

Town of Walpole



Community Resilience Building Workshop *Summary of Findings*

February, 2019

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Community Resilience Building Workshop

Summary of Findings

Overview

Extreme weather and natural and climate-related hazards are an increasing concern for the communities of Massachusetts, and there is a clear need to involve municipalities, corporations, organizations, and the State in increasing resilience at all levels. Recent storm events affecting the region have highlighted many of the vulnerabilities that towns and cities face. Hurricane Irene and Superstorm Sandy brought intense flooding to many municipalities and threatened (or destroyed) infrastructure across the state. Extreme temperatures at both ends of the spectrum have pushed the limits of communities' preparedness to protect both infrastructure and people. In coastal communities, the impacts of sea level rise are felt daily and further exacerbate the impacts of other extreme events. Current climate modeling indicates that all of these hazards are expected to increase in frequency and scale over the coming decades. The Municipal Vulnerability Preparedness (MVP) program provides support and a prescribed process for cities and towns in Massachusetts to plan proactively for resiliency and implement key climate change adaptation actions.

In 2018, the Town of Walpole was awarded a \$21,000 MVP grant to fund the planning stage of this process. The Town partnered with Fuss & O'Neill, a state certified MVP Provider, to complete a comprehensive, baseline climate change and natural hazard vulnerability assessment and develop a list of priority actions for the Town. This process involved the development of an MVP Core Team, which met on January 10, 2019 to determine initial concerns and worked to identify stakeholders within the municipality and set goals for the process. Those stakeholders were then invited to participate in a Community Resilience Building (CRB) workshop on January 30, 2019, engaging in a day-long, tried and tested process developed by The Nature Conservancy. The CRB methodology is an "anywhere at any scale" format that draws on stakeholders' wealth of information and experience to foster dialogue about the strengths and vulnerabilities within the Town. Workshop participants interacted at both large and small group levels, using an iterative process to gather input, synthesize ideas across groups, and ultimately develop a set of priority resilience and adaptation actions.

The CRB workshop's central objectives were to:

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

Top Hazards and Vulnerable Areas

During the Community Resilience Building workshop, participants were asked to identify the top four natural hazards of concern for the Town of Walpole. Discussion of the top hazards built on earlier conversations that took place at the MVP Core Team Meeting, as well as ongoing Town conversations that formed the basis for the Town's 2016 Hazard Mitigation Plan update. Flooding was identified as one of the Town's top hazards. The collective impacts of ice and snow were identified as a second hazard. Extreme temperatures, including days over 90 degrees F and days below 10 degrees F, were identified as a third hazard. Finally, severe weather events, including hurricanes, Nor'easters and heavy or prolonged rain events, were seen as a fourth major hazard. These four hazards have already had demonstrated impacts on the Town, and as climate change progresses, these hazards are expected to have ever greater consequences for infrastructure and environment, as well as for various societal elements. Specific areas of concern are identified below.

Top Hazards

- Flooding
- Snow/Ice
- Extreme Temperatures
- Severe Weather Events

Areas of Concern

While many impacts are expected to be felt Town-wide, certain elements, locations, or community groups present particular concerns.

Neighborhoods/Communities

Senior Residents, school-aged children, McDonald Circle, Oak Street, Norfolk Street, Wolcott Avenue, Burns Street, Union Street, Apple Tree Lane and Preserve Apartment neighborhoods

Ecosystems

Town Forests and Open Space, Neponset River and tributaries, Traphole Brook, Great Cedar Swamp, Cobbs Pond, Clarks Pond

Infrastructure

Elm Street Bridge, West Street Bridge, Coney Street Bridge, Wolcott Avenue Culvert, Union Street Culvert, Bird Pond Dam, Willet Pond Dam, Allen Reservoir Dam, Blackburn Dam, additional undersized culverts and stormwater infrastructure

Facilities

Washington Street Drinking Water Booster Station, Texaco Drinking Water Pump Station, Eldor Drive and Ganawatte Sewer Pump Stations

Current Concerns and Challenges Presented by Hazards

Major storm events have been a recurring threat to Walpole throughout its history, from hurricanes bringing wind, intense precipitation, and localized flooding to the inland community, to winter storms delivering ice and snow. During the flood of August 1955, the Town lost gas, water and electricity all at once and the Diamond Pond Dam let go, flooding Diamond Street and washing debris into Memorial Pond. Another notable historic event was the blizzard of 1978, which left cars stranded on the highway through Town due to insufficient roadway capacity. In 1998 one of the Town's Water Supply Pump Stations was flooded, limiting the Town's ability to distribute water to residents. It took a couple of months to restore the pump station to full function after that hazard event. A major ice storm in 2008 took down power lines, causing extensive electrical outages in Town.

More recently, the Town has been experiencing an increasing regularity of storms, with the so-called 100 year storm now happening several times a year. More intense storms delivering higher volumes of precipitation in a single event are expected to put significant pressure on dams, culverts, and other drainage infrastructure that were designed to handle smaller storms with more consistent distributions of precipitation. Flooding as a result of clogged or undersized stormwater conveyance systems and culverts already results in flooding of roads and bridges throughout Walpole. This problem is particularly noticeable in the frequent and recurrent flooding of the Elm Street Bridge, the West Street Bridge, and the areas surrounding McDonald Circle, Summer Street, and Wolcott Avenue. Many Town residents remember the floods that occurred in March of 2010, resulting in road closures that lasted for days. During the heavy rains that month there were a number of culvert failures throughout the Town, and they were carefully watching one of the dams in East Walpole for signs of failure.

The Town is also noticing a shift in the type and timing of storms. Many storm events now encompass a mixture of rain, ice, and snow, making it more difficult to maintain safe, accessible roadways. Three Nor'easters in March of 2018 were remembered by Bob Leblanc, Walpole Superintendent of Highways Parks and Cemeteries, as "the worst storms I can recall." He further noted that it was "all we could do to handle everything that was thrown at us," and that each storm required a different treatment approach. The storms brought large amounts of heavy wind and snow which resulted in power outages, downed trees and slippery roads. During recent winters temperatures have fluctuated quickly between above and below freezing, making it difficult to maintain safe roads and parking lots throughout Walpole. Police pointed out that the issue is further complicated when residents pump water from flooded basements into the road, leading to additional icing of the roads.

Extreme temperatures, both hot and cold, have had an impact on Walpole's residents, particularly the elderly and school age children. Last year the schools were impacted by severe winter weather and cold which used up all of the district's snow days and forced students to attend school later into the summer months. The Town's schools are not all equipped with air conditioning. There has been an increase in the number of children dealing with heat-related health conditions requiring visits to the nurse, including heat stroke and fainting. In a first for the Town, Walpole schools closed for two days at the end of the 2017-2018 school year as a result of excessive heat. Two additional heat closures have occurred already at the beginning of the 2018-2019 school year.

Extreme temperatures are also leading the Town to make greater use of heating and cooling shelters. The new Senior Center serves as a resource for the elderly during times of extreme heat or cold and power outages. The Town is interested in expanding the number of shelters available and ensuring more people, especially the elderly, are able to access these vital resources more often. The Town is also interested in improving options for residents with pets during emergencies, as the inability to bring pets to a shelter can prevent people from seeking shelter during an emergency.

Climate change may also bring previously unseen natural disasters to Massachusetts. The Walpole Fire Chief noted during the workshop that ten years ago tornados were not a concern in Walpole, however in recent years it has become standard for the Town to receive four to five tornado warnings in a year. Neither Walpole residents nor the Town's emergency services are equipped or trained to manage a tornado emergency.

While it did not emerge as one of the top four hazards, Walpole also has concerns about drought. The Town's public water supply consists of wells that draw from a sole source aquifer. Residents not served by the public water supply rely on private wells. As droughts increase with climate change, the Town is concerned about water shortages. In addition, drought during the summer of 2016 led to a gypsy moth infestation in Walpole which resulted in the death of many of the Town's trees. Many of these dead trees have not been removed and present a safety hazard during storms, as well as a fire risk. The Fire Chief recalled that the Town used to see frequent brush fires along the electrical transmission lines that cut through Town, although that area is now kept well-cleared by regular maintenance and poses less future risk.



Specific Categories of Concerns and Challenges

Infrastructural

Culverts and Bridges

Culverts and bridges are recognized as a high-priority concern town-wide. Workshop participants noted, in particular, that the Elm Street Bridge, Coney Street Bridge, West Street Bridge, and the Wolcott Avenue culvert frequently flood during rain events and roads may remain closed for days at a time. The Union Street culvert is another known area of concern, where flow from Traphole Brook causes flooding when it rains. No detailed inventory has cataloged the size and condition of culverts town-wide. Regardless of condition, culvert and bridge structures were designed to accommodate historic patterns of precipitation and runoff, which are rapidly transforming as a result of climate change. As precipitation events become more intense and less predictable, undersized culverts are expected to pose a greater threat of failure and flooding. Emergency service providers in the workshop noted that flooded roads can restrict and delay emergency access to certain areas of Walpole.

Dams

Dams in Walpole have been identified as a high-priority for assessments and safety improvements. Most town-owned dams are regulated under State dam safety regulations, and most are known quantities. Less information exists about many of the small dams in Town, particularly private dams, and whether they pose a risk. The Town has conducted improvements and repairs on some dams including Allen Reservoir Dam and Turner Pond Dam. Willet Pond Dam and Bird Pond Dam are known dams of concern that have not been improved or repaired. Willet Pond Dam is a high-hazard privately-owned dam located on the Walpole/Norwood line. The private ownership and shared town border complicate repair and management of the dam. Bird Pond Dam is a partially earthen dam and privately owned, which limits the Town's ability to make improvements. While some work has recently been done on Allen Reservoir Dam, workshop participants still identified it as a risk due to its aging infrastructure and the fact that it is located upstream of the downtown area. The Blackburn Dam was also a topic of discussion. Although classified as a low-hazard dam, the new Senior Center and Police Station are both downstream of the dam, and there is some concern over whether the hazard status of the dam needs to be re-evaluated in light of these critical downstream facilities. Feasibility of dam removals in Town has not yet been explored in depth, but there is concern about the public perception that may accompany dam removals which could potentially have dramatic impacts on residents' property, backyards, pond access, recreation, etc.

Stormwater Basins and Conveyances

Detention basins and other stormwater infrastructure are recognized as a potential concern Town-wide. Similarly to culverts conveying natural streams, there is a general recognition that much of the stormwater drainage system was designed to accommodate historic patterns of precipitation and runoff, and may be undersized as climate and weather patterns continue to shift. The Town's aging stormwater infrastructure and lack of maintenance funds exacerbates flooding potential during heavy rains. The section of School Street between Stone Street and Spring Brook was identified as an area prone to flooding due to issues with stormwater infrastructure. Development in Walpole has added to the amount of impervious area in the Town, which in turn has increased runoff and can increase flooding potential. Additional connections from new developments into the existing, already undersized infrastructure, also adds increased stress to the stormwater system. Furthermore, while newer Stormwater Best Management Practices (BMPs) meet appropriate standards and are being designed to withstand climate change impacts, existing BMPs are frequently not maintained by private owners. This not only renders them ineffective, but also contributes to increased potential for flood events. During the 2010 floods a privately-owned detention basin in the

Meadow Ridge subdivision breached and flooded Polley Lane. Public Works had to trench a path through the road in order to handle the flood waters. Untreated stormwater can have significant environmental effects for tributaries receiving flows if that stormwater carries sediment loads, pathogens, or other pollutants of concern.

Drinking Water Supply

Walpole's public water supply is provided by two water treatment facilities and multiple wells placed strategically at different points in Town that draw from the Head of the Neponset Aquifer. This Aquifer is designated as a sole source aquifer, meaning it supplies at least 50% of the drinking water for the Town of Walpole and that there are no reasonable alternatives if the aquifer becomes depleted or contaminated. Town officials expressed some concern over the need to increase water supply resiliency to ensure adequate supply during longer droughts, which are expected to increase as a result of climate change. There was also concern surrounding the potential for loss of low-lying water pump stations, some of which have below-grade infrastructure, and wells due to flooding. The Washington Street Booster Station and the Texaco Pump Station were highlighted as locations that are particularly at risk from flooding; the Texaco station is below-grade and has no storage tank. Flooding in 1998 resulted in the loss of a pump station, limiting the Town's ability to supply water to residents. Loss of pump stations could also limit firefighting capacity. In parts of the Town not serviced by public water, private wells are also a source of concern, as they are often shallow, and will be increasingly likely to run dry if drought conditions become more common in Walpole. Withdrawals from private wells are also unregulated which may result in depletion of the Town's water reserves. Contamination of the wells that are close to the railway is a concern in the event of a derailment or hazardous spill.

Sewer and Septic Systems

Walpole is serviced by both sewer and septic systems, although their sewer system is a collection system only, with treatment handled outside the Town by the Massachusetts Water Resources Authority. Septic systems are subject to failure and leakage, especially if subjected to flooding or overwhelmed by heavy precipitation. The Eldor Drive and Ganawatte Sewer Pump Stations are in low-lying areas that are at risk to flooding. The Town also has suspected infiltration and inflow problems in its sewer system, which need to be assessed and corrected in order to prevent sewage overflows during periods of heavy precipitation. The Town also knows that there are a number of illicit connections into their sewers where residents have connected basement pumps to the sewer lines. The Town is proactively working to address these connections as well as infiltration and inflow.

Electrical and Communications Infrastructure

Walpole's electrical and communication networks are vital to providing emergency services, but are vulnerable to a variety of climate change-related hazards. As demonstrated by the 2008 ice storm and more recent March snowstorms in 2018, power lines can be knocked out by snow and ice, in addition to wind events, causing extensive impacts to the Town. Extreme heat also stresses the electrical system, as increasing use of air conditioning leads to a risk of brown outs and outages, particularly if heat impacts are region-wide. Some of Walpole's newer developments feature buried electrical in underground conduit, which makes it more resilient to storms, but most of the Town's electrical infrastructure is above ground, and the costs to convert to underground wires have been estimated at \$1 million per mile. Participants also noted that Walpole contains significant electrical transmission infrastructure, including two substations, in addition to distribution lines.

Schools

Walpole's schools and student population are affected by a variety of hazard types. Workshop participant Mike Friscia, School Business Administrator, noted that school parking lots have been icy this winter, and alternating conditions of melting and refreezing have meant that multiple rounds of treatment have been

required to effectively de-ice them. There have been a number of slips and falls as students and teachers are entering school. Schools are increasingly forced to cancel classes due to snow and ice events or extreme cold that make it impossible to safely get students to school. This, in turn, has the potential to extend the school year further into the summer, which exacerbates the risks that school will be in session during extreme heat events. As days above 90 degrees increase, heat stroke is a concern for the student population in general, as the schools are not air conditioned. Heat related health conditions are particularly a concern for special needs students and student athletes, but extreme heat conditions also make for a poor learning environment in general. At Johnson Middle School, students were attempting to take tests in rooms with temperatures over 90 degrees, and the Administrator noted that there have been incidents of “kids passing out in classrooms” due to the heat.

Buildings and Facilities

In recent years Walpole has replaced Town-owned buildings including the Police Station, the Library, Norfolk County Agricultural School, and the Senior Center. All buildings that serve as shelters during emergencies now have back-up generators. The new Senior Center is an asset to the elderly population during power outages and extreme hot or cold temperatures. While the new buildings were viewed as a strength by workshop participants, they also acknowledged that older buildings still remain including the Blackburn Hall Recreation Facility, Town Hall, the Cedar Junction Correctional Facility, and many of the Town's schools. Older buildings are more likely to experience problems during extreme weather including burst pipes (a recent problem in Town Hall), heating and cooling problems, and power outages. There is interest in Walpole in pursuing designation as a Massachusetts Green Community. The Massachusetts Green Community Designation and Grant Program provides financial and technical support to designated communities to help them become more energy efficient and to utilize renewable energy in municipal buildings. Achieving Green Community designation would allow Walpole to update some of the aging Town buildings and facilities in a sustainable, climate-resilient manner.

Transportation

Walpole's major transportation routes include local roadways, State highways Route 95 and Route 1 and the Commuter Rail. Workshop participants noted Walpole's many transportation options as an asset to the community, however many roads in Walpole are vulnerable to flooding, as well as the impacts of snow and ice. In general, shifting weather patterns due to climate change are increasing the difficulty of maintaining those roadways. Roadways in Town are also susceptible to blockages from trees and power lines brought down by wind storms, or closure due to isolated flooding. These impacts in turn compromise the Town's ability to provide emergency services. Walpole is good at mitigating emergency situations when roadway closures or other hazards develop, however, especially as climate change increases the frequency of risks, more focus on prevention of hazard conditions is necessary to increase the resiliency of Walpole's roads. Flooding at the Elm Street and West Street Bridges was noted by workshop participants as particularly inconvenient, requiring drivers and emergency providers to take non-direct alternative routes.

Gillette Stadium

While Gillette Stadium is located in the neighboring town of Foxboro, workshop participants noted that stormwater generated from the stadium causes occasional flooding in the nearby Walpole neighborhoods off of Summer Street. Concerns were expressed about future proposed development in the area around Gillette Stadium worsening the stormwater problem. Workshop participants also noted that during stadium events traffic is increased significantly in the area and that State police reroute traffic around Route 1, limiting access to certain parts of Town. If a stadium event were to coincide with localized flooding, traffic problems would be exacerbated and transportation routes would be further restricted.



Environmental

Tree, Vegetation and Forest Management

Forests provide critical ecosystem services that help buffer the effects of climate change, from sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Street trees are likewise critical for infiltration of rainwater and provision of shade. However, trees and forests are also threatened by climate change. Wind and storms cause blowdowns, drought can contribute to die-off, invasive pests (e.g. Emerald Ash Borer, Asian Longhorned Beetle) are eliminating certain tree species, and others are in decline due to shifting temperature and precipitation regimes that favor more southerly species. The Town's emergency services also recognize that hazard events can convert trees from assets to threats. A gypsy moth caterpillar outbreak that corresponded with drought in the summer of 2016 killed many of the Town's trees. The Town works closely with Eversource to ensure that hazard trees are removed before they can pose a significant risk to roadways or electrical infrastructure, however workshop participants noted that dead wood located on Town-owned open space, private property, and locations away from the street is not properly managed and poses a risk during high wind and heavy snow events. There is also concern over wildfire risk, which is increased by the build-up of fuel (deadwood and underbrush) that results from die-offs and a lack of informed forest management.

Open Space

Open space provides ecosystem services that help buffer the effects of climate change, from sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Open space is also critical in floodplains for providing a buffer and increased flood storage, near public water supplies to maintain high water quality and promote recharge, and to maintain overall habitat connectivity that will be vital to allowing ecosystems and individual species to adapt to a changing climate. The Walpole Conservation

Agent noted that while Walpole has a lot of Open Space, there have been several properties that the Town would have liked to preserve but was unable to purchase due to lack of funding. The Town also feels constrained by competing zoning mandates from the state and pressures to encourage additional development. There is also a need to better manage the Town's Open Space properties to remove dead wood.

Ponds

Walpole's waterbodies are subject to algal blooms, particularly during times of excessive heat and/or drought. Excessive algal growth is exacerbated by climate change impacts, including increasing temperatures, drier summers, and overall lower water levels in the ponds, and results in fish kills, recreation impacts, and negative health effects. The problem is exacerbated by increasing nutrient pollution, which is frequently driven in part by land use change around ponds. If residential lawns lead right down to the water, there is no buffer to trap and filter nutrients. Invasive plants such as water chestnut, milfoil, and phragmites are also a known issue in and around the Town's ponds. In the fall of 2018, the Town of Walpole completed a pond restoration project on Memorial Pond by dredging excess sediment that had built up in the pond over time. Removing the excess sediment increased the storage capacity of the pond, reduced excessive weed growth, and improved the environmental conditions and aesthetic appeal of the pond. This project was successful for Memorial Pond and there are other ponds in Walpole with similar problems that would benefit from the same type of restoration.

Neponset River and tributaries

The Neponset River and its tributaries are important natural resources to the Town of Walpole. The rivers provide wildlife habitat, recreation opportunities, and historical significance to the Town. The Neponset River and one of its tributaries, Traphole Brook, are considered important habitat for a variety of trout. Trout are cold-water species that are threatened by increasing water temperatures associated with climate change. Walpole has conducted several restoration projects along the Neponset River and Traphole Brook with the Neponset River Watershed Association to remove dams and clear passage for trout along the rivers. Though these streams are valued as important natural resources to the Town, they are also recognized as a threat due to increasing flooding problems.

Great Cedar Swamp

Great Cedar Swamp is a 360-acre town-owned conservation area in the southern section of Walpole. The wetlands in this conservation area provide the Town with important ecosystem services including flood storage, water quality protection and wildlife habitat. As the effects of climate change become more evident in Walpole, the Town recognizes the importance of continuing to protect Great Cedar Swamp and the land around it from development.

Environmental Contaminants

A major CSX freight rail line runs through the center of the Town, passing in close proximity to several sensitive environmental areas, including lakes, streams, and wetlands, and within 20 feet of one of the Town's drinking water wells. Trains passing through the Town are known to carry a variety of hazardous materials that could pose a significant threat to people or the environment in the event of a spill. In particular, a spill that affected the drinking water well would likely result in the Town having to shut down the H. E. Willis Water Treatment Facility, one of two water treatment facilities in the Town, along with the supply well. This would negatively impact about one third of the Town's population. Similarly, Route 95 and Route 1 pass through the eastern portion of the Town. It is unknown specifically what the risk could be to the rail line or roadways due to climate change, but it is known that both flooding and extreme temperatures can affect the safe operation of trains, and that safe road travel is impacted by flooding and storm events.

Invasive Species

Invasive plants and animals are already a source of concern in Walpole, as they are throughout the Commonwealth. Forest and upland ecosystems are threatened by a variety of invasive plants, including plants such as oriental bittersweet, multiflora rose, and several non-native honeysuckles. Riparian and aquatic habitats are severely threatened by common reed, Japanese knotweed, invasive water chestnut, hydrilla, purple loosestrife, and Eurasian milfoil. Critical invasive insect pests already in the area include the Asian Longhorned Beetle and Emerald Ash Borer, both of which have the potential to do serious damage (both environmental and economic) to Massachusetts' forests and trees. These and other species already pose a significant challenge and have serious consequences for ecosystem health and resilience, and these impacts are likely to increase in response to climate change. Warming temperatures will also bring new invasives to the area, and these will have an easier time gaining a foothold if the Town's natural ecosystems are simultaneously weakened due to changes in climatic conditions.

Winter Road Treatment

The Walpole Department of Public Works has faced difficulties deicing roads and parking lots during recent winter storms that have encompassed a mixture of rain, ice, and snow. These storms have required more frequent applications of rock salt and magnesium chloride to the roads. These deicing chemicals are easily washed off the road by rain and melting ice, and they end up concentrating in nearby waterbodies, soils and groundwater. Salt and magnesium chloride have negative effects on water quality, aquatic species, soils and vegetation. Freshwater aquatic plants and animals are adapted to a narrow range of low chloride levels and even a slight increase can have negative effects. Increased chloride concentrations in water can also alter the distribution of oxygen and nutrients in waterbodies which can stress aquatic organisms. Similar to freshwater aquatic plants, most land plants are adapted to low levels of chloride in the soil. Salt that accumulates in soils can stress vegetation and provide opportunities for nuisance invasive plants to establish. Finally, excess salt that enters the groundwater supply can lead to more expensive and intensive drinking water treatment requirements.



Societal

Vulnerable Populations

Workshop participants acknowledged the challenges of identifying and reaching vulnerable individuals, especially those who may no longer have a land-line telephone, or who may not self-identify as vulnerable. Certain populations, especially seniors, are known to be at higher risk during hazard events and may require support beyond emergency notifications. Workshop participants expressed concerns about seniors' ability to obtain food and medical supplies during hazard events, as well as the challenges involved in getting seniors to leave their homes (and sometimes their pets) in order to seek shelter elsewhere. Better understanding what these needs are and how the Town can best prepare to proactively support its entire population are areas that require more exploration.

Vulnerable Neighborhoods

There are a number of neighborhoods in Walpole that are at risk from flooding, including the McDonald Circle, Oak Street, Norfolk Street, Wolcott Avenue, Burns Street and Union Street areas. The neighborhoods in the northern section of Walpole near Apple Tree Lane are also at risk due to their distance from the center of Town and emergency services. The Preserve Apartments, a densely populated neighborhood in the Southeastern section of Walpole, was also identified as a vulnerable neighborhood due to its isolation. Route 1 must be crossed to reach the neighborhood from the center of Town, which is especially difficult when events are occurring at Gillette Stadium and traffic is increased or diverted on Route 1. Hazardous events would make it more difficult to reach these already isolated neighborhoods. It was also noted in the workshop that the Town has a goal of increasing affordable housing in the future. There is concern that affordable housing frequently coincides with undesirable or vulnerable locations, and there is a need to ensure affordable housing, and new housing developments in general, are built strategically on land that is not vulnerable to climate change hazards such as flooding.

Pets and Service Animals

Pets and service animals are seen as members of the family and residents frequently refuse to use shelters or other emergency services if those services do not also accommodate their pets. This can therefore be a barrier to providing services to the Town's citizens, including vulnerable populations. Simultaneously, providing adequate shelter and services for animals can be a challenge in and of itself.

Stress on Emergency Services

Walpole's Fire, Police, and Public Works departments bear much of the burden of responding to the increased human threats that result from climate-induced hazards. An ever larger percentage of the departments' time and resources must be devoted to handling things like traffic accidents resulting from ice or other dangerous conditions and activities to maintain traffic flows or protect property during storm events, and Public Works is relied upon to clear roads and maintain access throughout the Town. These departments are also tasked with the provision of shelter services in times of need. The Town relies on volunteer staffing through the Medical Reserve Corps during emergencies as well but there is often a shortage of personnel for essential positions. Another concern brought up in the workshop is maintaining access to emergency medical flight take-off and landing areas. The ballfield next to Town Hall is one of two designated med-flight sites in Walpole, but this area is vulnerable to flooding and may become inaccessible during a hazard event.

Resident Engagement and Education

The Town recognizes the importance of engaging the community in climate resiliency planning. It is essential to communicate to the public about emergency situations, including information on road closures, driving bans and how to access emergency shelters. Workshop participants also noted the importance of educating owners of detention basins and septic systems about the importance of maintaining and cleaning them out on a regular basis to prevent failures or flooding.

Parks and Fields

Walpole's parks and fields are more frequently becoming inaccessible to students and residents due to impacts from both floods and drought conditions, both of which have led to closures in recent years. The Town's Parks and Recreation Director noted that when the fields flood it takes a long time for them to recover and athletic schedules need to be adjusted as a result. There has also been a noticeable increase in ticks and mosquitoes at the Town's parks and fields, which has required an increasing amount of chemical control.

Pests and Disease Control

Climate change is affecting pests and disease vectors both through changing precipitation conditions and changing temperature conditions. Warmer, wetter conditions lead to increased mosquito populations, while the absence of sufficient periods of cold means that pest populations that would historically have been killed off or reduced are able to survive the winter and emerge in greater numbers the following season. Further, as the Massachusetts climate begins to look more like the climate of the mid-Atlantic and southern states, we are seeing new types of diseases show up in existing pests (e.g. mosquitoes carrying West Nile Virus or Zika and ticks carrying Rocky Mountain Spotted Fever). A recent CDC report showed that vector-borne diseases tripled between 2004 and 2016, with approximately 75% of cases being related to tick-borne disease. Walpole is a voluntary member of the Norfolk County Mosquito District, and receives support from the district in the form of both chemical control and efforts to reduce stagnant water where mosquito populations breed. Workshop Participant Dave Lawson from the Norfolk County Mosquito District expressed concern that the invasive Asian Tiger Mosquito, which has established populations in Southeastern Massachusetts, may soon move north into Walpole and surrounding towns. This mosquito is a particular nuisance because it bites during the day as opposed to dawn and dusk like native mosquitos. Walpole residents also reported an increase in cases of Lyme disease in recent years. The deer population in Town, which serves as a key vector in the tick lifecycle, is largely uncontrolled. Deer in Walpole occur at a density of 25 individuals per square mile, whereas a more optimal and natural density is six to eight individuals per square mile. Increasing development has also brought deer habitat into closer contact with the built environment, exacerbating the problem of ticks on public and private property. These changes present a major public and animal health challenge in terms of education, prevention, and treatment.

Development

Over time, population increases and urban development have increased the impervious cover in Walpole, thereby increasing stormwater runoff and contributing to flooding problems throughout Town. Participants noted that new developments along route 1A already have drainage problems despite a stormwater bylaw requiring stormwater management in new developments. Even when the developments are properly designed and built, the additional input to existing infrastructure overwhelms structures that are in many cases already at or over capacity. As noted above, maintenance of stormwater infrastructure can also be hard to enforce. Walpole's land use regulations require that new developments establish an Operations and Maintenance Plan for Stormwater structures, which must be recorded with the property deed. However, all new structures remain privately owned and operated, which limits the Town's oversight. Because of consistent development in Town, the Planning Board is largely overwhelmed with public hearings and has had little time to focus on long-range planning or updates to the Town's land use regulations.

Current Strengths and Assets

While the Town recognized a number of vulnerabilities, workshop participants identified key strengths as well. Walpole has been proactive in protecting Open Space and the Town's natural resources through land procurement, wetlands protection and the creation of a stormwater bylaw. The Town has taken steps to provide emergency services to residents during power outages, storms and heat/cold emergencies. Walpole has improved senior citizens' access to essential services by building a new Senior Center. The Town has also been proactive in addressing critical infrastructural issues on Allen Reservoir Dam and Turner Pond Dam. Walpole benefits from a partnership with Eversource, which has played an essential role through their tree trimming program and taken key steps to make the Town's electrical infrastructure more resilient.

- Walpole's schools, police station, fire station, library and senior center already have **back-up generators**.
- The Town built a new **Senior Center** in 2018 that includes air conditioning and backup power.
- The Walpole **Council on Aging** maintains a roster with phone numbers of senior residents to facilitate contact during emergencies.
- The Town provides **emergency shelters with backup power** during storms, power outages and extreme temperatures.
- Walpole's **Medical Reserve Corps** is an organized group of volunteers prepared to respond to public health emergencies and other hazard events.
- The Town is already in the process of making arrangements for additional centers to serve as **shelters** during emergencies.
- Walpole has two **public pools and one existing splash pad that serve as cooling centers** in excessive heat and has plans to open a second splash pad.
- The Town **posts road closures on social media** to alert residents in a timely manner.
- Walpole benefits from the efforts of **Eversource**, which has invested time and money into clearing a tree trimming program, clearing hazard trees and improving the robustness of the electrical system through grid modernization.
- **Maintenance of transmission lines** in recent years has decreased the risk of brushfires along these infrastructure corridors.
- Walpole benefits from robust **mutual aid agreements** with surrounding towns.

- Walpole has approximately **2000 acres of preserved land** protected since the 1970s.
- The **Walpole Housing Partnership** is working to provide sufficient stock of affordable, efficient housing in the Town.
- The Conservation Commission is in the process of using grant funding to update the **Walpole Open Space and Recreation Plan**
- The Conservation Commission enforces the **Walpole Wetlands Protection Bylaw and the Stormwater and Erosion Control Bylaw** to minimize impacts on wetlands and improve stormwater quality.
- **Memorial Pond was dredged** in fall 2018 to improve flood storage and environmental conditions.
- The Town has completed **maintenance and upgrades on Allen Reservoir Dam and Turner Pond Dam.**
- **The Norfolk County Mosquito District** conducts spraying for mosquitos, brush clearing, and culvert cleaning and clearing of agricultural ditches to prevent standing water in Walpole.
- The Town has a **Comprehensive Emergency Management Plan** already in place that is currently undergoing updates.
- Walpole's **Police and Fire Stations are ideally located** in a very central part of Town that provides good access to all parts of Town.
- A new **urgent care facility** is being built on Route 1 that will serve Walpole residents.
- The Town's many **transportation access options** include rail, MBTA bus service, and access to Route 95.
- Walpole has an existing **tree inventory** that identifies hazard trees.
- There are three existing **solar farms** in Walpole, although these currently feed into the grid and are therefore not capable of providing resilient power during an outage that affects the grid.



Top Recommendations to Improve Resilience in Walpole

Participants at the CRB workshop identified a number of recommendations to address vulnerabilities and increase resiliency in three main topic areas: infrastructure, environment, and society. Management of water, primarily dealing with excesses of water due to flooding and improving undersized or deteriorating infrastructure systems, was a primary concern that emerged in both the small and large group discussions. Managing the Town's forests and eliminating dead wood emerged as a second major theme. Finally, much attention centered around providing services to the Town's residents during hazard events, with particular attention to vulnerable populations.

Highest Priority

- **Conduct a field inventory of culverts and bridges** to rank and prioritize projects for increased flooding resiliency and storm-hardening, followed by design and implementation of priority re-sizing or replacement projects. Green infrastructure, Low-Impact Design, and other nature-based solutions will be integrated with hard-infrastructure improvements to establish approaches that will be robust in the face of natural hazards and climate-change scenarios. Include prioritization of the Elm Street Bridge and West Street Bridge which are known problem areas in Town.
- **Complete a Town-wide dam inventory and assessment of all public and private dams** focusing on reducing the risk of flooding from dam failures during intense storm events and protection of critical ecosystems that provide flood storage and other climate resilience benefits. Technical study should include town-wide survey to update information on ownership and condition, determine risks from each dam, and prioritize projects. Focus on known problem areas including Bird Pond Dam and Willet Pond Dam. Include feasibility studies for dam removal where appropriate, and incorporate public process into any such study to best understand residents' concerns regarding changes to the character of their property, the impacts that a loss of a pond may have, and to engage citizens in a visioning and design process that will help them understand both the purpose of dam removal, and the aesthetic resources they could gain from a removal and stream restoration project.
- **Assess options to address excessively hot days in schools.** This may include implementing plans to install air conditioning in all Walpole schools, including necessary upgrades to the electrical infrastructure to allow for the additional capacity required to run air conditioning systems. An alternative solution is to keep children out of school on the hottest days of the year by reducing the school year. Options that will be considered include eliminating February vacation, lengthening the school day, and providing satellite education opportunities on snow days.
- **Identify vulnerable populations and foster an improved communications network** in advance of a hazard event to facilitate communication efforts and outreach to those most in need of information and assistance. Ensure that seniors and other at risk citizens are on the existing list of vulnerable individuals. Utilize networks of existing groups to encourage communication efforts

led by churches, schools, social groups, or Town agencies. Focus should be on populations that may be more vulnerable to climate-induced risks, such as extreme temperatures, may lack appropriate shelter during increasingly intense storms, or that may be unprepared if stranded or cut off from supplies due to flooding or storm events.

- **Develop a comprehensive tree, forests and land management program** to help address micro-flooding, and to identify, remove, and replace problem trees, preserve intact forests and street tree cover, and provide guidance and resources for gradually moving toward more climate-resilient trees and forest communities (e.g. species that will tolerate warmer temperatures). Simultaneously plan for the removal of excess standing dead wood and selective thinning to create space for more evenly aged forest stands and greater long-term resiliency. Focus on increasing stormwater infiltration and aquifer recharge, developing forests as effective carbon sinks, and improving habitat for native species. Simultaneously evaluate existing land use regulations and develop requirements for new development to encourage appropriate plantings and limit tree removal.
- **Assess additional mosquito/tick/pest control options**, including establishment of buffers between developed and undeveloped areas, determination of future risks due to increase in type and quantity of pests/disease vectors due to climate change. Build on existing efforts by the Board of Health and Norfolk County Mosquito District to continue proactive planning and education and outreach programs. Consider feasibility of expanding the Mosquito District's role to incorporate tick control strategies as well, and examine strategies to reduce deer populations and/or access of these populations to areas such as playing fields and school grounds.
- **Continue to foster partnership with Eversource** to ensure that hazardous trees are removed promptly and that the Town's electrical infrastructure is kept up-to-date.
- **Conduct a feasibility study to evaluate improvements to electrical resiliency**, including moving distribution lines underground in key areas or high-hazard areas, and exploring the viability of a microgrid to maintain power in certain areas independent of the main grid.
- **Increase maintenance of catch basins, conveyances and detention ponds.** Develop public education and outreach on appropriate operation and maintenance (O/M) of stormwater BMPs on private properties. Review and improve maintenance schedule and budgets, keep up with regular maintenance of publicly-owned structures, and increase frequency of street sweeping and catch basin cleaning.
- **Assess drainage-driven road flooding and develop green infrastructure solutions for stormwater management** to be used in tandem with improvements to the outdated and undersized stormwater system to reduce road flooding. Develop a list of specific priorities, assess feasibility and cost, rank priority projects in terms of climate resilience potential, and develop concept designs for key projects. Also review Town regulations and update as necessary to support green infrastructure and low-impact development.

Moderate Priority

- **Perform a risk assessment of the drinking water pump stations** and establish priority actions for reducing potential flooding impacts, including consideration of nature-based solutions or green infrastructure approaches. Establish plans to implement emergency back-up power for all pump stations.
- **Study the possibility of expanding the public water supply** to establish a back-up in the case of contamination or inundation of the wells in the low lying areas.
- **Provide public education and outreach to private well owners**, focusing on conservation measures and means of limiting water use to prevent impacts to the water supply. Simultaneously ensure that well owners are aware of their drought risks and adequately prepared for hazard scenarios from drought to power outages, both of which may affect their water supply.
- **Perform a risk assessment of the wastewater pump stations** and establish priority actions for reducing potential flooding impacts, including consideration of nature-based solutions or green infrastructure approaches. Establish emergency back-up plans for the plant and pump stations.
- **Conduct sewer infiltration and inflow study** to determine likely problem areas and establish a priority list of next steps for reducing flooding impacts related to infiltration and inflow. Continue locating and eliminating illicit connections from basement sump pumps to decrease inputs of groundwater into the sewer system.
- **Educate owners of private septic systems** about the importance of having systems pumped out and keeping them in good working condition in order to prevent risks to public health and the environment from systems that become overwhelmed during periods of heavy precipitation.
- **Partner with electric and gas utility providers** to identify and address vulnerabilities in utility infrastructure and enhance communication and cooperation between the Town and private utilities. Also Prioritize expansion and reliability of gas mains serving Walpole to ensure that the Town is not cut off from gas supply during hazard events.
- **Pursue public facilities upgrades that would increase resiliency**, including upgrades to Blackburn Hall Recreation Facility, Town Hall, the Cedar Junction Correctional Facility, and the Town's schools. Focus on creating buildings that are resilient to power outages, water supply problems and floods. Consider installation of solar panels with battery storage to increase resiliency to power outages.
- **Continue to support coordinated efforts to provide emergency shelters** that effectively serve Walpole's population during hazard events, including cooling and warming centers.
- **Continue to offer extended hours at public swimming pools** when temperatures are above 90 degrees F.
- **Develop plans for pet evacuation** to ensure that individuals' pets are safe and secure during a hazard, and that concern about pets does not prevent people from evacuating during an emergency.

- **Develop a more robust communications system** to inform the public prior to hazard events and disperse updates during hazards. Communications should include issues related to water supply, road closures, evacuation routes, and shelter information.
- **Identify alternative med-flight take-off and landing areas** in the event that the Town Hall field is flooded. Develop a robust communications system so that emergency service providers are notified as soon as possible when the area is unavailable for landing or take-off.
- **Develop an Alternate Emergency Staffing Plan** to ensure that essential roles are covered during an emergency, and reduce dependency on volunteers. Provide training so that Town employees in non-essential roles could be redirected to essential roles to provide support during emergencies.
- **Develop a way to publicize emergency evacuation routes during an emergency.** Routes currently exist, but are not marked or well known. There is concern about posting routes, as specific routes may need to be modified depending on the type and extent of a hazard event. However, it was acknowledged that there would be value in making residents aware of the fact that evacuation protocols and emergency routes do exist and that there is a system for informing the public about the appropriate routes to use during an emergency. Consider purchasing mobile signs or other equipment to facilitate flexible posting options during hazards and enable emergency services to remain flexible and responsive. Further, ensure that evacuation plans include consideration for moving residents who lack private transportation.
- **Pursue opportunities to fund open space acquisition** consistent with Town planning priorities. Focus on areas that will create flood resiliency through increasing storage capacity in floodplains and/or infiltration capacity in uplands. Priority should also be given to larger parcels that can provide connectivity between existing conserved parcels to maintain habitat corridors. Incorporate understanding of climate change impacts and priorities gained through the MVP Planning Process into the Open Space and Recreation Plan.
- **Continue to develop relationship with Neponset River Watershed Association** to protect trout species and promote climate resiliency in the Neponset River, Traphole Brook and other tributaries in Walpole. Explore the possibility of developing a Neponset River Watershed Management Plan with the Neponset River Watershed Association and other municipalities in the watershed.
- **Develop a management plan for Great Cedar Swamp** to ensure its continued protection as an important resource for flood storage, wildlife habitat and water quality protection in Walpole.
- **Analyze hazardous materials risk** to develop an understanding of how climate-change induced hazards could potentially increase the risk of accidents or spills involving the railroad lines that run through Town and quantify the potential risks to the Town, and particularly the Town water supply, that could result from accidents involving various classes and types of materials.
- **Develop a Town-wide affordable housing strategy with the Walpole Housing Partnership that specifically addresses climate impacts**, including consideration of geographic risks that may disproportionately impact residents in affordable housing (e.g., locations on less-desirable or at-risk land), and access to resources, including provisions and fuel, during hazard events, especially for residents without private transportation.

- **Partner with Foxboro to evaluate stormwater conditions in the vicinity of Gillette Stadium** and develop designs and solutions, including green infrastructure retrofits, to better infiltrate water in place and prevent impacts to Walpole's streets and neighborhoods.
- **Convene a committee to explore creative solutions to school resiliency**, and coordinate with MSBA to develop designs for a new school that would incorporate a variety of green components that would both provide functional resiliency for the school facilities and create unique educational and curricular opportunities for students. Examples might include: a solar canopy to generate power for the school and provide emergency back-up power as well as provide protection for the schools' fleet of 16 special education vans and eliminate the need to spend significant time cleaning vehicles on snowy mornings; rain gardens, pervious pavement, and other green infrastructure techniques for stormwater handling; or green roofs to reduce cooling needs and manage stormwater.

Lower Priority

- **Review and revise Town regulations** pertaining to stormwater management and compliance in order to increase resiliency, ensure that regulations accommodate and encourage nature-based solutions, and provide legal authority to enforce protective measures.
- **Conduct robust education and outreach to build awareness** of Town resources and make Town residents aware of the many planning efforts, agreements, shelters, etc. which are focused on making the Town more resilient to climate change impacts. Ensure that all residents know how to access these resources when they are needed.
- **Pursue designation as a Massachusetts Green Community.**
- **Assess cost-effectiveness of environmentally-friendly road treatment alternatives**, including salt brine, byproducts from the brewing industry, and other new products. Assess options for both efficacy and potential environmental impacts, such as nutrient content.
- **Advocate for the state to re-evaluate policies regarding winter road emergencies**, with the intent of limiting roadway use to essential personnel during hazard events and enabling emergency services and Public Works to more effectively and efficiently do their jobs of returning the roadways to a safe condition. Encourage education and outreach programs at the state level that encourage residents to limit travel during unsafe conditions.
- **Explore options to make Town fields and parks more resilient to weather impacts.** Consider preventative measures such as ensuring catch basins nearby are cleared out regularly and installing field drainage systems. Develop a post-flood clean-up team to restore fields to playable condition faster. Investigate green infrastructure designs to detain or infiltrate stormwater away from playing surfaces.
- **Pursue opportunities to fund pond restoration**, especially at Clarks Pond and Cobbs Pond, including dredging, to improve flood storage capacity and environmental conditions of the Town's ponds.
- **Develop comprehensive invasive species management** from inventory stage through management planning and implementation to address existing invasive populations that threaten

features such as open space or forests, both of which contribute to resiliency, as well as anticipate new invasives that are likely to move into the area as climates shift.

- **Update Mapping of Town-owned Open Space and Parks**, including to show emergency access points and facilitate emergency response.

CRB Workshop Participants

All workshop invitees are listed below; attendees are indicated with an asterisk.

| Name | Position/Organization |
|-------------------------|---|
| David Lawson* | Director, Norfolk County Mosquito Control |
| Philip Czachorowski* | Walpole Housing Partnership |
| Mike Teeley* | Walpole Housing Partnership |
| Landis Hershey* | Conservation Agent |
| Mike Friscia* | School Business Administrator |
| Maggie Walker* | Town Engineer |
| Gary Walsh* | EHS Director, Siemens Healthineers |
| Luke Parlow* | Police Patrol |
| Roger Turner* | Emergency Management Director |
| Melissa Cochrane* | Intern, Mass Maritime Academy |
| Bernie Marshall* | Superintendent Water/Sewer |
| Scott Gustafson* | Assistant Superintendent Water/Sewer |
| Brendan Croak* | Recreation Director |
| John Lee* | Teacher, Norfolk County Agricultural High School |
| Bob Leblanc* | Superintendent, Highways/Parks/Cemeteries |
| John Charbonneau* | Community Planner Director |
| Robin Chapell* | Health Director |
| Timothy F. Bailey, Jr.* | Fire Chief |
| Michael Yanovitch | Building Commissioner |
| Jim Johnson | Town Administrator |
| Kerri McManama | Council on Aging Director |
| Andrew Flowers | Housing Partnership, Finance Committee |
| Michael Porreca | Director of Project Management, Siemens Healthineers |
| John Carmichael | Police Chief |
| Patrick Shield | Assistant Town Administrator |
| Rick Mattson | Public Works Director |
| Marc Romeo | Planning Board and Economic Development Commission Member |

* indicates attendees

Citation

Fuss & O'Neill (2019). Community Resilience Building Workshop Summary of Findings. Town of Walpole, Fuss & O'Neill, Inc. Springfield, Massachusetts.

CRB Workshop Project Team: Organization, Name, Role

| Name | Organization | Role |
|-------------------------------|-------------------------------|--------------------------------------|
| Landis Hershey | Conservation Agent | Project Coordinator/Core Team Member |
| Michael Friscia | School Business Administrator | Core Team Member |
| John White | Police Sergeant | Core Team Member |
| Robin Chapell | Health Department | Core Team Member |
| Brendan Croak | Recreation Director | Core Team Member |
| Rick Mattson | Public Works Director | Core Team Member |
| John Charbonneau | Community Planning Director | Core Team Member |
| Timothy F. Bailey, Jr. | Fire Chief | Core Team Member |
| Patrick Shield | Assistant Town Administrator | Core Team Member |
| Chris Johnson | Assistant Town Engineer | Core Team Member |
| Julianne Busa | Fuss & O'Neill | MVP Lead Facilitator |
| William Guenther | Fuss & O'Neill | MVP Facilitator |
| Sarah Frazar | Fuss & O'Neill | Scribe |

Acknowledgements

Many thanks to the MVP Core Team members, CRB workshop participants, and to Landis Hershey who acted as the local Project Coordinator. Thanks to the Town of Walpole for providing a meeting space for the Core Team Meeting and the Walpole Public Library for providing a meeting space for the CRB Workshop.

Funding for the CRB Workshop was provided through a Massachusetts MVP grant.

Appendix A

Final Risk Matrix

Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.org

H-M-L priority for action
V = Vulnerability S =

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | Flooding | Snow/ Ice | Severe Weather Events | Extreme Temperatures | Time | |
|-----------------------------------|---|--------------|--------|---|-----------|-----------------------|----------------------|-------|--------------------|
| | | | | | | | | H-M-L | Short Long Ongoing |
| Culverts and Bridges | Town-wide | Town | V | Conduct a field inventory of culverts and bridges, rank and prioritize projects for increased flooding resiliency and storm-hardening; design and implement priority resizing and replacement projects; integrating green infrastructure, low-impact design, and other nature-based solutions; prioritize the Elm Street Bridge and West Street Bridge. | | | | H | S |
| | Allen Reservoir Dam and Turner Pond Dam | Town | S | The Town has completed maintenance and upgrades on Allen Reservoir Dam and Turner Pond Dam. | | | | N/A | N/A |
| Dams | Town-Wide | Town/Private | V | Complete a dam inventory and assessment of public and private dams; focus on reducing dam failures during intense storm events and protecting critical ecosystems; include town-wide survey to update information on ownership and condition, determine risks from each dam, and prioritize projects; focus on Bird Pond Dam and Willet Pond Dam; include feasibility studies for dam removal where appropriate and include public process to understand residents' concerns regarding dam removal. | | | | H | S |
| | | Town/Private | V | Increase maintenance of catch basins, conveyances and detention ponds. Develop public education and outreach on operation and maintenance of stormwater BMPs on private properties. Review and improve maintenance schedule and budgets, keep up with regular maintenance of publicly-owned structures, and increase frequency of street sweeping and catch basin cleaning. | | | | H | S |
| Stormwater Basins and Conveyances | Town-Wide | Town | V | Assess drainage-driven road flooding and develop green infrastructure solutions for stormwater management to be used in tandem with improvements to the outdated and undersized stormwater system. Develop a list of specific priorities, assess feasibility and cost, rank priority projects, and develop concept designs for key projects. Review Town regulations and update as necessary to support green infrastructure and low-impact development. | | | | H | S |
| | | Town | V | Perform a risk assessment of the drinking water pump stations and establish priority actions for reducing potential flooding impacts, including consideration of nature-based solutions or green infrastructure approaches. Establish plans to implement emergency back-up power for all pump stations. | | | | M | L |
| Drinking Water Supply | Town-wide | Private | V | Study the possibility of expanding the public water supply to establish a back-up in the case of contamination or inundation of the wells in the low lying areas. | | | | M | L |
| | | Private | V | Provide public education and outreach to private well owners, focusing on conservation measures and means of limiting water. Ensure that well owners are aware of their drought risks and adequately prepared for hazard scenarios including drought and power outages. | | | | M | L |
| Sewer and Septic Systems | | Town | V | Perform a risk assessment of the wastewater pump stations; establish priority actions for reducing potential flooding impacts, integrating nature-based solutions or green infrastructure approaches. Establish emergency back-up plans for the plant and pump stations. | | | | M | L |
| | | Town/Private | V | Conduct sewer infiltration and inflow study to determine likely problem areas; establish a priority list of next steps for reducing flooding impacts related to infiltration and inflow. Continue locating and eliminating illicit connections from basement sump pumps. | | | | M | O |
| | | Private | V | Educate owners of private septic systems about the importance of having systems pumped out and keeping them in good working condition in order to prevent risks to public health and the environment. | | | | M | O |

| | | | | | | |
|--|-------------------|--------------|---|---|-----|---|
| Electrical and Communications Infrastructure | Town-Wide | Town/Private | S | The Town benefits from the efforts of Eversource to clear hazard trees and improve the robustness of the electrical system. Maintenance of transmission lines in recent years has decreased the risk of brushfires along these infrastructure corridors. | N/A | O |
| | | Private | S | There are three existing solar farms in Walpole, although these currently feed into the grid and are therefore not capable of providing resilient power during an outage that affects the grid. | N/A | O |
| Schools | Town-Wide | Town/Private | V | Continue to foster partnership with Eversource to ensure that hazardous trees are removed promptly and that the Town's electrical infrastructure is kept up-to-date. | H | O |
| | | Private | V | Conduct a feasibility study to evaluate improvements to electrical resiliency, including moving distribution lines underground in key areas or high-hazard areas; explore the viability of a microgrid to maintain power in certain areas independent of the main grid. | H | S |
| | | Private | V | Partner with electric and gas utility providers to identify and address vulnerabilities in utility infrastructure; enhance communication and cooperation between the Town and private utilities; prioritize expansion and reliability of gas mains serving Walpole to ensure that the Town is not cut off from gas supply during hazard events. | M | L |
| | | | V | Assess options to address excessively hot days in schools. Consider installing air conditioning and upgrading the electrical infrastructure. Consider alternatives such as reducing the school year, eliminating February vacation, lengthening the school day, and providing satellite education opportunities on snow days. | H | S |
| Buildings and Facilities | Various Locations | | V | Convene a committee to explore creative solutions to school resiliency; coordinate with MSBA to develop designs for a new school that would incorporate a variety of green components. Examples might include: a solar canopy to generate power for the school, provide emergency back-up power and provide protection for the schools' special education vans, rain gardens, pervious pavement, and green roofs. | M | L |
| | | | S | Walpole's schools, police station, fire station, library and senior center already have back-up generators. The Town built a new Senior Center in 2018 that also includes air conditioning. | N/A | O |
| | | Town | V | Pursue public facilities upgrades that would increase resiliency, including upgrades to Blackburn Hall Recreation Facility, Town Hall, the Cedar Junction Correctional Facility, and the Town's schools. Focus on creating buildings that are resilient to power outages, water supply problems and floods. Consider installation of solar panels with battery storage. | M | L |
| | | Town-Wide | V | Pursue designation as a Massachusetts Green Community | L | L |
| Transportation | Town-Wide | Town/Private | S | The Town's many transportation access options include rail, MBTA bus service, and access to Route 95. The Town posts road closures on social media to alert residents in a timely manner. | N/A | O |
| Gillette Stadium | Foxboro | Private | V | Partner with Foxboro to evaluate stormwater conditions in the vicinity of Gillette Stadium; develop designs and solutions, including green infrastructure retrofits, to better infiltrate water in place and prevent impacts to Walpole's streets and neighborhoods. | M | L |
| Societal | | | | | | |
| Vulnerable Populations | Various Locations | | S | Walpole has two public pools and a splash pad that serve as cooling centers in excessive heat and has plans to open a second splash pad. | N/A | O |
| | | Town | V | Continue to offer extended hours at public swimming pools when temperatures are above 90 degrees F. | M | S |
| | | | S | The Walpole Council on Aging maintains a roster with phone numbers of senior residents to facilitate contact during emergencies. | N/A | O |

| | | Town/ Private | V | Identify vulnerable populations and foster an improved communications network to facilitate communication and outreach to those most in need of information and assistance. Ensure that seniors and other at risk citizens are on the existing list of vulnerable individuals. Utilize networks of existing groups to encourage communication efforts led by churches, schools, social groups, or Town agencies. | H | S |
|-----------------------------------|-------------------|------------------|---|--|-----|---|
| Vulnerable Neighborhoods | Town-Wide | Town/ Private | S | The Walpole Housing Partnership is working to provide sufficient stock of affordable, efficient housing in the Town. | N/A | O |
| | | Town/ Private | V | Develop a Town-wide affordable housing strategy with the Walpole Housing Partnership that specifically addresses climate impacts; consider geographic risks that may disproportionately impact residents in affordable housing and access to resources during hazard events, especially for residents without private transportation. | M | L |
| Pets and Service Animals | Various Locations | Town | V | Develop plans for pet evacuation to ensure that individuals' pets are safe and secure during a hazard, and that concern about pets does not prevent people from evacuating during an emergency. | M | S |
| | | Town/ Private | S | The Town provides emergency shelters with backup power during storms, power outages and extreme temperatures and is already in the process of making arrangements for additional centers to serve as shelters during emergencies. Walpole's Medical Reserve Corps is an organized group of volunteers prepared to respond to public health emergencies and other hazard events. The Town has a Comprehensive Emergency Management Plan already in place that is currently undergoing updates. Walpole's Police and Fire Stations are ideally located in a very central part of Town that provides good access to all parts of Town. A new urgent care facility is being built on Route 1 that will serve Walpole residents. Walpole benefits from robust mutual aid agreements with surrounding towns. | N/A | O |
| Streets on Emergency Services | Various Locations | Town | V | Continue to support coordinated efforts to provide emergency shelters that effectively serve Walpole's population during hazard events, including cooling and warming centers. | M | S |
| | | Town/ Private | V | Identify alternative med-flight take-off and landing areas in the event that the Town Hall field is flooded. Develop a robust communications system so that emergency service providers are notified as soon as possible when the area is unavailable for landing or take-off. | M | L |
| Resident Engagement and Education | Town-Wide | Town | V | Develop an Alternate Emergency Staffing Plan to ensure that essential roles are covered during an emergency, and reduce dependency on volunteers. Provide training so that Town employees in non-essential roles could be redirected to essential roles to provide support during emergencies. | M | L |
| | | Town | V | Develop a more robust communications system to inform the public prior to hazard events and disperse updates during hazards. Communications should include issues related to water supply, road closures, evacuation routes, and shelter information. | M | S |
| | | Town | V | Develop a way to publicize emergency evacuation routes during an emergency. Consider purchasing mobile signs or other equipment to facilitate flexible posting options during hazards and enable emergency services to remain flexible and responsive. Ensure that evacuation plans include consideration for moving residents who lack private transportation. | M | L |
| | | Town | V | Conduct robust education and outreach to build awareness of Town resources and make Town residents aware of the many planning efforts, agreements, shelters, etc. which are focused on making the Town more resilient to climate change impacts. Ensure that all residents know how to access these resources when they are needed. | L | L |
| Parks and Fields | Various Locations | Town | V | Explore options to make Town fields and parks more resilient to weather impacts. Consider preventative measures such as ensuring catch basins nearby are cleared out regularly and installing field drainage systems. Develop a post-flood clean-up team to restore fields to playable condition faster. Investigate green infrastructure designs to detain or infiltrate stormwater away from playing surfaces. | L | L |
| | | Town | V | Update Mapping of Town-owned Open Space and Parks, including to show emergency access points and facilitate emergency response. | L | L |
| Pests and Disease Control | Town-Wide | Town/ Private | S | The Norfolk County Mosquito District conducts spraying for mosquitos, brush clearing, and culvert cleaning and clearing of agricultural ditches to prevent standing water in Walpole. | N/A | O |
| | | Town/ Private | V | Assess additional mosquito/tick/pest control options, including establishment of buffers between developed and undeveloped areas and determination of future risks due to increase in type and quantity of pests/disease vectors. Build on existing efforts by the Board of Health and Norfolk County Mosquito District to continue proactive planning and education and outreach programs. Consider feasibility of expanding the Mosquito District's role to incorporate tick control strategies as well; examine strategies to reduce deer populations and/or access of these populations to areas such as playing fields and school grounds. | H | S |

| Development | Town-Wide | Town/Private | V | Review and revise Town regulations pertaining to stormwater management and compliance in order to increase resiliency, ensure that regulations accommodate and encourage nature-based solutions, and provide legal authority to enforce protective measures. | L | L |
|--|--------------------------------|--------------|---|--|-----|-----|
| Environmental | | | | | | |
| Tree, Vegetation and Forest Management | Town-Wide | Town/Private | S | Walpole has an existing tree inventory that identifies hazard trees. | N/A | O |
| | | | V | Develop a comprehensive tree, forests and land management program to address micro-flooding, identify, remove, and replace problem trees, preserve intact forests and street tree cover, and provide guidance for moving toward more climate-resilient trees and forest communities. Plan for the removal of excess standing dead wood and selective thinning to create space for more evenly aged forest stands. Focus on increasing stormwater infiltration and aquifer recharge, developing forests as effective carbon sinks, and improving habitat for native species. Evaluate existing land use regulations and develop requirements for new development to encourage appropriate plantings and limit tree removal. | H | S |
| Open Space | Town-Wide | Town | S | Walpole has approximately 2000 acres of preserved land protected since the 1970s. | N/A | O |
| | | | V | The Conservation Commission is in the process of using grant funding to update the Walpole Open Space and Recreation Plan. Pursue opportunities to fund open space acquisition. Focus on areas that will create flood resiliency and on larger parcels that can provide connectivity between existing conserved parcels. Incorporate understanding of climate change impacts and priorities gained through the MVP Planning Process into the Open Space and Recreation Plan. | M | L |
| Ponds | Memorial Pond | Town | S | Memorial Pond was dredged in fall 2018 to improve flood storage and environmental conditions. | N/A | N/A |
| | Various Locations | Town | V | Pursue opportunities to fund pond restoration, especially at Clarks Pond and Cobbs Pond. | L | L |
| Neponset River and Tributaries | Neponset River and Tributaries | Town | V | Continue to develop relationship with Neponset River Watershed Association to protect trout species and promote climate resiliency in the Neponset River, Trapshole Brook and other tributaries in Walpole. Explore the possibility of developing a Neponset River Watershed Management Plan with the Neponset River Watershed Association and other municipalities in the watershed. | M | L |
| Great Cedar Swamp | Various Locations | Town/Private | S | The Conservation Commission enforces the Walpole Wetlands Protection Bylaw and the Stormwater and Erosion Control Bylaw to minimize impacts on wetlands and improve stormwater quality. | N/A | O |
| | Great Cedar Swamp | Town | V | Develop a management plan for Great Cedar Swamp to ensure its continued protection as an important resource for flood storage, wildlife habitat and water quality protection in Walpole. | M | L |
| Environmental Contaminants | Town-Wide | Town/Private | V | Analyze hazardous materials risk to develop an understanding of how climate-change induced hazards could potentially increase the risk of accidents or spills involving the railroad lines that run through Town and quantify the potential risks to the Town, and particularly the Town water supply, that could result from accidents involving various classes and types of materials. | M | L |
| Invasive Species | Town-Wide | Town/Private | V | Develop comprehensive invasive species management from inventory stage through management planning and implementation to address existing invasive populations that threaten features such as open space or forests, both of which contribute to resiliency, as well as anticipate new invasives that are likely to move into the area as climates shift. | L | L |
| Winter Road Treatment | Town-Wide | Town/Private | V | Assess cost-effectiveness of environmentally-friendly road treatment alternatives, including salt brine, byproducts from the brewing industry, and other new products. Assess options for both efficacy and potential environmental impacts, such as nutrient content. | L | L |
| | | | V | Advocate for the state to re-evaluate policies regarding winter road emergencies, with the intent of limiting roadway use to essential personnel during hazard events and enabling emergency services and Public Works to more effectively and efficiently do their jobs of returning the roadways to a safe condition. Encourage education and outreach programs at the state level that encourage residents to limit travel during unsafe conditions. | L | L |

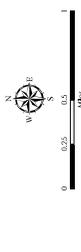
Appendix B

CRB Workshop Base Map

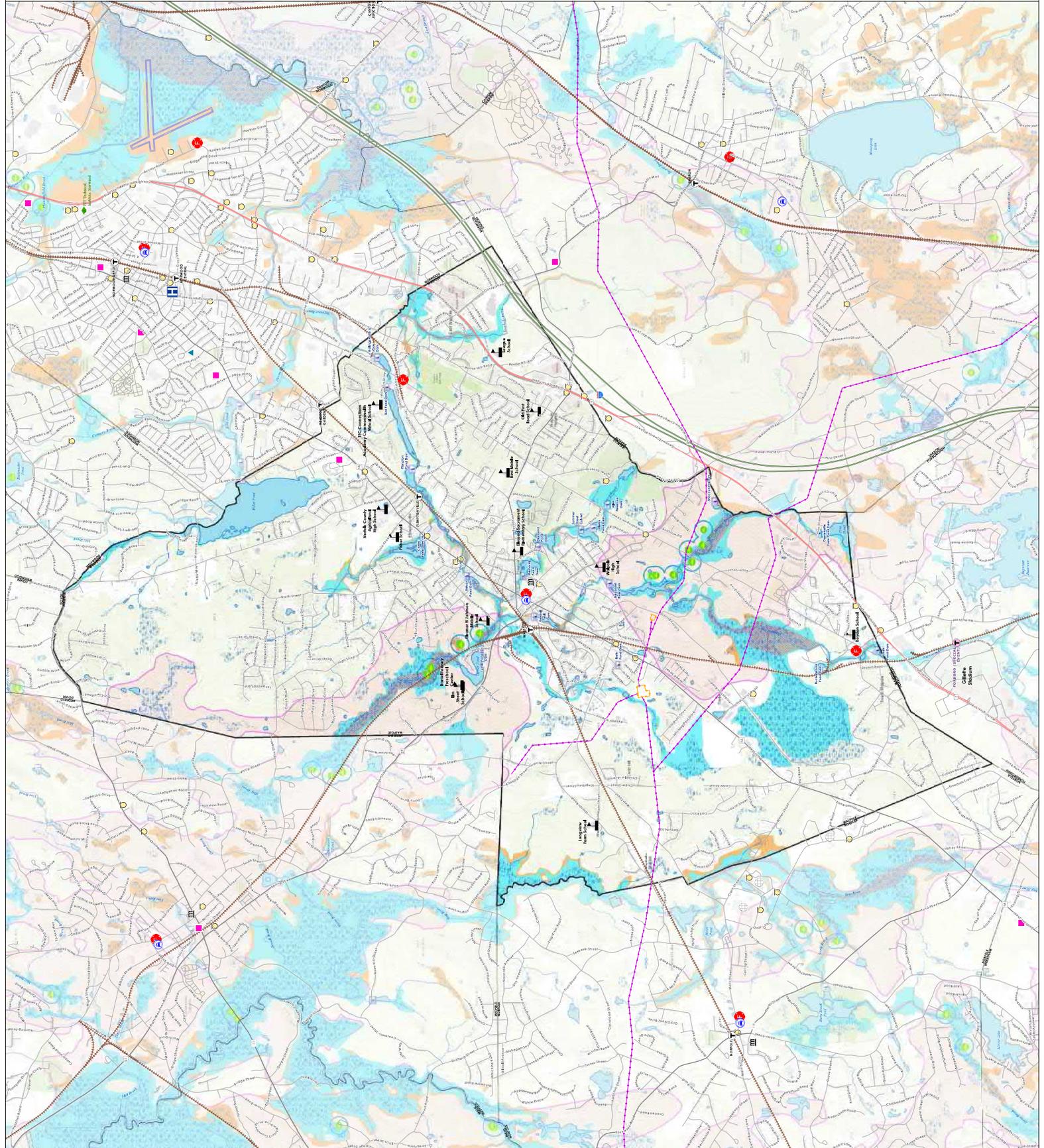
WALPOLE, MA

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

- Town Hall
 - Police Station
 - Fire Station
 - Hospital
 - School
 - Private University
 - Community Groundwater Source
 - Dams
 - Underground Storage Tanks
 - Prisons
 - Assisted Living Facility
 - Nursing Home
 - Interstate
 - U.S. Highway
 - State Route
 - Non-numbered Road
 - Powerline
 - Substation
 - Landing Ship/Airport
 - Railroads - Active Service
 - Regular Service
 - Open Only Seasonally or for Special Events
 - Perennial Stream
 - Intermittent Stream
 - Shoreline
 - Marmade Shoreline
 - Ditch/Canal
 - Pond, Lake, Ocean
 - Wetland
 - Cranberry Bog
 - Wellhead Protection Zone I
 - Wellhead Protection Zone II
- ### Flood Zone Designations
- 1% Annual Chance of Flooding
 - Regulatory Floodway
 - 0.2% Annual Chance of Flooding
 - Area with no DFIRM - Paper FIRMs in Effect



Data sources:
MassGIS - Infrastructure, Hydrology, and Administrative Data
ESRI - World Topographic Map - State Map



Appendix C

CRB Workshop Outputs: Participatory Mapping Exercise & Risk Matrices

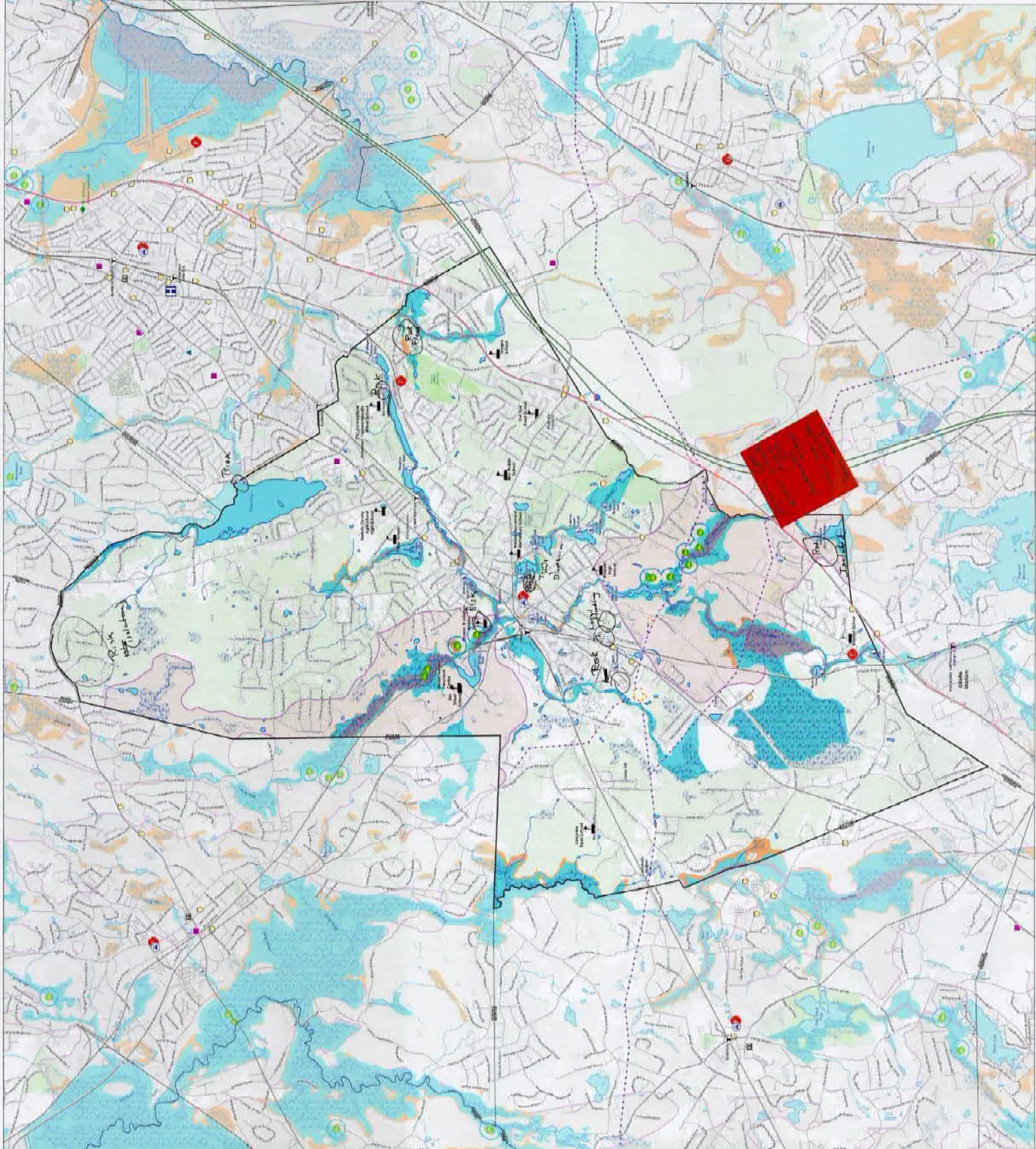
WALPOLE, MA

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

- Town Hall
 - Police Station
 - Fire Station
 - Hospital
 - School
 - Private University
 - Community Groundwater Source
 - Dams
 - Underground Storage Tanks
 - Prisons
 - Assisted Living Facility
 - Nursing Home
 - Interstate
 - U.S. Highway
 - State Route
 - Non-numbered Road
 - Powerline
 - Substation
 - Landing Strip/Airport
 - Railroads - Active Service
 - Regular Service
 - Open Only Seasonally or for Special Events
 - Perennial Stream
 - Intermittent Stream
 - Shoreline
 - Mann-made Shoreline
 - Ditch/Canal
 - Pond, Lake, Ocean
 - Wetland
 - Cranberry Bog
 - Wellhead Protection Zone I
 - Wellhead Protection Zone II
- ### Flood Zone Designations
- 1% Annual Chance of Flooding
 - Regulatory Floodway
 - 0.2% Annual Chance of Flooding
- AEC with inc DIRM - Paper FRMs in Effect



Data sources:
 MassGIS - Infrastructure, Hydrology, and Administrative Data
 FIRM - Flood Insurance Rate Map



WALPOLE, MA

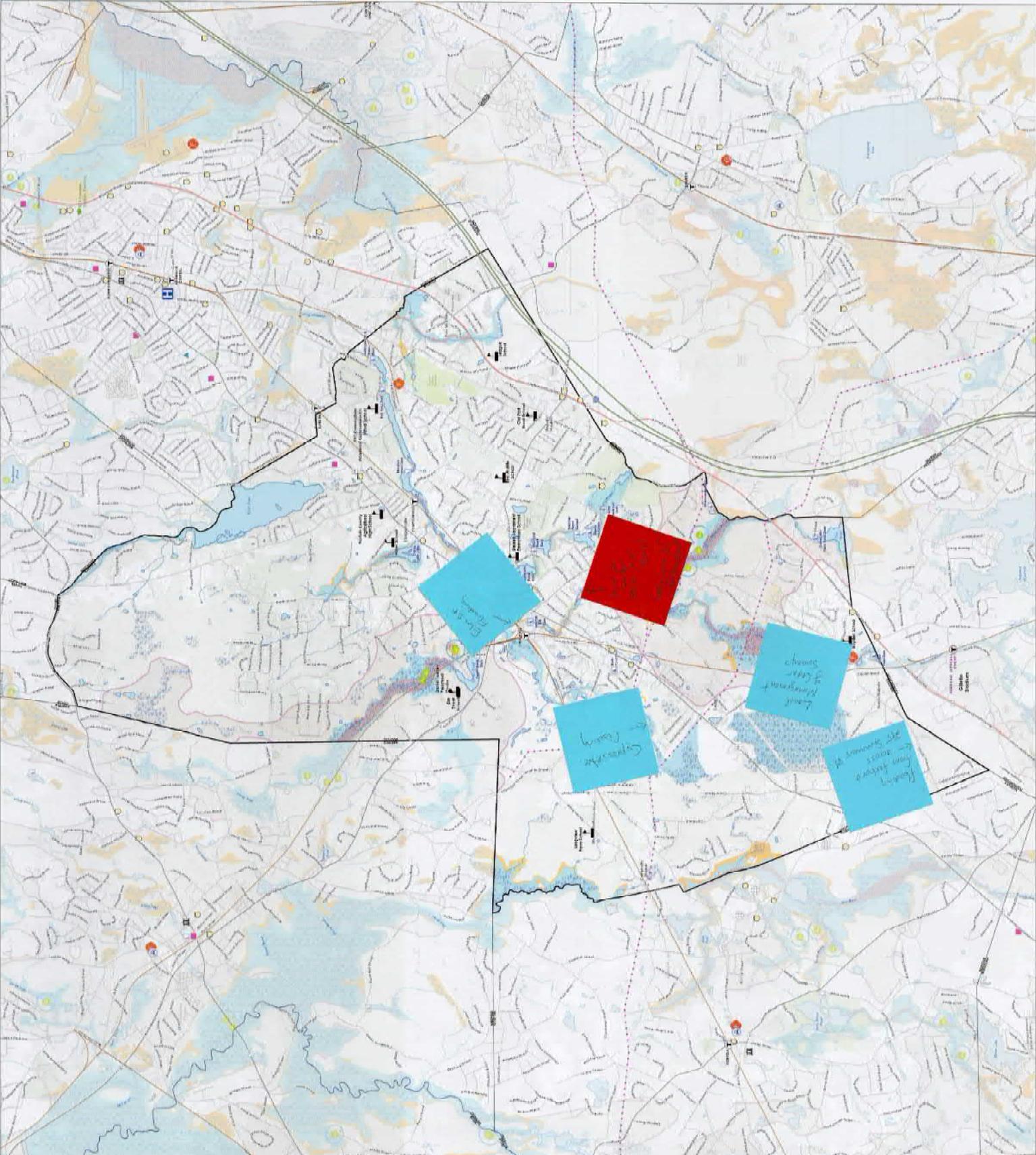
MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM

- Town Hall
- Police Station
- Fire Station
- Hospital
- School
- Plymou University
- Community Groundwater Source
- Dam
- Underground Storage Tanks
- Prisons
- Assisted Living Facility
- Nursing Home
- Interstate
- U.S. Highway
- State Route
- Non-Numbered Road
- Powerline
- Substation
- Landing Strip/Airport
- Railroads - Active Service
- Regular Service
- Open Only Seasonally or for Special Events
- Perennial Stream
- Intermittent Stream
- Snowline
- Mannmade Shoreline
- Ditch/Canal
- Ponds, Lake, Ocean
- Wetland
- Crabapple Bog
- Wellhead Protection Zone I
- Wellhead Protection Zone II

- ### Flood Zone Designations
- 1% Annual Chance of Flooding
 - Regulatory Floodway
 - 0.2% Annual Chance of Flooding
- Area with no DFIRM - Paper FIRMs in Effect

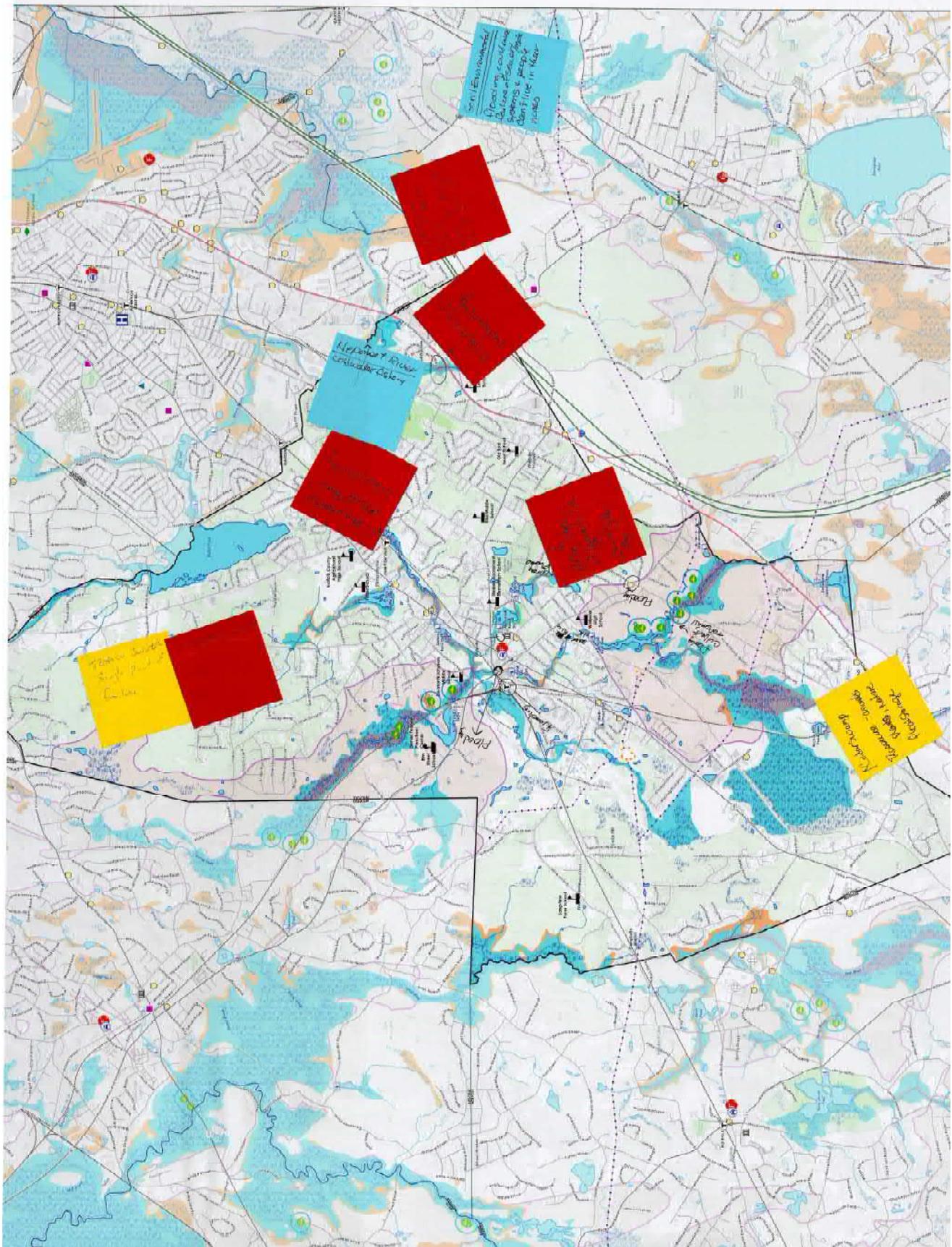
Scale: 0, 0.25, 0.5, 1, 2 miles

Data sources:
 Mapbox - Infrastructure, Hydrology, and Administrative Data
 ESRI - World Topographic Map, Base Map



PREPAREDNESS PROGRAM

- Town Hall
 - Police Station
 - Fire Station
 - Hospital
 - School
 - Private University
 - Community/Groundwater Source
 - Dams
 - Underground Storage Tanks
 - Pikors
 - Assisted Living Facility
 - Nursing Home
 - Interstate
 - U.S. Highway
 - State Route
 - Non-numbered Road
 - Powerline
 - Substation
 - Landing Strip/Airport
 - Railroads - Active Service
 - Regular Service
 - Open Only Seasonally or for Special Events
 - Paravital Stream
 - Intermittent Stream
 - Shoreline
 - Mammals Shoreline
 - Ditch/Canal
 - Pond, Lake, Ocean
 - Wetland
 - Cranberry Bog
 - Wellhead Protection Zone I
 - Wellhead Protection Zone II
- ### Flood Zone Designations
- 1% Annual Chance of Flooding
 - Regulatory Floodway
 - 0.2% Annual Chance of Flooding
 - Area with no DFIRM - Paper FRMs in Effect





Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | Priority | | | Time |
|------------------------------|---|--------------------------------|---|----------|---|---|------------|
| | | | | H | M | L | |
| Infrastructure | | | | | | | |
| Retention Basins | Through out Meadow Ridge | MST Private | V | | | | Short Term |
| DAMS | Throughout Town | Private/Town | V | | | | Long Term |
| Societal | | | | | | | |
| Air Conditioning in Schools | Town | Town | V | | | | Long Term |
| A/c for Seniors | Town | Town | S - Municipal V | | | | On Going |
| Environmental | | | | | | | |
| Tree / Dead Woods (Trimming) | Under High Voltage wires Urban 55+ miles | Private Town Home owners | S - Baraback V - Town S - Emergency V - Home owners (Contract to actual) Government from owner | | | | On Going |
| Vegetation (Control of) | | | | | | | On Going |
| Winter Roads Treatment | All Roads | Town | V | | | | Long Term |

Flooding

Snow/Ice

Severe Weather

Extreme Temps

Maintenance Issues
Crack pipe performance
Subsequent regulatory duties

Small Biz
School Day long term
All types of vendors & manufacturers
Range local and
Range of services

Shrink the line
Maintenance
Firewood Training
Drought
- Fueling
- Fire
- Fire
- Fueling

Bus, Family Alternatives

City
y to
lity

1st 10-15-20-25-30-35-40-45-50-55-60-65-70-75-80-85-90-95-100-105-110-115-120-125-130-135-140-145-150-155-160-165-170-175-180-185-190-195-200-205-210-215-220-225-230-235-240-245-250-255-260-265-270-275-280-285-290-295-300-305-310-315-320-325-330-335-340-345-350-355-360-365-370-375-380-385-390-395-400-405-410-415-420-425-430-435-440-445-450-455-460-465-470-475-480-485-490-495-500-505-510-515-520-525-530-535-540-545-550-555-560-565-570-575-580-585-590-595-600-605-610-615-620-625-630-635-640-645-650-655-660-665-670-675-680-685-690-695-700-705-710-715-720-725-730-735-740-745-750-755-760-765-770-775-780-785-790-795-800-805-810-815-820-825-830-835-840-845-850-855-860-865-870-875-880-885-890-895-900-905-910-915-920-925-930-935-940-945-950-955-960-965-970-975-980-985-990-995-1000

Shrink
- Fueling
- Fire
- Fire
- Fueling

Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
 V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | Flooding | Snow/Ice | Extreme Temps | Severe weather Events | Priority | |
|-----------------------------|-----------------------------------|------------------|--------|--|----------|---------------|-----------------------|----------|------------------------|
| | | | | | | | | H-M-L | Time |
| Infrastructure | | | | | | | | | |
| Culverts | | | V/S | Known to flooding, bridge | | | | | |
| Dams | | | V/S | | | | | | |
| Schools | | | V/S | | | | | | |
| Fields | | | V/S | Field coverage from water/flood, build up | | | | | |
| Railroads | | | V | develop plans to manage spillage and other accidents | | | | | |
| Societal | | | | | | | | | |
| Elderly Pop. | | | V/S | New Senior Center provide emergency shelter services | | | | | |
| School Aged Children | | | V | Inhouse climate controls within all school buildings | | | | | update emergency plans |
| Emergency Shelters | | | S | Address back up generators in all buildings | | | | | ID an animal shelter |
| Utilities: electric, gas | | | S | Maintain communications with current contractors | | | | | |
| Cooling and heating Centers | | | S | ID location | | | | | |
| Environmental | | | | | | | | | |
| Protected Open Space | | Public + Private | V/S | Improve mapping and identification and marking access paths | | | | | |
| Parks | Bird park, wetlands, other fields | Public | V | Drainage - Add - First Aid - Search and rescue - Wilderness | | | | | |
| Ponds + Wetlands + Wells | Wetland, wetland, wetland | Wetland | V | Continue observation for hazardous contamination and unstable floods | | | | | |

Community Resilience Building Risk Matrix



www.CommunityResilienceBuilding.com

H-M-L priority for action over the Short or Long term (and Ongoing)
 V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | Top Priority Hazards | | | | Time | |
|--------------------------|--|-----------|--------|----------------------|----------|---------------|------------------------|------|-------|
| | | | | Flooding | Snow/Ice | Extreme Temps | Severe weather | | H-M-L |
| Infrastructural | | | | | | | | | |
| Buildings | Police/Fire, Aggie, Blackburn, Town Hall, Prison | Town | S | | X | | | M | O |
| Electrical | (regular line clearing) Tunners Allen | Private | S | | | | Tree maintenance | H | O |
| Dams | Willett Bird | Town | S | Breach or repair | | | | H | S |
| Transportation | Rail | Private | S | | | | | M | O |
| | Bus | MBTA | S | | | | | L | O |
| | Highway | Federal | S | | | | | H | O |
| Societal | | | | | | | | | |
| New Senior Center | South St | Town | S | Near Neponset | | | | H | O |
| Evacuation Plan | | - | | Do we have a plan? | | | | L | L |
| Vulnerable neighborhoods | Apple tree Ln Pineville Ave Cape Cod Cape Cod | - | V | low areas | | | Isolated areas in town | H | O |
| Resident engagement | | Town | S | | | | Communications | | |
| Environmental | | | | | | | | | |
| Neponset River | South Weymouth to East Weymouth | | V | River | | | | H | O |
| Wood lot management | Town owned land | Town land | V | | | | Cut trees | L | L |
| Tree inventory | Town | | S | Blocked roads | | | | M | O |
| Solar farms | 3 | Private | S | | | | Available power | M | L |

Community Resilience Building Risk Matrix



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H-M-L priority for action over the Short or Long term (and Ongoing)
 V = Vulnerability S = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | Flooding | Snow/Ice | Extreme Temps | Severe Weather Events | Priority | |
|--------------------------------|--|------------------------------|--------|--|----------|-------------------------------------|-----------------------|----------|--|
| | | | | | | | | H-M-L | Time |
| Infrastructural | | | | | | | | | |
| DAMS Risks / Remedials | Multiple | Municipal Private | V/S | TURNERS BARRAGE TAYLOR POND - S SANDY CREEK POND - V | | | | | |
| MISC CULVERTS | TOWN | MUNICIPAL | V/S | SURVEY & IDENTIFY UNPERTURBED | | | | | SURVEY & IDENTIFY UNPERTURBED |
| ELECTRICAL SYSTEM | TOWN | UTILITY COMPANIES | V/I | CONSIDER MORE TREE MATURED, UNDERPINE LINES, PLANNING | | | | | |
| Tree plantings | Town | | | | | More drought resistant plantings | | | |
| Private wells | Town | private | V | | | Regulate withdrawals | | | |
| Societal | | | | | | | | | |
| ALTERNATIVE STAFFING | Townwide | | V | | | | | | develop system for alternate staffing |
| HOUSING STOCK | TOWNWIDE | | V | | | | | | STRATEGIC PLACEMENT NEAR SERVICES |
| Active Recreational | Townwide | Municipal | V/S | | | | | | like total - but cut watering dipnits water areas, etc. planting walking paths |
| Green Community | Townwide | | S | | | | | | mitig water use green to reduce carbon footprint |
| Environmental | | | | | | | | | |
| Micro Flooding events. | Throughout town | | V | | | | | | |
| Emerging Aseases | Townwide | | V/S | | | | | | pre planning education, communication |
| Mosquito Control | | Town - County may control | S | belongs to project | | | | | |
| Land Management Plan (himples) | Conservationland Townland | town | V | Remove downed wood in watersheds. Bundling | | | | | Fire control management of dead wood. Thinning fuelwood |
| Open Space Protection | Townwide | | V/S | Maintain natural areas for flood state funding central | | | | | Maintain natural open space funding |
| Pond Restoration | Clark's pond Coles pond Ponsorial pond | Town | | Dredge accumulated sediments for flood control | | | | | Maintain dams |

Appendix D

CRB Workshop Presentation Materials



Boston Firefighters, January 4, 2018 (Reuters)



Diamond Pond Dam, Walpole, MA

Municipal Vulnerability Preparedness Program Community Resilience Building Workshop Town of Walpole

January 30, 2019

Community Resilience Building Workshop

Agenda

- CRB Team and participant introductions
- Introduction to Massachusetts Municipal Vulnerability Preparedness Program (MVP)
- Introduction to Climate Change and the Town of Walpole
- Discussion by Walpole participants on status of current planning and risks
- Introduction to CRB Workshop process
- **Large group**
 - Determine top four hazards
- **Small work groups (Using Risk Matrix)**
 - Identify Walpole's vulnerabilities and strengths
 - Prioritize response actions
- **Lunch**
- **Large group**
 - Report out from small groups
 - Determine overall priority actions for the Town
- **Discussion on next steps**
- **Conclusion**



Fuss & O'Neill Overview



Fuss & O'Neill is a leading MVP consultant in assisting Massachusetts communities secure grant assistance, achieve designation as a Massachusetts Municipal Vulnerability Preparedness (MVP) community, and execute their MVP priority projects.

The MVP team is experienced in local government, environmental services, civil site engineering, stormwater management, and emergency management.

Fuss & O'Neill assisted new MVP communities secure more than \$700,000 MVP Action Grants in the program's first funding round.



MVP Project Team



Julie Busa

Julie is an environmental scientist in the Water Environment and Natural Resources group of Fuss & O'Neill. She has over 10 years of experience in the areas of global biodiversity and forest conservation, sustainability, and ecological modelling. Julie works extensively with municipalities on MS4 compliance and the MVP program.



Bill Guenther

Bill is an Environmental Scientist in Fuss & O'Neill's Water and Natural Resource Planning Department. His principal areas of expertise include watershed and stormwater management, water quality monitoring and evaluation, Illicit Connection Detection and Elimination (IDDE) surveys, structural and non-structural stormwater BMP selection, and Harmful Algal Blooms (HABs).



Walpole MVP Program - \$21,000

- **Grant Supports Climate Change Vulnerability Assessments and Resiliency planning**
 - **Comprehensive Approach**
 - Infrastructure
 - Society
 - Environment
 - **Scope and Process Use the Guidance in the Community Resilience Building Workshop Guide**
 - **Municipalities That Complete This Process Will Be Designated Municipal Vulnerability Preparedness (MVP) Municipalities**

MVP Designation Leads to Enhanced Standing in Future Funding Opportunities



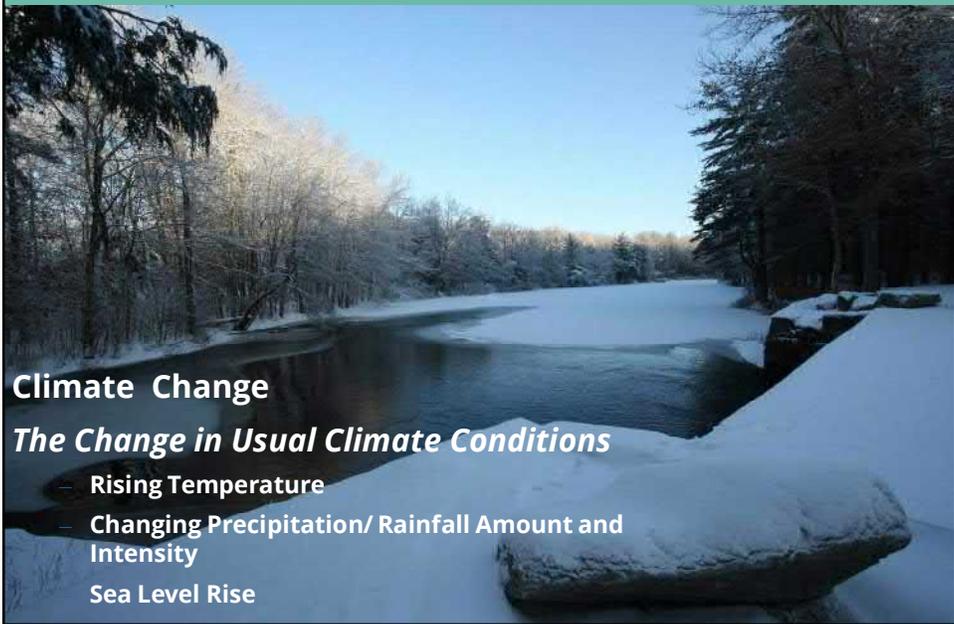
MVP Action Grant NEW

- **Grant supports priority actions identified at Community Resilience Building Workshop**
- **\$10,000 - \$400,000 available**
- **Local match of 25% - can be in-kind**
- **Next funding round anticipated early 2019**

Only those communities which have completed the CRB workshop are eligible to apply



Terminology



Climate Change
The Change in Usual Climate Conditions

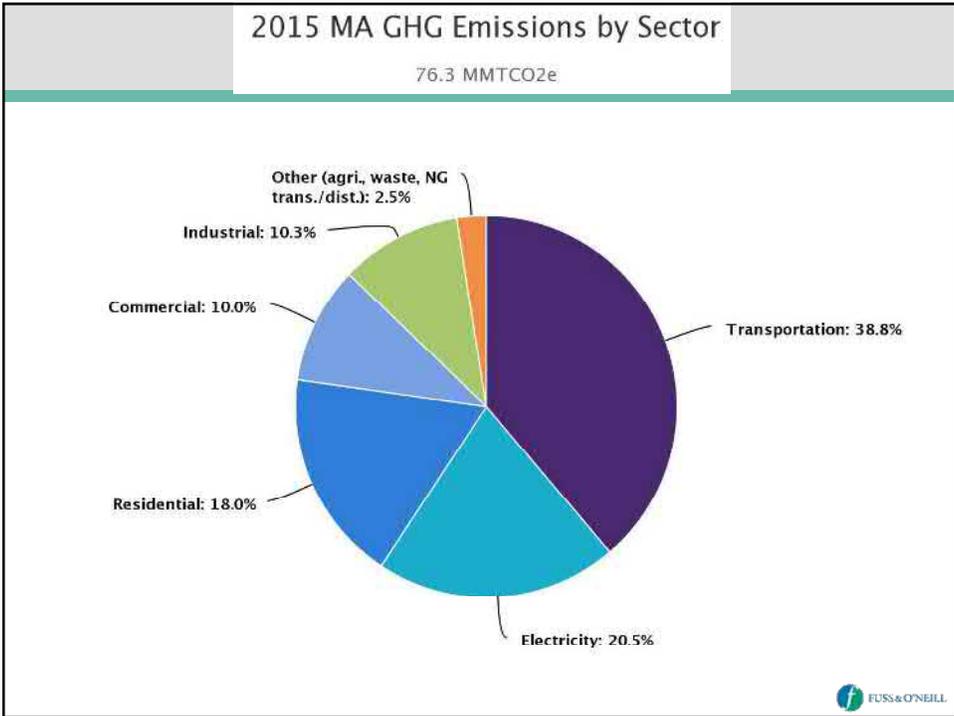
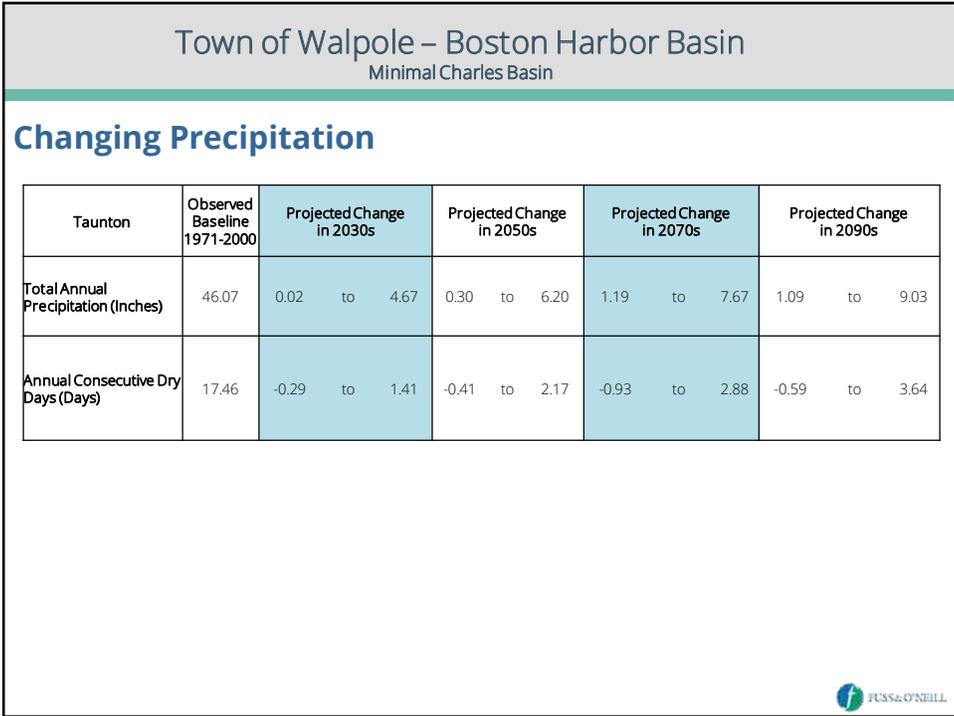
- Rising Temperature
- Changing Precipitation/ Rainfall Amount and Intensity
- Sea Level Rise

Town of Walpole – Boston Harbor Basin
 Minimal Charles Basin

Rising Temperature

| Taunton | Observed Baseline 1971-2000 | Projected Change in 2030s | Projected Change in 2050s | Projected Change in 2070s | Projected Change in 2090s |
|--|-----------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Average Annual Temperature (°F) | 50.13 | 2.07 to 3.99 | 2.73 to 6.07 | 3.18 to 8.92 | 3.46 to 10.84 |
| Annual Days with Maximum Temperature over 90°F (Days) | 7.85 | 5.60 to 15.57 | 7.75 to 29.07 | 9.46 to 49.32 | 11.54 to 66.93 |
| Annual Days with Minimum Temperature below 32°F (Days) | 119.21 | -11.79 to -27.09 | -17.05 to -42.10 | -21.02 to -54.79 | -22.54 to -65.69 |





Climate Change Impacts - Temperature

- **Economic**
 - Winter Recreation
 - Snow and Ice
- **Agricultural**
 - Longer Growing Season
- **Health**
 - Increased Pests
 - Heat Stroke
- **Infrastructure**
 - Road Buckling
 - More Potholes
 - Power Outages
- **Environment**
 - Change in Habitat



FUSS & O'NEILL

Climate Change Impacts - Precipitation

- **Economic**
 - Dangerous Floods
 - Lost work time
- **Agricultural**
 - Excessively Wet Spring
 - Drought
- **Health**
 - Flood/High Water-related Deaths
 - Emergency Response Delays
- **Infrastructure**
 - Road Washout
 - Environment
 - Sewer System Overflows
 - Compromised Bridges
- **Changes in Habitat**



FUSS & O'NEILL

MVP Program

- Identify Top Four Hazards
 - Review MVP Sectors
 - Maps as tool
 - List infrastructure, societal, environmental feature
 - Determine whether a vulnerability or strength
 - Identify actions to reduce vulnerability or reinforce strength
 - Prioritize actions
 - Report Out
- Finalize Prioritization Plan



Climate Change Hazards

- Flooding
- Extreme Precipitation Events
- Heat Waves
- Drought
- Snow/Ice
- Wildfire
- Tornadoes
- Hurricanes
- Nor'easters
- Other



MVP Sectors

• Infrastructure

- Evacuation routes
- Schools
- Roads, bridges, dams
- Water and wastewater
- Septic systems
- Hospitals
- Commercial Buildings, churches
- Utilities: electric, gas
- Factories
- Emergency management facilities



MVP Sectors

• Societal

- Emergency shelters
- Senior housing
- Schools and campuses
- Economically challenged populations
- Evacuation plans
- Animal shelters
- Hospitals, pharmacies
- Grocery stores
- Utilities: electric, gas
- Homeless
- Other



MVP Sectors

- **Environmental**

- Drinking water supply
- Rivers and streams
- Parklands
- Agriculture
- Title V systems
- Stormwater management
- Open spaces
- Flood plains
- Forest
- Other



Community Resilience Building Workshop

Next Steps:

- Public Review of Priorities
- Monitor and Update
- Annual Review



Community Resilience Building Workshop

Questions?

