SUMMARY OF FINDINGS

COMMUNITY RESILIENCE BUILDING WORKSHOPS

Hingham, Massachusetts

Prepared for:

Town of Hingham
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1.0 INTRODUCTION

In June 2018, the Town of Hingham (the Town) received a Municipal Vulnerability Preparedness (MVP) Planning Grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) to evaluate natural hazards facing the Town, discuss municipal strengths and vulnerabilities, and identify opportunities to improve the Town's overall resiliency to climate change. These goals were accomplished by following the Community Resilience Building (CRB) framework, a public-input process developed by The Nature Conservancy, which leverages the local knowledge and experience of community members to develop a Town-specific list of priorities to respond to climate-related hazards.

Upon completion of the CRB process, the Town will become designated by EEA as an MVP Certified Community. This designation will make the Town eligible for grant funds to implement resiliency planning and improvement projects.

1.1 Background

The Town of Hingham is a coastal community located approximately 14 miles south of Boston. The Town is bounded to the north by Hingham Harbor. The communities of Hull, Cohasset, and Scituate are located to the east, Norwell and Rockland to the south, and Weymouth to the west of Hingham.

The Town contains approximately 22.5 square miles, or 14,092 acres, of land. The estimated length of coastline is approximately 10 miles. This shoreline is relatively well-protected from open ocean wave action by the Hull peninsula. Significant resource areas consisting of floodplain, estuaries, and salt marsh, which extend inland from the coastline, are impacted by tidal action and the effects of storm surge. Critical public infrastructure, commercial districts, and residential neighborhoods throughout the community are at risk of flooding from storm surge as well as heavy precipitation. The existing risk is likely to be exacerbated by climate change.

Due to both its experience with significant storm events and its exposure to the potential effects of sea level rise, the Town recently conducted several studies intended to mitigate or adapt to a changing climate. These include:

- Kleinfelder. (2015). *Climate Change Vulnerability, Risk Assessment and Adaptation Study.*
- Metropolitan Area Planning Council. (2016). *Town of Hingham Hazard Mitigation Plan 2014 Update.*

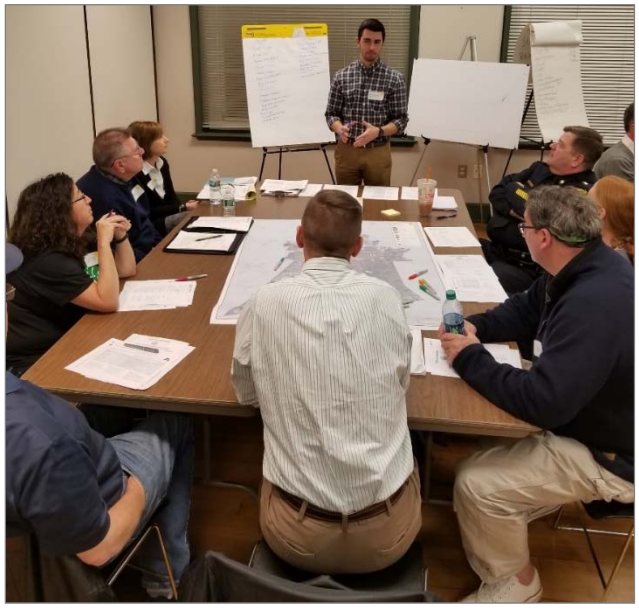
These reports as well as data provided by the resilient MA Climate Clearinghouse (http://www.resilientma.org/) informed the CRB planning process.

2.0 COMMUNITY RESILIENCE BUILDING WORKSHOPS

The Town chose to conduct the CRB process over the course of two four-hour workshops, hosted on December 12, 2018 and on January 14, 2019. The Town invited a total of 50 individuals to participate as stakeholders in the CRB process. These stakeholders included a variety of community members with an interest in resiliency efforts, including representatives of municipal and state government, local businesses, non-profit organizations, and other interest groups. Please refer to Section 10.1 for a list of invited stakeholders, with asterisks denoting those who attended the workshop(s).

The central objectives of the workshops were to:

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



Stakeholder group discussing strengths and vulnerabilities at workshop on December 12, 2018

The first workshop focused on identifying the top hazards facing the Town, as well as related strengths and vulnerabilities. Facilitators presented demographic data specific to Hingham from the 2017 American Community Survey. In addition, stakeholders were given a presentation and handout summarizing climate change data from the Massachusetts Climate Change Projections, published December 2017, as well as the Town's Climate Change Vulnerability Risk Assessment and Adaption Study, published June 29, 2015. As a large group, stakeholders discussed the primary hazards facing Hingham, reaching agreement on the top hazards as outlined in Section 3.0 and 5.0 herein. Stakeholders then broke up into small groups of 7 to 8 individuals to discuss and identify features that could be considered strengths and/or vulnerabilities unique to the community in light of the identified hazards.

The second workshop presented a summary of findings from the first workshop, including an overview of nature-based solutions for stakeholders' consideration when identifying actions. Stakeholders divided into small groups of 5 to 6 individuals to develop actions intended to enhance the strengths and mitigate the vulnerabilities identified during the previous workshop. The small groups prioritized these actions and identified a timeframe for completion. Then, as a large group, stakeholders collectively discussed the high priority actions, and identified the top three priority actions for the Town, as outlined in Section 8.0.

Refer to Appendix A for presentations and handouts provided to workshop participants.

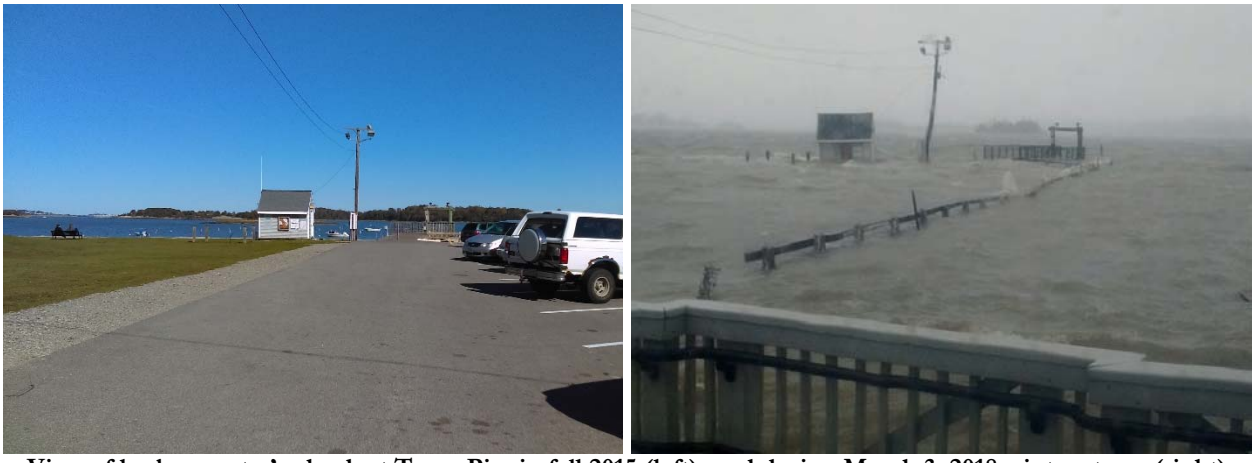
3.0 TOP CLIMATE-RELATED HAZARDS

After discussion, workshop participants identified the top climate-related hazards facing the Town of Hingham as the following:

- Coastal Flooding
- Inland Flooding
- Severe Storms
- Heat/Drought

4.0 CURRENT CONCERNS AND CHALLENGES PRESENTED BY CLIMATE-RELATED HAZARDS

As a coastal community, stakeholders placed particular emphasis on coastal flooding. More specifically, participants raised concern with recent storm events that resulted in overtopping of the seawalls along the Hingham Harbor waterfront, making infrastructure behind the seawalls vulnerable. For example, the winter storm on March 3, 2018 resulted in the overtopping of Town Pier and Barnes Wharf, located proximate to Route 3A. These types of storm events are anticipated to become both more frequent and impactful based on climate change and sea level rise projections, making additional infrastructure, such as the Mill Street Pump Station, subject to an increased risk from flooding.



View of harbormaster's shack at Town Pier in fall 2015 (left), and during March 3, 2018 winter storm (right)

Participants also expressed concern related to inland flooding since climate change projections suggest that there will be an increase in the number of days with significant precipitation (greater than 1"). Inland or riverine flooding may occur during storm events that cause non-tidal rivers and streams to overtop their banks and inundate adjacent areas. Intense precipitation also has the potential to overwhelm stormwater systems, resulting in flooded roadways.

Other impacts from severe storms, such as high winds or ice and snow, were considered separately. These hazards pose concerns related to access during storm events, both for emergency responders and evacuees, as well as the interruption of utility services (e.g. downed overhead wires). Wave action associated with severe storms were also noted as contributors to erosion.

As weather patterns are predicted to continue changing, heat and drought were identified as hazards having a disproportionate impact to vulnerable populations, such as the elderly who make up 22% of Hingham's residents. Drought was discussed as a cause of increased risk of wildfires as a result of dry trees and brush in open space areas, as well as the potential for decreased availability of water supply.

5.0 NON-CLIMATE-RELATED CONCERNS AND CHALLENGES

In addition to the natural hazards characterized above, stakeholders expressed interest in developing actions to address the following non-climate-related concerns through the CRB process:

- Pollution
- Population Density

Pollution presents a particular challenge to the Town's potable water supply. Potential sources of pollution identified by stakeholders included nutrient loading from septic systems, the use and storage of hazardous materials, roadway runoff containing deicing compounds, and pesticides. The risk associated with pollution of existing water supply wells and reservoirs can be exacerbated by flooding and severe storms.

Compounding the climate-related hazards is the existing population density, as well as the growth anticipated in areas such as the Route 3A corridor. These place an increased demand on emergency response operations. Furthermore, changes in population require consideration of the adequacy of existing evacuation routes and emergency shelters.

6.0 SPECIFIC AREAS OF CONCERN

In identifying features for consideration of action items, stakeholders identified the following areas of concern. For clarity, the features identified on the risk matrix have been noted in underlined text.

Refer to Appendix B for the base map provided to workshop participants, and Appendix C for the participatory mapping completed during the workshop.

6.1 Geographic

- Geographic areas of concern included the Hingham Shipyard, Bare Cove Park, the Hingham Harbor coast and waterfront and Route 3A rotary and corridor, and Foster School areas, which stakeholders noted were particularly vulnerable to flooding under current conditions. Some of these areas are heavily developed and/or densely populated, posing hazards to both infrastructural and societal resources.

6.2 Infrastructural

- Aging infrastructure, including sewer and drainage infrastructure, was broadly identified as a vulnerability for Hingham. In particular, the existing conditions of the sewer pump stations, many of which are currently located in areas vulnerable to both coastal and inland flooding, were of importance. Stakeholders also expressed concerns regarding the adequacy of existing drainage infrastructure to handle increased precipitation and flooding resulting from climate change.
- Public transportation such as the commuter rail and ferry were considered a vulnerability due to the possibilities of flooding of the train tunnel, and the potential for disruption of ferry and train service as a result of flooding and severe storms. Stakeholders further identified the need for a better understanding of flood-prone areas in the vicinity of the commuter rail line near Route 3A, due to the alteration of topography associated with the rail's construction.
- Seawalls, piers, and oceanic buffers were considered a vulnerability due to their current condition and the need for maintenance.

- Stakeholders raised concerns regarding the number and capacity of emergency shelters in town, as well as the public's knowledge of the shelter locations in the event that their use becomes necessary.
- Stakeholders identified the need for improvements to the resiliency of existing utilities, the need for green energy to reduce emissions, as well as the need to improve the education of utility users regarding improvements to energy consumption.

6.3 Societal

- Stakeholders identified the need to effectively communicate the location of existing and future evacuation routes to the general public.
- The aging population makes up 22% of Hingham's residents, and several assisted living facilities are located near flood-prone areas. These populations are also particularly vulnerable to the effects of heat and drought.
- Stakeholders raised concerns regarding the Town's reliance on technology in the event that a hazard were to cause failure of electronic forms of communication (e.g. a cell tower knocked over by severe storms).
- The abandonment of pets during emergencies was noted as a concern.
- Many of the Town's historic monuments, structures, and cemeteries are located on the harbor waterfront, and thus are vulnerable to coastal flooding.

6.4 Environmental

- Maintaining the existing quality and quantity of ground and surface water supply was expressed as a specific concern. Considerations regarding water quality included discussion of roadway runoff and the locations of hazardous material use and storage. Stakeholders discussed the need to identify potential new sources and distribution methods of potable water, along with conservation measures for the existing water supply. The 2019 Annual Town Meeting voted, subsequent to the workshops, to purchase the Aquarion Water Company, the company that provides Hingham's water supply.
- Multiple areas of improvement to chemical management were identified by stakeholders, both in terms of the Town's operations, and the need to understand the location and methods of storage of oil and hazardous materials.
- Open space and the health of local forests may be compromised as a result of severe storms and flooding, as well as an increased risk of fire from drought.
- The transfer station represents a potential source of pollution.

7.0 CURRENT STRENGTHS AND ASSETS

In identifying features for consideration of action items, stakeholders identified the following strengths and assets. For clarity, the features identified on the risk matrix have been noted in underlined text.

7.1 Infrastructural

- Existing coastal infrastructure, including seawalls, piers, and oceanic buffers, protect seaside properties from severe storms and the resulting coastal flooding.
- Public transportation, such as the commuter rail, ferry, and busses, reduce greenhouse gas emissions and other types of pollution, reduce traffic demand, and provide potential methods of evacuation.

7.2 Societal

- The harbor preserves the public's rights to access the waterfront. In addition, resilient waterfront properties can provide a buffer to landward properties for severe storms and coastal flooding.
- As a result of reliance on technology, the Town has the ability to reach many people simultaneously in the event of an emergency, such as through the Reverse 911 program.
- Hingham has multiple regulatory and social organizations with an interest in protecting and maintaining the Town's heritage through preservation of historic monuments, structures, and cemeteries.
- Due to the strategic locations of the fire station and harbormaster's office, the Town has the ability to respond to emergencies during flooding and severe storms, improving public safety.
- Churches, religious organizations, and places of worship support engagement in Hingham's community, as well as providing an avenue though which vulnerable populations, such as the elderly, may be contacted.

7.3 Environmental

- The Town's existing ground and surface water supply are high-quality, and have multiple regulatory protections in place to maintain that quality.
- The Town's transfer station is located in an area outside of the floodplain, and may provide space for disposal of rubbish during post-emergency clean-up.
- Open space, trees, and local forest health all provide sources of carbon sequestration, reduce the heat island effect, and offer a green space buffer that can reduce the impacts of flooding.

8.0 TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

Workshop #2 had stakeholders develop actions that enhance the strengths and mitigate the vulnerabilities outlined in the previous sections. Following discussions as a large group at the conclusion of this workshop, stakeholders identified the following actions as the three highest priorities to improve the Town's resilience to climate change:

1. Increase the height of the existing seawalls and adjacent upland, continue ongoing maintenance of existing walls, and work with private property owners to improve private seawalls.

2. Implement resiliency improvements to sewer pump stations, including installation of watertight mitigation gates, improvements to pump station buildings, and sealing of manhole covers.

3. Protect the quality and quantity of potable groundwater and surface water supply, including:
    a. Identifying additional sources of water supply
    b. Reducing water usage within the Town
    c. Establishing emergency water distribution sites
    d. Educating homeowners on testing of private wells
    e. Educating private well owners and developing a bylaw related to irrigation

8.1 High Priority Actions

Category	Action	Lead Department	Support
	Infrastructural		
Coastal Resiliency	Increase the height of the existing seawalls and adjacent upland, continue ongoing maintenance of existing walls, and work with private property owners to improve private seawalls	Engineering	Harbor Development
Utility Infrastructure	Implement resiliency improvements to sewer lines and pump stations, including installation of watertight mitigation gates, improvements to pump station buildings, and sealing of manhole covers	Sewer Commission/Department	Engineering
Coastal Resiliency	Install automatic tide gates at the Broad Cove culvert to replace aging infrastructure	MassDOT, Engineering	
Municipal Facilities	Conduct flood protection project(s) for the Foster School to protect aging infrastructure	School Department	
Municipal Facilities	Construct a new fire station to replace aging infrastructure	Fire Department	
Municipal Facilities	Provide dock space for the Harbormaster to replace aging infrastructure	Harbormaster	
Utility Infrastructure, Transportation	Identify impacts of road salting on aging infrastructure	Public Works	
Utility Infrastructure	Improve stormwater and drainage technology	Engineering	
Regulatory/Planning	Develop regulations that require sewer inflow and infiltration mitigation to reduce pollution risk from drainage	Sewer Commission/Department	
Utility Infrastructure	Conduct a design assessment or "stress test" of the existing drainage system	Engineering	
Regulatory/Planning	Require new development to use corrosion-resistant additives in concrete to improve drainage	Planning Board, Board of Appeals	
	Societal		
Emergency Response, Transportation	Finalize and implement evacuation routes	Emergency Management	Fire Department, Police Department
Multiple	Conduct outreach to other towns regarding aging population	Board of Selectmen	
Emergency Response	Establish an outreach program that travels to vulnerable populations,	Emergency Management	

	including the aging population, and encourage additional outreach from neighbors		
Emergency Response	Educate the public, particularly vulnerable and aging populations, on the Reverse 911 program	Fire Department, Police Department	
	Environmental		
Water Supply and Quality	Protect the quality and quantity of potable groundwater and surface water supply, including finding additional sources of water supply, reducing water usage within the Town, establishing emergency water distribution sites, educating homeowners on testing of private wells, and educating private well owners and developing a bylaw related to irrigation	Board of Water Commissioners, Board of Health	
Water Supply and Quality, Utility Infrastructure	Install stormwater controls to treat nutrients in runoff to maintain the quality and quantity of groundwater and surface water supply	Public Works	
Water Supply and Quality	Educate public on nutrients and pesticides in runoff to maintain the quality and quantity of groundwater and surface water supply	Board of Health	
Coastal Resiliency	Conduct beach nourishment and construct an armor stone wall at North Beach to protect the coastline in this area	Engineering	
Coastal Resiliency	Conduct beach nourishment and additional protection at residences to protect the coastline	Engineering	Conservation Commission
Municipal Facilities	Construct a new and/or improved salt shed to improve chemical management	Public Works	
Water Supply and Quality	Reduce road salt use and develop an alternative or low-sodium ice treatment to improve chemical management	Public Works	
Regulatory/Planning	Improve regulatory controls regarding storage of oil and hazardous materials in areas vulnerable to hazards to improve chemical management	Planning Board, Board of Appeals, Conservation Commission	Fire Department
Water Supply and Quality, Emergency Response	Improve the existing Fire Department database regarding the presence of hazardous material storage in areas vulnerable to hazards to improve chemical management	Fire Department	

8.2 Moderate Priority Actions

Category	Action	Lead Department	Support
	Infrastructural		
Transportation	Increase frequency of ferry and extend schedule to improve access to public transportation	Board of Selectmen	MBTA
Transportation	Increase parking available for the commuter rail to improve access to public transportation	Board of Selectmen	MBTA
Coastal Resiliency	Increase seawall and upland height and construct riprap adjacent to Route 3A, the associated rotary, and the commuter rail	Board of Selectmen	Harbor Development, MassDOT, MBTA
Emergency Response	Increase public outreach regarding the locations of existing emergency shelters and add new shelters	Emergency Management	
Utility Infrastructure	Move electric utilities underground	Municipal Lighting Plant	
Utility Infrastructure	Create redundancy to existing power supply to protect utilities	Municipal Lighting Plant	
Utility Infrastructure	Conduct improvements to sewer infiltration and inflow (utilities)	Sewer Department	
Utility Infrastructure	Repair existing storm drainage infrastructure (utilities)	Public Works	Engineering
Utility Infrastructure	Clear and maintain existing utility easements	Public Works, Municipal Lighting Plant	
Utility Infrastructure	Educate utility clients on reductions in energy use (utilities)	Municipal Lighting Plant	
	Societal		
Emergency Response	Encourage assisted living facilities to develop facility-specific evacuation plans	Council on Aging	
Emergency Response	Improve resiliency of assisted living facilities to flood and severe storms	Council on Aging	
Coastal Resiliency	Minimize beach erosion to maintain the quality of the harbor	Conservation Commission	
Water Supply and Quality	Develop a plan to mitigate and or decrease bacteria levels at beaches bounding the harbor	Board of Health	

Regulatory/Planning	Develop strategies to communicate during emergencies in event of electronic communication failure to reduce reliance on technology	Planning Board, Zoning Board of Appeals	
Emergency Response	Establish pet-friendly emergency shelters	Emergency Management	
Emergency Response	Educate pet-owners on evacuation of pets and associated emergency preparedness	Emergency Management	
Regulatory/Planning	Develop plans for temporary flood barriers to protect historic monuments, structures, and cemeteries, and prioritize protected assets	Historical Commission	
	Environmental		
Emergency Response, Open Space	Maintain fire roads and access to open space areas	Conservation Commission	Fire Department
Regulatory/Planning, Open Space	Study the preservation of open space and flooding at salt marshes	Conservation Commission	
Open Space	Acquire additional open space	Open Space Acquisition Committee	Conservation Commission
Open Space	Evaluate dams for removal (open space)	Conservation Commission	
Water Supply and Quality	Educate the public on water consumption to maintain quality of open space	Board of Water Commissioners	
Open Space	Construct additional public access and trails at existing open space areas	Conservation Commission	

8.3 Lower Priority Actions

Category	Action	Lead Department	Support
	Infrastructural		
Coastal Resiliency	Install nature-based solutions for flood protection in areas that do not have existing seawalls	Conservation Commission	
Coastal Resiliency	Conduct beach nourishment along existing seawalls	Conservation Commission	
	Societal		
Emergency Response	Obtain flood transportation vehicles for emergency medical services to improve public safety	Fire Department	
Emergency Response	Use churches, religious organizations, and places of worship as supplemental shelters	Emergency Management	
	Environmental		
Municipal Facilities	Add additional hours to transfer station operations and provide additional space, to prepare for cleanup after emergencies	Public Works	
Open Space	Conduct tree maintenance	Public Works, Municipal Lighting Plant	
Open Space	Improve forest management techniques for locally-owned forests, and coordinate with the state regarding Wompatuck State Park	Conservation Commission	Public Works, DCR

9.0 PUBLIC LISTENING SESSION

A public listening session was held at the Board of Selectmen meeting on June 4, 2019 to review the results of the CRB process. A recording of the meeting was subsequently posted online. At this meeting, representatives from the Town presented an overview of the draft report, and presented the top actions identified at the CRB workshops. Questions were addressed by representatives from the Town and Beals and Thomas, Inc. In particular, attendees discussed the water quality-related goals in light of the Town's recent acquisition of Aquarion Water Company, as well as local- and state-led efforts to support affordable housing that will require consideration of the open space actions.

The Draft MVP Summary of Findings Report was then made available for public comment for a period of two weeks, through June 18, 2019.

Refer to Appendix E for the announcement of the listening session, the agenda for the applicable Board of Selectmen meeting, and the presentation given at the listening session.

10.0 ACKNOWLEDGEMENTS

Completion of the CRB process was made possible by an MVP Planning Grant from EEA. The Core Team would like to thank the Board of Selectmen, Board of Health, Planning Board, Aquarion Water Company, the Weir River Watershed Association, Inc., the Trustees of Reservations, and the Weir River Estuary Park Committee for their letters in support of the MVP Planning Grant application.

The Core Team would also like to thank the Hingham Town Hall and the Hingham Public Library for providing the workshop venues, and the Fruit Center Marketplace for providing refreshments.

10.1 Workshop Stakeholders

The following individuals participated in the CRB Workshops:

FINAL MVP STAKEHOLDER LIST			
Name	**Affiliation**	**Workshop #1**	**Workshop #2**
Nicholas Bonn	Bare Cove Marina	*	*
Ken Corson	Hingham Harbormaster	*	
Patti Coyle	Weir River Estuary Park Committee	*	
Joseph Driscoll	Hingham Head Assistant Harbormaster		*
Roger Fernandes	Hingham Engineering	*	*
Loni Fournier	Hingham Conservation Department		*
Paul Heanue	Hingham Municipal Lighting Plant	*	
Robert Higgins	Hingham Sewer Commission	*	*
Susan Kane	Massachusetts Department of Conservation and Recreation	*	
Bruce MacAloney	Harbor Development Committee		*
Ted Matthews	Bare Cove Park Committee	*	*
Tom Mayo	Hingham Town Administrator	*	
Tom Molinari	Hingham Engineering	*	*

Michelle Monsegur	Hingham Assistant Town Administrator	*	
Thomas Morahan	Hingham Municipal Lighting Plant		*
Steve Murphy	Hingham Fire Department	*	
Stephen C. Olson	Aquarion Water Company of Massachusetts	*	*
Glenn Olsson	Hingham Police Department	*	
Bill Reardon	Harbor Development Committee	*	
Susan Sarni	Hingham Health Department	*	
Mary Savage-Dunham	Hingham Department of Community Planning	*	
Dawn Sibor	Hingham Council on Aging	*	
Mark Schow	The Friends of Wompatuck	*	*
Harry Sylvester	Hingham Engineering	*	*
Randy Sylvester	Hingham Public Works	*	
Mark Thorell	Hingham Recreation Department	*	
Gary Tondorf-Dick	Hingham Planning Board	*	
Adam White	Water Supply Committee	*	
Samantha Woods	North and South Rivers Watershed Association	*	
Andrea Young	Historic District Commission	*	

Stakeholders identified and invited, but unable to participate in the Workshops, include representatives of the following organizations:

- South Shore Chamber of Commerce
- Hingham Downtown Association
- League of Women Voters
- Weir River Watershed Association
- Trustees of Reservations
- Hingham Maritime Center
- Hingham Land Conservation Trust
- Board of Selectmen
- Council on Aging
- Building Department
- Bathing Beach Trustees
- School Department
- Zoning Board of Appeals
- MassDOT District 5
- Samuels Associates (Shipyard)

10.2 MVP Core Team

The following individuals from the Town of Hingham and Beals and Thomas, Inc. comprised the MVP Core Team:

- Roger Fernandes, Hingham Town Engineer, Core Team Member
- Thomas Molinari, Hingham Assistant Projects Engineer, Core Team Member
- Eric J. Las, PE, LEED AP, Beals and Thomas, Inc., Lead Facilitator
- Daniel M. Gagne, PE, Beals and Thomas, Inc., Facilitator
- Mary Kate Schneeweis, Beals and Thomas, Inc., Facilitator
- Nicholas P. Santangelo, EIT, Beals and Thomas, Inc., Facilitator

10.3 Suggested Citation

Town of Hingham, Beals and Thomas, Inc (2019). "Summary of Findings, Hingham Municipal Vulnerability Preparedness Workshop." Hingham, Massachusetts.