draft HMP plan that is structured to clearly communicate the plan's goals and proposed mitigation projects.
- Be responsible for sharing the draft plan for comments including implementation, maintenance and updating of the plan as it is reviewed.

As part of the project kickoff meeting, we will review data needs for tasks 2 – 10. If practicable, we request that data be provided to us at or before the kickoff meeting in order to expedite project work and development of the HMP.

Following the meeting, we will provide a meeting summary that summarizes the meeting results and framework for the HMP. We understand that this task is limited to holding the kickoff meeting and developing the framework. Implementation of items in the framework will be completed under other tasks.

We propose to conduct work-product review meetings at end of August (deliverables for tasks 2, 3, and 4), September (deliverables for tasks 5 and 6), November (deliverables for tasks 7 and 8) and January (deliverables for task 9).

Task 1 Deliverables: A kick off meeting with the HMP Committee and a meeting summary with an HMP framework. Four work-product review meetings.

Task 2 – Update Hazard Profiles

Using the best available existing data from public sources such as the City, regional and state government, Weston & Sampson will create a map of areas affected by multiple natural hazards for the City. We will include a set of hazard maps as part of the HMP. We will also make GIS files used to create the maps available to the City for integration with their other community plans.

We understand that the HMP maps will be the basis for the community's known hazards. The hazard identification will include an assessment of Attleboro's risks that summarize the vulnerability of each hazard based on the location, extent, probability, and severity of the hazards.

Weston & Sampson will perform a vulnerability analysis. The vulnerability analysis may be developed using FEMA's HAZUS–MH and a GIS map analysis to delineate those critical facilities that are located within mapped hazard areas. Working with you and the HMP Committee, we will provide a description and prioritization of the natural hazards that have occurred within the community.

> *Task 2 Deliverables: Deliverables will include a map set (as part of the plan) as well as GIS files for the City to integrate with other City plans. An assessment of natural hazard risks including a written description of the assessed risks based on location, extent, probability and severity. A vulnerability assessment using HAZUS-MH and GIS mapping as appropriate.*

Task 3 – Update Critical Facility Inventory

Weston & Sampson will prepare an inventory of critical facilities in both Excel and GIS format that explains how these facilities intersect with the known hazards for the community. To develop the inventory, we will use input from the community and the best available local and state information. We understand that the inventory is to be developed in collaboration with the City's HMP Committee. We understand that critical facilities include, but are not limited to, the following:

- Government Center/Municipal Offices
- Fire Stations
- Police Stations
- Emergency Operations Centers
- Schools (Public and Private, including Universities/Colleges)
- Senior Center
- Water Treatment Plant
- Wastewater Treatment Plant
- Sewage Pumping Stations
- Satellite Municipal Buildings
- Hospitals
- Day–Care Facilities
- Public Works Highway Yard / Satellite Facilities
- Nursing Homes/Elderly Housing
- Emergency Shelters

To extent that they exist in the City, we will also update repetitive flood loss structures and structures that have incurred substantial damage as defined by FEMA. We will analyze these structures by type, number, and general location as it relates to the known hazard areas. Weston & Sampson will prepare an existing conditions land use map as well as an anticipated future land use map that depicts the location of developed land uses, delineated by categories based on use (e.g. residential, commercial, industrial, institutional, other public use, etc.) and where they intersect with hazards. We assume that the City will provide us with the data needed to develop these maps and that our work will be limited to creating the map with available data.

Task 3 Deliverables: Deliverables will include a map of established critical facilities (and a table in Excel format), a map and table of repetitive flood loss structures, and an "anticipated future land use map" which displays developed land uses and where they intersect natural hazard areas.

Task 4 – Update Hazard Vulnerability

Based on the data collected and results of the prior three tasks, Weston & Sampson will develop an overview of each of the specific hazards and the City's vulnerability to those specific hazards for review by the HMP Committee. This vulnerability assessment shall include:

- Types and numbers of buildings, infrastructure, and critical facilities located in the hazard areas.
- Existing multiple hazard protection measures within the City, including protective measures under the National Flood Insurance Program (NFIP).
- A description of each measure, the method of enforcement, and/or the point of contact responsible for implementation of each measure.
- Historical performance of each measure and a description of improvements or changes needed.
- General description of land uses and development trends to incorporate future land use decisions.

Once the overview is developed, we will provide it to the City for review and comment. We will then work with the City to provide the overview to the HMP Committee for their input. We have budgeted for one round of comments from the City and one round of comments from the HMP Committee.

Task 4 Deliverables: An overview of specific hazards and the City's vulnerability to those hazards based on the results and data from tasks 1 – 3.

Task 5 – Update Mitigation Goals

In collaboration with the HMP Committee, Weston & Sampson will develop mitigation strategies specific to each community exposure to, and impacts from, identified natural hazards. The strategy will include a list of mitigation goal and objective statements that focus on reducing the risks from the identified natural hazards.

Task 5 Deliverables: A strategy with detailed mitigation goal and objective statements that address risks from identified natural hazards.

Task 6 – Update Actions

In collaboration with the HMP Committee, Weston & Sampson will identify and prepare a written analysis of a comprehensive range of specific mitigation actions and projects. Actions and projects will include both existing and planned projects to reduce the effects of each hazard, with particular emphasis on buildings and infrastructure. The written analysis will include a list of prioritized hazard mitigation projects that best meet the City's needs for multiple hazard damage reduction. We understand that the projects may include structural solutions (e.g., seawalls, dams, dikes) and nonstructural solutions (e.g., planning, regulatory measures, property acquisition, retrofitting, and elevation). We will prepare the list of prioritized projects based on a process that results in identification of cost–effective hazard mitigation projects with public input that includes:

- An analysis of proposed mitigation projects focused on several key areas, including but not limited to economic considerations (including benefits and costs), engineering, technical, legal, environmental, and social feasibility.
- Coordination with relevant state and federal agencies for input and technical assistance.

Task 6 Deliverables: A written analysis summarizing updated and prioritized mitigation actions including both structural and nonstructural alternatives.

Task 7 – Plan Review, Evaluation, and Implementation

Weston & Sampson will prepare the Draft Plan based on the work completed in previous tasks including the hazard maps, vulnerability assessment, and the multi–hazard mitigation strategy. We understand that the plan must include a proposed implementation schedule with procedures for ensuring the plan's implementation, updating and revision every five years. To ensure completeness, we will shall review and evaluate the plan with the HMP Committee prior to distribution to the public for comment. We have budgeted for one round of HMP Committee comments with revisions as needed prior to distribution to the public.

Task 7 Deliverables: A complete draft HMP for review by the HMP Committee. One round of comments and revisions.

Task 8 – Plan Maintenance

Weston & Sampson will develop short–term and long–term recommendations in collaboration with the City and provide them to the HMP Committee as part of the plan to ensure it remains a current document and becomes embedded into City procedure/processes and policies. We will also develop an implementation schedule with procedures for ensuring the plan's implementation, updating and revision every five years. The procedure updating the HMP will be provided as a narrative and included as a section of your HMP. We anticipate providing the short- and long-term recommendations in a tabular form that includes a row for each recommendation and columns for responsible lead entity, other participants, approximate implementation cost, schedule, and other implementation issues.

Task 8 Deliverables: An implementation schedule in a tabular summary as well as a procedure for HMP maintenance.

Task 9 – Public Review of the Draft Plan

Weston & Sampson will work in collaboration with the HMP Committee to post the Draft HMP Plan for public comment on the City's website. After the comment period, we will work with the HMP Committee to finalize the draft plan and submit it to MEMA/FEMA for review. We have budgeted for one round of HMP Committee comments with revisions as needed prior to submission to MEMA/FEMA.

Task 9 Deliverables: Posting of the HMP on the City's website. Finalization and submission of the HMP to MEMA/FEMA for review.

Task 10 – Review and Approval

Weston & Sampson will work with the HMP Committee to revise the draft plan based on MEMA/FEMA comments and submit the revised plan for approval pending adoption. After approval from MEMA/FEMA is received, we will work with the HMP Committee to submit the plan to the City for adoption. We understand that the HMP Committee will send the final adopted plan to MEMA/FEMA.

Task 10 Deliverables: A final HMP submitted for adoption to MEMA/FEMA and the City.

Task 11 – Pro Bono Grant Assistance (Optional)

If desired by the City, Weston & Sampson proposes to include assistance with developing a grant application for FEMA or MVP to address one or more recommendations in the City's HMP. This is offered at no additional cost as part of this project scope of work if we are the selected consultant. We anticipate negotiating the logistics of this task with you during the contracting phase for this project.

Task 11 Deliverables: Assistance in developing a FEMA or MVP grant application for implementation of one or more recommendations of the HMP.

Federal Emergency Management Agency
Local Mitigation Plan Review Guide and the Community Resilience Building Process

Summary: The following is a cross-walk between FEMA's Local Mitigation Plan Review Guide and the Community Resilience Building Process. The intent is to clearly identify where and how the Community Resilience Building Process can satisfy specific Elements of the Regulatory Checklist.

Overview: To help assist Federal and State officials assess and ensure Local Mitigation Plans meet the Stafford Act and Title 44 Code of Federal Enforcement (CFR) §201.6.1 requirements in a fair, equitable, and consistent manner the Local Mitigation Plan Review Guide was developed (https://www.fema.gov/media-library-data/20130726-1809-25045-7498/plan_review_guide_final_9_30_11.pdf). This "Review Guide" is FEMA's official source for interpreting and defining the statutory and regulatory requirements of Local Mitigation Plans. This "Review Guide" works in tandem with the Local Mitigation Planning Handbook so practitioners developing plans have a clear understanding of technical requirements and approaches to meet these requirements. Referencing the requirements stated in this Review Guide, practitioners developing Local Mitigation Plans can utilize the Community Resilience Building Workshop to ensure Local Plans go above and beyond minimum requirements for certain elements during the review process by Federal and State officials. The connections between Local Mitigation Plans and the Community Resilience Building Workshop begin with FEMA's Guiding Principles for mitigation planning: these include but are not limited to A) "Focus on Mitigation Strategy" B) "Process is as important as the Plan itself"; C) "This is a Community's Plan"; and D) "Foster Relationships". All of these Guiding Principles are directly in line with principles of Community Resilience Building that allows for the development of mitigation orientated actions for all hazards by broad, diverse stakeholders through a community-driven and community-owned process that ultimately strengthens relationships around risk and resilience at multiple scales. Community Resilience Building can specifically advantage the following select technical and approach regulatory elements of FEMA's Review Guide's Regulation Checklist.

Excerpts from FEMA's Local Mitigation Plan Review Tool (Appendix A – Local Mitigation Plan Review Guide) with cross-walk to Community Resilience Building (CRB) Workshop Steps and Tasks.

1. REGULATION CHECKLIST (Regulation (44 CFR §201.6.1 Local Mitigation Plans)	
ELEMENT A. PLANNING PROCESS	
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	CRB should be clearly documented as part of the planning process by preparers for each jurisdiction.

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	CRB helps to ensure a broad, stakeholder engagement that should include members of neighboring communities, local/regional hazard mitigation professionals, and agencies with authority over development. Refer to CRB Step A - Preparing for Workshop Task 2 – Engage stakeholders.
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	CRB is ideally an early step while preparing a mitigation plan therefore providing for public involvement in the drafting stages. Refer to CRB Step A: Task 2; Step G – Moving Forward Task 1 – Continue community outreach and engagement.
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	CRB Step A Task 3 - Preparing materials for workshop can be used as an initial review of existing plans, studies, reports, and technical information for each jurisdiction addressed in the Plan. Additional documentation will likely be needed to satisfy this requirement fully.
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Each jurisdiction addressed in the Plan will need to develop a process to continue public participation. Refer to CRB Step G Task 1.
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Each jurisdiction addressed in the Plan will need to describe the method and schedule for monitoring, evaluating, and updating. CRB can be used to effectively update mitigation plans within a 5-year cycle.
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT	
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	CRB affords the community an opportunity to provide descriptions of all hazards via surveys, facilitated dialogue, and participatory mapping. Refer to Step A – Task 3 – Prepare materials for workshop (i.e., Community Characterization Survey); Step B – Characterize Hazards Task 1 – Identify past, current, and future impacts.

B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	CRB Step B Task 1 provides an opportunity for the community(ies) to generate information on previous and future hazard events. Additional documentation and dialogue with community members will likely be needed to satisfy this requirement fully.
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	CRB Step B Task 1 and Task 2 - Determine the highest-priority hazards; Step C - Identify Community Vulnerabilities and Strengths provides initial descriptions of hazard impacts and an overall summary of vulnerabilities. Additional documentation will likely be needed to satisfy this requirement fully.
B4. Does the Plan address the NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	CRB Step B and Step C provide the community an opportunity to address NFIP insured structures within the jurisdiction. Additional documentation will likely be needed to satisfy this requirement fully.
ELEMENT C. MITIGATION STRATEGY	
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	CRB provides an initial opportunity to discuss existing and expanded/improved authorities, policies, programs, and resources through Step C and Step D - Identify and Prioritize Community Actions. Additional documentation will likely be needed to satisfy this requirement fully.
C2. Does the Plan document each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii)	Additional documentation will likely be needed to satisfy this requirement fully.
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	CRB requires the community to identify mitigation actions to reduce/avoid immediate and long-term vulnerabilities to identified hazards for infrastructural, societal, and environmental assets. Refer to Step C and Step D.

C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	CRB requires the community to specifically focus on infrastructure-related mitigation to multiple hazards including new and existing buildings as required in a given community. Refer to Step C Task 1 – Identify infrastructural vulnerabilities and strengths; Step D Task 1 – Identify and prioritize infrastructural actions.
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized, implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iii)) (Requirement §201.6(c)(3)(iv))	CRB provides the community with a comprehensive method to prioritize actions for infrastructural, societal, and environmental community components. Refer to Step D; Step E – Determine the Overall Priority Actions. Additional dialogue will likely be needed to satisfy this requirement fully.
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	CRB Step D, E - Determine the Overall Priority Actions; Step G - Move Forward - Task 3 - Inform existing planning and project activities are designed to provide local governments an opportunity to initially address integration of mitigation plan requirements. Additional documentation will likely be needed to satisfy this requirement fully.
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)	
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3)	Additional documentation will likely be needed to satisfy this requirement fully.
D2. Was the Plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	CRB affords the community to revisit outputs from earlier workshop(s) (i.e., CRB Summary of Findings, Risk Matrix) as they conduct additional workshop(s) during a revision process to determine progress over time (5-year cycle for CRB Workshop(s)).
D3. Was the Plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	CRB outputs (i.e., CRB Summary of Findings, Risk Matrix) provide a quick reference to changes in priorities over time – ideally as priority actions are taken to reduce risk from earlier priorities (5-year cycle for CRB Workshop(s))

ELEMENT E. PLAN ADOPTION	
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Additional documentation will be needed to satisfy this requirement fully.
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Additional documentation will be needed to satisfy this requirement fully.

SCHEDULE (As of August 27, 2019)

We propose to complete the overall project approximately one month before the project completion date listed in your RFP. A task-by-task schedule is provided below for clarity. This schedule assumes a project start date and kick-off meeting with the HMP Committee in August 2019. We propose to conduct a kickoff meeting with the HMP Committee in August, followed by work-product review meetings at end of September (deliverables for tasks 2, 3, and 4), October (deliverables for tasks 5 and 6), December (deliverables for tasks 7 and 8) and February (deliverables for task 9). If the City wishes to adjust the proposed schedule, we are prepared to do that as part of contracting.

TASK	MONTH											
	2019					2020						
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Task 1 – Coordinate with the City and HMP Committee to Establish a Framework												
Task 2 - Update Hazard Profiles												
Task 3 - Update Critical Facility Inventory												
Task 4 - Update Hazard Vulnerability												
Task 5 - Update Mitigation Goals												
Task 6 - Update Actions												
Task 7 - Plan Review, Evaluation, And Implementation												
Task 8 Plan Maintenance												
Task 9 Public Review of Draft Plan												
Task 10 - Review and Approval												
Task 11 – Pro Bono Grant Assistance (Optional)	*To Be Determined*											

Note: The schedule above is assumed based on the RFP. We are prepared to work with you to adjust it as part of work plan development if needed.

Hazard Mitigation Plan Committee Kick-Off Meeting

	Name	Department / Organization	Telephone	Email
✓	Nick Wyllie	Conservation Commission		
✓	Gary Ayrassian	Planning Dept.		
✓	Stephanie Davies	Planning Dept.	508-223-2222 x3149	seniorplanner@cityofattleboro.us
✓	Jim Riordan	Weston & Sampson		
	Paul Heroux	Mayor		
✓	Derek Corsi	Park & Forestry	774-719-2218	Parksuperintendent@cityofattleboro.us
✓	Kathleen Ilkowitz	Mayor (Executive Secretary)	508-223-2222 x7201	MAYORSSECRETARY@CITYOFATTLEBORO.US
✓	Kourtney Wunchel	Water Dept.	774-203-1850	water1@cityofattleboro.us
	Greg O'Brien	Water Dept.		
✓	Steve Brasier	Water Dept.	508-505-1610	stevenccsb12@comcast.net
	Kyle Heagney	Police Dept.		
	Mike Tyler	Public Works		
✓	Tom Hayes	Wastewater Dept.	774-203-1820	waterpollutionoperations@cityofattleboro.us
✓	Madeline McNeilly	Council on Aging 774-203 1900		COA@cityofAttleboro.us
	Scott LaChance	Fire Dept.		
✓	John Staskiewicz	Health Dept.	4013684475	JSTASK1@COX.NET
✓	Bill McDonough	Building Dept.	508.223.2222 x3251	INSPECTIONS1@cityofattleboro.us
	Paul Danesi	Planning Board		
✓	Roy Belcher	Attleboro Land Trust	508-455-7873	Serenade_wy2@Yahoo.com
✓	Bertha Young	OSRP	508-369-6896	berthayoung85@gmail.com
✓	Ben Cote	Friends of the Ten Mile	401-578-7746	TENMILEFRIENDS@GMAIL.COM
✓	Keith Gonsalves	Ten Mile River Watershed Council	401-474-5815	Keith@Tenmileriver.net
✓	Wayne Cobleigh	Resident	774-203-3433	cobleighww@gmail.com
	David Denneno	Sturdy Memorial Hospital		

100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

MEMORANDUM

TO: Gary Ayrassian, Director of Planning and Development, City of Attleboro

FROM: Jim Riordan, Senior Project Manager

DATE: October 11, 2019

SUBJECT: Summary of Hazard Mitigation Planning Committee meeting, September 30, 2019

Introductions

The Attleboro Hazard Mitigation Plan (HMP) Committee (herein "the Committee") began its meeting at 2:05 p.m. Jim Riordan, Weston & Sampson, explained that the City of Attleboro (herein "the City") is currently working on the HMP, but will begin the Municipal Vulnerability Preparedness (MVP) Plan soon. He introduced Weston & Sampson Engineers (WSE) staff, and each Committee member stated his or her name and affiliation.

Findings from Report 1, Data Needs, and HMP Actions

Jim asked if everyone received Report 1 that was emailed previously. He said that he would like to get feedback from the Committee on what was missing or any other comments or thoughts. The Committee was asked to think about how they want to improve the hazard mitigation process. He also briefly explained the MVP grant process.

Jim passed out maps, which he pointed are base maps for the HMP and will eventually be developed into a full set of HMP maps as part of the draft HMP in November. He described the maps for review:

1. A Flood Zone Map of Attleboro, which indicates flood areas. Jim asked the Committee to review the maps and see if the areas make sense, or if there are areas of localized flooding that are not on the maps.

   Members of the group discussed flooding in the center of the City. The City monitors the area during heavy rainfall. If rising waters reach within six inches of bottom of bridge then flooding begins. Improvements downstream have made flooding less severe and frequent. The City monitors water height each week. Other flooding problems exist in the City. For example, where the dam discharges flow down into the culvert near the school, the water has no place to go and drains into the ballfield and then onto County Street.

The Committee discussed flood problems and response protocols. Flooding typically occurs during rain events of depth greater than five inches, but it is difficult to predict occurrence of flooding with certainty. Flooding may be aggravated when North Attleboro lowers Whiting Pond or Falls Pond since Mechanics Pond is downstream. A valve exists so that the City can relieve backflow in Mechanics Pond but the valve is inconvenient to open and reset. Downstream improvements include removal of debris, but no flood control infrastructure.

The Committee also discussed new construction in flood-prone areas along the riverbank. For example, new condominiums have materials in their garage where they are not supposed to store things.

2. Existing Facilities Map. A Committee member mentioned that the map does not show nursing home facilities. The group discussed group homes and whether or not they should be indicated on the map. Several committee participants noted that this may create confidentiality concerns, but some facilities are mapped and the City should be able to provide that mapping.

   The wastewater treatment plant is on the map, but not all 15 pump stations are shown and a sixteenth pump station will be built soon. Nick Wylie indicated that he had not heard of Sutton Falls Dam in Attleboro, others on the Committee agreed, and it will be removed. (Jim noted that it is part of Massachusetts state dataset and was likely misentered in that data.) Also, Luther Dike needs to be added.

   The Committee discussed whether contaminated sites should be indicated on the map. Gary mentioned the Shpack Landfill on Peckham Street on the Norton town line. Other areas of possible contamination were discussed, including North Avenue where the federal government came in and evacuated and remediated an old factory, and Finberg Field (an EPA clean up). Committee members noted that flooding can plan a role in the migration of contaminants. Gary indicated that he or Nick can speak to the federal government agencies to see if this requires further consideration for emergency planning.

3. Land Use Map. Gary stated that there are areas where Attleboro continues to grow and areas where it will not. He discussed SRPEDD's growth management study from 2000, which included a future land use map. He said that the City has not done another such map. Gary stated that residential uses are allowed almost anywhere in the City except planned highway business and industrial parks. They are seeing all types of residential and industrial/commercial developers are siting development to take advantage of the easy highway access. The Mayor recently focused attention on urban redevelopment, but that does not preclude development outside of downtown as long as it is done properly.

   Jim asked if there were areas unlikely to be developed. Gary stated that he has a list of conservation properties and they can look up a list of real estate properties available for development.

The Committee discussed the cleaning of catch basins. The City operates roughly 5,000 catch basins. The City prioritizes catch-basin cleanout to address known areas of flooding and to address complaints of backup. Typically, the City cleans about 25% of catch basins each year. The Committee discussed National Pollution Discharge Elimination System (NPDES) Phase II Stormwater standards and the requirement to do annual catch basin cleanout or document where lower-frequency cleanout would be adequate.

Downtown roads are swept weekly. Other roads may be swept less frequently, but all roads are swept at least once each year.

The Committee discussed additional actions listed in Table 3-1D of HMP Report 1. Funding is an issue. The Committee discussed how a stormwater fee could be used to ensure adequate financing but expressed that such a fee is generally seen as a tax increase and may be politically difficult to adopt. Jim said that he could write up a general description of an approach to establish a stormwater fee. Jim also discussed that planning and implementation of a stormwater fee could probably be developed using Clean Water Act, Section 319 (i.e., nonpoint point pollution abatement) grant funding.

Upcoming MVP Grant Round

Jim discussed that Massachusetts Executive Office of Energy and Environmental Affairs (EEA) is expected to release a Request for Responses (RFR) for the Municipal Vulnerability Preparedness program. EEA also plans to open a similar RFR in spring 2020. The City was recently awarded an MVP planning grant and will need to complete it before becoming eligible for another grant. The City may wish to consider applying for an MVP grant during the spring 2020 RFR.

Next Steps

Jim discussed the next meeting in the last week in October, with a more thorough discussion of the action plan.

Attachments:

September 30 Meeting Materials
Sign-In

Attleboro
Local Hazard Mitigation Plan Update

Monday, September 30, 2019
2:00 pm – 4:00 pm

1. Opening

2. Findings from Report 1 (Tasks 2 – 4)
   a. Overview
   b. Comments received
   c. Review maps (critical facilities, repetitive loss, future land use)

3. Questions and Data Needs

4. Goals and Actions
   a. Review Goals and Actions
   b. Status of Current Actions

5. Upcoming MVP Grant Round
   a. Opens this week
   b. Closes in 60 days
   c. June 30 horizon
   d. 18-month horizon
   e. Spring MVP grant round

6. Wrap Up and Next Steps

Action Items	W&S	Town
Goals and Actions Status Comments		X
Next Meeting	X	X

City of Attleboro, Massachusetts

Hazard Mitigation Update Project

Report 1: Draft for Committee Review

Prepared by:

Weston & Sampson

September 23, 2019

3.0 EXISTING MITIGATION MEASURES

The City of Attleboro currently practices a variety of hazard mitigation measures. These measures are existing protections and capabilities that are based on the City's implementation of zoning, land use, and environmental regulations, infrastructure maintenance and drainage infrastructure improvement projects. The City's existing mitigation measures are summarized and listed by the type of protection measure implemented, followed by a more detailed discussion of each measure categorized by the type(s) of hazard(s) they address.

Table 3-1. Summary of Existing Hazard Mitigation Measures

Hazard	Area	Mitigation Measures
Flood – Related	Citywide	A) The City participates in the National Flood Insurance Program and adopted the FIRM maps. There are 253 policies in force. The City actively enforces floodplain regulations. B) Streets and catch basins are cleaned annually. C) 25/75 Sand/salt mix plus IceBan is used for winter road treatments. D) Drainage infrastructure and maintenance performed using MA Chapter 90 funds. E) Subdivision Rules for drainage F) Flood Plain Overlay District G) Site Plan Review for stormwater and erosion H) Aquifer Protection Overlay District I) Flexible Developments allowed J) Water Resource Protection Bylaw K) Discharges to MS4 Bylaw L) Open Space Plan with a focus on dam functions, flooding, runoff and maintenance of wetlands M) Community Preservation Act adopted in 2005 N) Dam repairs are made as funds are available (both private and public) and the City is proactively monitoring dams in the municipal area O) Increased storage at Manchester Pond by 1½ foot P) Local regulations require interdepartmental review related to floodplains and wetlands Q) Enforces Phase II Stormwater Management Plan and actions R) Ongoing clearing of rivers and culverts in coordination with the Ten Mile River Alliance S) Monitoring of water and precipitation levels along major rivers by the Department of Water and Wastewater T) Ten Mile River Flood Warning Plan
Wind-Related	Citywide	A) Tree maintenance completed by the Department of Parks and Forest. National Grid maintains trees within its power line corridors. B) The City enforces the Massachusetts State Building Code.
Winter-Related	Citywide	Standard snow operations with 75/25 salt/sand mix, as well as IceBan® in icy or environmentally sensitive areas.

Table 3-1. Summary of Existing Hazard Mitigation Measures

Hazard	Area	Mitigation Measures
Brush Fire-Related	Citywide	The Fire Department requires a written permit for outdoor burning. The Fire Department reviews all subdivision development plans.
Geologic - Earthquake	Citywide	A) The City enforces the MA State Building Code. B) Evacuation plans in CEMP C) Shelters and backup facilities available
Geologic-Landslide	Citywide	Maximum slope for subdivision roads Earth Removal Bylaws
Multi-Hazard	Citywide	A) The City enforces the MA State Building Code. B) The City has a Comprehensive Emergency Plan C) The City utilizes the MA Emergency Incident Command Unit. D) The City has a reverse 911 program. E) The City is a member of the Region One Boston Network (BAPERN). F) The City has its own Local Emergency Planning Committee. G) The City Hall, Fire Station, DPW facility and Police facility have a fixed, natural gas generator. H) Multi department review of all developments. I) The Council on Aging has a list of everyone over 60 years old and has targeted homebound elderly and provided disaster preparedness information and some disaster kits.

There are several mitigation measures that impact more than one hazard. These include the Comprehensive Emergency Management Plan (CEMP), the Massachusetts State Building Code and participation in local Emergency Planning Committees.

Comprehensive Emergency Management Plan (CEMP) – Every community in Massachusetts is required to have a Comprehensive Emergency Management Plan. These plans address mitigation, preparedness, and response and recovery from a variety of natural and manmade emergencies. These plans contain important information regarding flooding, dam failures, and winter storms. Therefore, the CEMP is a mitigation measure that is relevant to many of the hazards discussed in this plan.

Enforcement of the State Building Code – The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing and snow loads. All municipalities within the Commonwealth are required to enforce the State Code. Therefore, enforcement of the State Code at the local level is considered a mitigation measure, as it addresses hazard related building issues with rehabilitation and new construction.

3.1 Existing Flood-Hazard Mitigation Measures

Attleboro recognizes that flooding is a relevant hazard and poses a serious threat. As such, the City minimizes potential flooding and the associated impacts through several measures currently. Those include:

National Flood Insurance Program (NFIP) – Attleboro participates in the NFIP with 253 policies in force as of September 2018. Information regarding participation in the NFIP can be obtained from the

Massachusetts Department of Conservation and Recreation and from FEMA's database on flood insurance policies and claims. Table 3-? provides data related to Attleboro's participation in the NFIP.

Table 3-2. National Flood Insurance Program in Attleboro	
Insurance Statistic	Measure
Flood insurance policies in force (as of September 30, 2019)	253
Coverage amount of flood insurance policies	$67,394,400
Written Premium in Force	$224,964
Total losses (all losses submitted regardless of the status)	68
Closed losses (Losses that have been paid)	46
Open losses (Losses that have not been paid in full)	0
CWOP losses (Losses that have been closed without payment)	22
Total payments (Total amount paid on losses)	$1,076,071

Source: FEMA

Floodplain Regulation – The City of Attleboro maintains up-to-date floodplain maps, enforces floodplain regulations, and provides information to property owners and builders regarding floodplains and building requirements, and thus complies with NFIP. Floodplain Regulations are incorporated into the Attleboro Zoning Ordinance at Section 17-12.

Massachusetts State Building Code – The City enforces the Massachusetts State Building Code, which regulates how buildings must be designed to accommodate specific wind loads, earthquake resistant design, flood-proofing, and snow loads.

Street Sweeping – Street sweeping is completed by contract around April of each year.

Catch Basin Cleaning – (2019 Draft Stormwater Management Plan) The City's catch basins are cleaned out annually. The City's standard operating procedures outline the methodology for cleaning catch basins (City of Attleboro, SOP 3).

- Establish a schedule for catch basin cleaning such that each catch basin is no more than 50% full and clean catch basins on that schedule (MS4 General Permit).

Regulations/Bylaws and Codes – The City implements a number of mitigation measures through the enforcement of development regulations, bylaws, and codes. Those are explored in further detail below:

- Ordinance Section 17-12 requires review and comment by the Inspector of Buildings, Conservation Commission and the Zoning Board of Appeals on all proposed development within the 100-year floodplain.
- Ordinance Section 18-1 requires a 25-foot no-build zone associated with wetlands and floodplain areas.
- Ordinance Section 17-10.2 contains earth removal requirements.
- Ordinance Section 17-10.5 & 17-10.6 provides for the clustering of homes reducing impervious coverage and allows for clustering away from flood-prone areas.
- Ordinance Section 17-13 creates an overlay district for Water Resource Protection.
- The City has adopted and currently implements Phase II Stormwater Management Plan and Actions.

3.2 Existing Wind Hazard Mitigation Measures

Massachusetts State Building Code – The City enforces the Massachusetts State Building Code which includes protection again most wind damage and is a cost-effective mitigation measure against tornados.

Tree-trimming program – The Tree Warden is responsible for the care of all trees in city parks, playgrounds, conservation areas, and other public property. Forestry Department employees will trim or remove a tree or limb that is on public property, provided an evaluation has deemed the tree or limb hazardous or unhealthy. Forestry employees will remove any tree or limb that has fallen on a public roadway or sidewalk. All issues within 10 feet of a live power line should be passed on to National Grid for their recommendation on how to proceed. Whether on public or private property, National Grid may decide to remove the tree or limb from or below the power lines. Once National Grid has made efforts to help make-safe the potential danger, responsibility falls back to the Forestry Department if the tree or limb is on public property or to the homeowner if on private property. Forestry Department is responsible for the care of a tree or limb on public property. Property owners are responsible for the care of a tree or limb on private property.

3.3 Existing Winter Hazard Mitigation Measures

Roadway Treatments – Prior to a winter storm, MassDOT applies a liquid anti-ice (wet salt with Magnesium Chloride) solution to state-owned roadways, which prevents snow and ice accumulation from binding to the road. The state also uses rock salt and plows to de-ice the roadway throughout the duration of the storm. After the storm, the state spreads a post-storm treatment to prevent re-freezing during the night.

For local roads, the City of Attleboro uses a 25/75 mixture of sand and salt for roadway ice treatment. IceBan® (liquid ice melt) is used in addition to or in place of the sand and salt mixture in particularly icy or environmentally sensitive areas.

3.4 Existing Geological Hazard Mitigation Measures

Massachusetts State Building Code – The Massachusetts State Building Code contains a section on designing for earthquake loads (780 CMR 1612.0). Section 1612.1 of the Building Code states that the purpose of this section is "to minimize the hazard to life to occupants of all buildings and non-building structures, to increase the expected performance of higher occupancy structures as compared to ordinary structures, and to improve the capability of essential facilities to function during and after an earthquake." This section further states that due to the complexity of seismic design, the criteria presented are the minimum considered to be "prudent and economically justified" for the protection of life safety. The code acknowledges that absolute safety and prevention of damage resulting from an earthquake event cannot be achieved economically for most buildings.

Section 1612.2.5 and Table 1612.2.5 of the Massachusetts State Building Code establish seismic hazard exposure groups and assign buildings to these groups. Group II includes buildings that have a substantial public hazard due to occupancy or use and Group III includes buildings with essential facilities that are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

3.5 Existing Fire Hazard Mitigation Measures

Permits Required for Seasonal Outdoor Burning – The Fire Department requires a written permit for outdoor burning, which is permitted only between January 15 to May 1. Permit holders must call the Fire Department to ensure that burning is allowed on that day. Failure to call is grounds for revocation of the permit.

Subdivision Review – The Fire Department is involved in reviewing all subdivision plans.

3.6 Existing Extreme Temperature Hazard Mitigation Measures

The National Weather Advisory issues excessive heat watches when temperatures exceed 90 degrees. The Attleboro Fire Department broadcasts that is information along with contact numbers and measures that residents can take to protect themselves, elderly residents, children, and pets as established by the American Red Cross and the National Safety Council.

City officials can authorize cooling stations (areas with air conditioning) and residents can use the public library for air-conditioned space.

3.7 Existing Drought Hazard Mitigation Measures

Water Department – the City's Water Department has adopted and implemented an emergency response plan and a drought plan

The City of Attleboro is authorized to adopt and amend several local bylaws and regulations that support capabilities to mitigate natural hazards under the Massachusetts system of "Home Rule." Local bylaws include zoning bylaws, subdivision and site plan review regulations, wetlands bylaws, health regulations, Public Works regulations, and local enforcement of the State Building Code. Local bylaws may be amended at the City's Annual Meeting to improve the City's capabilities. Regulations, which are intended to help implement the bylaws, are updated through a public hearing and vote of the authorized board or commission, such as the Planning Board or Conservation Commission.

City of Attleboro
NATURAL HAZARDS DISASTER MITIGATION PLAN

November 2004






Chapter Five: Proposed Pre-Disaster Mitigation Actions City of Attleboro

The following table represents recommended mitigation actions. Some of these activities will require grant funding, others will require the cooperation of other agencies. The City of Attleboro will make a good faith effort to implement these actions within the constraints of the local budget, staff resources, and new demands from state and federal agencies.

PROPOSED MITIGATION ACTIONS: CITY OF ATTLEBORO

GOAL: Reduce the loss of life, property, infrastructure, and cultural resources from natural disasters.

Objective	*Action*	*Responsible Parties*	*Timeline*	*Resources Needed*
Undertake Capital and Structural Improvements to achieve disaster mitigation.	(1) Correct drainage problems in the vicinity of Forest Street	City Council/Mayor/ DPW	Next five years	Funding under HMGP/PDM with state of municipal 25% match.
	(2) Correct drainage problems in the vicinity of Peck Street	City Council/Mayor/ DPW	Next five years	Funding under HMGP/PDM with state of municipal 25% match.
	(3) Acquire easements or property along the river in downtown that provides some flood protection and decreases impervious surface at the river's edge.	Mayor/City Council	Next five years.	Funding under HMGP/PDM with state of municipal 25% match.
	(4) Purchase generators for the Emergency Operations Center and Senior Center.	Public Safety Officials working with Mayor/City Council	Next two years	Funding under HMGP/PDM with state of municipal 25% match.
	(5) Study the potential for a new siren system that could be used as a means of getting the public to tune into Cable and radio stations for emergency information.	Public Safety Officials working with Mayor/City Council	Over next five years	Pursue grant funding

Objective	*Action*	*Responsible Parties*	*Timeline*	*Resources Needed*
Adopt Regulations to address disaster mitigation.	(6) Study the pros and cons of mandating Underground Utilities in new subdivisions.	Planning Board/Planning Department	City-wide	Findings will determine outcome.
	(7) Study the pros and cons of adopting an uplands requirement for new lots by district.	Planning Board/Planning Department	City-wide	Findings will determine outcome.
	(8) Have revisions made to the National Flood Insurance Program (NFIP) maps for Attleboro. This is needed given the changes that have been made since the 1981 maps were prepared including alterations to dams, increased impervious coverage, and other drainage pattern changes.	Planning Department working with MA DCR and Army Corps Of Engineers (ACOE).	City-wide	Needs funding or prioritization by DCR/ACOE.
Improve Operations, Administration, and Enforcement that is under municipal control to achieve disaster mitigation.	(9) Additional manpower is needed to undertake more detailed monitoring of hazards waste users and storage practices, including the construction of a data-base and efforts to keep it up to date.		City-wide	Need funding.
Integrate disaster mitigation into ongoing planning efforts.	(10) Comprehensive Plan process underway will integrate disaster mitigation.	Planning Board/Planning Department	City-wide	Underway to be complete in 2005.
	(11) Update Pre-Disaster Mitigation Plan at least every 5 years, or as needed.	Planning Department with Emergency Management Director.	Every 5 years	If major work required look into funding through HMGP or PDM.

Objective	*Action*	*Responsible Parties*	*Timeline*	*Resources Needed*
Run Education & Training programs on disaster mitigation topics.	(12) Develop a direct mail piece for Attleboro households on disaster mitigation.	Public Safety Officials working with Mayor/City Council	City-wide	Needs funding – work cooperatively with neighboring communities, too.
	(13) Pursue Storm Ready Certification	Public Safety Officials working with Mayor/City Council	City-wide	If funding needed, pursue grant opportunities.
	(14) Expand outreach to the 500 homebound seniors and others in the community that could use disaster preparedness assistance and kits.	Council on Aging and Public Safety Officials, working with Mayor/City Council	City-wide	Pursue grant funding for this work.

Hazard Mitigation Plan Committee 9/30/19 Meeting

Name	Department / Organization	Telephone	Email
Nick Wyllie	Conservation Commission		
Gary Ayrassian	Planning Dept.		
Stephanie Davies	Planning Dept.		
Jim Riordan	Weston & Sampson		
Paul Heroux	Mayor		
Derek Corsi	Park & Forestry	774-203-1866	ParkSuperintendent@CityofAttleboro.US
Kathleen Ilkowitz	Mayor (Executive Secretary)		
Kourtney Wunchel	Water Dept.		
Greg O'Brien	Water Dept.	774-203-1850	WATER4@CITYOFATTLEBORO.US
Steve Brasier	Water Dept.		
Kyle Heagney	Police Dept.		
Mike Tyler	Public Works		
Tom Hayes	Wastewater Dept.	774 203 1820	WaterPollutionOperations@CityofAttleboro.US
Madeline McNeilly	Council on Aging		
Scott LaChance	Fire Dept.		
John Staskiewicz	Health Dept.		
Bill McDonough	Building Dept.		
Paul Danesi	Planning Board		
Roy Belcher	Attleboro Land Trust		
Bertha Young	PUBLIC CITIZEN & VOTER		
Ben Cote	Friends of the Ten Mile		
Keith Gonsalves	Ten Mile River Watershed Council		
Wayne Cobleigh	Resident		
David Denneno	Sturdy Memorial Hospital		
Mark Cuddy	~~Cuddy Insurance~~ FBINSURE	508 226 2109	mcuddy@fbinsure.com
Bobby Araujo	DPW		
William Johnson	Wastewater	774 203 1829	operations1@cityofattleboro.US
JIM MACDOWELL	POLICE	508-400-8008	JMacdonell@attleboropolice.org

Weston & Sampson
100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

MEMORANDUM

TO:	Gary Ayrassian, Director of Planning & Development
	Nicholas Wyllie, Conservation Agent
FROM:	Jim Riordan, Project Manager
DATE:	November 13, 2019
SUBJECT:	Summary of HMP Action Planning Workshop Attleboro HMP/MVP

The following summarizes workshop exercises that were completed on October 28, 2019 for the Attleboro HMP/MVP. During this meeting a SWOT analysis was conducted as well as a discussion of future action items.

Review of Meeting Materials

Jim Riordan, Weston & Sampson, provided an overview of meeting materials using a PowerPoint presentation. Meeting materials and PowerPoint are attached.

Jim provided and reviewed a list of hazard profiles. The committee was asked to identify any other hazards that need to be added to the list.

An updated draft map was provided listing critical facilities which included elements of the 2004 plan that continue to currently apply today, and any additions previously provided by the committee. The committee was asked to review these as homework and provide feedback at the November meeting.

Workshop Results

Below are the results of the SWOT (strengths, weaknesses, opportunities and threats) Analysis and the Action Planning Workshop. Jim and Caroline provided the committee with an overview of what a SWOT analysis is and how the exercise is conducted. During this meeting participants were divided into three groups and asked to identify the strengths, opportunities, weaknesses and threats facing Attleboro. After that each group was asked to identify action items associated with the HMP/MVP and determine responsible parties and associated time frames. The results of this are summarized below.

SWOT Analysis[1]

Table 1:

Strengths	Weaknesses
• City employees – experienced • Collaboration with smaller communities in the area • Communication – community is good (radio, cable, website) • EOC [emergency operation center] – strength and weakness • MEMA [Massachusetts Emergency Management Agency]– extra equipment needed must be by EMP [emergency management planning committee] • Advanced notice severe weather conditions • Sturdy Hospital	• Training new employees • Up to date skills of current employees • Process manpower • Measures to communicate • Emergency management planning committee – defunct • EOC – location, well established, ready to respond in any event • Aging population • Recruit volunteers - insurance
Opportunities	**Threats**
• Action grants – state • Municipal grants • MEMA	• Federal funds

[1] Text in brackets indicates the assumed meaning of acronyms and other abbreviations.

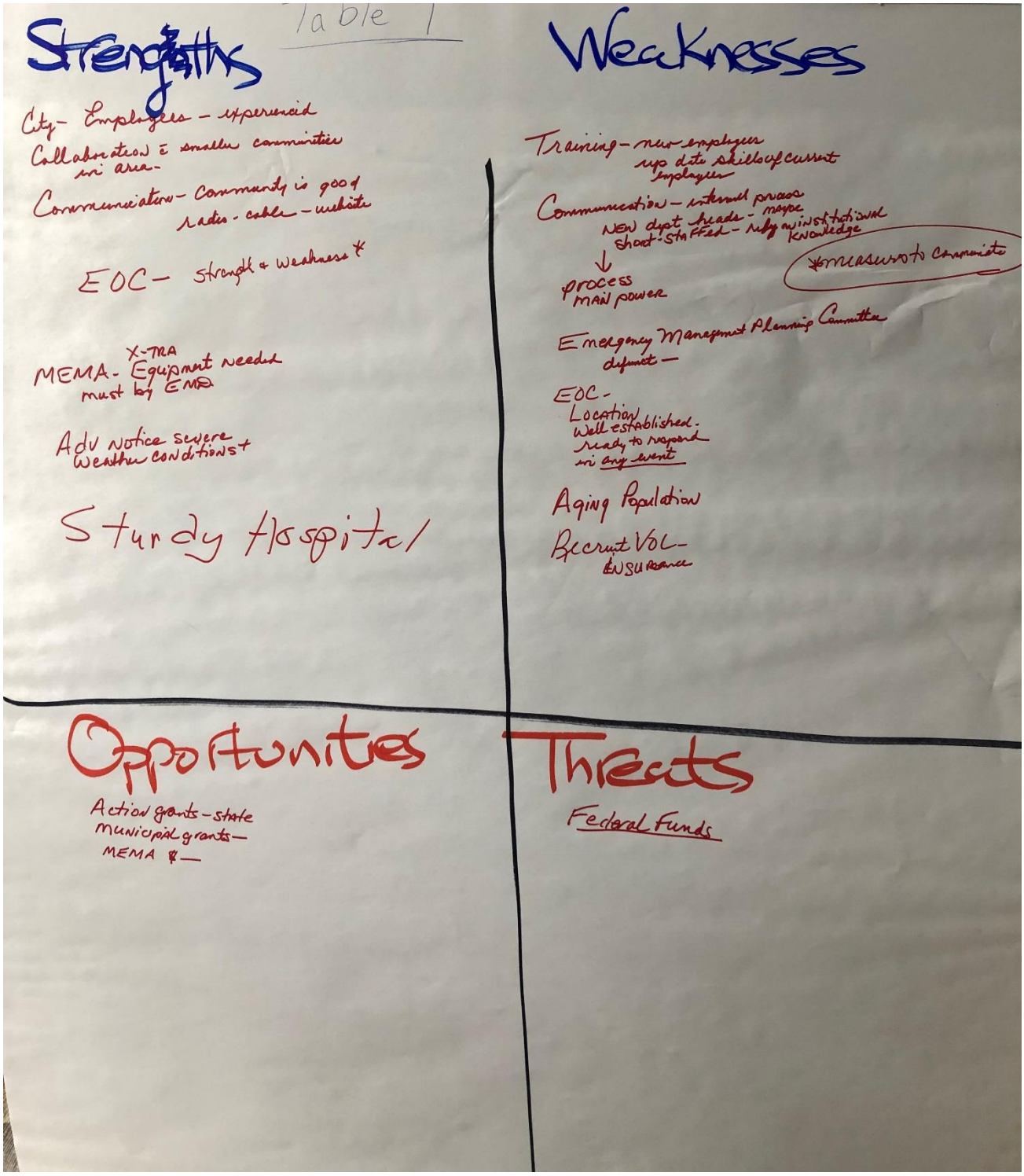


Table 1
Strengths
City- Employees - experienced
Collaboration ē smaller communities in area-
Communication- Community is good radio - cable - website
EOC- strength & weakness *
MEMA- X-TRA Equipment needed must by EMA
Adv Notice severe Weather conditions +
Sturdy Hospital
Weaknesses
Training- new employees up date skills of current employees
Communication- internal process NEW dept heads - maybe short-staffed - lack of institutional knowledge
process main power
*measures to communicate
Emergency Management Planning Committee
EOC- Location Well established. ready to respond in any event
Aging Population
Recruit VOL- ENSURance
Opportunities
Action grants - state municipal grants- MEMA $-
Threats
Federal Funds

Table 2:

Strengths	Weakness
• Management system for water system and safety meetings/action plans • Automatic generators offer backup for water and wastewater\ • Dams – Luther dam has a generator • Natural gas – as long as running/diesel in WW [water works] – supplies ordered immediately • Ability of city to move downed trees • Water supply agreements with other towns • Good fleet of trucks	• Internal communication consistency in the past • Possible manpower shortage • Big snowstorm – trucks can only do so much • Drought/heat combo "no water" at state – stress locally
Opportunities	**Threats**
• Need a list of potential grant/funding sources @ federal/state level	• Clarity on North Attleboro plan – communication • North Attleboro – Hoppin Hill Reservoir (owned by Attleboro) • Plans for water facilities outside of the city

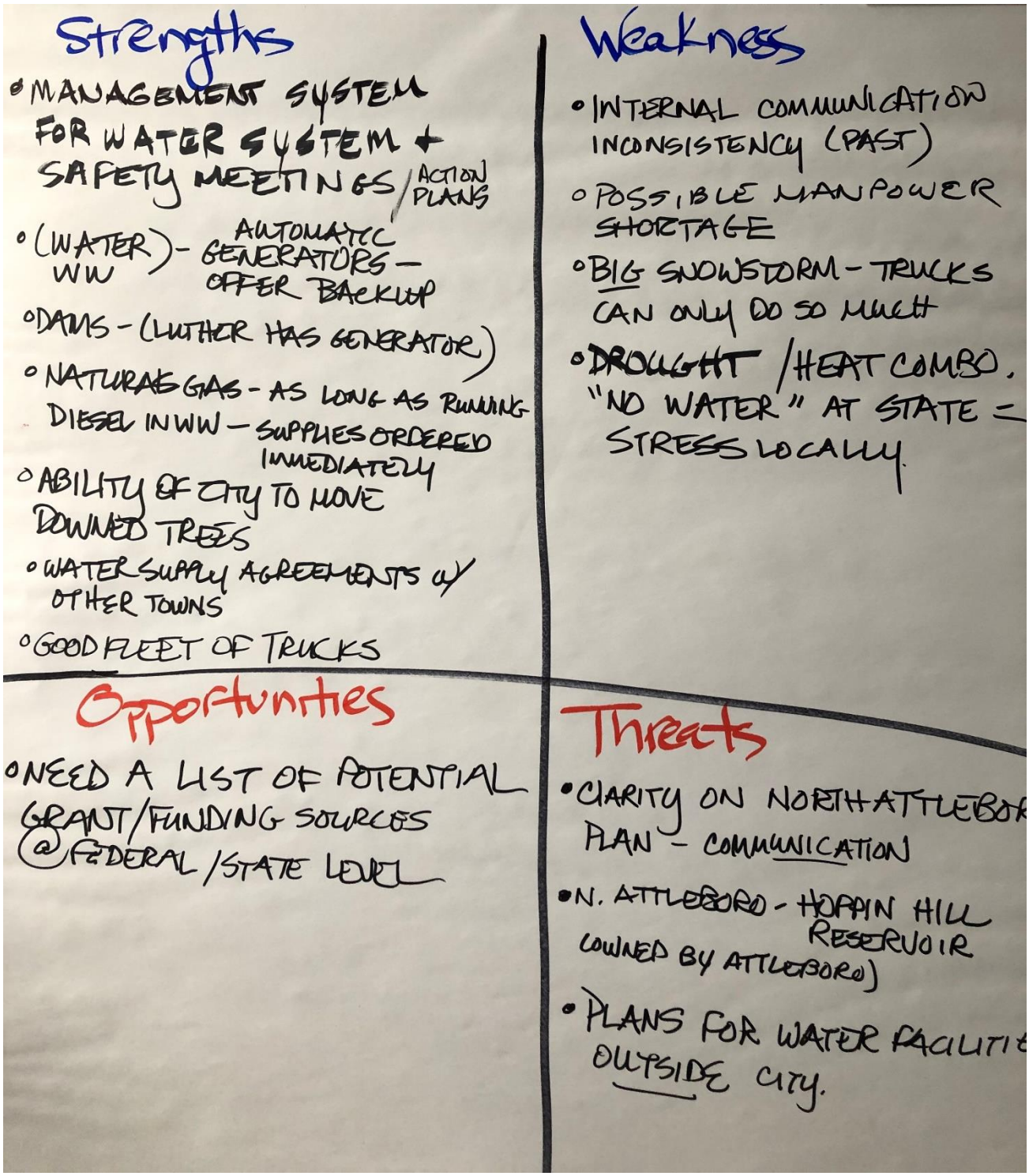

Strengths
• MANAGEMENT SYSTEM FOR WATER SYSTEM + SAFETY MEETINGS / ACTION PLANS
• (WATER) WW - AUTOMATIC GENERATORS - OFFER BACKUP
• DAMS - (LUTHER HAS GENERATOR)
• NATURAL GAS - AS LONG AS RUNNING
DIESEL IN WW - SUPPLIES ORDERED IMMEDIATELY
• ABILITY OF CITY TO MOVE DOWNED TREES
• WATER SUPPLY AGREEMENTS W/ OTHER TOWNS
• GOOD FLEET OF TRUCKS
Weakness
• INTERNAL COMMUNICATION INCONSISTENCY (PAST)
• POSSIBLE MANPOWER SHORTAGE
• BIG SNOWSTORM - TRUCKS CAN ONLY DO SO MUCH
• DROUGHT / HEAT COMBO. "NO WATER" AT STATE = STRESS LOCALLY.
Opportunities
• NEED A LIST OF POTENTIAL GRANT/FUNDING SOURCES @ FEDERAL / STATE LEVEL
Threats
• CLARITY ON NORTH ATTLEBOR PLAN - COMMUNICATION
• N. ATTLEBORO - HOPPIN HILL RESERVOIR (OWNED BY ATTLEBORO)
• PLANS FOR WATER FACILITI OUTSIDE CITY.

Table 3:

Strengths	Weakness
• 90% SW [stormwater] system mapped • Good institutional knowledge (MS4). Only Bobbie • Good regulations/ordinances (2,500 sf [disturbance threshold]) • Water rights/reservoirs in many towns	• Public transit breakdown • Snow removal during additive events • Drainage/culvert system ([not] mapped, [just Bobbie]?) • Manpower/equipment • Unknown location of critical care facilities
Opportunities	**Threats**
• I-95 MADOT SW improvement plan – leverage it • Listing group homes as "[critical] care" • Cooperate w/ National Grid to improve coordination (good recently) • Increase wetland setbacks • Replicate Norton's volunteer program	• Flat roofs • Dead trees susceptible to drought, insects, wind events • Rogue actors – "Harry homeowner" • Housing development – crowding, wetlands • Vector borne illnesses (mosquitos, ticks) • Decrease in pollinators • Removal of snow in extreme events

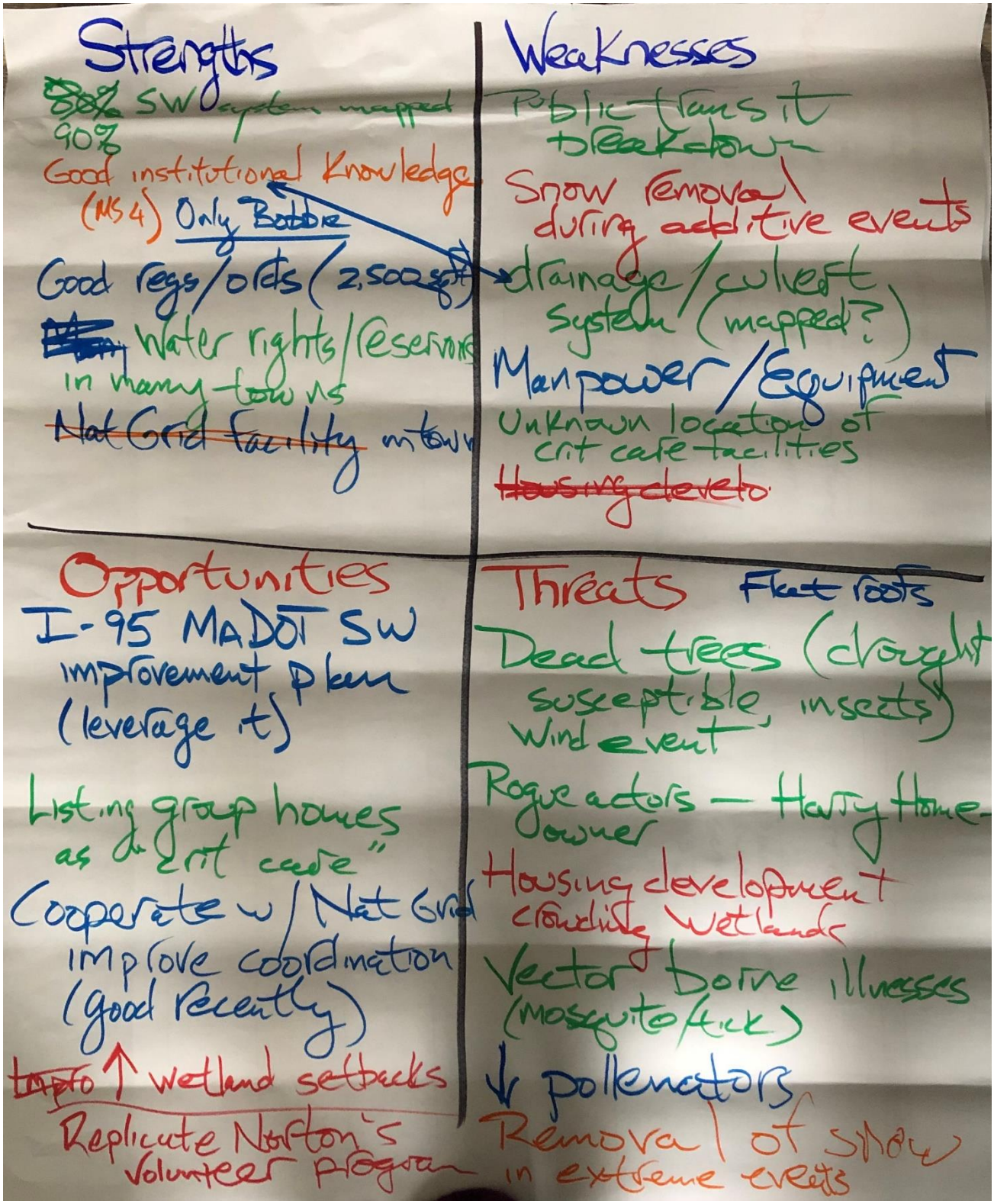
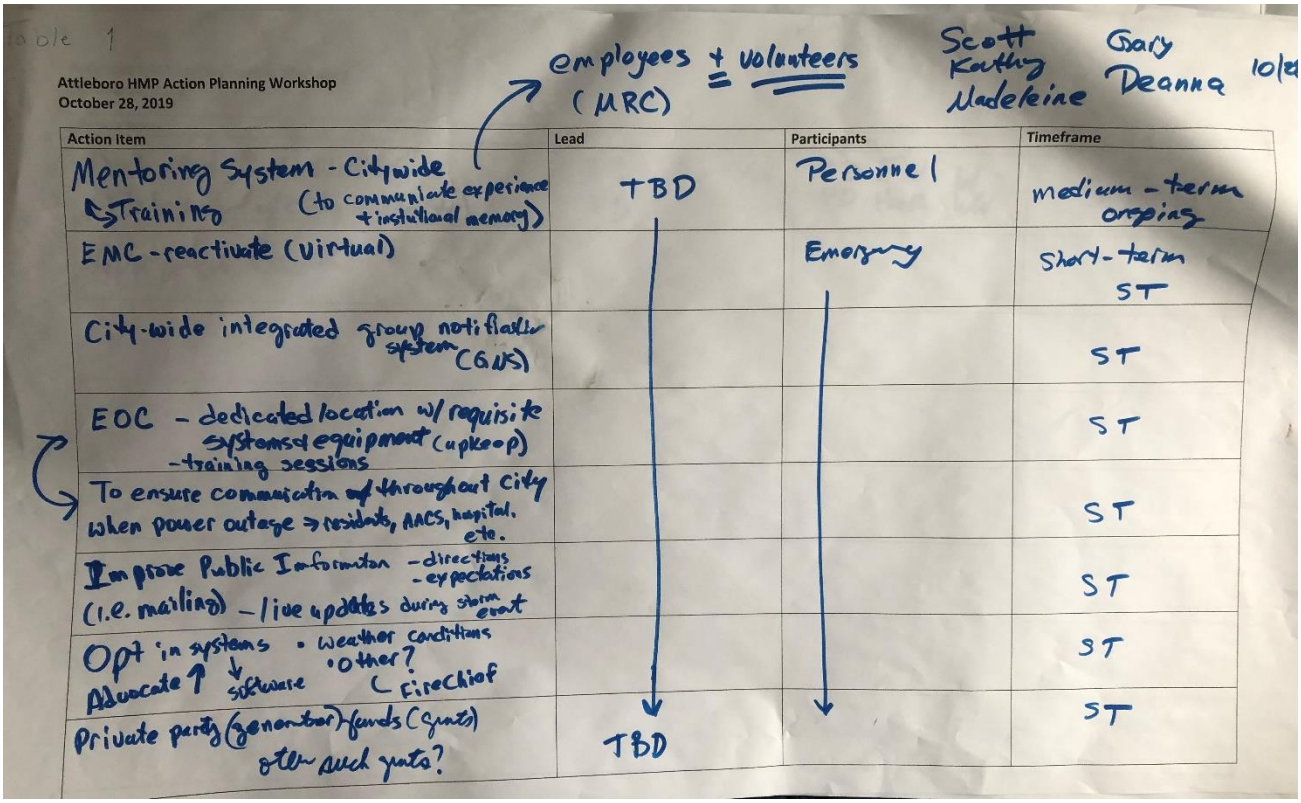
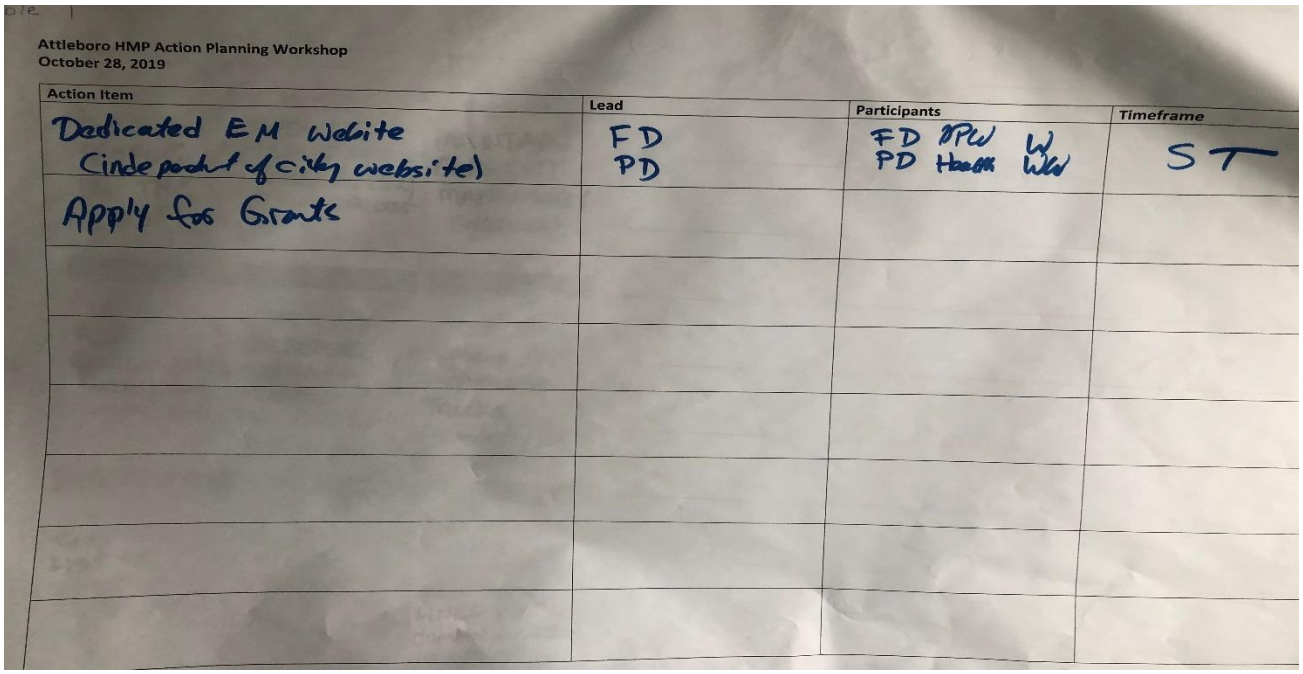

Strengths
80% SW system mapped
90%
Good institutional Knowledge
(MS4) Only Bobbie
Good regs/ords (2,500sqft)
Water rights/reservoirs
in many towns
Nat Grid facility in town
Weaknesses
Public transit
breakdown
Snow removal
during additive events
drainage/culvert
system (mapped?)
Manpower/Equipment
Unknown location of
crit care facilities
Housing density
Opportunities
I-95 MaDOT SW
improvement plan
(leverage it)
Listing group homes
as "crit care"
Cooperate w/ Nat Grid
improve coordination
(good recently)
↑ wetland setbacks
Replicate Norton's
volunteer program
Threats
Flat roofs
Dead trees (drought
susceptible, insects)
Wind event
Rogue actors — Hasty Home-
owner
Housing development
crowding wetlands
Vector borne illnesses
(mosquito/tick)
↓ pollenators
Removal of snow
in extreme events

Table 1 Action Planning:

Action Items	Responsible Party	Participants	Timeframe
Mentoring/training system – citywide (to communicate experience and institutional memory) (employees and volunteers) (MRC)	TBD	Personnel	Medium Term/Ongoing
EMC – reactivate (virtual)	TBD	Emergency	Short Term
City-wide integrated group notification system	TBD	Emergency	Short Term
EOC – dedicated location with requisite system and equipment (upkeep)/training sessions	TBD	Emergency	Short Term
Improve public information (directions, expectations, i.e. mailing) – live updates during storm event	TBD	Emergency	Short Term
Opt in systems (advocate, software) – weather conditions, other, fire chief?	TBD	Emergency	Short Term
Private party generator funds (grant)	TBD	Emergency	Short Term
Dedicated EM website (independent of city website)	Fire Department Police Department	Fire, Police, DPW, Health, Water, WW	Short Term
Apply for grants			Ongoing



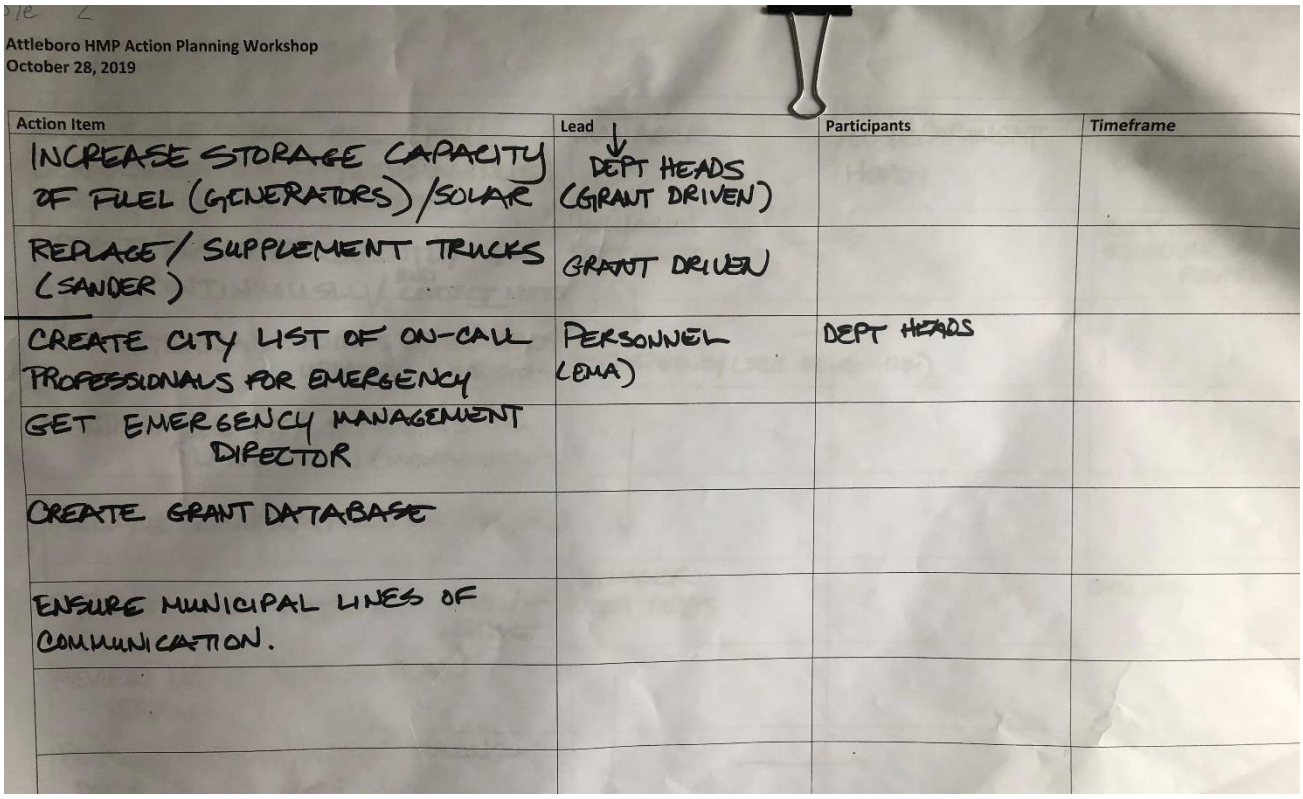


Attleboro HMP Action Planning Workshop
October 28, 2019

Action Item	Lead	Participants	Timeframe
Dedicated EM Website (independent of city website)	FD PD	FD DPW W PD Health Wtr	ST
Apply for Grants			

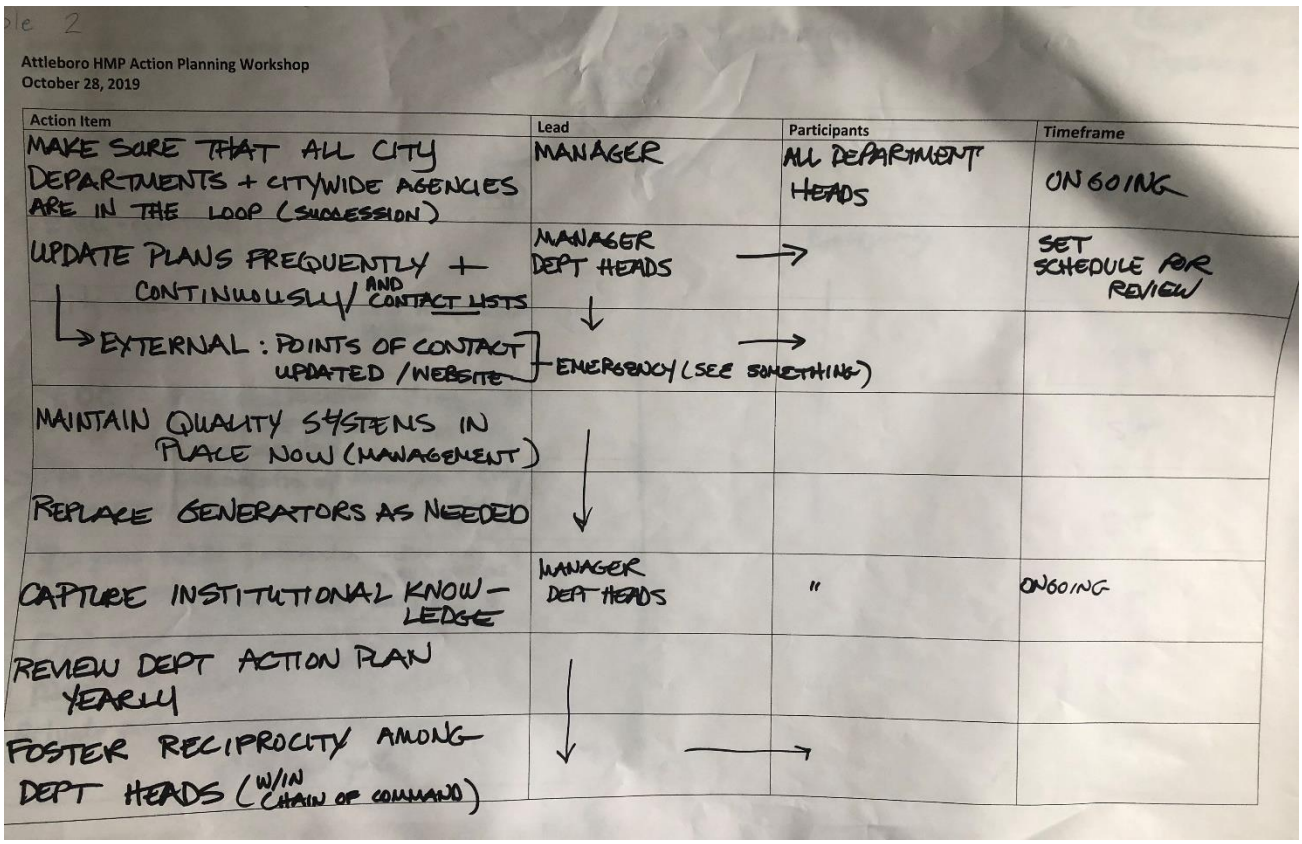
Table 2 Action Planning:

Action Items	Responsible Party	Participants	Timeframe
Make sure that all city departments and citywide agencies are in the loop (succession)	Manager	All Department Heads	Ongoing
Update plans frequently and continuously/and contact lists	Manager/Department Heads	All Department Heads	Set schedule for review
External: points of contact updated/website	Manager	All Department Heads/Emergency	
Maintain current management system	Emergency		
Replace generators as needed (Army Corp/National Grid)	Emergency		
Capture institutional knowledge	Manager/Department Heads		Ongoing
Review department action plan yearly	Manager	All Department Heads	
Foster reciprocity among department heads w/in chain of command	Manager	All Department Heads	
Increase storage capacity of fuel (generators)/solar	Department Heads		Grant driven
Replace/supplement trucks (sander) for road (water)			Grant driven
Create city list of on-call professionals for emergency	Personnel (EMA)	Department Heads	
Get Emergency Management Director			
Create grant database for Water/WW facilities			
Ensure/maintain municipal lines of communication w/other towns			



Attleboro HMP Action Planning Workshop
October 28, 2019

Action Item	Lead	Participants	Timeframe
INCREASE STORAGE CAPACITY OF FUEL (GENERATORS) / SOLAR	DEPT HEADS (GRANT DRIVEN)		
REPLACE / SUPPLEMENT TRUCKS (SANDER)	GRANT DRIVEN		
CREATE CITY LIST OF ON-CALL PROFESSIONALS FOR EMERGENCY	PERSONNEL (EMA)	DEPT HEADS	
GET EMERGENCY MANAGEMENT DIRECTOR			
CREATE GRANT DATABASE			
ENSURE MUNICIPAL LINES OF COMMUNICATION.			



Attleboro HMP Action Planning Workshop
October 28, 2019

Action Item	Lead	Participants	Timeframe
MAKE SURE THAT ALL CITY DEPARTMENTS + CITYWIDE AGENCIES ARE IN THE LOOP (SUCCESSION)	MANAGER	ALL DEPARTMENT HEADS	ONGOING
UPDATE PLANS FREQUENTLY + CONTINUOUSLY / AND CONTACT LISTS	MANAGER DEPT HEADS →		SET SCHEDULE FOR REVIEW
→ EXTERNAL: POINTS OF CONTACT UPDATED / WEBSITE	↓ → EMERGENCY (SEE SOMETHING)		
MAINTAIN QUALITY SYSTEMS IN PLACE NOW (MANAGEMENT)	↓		
REPLACE GENERATORS AS NEEDED	↓		
CAPTURE INSTITUTIONAL KNOWLEDGE	MANAGER DEPT HEADS	"	ONGOING
REVIEW DEPT ACTION PLAN YEARLY	↓		
FOSTER RECIPROCITY AMONG DEPT HEADS (W/IN CHAIN OF COMMAND)	↓ →		

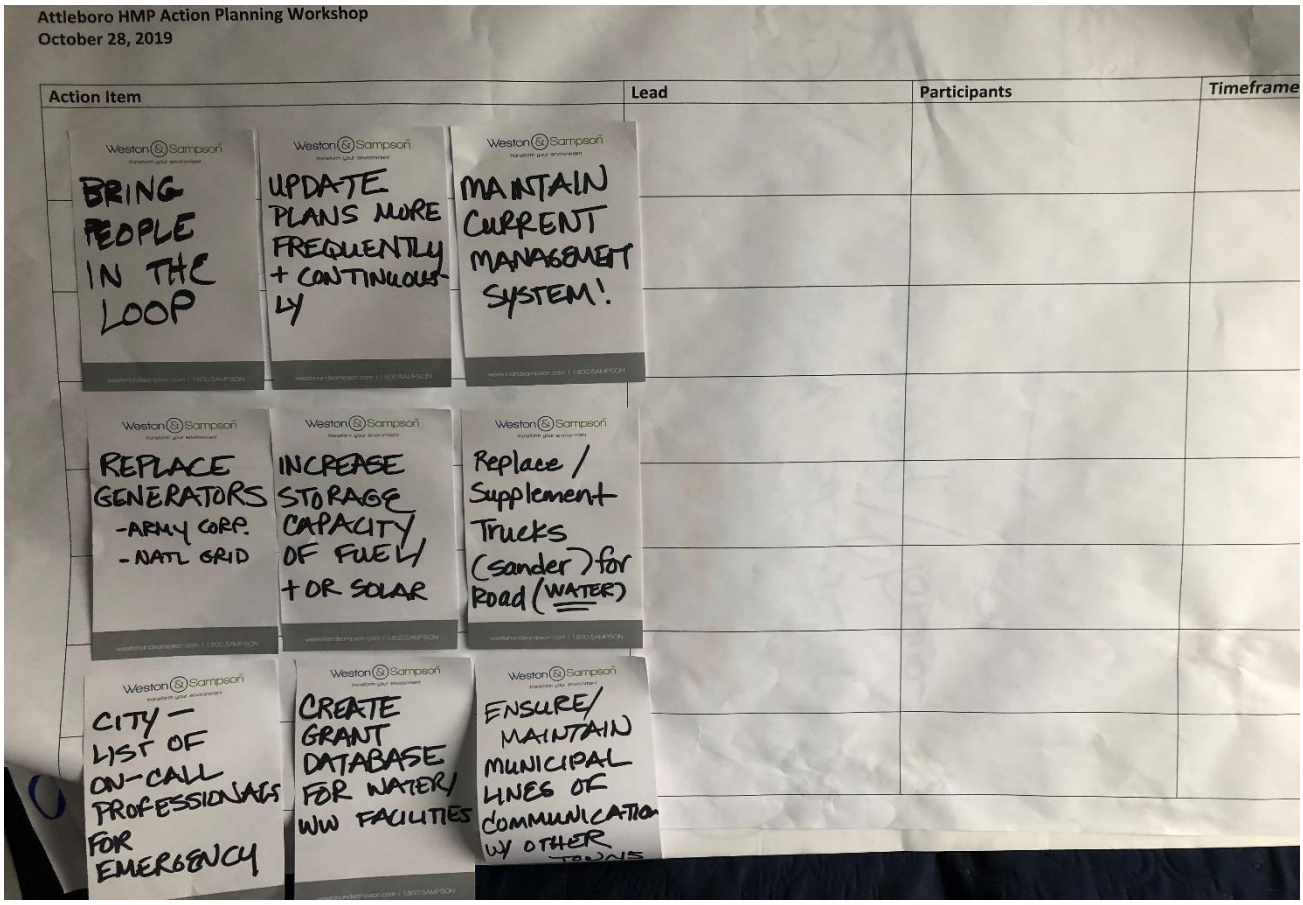
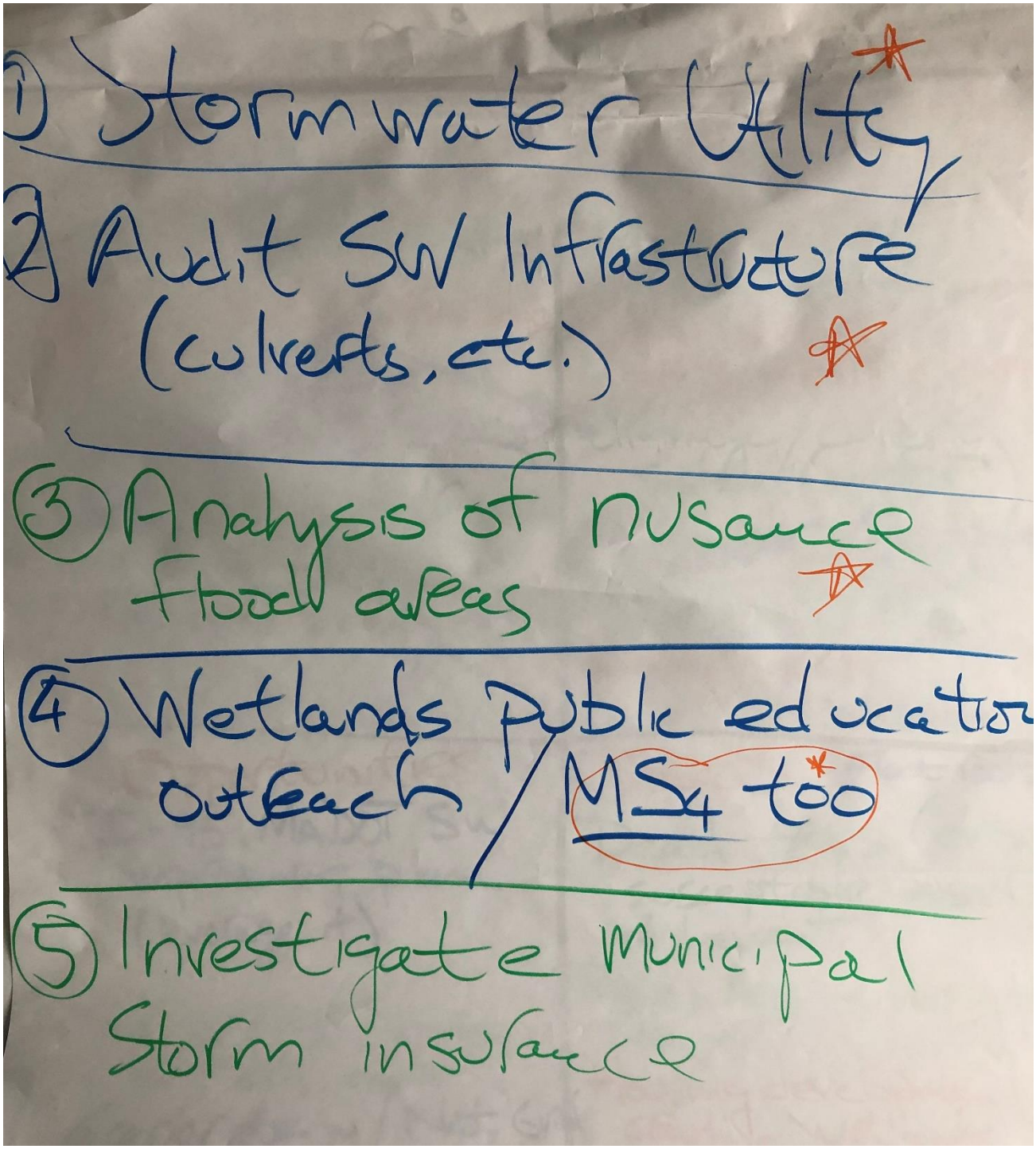
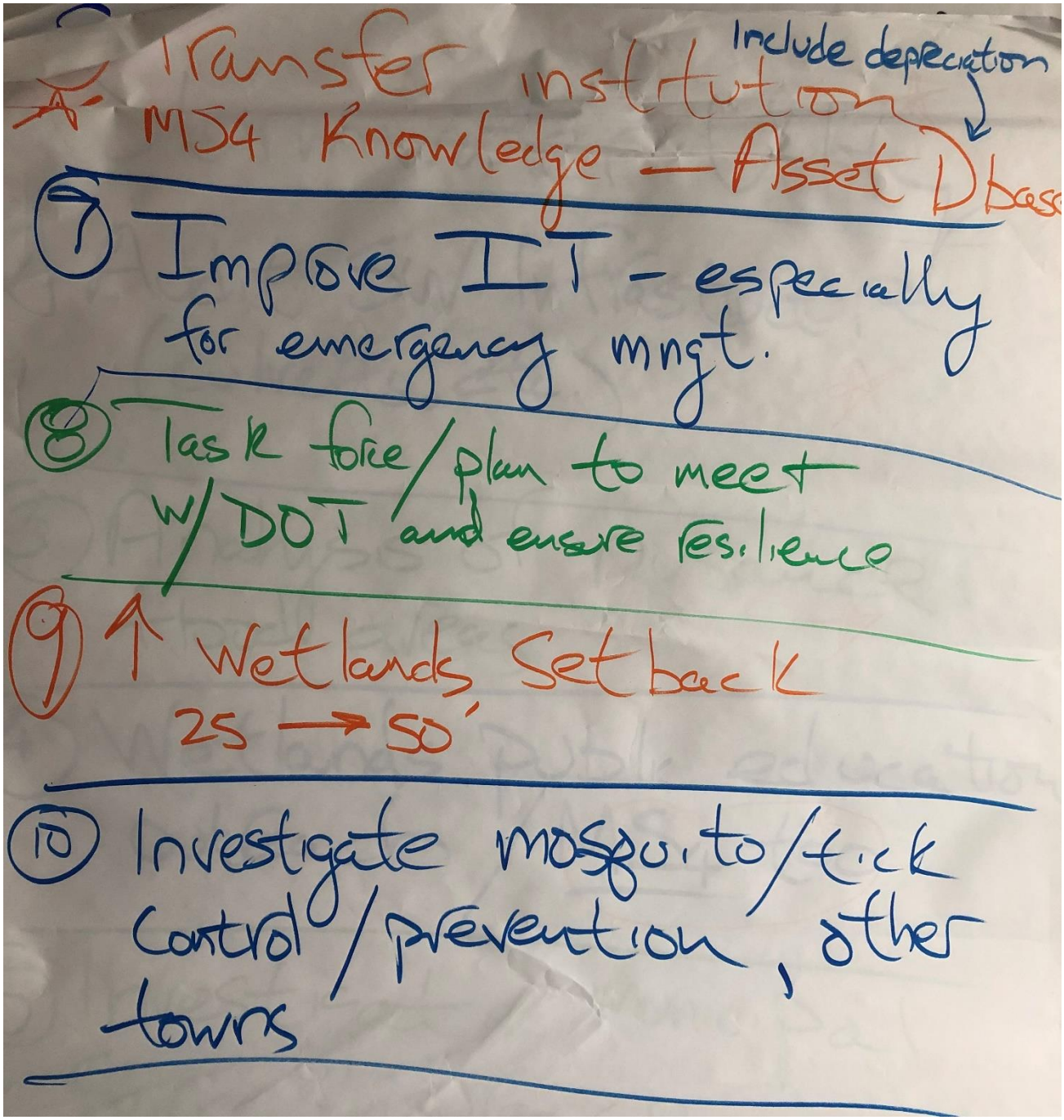

Attleboro HMP Action Planning Workshop
October 28, 2019
Action Item
Lead
Participants
Timeframe
BRING PEOPLE IN THE LOOP
UPDATE PLANS MORE FREQUENTLY + CONTINUOUSLY
MAINTAIN CURRENT MANAGEMENT SYSTEM!
REPLACE GENERATORS -ARMY CORP. -NATL GRID
INCREASE STORAGE CAPACITY OF FUEL + OR SOLAR
Replace / Supplement Trucks (sander) for Road (WATER)
CITY — LIST OF ON-CALL PROFESSIONALS FOR EMERGENCY
CREATE GRANT DATABASE FOR WATER/ WW FACILITIES
ENSURE/ MAINTAIN MUNICIPAL LINES OF COMMUNICATION W/ OTHER TOWNS

Table 3 Action Planning

Action Items	Responsible Party	Participants	Timeframe
Stormwater infrastructure database – asset management	DPW	Planning Dept. IT consulting	
Analysis/audit nuisance flood areas	DPW	Planning Dept. SW consultants General public	
Investigate implementation of stormwater utility	Planning Dept.	DPW City Council Mayor	
Audit SW infrastructure (culverts, etc.)			
Wetlands public education/outreach			
Investigate municipal storm insurance			
Transfer institution – MS4 knowledge – asset database			
Improve IT – especially for emergency management			
Task force/plan to meet w/DOT and ensure resilience			
Increase wetlands setbacks 25' – 50'			
Investigate mosquito/tick control/prevention, other towns			


1) Stormwater Utility
2) Audit SW Infrastructure (culverts, etc.)
3) Analysis of nuisance flood areas
4) Wetlands Public education outreach / MS4 too
5) Investigate Municipal Storm insurance



Wrap Up and Next Steps

Jim then provided an overview of what was accomplished during the exercise and why is was important, as well as providing relevant next steps to the committee.

Attachments:

- Meeting Materials
- Sign-In Sheet

Attleboro
Local Hazard Mitigation Plan Update

Monday, October 28, 2019, 2:00 pm – 4:30 pm
Attleboro Public Library, Balfour Room

1. Opening

2. Review of Meeting Materials
    a. Recap Task 2:
        i. W&S to present to the committee the 2004 list of hazard profiles.
        ii. Review what hazards were brought up at the last meeting.
        iii. W&S to ask the committee what other hazard profiles need to be added and what hazards W&S advise adding.
    b. Recap Task 3:
        i. W&S to hand out updated draft map and updated draft list of critical facilities inventory which are to include any elements of '04 plan that continue to currently apply today and additions previously provided by the committee. Committee to review these for homework and provide feedback at the November meeting.

3. Workshop—Update of HMP Actions (See *Action Planning Workshop*)
    a. SWOT Analysis
        i. What is a SWOT analysis?
        ii. Breakout into three groups led by W&S.
        iii. W&S to facilitate discussion on how the city mitigates hazards in the past and present.

4. Wrap Up (Here's what we accomplished today and why it's important/relevant to next steps)

5. Next Steps
    a. Hand in homework assignment (Agenda Item 2b)
    b. Present results of SWOT analysis
    c. Present draft "Update Hazard Vulnerability" profile (Task 4)
    d. Begin process "Update Mitigation Goals" (Task 5)

Attleboro, MA HMP Update

Action Planning Workshop

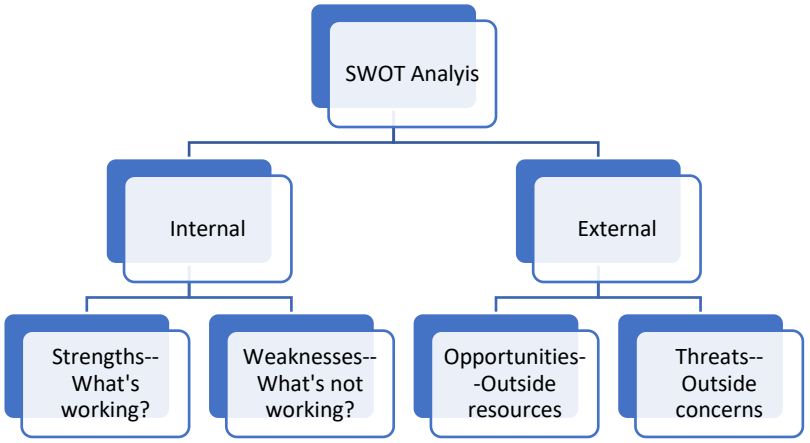
This workshop combines brainstorming, SWOT analysis and building an action list.

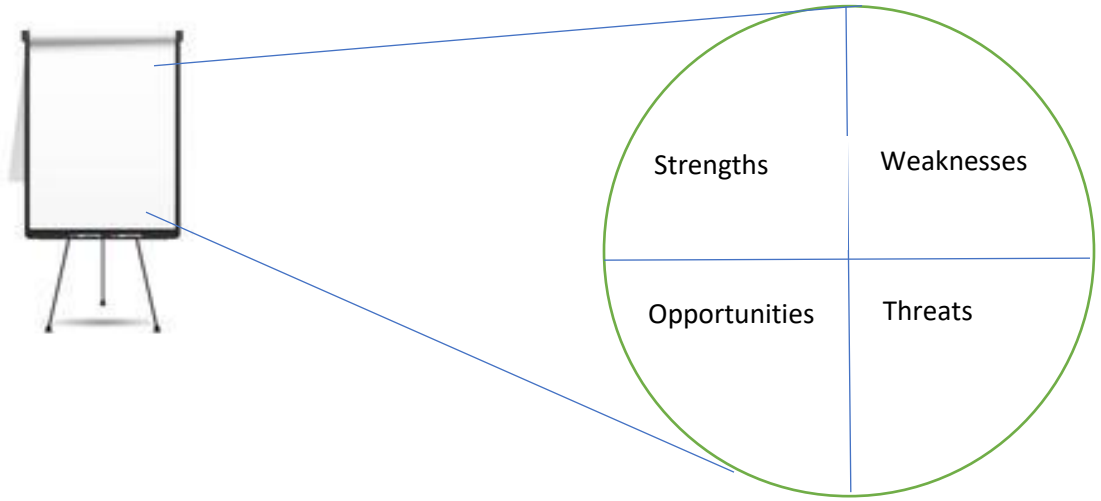
Timing: 1 hour, 45 minutes

Materials (to be provided by Weston & Sampson:

- Scratch paper for initial brainstorming
- Colored markers
- Flip charts
- Half-sheets of paper with masking tape or large Post-It notes
- Plot-printed tables for each group

Setup (One Station for each Breakout Group)





Actions from SWOT posted on half-sheets

PLOT-PRINTED TABLE

(next to each flip chart)

Action	Lead	Participants	Time

How to Proceed (with approximate timing):

Workshop Question

- *What actions should we add, remove, and update to improve hazard mitigation in the City?*

- Reflect on experience with natural hazards since about 2004 (5 min)

<u>Breakout Session 1 with Report Out</u>

- Work with your group to conduct a SWOT analysis (strengths, weaknesses, opportunities, and threats) of existing hazard mitigation on the flip chart provided. (20 minutes)
- Select a group reporter to describe the SWOT analysis results (1 minute).
- Conduct report-outs by each group (2 minutes each, assume about 10 minutes collectively).
- After the report-outs ask for observations from the full committee about the SWOT results (5 minutes).

<u>Breakout Session 2 with Report Out</u>

- Work with your group to build an action list using half-sheet cards on the large-format table. Actions may address items in your SWOT analysis or may arise from group discussion. Assign responsibility for leading action implementation, participation, approximate timeframes (immediate, within two years, within five years, long-term (i.e., more than five years) (30 minutes).
- Select a group reporter to describe the action plan results (1 minute).
- Conduct report-outs by each group (2 minutes each, assume about 10 minutes collectively).

<u>Group Discussion</u>

- Observations from the full committee about the action plan results and overall goals for the HMP (20 minutes).

welcome

transform your environment

Attleboro HMP Update

- Committee Meeting 3
- October 28, 2019

Overview of the Agenda

- Review of Meeting Materials
  - Recap Task 2 (Hazard Profiles)
  - Recap Task 3 (Critical Facilities Map)
- Workshop—Update of HMP Actions
- Wrap Up
- Next Steps

Hazard Profiles

FLOOD HAZARDS

WIND HAZARDS

WINTER STORMS

EARTHQUAKES, LANDSLIDES, ETC.

FIRE

EXTREME TEMPERATURES

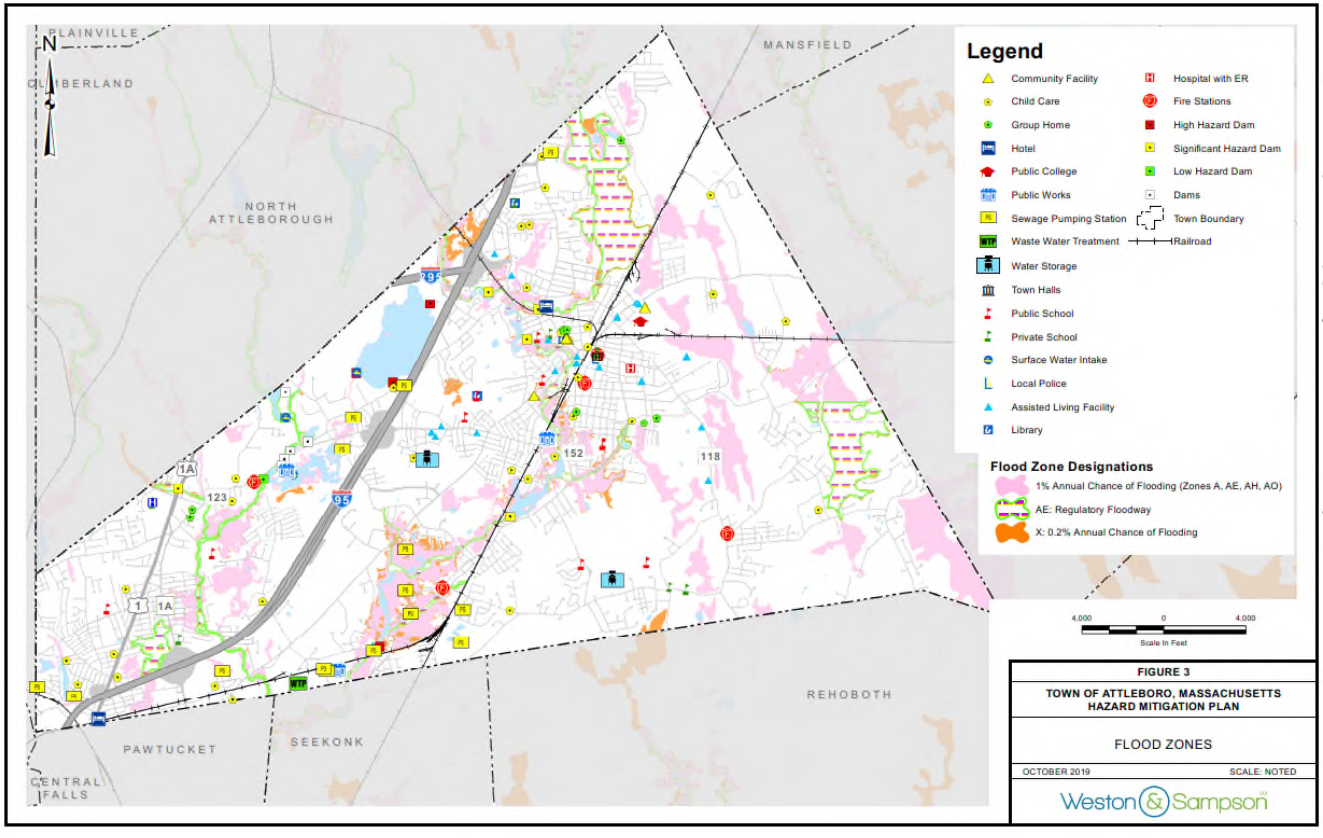
DROUGHT

CLIMATE CHANGE

Flood Hazards

4 events reported by NOAA since 1996:

- No reported deaths or injuries
- Just less than $12M in damage
- March 2010 accounts for $11,790,000



Wind Hazards

- 13 hurricanes recorded by NOAA since 1938, 4 since 2010, 1 category 3 (1938).
- No recorded tornadoes in Attleboro since 1953, but there have been 9 tornadoes in Bristol County responsible for $2,615,000 in damages.
- 12 Nor’easters since 1978.
- 104 severe thunderstorms in Bristol County since 1998, responsible for $615,700 in damages.

Aftermath of the 1978 blizzard in Attleboro. *Courtesy Sun Chronicle*

Winter Storms

- Nor'easters and severe winter storms are often one and the same.
- Nor'easters rotate counterclockwise and typically include storm surges.
- Blizzards bring very cold temperatures and whiteout conditions.

Table 2-15. Winter Storm

Date	Winter Storm Type
February 1978	Blizzard of 1978
October 1991	Severe Coastal Storm ("Perfect Storm")
December 1992	Great Nor'easter of 1992
January 2005	Blizzard/Nor'easter
October 2005	Coastal Storm/Nor'easter
April 2007	Severe Storms, Inland & Coastal Flooding/Nor'easter
January 2011	Winter Storm/Nor'easter
October 2011	Severe Storm/Nor'easter
February 2013	Blizzard/Nor'easter
January 2015	Blizzard/Nor'easter
March 2015	March 2015 Nor'easter
March 2018	March 2018 Nor'easter

Table 2-12. Nor'easter Events for Massachusetts, 1978 to 2015

Nor'easter Event	Date
Blizzard of 1978	February 1978
Severe Coastal Storm ("Perfect Storm")	October 1991
Great Nor'easter of 1992	December 1992
Blizzard, Nor'easter	January 2005
Coastal Storm, Nor'easter	October 2005
Severe Storms, Inland and Coastal Flooding	April 2007
Winter Storm and Nor'easter	January 2011
Severe Storm and Snowstorm	October 2011
Severe Winter Storm, Snowstorm, and Flooding	April 2013
Severe Winter Storm, Snowstorm, and Flooding	April 2015
Severe Winter Storm and Flooding	March 2018
Severe Winter Storm and Snowstorm	March 2018

Source: MEMA and DCR 2013, pages 402-406; MEMA and EOEEA 2018, Appendix B

Aftermath of the 1978 blizzard in Attleboro. *Courtesy Sun Chronicle*

Fires

- Urban fires and brush fires.
- No wildfires.

Extreme Temperatures

- Heat or cold.
- Only one extreme cold event since 1998.
- No extreme heat events since 1998.

Figure 2.3 Heat Index Chart

Relative Humidity (%) \ Temperature (°F)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Category	Heat Index	Health Hazards
Extreme Danger	130 °F – Higher	Heat Stroke or Sunstroke is likely with continued exposure.
Danger	105 °F – 129 °F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F – 105 °F	Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.
Caution	80 °F – 90 °F	Fatigue possible with prolonged exposure and/or physical activity.

Figure 2-2. Wind Chill Temperature Index and Frostbite Risk

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

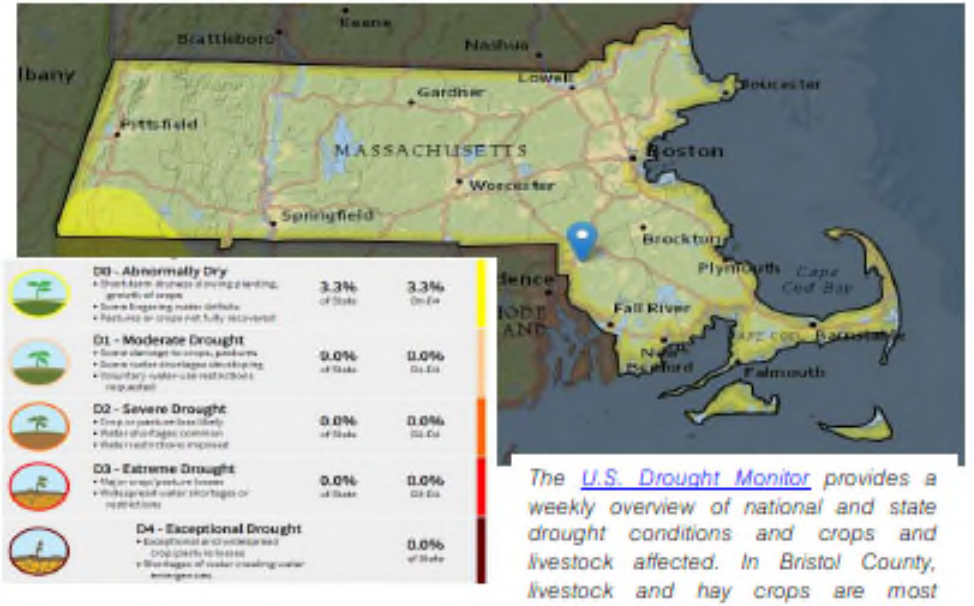
Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Source: National Weather Service

Droughts

- 14 drought events since 1998 (not severe).
- Severe droughts are 50 – 100-year events.

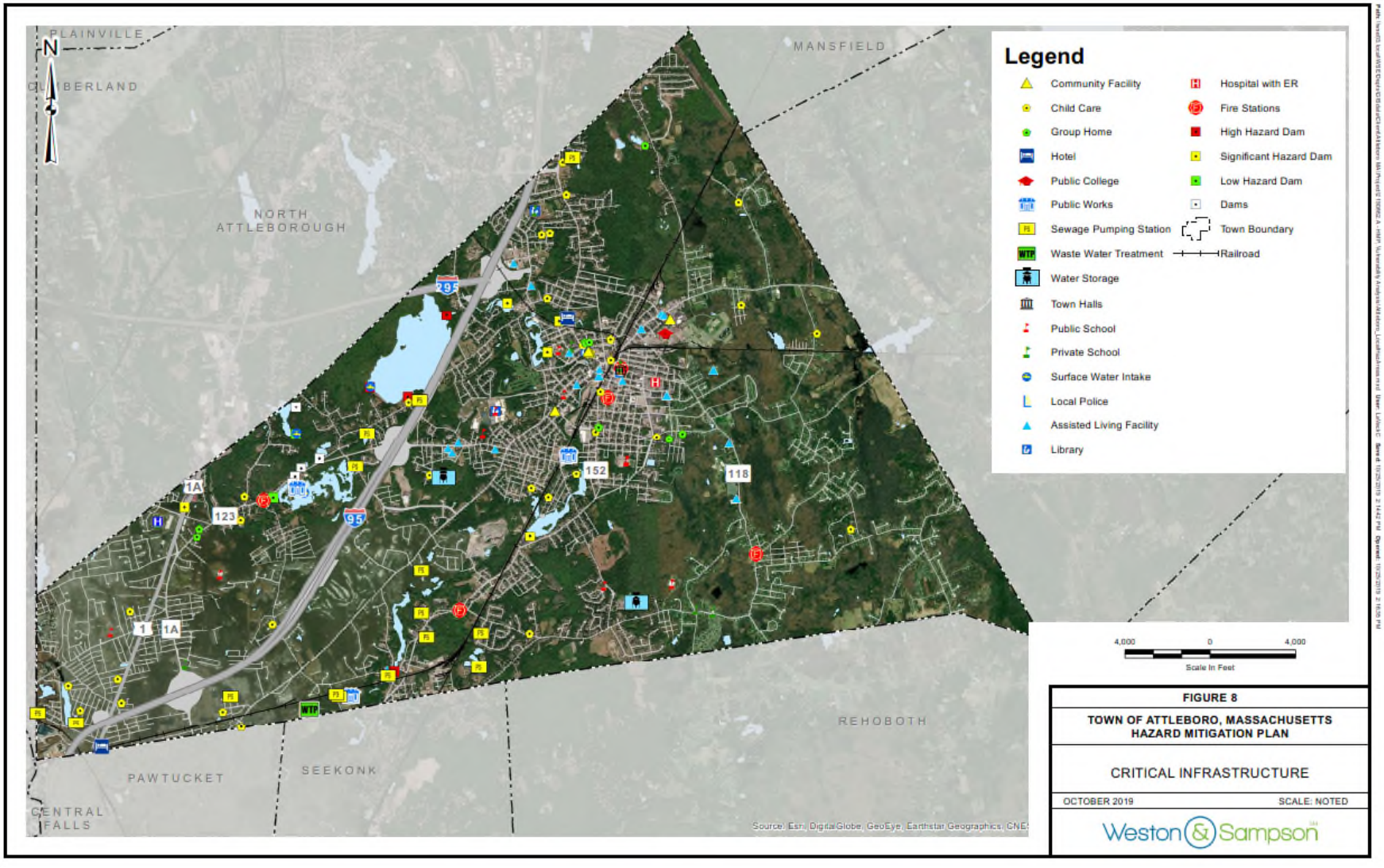


The U.S. Drought Monitor provides a weekly overview of national and state drought conditions and crops and livestock affected. In Bristol County, livestock and hay crops are most affected, and the state is currently abnormally dry (as of August 14, 2019).

Climate Change

- Could worsen any climatic event.
- Actual effects are unknown since predictive modelling is changing all the time.

Critical Facilities Map

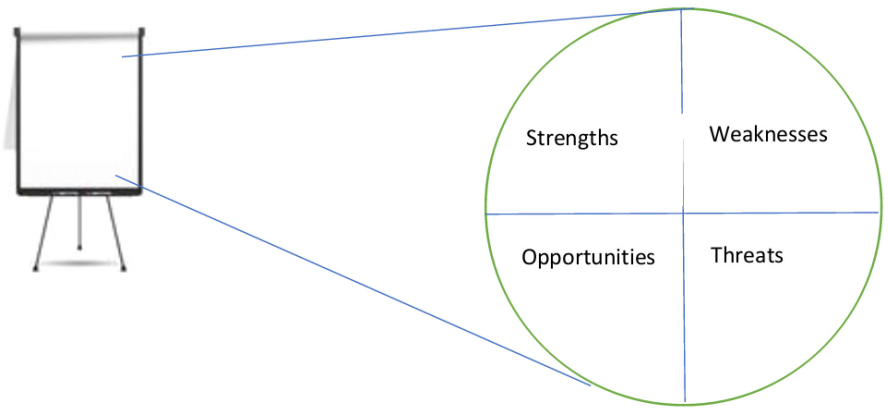


Three-Part Workshop

Reflect, SWOT, and Action Planning

What actions should we add, remove, and update to improve hazard mitigation in the City?

Reflect on Hazards Since 2004



Actions from SWOT posted on half-sheets

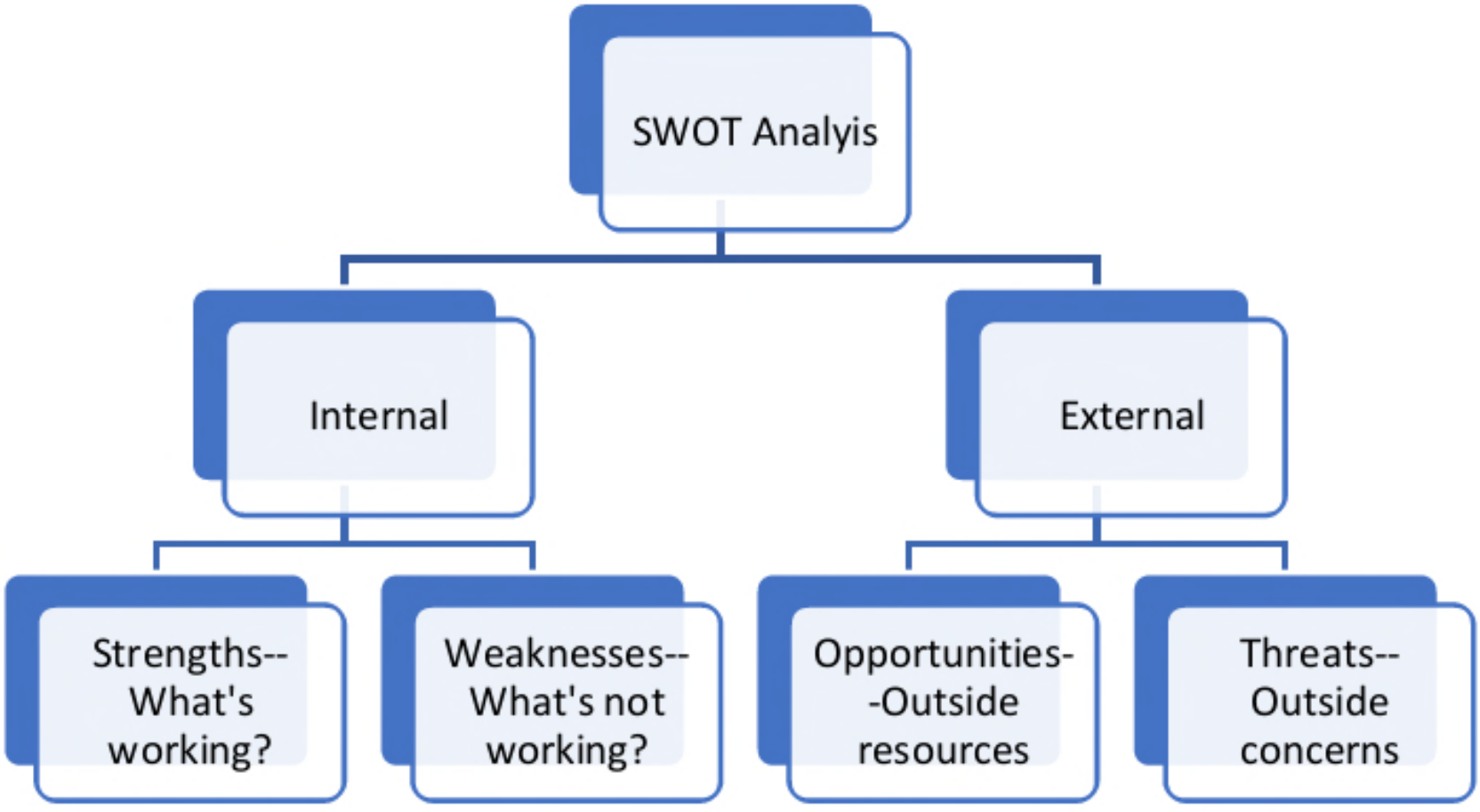
PLOT-PRINTED TABLE

(next to each flip chart)

Action	Lead	Participants	Time

SWOT Analysis

What's a SWOT?



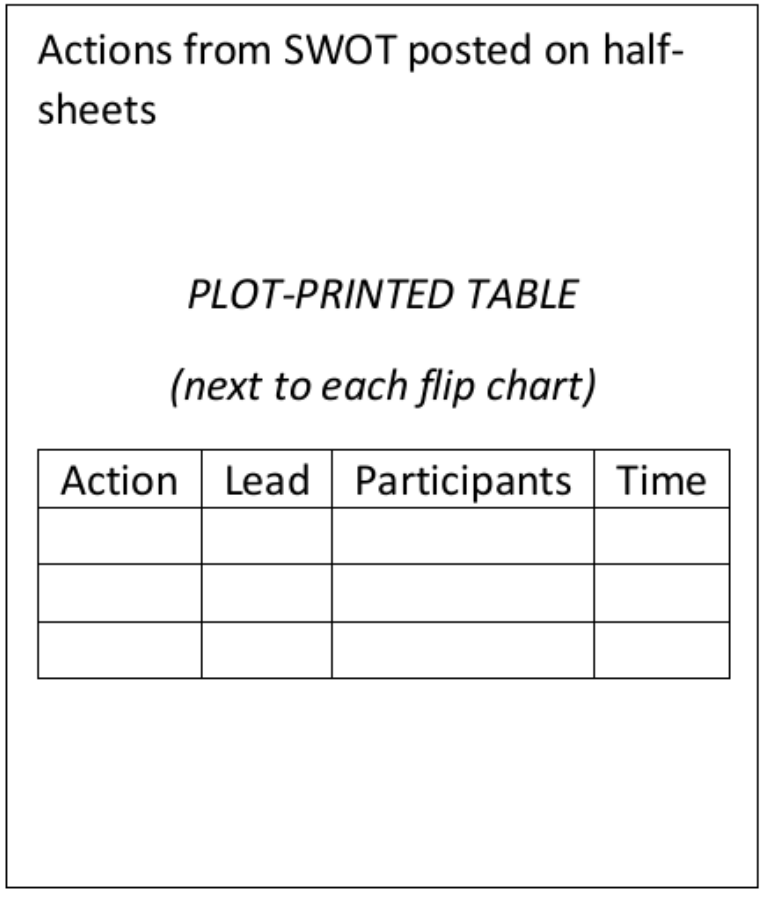
SWOT Analysis (~35 min)

Setup

- Scratch paper for initial brainstorming
- Colored markers
- Flip charts

Action Planning (~40 min)

Setup



- Half-sheets of paper with masking tape or large Post-It notes
- Plot-printed tables for each group

Next Steps

- “Homework” comment on Map (Item 2.b).
- Compile SWOT analysis results.
- Update Hazard Vulnerability (Task 4).
- Initiate update of mitigation goals (Task 5).

thank you

westonandsampson.com

Hazard Mitigation Plan Committee 10/28/19 Meeting

Initials	Name	Department / Organization
NW	Nick Wyllie	Conservation Commission
GA	Gary Ayrassian	Planning Dept.
SD	Stephanie Davies	Planning Dept.
	Jim Riordan	Weston & Sampson
	Paul Heroux	Mayor
DC	Derek Corsi	Park & Forestry
KI	Kathleen Ilkowitz	Mayor (Executive Secretary)
	Kourtney Wunchel	Water Dept.
GOB	Greg O'Brien	Water Dept.
SB	Steve Brasier	Water Dept.
	Kyle Heagney	Police Dept.
	Mike Tyler	Public Works
	Tom Hayes	Wastewater Dept.
MM	Madeline McNeilly	Council on Aging
ST	Scott LaChance	Fire Dept.
JS	John Staskiewicz	Health Dept.
	Bill McDonough	Building Dept.
	Paul Danesi	Planning Board
RBB	Roy Belcher	Attleboro Land Trust
BY	Bertha Young	Resident
	Ben Cote	Friends of the Ten Mile
	Keith Gonsalves	Ten Mile River Watershed Council
WC	Wayne Cobleigh	Resident
	David Denneno	Sturdy Memorial Hospital
MC	Mark Cuddy	FBinsure
	Bobby Araujo	Public Works

	William Johnson	Wastewater Dept.
	Jim MacDonald	Police Dept.

Weston & Sampson
100 Foxborough Blvd., Suite 250, Foxborough, MA 02035
Tel: 508.698.3034

MEMORANDUM

TO:	Gary Ayrassian, Director of Planning & Development
	Nicholas Wyllie, Conservation Agent
FROM:	Jim Riordan, Project Manager
DATE:	January 2, 2020
SUBJECT:	Summary of HMP Action Planning Workshop Attleboro HMP/MVP

The following summarizes workshop exercises that were completed on December 16, 2019 for the Attleboro HMP/MVP. During this meeting, the HMP Committee reviewed the revised critical facilities map and list, the actions that were drafted from the October 28th workshop, and the draft HMP Actions and Goals. In addition, the group heard about the Municipal Vulnerability Planning process and Community Resilience Building Workshop, which will focus on future actions to further adaptation to climate change.

Review of Meeting Materials

Jim Riordan, Weston & Sampson, provided an overview of meeting materials using a PowerPoint presentation. Meeting materials and PowerPoint are attached.

Review of Final Critical Facilities

The HMP Committee reviewed the critical facilities plan. They discussed whether or not it makes sense to include emergency/urgent care facilities as a critical facility (Sturdy Memorial Hospital is the only listed critical facility). We may want to ensure that these facilities have back power and medications if transportation or power is compromised. The Committee also noted that the list of critical facilities should be updated annually. If the City is able to reactivate the EMA planning role, maintain an updated critical facilities list will become part of that role's charge.

Review of Actions (from October 28th Workshop)

Jim posted the "raw data" from the October 28th workshop, which included the results of the SWOT analysis and action planning. He referred to handouts including the mitigation action (draft), 2004 actions, and the draft goals. Some of the items required clarification.

- The HMP Committee commented that they should consult with Madeleine McNeilly on generators. They also discussed opt-in for emergency contacts. They now have a robocall system through MIS. They should also fix the reverse 911 (Police).

The Police Chief described the Community Response Volunteer process that used to exist in Attleboro and still exists in other towns. This volunteer group is trained to respond to certain emergencies and to provide support to police and fire. Attleboro should reconsider reinstating this group, and work to understand the insurance issues that surround such an organization.

The HMP Committee also discussed the response to dead trees during wind events. Trimming and debris removal are preventative measures. The issue is the need for more staff and equipment, especially tree-cutting equipment. Prevailing wage makes additional staff cost prohibitive. When they have a storm, it is all hands-on-deck. The City should create a plan or protocol for when emergency events occur that details:

- Staff available across all departments that can be shared;
- Who is available (trucks should be called in)
- Debris now goes to a compost center, but a secondary debris storage should be identified (especially at the end of the year). Need a City facility.

The HMP discussed reactivating the Emergency Management Committee and hiring a Director and expressed concerns about the aging population.

The Police Chief talked about the cooling station for periods with extreme temperatures. Cooling Centers by law must have appropriate trained staff, equipment, and access – this should be defined specifically in the HMP (and maybe in a call out box). Cooling stations are usually for post-storm events when temperatures are high, and the power is out. The Committee discussed the capacity needs for the future. They discussed creating a Risk Assessment of seniors' needs right now and in the future.

- What defines an "emergency" and who decides? In the past, political influences determined an emergency rather than an accepted shared standard, but the definition should come from the state government.
- Many people do not use Cooling Centers (they do not want to go). The City should look at other alternatives, such as mobile air conditioning units, costs of local hotels, etc.
- MEMA wants to be notified if a Cooling Center is established.
- If the City sets up a Cooling Center, it should be accessible regionally and publicized (all Attleboro shelters are regional shelters).

The HMP discussed creating a dedicated website for emergency services and a central contact number for phone calls. Direct mail contacts with a fact sheet would also be useful. The City needs to identify staff who can process phone calls (dispatch, for example). The Committee proposed an action to create a cooperative convenient center, and then track the number of people who go.

The HMP Committee discussed stormwater management. North Attleboro has a written plan. When they see a forecast for significant rain, the Chief contacts Attleboro – but North Attleboro's DPW also talks to Attleboro's DPW. The process is updated but not communicated broadly. They should formalize their communication (especially for people who expect electronic communication). The City should create a group with specific EMA roles. The Department should have three-four people in the same communication loop. The Committee also discussed integrating an EMA plan with software.

Review of Draft HMP Actions and Goals

The HMP Committee reviewed the draft Actions and Goals. On the Goals, the following were added:

> Goal 2: Use the available best data and management practices to prepare for and address the adverse effects of changing weather patterns (i.e. climate change) to increase resiliency.
>
> Goal 3: add "sufficient personnel" to bullets
>
> Goal 3: Personnel training before storm and transfer of knowledge and skills outlined in a management plan that also defines a post-disaster response. All departments, schools, key private businesses, agencies and institutions should have one-two EMS personnel to provide knowledge and communication. Dedicated crews should be available to provide a debrief of situations and accumulate the information needed by FEMA/MEMA. These positions should be reimbursed.

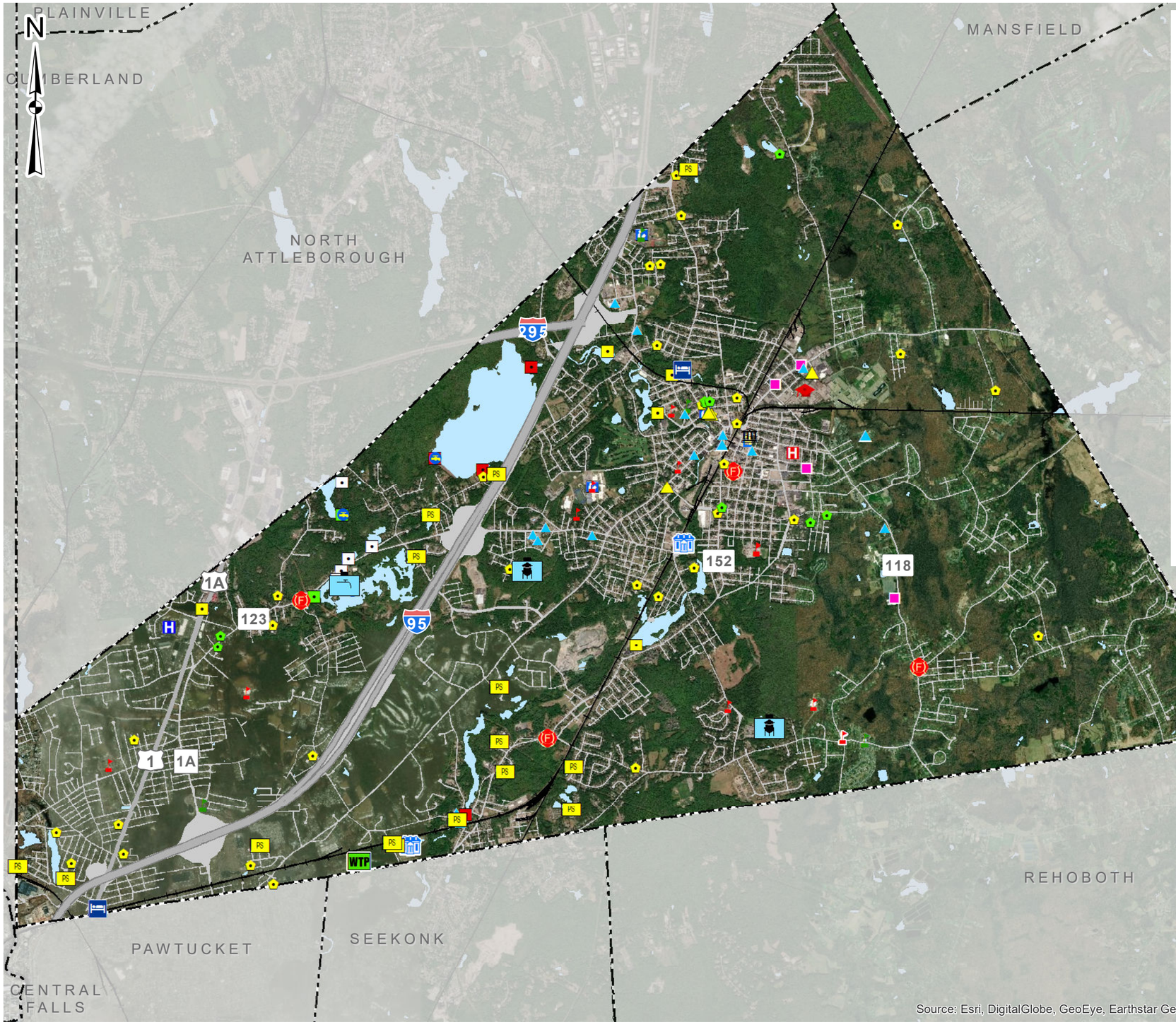
The Committee also discussed adding the following actions:

- Cooperation with National Grid
- Replicate Mansfield and Norton's Volunteer Emergency Response Teams (volunteers)
- Review the need for a communications truck and an emergency services truck (Mansfield has a truck retrofitted for coffee, etc. to support working crews in an emergency. These trucks are run by volunteers)
- Consider creating a truck/trailer as a portable shelter
- Need to coordinate with MBTA/DOT/National Grid on transportation, tree management, stormwater
- Need to look at stormwater improvements needed on state roads
- Locate and identify flat roofs that are vulnerable to collapse from snow weight.

Attleboro
Local Hazard Mitigation Plan Update

Monday, December 16, 2019, 2:00 pm – 4:00 pm
Attleboro Public Library, Balfour Room

1. Opening
2. Review of Final Critical Facilities
3. Review of Actions (Raw Data from the October 28 Workshop)
4. Review Draft HMP Actions and Goals
5. Integration of Municipal Vulnerability Planning and Community Resiliency Building (CRB) Workshop
    a. Tentatively Saturday, January 11, 2020 (8 a.m. to 4 p.m.)
    b. Location TBD
6. Next Steps
    a. Initiate MVP Project
    b. Conduct CRB Workshop
    c. Finalize Risk Assessment, Vulnerabilities, and Existing Mitigation Measures (Tasks 2 – 4)
    d. Update Actions and Goals



Legend

- Community Facility
- Child Care
- Group Home
- Hotel
- Public College
- Public Works
- Sewage Pumping Station
- Waste Water Treatment
- Water Office
- Water Storage
- Hospital
- Hospital with ER
- City Hall
- Public School
- Private School
- Surface Water Intake
- Local Police
- Assisted Living Facility
- Nursing Home
- Library
- Fire Stations
- Dam (High Hazard)
- Dam (Significant Hazard)
- Dam (Low Hazard)
- Dam (No Hazard Classification)
- Town Boundary
- Railroad

4,000 0 4,000

Scale In Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES

FIGURE 8

CITY OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

CRITICAL INFRASTRUCTURE

DECEMBER 2019 SCALE: NOTED

Weston & Sampson

Path: \\wse03.local\WSE\Depts\GIS\data\Client\Attleboro MA\Project\2190862.A - HMP Vulnerability Analysis\Attleboro_LocalHazAreas.mxd User: LaVackC Saved: 12/5/2019 2:05:24 PM Opened: 12/5/2019 2:06:56 PM

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Life Care Center of Attleboro	969 Park Street	Assisted Living	In both
Canterbury Woods	100 Garfield Avenue	Assisted Living	In both
Christopher Heights of Attleboro	45 S. Main Street	Assisted Living	In both
Victorian Mansion/Warrior Past West	574 Newport Avenue	Assisted Living	In both
Nickerson Courts Apartments	100 South Avenue	Assisted Living	In both
Hebron Mill Elderly Apartments	169 Knight Avenue	Assisted Living	In both
Attleboro Housing Authority	37 Carlon Street	Assisted Living	In both
River Court Senior Housing	4 Hodges Street	Assisted Living	In both
Gardner Terrace Apartments	46 Pine Street	Assisted Living	In both
Oakhurst Apartments	51 South Ave	Assisted Living	2019 list only.
Maple Terrace	6 Maple Terrace	Assisted Living	2019 list only.
Hope Gardens	847 Park Street	Assisted Living	In both
Hillside Adult Day Health	50 Walton Street	Assisted Living	In both
Luther's Dike	41.939369000 N 71.337231000 W	Dam (No Hazard Classification)	2019 list only. Not classified by hazard type.
Attleboro #1 Dam	41.931153000 N 71.335770000 W	Dam (No Hazard Classification)	2019 list only. Not classified by hazard type.
Attleboro #2 Dam	41.932427000 N 71.332620000 W	Dam (No Hazard Classification)	2019 list only. Not classified by hazard type.
Orr's Pond #1 Dam	41.929956000 N 71.336840000 W	Dam (No Hazard Classification)	2019 list only. Not classified by hazard type.
Orr's Pond #2 Dam	41.929070000 N 71.337360000 W	Dam (No Hazard Classification)	2019 list only. Not classified by hazard type.
Luther Reservoir Dam	41.935617420 N 71.336690200 W	Dam (Low Hazard)	2019 list only
Orrs Pond Dam	41.927322210 N 71.340573210 W	Dam (Low Hazard)	2019 list only
Dodgeville Pond Dam	41.922246010 N 71.296388110 W	Dam (Significant Hazard)	In both. 2004 identifies as "Dam C."
Mechanics Pond Dam	41.946018000 N 71.293317000 W	Dam (Significant Hazard)	In both. 2004 identifies as "Dam F."
Mechanics Pond Dike	41.945090000 N 71.294195000 W	Dam (Significant Hazard)	2019 list only

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Simmons Pond Dam	41.949955000 N 71.291315000 W	Dam (Significant Hazard)	2019 list only
Farmers Pond Dam	41.952378060 N 71.300220230 W	Dam (Significant Hazard)	In both. 2004 identifies as "Dam B."
Lake Como Dam	41.926117220 N 71.355876790 W	Dam (Significant Hazard)	2019 list only
Manchester Pond Reservoir South Dike	41.940290000 N 71.317360000 W	Dam (High Hazard)	In both
Manchester Pond Reservoir East Dike Embankment 3 & 4	41.950789000 N 71.310692000 W	Dam (High Hazard)	In both. 2004 Plan doesn't recognize embankments
Manchester Pond Reservoir Dam	41.941525000 N 71.323924000 W	Dam (High Hazard)	2019 list only
Hebronville Pond Dam	41.904925921 N 71.319813932 W	Dam (High Hazard)	In both
For Pete's Sake Preschool, Inc.	18 Baltic Street	Child Care	In both
Busy Bees Learning Center, Inc.	209 South Main Street	Child Care	In both
Family Child Care	114 South Main Street	Child Care	2019 list only.
Just Kids Inc Pre-School	260 Rice Street	Child Care	2019 list only.
Jack and Jill Nursery School	50 Park Street	Child Care	In both
Little Blessings Preschool	841 North Main Street	Child Care	In both
Maple Street Learn & Play Daycare, Inc.	107 Maple Street	Child Care	In both
Little Folks School	121 North Main Street	Child Care	In both
Attleboro YMCA School's Out and Y Way Play Preschool	63A North Main Street	Child Care	2019 list only.
Family Child Care	803 North Main Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	10 Elmina Drive	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	11 Romoli Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Family Child Care	11 Tanya Drive	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	119 Fisher Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	186 Patterson Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	190 Pike Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	22 Sheridan Circle	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	24 Halko Drive	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care".
Family Child Care	242 Thurber Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	26 Henry Lane	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	3 Cross Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	317 Newport Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	334 Richardson Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	35 Nelson Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	44 Bretton Woods Drive	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	5 Ashton Road	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	52 Curtis Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Family Child Care	59 Peck Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	67 Chesett Lane	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	75 Sycamore Avenue	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	799 West Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Family Child Care	87 Grant Street	Child Care	Not in the 2004 Plan/No name in 2019 list/2019 list identified as "Family Child Care."
Attleboro Emergency Mgt/Fire HQ	100 Union Street	Fire Station	In both. 2004 identified as labeled here, classified as "Emergency Facility. 2019 lists as "Fire Station."
So. Attleboro Fire Station	1476 West Street	Fire Station	In both. 2004 identifies as "Emergency Facility" 2019 lists as "Fire Station."
Briggs Corner Fire Station	1276 Park Street	Fire Station	In both. 2004 identifies as "EOC". 2019 lists "Fire Station." Named in 2004 plan as shown here. 2019 lists no name.
Twin Village Fire Department	796 South Main Street	Fire Station	In both
Warrior Path East	200 South Main Street	Group Home	2019 list only
Journey Home	630 Lindsey Street	Group Home	2019 list only
Family Resource	11 Peck Street	Group Home	2019 list only
Starr	543 Newport Avenue	Group Home	2019 list only
Family Resource	13 Peck Street	Group Home	2019 list only
Group Home	17 Peck Street	Group Home	2019 list only
Group Home	91 George Street	Group Home	2019 list only
Justice Resource Institute	167 Maple Street	Group Home	2019 list only
Attleboro Motor Inn	1116 Washington Street	Hotel	2019 list only.
Colonel Blackinton Inn	203 North Main Street	Hotel	2019 list only.
Pleasant Manor Nursing Home	195 Pleasant Street	Nursing Home	In both.

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Ridgewood Court Nursing & Rehab Center	27 George Street	Nursing Home	In both
Pleasant Street Rest Home	144 Pleasant Street	Nursing Home	In both
Sturdy Memorial Hospital	211 Park Street	Hospital with ER	In both
Arbour-Fuller Hospital	200 May Street	Hospital	In both
Briggs Corner School	908 Oak Hill Avenue	Private School	2019 list only
Bristol Community College	11 Field Road	Public College	2019 list only
DPW Highway Yard	101 Lamb Street	Public Works	2019 list only
Attleboro Water Department	1296 West Street	Water	2019 list only
Attleboro High School	100 Rathburn Willard Drive	School	In both (2004 Plan lists as School/Shelter)
Bi-County Collaborative (BICO) – Learning Center	100 Rathburn Willard Drive	School	2019 list only
Grace Baptist Christian Academy	1000 Oak Hill Avenue	School	In both
Dayspring Christian	1052 Newport Avenue	School	In both
Bi-County Collaborative (Finberg School)	1125 So. Main Street	School	2019 list only
St. John The Evangelist	13 Hodges Street	School	In both
A. Irvin Studley Elementary School	299 Rathburn Willard Drive	School	In both
Wamsutta Middle School	300 Locust Street	School	In both
Thomas E. Willett School	32 Watson Avenue	School	In both
Cyril K. Brennan Middle School	320 Rathburn Willard Drive	School	In both
Peter Thatcher Elementary School	7 James Street	School	In both (2004 Plan lists address as 30 James St.)
Bishop Feehan High School	70 Holcott Drive	School	In both
Hyman Fine Elementary School	790 Oak Hill Avenue	School	In both (2004 Plan identifies as School/Shelter)

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Community Care Service	80 Park Street	School	2019 List only
Hill-Roberts Elementary School	80 Roy Avenue	School	In both (2004 Plan has Roy STREET and lists as School/Shelter)
SMARTS Collaborative -Archi-Camp February Vacation Program	99 Brown Street	School	2019 List only
Robert J. Coelho Middle School	99 Brown Street	School	In both (2004 Plan lists address as 91 Brown)
Read Street Station	Corner of Read and Phillips Street	Sewage Pumping Station	2019 list only
George Ide Drive Pumps Station	0 George Ide Drive Pole# 2078	Sewage Pumping Station	2019 list only
West Street Extension Pump Station	750 West Street Pole# 7605	Sewage Pumping Station	2019 list only
Tiffany Street Pump Station	745 Tiffany Street	Sewage Pumping Station	2019 list only
Conner Court Pump Station	38 Conner Court	Sewage Pumping Station	2019 list only
Greenfield Pump Station	Greenfield Street Pole# 7579	Sewage Pumping Station	2019 list only
Theodore Lane Pump Station	10 Theodore Lane	Sewage Pumping Station	2019 list only
Bearcourt Pump Station	26 Bearcourt Drive	Sewage Pumping Station	2019 list only
Abbie Lane Pump Station	Abbie Drive	Sewage Pumping Station	2019 list only
Trinity Circle Pump Station	55 Trinity Circle	Sewage Pumping Station	2019 list only
Shady Lane Pump Station	Shady Lane	Sewage Pumping Station	2019 list only
Rutledge Drive Pump Station	20 Rutledge Drive Pole# 280	Sewage Pumping Station	2019 list only
Rutledge Drive Pump Station	West Carpenter Street Pole# 261-6	Sewage Pumping Station	2019 list only
West Carpenter Street Pump Station	27 Pond Street N.	Sewage Pumping Station	2019 list only
Pond Street North Pump Station	27 Pond Street N. Pole# 318-1	Sewage Pumping Station	2019 list only
Attleboro WPCF	27 Pond Street North	Wastewater Treatment	2019 list only
Ides Hill Water Tanks	1 Odonnell Drive	Water Storage	2019 list only

Attleboro Critical Facilities			
FACILITY NAME	FACILITY ADDRESS	FACILITY TYPE	COMMENTS
Oak Hill Water Tanks	Oak Hill	Water Storage	2019 list only
Seven Mile River (Orrs Pond)	Unknown/ Undetermined	Surface Water Intake	2019 list only
Luther Reservoir Pump Station	41.935617420 N 71.336690200 W	Surface Water Intake	2019 list only
Manchester Pond	41.941525000 N 71.323924000 W	Surface Water Intake	2019 list only

SWOT Analysis[1]

Table 1:

Strengths	Weaknesses
• City employees – experienced • Collaboration with smaller communities in the area • Communication – community is good (radio, cable, website) • EOC [emergency operation center] – strength and weakness • MEMA [Massachusetts Emergency Management Agency]– extra equipment needed must be by EMP [emergency management planning committee] • Advanced notice severe weather conditions • Sturdy Hospital	• Training new employees • Up to date skills of current employees • Process manpower • Measures to communicate • Emergency management planning committee – defunct • EOC – location, well established, ready to respond in any event • Aging population • Recruit volunteers - insurance
Opportunities	**Threats**
• Action grants – state • Municipal grants • MEMA	• Federal funds

[1] Text in brackets indicates the assumed meaning of acronyms and other abbreviations.

Table 2:

Strengths	Weakness
• Management system for water system and safety meetings/action plans • Automatic generators offer backup for water and wastewater\ • Dams – Luther dam has a generator • Natural gas – as long as running/diesel in WW [water works] – supplies ordered immediately • Ability of city to move downed trees • Water supply agreements with other towns • Good fleet of trucks	• Internal communication consistency in the past • Possible manpower shortage • Big snowstorm – trucks can only do so much • Drought/heat combo "no water" at state – stress locally
Opportunities	**Threats**
• Need a list of potential grant/funding sources @ federal/state level	• Clarity on North Attleboro plan – communication • North Attleboro – Hoppin Hill Reservoir (owned by Attleboro) • Plans for water facilities outside of the city

Table 3:

Strengths	Weakness
• 90% SW [stormwater] system mapped • Good institutional knowledge (MS4). Only Bobbie • Good regulations/ordinances (2,500 sf [disturbance threshold]) • Water rights/reservoirs in many towns	• Public transit breakdown • Snow removal during additive events • Drainage/culvert system ([not] mapped, [just Bobbie]?) • Manpower/equipment • Unknown location of critical care facilities
Opportunities	**Threats**
• I-95 MADOT SW improvement plan – leverage it • Listing group homes as "[critical] care" • Cooperate w/ National Grid to improve coordination (good recently) • Increase wetland setbacks • Replicate Norton's volunteer program	• Flat roofs • Dead trees susceptible to drought, insects, wind events • Rogue actors – "Harry homeowner" • Housing development – crowding, wetlands • Vector borne illnesses (mosquitos, ticks) • Decrease in pollinators • Removal of snow in extreme events

Action Plans

Table 1 Action Planning:

Action Items	Responsible Party	Participants	Timeframe
Mentoring/training system – citywide (to communicate experience and institutional memory) (employees and volunteers) (MRC)	TBD	Personnel	Medium Term/Ongoing
EMC – reactivate (virtual)	TBD	Emergency	Short Term
City-wide integrated group notification system	TBD	Emergency	Short Term
EOC – dedicated location with requisite system and equipment (upkeep)/training sessions	TBD	Emergency	Short Term
Improve public information (directions, expectations, i.e. mailing) – live updates during storm event	TBD	Emergency	Short Term
Opt in systems (advocate, software) – weather conditions, other, fire chief?	TBD	Emergency	Short Term
Private party generator funds (grant)	TBD	Emergency	Short Term
Dedicated EM website (independent of city website)	Fire Department Police Department	Fire, Police, DPW, Health, Water, WW	Short Term
Apply for grants			Ongoing

Table 2 Action Planning:

Action Items	Responsible Party	Participants	Timeframe
Make sure that all city departments and citywide agencies are in the loop (succession)	Manager	All Department Heads	Ongoing
Update plans frequently and continuously/and contact lists	Manager/Department Heads	All Department Heads	Set schedule for review
External: points of contact updated/website	Manager	All Department Heads/Emergency	
Maintain current management system	Emergency		
Replace generators as needed (Army Corp/National Grid)	Emergency		
Capture institutional knowledge	Manager/Department Heads		Ongoing
Review department action plan yearly	Manager	All Department Heads	
Foster reciprocity among department heads w/in chain of command	Manager	All Department Heads	
Increase storage capacity of fuel (generators)/solar	Department Heads		Grant driven
Replace/supplement trucks (sander) for road (water)			Grant driven
Create city list of on-call professionals for emergency	Personnel (EMA)	Department Heads	
Get Emergency Management Director			
Create grant database for Water/WW facilities			
Ensure/maintain municipal lines of communication w/other towns			

Table 3 Action Planning

Action Items	Responsible Party	Participants	Timeframe
Stormwater infrastructure database – asset management	DPW	Planning Dept. IT consulting	
Analysis/audit nuisance flood areas	DPW	Planning Dept. SW consultants General public	
Investigate implementation of stormwater utility	Planning Dept.	DPW City Council Mayor	
Audit SW infrastructure (culverts, etc.)			
Wetlands public education/outreach			
Investigate municipal storm insurance			
Transfer institution – MS4 knowledge – asset database			
Improve IT – especially for emergency management			
Task force/plan to meet w/DOT and ensure resilience			
Increase wetlands setbacks 25' – 50'			
Investigate mosquito/tick control/prevention, other towns			

Table 3-1. Attleboro's 2004 Mitigation Measures

Hazard	Mitigation Measures and Status of Implementation
Flood	A. The City participates in the National Flood Insurance Program and adopted the FIRM maps. 253 policies are in force. The City actively enforces floodplain regulations. **Status: Ongoing** B. Streets are swept at least annually. Some streets, such as in the downtown area, as swept weekly. **Status: Ongoing** C. City cleans its catch basins routinely based on prioritized need to prevent backup. About 25% of catch basins are cleaned each year; however, some are cleaned more frequently to address potential for backup and flooding. **Status: Ongoing** D. 25/75 sand/salt mix plus IceBan® is used for winter road treatments, which limits sand deposited on roadways and into catch basins. **Status: Ongoing** E. The City implements National Pollution Discharge Elimination System Phase II Stormwater Management Plan (SWMP) and actions. These include several quantity control and flood control measures. **Status: Ongoing** F. The City makes drainage infrastructure improvements performed using, in part, Massachusetts Chapter 90 funds. G. Rules and Regulations Governing the Subdivision of Land addressing the City's Flood Plain District (s. 1.9), wetlands (s. 1.10), and drainage (s. 1.9(c)). These rules also requirement development of a stormwater management plan for each application (s. 5.4(h)), which must address Post-Construction Storrmwater Management Standards (s.6.3). **Status: Ongoing** H. Flood Plain Overlay District, which includes the objective of preserving flood control characteristics of floodplain (s. 17-12.3(c)) and protecting the public from hazard and loss (s. 17-12.3(d)). **Status: Ongoing** I. Local regulations require interdepartmental review related to floodplains and wetlands. **Status: Ongoing** J. Site Plan Review that includes provisions for review of stormwater and erosion control (s. 17-15.0(K)). **Status: Ongoing** K. Flexible Developments allowed including cluster development (s. 17-10.11) and open space development (s. 17-10.5 and 17-10.6). **Status: Ongoing** L. Attleboro has established a Stormwater Management Ordinance under Chapter 19 of its Code of Ordinances. Item 3 of the purpose statement notes the purpose of regulation and control of stormwater runoff quantity and quality. **Status: Action Complete**

Hazard	Mitigation Measures and Status of Implementation
	M. Open Space Plan which discusses flooding, flood hazard areas, and the flood mitigation benefits of wetlands and floodplains. **Status: Action Complete** N. Dam repairs are made as funds are available (both private and public) and the City is proactively monitoring dams in the municipal area. **Status: Ongoing** O. Increased storage at Manchester Pond by 1½ foot. P. Ongoing clearing of rivers and culverts in coordination with the Ten Mile River Alliance. Q. Monitoring of water and precipitation levels along major rivers by the Department of Water and Wastewater. **Status: Ongoing** R. Ten Mile River Flood Warning Plan.
Wind	A. Tree maintenance completed by the Department of Parks and Forest. National Grid maintains trees within its power line corridors. **Status: Ongoing** B. The City enforces the Massachusetts State Building Code. **Status: Ongoing**
Winter	A. Standard snow operations with 75/25 salt/sand mix, as well as IceBan® in icy or environmentally sensitive areas. **Status: Ongoing**
Brush Fire	A. The Fire Department requires a written permit for outdoor burning. **Status: Ongoing** B. The Fire Department reviews all subdivision development plans. **Status: Ongoing**
Geologic - Earthquake	A. The City enforces the MA State Building Code. **Status: Ongoing** B. Evacuation plans in the Comprehensive Emergency Management Plan (CEMP). C. Shelters and backup facilities available. **Status: Ongoing**
Geologic-Landslide	A. Maximum slope for subdivision roads. **Status: Ongoing** B. Earth Removal Ordinance. **Status: Ongoing**
Multihazard	A. The City enforces the MA State Building Code. **Status: Ongoing** B. The City has a CEMP. **Status: Ongoing** C. The City utilizes the MA Emergency Incident Command Unit. **Status: Ongoing** D. The City has a reverse 911 program. **Status: Ongoing**

Hazard	Mitigation Measures and Status of Implementation
	E. The City is a member of the Region One Boston Area Police Emergency Radio Network (BAPERN). F. The City has its own Local Emergency Planning Committee. G. The City Hall, Fire Station, DPW facility and Police facility have a fixed, natural gas generator. **Status: Action Complete** H. Multi department review of all developments. **Status: Ongoing** I. The Council on Aging has a list of everyone over 60 years old and has targeted homebound elderly and provided disaster preparedness information and some disaster kits.

Notes:

a. Yellow highlighted text indicates mitigation measures where status is undetermined or uncertain.

Mitigation Action
Create an internal Citywide Emergency Plan to capture institutional knowledge and protocols. The plan should include: • a schedule for updates • training for new staff • mentoring of existing staff • updated contact lists of internal staff and on-call professionals • reciprocity among Department Heads
Hire an Emergency/Management Director and reactivate the Emergency Management Committee
Deploy a citywide notification system
Create a dedicated location with required systems and equipment for Emergency Operations Center and ensure that training sessions are maintained.
Create an Emergency Public Information Plan for various media (website, social media, direct mail) to keep the public informed before, during and after hazard events. Ensure that points of contact are continuously updated.
Ensure and maintain communication and protocols with neighboring towns
Improve the City's IT system, especially for emergency operations
Opt in systems (advocate, software) – weather conditions, other, fire chief
Pursue grant funding to for private generators that are available for vulnerable residents in need.
Invest in department equipment that can supplement emergency services during a storm, such as trucks with sanding equipment.
Maintain a list of critical equipment (such as generators) and supplies that will need replacing in the next 3-5 years and target grant applications to support replacements.
Explore options that will increase the storage capacity of fuel for generators (such as solar power)

Mitigation Action
Create a grant database for water supply and wastewater facilities
Create an asset management database that includes stormwater infrastructure and MS4 knowledge.
Audit and analyze nuisance flood areas
Explore the cost and requirements for municipal storm insurance
Create a task force to meet with the Department of Transportation to understand what methods are used to ensure resiliency of state roads.
Investigate the implementation of a stormwater utility
Create an outreach and public education initiative about the importance of wetlands
Increase wetland setbacks 25-50 feet.
Investigate mosquito and tick prevention and control and see what is being done in other towns.

Stephanie was here

Hazard Mitigation Plan Committee 12/16/19 Meeting

Initials	Name	Department / Organization
NW	Nick Wyllie	Conservation Commission
	Gary Ayrassian	Planning Dept.
	Stephanie Davies	Planning Dept.
	Paul Heroux	Mayor
DE	Derek Corsi	Park & Forestry
	Kathleen Ilkowitz	Mayor (Executive Secretary)
KW	Kourtney Wunchel	Water Dept.
GOB	Greg O'Brien	Water Dept.
SPB	Steve Brasier	Water Dept.
	Kyle Heagney	Police Dept.
	Mike Tyler	Public Works
TH	Tom Hayes	Wastewater Dept.
	Madeline McNeilly	Council on Aging
SR	Scott LaChance	Fire Dept.
JS	John Staskiewicz	Health Dept.
BM	Bill McDonough	Building Dept.
	Paul Danesi	Planning Board
RBB	Roy Belcher	Attleboro Land Trust
	Bertha Young	Resident (Unable to attend - Medical leave)
	Ben Cote	Friends of the Ten Mile
	Keith Gonsalves	Ten Mile River Watershed Council
WC	Wayne Cobleigh	Resident
	David Denneno	Sturdy Memorial Hospital
	Mark Cuddy	FBinsure
	Bobby Araujo	Public Works
	William Johnson	Wastewater Dept.

APPENDIX B

Hazard Mapping

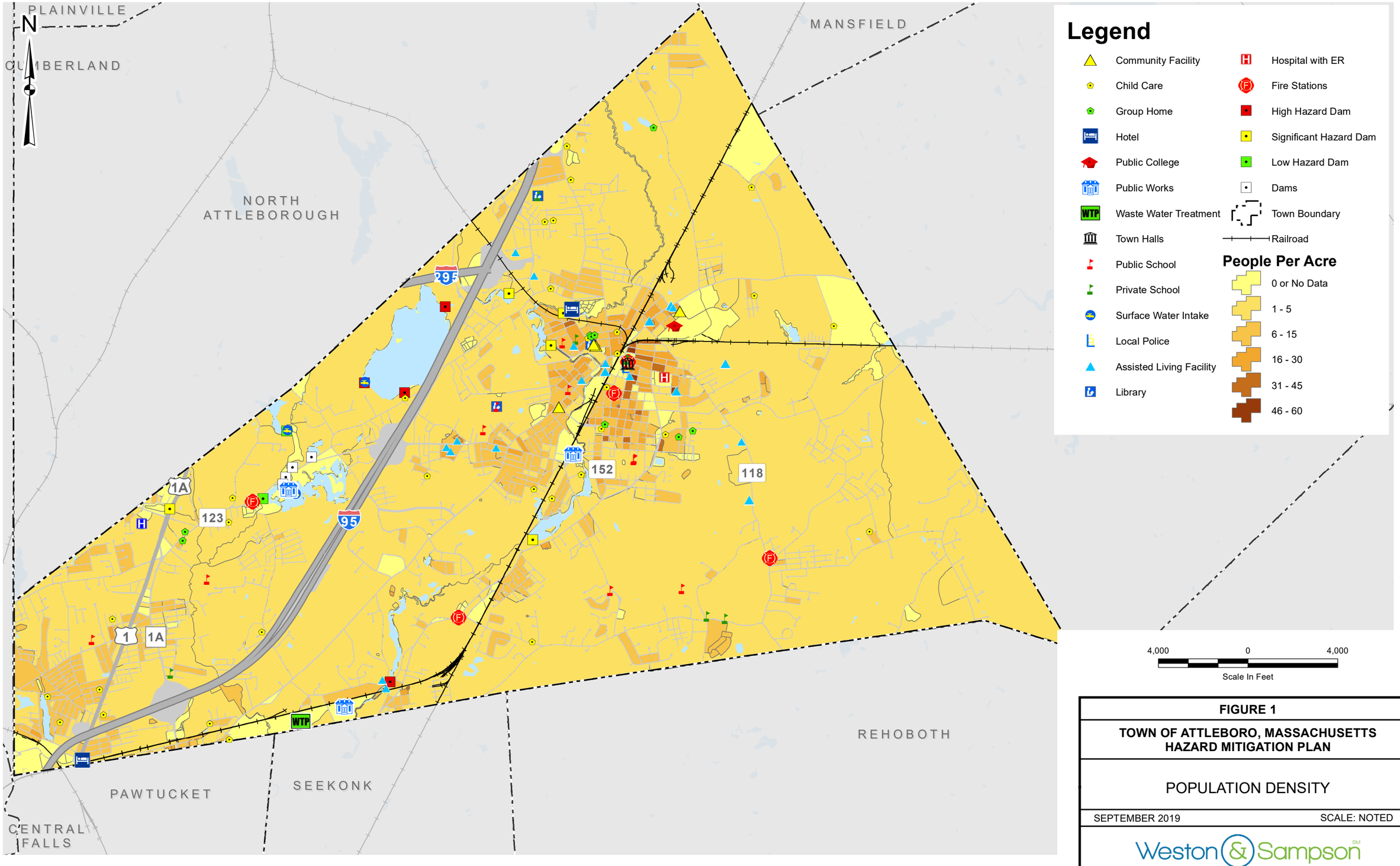


FIGURE 1

TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

POPULATION DENSITY

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

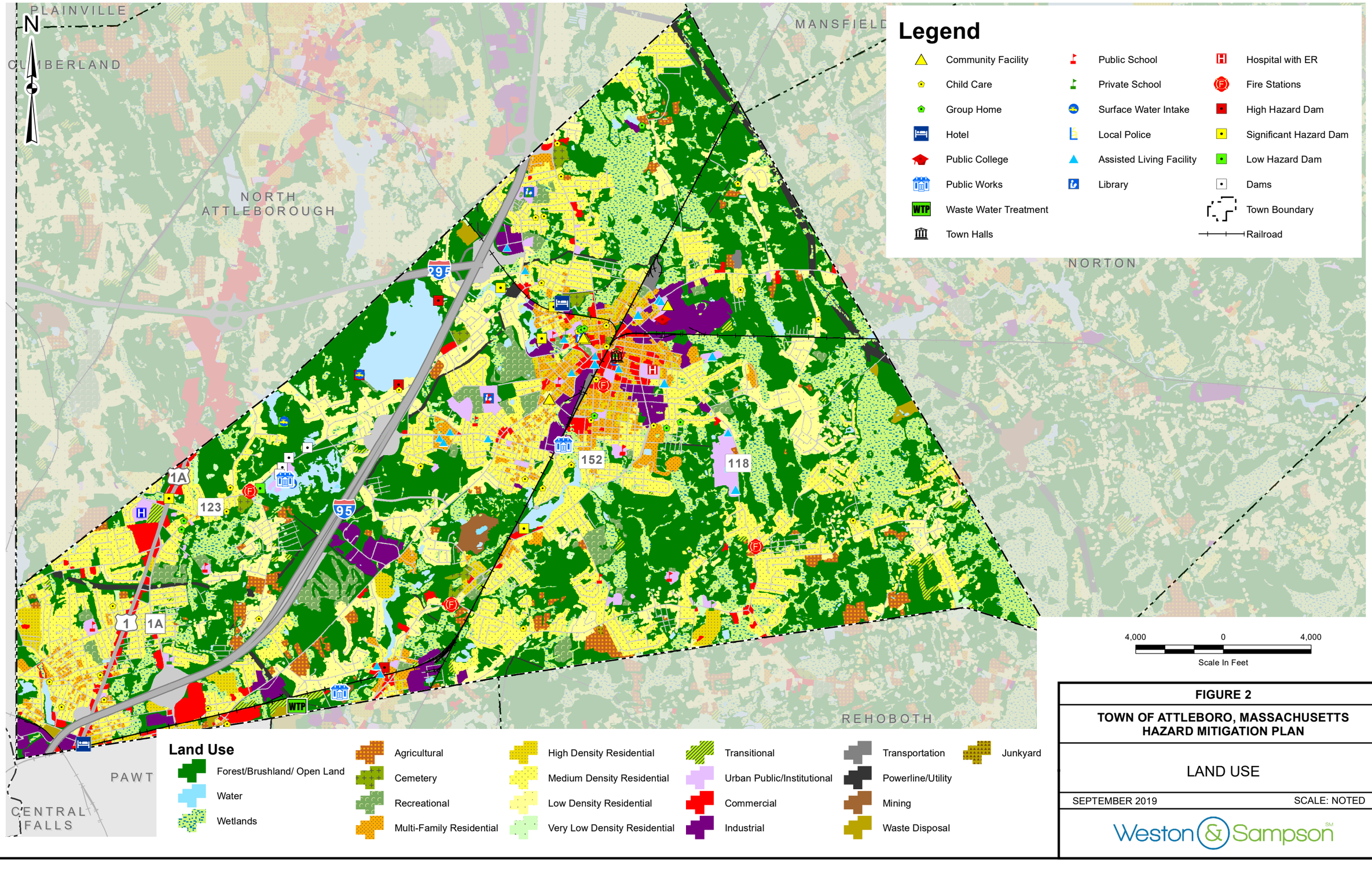


FIGURE 2

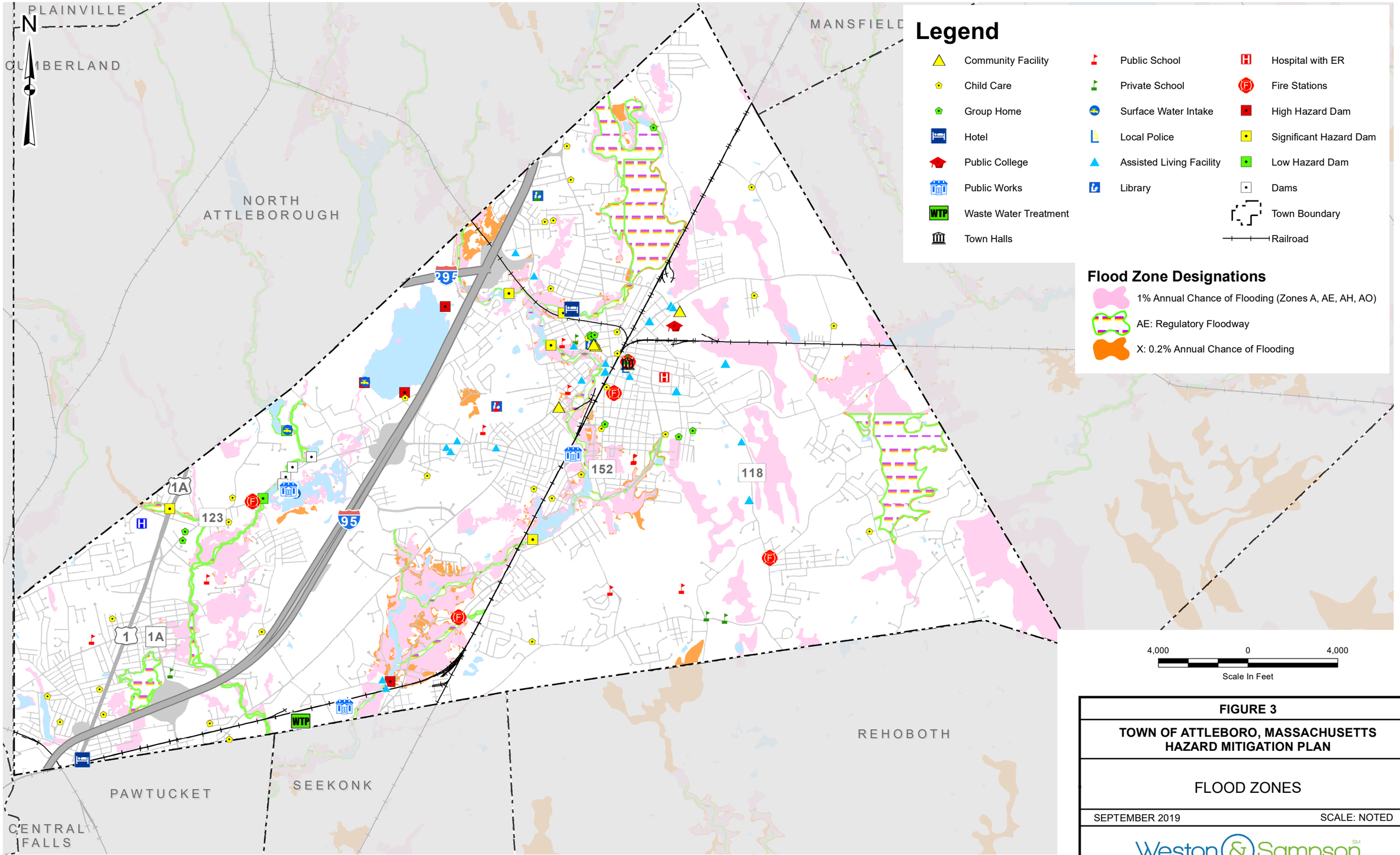
TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

LAND USE

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

Path: \\wse03.local\WSE\Depts\GIS\data\Client\Attleboro MA\Project\2190862.A - HMP Vulnerability Analysis\Attleboro_LandUse.mxd **User:** LaVeskC **Saved:** 9/19/2019 4:58:19 PM **Opened:** 9/19/2019 4:59:59 PM



Legend

- Community Facility
- Child Care
- Group Home
- Hotel
- Public College
- Public Works
- Waste Water Treatment
- Town Halls
- Public School
- Private School
- Surface Water Intake
- Local Police
- Assisted Living Facility
- Library
- Hospital with ER
- Fire Stations
- High Hazard Dam
- Significant Hazard Dam
- Low Hazard Dam
- Dams
- Town Boundary
- Railroad

Flood Zone Designations

- 1% Annual Chance of Flooding (Zones A, AE, AH, AO)
- AE: Regulatory Floodway
- X: 0.2% Annual Chance of Flooding

FIGURE 3

TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

FLOOD ZONES

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

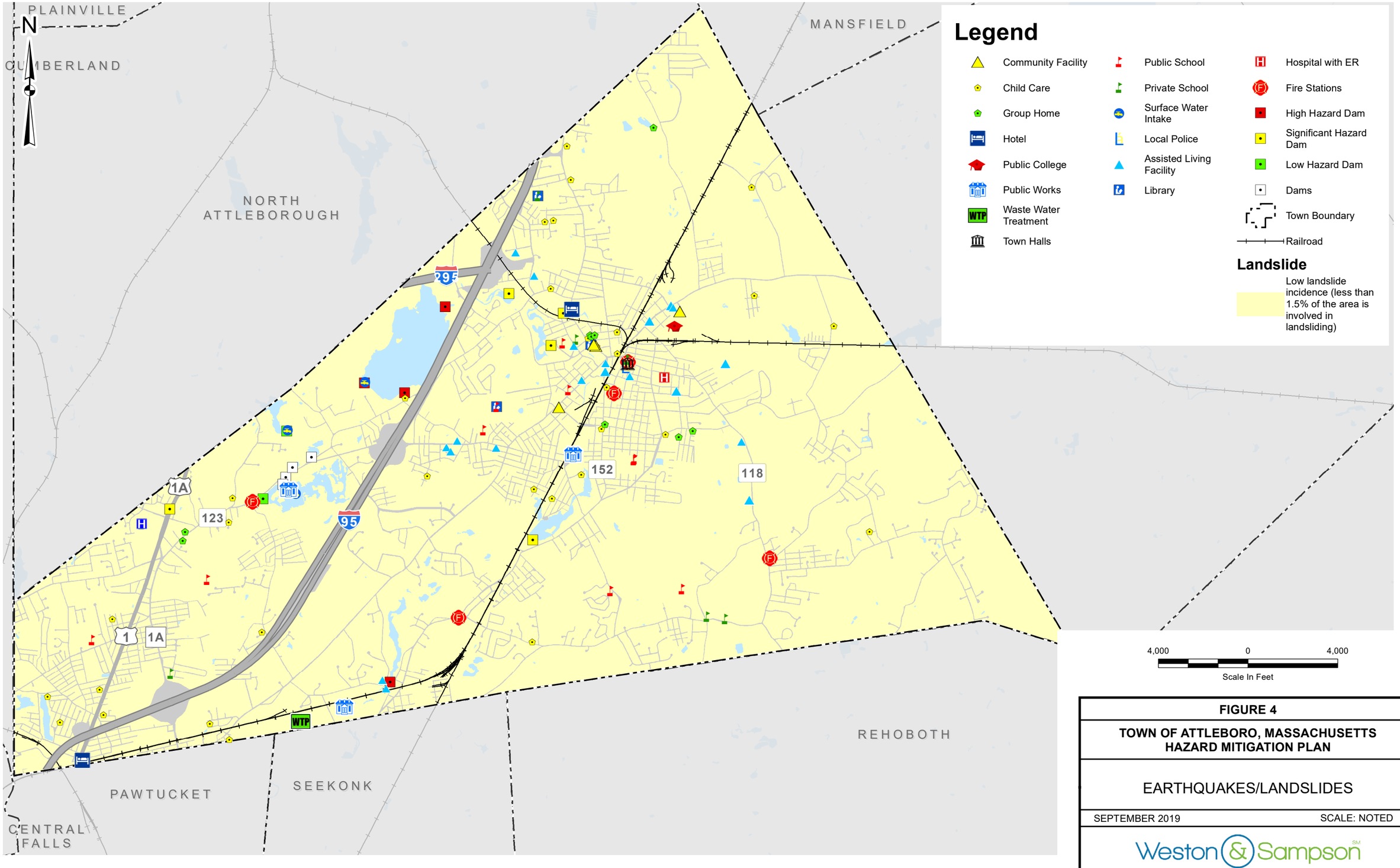


FIGURE 4

TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

EARTHQUAKES/LANDSLIDES

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

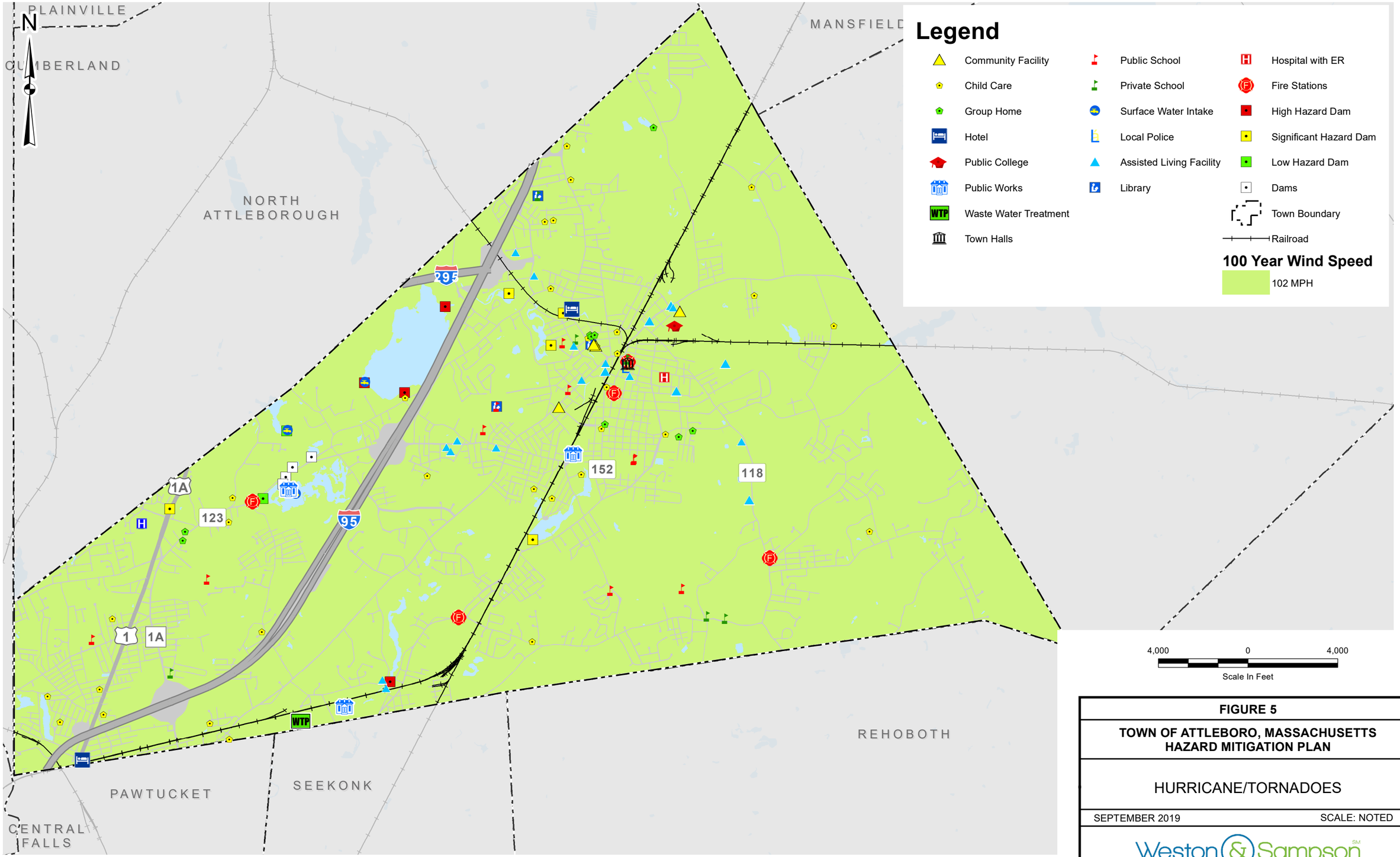


FIGURE 5

TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

HURRICANE/TORNADOES

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

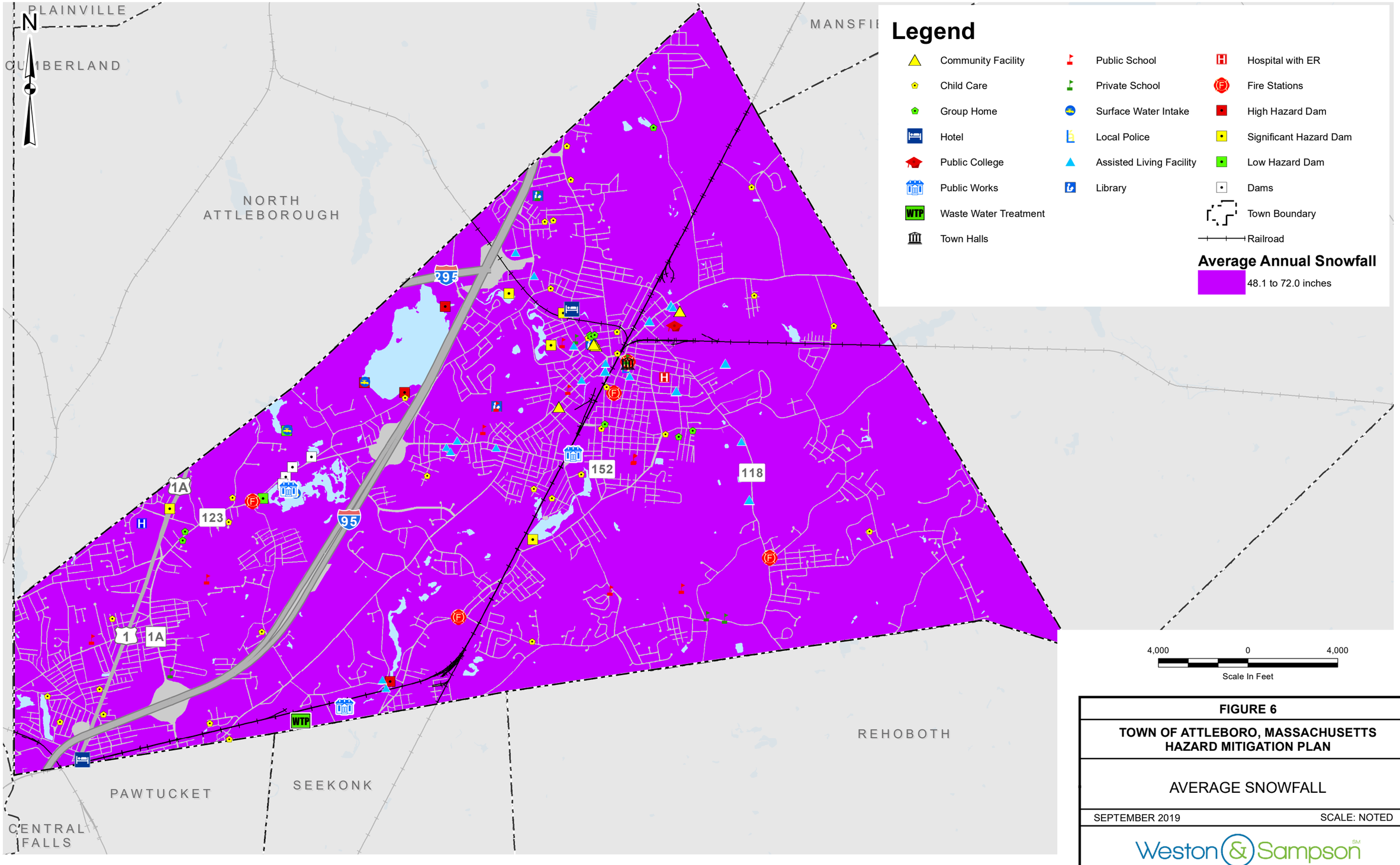


FIGURE 6

TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

AVERAGE SNOWFALL

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

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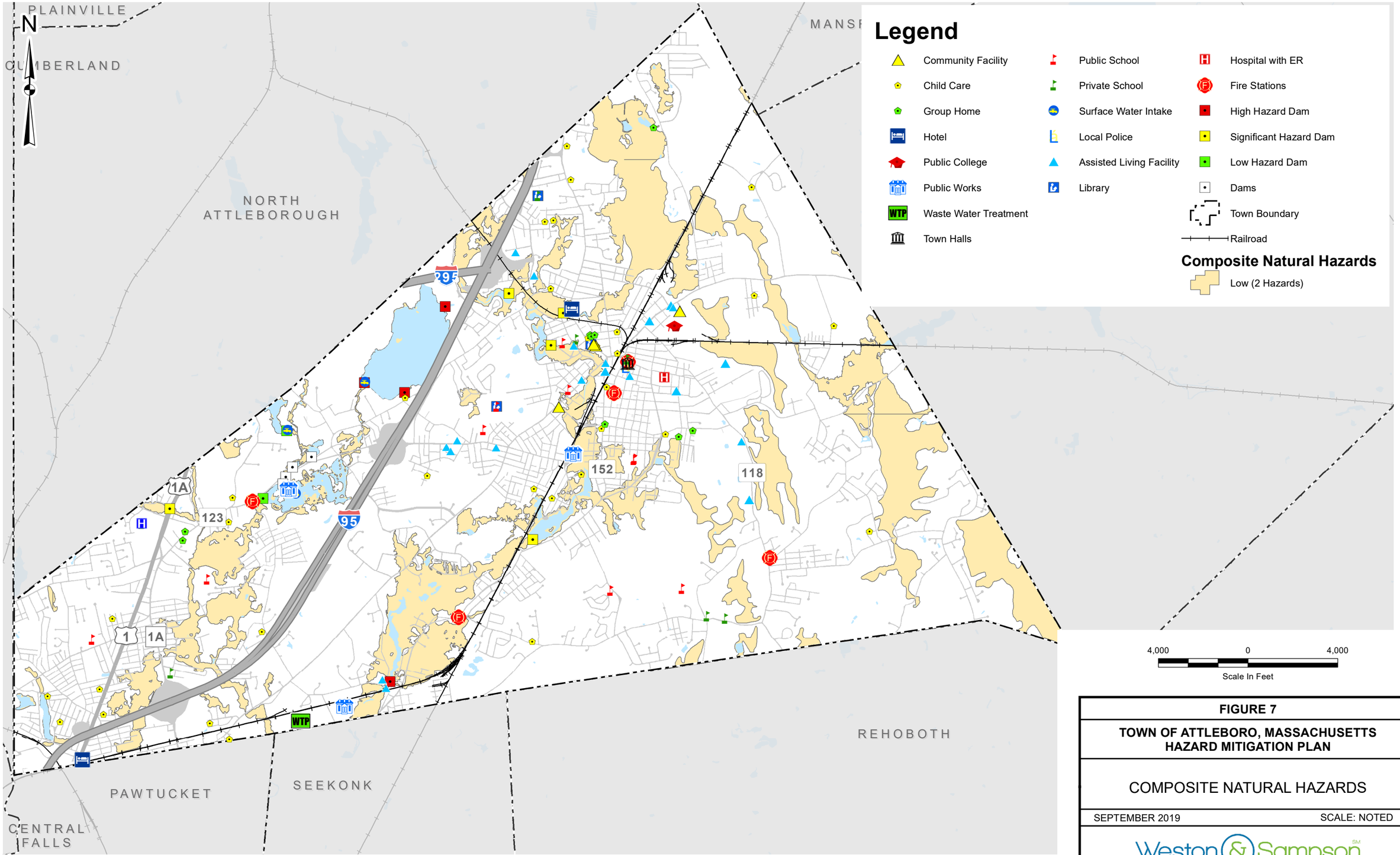


FIGURE 7

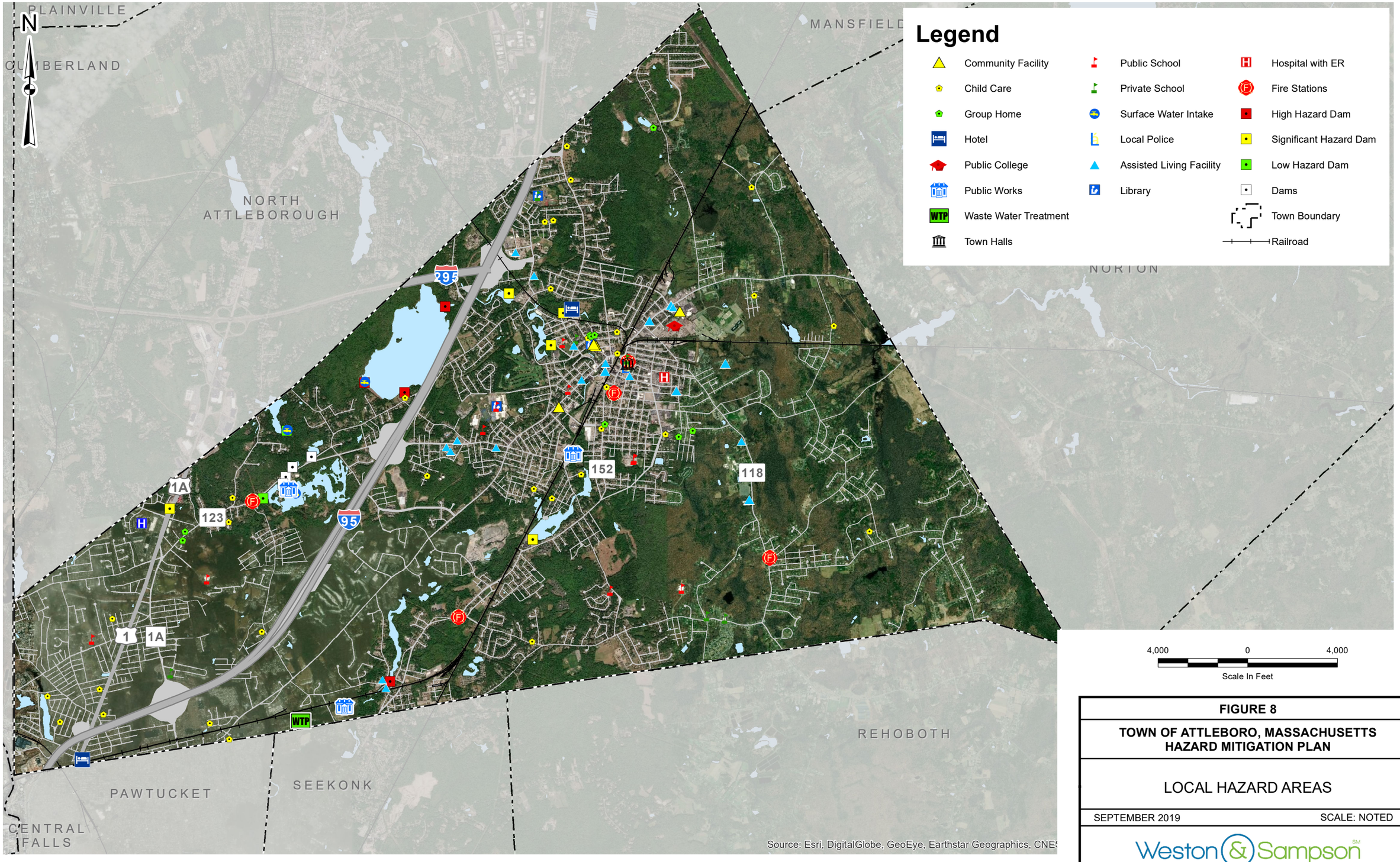
TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

COMPOSITE NATURAL HAZARDS

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson

Path: \\wse03.local\WSE\Depts\GIS\data\Client\Attleboro MA\Project\2190862.A - HMP, Vulnerability Analysis\Attleboro_Composite.mxd **User:** LaVackC **Saved:** 9/20/2019 9:37:54 AM **Opened:** 9/20/2019 9:38:55 AM



Legend

- Community Facility
- Child Care
- Group Home
- Hotel
- Public College
- Public Works
- Waste Water Treatment
- Town Halls
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- Private School
- Surface Water Intake
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- Assisted Living Facility
- Library
- Hospital with ER
- Fire Stations
- High Hazard Dam
- Significant Hazard Dam
- Low Hazard Dam
- Dams
- Town Boundary
- Railroad

4,000 0 4,000

Scale In Feet

FIGURE 8

TOWN OF ATTLEBORO, MASSACHUSETTS
HAZARD MITIGATION PLAN

LOCAL HAZARD AREAS

SEPTEMBER 2019 SCALE: NOTED

Weston & Sampson SM

Path: \\wse03.local\WSE\Depts\GIS\data\Client\Attleboro MA\Project\2190862.A - HMP, Vulnerability Analysis\Attleboro_LocalHazAreas.mxd **User:** LaVackC **Saved:** 9/19/2019 4:41:46 PM **Opened:** 9/19/2019 4:44:26 PM

N

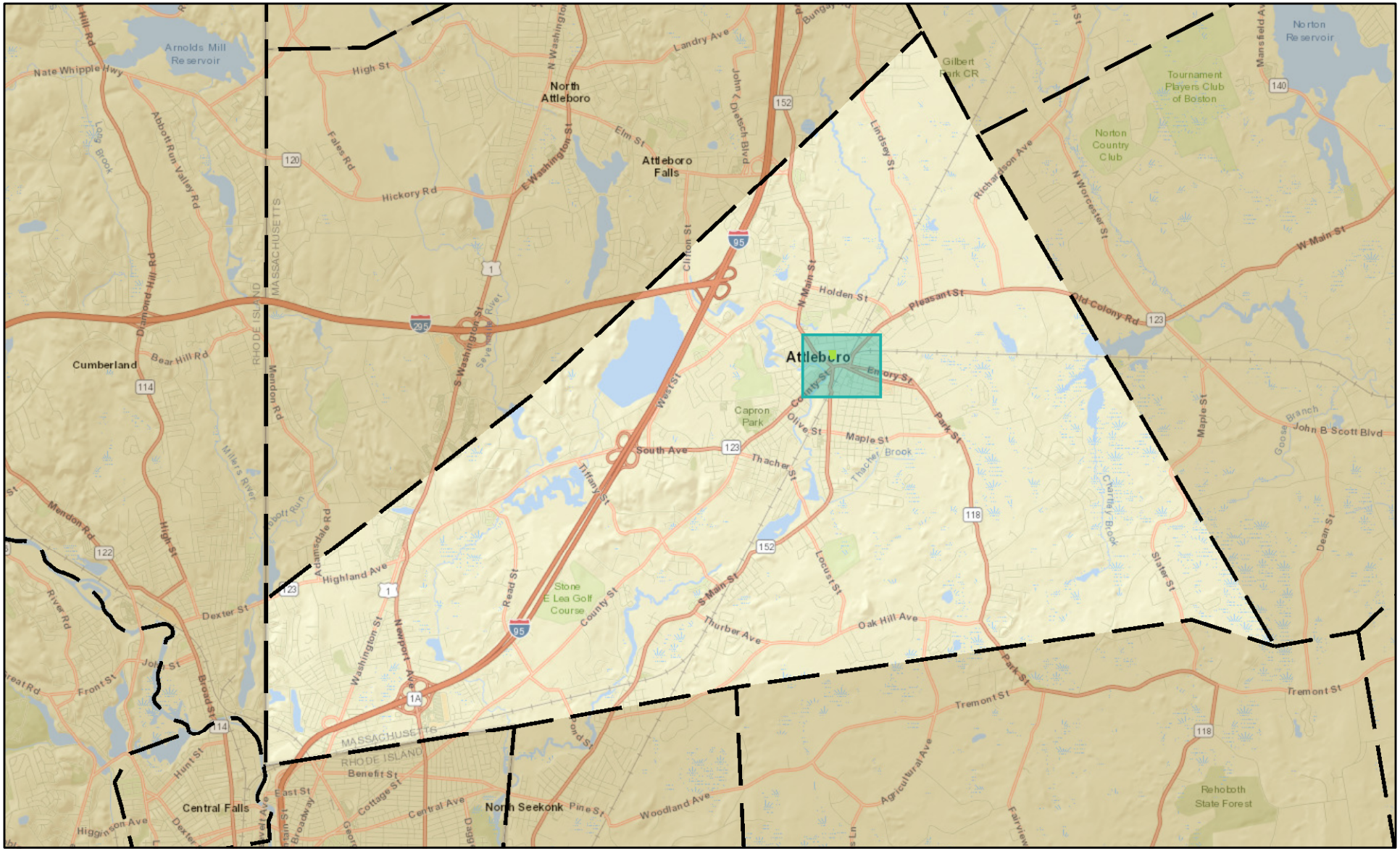
Attleboro, MA

1 inch = 6500 Feet

0 6500 13000 19500

CAI Technologies
Precision Mapping. Geospatial Solutions.

Figure 9
December 7, 2020



Data shown on this map is provided for planning and informational purposes only. The municipality and CAI Technologies are not responsible for any use for other purposes or misuse or misrepresentation of this map.

N

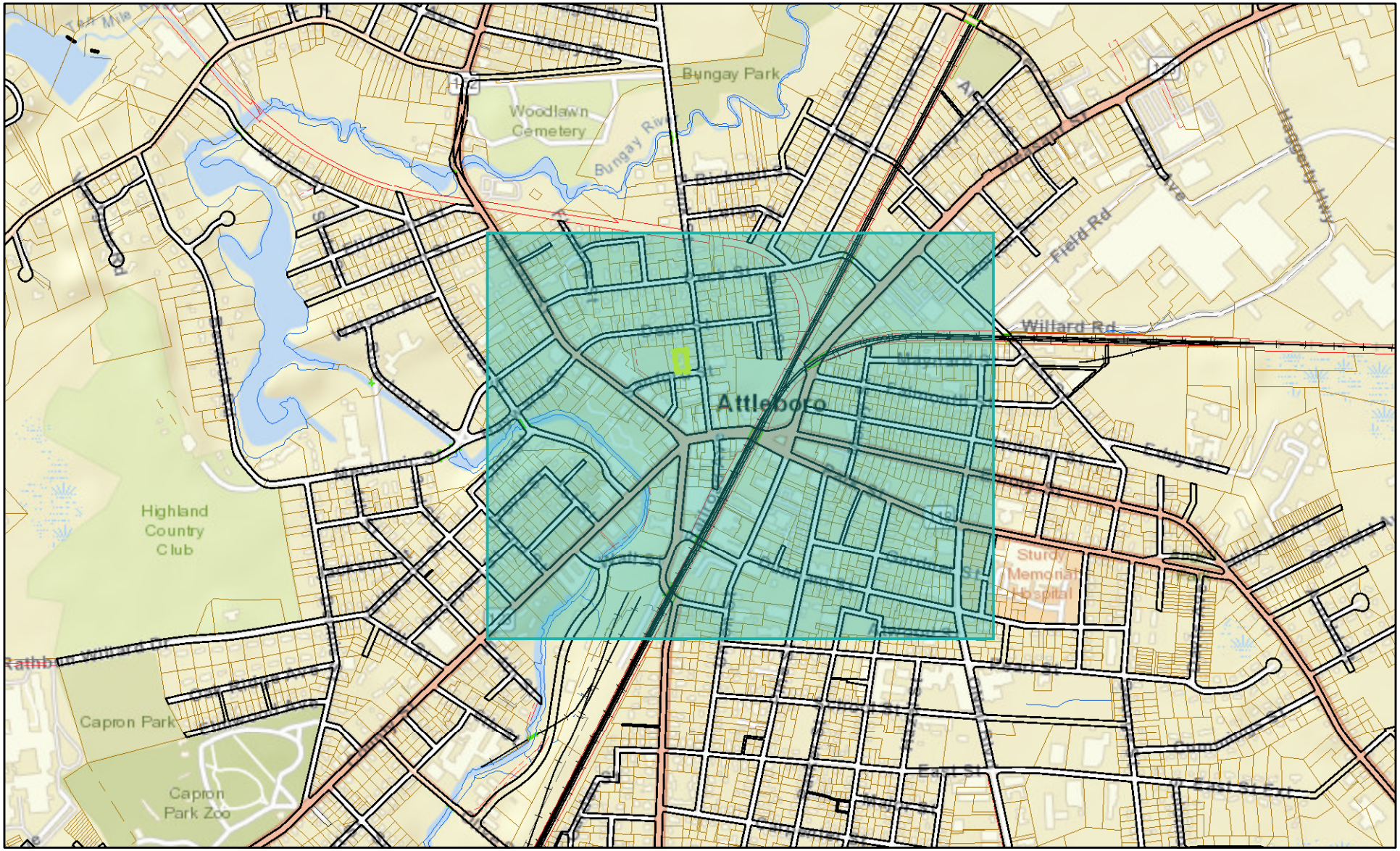
Attleboro, MA

1 inch = 1000 Feet

0 1000 2000 3000

CAI Technologies
Precision Mapping. Geospatial Solutions.

Figure 10
December 7, 2020



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APPENDIX C

Public Meetings

CLASSIFIED

appointed at State expense.

WITNESS, Hon. Katherine A Field, First Justice of this Court.
Date: October 14, 2020
Register of Probate Thomas C Hoye, Jr.
10/29/2020

LEGALS

Meeting-Plan

PreDisaster Hazard Mitigation Plan Update/ Municipal Vulnerability Preparedness Plan Public Meeting

The City of Attleboro will be hosting a Public Meeting on Wednesday, November 4, 2020 from 6:30 p.m. to 8:00 p.m. relative to the draft *PreDisaster Hazard Mitigation Plan Update/ Municipal Vulnerability Preparedness Plan*. The purpose of this plan is to identify the City's vulnerabilities to natural disasters and actions that the City may take to mitigate negative impacts from natural disasters. In addition, this plan incorporates the impact of climate change and resiliency actions the City may take to mitigate the effects of climate change. The City's Department of Planning and Development and the City's environmental engineering consultant, Weston & Sampson, will present the draft plan and then open the session for a public comment period and a question and answer period. The draft report may be found on the City's website at https://www.cityofattleboro.us/202/Planning-Development. The link to the November 4 Zoom meeting is at https://us02web.zoom.us/j/85057655559.
10/29,10/31/2020

afford a lawyer, one may be appointed at State expense.

WITNESS, Hon. Katherine A Field, First Justice of this Court.
Date: October 14, 2020
Thomas C Hoye, Jr., Register of Probate
10/29/2020

LEGALS

Working Man Distillers

TOWN OF NORTH ATTLEBOROUGH
NORTH ATTLEBOROUGH LICENSING BOARD
43 South Washington Street
North Attleborough MA 02760
508-699-0100
508-643-1268 (fax)

PUBLIC HEARING

Notice is hereby given under Chapter 138 Section 12 of the Massachusetts General Laws, that a Public Hearing will be held by the Licensing Authority, The North Attleborough Licensing Board, on **Monday, November 16, 2020 at 6:01 p.m.** in the Town Hall Lower Level Conference Room located at 43 South Washington Street, North Attleborough, MA **OR** Pursuant to Governor Bakers Orders signed on March 12, 2020, this Public Hearing will be held virtually by calling 1-866-899-4679, Access Code 766-215-005 on the permit application from Working Man Distillers, LLC for an On-Premise Farmer Series Pouring Permit located at 42 Commonwealth Avenue, Unit 4, North Attleborough, MA. The Manager of Record is Kelly Lendall.

Kevin Poirier, Chairman
Deputy Michael Chabot
Captain Joseph DiRenzo
AnneMarie Fleming
Gail Heidke

10/29/2020

GENERAL HELP WANTED

u

		7
1	5	6
		4
	6	8
5		
	7	5
8		

Level: Advanced

Fun By The Numbers

Like puzzles? Then you'll love sudoku. This mind-bending puzzle will have you hooked from the moment you square off, so sharpen your pencil and put your sudoku savvy to the test!

s a 9x9 grid, broken down into nine
ne numbers 1 through 9 must fill each
per can appear only once in each row,
out the order in which the numbers will
es already provided in the boxes. The
sier it gets to solve the puzzle!

ANSWER:

7	5	6	2	4
8	3	7	6	5
9	2	8	1	3
4	8	9	6	7
1	9	4	5	2
5	6	1	3	8
6	4	5	7	1
2	7	3	4	9
3	1	2	8	6

LEGALS

Meeting-Plan

PreDisaster Hazard Mitigation Plan Update/ Municipal Vulnerability Preparedness Plan Public Meeting

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10/29,10/31/2020

LEGALS

Bids

FRCS
Invitation for Bids
For the following FY2021 project
FY21 Executive Director/Superintendent Search Firm

FRCS is seeking sealed bids for the project work generally described above and particular set forth in the invitation to bid package which may be obtained at the District Office from our building located at 131 Central Street, Foxborough, MA or requested via email at kcalvert@foxboroughrcs.org. Per the bid packet, all bids shall be filed no later than 3:00 pm on November 9, 2020 at the District Office, 131 Central Street, Foxborough, MA 02035 at which time these bids will be publicly opened and read. The award of any contract shall be subject to the approval of the Board of Trustees.
10/31/2020

AUTO WANTED

$$$ MORE CASH PAID $$$ Junk cars & fixers. Trucks, Vans, Jeeps . Call Joe 24/7 at 781-361-1472

WANTED Junk or Unwanted Cars or Trucks. Will pick up & pay $$$ FOGERTY'S TOWING & AUTO SALVAGE. NORTON. Call 508-285-7440.

AUTOS FOR SALE

2006 Chrysler 300, 1 owner, 161k miles, mint condition, 4,000 or BO call 781-361-1472

2007 CHRYSLER 300 touring,one owner,all paper work,garaged,newsticker,148k miles, $3500. 508-941-3926

2015 FORD FUSION, White w/Back,immaculate, $13,500 interior, 38k mile,. 508-695-3003

BUSINESS SERVICES

Four Seasons Carpentry
New Construction, Additions, Home Improvement. Lic./Ins. 508-455-1455

Hello Readers....
We Are **OPEN** for **BUSINESS**, So Give Us A Ring!

Big Blue Removal
Trash & Junk Removal
Attic-Cellar-Garage
We Take Everything
•Furn. Appl Yard Waste
•Construction Debris Brush
DEMOLITION Sheds
•Decks Pools Fences•
•Best Prices Free Est.•
Call Tony **508-226-1295**

JR's Home Imp.
Roofing & Siding Specialist . Carpentry-Windows-Painting Lic. & Ins. ~ 508-982-4243

MJC PLASTERING, INC.
Plaster & blue board installation. Rehab & new const. Ins. Mike **508-838-6272**

Norton Asphalt Paving
Complete Driveway Services
Installations • Resurface
Repair • Sealcoating
Gravel • Stonedust
Serving locally over 50 yrs.

GENERAL HELP WANTED

VISITING ANGELS

HIRING IMMEDIATELY for WEEKEND SHIFTS!
Also needed Early Morning Starts. You must be kind, dependable & have experience. Hoyer lift exp. a plus.
~ Car required. ~
Call 508-699-3969

FUEL/FIREWOOD/ WOOD STOVES

ALL SEASONED HARDWOOD 128 cu ft/cord. Cut/split 508-761-5221. $300.Lesser amts avail.

T&M FUEL
NO ONE WILL BEAT OUR PRICE!
~ 508-761-7651 ~

GARAGE/ YARD SALES/ FLEA MARKETS

ATTLEBORO – Sat. Oct. 31, 8-1p.m. Kratz Ave. off 152 Kitch. Items, home décor, designer clothes, skis, candles, books, Thule bike rack, Longaberger Baskets, crafts, jewelry, great assort.

Estate Sale- All of October By Appointment call 781-307-5177. Tools, Furn, Hsewares, clothes, & more! New, Old, and Gently Used.

APARTMENTS, UNFURNISHED

ATTLEBORO – Brook Haven Estates – Pool, fitness room, walking trails, close to ,T, 2 BR. Rents $1200+up. Call for availability •••• **866-267-9747**

ATTLEBORO
Near center, w/w, kitchen privileges. $100 & up per wk.
508-822-8982

MANSFIELD, 2brdrm,clean & sunny, w/w, walk to train, no smoking/pets, $1200 plus utilities. 508-339-7768

APARTMENTS, FURNISHED

N.ATTLEBORO, 1 Bdrm, heat/h.w. Incl., no pets, lrge closets,stv, ref, $230 per wk. 508-254-6375, 508-989-8841

FOXBORO
Location, Size & Value
1-2 Br., 1-1½ Bath
Apartments - Duplex
Twnhses. Nr. Rts. 95, 495, 1, 1A, 27 & 140

CITY OF ATTLEBORO

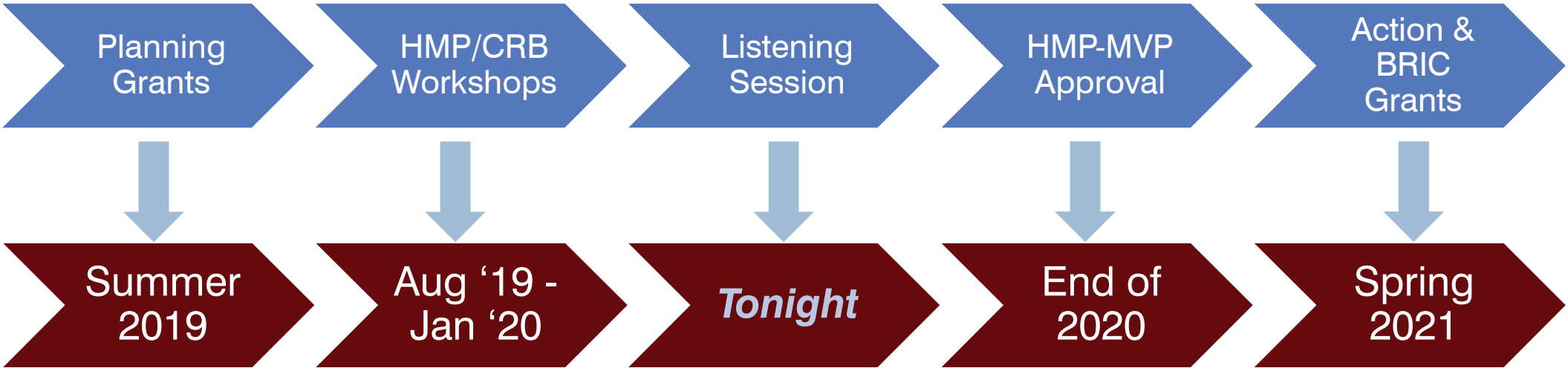
Listening Session

Hazard Mitigation Plan & Municipal Vulnerability Preparedness

November 4, 2020

PROJECT CORE TEAM

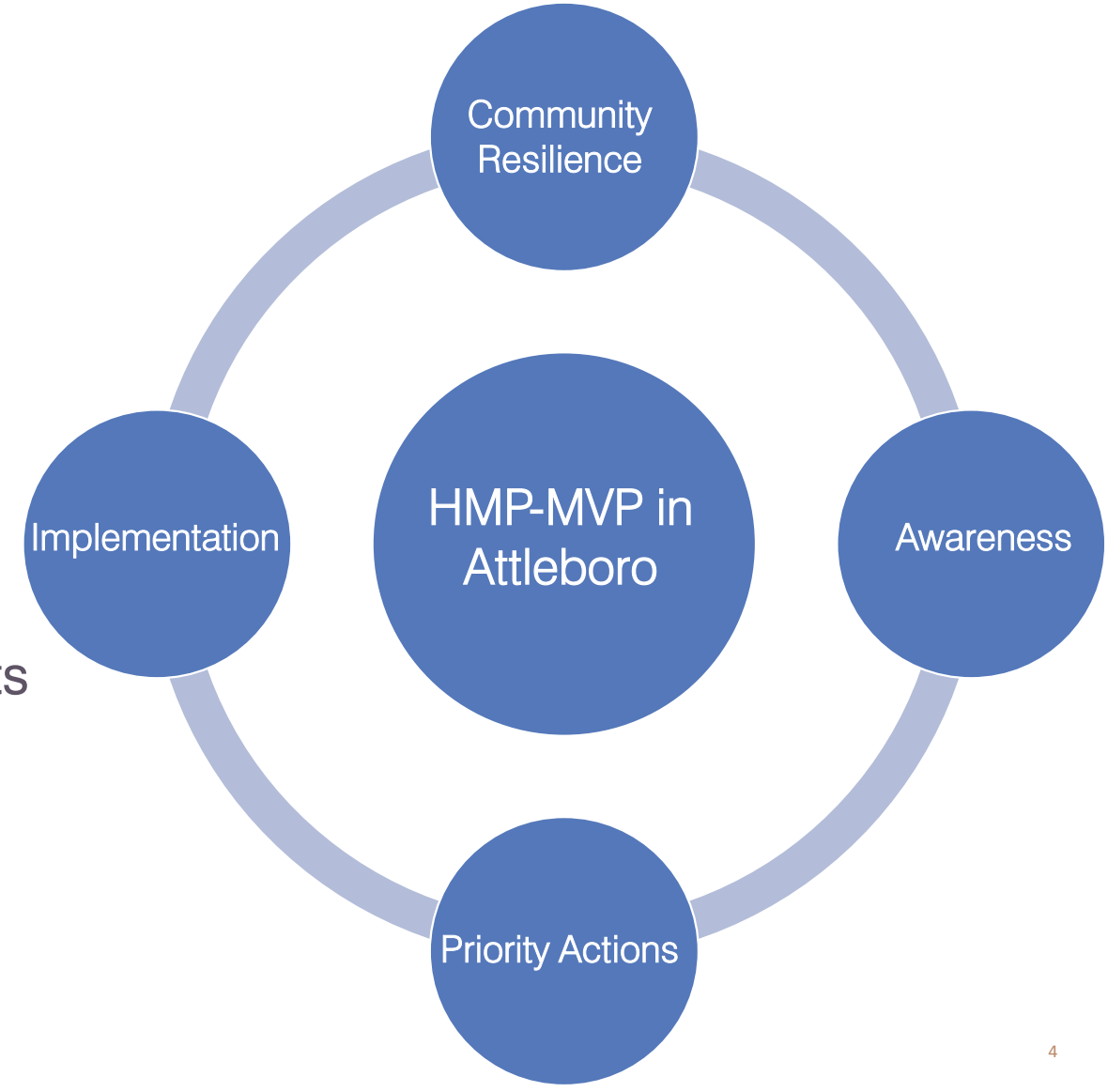
Bobbie Araujo
Gary Ayrassian
Roy Belcher
Steve Braiser
Wayne Cobleigh
Derek Corsi
Ben Cote
Mark Cuddy
Paul Danesi
Stephanie Davies
David Denneno
Keith Gonsalves
Tom Hayes
Kyle Heagney, Police Chief
Kathleen Ilkowitz
William Johnson
Scott LaChance, Fire Chief
Jim MacDonald
Bill McDonough
Madeline McNeilly
Greg O'Brien
John Staskiewicz
Mike Tyler
Nick Wyllie
Kourtney Wunchel
Bertha Young



- November 17: Solicit comments and consent from Municipal Council
- Incorporate comments for submission to MEMA and EEA
- Receive comments from MEMA and EEA and amend plan
- December 1: Submit final plan to Municipal Council for approval
- December 1 or 15: Municipal Council approval
- December 30: Submission deadline final plan to MEMA and EEA for approval

HMP-MVP IN ATTLEBORO

- Prepare for natural disasters
- Ease disaster recovery
- Improve community resilience
- Access to FEMA and EEA grants
- Flood insurance cost reduction (15%)



HAZARDS & CLIMATE CHANGE

IN ATTLEBORO AND NEW ENGLAND

Weston & Sampson

HAZARDS IN ATTLEBORO

FLOOD HAZARDS

WIND HAZARDS

WINTER STORMS

EARTHQUAKES

FIRE

EXTREME TEMPERATURES

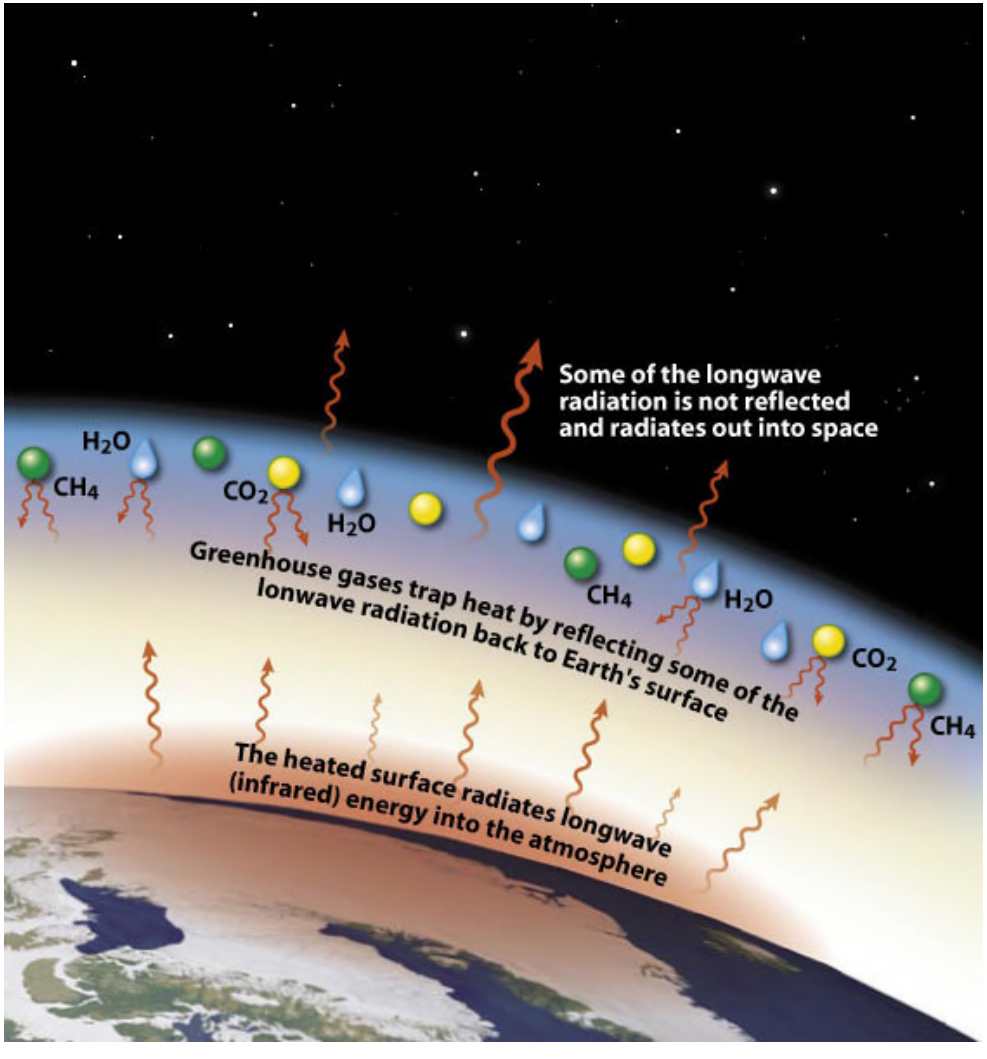
DROUGHT

CLIMATE CHANGE

GREENHOUSE GASES (GHG)

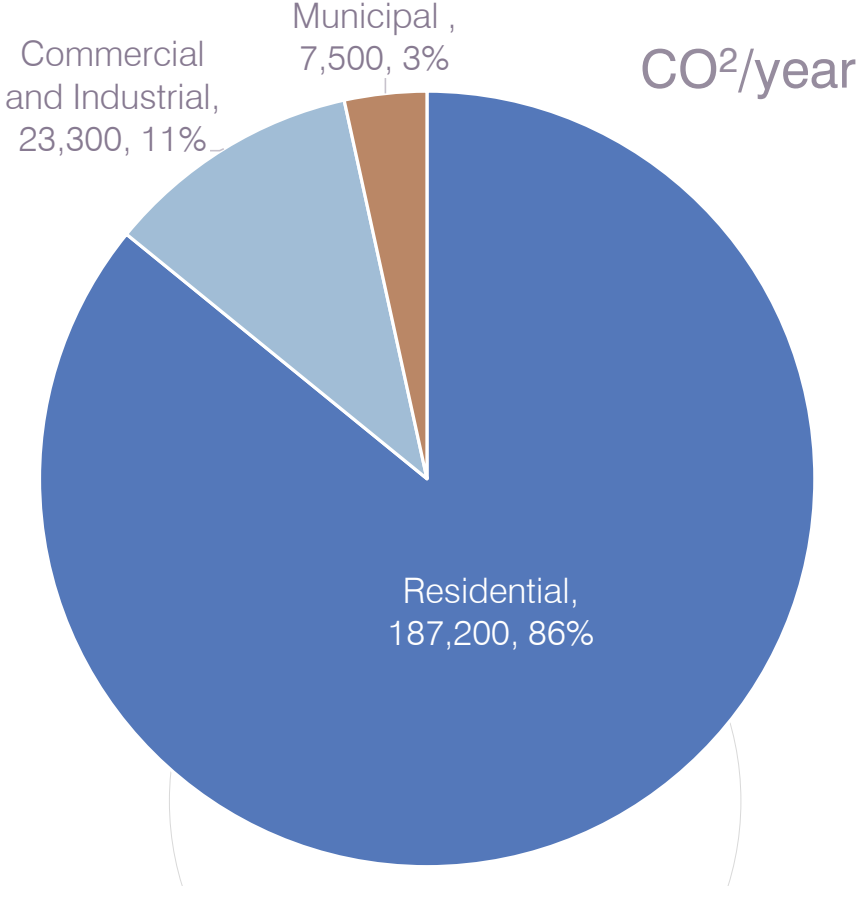
- Naturally occurring
- Act as a blanket
- Examples: carbon dioxide and methane

Climate mitigation ensures there is less to adapt to and is a key component of our community's resilience



Smithsonian Environmental Research Center. "Too Much of a Good Thing." http://forces.si.edu/atmosphere/02_04_07.html

2006 GHG EMISSIONS



Hazards in Attleboro

Hazard	Frequency (in Attleboro)	Severity (in Attleboro)
Flooding	High	Minor to Serious
Dam Failures	Very Low	Minor to Catastrophic
Snowstorms	High	Minor
Ice Storms	High	Moderate
Hurricanes	Medium	Moderate
Nor'easters	High	Moderate
Thunderstorms	High	Minor
Brush and Urban Fires	Medium	Minor
Earthquakes	Very Low	Minor to Catastrophic
Landslides	Low	Minor to Extensive
Extreme Temperatures	Low	Minor to Serious
Drought	High	Minor to Serious

EXTREME TEMPERATURES

WARMER ANNUAL AIR TEMPERATURES

UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS

UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE

EXTREME TEMPERATURES IN MASSACHUSETTS

DAYS WITH TEMPERATURES ABOVE 90°F

2005 OBSERVED ANNUAL AVERAGE	MID-CENTURY PROJECTED ANNUAL AVERAGE	END-OF-CENTURY PROJECTED ANNUAL AVERAGE
6	24	35

DAYS WITH TEMPERATURES BELOW 32°F

2005 OBSERVED ANNUAL AVERAGE	MID-CENTURY PROJECTED ANNUAL AVERAGE	END-OF-CENTURY PROJECTED ANNUAL AVERAGE
145	114	101

Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "ResilientMA Datagrapher." Massachusetts Climate Change Clearinghouse. Resilientma.org/datagrapher/?c=Temp/state/tx90/ANN/MA/
Notes: Mid-century projected annual averages use a 2040-2069 time range. End-of-century project annual averages use a 2080-2097 time range.

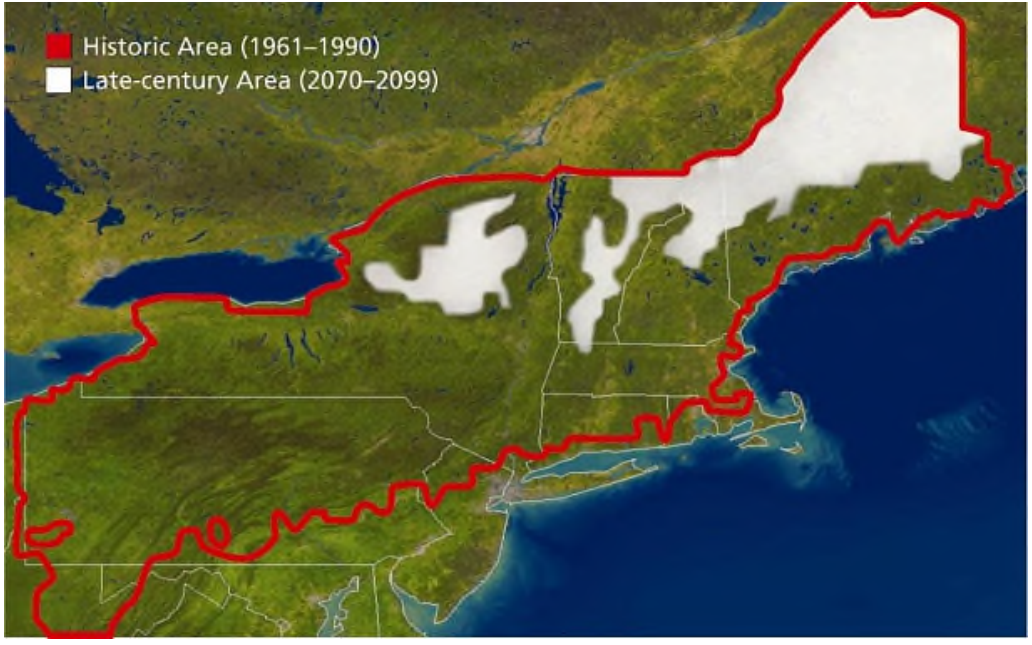


Photo: UCSUSA “Confronting Climate Change in the U.S. Northeast”.

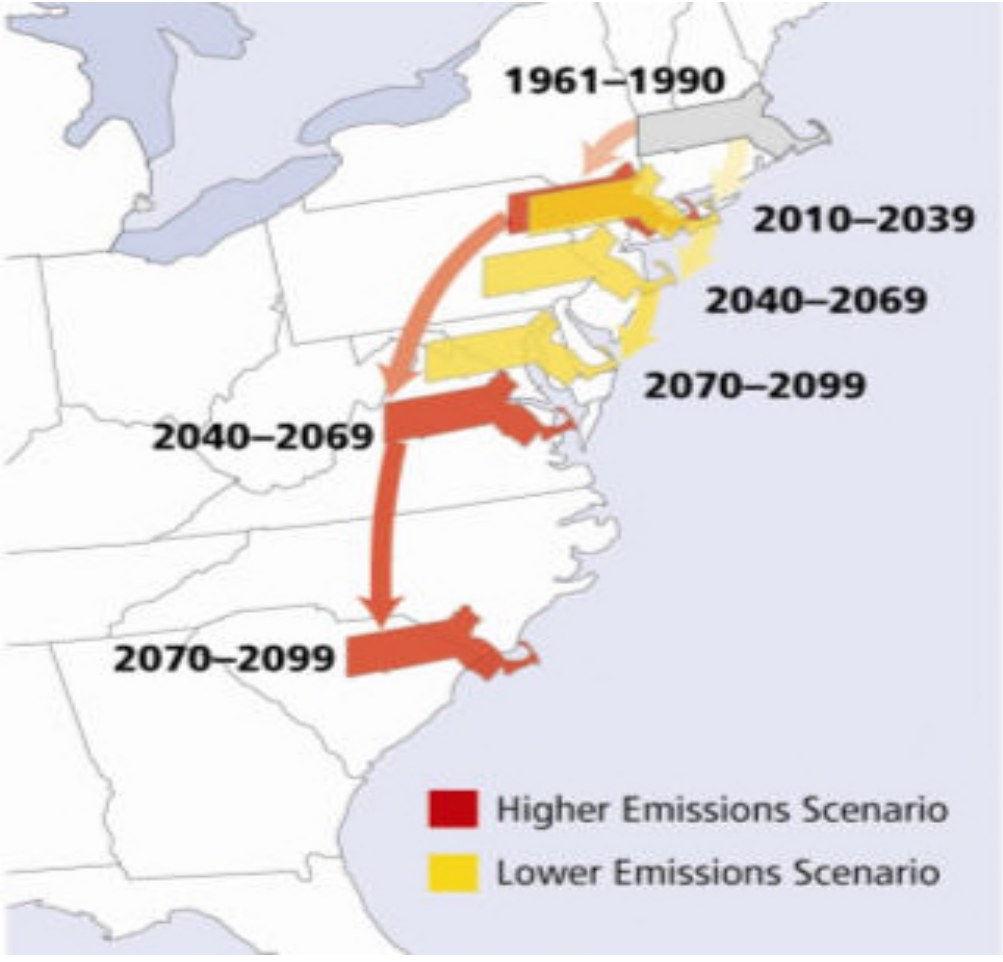
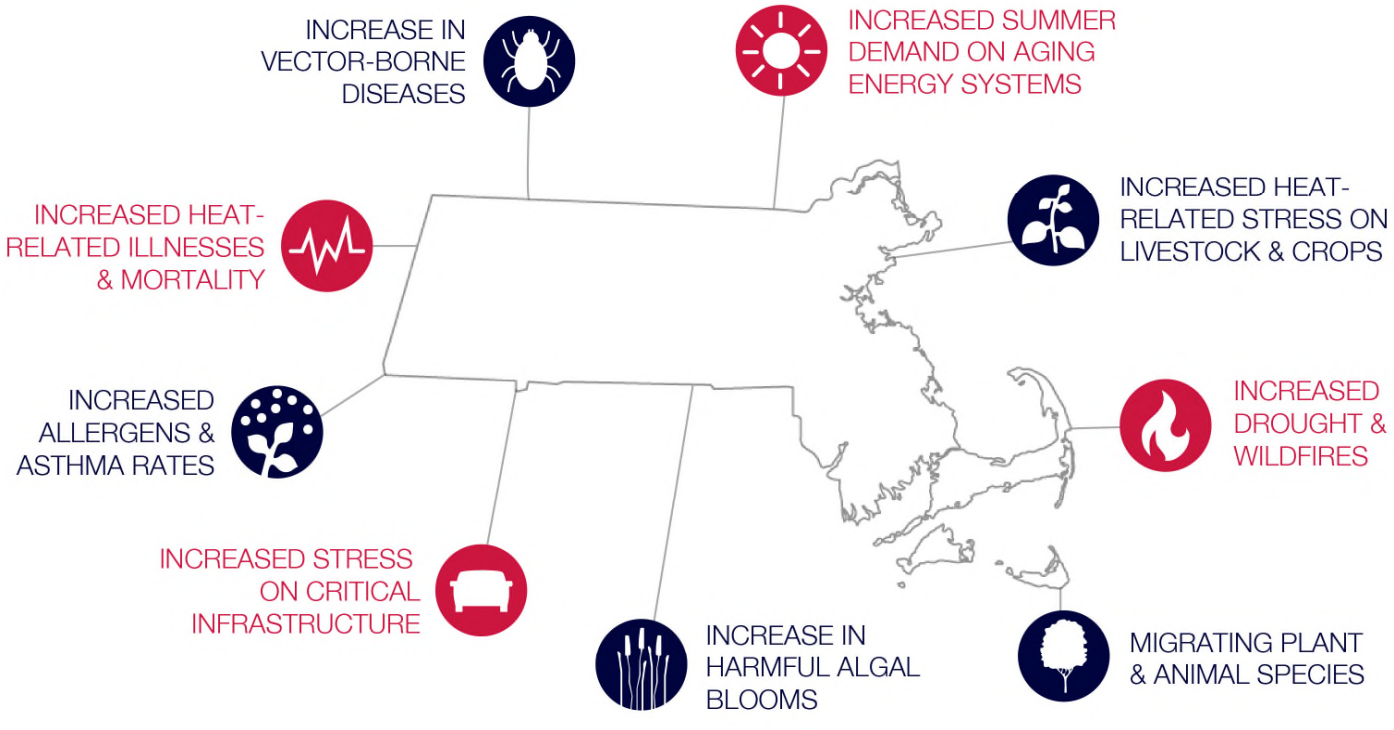


Photo: NECIA/UCS, 2007.

IMPACTS OF **RISING TEMPERATURES**

WARMER ANNUAL AIR TEMPERATURES
UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS
UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE



Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Rising Temperatures." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/rising-temperatures


BOSTON
MOSQUITO SEASON GROWING
THEN
96
DAYS
On average per year
1980-1989
NOW
119
DAYS
On average per year
since 2006
Source: Yamana and Eltahir (2013), NCBI, National Institutes of Health. Daymet Data, Oak Ridge National Laboratory
CLIMATE CENTRAL

CHANGES IN PRECIPITATION

MORE **INTENSE & FREQUENT** EXTREME RAIN EVENTS

PRECIPITATION DURING **HEAVY EVENTS** IN THE NORTHEAST

INCREASED BY MORE THAN

70%

BETWEEN 1958-2010

Massachusetts Executive Office of Energy & Environmental Affairs. 2019. “Changes in Precipitation.” Massachusetts Climate Change Clearinghouse. Resilientma.org/changes/changes-in-precipitation

EXTREME PRECIPITATION

8%

Increase in extreme precipitation events by midcentury

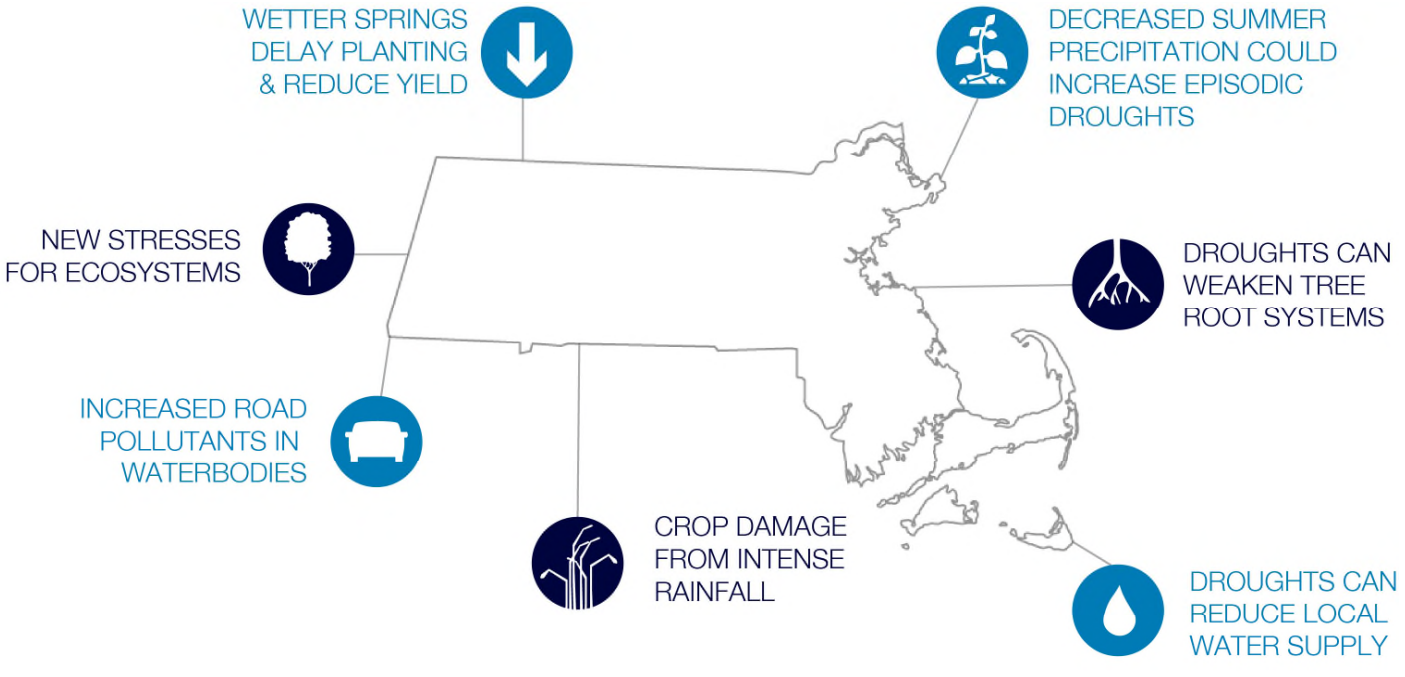
13%

Increase in extreme precipitation events by 2100

IMPACTS OF CHANGING **PRECIPITATION**

HIGHER AVERAGE ANNUAL PRECIPITATION

INCREASED BY ABOUT 10% IN THE NORTHEAST INTHE LAST 50 YEARS



Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Changes in Precipitation." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/changes-in-precipitation

FLOODING

Vulnerable Areas

- Poor drainage
- High amounts of impervious surface
- Undersized culverts

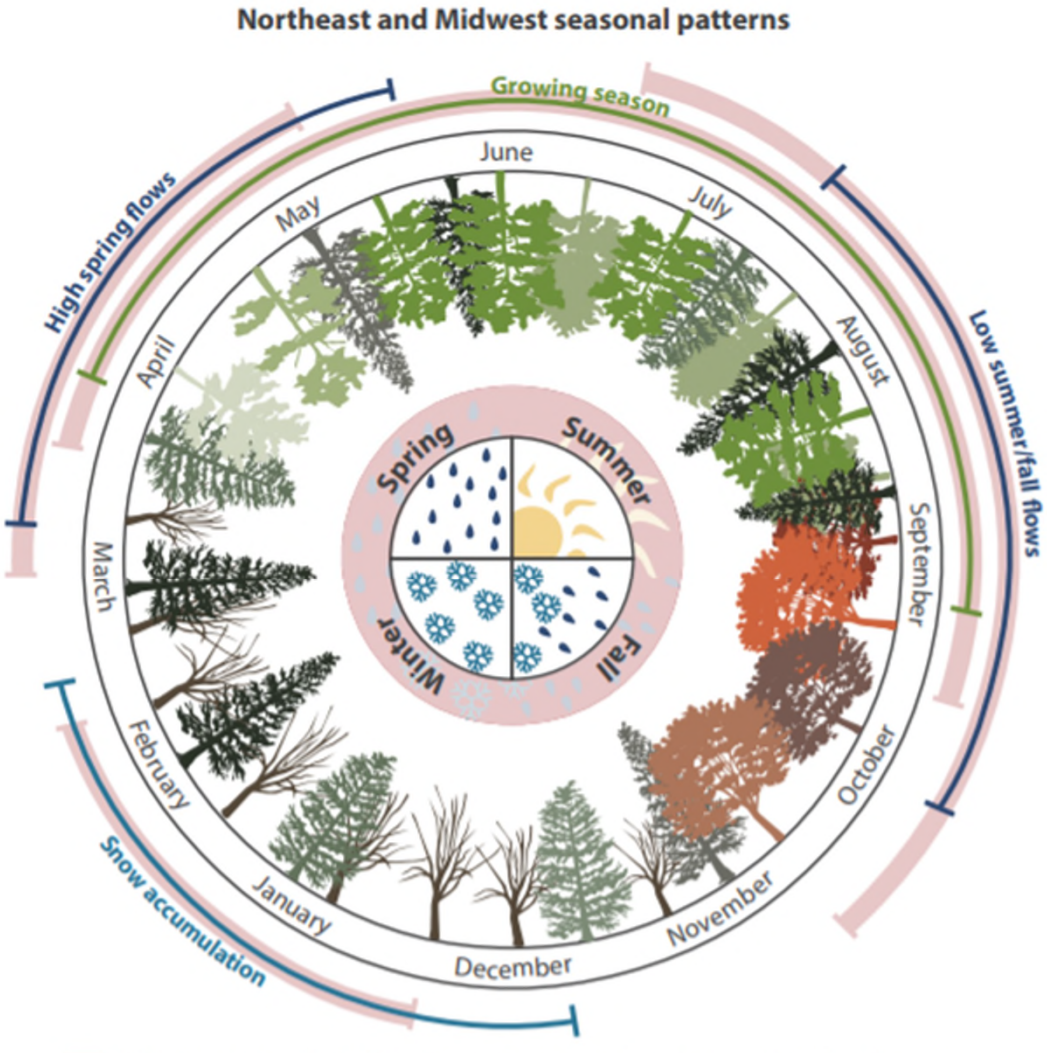
4 events reported by NOAA since 1996:

- No reported deaths or injuries
- Just less than $12M in damage
- March 2010 accounts for $11,790,000

WINTER STORMS

The blizzard of 2013 left nearly **400,000 Massachusetts residents without power**

"Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."



The most notable recent drought event was in

2016 - 17

The occurrence of droughts

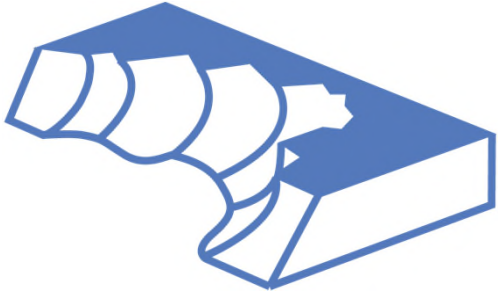
lasting 1 to 3 months

could go up by as much as

75% over existing conditions

by the end of the century, under the high emissions scenario

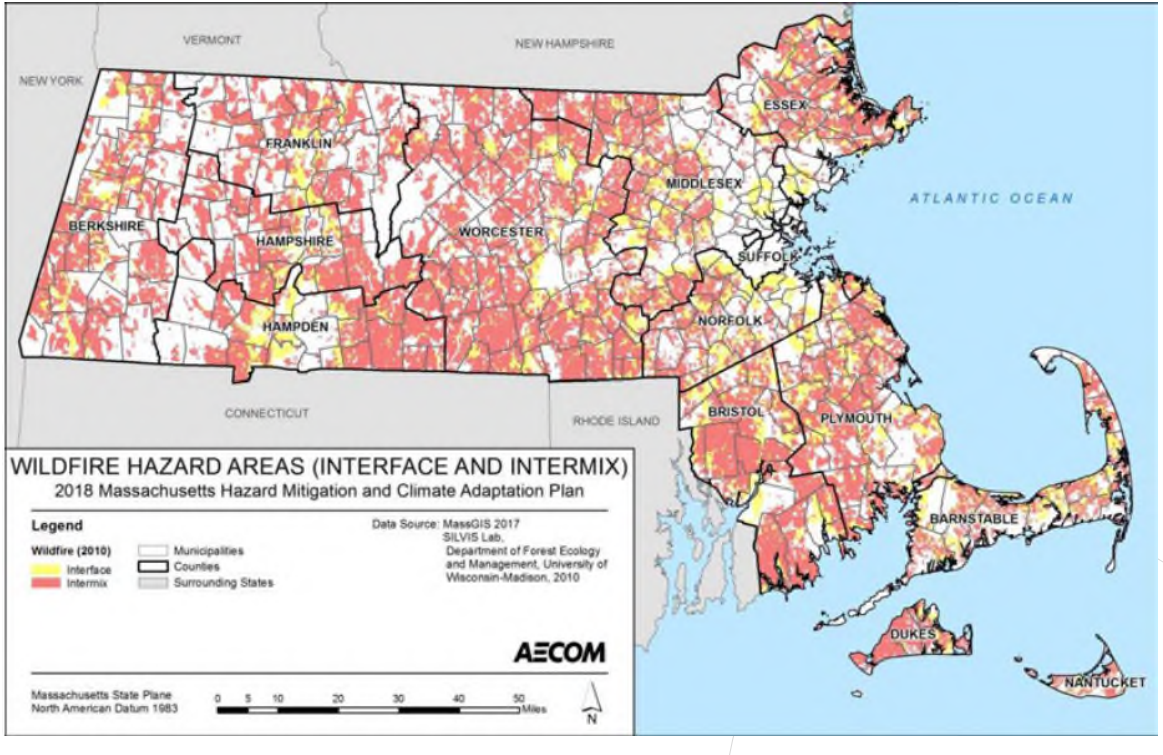
EROSION



- Caused by riverine flow & stormwater[1]
- Increased precipitation, including winter rains, could increase erosion[1]
- Drier soils will reduce resistance to erosion

1. Executive Office of Energy and Environmental Affairs, Adaptation Advisory Committee. 2011. "Massachusetts Climate Change Adaptation Report," 42.

FIRE



Massachusetts Fire Incident Reporting System reported 57 fires in 2017 in Attleboro. Eight of these were listed as “serious.”

HURRICANES AND EARTHQUAKES

HURRICANE

Sandy and nor'easters cause downed trees and power lines

Upward trend in North Atlantic hurricane activity since 1970

Nor'easters along the Atlantic coast are increasing in frequency and intensity

EARTHQUAKE

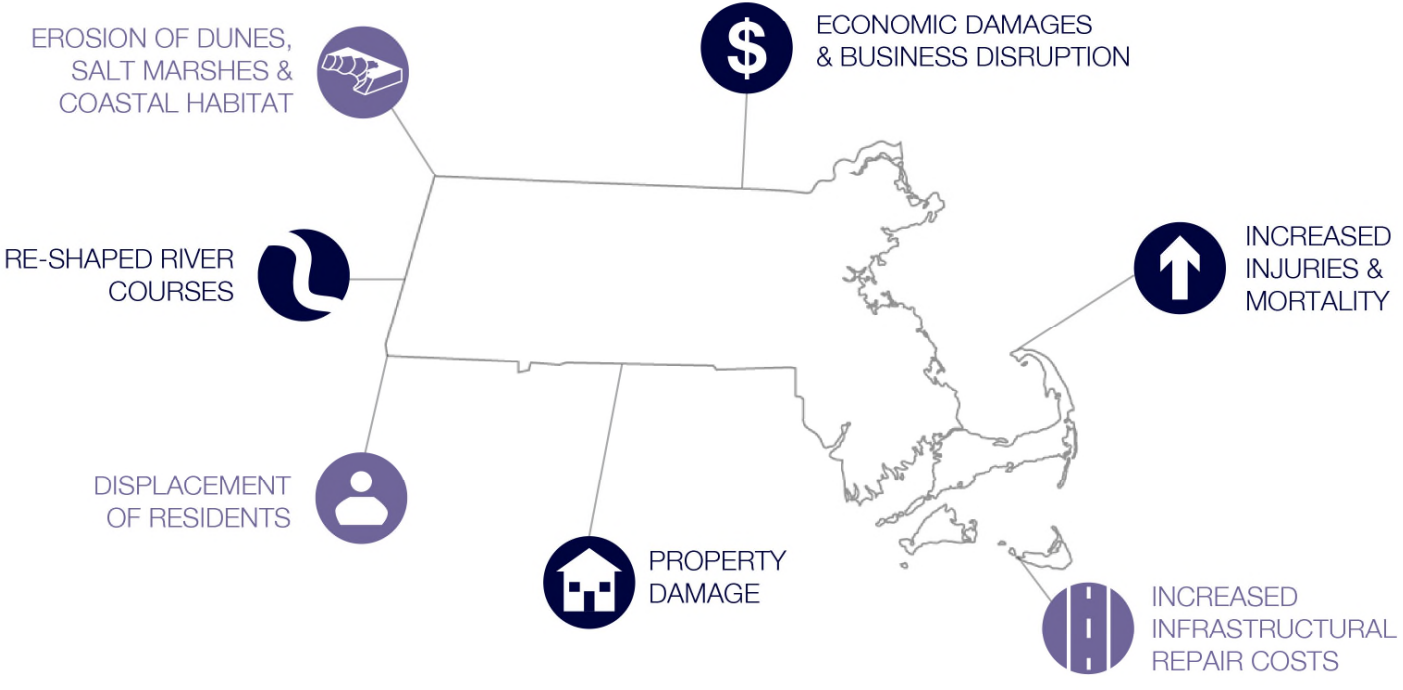
30-40

Earthquakes occur in New England each year, although most are not felt.

Source: Climate Science Special Report, Fourth National Climate Assessment (NCA4), Volume prepared by the U.S. Global Change Research Program (USGCRP)Northern Middlesex Council of Governments. 2015. "Hazard Mitigation Plan for the Northern Middlesex Region," 159-160.

IMPACTS OF **EXTREME WEATHER**

STORMS ARE BECOMING MORE INTENSE AND DAMAGING



Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Extreme Weather." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/extreme-weather

HAZARD POTENTIAL OF DAMS

Dam Name	Ownership	Hazard Potential*
Luther's Dike	City of Attleboro	No Classification
Attleboro #1 Dam	City of Attleboro	No Classification
Attleboro #2 Dam	City of Attleboro	No Classification
Orr's Pond #1 Dam	City of Attleboro	No Classification
Orr's Pond #2 Dam	City of Attleboro	No Classification
Luther Reservoir Dam	City of Attleboro	Low
Orrs Pond Dam	City of Attleboro	Low
Dodgeville Pond Dam	City of Attleboro	Significant

HAZARD POTENTIAL OF DAMS

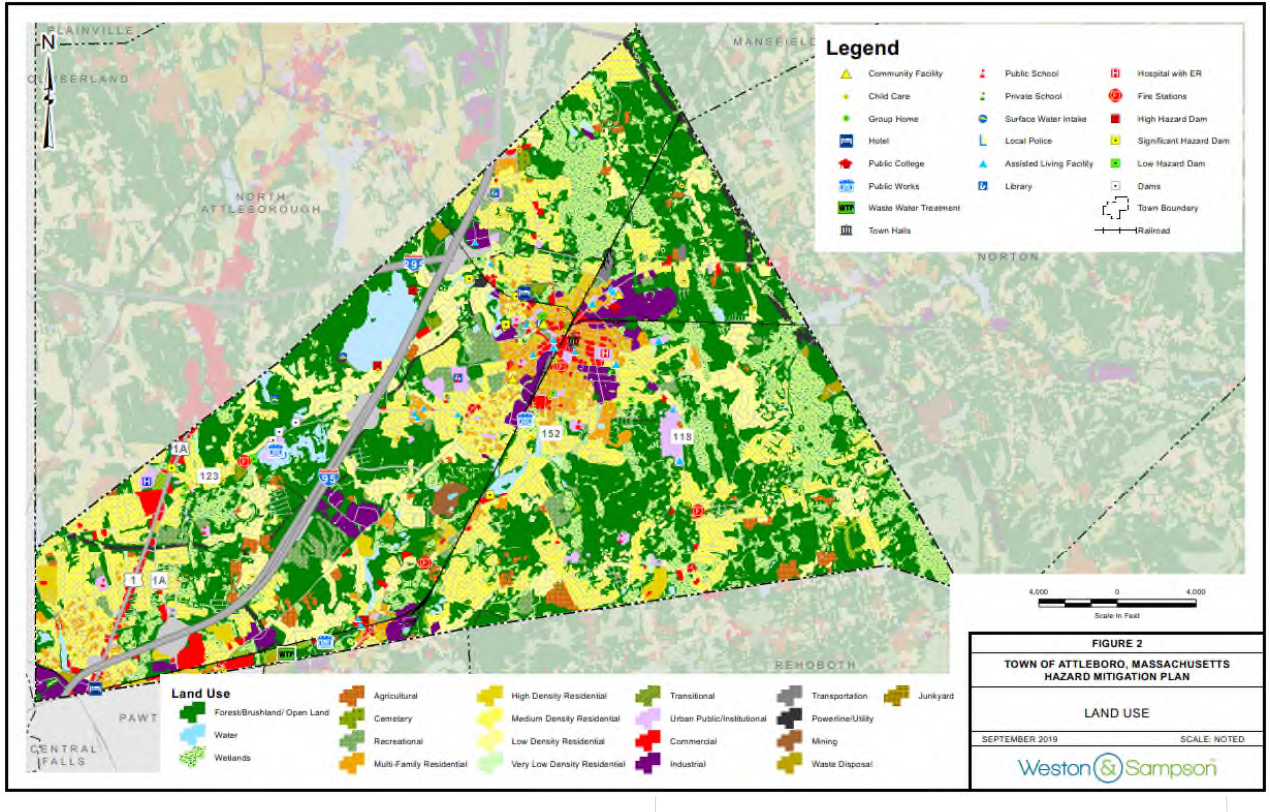
Dam Name	Ownership	Hazard Potential*
Mechanics Pond Dam	City of Attleboro	Significant
Mechanics Pond Dike	City of Attleboro	Significant
Simmons Pond Dam	City of Attleboro	Significant
Farmers Pond Dam	Mossberg Realty Corp	Significant
Lake Como Dam	Seventh Day Adventist	Significant
Manchester Pond Reservoir South Dike	City of Attleboro	High
Manchester Pond Reservoir East Dike Embankment 3 & 4	Mass Electric Co.	High
Manchester Pond Reservoir Dam	City of Attleboro	High
Hebronville Pond Dam	Hebronville Pond Dam	High

PLANNING CONTEXT

IN ATTLEBORO

Weston & Sampson

Attleboro's Land Use



Attleboro's Land Use

- 17,792 Acres (27.8 sq mi)
- 41% Urban of which about 33% is residential
- 3.6% is commercial
- 6.1% is industrial

INFRASTRUCTURAL FEATURES

Police Department

Fire Department

Wastewater

Dams

Roadways

Water Supply

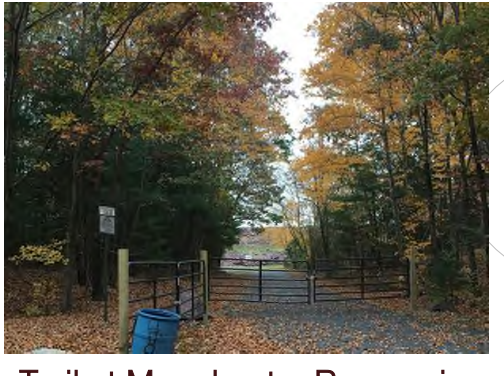
DEMOGRAPHIC PROFILE

Population	Attleboro	Massachusetts
2010	43,593	6,547,790
2018	45,117	6,902,149
Age		
Under 18 years:	22.7%	20%
65+ years:	12.9%	17%
Education		
Bachelor's degree or higher:	32%	42.1%
Additional Information		
Median household income:	$74,225	$74,167
Persons in poverty:	8.9%	10.5%
Language other than English spoken at home:	13%	23.1%

Source: U.S. Census Bureau, 2013-2017 ACS Estimates

ENVIRONMENTAL FEATURES

Luther's Reservoirs



Trail at Manchester Reservoir

Attleboro's Open Space

- 4.5% of the City is open land
- 2.5% is recreational space

IDENTIFY PRIORITY ACTIONS

ADD LOCAL PHOTO

AREAS of PROPOSED ACTIONS

- Public education
- Communication systems
- National Flood Insurance Program (NFIP)
- Policy-related strategies
- Infrastructure (dams, stormwater, etc.) and equipment
- Green technologies
- Emergency response planning and enhanced management
- Tree and vegetation maintenance

SYNOPSIS of ACTIONS (HMP-MVP Table 8.1)

Mitigation Action	Hazard Phase	Estimated Cost	Responsibility	Timeframe	Priority
Hire an Emergency/Management Director and create an Emergency Management Department reactivate the Emergency Management Committee	PRE	$$	**Mayor**	S	H
Create a dedicated location with required systems and equipment for Emergency Operations Center and ensure that training sessions are maintained.	PRE	$$	**Fire**, Police, Public Works, Health, Water, Wastewater	S	H
Create an Emergency Public Information Plan for various media (website, social media, direct mail) to keep the public informed before, during and after hazard events. Ensure that points of contact are continuously updated. Part of the plan should include deployment of a citywide multimedia hazard notification system	PRE	$$	**Fire**, Police, Public Works, Health, Water, Wastewater	S/O	H

WESTON & SAMPSON

Jim Riordan, Senior Project Manager

riordanj@wseinc.com

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ATTLEBORO MUNICIPAL COUNCIL REGULAR MEETING
NOVEMBER 17, 2020 - 7:00 P.M.
AGENDA
REMOTE LINK: https://zoom.us/j/636857461

APPROVAL OF THE RECORDS: May 26, June 9, June 16, 2020, July 21, 2020, August 18, 2020, August 20, 2020, September 8, 2020, September 15, 2020, September 22, 2020, October 6, October 20, and November 3, 2020. Executive Sessions June 6, 2017, June 27, 2017, April 10, 2018 and March 12, 2019.

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance Sec 7-12 Styrofoam Food Container Waste Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-13 Plastic Food Waste Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-14 Mercury Waste Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-15 Neonicotinoid Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-16 Single Use Plastic Water Bottle Waste Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-17 Micro-Plastics in Water Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-18 Plastic Shot Bottle Waste Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 7-19 Plastic Straw Reduction. (11-17-20)

CONTINUED PUBLIC HEARING relative to the following amendment to City of Attleboro Ordinance 11-22 Use of Balloons. (11-17-20)

PUBLIC HEARING pursuant to §16–2.2 of the REVISED ORDINANCES OF THE CITY OF ATTLEBORO, as amended, to layout Crown Street as a public way (length of approximately 160 feet) and accept said way and any related drainage, water or sewer facilities or easements, all as shown on a plan and profile entitled "STREET ACCEPTANCE PLAN FOR CROWN STREET", dated February 2020, prepared by Samuel Hemenway, P.E., and Samuel A. White, Jr, P.L.S. (11-17-20)

PUBLIC HEARING pursuant to §16–2.2 of the REVISED ORDINANCES OF THE CITY OF ATTLEBORO, as amended, to discontinue Crown Street as a public way (length of approximately 160 feet) and approve said discontinuance, as shown on the street discontinuance plan available for viewing at the Planning Department at City Hall. (11-17-20)

PUBLIC SAFETY & EMERGENCY MANAGEMENT

TRANSPORTATION & TRAFFIC

- Review of allowed parking on Scott Street southerly side from Route 1. (7/21/20)
- Request to install a Stop sign at the intersection of Bearcourt Dr. & Falcon Drive. (5/19/20)
- Communication from the Walsh family of Newport Ave regarding safety at May Street. (02/17/20)
- To install a solar flashing light southbound on Slater St. before Augsburg Dr. Refer to TSC (NB Porreca 12/17/19)
- To restrict parking 20 feet on either side of residential entrances and egresses on Commerce Way adjacent to NESV (NB Porreca 12/17/19)
- Traffic Study Commission recommends delay Rathbun-Willard Dr. opening until proposed traffic light installed (11/19/19)
- Request to review the Lasalette Shrine Holiday Traffic issues (11/19/19 Jackson)
- Letter from Ms. Redlund - Zeoli of Augsburg Dr. about exiting to Slater Street. (10/15/19)

- Amend Section 10-4.15: Operation of Heavy Commercial Vehicles adding May St. from Washington St. to Newport Ave. (Ms. Porreca 11/6/18)
- Amend Section 10-4.6 Left Turn Prohibited: May Street to Newport Avenue: May Street traffic traveling --- bound prohibited from making a Left turn onto Newport Avenue Northbound unless directed by a public safety official. (Ms. Porreca 11/6/18)

CAPITAL IMPROVEMENTS & CITY DEVELOPMENT

- Request to waive some fees associated with Attleboro-Pawtucket Interconnection Project (11/3/20) (PH 12/1/20)
- Loan order amendment on School Roofs to include gym floors (11/3/20) (PH 12/1/20)
- Loan order amendment on Library rehab loan to include elevator language (11/3/20) (PH 12/1/20)
- A communication from the Budget Director concerning the Attleboro-Pawtucket Connection Project.

PERSONNEL AND HUMAN SERVICES COMMITTEE

- Request appointment of Vyju Iyengar of Steeple Chase Circle for a term on the Cultural Council (11/3/20)
- Request appointment for Corina Bonefant of O'Donnell Drive for the Traffic Study Commission (11/3/20)
- Request appointment of John Bender of Read Street to the Zoning Board of Appeals (11/3/20)
- Reappointment for J. Parent to the Fire Commission. (3/3/20)

PUBLIC WORKS

- Request to purchase a Ford Ranger 4x4 with 6' bed and tool box for the Water Dept. (11/3/20)
- Request to purchase a Ford Ranger 4x4 with 6' bed and tool box for the Water Dept (11/3/20)
- Request to purchase a Ford F350 diesel with plow package and fuel transfer for the Water Dept (11/3/20)
- Letter discussing possible changes to Winter Parking Ban from Lisa Abreau (10/20/20)
- Rescind 3-3-20 request for a new F150 for the Water Department (4/7/20)
- Surplus declaration for a 2003 Ford F350 and 2007 Ford F150 from the Water Department (4/7/20)
- Create Special Committee to address Ordinances for the Winter Parking Ban concern and Snow Removal. (NB 12/17/19)
- Robert Peterson communicating that parking ban is outdated. (12/17/19)
- Amy Lambert of Pleasant St. requesting help with drivers down her driveway thinking it is Pike Avenue (12/17/19)
- Haley Fiske communication suggesting winter parking ban is unnecessary (12/17/19)
- George Jackson suggesting "as needed" parking ban (12/17/19)
- A communication from Robert Peterson suggesting the parking ban is outdated and should only be on storm days. (12/17/19)
- Communication dated January 21, 2018 from resident Kellie Marcil, suggesting a change in the Winter Parking Ban (2/6/18)
- Communication dated January 15, 2018 from Adam Stuminski, relative to changes in the Winter Parking Ban (2/6/18)
- To investigate the following amendments: Section 11-10 Sidewalk Snow and Ice Removal and Section 11-10 Sidewalk Snow Removal in Commercial or Industrial Zones (New Business—Ms. Porreca) (1/16/18)

BUDGET & APPROPRIATIONS

- To study the request to have a City Wide Vehicle Purchasing program. (11/3/20) (DiLisio, DeSimone and Jackson)
- Request to pay an FY20 Library invoice for $230 from G&G Fire Protection (11/3/20)
- Request that the Attleboro Municipal council conduct a review of the City's fiscal policy & cash reserve policy (DiLisio)
- FYI on Covid reimbursement explanations and allowed use from Federal Cares Act and FEMA (6/16/20)
- Amend the agreement between City and Schools that all Medicaid reimbursement go to schools. (Ms. Porreca 12/17/19)
- Collaborate with state officials to have a meeting to understand the Community Pact Program thru FY2019 for best financial policies for capital improvement (NB Conti 11/13/18)

ZONING & LAND USE

- Accept Angeline Street as a public way (11/3/20) (PH 12/1/20)
- Accept Palm Street as a public way (11/3/20) (PH 12/1/20)
- Accept Raymond Drive as a public way (11/3/20) (PH12/1/20)
- Request for a public meeting for the City's draft of Pre-Disaster Hazard Mitigation Plan Update (11/3/20)
- A rezoning petition from Atlantic Golf Centers 754 Newport Ave to change 39.21 acres to GB – GRA (11/3/20) (PH 12/15)
- Street acceptance for Crown Street as a public way (10/20/20) (PH 11-17-20)
- Street discontinuance request for Crown Street (10/20/20) (Joint PH 11-17-20)
- A communication from City Planner and Conservation Agent regarding NPDES II. (7/21/20)
- Review Section 17-13.0, Water Resources Protection District, and modify or remove. (6/16/20) (Reynolds)
- Hearing for the designation of a Downtown Attleboro Housing Development Zone (6/2/20) (PH 6/16/20)
- A communication from Joe Drazek of South Attleboro with concern about proposed marijuana establishment. (3/3/20)

- Amend §17–16.10 NON–CONFORMING SIGNS Delete B in its entirety and insert new language (see New Business-Ms. Porreca & Mr. DiLisio) (12/12/17)

LICENSE

- An automated Amusement Device License for Market Basket on Newport Avenue (11/3/20)
- A Class I license application from Cerrone Chevrolet, Buick & GMC 103 Washington Street (11/3/20)
- 11 Class II applications from the following businesses: 100 Percent Auto, Tri Town Auto Sales, M&J Auto Sales, Landes Family Auto Sales, Pine Crest Motors, Vachon Motor Company, Byrider, JMAC, Better Auto, Paris Auto body and C&A Millennium. (11/3/20)
- Tri Town Auto request a Class III license at 1850 County Street (11/3/20)

CITY PROPERTY & CLAIMS

- Request to surplus equipment from water department – Water meters and Portable 4-Gas Monitors (11/3/20)
- Donation of $250 in Stop & Shop cards to the Health Department from Emmett Larkin Memorial Foundation (10/20/20)
- Anonymous donation of $180 in Stop & Shop cards to the Health Department (10/20/20)

ORDINANCES, ELECTIONS & LEGISLATIVE MATTERS

- Mayor's communication regarding Bulk Item update to the Waste Management contract (11/3/20)
- A communication from resident Sharon Fortune in support of proposed Environmental ordinance amendments (10/20/20)
- A communication from resident Joe Caponigro against some of the amendments to the Environmental ordinance (10/20/20)
- 87 page petition to prevent ban on small sized bottles (10/6/20)
- 4 letters in support of Mayor's proposals for Environmental Protection & Prevention (10/6/20)
- Twenty – Three letters from residents and businesses opposed to the ban on small plastic bottles as well as objections to additional amendments requested by the Mayor (10/6/20)
- Director of Planning, Gary Ayrassian, writing in support of the Environmental Protection amendments (10/6/20)
- Requested amendment to section 11-22.1 Use of Balloons
- Requested amendments to Section 7 designed to make Attleboro a cleaner, greener, healthier place
- Letter from mark Kolakowski regarding change of hours at the city Compost Center. (6/16/20)
- Letter from mark Rioux to oppose Water Department Fee increases until a "live hearing" before the Council. (6/16/20)
- Requested Amendments to Section 7-7 through 7-9 for Collection of Solid Waste (6/16/20) (PH 7/21/20)
- A letter from Joseph Caponigro of Pike Avenue regarding proposed fee increases to Water & Wastewater. (6/2/20)
- Requested Amendments to Ordinance 16-10 thru 14 for Water Fees and Installations (4/7/20) (PH 5/19/20)
- Requested Amendments to Ordinance 16-15 for Building Sewers Connections (4/7/20) (PH 5/19/20)
- Ordinance to 10-4.18 regarding Speed Humps/Speed Cushion (3/17/20)
- Request that a Special Commission be formed to review the City Charter. (Ms. Jackson) (2/4/20)
- To adopt Massachusetts General law Chapter 41, s. 61. (Ms. Jackson) (2/4/20)
- New Business to add a sentence to City Ordinance 9-28:1 regarding utility pole placement or relocation (Conti 11/5/19)
- To differentiate between the positions of an executive and legislative city solicitor section 2-3 of the Ordinances of the City of Attleboro. (Ms. Holmes and Mr. Kobus 10/16/18)
- Request for a new ordinance as it pertains to Smoking restrictions in cars with children in car seats (Public Hearing scheduled for September 18, 2018) (7/17/18)

SPECIAL COMMITTEE ON THE COUNCIL'S RULES OF PROCEDURES

- Introduce the Revised Attleboro Municipal Council Rules of Procedure (4/28/20)(Docket of 5/19/20)

SPECIAL COMMITTEE FOR TAX ABATEMENT REVIEW

- Request adjustment of money from $600 to $700 for property tax exemption for senior citizens. (5/7/19)
- Home Rule petition for city with House of Representatives Amendment Article 89 and MGL Ch. 43B to adopt Ordinance for a Senior Tax Program authorizing City to amend Ch. 169 of Acts of 2012 (House, 3815). (Mr. Conti 7/17/18)
- Create an Elderly and Disabled Taxation Aid Fund. (Mr. Kobus 9/18/18)
- That the City of Attleboro create a local property tax freeze program that will bar property tax increases for certain seniors and other eligible populations who are on a fixed income and most affected by an increase taxes (Mr. Kobus 9/18/18)

OLD BUSINESS:

NEW BUSINESS: To refer for study and recommendation: To present for approval Local Option of 940 CMR 29.01,2,3 and 10 as follows:

The purpose of 940 CMR 29.00 is to interpret, enforce and effectuate the purposes of the Open Meeting Law, M.G.L. c. 30A, §§ 18 through 25. (Mr. Conti)

(Disclaimer: This agenda has been prepared in good faith based on topics that the Municipal Council anticipates may be discussed at its meeting). Agenda prepared by the Administrative Assistant from the Office of the Municipal Council.

ATTLEBORO MUNICIPAL COUNCIL
DOCKET
NOVEMBER 17, 2020

TRAFFIC AND TRANSPORTATION

Cathleen DeSimone, Chairperson

PUBLIC SAFETY

Peter Blais, Chairperson

CAPITAL IMPROVEMENTS AND CITY DEVELOPMENT

Richard Conti, Chairperson

The Mayor respectfully submits a communication from Director of Budget and Administration Jeremy Stull requesting approval to waive permitting and inspection fees associated with the Attleboro-Pawtucket Water Interconnection project. In accordance with Section 3-8.3 of the Revised City Ordinances, the Mayor hereby requests Your Honorable Body waive the following:
Stormwater Management Permit fee, the Minor Site Plan Review application fee, building permit fee – waive 100% of fees as required.
Electrical inspection fee – waive 35% of Inspection Fees as required (65% of the electrical inspection fee cannot be waived as that portion of the fee goes directly to the contracted inspector as payment for their services rendered).

On February 18, 2020, the Municipal Council voted a loan order in the amount of $3,900,000.00 relating to the repairs associated with the Brennan/Wamsutta School Roofs. An additional need was identified for the Hyman Fine and Hill Roberts Elementary Schools Gymnasium Floors after the vote took place. Due to this identified need, it is necessary to amend the approved loan order to expand the scope of the authorization to include the Gymnasium Floors.

Therefore, the Mayor respectfully requests Your Honorable Body to approve the following amended loan order:

ORDERED: that the loan order of the Municipal Council passed February 18, 2020 relating to the remodeling of the roofs and interior of the Brennan Middle School and Wamsutta Middle School be amended to add the additional purpose of the removal and replacement of the gymnasium floors and Environmental Hygienist monitoring at Hyman Fine and Hill Roberts Elementary Schools so that the loan order as amended provides as follows:

"ORDERED: that Three Million, Nine Hundred Thousand Dollars ($3,900,000.00) is appropriated for the permitting, bidding, construction oversight and construction costs associated with the remodeling, reconstructing and making of extraordinary repairs to the

roofs and interior of both the Brennan Middle School, located at 320 Rathbun Willard Drive in Attleboro, MA, and the Wamsutta Middle School, located at 300 Locust Street in Attleboro, MA, and the removal and replacement of the gymnasium floors and Environmental Hygienist monitoring at Hyman Fine Elementary School, located at 790 Oakhill Avenue in Attleboro, MA, and Hill Roberts Elementary School, located at 80 Roy Avenue in Attleboro, MA (collectively, the "Project"), including the payment of all costs incidental or related thereto; that to meet this appropriation, the Treasurer with the approval of the Mayor is authorized to borrow Three Million, Nine Hundred Thousand Dollars ($3,900,000.00) under Section 7(1) of Chapter 44 of the General Laws, or any other enabling authority; that the Mayor is authorized to take any other action necessary or convenient to carry out this Project. Any premium received by the City upon the sale of any bonds or notes approved by this order, less any such premium applied to the payment of the costs of issuance of such bonds or notes, may be applied to the payment of costs approved by this order in accordance with Chapter 44, Section 20 of the General Laws, thereby reducing the amount authorized to be borrowed to pay such costs by a like amount."

(PH 12-1-2020)

On February 18, 2020, the Municipal Council voted a loan order in the amount of $6,900,000.00 relating to the renovations to the Attleboro Public Library. An additional need was identified for the modernization of the elevator after the vote took place. Due to this identified need, it is necessary to amend the approved loan order to expand the scope of the authorization to include the elevator language.

The public hearing for the Attleboro Public Library loan authorization revision took place on June 23, 2020. Due to an error by the Sun Chronicle, the newspaper publication for the public hearing for the Attleboro Public Library was not published and therefore we need to start the process over in order to satisfy Bond Counsel requirements.

Therefore, the Mayor respectfully requests Your Honorable Body to approve the following amended loan order:

ORDERED: that the loan order of the Municipal Council passed February 18, 2020 relating to the renovations to the Attleboro Public Library be amended to include elevator improvements so that the loan order as amended provides as follows:

"ORDERED: that Six Million, Nine Hundred Thousand Dollars ($6,900,000.00) is appropriated for the design, permitting, bidding, construction oversight and construction costs associated with the roof, HVAC, elevator improvements, window and exterior repairs to the Attleboro Public Library Building, located at 74 North Main Street, Attleboro, MA (collectively the "Project"), including the payment of all costs incidental or related thereto; that to meet this appropriation, the Treasurer with the approval of the Mayor is authorized to borrow Six Million, Nine Hundred Thousand Dollars ($6,900,000.00) under Section 7(1) of Chapter 44 of the General Laws, or any other enabling authority; that the Mayor is authorized to take any other action necessary or convenient to carry out this Project. Any premium received by the City upon the sale of

any bonds or notes approved by this order, less any such premium applied to the payment of the costs of issuance of such bonds or notes, may be applied to the payment of costs approved by this order in accordance with Chapter 44, Section 20 of the General Laws, thereby reducing the amount authorized to be borrowed to pay such costs by a like amount." **(PH 12-1-2020)**

PERSONNEL, VETERANS AND HUMAN SERVICES

Ty Waterman, Chairperson

The Mayor respectfully submits for confirmation by Your Honorable Body the appointment of Vyju Iyengar, 18 Steeple Chase Circle Attleboro, to fill an unexpired term on the Cultural Council. Term to expire February 2023.

The Mayor respectfully submits for confirmation by Your Honorable Body the appointment of Corina Bonenfant, 27 O'Donnell Drive, Attleboro, to fill an unexpired term on the Traffic Study Commission. Term to expire February 2023.

The Mayor respectfully submits for confirmation by Your Honorable Body the appointment of John Bender, 437 Read Street, Attleboro, to fill an expired term on the Zoning Board of Appeals as an Associate Member. Term to expire February 2022.

PUBLIC WORKS

Kate Jackson, Chairperson

The Mayor respectfully submits a communication from Superintendent of Water Kourtney Wunschel regarding the need to purchase a new Ford Ranger 4x4 super cab with a 6' bed and tool box. This vehicle is currently listed in the 2021-2025 Capital Improvement Program. This purchase will include strobes, radio, installation of meter reading equipment and lettering. This vehicle will replace a 2004 Ford Ranger that has 145,000 miles and is off the road due to a failed inspection because of extensive body and cabin rot. Therefore, the Mayor hereby requests Your Honorable Body appropriate $31,572.00 from Account 6100-359000 (Water Enterprise Fund – Retained Earnings) to Account 6100-587044 (Water Enterprise Fund – Replacement Truck).

The Mayor respectfully submits a communication from Superintendent of Water Kourtney Wunschel regarding the need to purchase a new Ford Ranger 4x4 super cab with a 6' bed and tool box. This vehicle is currently listed in the 2021-2025 Capital Improvement Program. This purchase will include strobes, radio, and lettering. This vehicle will replace a 2007 Ford F150 that has 246,000 miles and is off the road due to extensive work needed on the engine and transmission. Therefore, the Mayor hereby requests Your Honorable Body appropriate $29,972.00 from Account 6100-359000 (Water Enterprise Fund - Retained Earnings) to Account 6100-587044 (Water Enterprise Fund - Replacement Truck).

The Mayor respectfully submits a communication from Superintendent of Water Kourtney Wunschel regarding the need to purchase a new Ford F350 4x4 diesel super cab with 8' service body, plow prep package and fuel transfer tanks. This vehicle is currently listed in the 2021-2025 Capital Improvement Program. This purchase will include strobes, radio, and lettering. This vehicle will replace a 2009 Ford F250 Utility Body that has 117,000 miles and needs extensive work on the body mounts and motor. Therefore, the Mayor hereby requests Your Honorable Body appropriate $65,827.00 from Account 6100-359000 (Water Enterprise Fund – Retained Earnings) to Account 6100-587044 (Water Enterprise Fund – Replacement Truck).

BUDGET AND ADMINISTRATION

Jay DiLisio, Chairperson

The Mayor respectfully submits a communication from Library Director Christine Johnson regarding the need for funds to pay an FY20 invoice to G&G Fire Protection. Therefore, the Mayor hereby requests Your Honorable Body transfer $230.00 from Account 16101000-524240 (Library - Equipment Maintenance) to Account 16101000-578020 (Library – Previous Years Bills).

Recommendation for a City Wide Vehicle Purchasing program. (DiLisio, Jackson, DeSimone)

ZONING AND LAND USE

Todd Kobus, Chairperson

The Mayor hereby requests your honorable body to schedule a public hearing pursuant to §16–2.2 of the Revised Ordinances of the City of Attleboro, as amended, to layout Angeline Street as a public way (length of 750 feet, from STA 200+00 to STA 207+50.20) and accept said way and any related drainage, water or sewer facilities or easements, all as shown on a plan and profile entitled "Street Acceptance Plan for Angeline Street", dated September 13, 2019, prepared by Samuel A. White, Jr. R.L.S., which plan and profile have been deemed satisfactory to the Superintendent of Public Works. **(PH 12-1-2020)**

The Mayor hereby requests your honorable body to schedule a public hearing pursuant to §16–2.2 of the Revised Ordinances of the City of Attleboro, as amended, to layout a portion of Palm Street (length of 55.00 feet, from STA 0+00 to STA 0+55) as a public way and accept said way and any related drainage, water or sewer facilities or easements, all as shown on a plan and profile entitled "Acceptance Plan Palm Street Attleboro, Mass," dated January 30, 2012, by Joyce E. Hastings, P.L.S. and Daniel R. Campbell, R.P.E., which plan and profile have been deemed satisfactory to the Superintendent of Public Works.
(PH 12-1-2020)

The Mayor hereby requests your honorable body to schedule a public hearing pursuant to §16–2.2 of the Revised Ordinances of the City of Attleboro, as amended, to layout Raymond Drive as a public way (length of 700.25 feet, from STA 0+00 to STA 7+00.25) and accept said way and any related drainage, water or sewer facilities or easements, all as shown on a plan and profile entitled "Street Acceptance Plan of Land", dated February 10, 2020, prepared by Richard W. Reid, Jr. P.L.S., which plan and profile have been deemed satisfactory to the Superintendent of Public Works. **(PH 12-1-2020)**

The mayor respectfully submits a communication from Director of Planning and Development Gary Ayrassian and Environmental Planner Nick Wyllie requesting that the Municipal Council hold a public **meeting** on Tuesday, November 17th during which time they and the City's environmental engineering consultant, Weston & Sampson, will present the draft *Pre–Disaster Hazard Mitigation Plan Update / Municipal Vulnerability Preparedness Plan* and answer any questions. The purpose of this plan is to identify the City's vulnerabilities to natural disasters and actions that the City may take to mitigate negative impacts from natural disasters. In addition, this plan incorporates the impact of climate change and resiliency actions the City may take to mitigate the effects of climate change. Following the presentation, and pursuant to the Massachusetts Emergency Management Agency (MEMA) grant requirements, the HMP/MVP Steering Committee and Department of Planning and Development requests your Honorable Body to vote the same evening to give consent to submit the draft plan to the state for review and comment. The staff will incorporate feedback from your Honorable Body into the draft plan prior to its submission to the state. The draft plan may be found on the City's website at https://www.cityofattleboro.us/202/Planning-Development.

A rezoning petition was received from Attorney John Jacobi on behalf of Atlantic Golf Centers regarding 754 Newport Avenue also known as Assessor's Plat #69 and Lot #26Bto change the Zoning of the 39.21 acres to General Business and General Residence A.
(Joint PH 12-15-2020)

LICENSES

Laura Dolan, Chairperson

An application from the Market Basket Supermarket on Newport Avenue for an Automated Amusement Device License for a mini carousel and a truck.

The following application was received for a Class I license:

Cerrone Chevrolet, Buick & GMC at 103 Washington Street with 84 customer parking spaces and 288 display spaces.

The following applications were received for Class II licenses:

100 Percent Auto at 21 Washington Street with 10 customer and 48 display spaces.
Tri Town Auto Sales 1850 County Street with 4 customer spaces and 6 display spaces.

M&J Auto Sales at 650 Washington Street with 10 customer and 49 display spaces.
Landes Family Auto Sales at 859 Washington Street with 9 customer and 27 display.
Pine Crest Motors at 2117 County Street with 5 customer spaces and 15 display spaces.
Vachon Motor Company at 957 Washington Street with 12 customer and 55 display.
Byrider at 957 Washington Street with 12 customer spaces and 58 display.
JMAC 30 Main Street with 4 customer parking spaces and 23 display spaces.
Better Auto at 473 Washington Street with 10 customer spaces and 4 display spaces.
Paris Auto Body 21 Chartier Street with 9 customer spaces and 20 display spaces.
C&A Millennium 1894 County Street with 10 customer parking and 8 display spaces.

The following application was received for a Class III license:

Tri Town Auto at 1850 County Street with 4 customer spaces and 6 display spaces.

CITY PROPERTY AND CLAIMS

Sara-Lynn Reynolds, Chairperson

The Mayor respectfully submits a communication from Legal Secretary Alison Wood regarding equipment that the Water Department would like to declare as surplus. Therefore, the Mayor hereby requests Your Honorable Body to declare the following as surplus and available for disposition:

QUANTITY	DESCRIPTION	CONDITION
200	Water Meters	Used
6	Portable 4-Gas Monitors	Used

ORDINANCES, ELECTIONS & LEGISLATIVE MATTERS

Diana Holmes, Chairperson

A communication from the Mayor's office regarding Bulk Item update to the contract with Waste Management.

CITY OF ATTLEBORO

Municipal Council Public Meeting

Hazard Mitigation Plan & Municipal Vulnerability Preparedness

November 17, 2020

Weston & Sampson℠

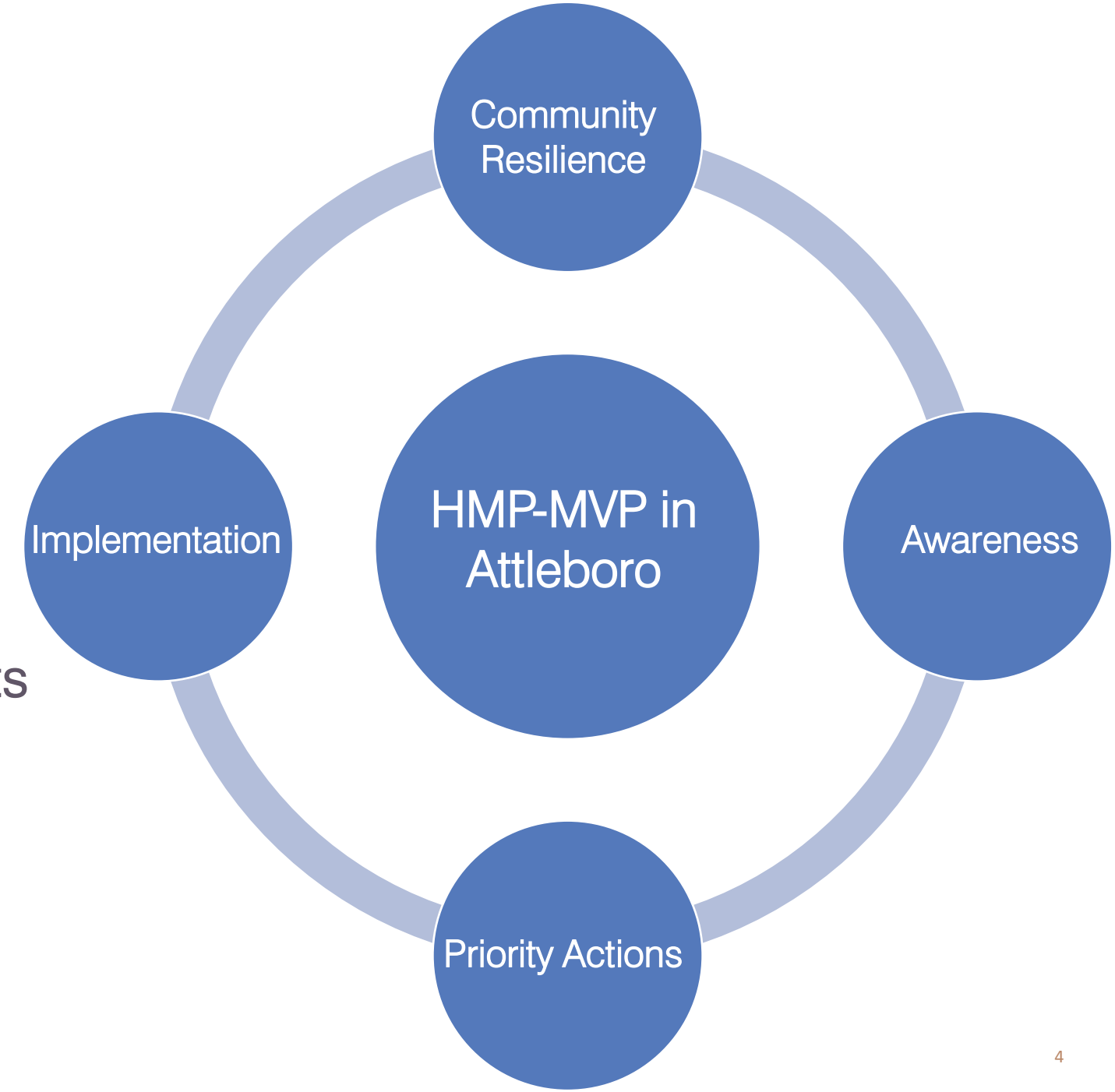
PROJECT CORE TEAM

Bobbie Araujo
Gary Ayrassian
Roy Belcher
Steve Brasier
Wayne Cobleigh
Derek Corsi
Ben Cote
Mark Cuddy
Paul Danesi
Stephanie Davies
David Denneno
Keith Gonsalves
Tom Hayes
Kyle Heagney, Police Chief
Paul Heroux
Kathleen Ilkowitz
William Johnson
Scott LaChance, Fire Chief
Jim MacDonald
Bill McDonough
Madeleine McNielly
Greg O'Brien
John Staskiewicz
Mike Tyler
Nick Wyllie
Kourtney Wunschel
Bertha Young

- November 17: Solicit comments and consent from Municipal Council
- Incorporate comments for submission to MEMA and EEA
- Receive comments from MEMA and EEA and amend plan
- December 1: Submit final plan to Municipal Council for approval
- December 1 or 15: Municipal Council approval
- December 30: Submission deadline final plan to MEMA and EEA for approval

HMP-MVP IN ATTLEBORO

- Prepare for natural disasters
- Ease disaster recovery
- Improve community resilience
- Access to FEMA and EEA grants
- Flood insurance cost reduction (15%)



HAZARDS & CLIMATE CHANGE

IN ATTLEBORO AND NEW ENGLAND

Weston & Sampson

HAZARDS IN ATTLEBORO

FLOOD HAZARDS

WIND HAZARDS

WINTER STORMS

EARTHQUAKES

FIRE

EXTREME TEMPERATURES

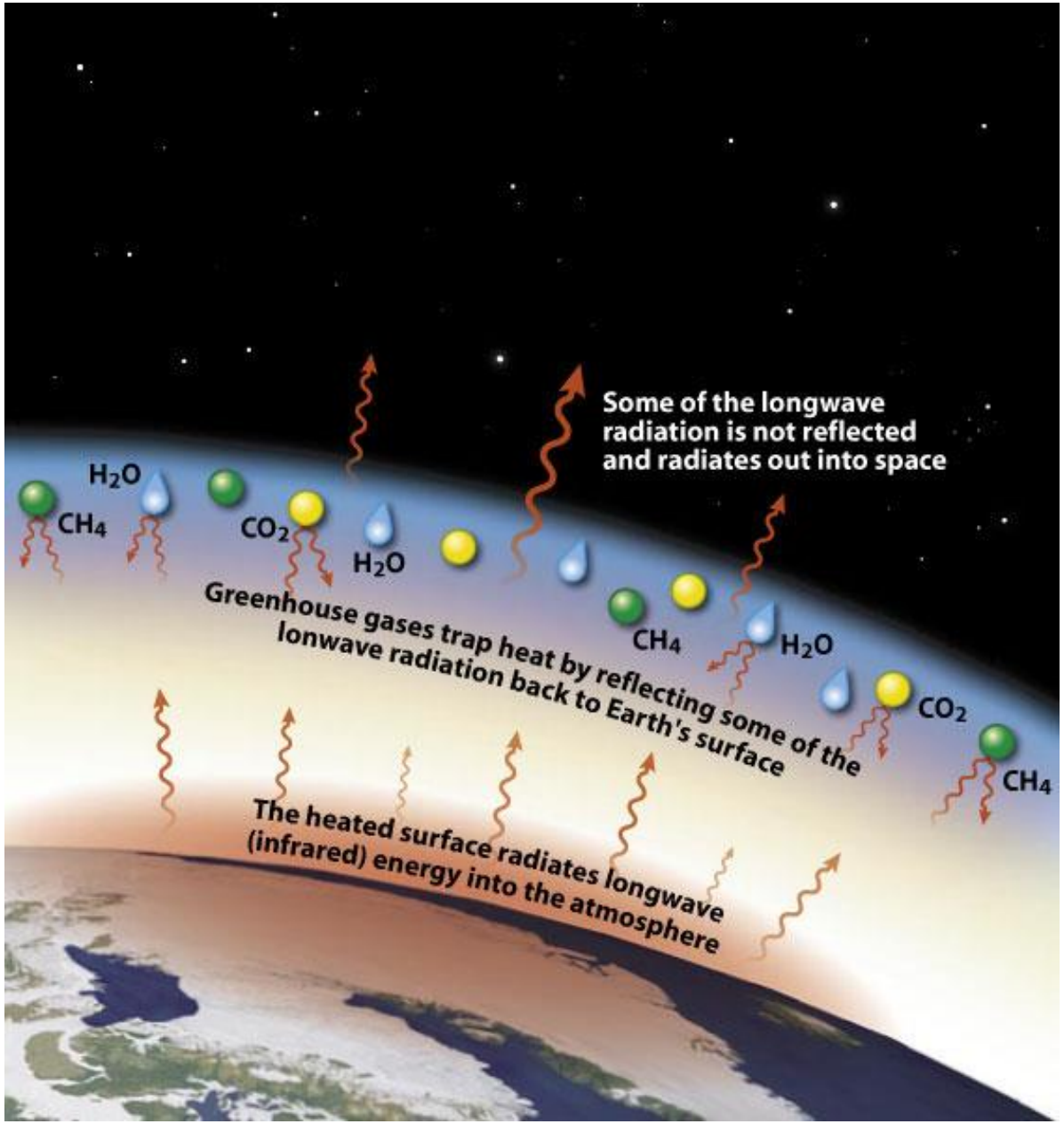
DROUGHT

CLIMATE CHANGE

GREENHOUSE GASES (GHG)

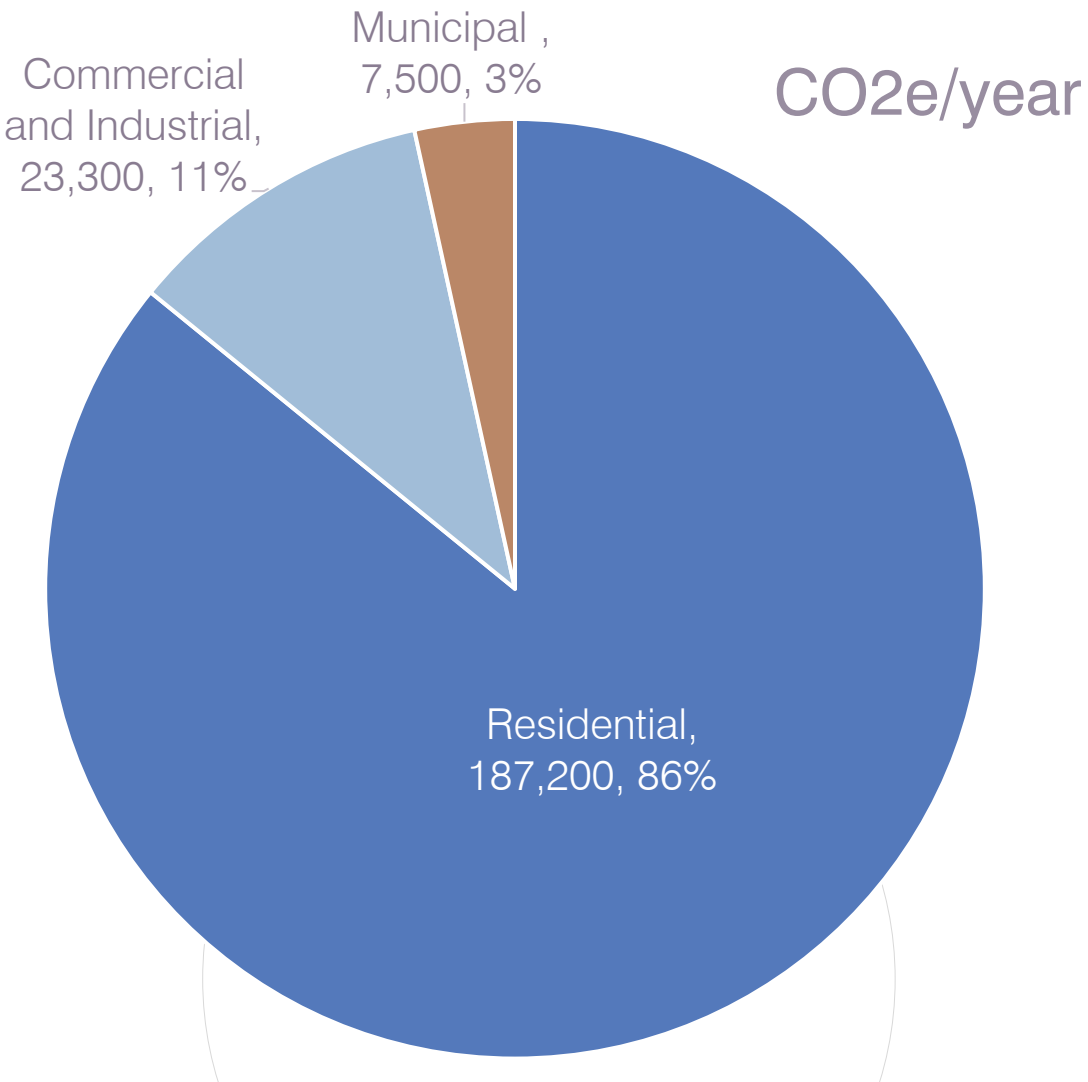
- Naturally occurring
- Act as a blanket
- Examples: carbon dioxide and methane

Climate mitigation ensures there is less to adapt to and is a key component of our community's resilience



Smithsonian Environmental Research Center. "Too Much of a Good Thing." http://forces.si.edu/atmosphere/02_04_07.html

2006 GHG EMISSIONS



Hazards in Attleboro

Hazard	Frequency (in Attleboro)	Severity (in Attleboro)
Flooding	High	Minor to Serious
Dam Failures	Very Low	Minor to Catastrophic
Snowstorms	High	Minor
Ice Storms	High	Moderate
Hurricanes	Medium	Moderate
Nor'easters	High	Moderate
Thunderstorms	High	Minor
Brush and Urban Fires	Medium	Minor
Earthquakes	Very Low	Minor to Catastrophic
Landslides	Low	Minor to Extensive
Extreme Temperatures	Low	Minor to Serious
Drought	High	Minor to Serious

EXTREME TEMPERATURES

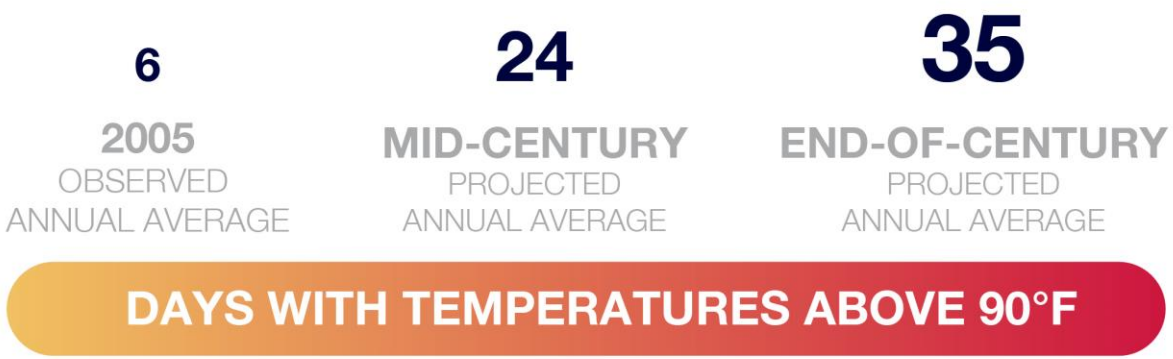
WARMER ANNUAL AIR TEMPERATURES

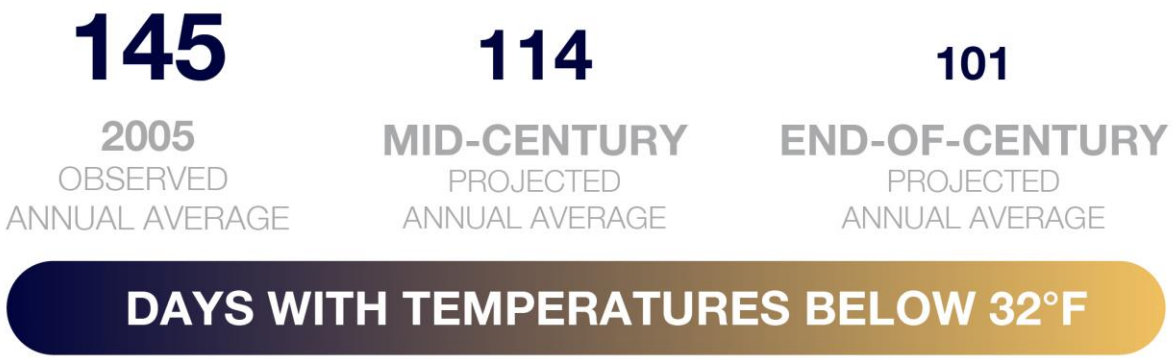
UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS

UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE

EXTREME TEMPERATURES IN MASSACHUSETTS





Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "ResilientMA Datagrapher." Massachusetts Climate Change Clearinghouse. Resilientma.org/datagrapher/?c=Temp/state/tx90/ANN/MA/
Notes: Mid-century projected annual averages use a 2040-2069 time range. End-of-century project annual averages use a 2080-2097 time range.

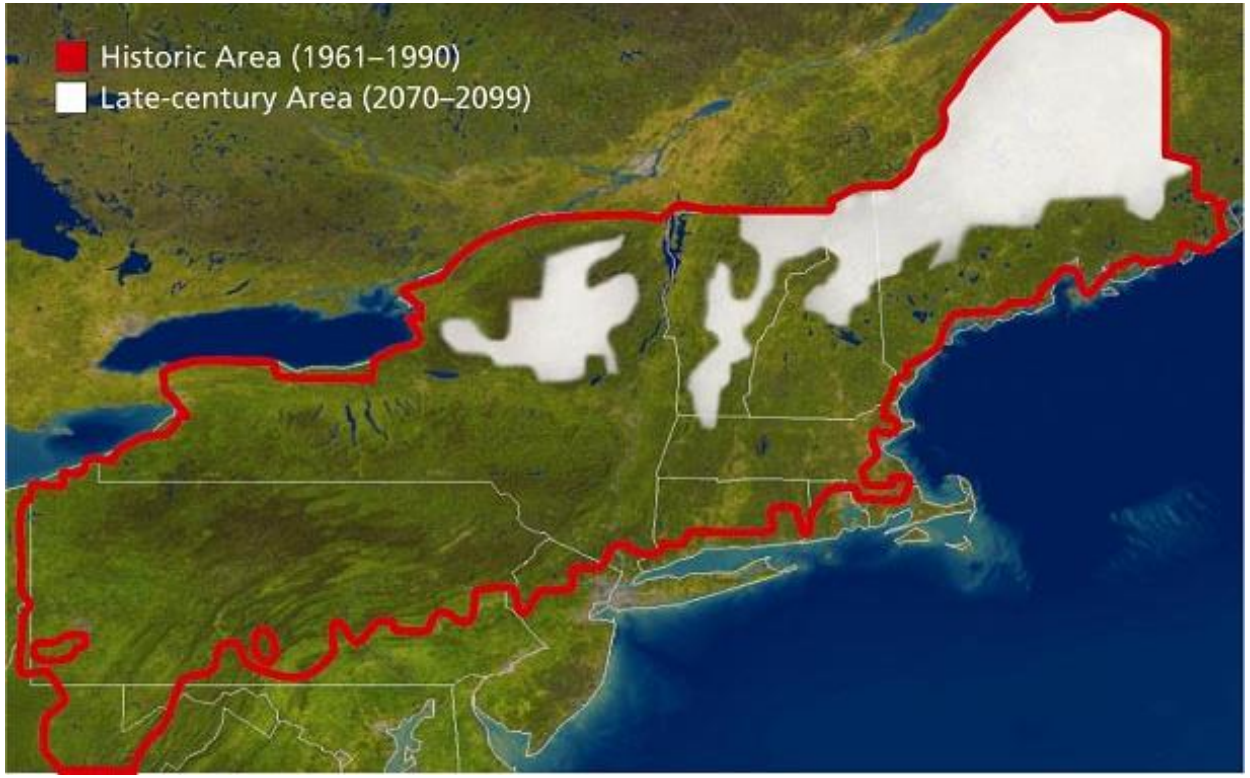


Photo: UCSUSA “Confronting Climate Change in the U.S. Northeast”.

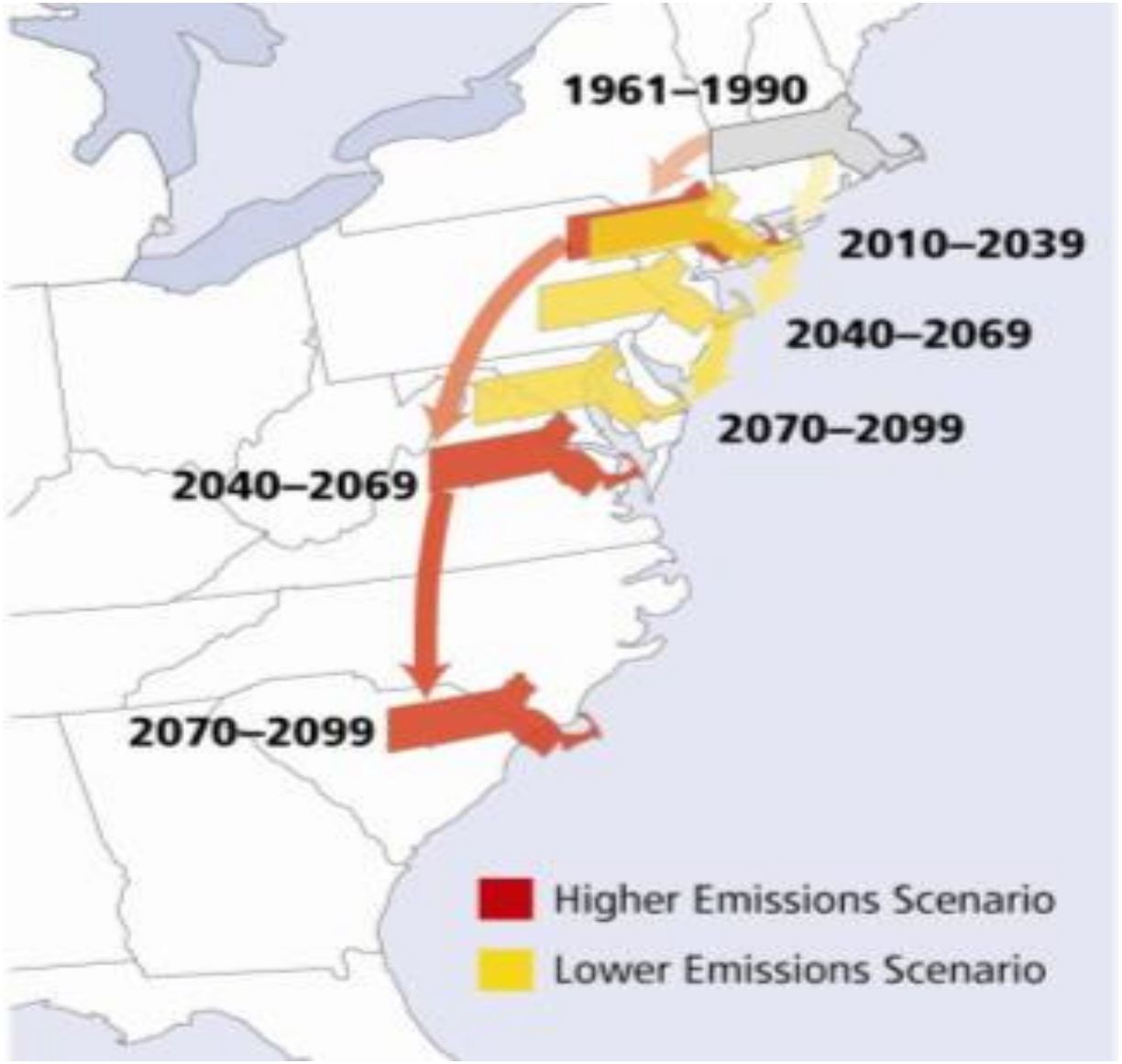
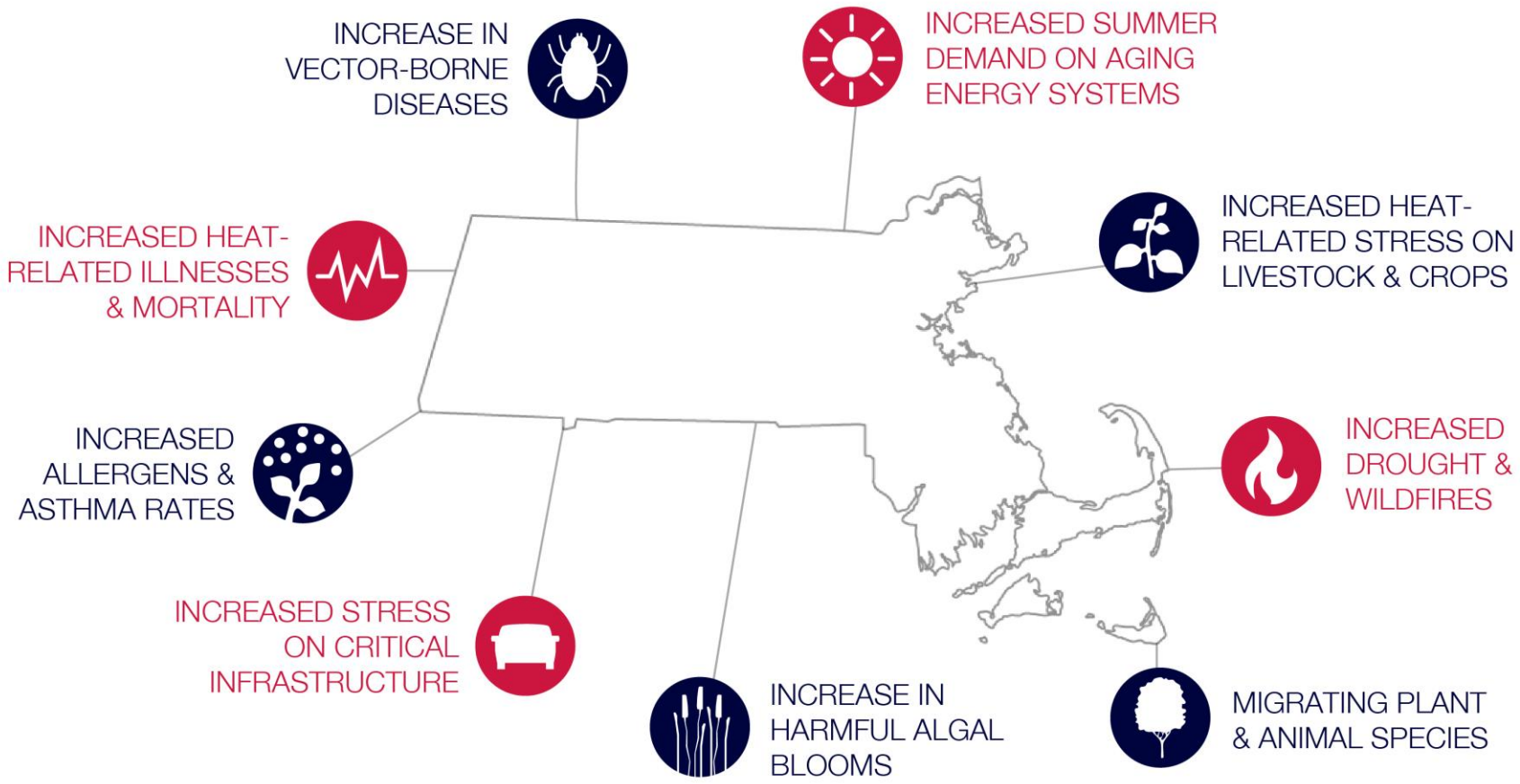


Photo: NECIA/UCS, 2007.

IMPACTS OF **RISING TEMPERATURES**

WARMER ANNUAL AIR TEMPERATURES
UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS
UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE



Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Rising Temperatures." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/rising-temperatures


BOSTON
MOSQUITO SEASON GROWING
THEN
96
DAYS
On average per year
1980-1989
NOW
119
DAYS
On average per year
since 2006
Source: Yamana and Eltahir (2013), NCBI, National Institutes of Health, Daymet Data, Oak Ridge National Laboratory
CLIMATE CENTRAL

CHANGES IN PRECIPITATION

MORE **INTENSE & FREQUENT** EXTREME RAIN EVENTS

PRECIPITATION DURING **HEAVY EVENTS** IN THE NORTHEAST

INCREASED BY MORE THAN

70%

BETWEEN 1958-2010

Massachusetts Executive Office of Energy & Environmental Affairs. 2019. “Changes in Precipitation.” Massachusetts Climate Change Clearinghouse. Resilientma.org/changes/changes-in-precipitation

EXTREME PRECIPITATION

8%

Increase in extreme precipitation events by midcentury

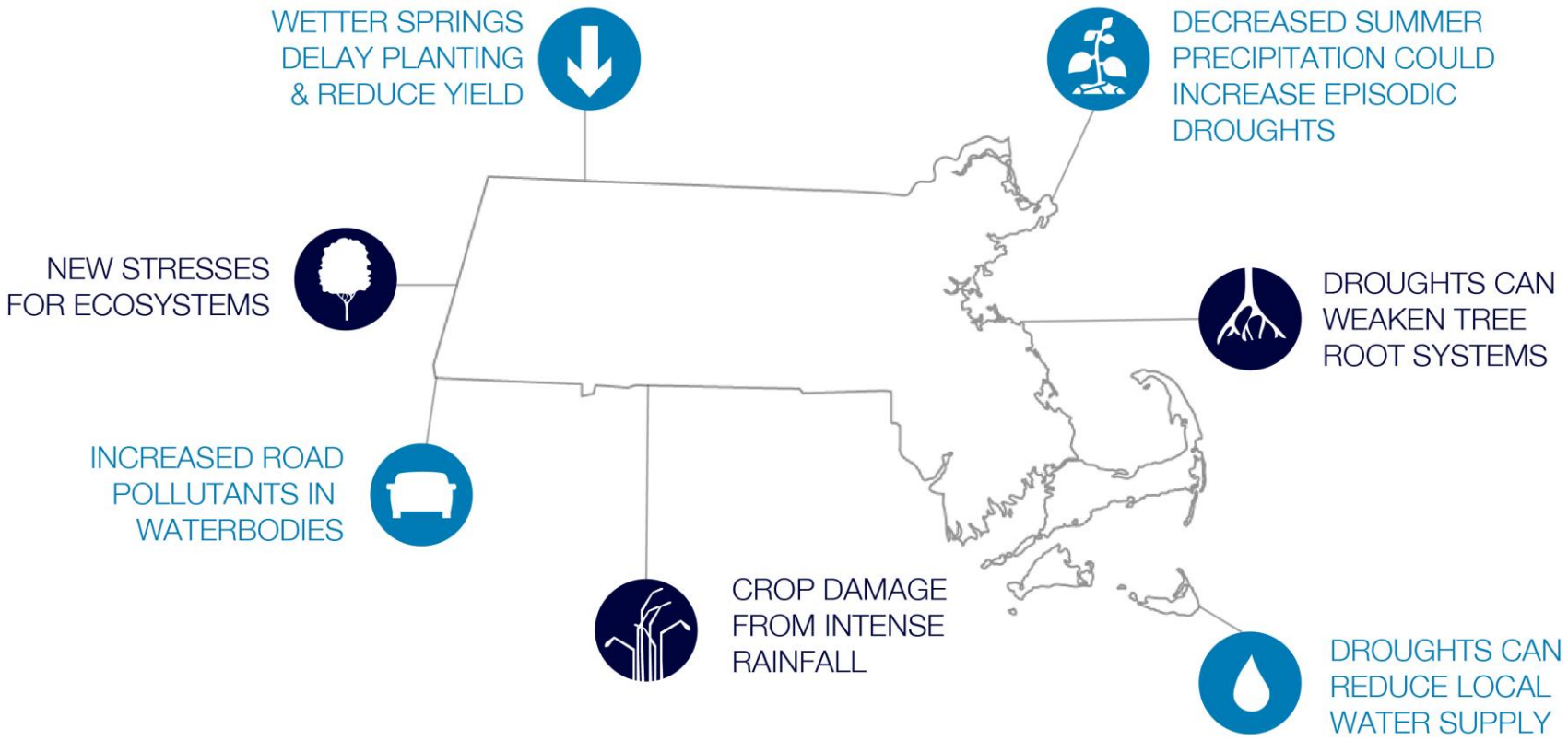
13%

Increase in extreme precipitation events by 2100

IMPACTS OF CHANGING **PRECIPITATION**

HIGHER AVERAGE ANNUAL PRECIPITATION

INCREASED BY ABOUT 10% IN THE NORTHEAST INTHE LAST 50 YEARS



Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Changes in Precipitation." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/changes-in-precipitation

FLOODING

Vulnerable Areas

- Poor drainage
- High amounts of impervious surface
- Undersized culverts

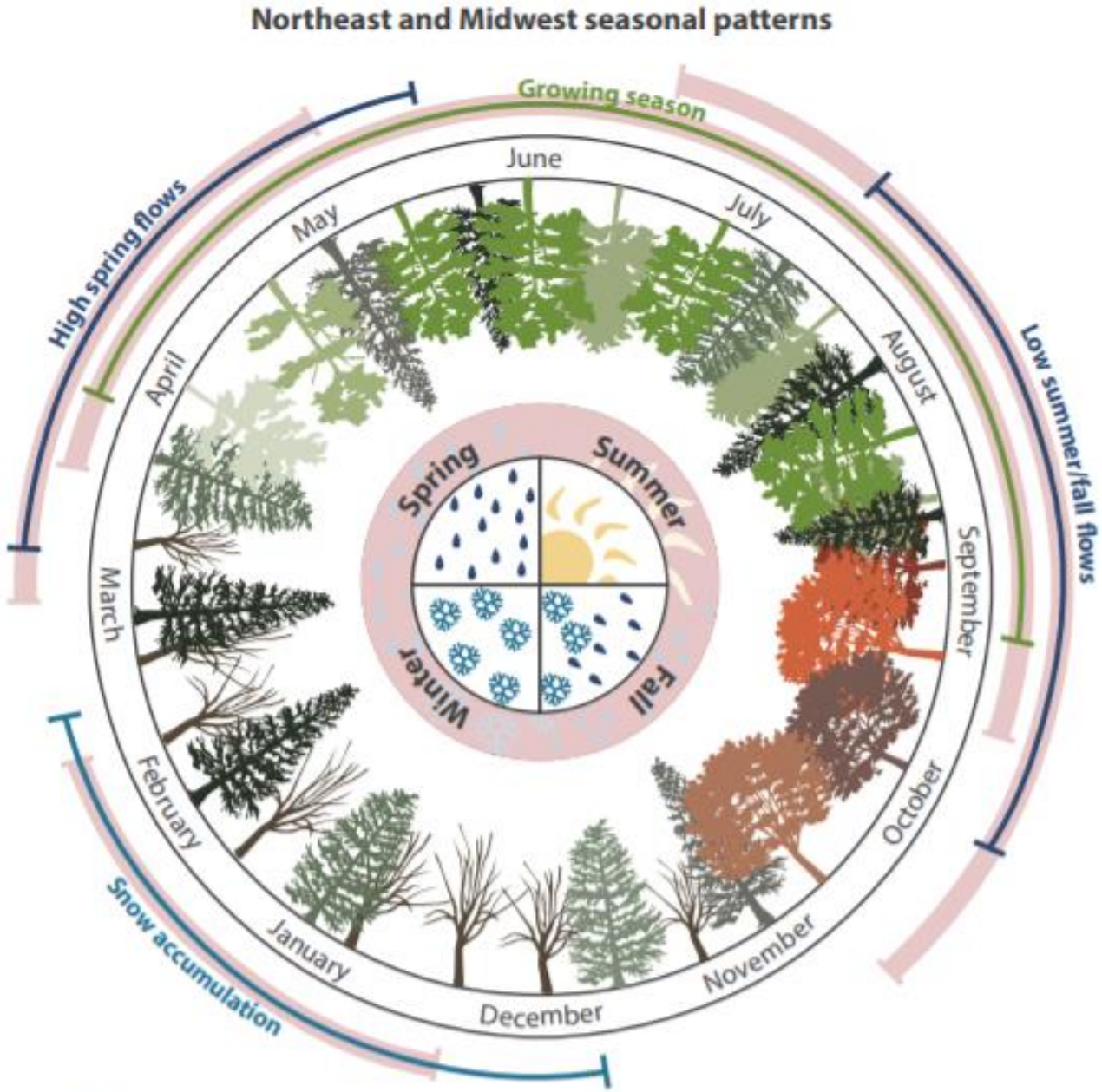
4 events reported by NOAA since 1996:

- No reported deaths or injuries
- Just less than $12M in damage
- March 2010 accounts for $11,790,000

WINTER STORMS

The blizzard of 2013 left nearly **400,000 Massachusetts residents without power**

"Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."



The most notable recent drought event was in

2016 - 17

The occurrence of droughts

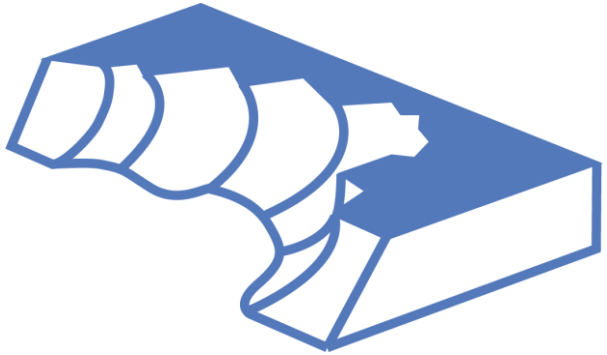
lasting 1 to 3 months

could go up by as much as

75% over existing conditions

by the end of the century, under the high emissions scenario

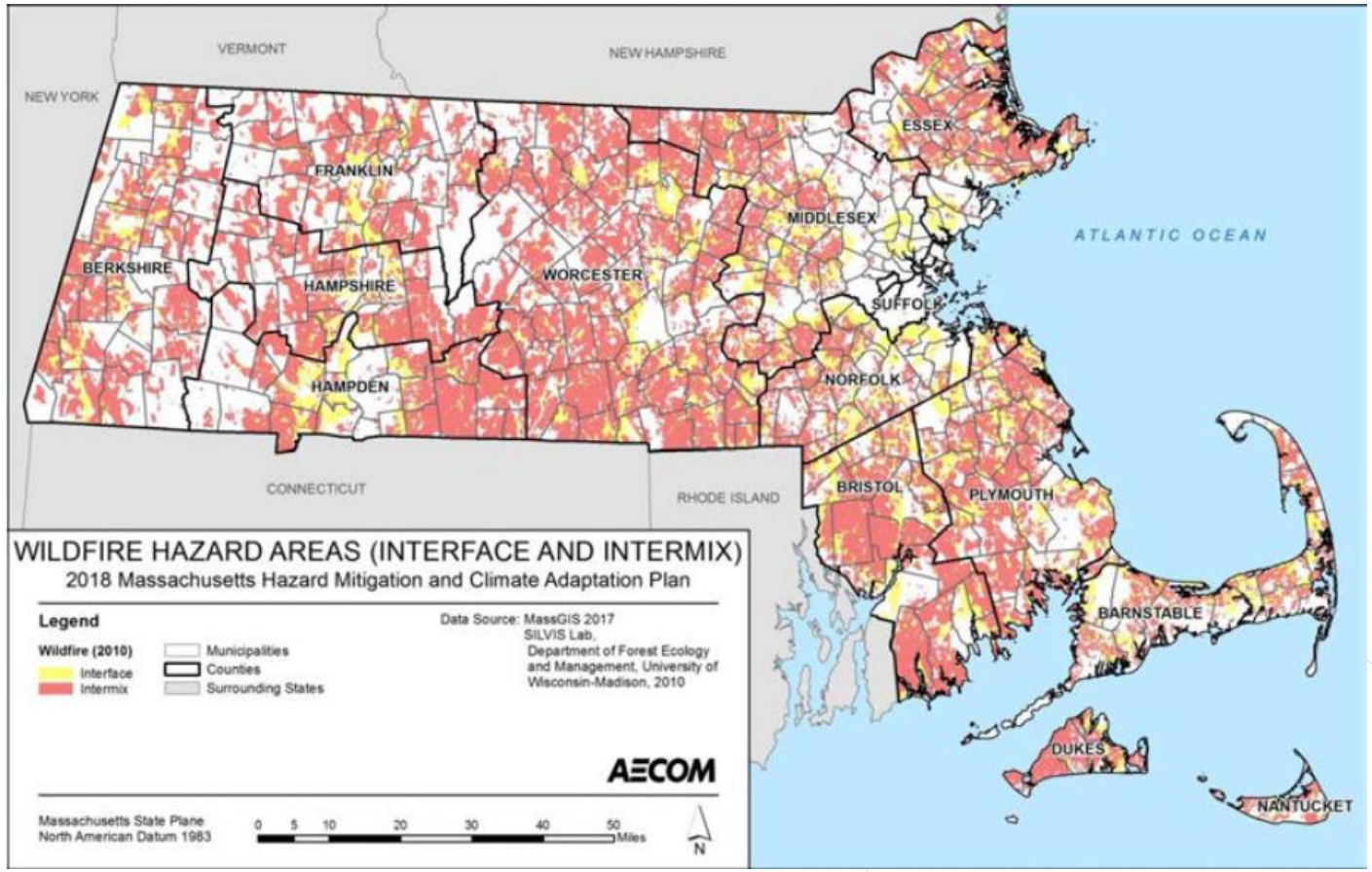
EROSION



- Caused by riverine flow & stormwater[1]
- Increased precipitation, including winter rains, could increase erosion[1]
- Drier soils will reduce resistance to erosion

1. Executive Office of Energy and Environmental Affairs, Adaptation Advisory Committee. 2011. "Massachusetts Climate Change Adaptation Report," 42.

FIRE



Massachusetts Fire Incident Reporting System reported 57 fires in 2017 in Attleboro. Eight of these were listed as “serious.”

HURRICANES AND EARTHQUAKES

HURRICANE

Sandy and nor'easters cause downed trees and power lines

Upward trend in North Atlantic hurricane activity since 1970

Nor'easters along the Atlantic coast are increasing in frequency and intensity

EARTHQUAKE

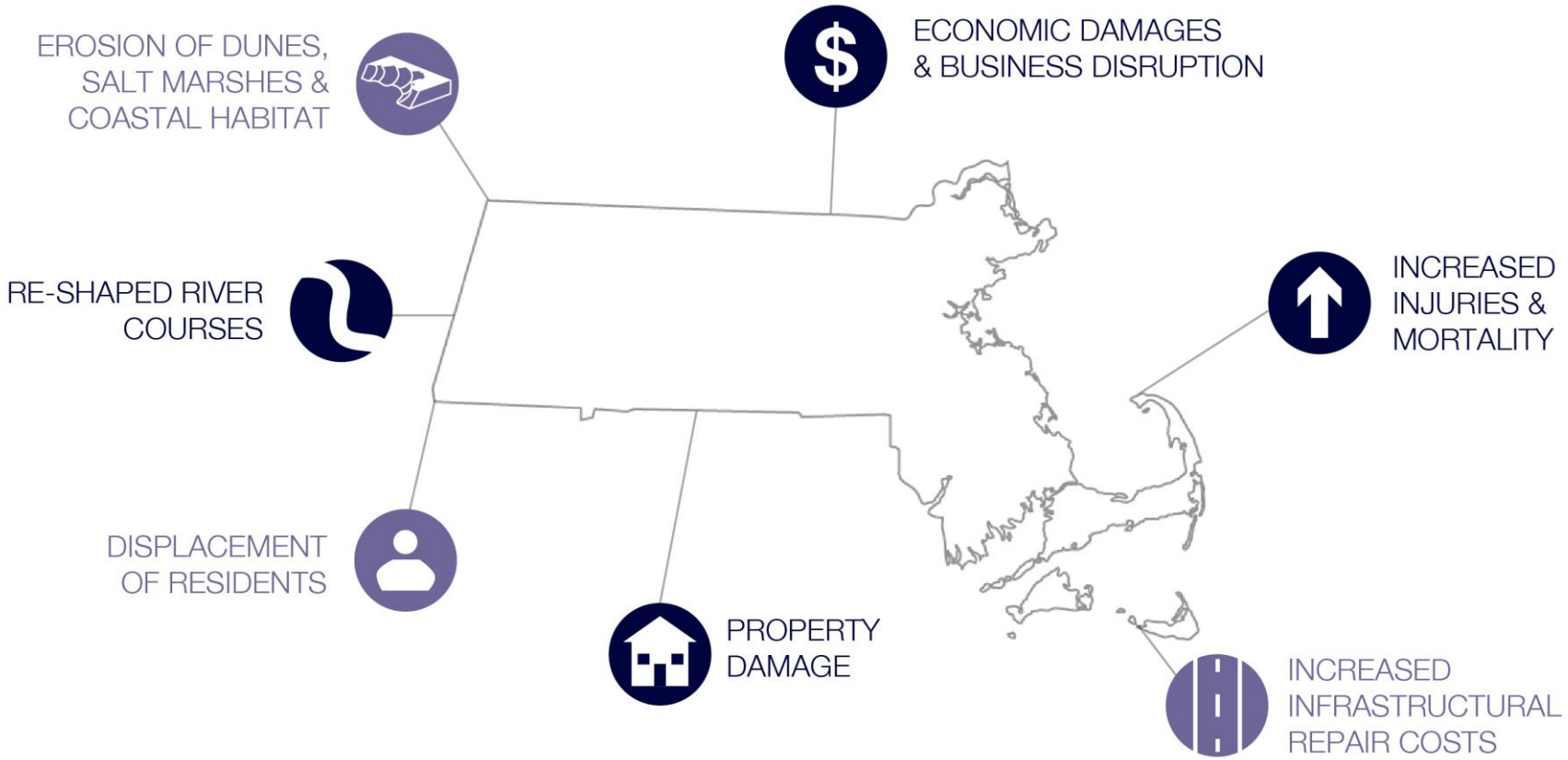
30-40

Earthquakes occur in New England each year, although most are not felt.

Source: Climate Science Special Report, Fourth National Climate Assessment (NCA4), Volume prepared by the U.S. Global Change Research Program (USGCRP)Northern Middlesex Council of Governments. 2015. "Hazard Mitigation Plan for the Northern Middlesex Region," 159-160.

IMPACTS OF **EXTREME WEATHER**

STORMS ARE BECOMING MORE INTENSE AND DAMAGING



Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Extreme Weather." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/extreme-weather

HAZARD POTENTIAL OF DAMS

Dam Name	Ownership	Hazard Potential*
Luther's Dike	City of Attleboro	No Classification
Attleboro #1 Dam	City of Attleboro	No Classification
Attleboro #2 Dam	City of Attleboro	No Classification
Orr's Pond #1 Dam	City of Attleboro	No Classification
Orr's Pond #2 Dam	City of Attleboro	No Classification
Luther Reservoir Dam	City of Attleboro	Low
Orr's Pond Dam	City of Attleboro	Low
Dodgeville Pond Dam	Private	Significant

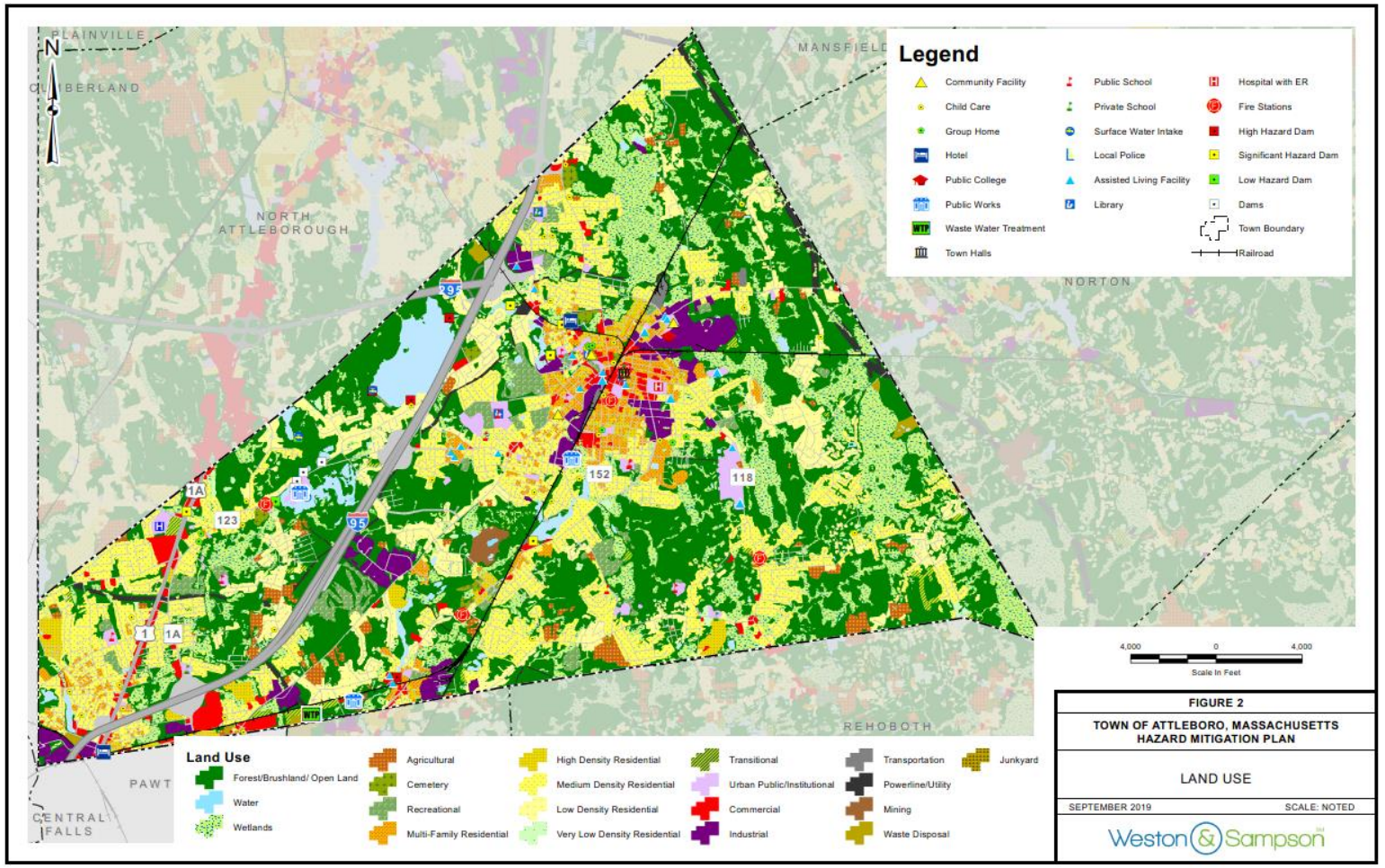
HAZARD POTENTIAL OF DAMS

Dam Name	Ownership	Hazard Potential*
Mechanics Pond Dam	City of Attleboro	Significant
Mechanics Pond Dike	Private	Significant
Simmons Pond Dam	City of Attleboro	Significant
Farmers Pond Dam	City of Attleboro	Significant
Lake Como Dam	Private	Significant
Manchester Pond Reservoir South Dike	City of Attleboro	High
Manchester Pond Reservoir East Dike Embankment 3 & 4	City of Attleboro	High
Manchester Pond Reservoir Dam	City of Attleboro	High
Hebronville Pond Dam	Private	High

PLANNING CONTEXT

IN ATTLEBORO

Attleboro's Land Use



Attleboro's Land Use

- 17,792 Acres (27.8 sq mi)
- 41% Urban of which about 33% is residential
- 3.6% is commercial
- 6.1% is industrial

INFRASTRUCTURAL FEATURES

Police Department

Fire Department

Wastewater

Dams

Roadways

Water Supply

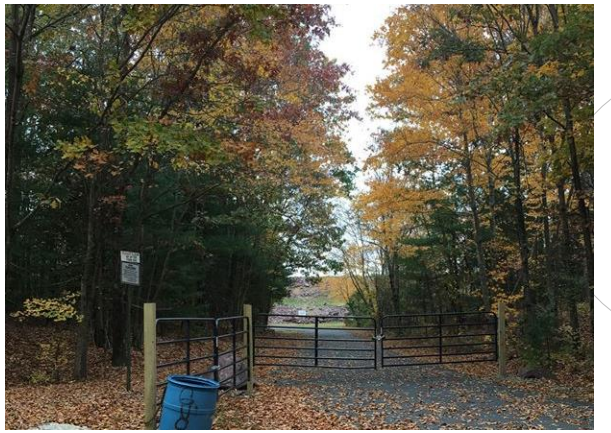
DEMOGRAPHIC PROFILE

Population	Attleboro	Massachusetts
2010	43,593	6,547,790
2018	45,117	6,902,149
Age		
Under 18 years:	22.7%	20%
65+ years:	12.9%	17%
Education		
Bachelor's degree or higher:	32%	42.1%
Additional Information		
Median household income:	$74,225	$74,167
Persons in poverty:	8.9%	10.5%
Language other than English spoken at home:	13%	23.1%

Source: U.S. Census Bureau, 2013-2017 ACS Estimates

ENVIRONMENTAL FEATURES

Luther Reservoir



Trail at Manchester Reservoir

Attleboro's Open Space

- 15.3% of the City is open space
- 2.5% is recreational space

IDENTIFY PRIORITY ACTIONS

ADD LOCAL PHOTO

AREAS of PROPOSED ACTIONS

- Public education
- Communication systems
- National Flood Insurance Program (NFIP)
- Policy-related strategies
- Infrastructure (dams, stormwater, etc.) and equipment
- Green technologies
- Emergency response planning and enhanced management
- Tree and vegetation maintenance

SYNOPSIS of ACTIONS (HMP-MVP Table 8.1)

Mitigation Action	Hazard Phase	Estimated Cost	Responsibility	Timeframe	Priority
Hire an Emergency/Management Director and create an Emergency Management Department reactivate the Emergency Management Committee	PRE	$$	**Mayor**	S	H
Create a dedicated location with required systems and equipment for Emergency Operations Center and ensure that training sessions are maintained.	PRE	$$	**Fire**, Police, Public Works, Health, Water, Wastewater	S	H
Create an Emergency Public Information Plan for various media (website, social media, direct mail) to keep the public informed before, during and after hazard events. Ensure that points of contact are continuously updated. Part of the plan should include deployment of a citywide multimedia hazard notification system	PRE	$$	**Fire**, Police, Public Works, Health, Water, Wastewater	S/O	H

WESTON & SAMPSON

Jim Riordan, Senior Project Manager

riordanj@wseinc.com

APPENDIX D

Plan Adoption

{Mayor's Letterhead}

{Date}

To Whom it May Concern:
Please be advised that on behalf of the City of Attleboro, and as the Mayor of the City, I hereby adopt the attached Municipal Vulnerability Preparedness and Hazard Mitigation Plan 2019.

Thank you.

Sincerely,

Paul Heroux

APPENDIX E

Plan Approval