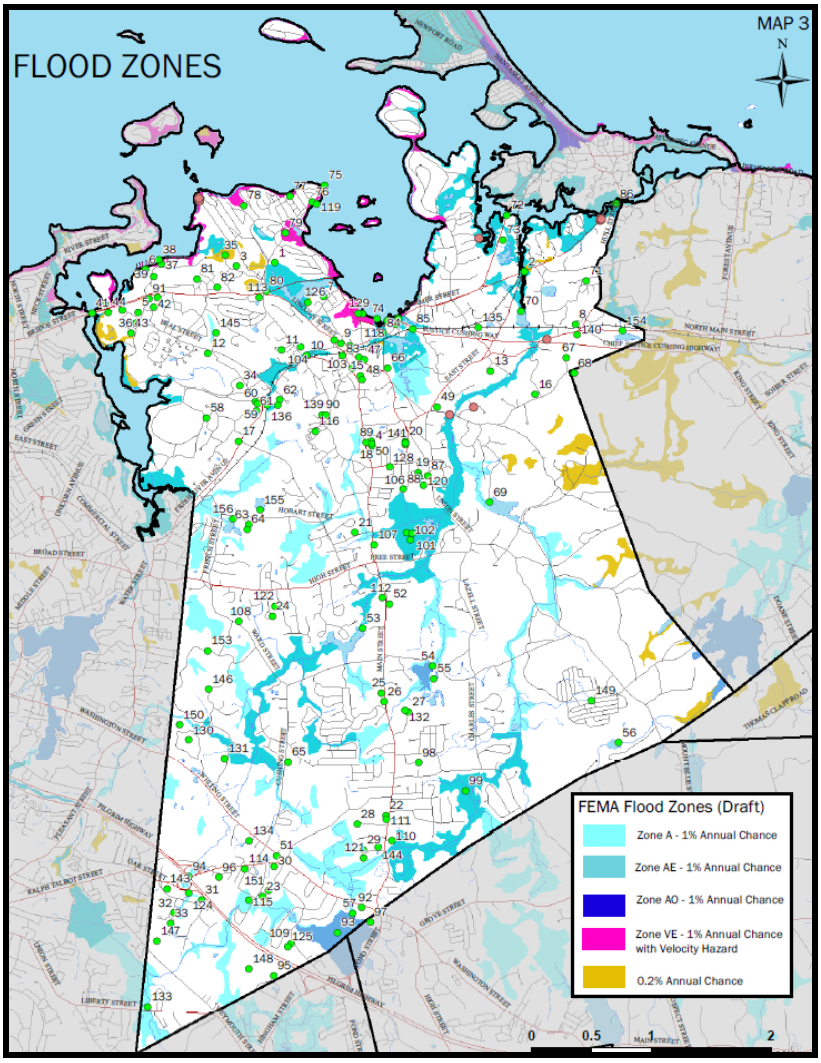
TOWN OF HINGHAM
HAZARD MITIGATION PLAN 2014 UPDATE



MAPC
METROPOLITAN AREA PLANNING COUNCIL

Metropolitan Area Planning Council

FINAL PLAN
ADOPTED MAY 5, 2016

TOWN OF HINGHAM HAZARD MITIGATION PLAN
2014 UPDATE

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2014 UPDATE

ACKNOWLEDGEMENTS AND CREDITS

This plan was prepared for the Town of Hingham by the Metropolitan Area Planning Council (MAPC) under the direction of the Massachusetts Emergency Management Agency (MEMA) and the Massachusetts Department of Conservation and Recreation (DCR). The plan was funded by the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation (PDM) Grant Program.

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TOWN OF HINGHAM HAZARD MITIGATION PLAN
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I. EXECUTIVE SUMMARY

Hazard Mitigation planning is a proactive effort to identify actions that can be taken to reduce the dangers to life and property from natural hazard events. In the communities of the Boston region of Massachusetts, hazard mitigation planning tends to focus most on flooding, the most likely natural hazard to impact these communities. The Federal Disaster Mitigation Act of 2000 requires all municipalities that wish to be eligible to receive FEMA funding for hazard mitigation grants, to adopt a local multi-hazard mitigation plan and update this plan in five year intervals.

Planning Process

Planning for the Hazard Mitigation Plan update was led by the Hingham Local Hazard Mitigation Planning Committee, composed of staff from a number of different Town Departments. This committee discussed where the impacts of natural hazards most affect the Town, goals for addressing these impacts, and hazard mitigation measures that would benefit the Town.

Public participation in this planning process is important for improving awareness of the potential impacts of natural hazards and to build support for the actions the Town takes to mitigate them. The Town hosted two public meetings, the first on November 28, 2011 and the second on December 6, 2012 and the draft plan was posted on the Town's website for public review and neighboring municipalities were contacted for comment.

Risk Assessment

The Hingham Hazard Mitigation Plan assesses the potential impacts to the Town from flooding, high winds, winter storms, brush fire, and geologic hazards. Flooding, driven by northeasters, hurricanes and other storms, clearly presents the greatest hazard to the Town.

The Hingham Local Committee identified those areas where flooding most frequently occurs, comprising 3.24% of the Town's land area, and an estimated 227 buildings worth approximately $74,941,200.

Hazard Mitigation Goals

1. Ensure that critical infrastructure sites are protected from natural hazards.
2. Protect existing residential and business areas from flooding.
3. Maintain existing mitigation infrastructure in good condition.
4. Continue to enforce existing zoning and building regulations.

5. Educate the public about zoning and building regulations, particularly with regard to changes in regulations that may affect tear-downs and new construction.

6. Work with surrounding communities to ensure regional cooperation and solutions for hazards affecting multiple communities such as coastal erosion.
7. Encourage future development in areas that are not prone to natural hazards.
8. Educate the public about natural hazards and mitigation measures.
9. Make efficient use of public funds for hazard mitigation.
10. Prepare to respond to various natural hazard events.

Hazard Mitigation Strategy

The Hingham Local Committee identified a number of mitigation measures that would serve to reduce the Town's vulnerability to natural hazard events. The most important of these are projects that entail investigating areas of flooding, understanding the causes of flooding as part of the stormwater management system and developing structural and non-structural solutions. The hazard mitigation strategy also includes policy and educational measures such as an update to the Town's Master Plan, which will position the Town to integrate natural hazard mitigation considerations and activities into the vision for the Town, and to provide public education relating to flooding and other natural hazards potentially impacting the Hingham.

Overall, the hazard mitigation strategy recognizes that mitigating hazards for Hingham will be an ongoing process as understanding of natural hazards and the steps that can be taken to mitigate their damages changes over time. In particular, global climate change has the potential to impact the Town's vulnerability in ways that past experiences have not. Changing rainfall patterns and heavier storms in combination with a higher sea level is something that Town plans to monitor as part of the hazard mitigation process.

Due to the regional nature of many hazards, local officials will need to work together across municipal lines and with state and federal agencies in order to understand and address these changes. Similarly, at the local level, the Hazard Mitigation Strategy will be incorporated into other related plans and policies to inform other proposed and programmed changes in the Town.

Plan Review and Update Process

Table 1 Plan Review and Update

Chapter	Reviews and Updates	
III – Public Participation	The Hingham Local Committee placed an emphasis on public participation for the update of the Hazard Mitigation Plan, discussing strategies to enhance participation opportunities at the first local committee meeting. During plan development, the plan was discussed at public meetings hosted by the Planning Board. The Board of Selectmen's meeting was televised. The plan was also available on the Town's website for public comment.	
IV – Risk Assessment	MAPC gathered the most recently available hazard and land use data and met with Town staff to identify changes in local hazard areas and development trends. Town staff reviewed critical infrastructure with MAPC staff in order to create an up-to-date list. MAPC also used the most recently available version of HAZUS and assessed the potential impacts of flooding using the latest data.	
V - Goals	The Hazard Mitigation	

	Goals were reviewed and endorsed by the Local Hazard Mitigation Committee.
VI – Existing Mitigation Measures	The list of existing mitigation measures was updated to reflect current mitigation activities in the Town.
VII & VIII – Hazard Mitigation Strategy	Mitigation measures from the 2005 plan were reviewed and assessed as to whether they were completed, on-going, or deferred. The Local Committee determined whether to carry forward measures into the 2014 plan update or delete them. The updated Hazard Mitigation Strategies reflect both new measures and measures carried forward from the 2005 plan. Through a discussion of the strategies in the context of current conditions, the Committee identified the priority of these measures.
IX – Plan Adoption & Maintenance	This section of the plan was updated with a new on-going plan implementation review and five year update process that will assist the Town in incorporating hazard mitigation issues into other Town planning and regulatory review processes and better prepare the Town to

	update the plan in 2019.

As indicated on Table 23, Hingham has made significant progress on implementing mitigation measures identified in the 2005 Hazard Mitigation Plan, including advancement and completion of work related to Emergency Management Radio Communication in Town, Home Meadow tide gate capacity improvements and Town-wide Inflow & Infiltration study. In addition, the Town has used the time between plans to consider their approach to flood management, and is currently looking at solutions that would restore natural processes of waterways and not rely as heavily on structural solutions.

Constraints on available funding and staff have hampered the Town's ability to address hazard mitigation and storm drainage system maintenance. Moving forward into the next five year plan implementation period there will be many opportunities to incorporate hazard mitigation into the Town's decision making processes, such as updating the Master Plan, advancing work from the Harbor Seawall Study and restoring waterways.

II. INTRODUCTION

Planning Requirements under the Federal Disaster Mitigation Act

The Federal Disaster Mitigation Act, passed in 2000, requires that after November 1 2004, all municipalities that wish to continue to be eligible to receive FEMA funding for hazard mitigation grants, must adopt a local multi-hazard mitigation plan and update this plan in five year intervals. This planning requirement does not affect disaster assistance funding.

Massachusetts has taken a regional approach and has encouraged the regional planning agencies to apply for grants to prepare plans for groups of their member communities. The Metropolitan Area Planning Council (MAPC) received a grant from the Federal Emergency Management Agency (FEMA) under the Pre-Disaster Mitigation (PDM) Program, to assist the Town of Hingham and nine other South Shore communities to update their local Hazard Mitigation Plans, which were first adopted in as part of a South Shore Regional Hazard Mitigation Plan. The local Hazard Mitigation Plan updates produced under this grant are designed to individually meet the requirements of the Disaster Mitigation Act for each community.

In order to address multijurisdictional and regional issues, the participating municipalities were afforded the opportunity to meet with their neighboring communities during plan development, and MAPC has also produced a regional document that summarizes the issues and recommendations for the South Shore communities.

What is a Hazard Mitigation Plan?

Natural hazard mitigation planning is the process of determining how to systematically reduce or eliminate the loss of life and property damage resulting from natural hazards such as floods, earthquakes, and hurricanes. Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries, and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, programs, projects, and other activities.

Previous Federal/State Disasters

The Town of Hingham has experienced 17 natural hazards that triggered federal or state disaster declarations since 1991. These are listed in Table 2 below. The vast majority of these events involved flooding.

Table 2 Previous Federal/State Disaster Declarations

DISASTER NAME (DATE OF EVENT)	TYPE OF ASSISTANCE	DECLARED AREAS
Hurricane Bob (August 1991)	FEMA Public Assistance Project Grants	Counties of Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
	Hazard Mitigation Grant Program	Counties of Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk (16 projects)
No-Name Storm (October 1991)	FEMA Public Assistance Project Grants	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk
	FEMA Individual Household Program	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk
	Hazard Mitigation Grant Program	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk (10 projects)
December Blizzard (December 1992)	FEMA Public Assistance Project Grants	Counties of Barnstable, Dukes, Essex, Plymouth, Suffolk
	Hazard Mitigation Grant Program	Counties of Barnstable, Dukes, Essex, Plymouth, Suffolk (7 projects)
March Blizzard (March 1993)	FEMA Public Assistance Project Grants	All 14 Counties
January Blizzard (January 1996)	FEMA Public Assistance Project Grants	All 14 Counties
May Windstorm (May 1996)	State Public Assistance Project Grants	Counties of Plymouth, Norfolk, Bristol (27 communities)

DISASTER NAME (DATE OF EVENT)	TYPE OF ASSISTANCE	DECLARED AREAS
October Flood (October 1996)	FEMA Public Assistance Project Grants	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
	FEMA Individual Household Program	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
	Hazard Mitigation Grant Program	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk (36 projects)
1997	Community Development Block Grant-HUD	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
June Flood (June 1998)	FEMA Individual Household Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
	Hazard Mitigation Grant Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester (19 projects)
(1998)`	Community Development Block Grant-HUD	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
March Flood (March 2001)	FEMA Individual Household Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
	Hazard Mitigation Grant Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester (16 projects)
February Snowstorm (Feb 17-18, 2003)	FEMA Public Assistance Project Grants	All 14 Counties
January Blizzard (January 22-23, 2005)	FEMA Public Assistance Project Grants	All 14 Counties
Hurricane Katrina (August 29, 2005)	FEMA Public Assistance Project Grants	All 14 Counties
May Rainstorm/Flood (May 12-23, 2006)	Hazard Mitigation Grant Program	Statewide

DISASTER NAME (DATE OF EVENT)	TYPE OF ASSISTANCE	DECLARED AREAS
April Nor'easter (April 15-27, 2007)	FEMA Public Assistance Project Grants	Barnstable, Berkshire, Dukes, Essex, Franklin, Hampden, Hampshire, Plymouth
	zard Mitigation Grant Program	Statewide
Flooding (March, 2010)	FEMA Public Assistance FEMA Individuals and Households Program SBA Loan	Bristol, Essex, Middlesex, Suffolk, Norfolk, Plymouth, Worcester
	Hazard Mitigation Grant Program	Statewide
Hurricane Earl (September 2010)	FEMA Public Assistance Project Grants	Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester
Tropical Storm Irene (August 27-28, 011)	FEMA Public Assistance	Statewide
Severe snowstorm and Flooding (February 8-09, 2013	FEMA Public Assistance; Hazard Mitigation Grant Program	Statewide

(Source: database provided by MEMA)

FEMA Funded Mitigation Projects

In the last 20 years, the Town of Hingham has received funding from FEMA for one mitigation project under the Hazard Mitigation Grant Program. This project totaled $209,800, with $157,350 covered by FEMA grants and $52,450 by local funding. The project is summarized in Table 3 below.

Table 3 FEMA-Funded Mitigation Projects

Year	Project Title	Scope of Work	Total Cost	Federal Funding	Local Funding
1998	Foundry Pond Dam Improvements	Removal of dam components & appurtenant structures; reconstruction of masonry wall; construction of low level outlet and new spillway	$209,800.00	$157,350.00	$52,450.00

(Source: database provided by MEMA)

Community Profile

Hingham is located 15 miles southeast of Boston, and is served by Route 3A in the northern section of Town and Route 3 in the south. The Town values its village character and scenic vistas, and its land use is predominantly residential with commercial development located adjacent to Route 3, along Route 3A and in the Downtown. Hingham has a 21-mile shoreline along the Boston Harbor and numerous open spaces including Bare Cove Park, World's End conservation and recreation area, and Wompatuck State Park. The Town operates under a Board of Selectmen and has an Open Town Meeting form of governance.

Hingham is in the Boston Harbor watershed, entirely within the Weymouth and Weir River sub-basin, which discharges into the coastal waters of Hingham Harbor and Hingham Bay. The Town's physical geography is part of the Boston Basin, which consists of a low coastal plain with generally gently sloping terrain.

Hingham enjoys commuter rail access to Boston on the Greenbush Line and Ferry Service from the Hingham Shipyard on Hewitt's Cove; both services are part of the Massachusetts Bay Transit System (MBTA). The population in 2010 was 22,157 in a land area of approximately 22.5 square miles. The population density, based on the 2010 population is approximately 984 people per square mile. In 2010 there were an estimated 8,465 housing units.

Hingham is bordered by the Boston Harbor to the north, Towns of Hull, Cohasset and Scituate to the east, Norwell and Rockland to the south, and Weymouth to the west.

The Town maintains a website at http://www.hingham-ma.gov.

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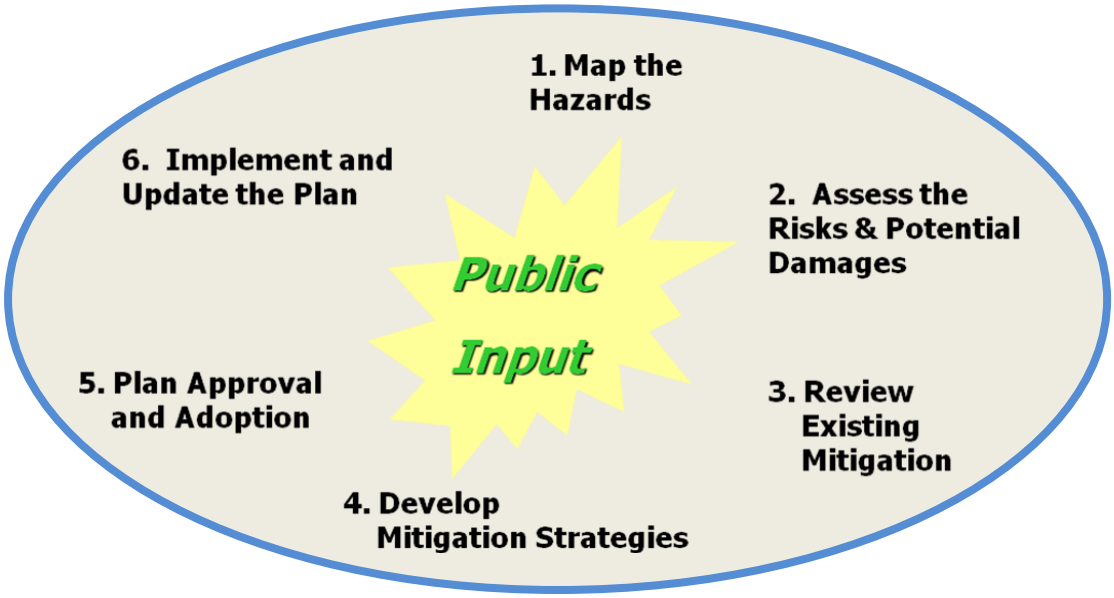
III. PLANNING PROCESS AND PUBLIC PARTICIPATION

MAPC employs a six step planning process based on FEMA's hazard mitigation planning guidance focusing on local needs and priorities but maintaining a regional perspective matched to the scale and nature of natural hazard events. Public participation is a central component of this process, providing critical information about the local occurrence of hazards while also serving as a means to build a base of support for hazard mitigation activities. MAPC supports participation by the general public and other plan stakeholders through Regional and Local Hazard Mitigation Planning Committees, two public meetings hosted by the local Planning Board and Board of Selectmen, posting of the plan to the Town's website, and invitations sent to neighboring communities, Town boards and commissions, the local chamber of commerce, and other local or regional entities to review the plan and provide comment.

Planning Process Summary

The six-step planning process outlined below is based on the guidance provided by FEMA in the Local Multi-Hazard Mitigation Planning Guidance; July 1, 2008. Public participation is a central element of this process, which attempts to focus on local problem areas and identify needed mitigation measures based on where gaps occur in the existing mitigation efforts of the municipality. By working on municipal hazard mitigation plans in groups of neighboring cities and Towns, MAPC is able to identify regional opportunities for collaboration and facilitate communication between communities. In plan updates, the process described below allows staff to bring the most recent hazard information into the plan, including new hazard occurrence data, changes to a municipality's existing mitigation measures, and progress made on actions identified in previous plans.



1. Map the Hazards – MAPC relies on data from a number of different federal, state, and local sources in order to map the areas with the potential to experience natural hazards. This mapping represents a multi-hazard assessment of the municipality and is used as a set of base maps for the remainder of the planning process. A particularly important source of information is the knowledge drawn from local municipal staff on where natural hazard impacts have occurred, which is collected. These maps can be found in Appendix B.

2. Assess the Risks & Potential Damages – Working with local staff, critical facilities, infrastructure, vulnerable populations, and other features are mapped and contrasted with the hazard data from the first step to identify those that might represent particular vulnerabilities to these hazards. Land use data and development trends are also incorporated into this analysis. In addition, MAPC develops estimates of the potential impacts of certain hazard events on the community.

3. Review Existing Mitigation – Municipalities in the Boston Metropolitan Region have an active history in hazard mitigation as many have adopted flood plain zoning districts, wetlands protection programs, and other measures as well as enforcing the State building code, which has strong provisions related to hazard resistant building requirements. All current municipal mitigation measures must be documented.

4. Develop Mitigation Strategies – MAPC works with the local municipal staff to identify new mitigation measures, utilizing information gathered from the hazard identification, vulnerability assessments, and the community's existing mitigation efforts to determine where additional work is necessary to reduce the potential damages from hazard events. Additional information on the development of hazard mitigation strategies can be found in Chapter VII.

5. Plan Approval & Adoption – Once a final draft of the plan is complete it is sent to MEMA for the state level review and, following that, to FEMA for approval. Typically, once FEMA has approved the plan the agency issues a conditional approval with the condition being adoption of the plan by the municipality. More information on plan adoption can be found in Chapter IX and documentation of plan adoption can be found in Appendix D.

6. Implement & Update the Plan – Implementation is the final and most important part of any planning process. Hazard Mitigation Plans must also be updated on a five year basis making preparation for the next plan update an important on-going activity. Chapter IX includes more detailed information on plan implementation.

Hingham's Participation in the Regional Committee

On January 15, 2010 a letter was sent notifying the communities of the first meeting of the South Shore Regional Committee and requesting that the Chief Elected Official designate a minimum of two municipal employees and/or officials to represent the

community. The following individuals were appointed to represent Hingham on the regional committee:

Mark Duff	Chief, Fire Department Emergency Management
Robert Olsson	Deputy Chief, Fire Department Emergency Management

The South Shore Regional Committee met on February 9, 2010. At that meeting, Hingham's representatives reviewed hazard mitigation strategies with representatives from the neighboring cities and Towns of Milton, Cohasset, Quincy, Braintree, Weymouth, Hingham, Hull, Scituate and Marshfield.

The Local Multiple Hazard Community Planning Team

In addition to the regional committee meetings, MAPC worked with the local community representatives to organize a local Multiple Hazard Community Planning Team for Hingham (Local Committee). MAPC briefed the local representatives as to the desired composition of that team as well as the need for representation from the business community and citizens at large.

The Local Multiple Hazard Community Planning Team Meetings

On October 6, 2011, and on July 9 and 16, 2012, MAPC conducted meetings of the Hingham Local Committee. The meetings were organized by Chief Mark Duff and Deputy Chief Robert Olsson of the Hingham Fire Department/Emergency Management. The purpose of the first meeting was to introduce the PDM program, develop hazard mitigation goals, and to gather information on local hazard mitigation issues and sites or areas related to these.

The second meeting focused on verifying information gathered by MAPC staff and discussion of existing mitigation practices, the status of mitigation measures identified in the 2005 hazard mitigation plan, and identify new potential mitigation measures. The second meeting included a discussion that identified prioritization of proposed mitigation measures as well as measures carried forward from the previous plan.

Table 4 lists the attendees at each meeting of the team. The agendas for these meetings are included in Appendix A.

Table 4 **Attendance at the Hingham Local Committee Meetings**	
Name	**Representing**
October 6, 2011	
Bruce Capman, RS, Exec. Health Officer	Board of Health
W. Clifford Prentiss, Conservation Officer	Conservation Commission
Mark Duff, Chief	Fire Department/Emergency Management
Robert Olsson, Deputy Chief	Fire Department/Emergency Management
David Damstra, Captain	Fire Department/Emergency Management
Katy Lacy, Community Planning Director	Planning Board
Glenn Olsson, Deputy Chief	Police Department
Randy Sylvester, Superintendent	Public Works Department
July 9 and July 16, 2012	
Laura Burns, Selectman	Board of Selectman
Carolyn Nielsen, Chairman	Conservation Commission
Mark Duff, Chief	Fire Department/Emergency Management
Robert Olsson, Deputy Chief	Fire Department/Emergency Management
Katy Lacy, Community Planning Director	Planning Board
Michael Simpson, Inspector of Buildings	Building Department
Kenneth R. Corson, Harbor Master	Police Department
Glenn Olsson, Deputy Chief	Police Department
Bruce Capman, RS, Exec. Health Officer	Board of Health
Randy Sylvester, Superintendent	Public Works Department

Public Meetings

Public participation in the hazard mitigation planning process is important, both for plan development and for later implementation of the plan. Residents, business owners, and other community members are an excellent source for information on the historic and potential impacts of natural hazard events and particular vulnerabilities the community may face from these hazards. Their participation in this planning process also builds understanding of the concept of hazard mitigation, potentially creating support for mitigation actions taken in the future to implement the plan. To gather this information and educate residents on hazard mitigation, the Town hosted two public meetings: one during the planning process and one just prior to a complete draft plan was ready for review.

Natural hazard mitigation plans unfortunately rarely attract much public involvement in the Boston region, unless there has been a recent hazard event. One of the best strategies for overcoming this challenge is to include discussion of the hazard mitigation plan on the agenda of an existing board or commission. With this strategy, the meeting receives widespread advertising and a guaranteed audience of the board or commission members

plus those who attend the meeting. These board and commission members represent an informed and engaged audience that is up to date on many of the issues that relate to hazard mitigation planning in the locality and will likely be involved in plan implementation – making them an important audience with which to build support for hazard mitigation measures. In addition, these meetings frequently receive press coverage and are televised, expanding the audience that has the opportunity to hear the presentation and provide comment by phoning or emailing local staff.

The plan was introduced to the public at two public meetings, once during the planning process and once after a final draft plan was completed. The public had an opportunity to provide input to the planning process during a meeting of the Planning Board on November 28, 2011 held in the Hingham Town Hall. The final draft of the plan was presented for public comment at a meeting of the Board of Selectmen on December 6, 2012. This meeting was held in the Hingham Town Hall. The Board of Selectmen's meeting was televised and re-broadcast on local cable (Comcast Channel 10 / Verizon Channel 30).

The first meeting was publicized as a regular meeting of the Planning Board with the public invited to comment and ask questions regarding the plan. The presentation of the final draft was publicized as a regular Board of Selectmen meeting, again with the invitation for public comment. An attendance list for each meeting can be found in Table 5. In addition, the plan was made available on the Town's website for public review.

Table 5
Attendance at Public Meetings

Name	**Representing**
First Public Meeting	
Sarah Corey. Chairman	Planning Board
Judy Sneath, Clerk	Planning Board
Paul Healey	Planning Board
Gary Tondorf-Dick	Planning Board
William Ramsey	Planning Board
Katy Lacy, Community Planning Director	Planning Board
David Damstra, Captain	Fire Department/Fire Prevention
Second Public Meeting	
Laura Burns	Board of Selectmen
Bruce Rabuffo	Board of Selectmen
Irma Lauter	Board of Selectmen
Mark Duff, Chief	Fire Department/Emergency Management
15 Members of the public	

Other Opportunities for Public Involvement

Review by Community Organizations

In addition to communications with local departments about the plan, notice was sent to the following organizations and neighboring municipalities inviting them to review the Hingham Hazard Mitigation Plan, and submit their comments to the Town.

Town of Cohasset
Town of Scituate
Town Norwell
Town of Rockland
Town of Weymouth
Town of Hull
Trustees of the Reservation
Massachusetts Office of Coastal Zone Management

Website

A draft copy of the Hingham Hazard Mitigation Plan was posted on the Town's website. Members of the public could access the draft document and submit comments or questions. In addition, communication was sent to neighboring municipalities to share the draft plan and to provide opportunity for comment.

No comments on the draft plan were received during the public review process

Planning Timeline

January 15, 2010	Letter to the municipalities initiating the project.
February 9, 2010	Meeting of the South Shore Regional Committee
October 6, 2011	Meeting of the Local Committee
July 9, 2012	Meeting of the Local Committee
July 16, 2012	Meeting of the Local Committee
November 28, 2011	First Public Meeting with the Planning Board
December 6, 2012	Second Public Meeting with the Board of Selectmen
May 7, 2013	Plan submitted to MEMA
September 27, 2013	Plan Review Tool completed by MEMA
July 25, 2014	Revised Draft Plan submitted to MEMA
May 6, 2015	Revised Draft Plan submitted to MEMA
January 20, 2016	Revised Draft Plan submitted to FEMA
January 29, 2016	FEMA Approval Pending Adoption

IV. RISK ASSESSMENT

The risk assessment analyzes the potential natural hazards that could occur within the Town of Hingham as well as the relationship between those hazards and current land uses, potential future development, and critical infrastructure. This section also includes a vulnerability assessment that estimates the potential damages that could result from certain large scale natural hazard events.

Update Process

In order to update Hingham's risk assessment, MAPC gathered the most recently available hazard and land use data and met with Town staff to identify changes in local hazard areas and development trends. MAPC also used the most recently available version of HAZUS (described below).

Overview of Hazards and Impacts

The Commonwealth of Massachusetts Hazard Mitigation Plan 2013 (state plan) provides an in-depth overview of natural hazards in Massachusetts. The state plan indicates that Massachusetts is most vulnerable to the following natural hazards: flooding, severe storms, and winter events, and is also vulnerable to other natural hazards such as drought, brush fires, earthquakes, landslides, tsunamis, and extreme temperatures. Previous state and federal disaster declarations since 1991 are summarized in Table 1.

Table 6 summarizes the hazard risks for Hingham. This evaluation takes into account the frequency of the hazard, historical records, and variations in land use. This analysis is based on the vulnerability assessment in the Commonwealth of Massachusetts State Hazard Mitigation Plan, 2013. The statewide assessment was modified to reflect local conditions in Hingham using the definitions for hazard frequency and severity listed below Table 6.

Table 6
Hazard Risks Summary

Hazard	Frequency	Severity
Flood Related		
Inland/Riverine	High	Minor
Coastal Storms	High	Minor
Dam Failure	Very Low	Minor
Ice Jam	Low	Minor
Wind		
Hurricanes	Medium	Serious
Tornadoes	Low	Serious
Nor'easter	High	Serious

Table 6
Hazard Risks Summary

Severe Thunderstorm	High	Low
Winter Storms		
Ice Storm	Medium	Minor
Blizzard	High	Minor
Geologic		
Earthquakes	Low	Extensive
Landslide	Low	Minor
Other Natural Hazards		
Brush Fire	Medium	Minor
Extreme temperatures	Medium	Minor
Drought	Low	Minor

Definitions used in the Commonwealth of Massachusetts State Hazard Mitigation Plan

Definitions Used in the Commonwealth of Massachusetts State Hazard Mitigation Plan 2013

Frequency Categorization

Very low: events that occur less frequently than once in 100 years (Less than 1% per year)

Low: events that occur from once in 50 years to once in 100 years (1% to 2% per year)

Medium: events that occur from once in 5 years to once in 50 years (2% to 20% per year)

High: events that occur more frequently than once in 5 years (Greater than 20% per year)

Severity Categorization

Minor: Limited and scattered property damage; limited damage to public infrastructure and essential services not interrupted; limited injuries or fatalities.

Serious: Scattered major property damage; some minor infrastructure damage; essential services are briefly interrupted; some injuries and/or fatalities.

Extensive: Widespread major property damage; major public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and/or fatalities.

Catastrophic: Property and public infrastructure destroyed; essential services stopped; numerous injuries and fatalities

Flood Related Hazards

Flooding was the most prevalent natural hazard identified by local officials in Hingham. Flooding is generally caused by hurricanes, nor'easters, severe rainstorms and thunderstorms. Global climate change has the potential to exacerbate these issues over time with the potential for changing rainfall patterns and heavier storms in combination with a higher sea level.

Previous Occurrences and Extent of Flooding

There have been a number of major floods that have affected the South Shore region over the last fifty years. Significant historic flood events in Hingham have included:

- March 1968
- The blizzard of 1978
- January 1979
- April 1987
- October 1991 ("The Perfect Storm")
- October 1996
- June 1998
- March 2001
- April 2004
- May 2006
- April 2007
- March 2010
- December 2010

Town-specific data for previous flooding occurrences are not collected by the Town of Hingham. The best available local data is from the National Climatic Data Center (see Table 7). Plymouth County, which includes the Town of Hingham, experienced 37 flood events from 1996 –2014. No deaths or injuries were reported and the total reported property damage in the county was $25.8 million dollars.

Table 7 Plymouth County Flood Events, 1996-2014

Location	Date	Type	Deaths	Injuries	Property Damage
PLYMOUTH CO.	9/18/1996	Flood	0	0	0
PLYMOUTH CO.	3/5/2001	Flood	0	0	0
EASTERN PLYMOUTH	3/28/2005	Flood	0	0	0
EASTERN PLYMOUTH / PART OF NORFOLK	10/15/2005	Flood	0	0	350,000
WESTERN PLYMOUTH	10/15/2005	Flood	0	0	200,000
EASTERN PLYMOUTH / PART OF NORFOLK	10/15/2005	Flood	0	0	50,000

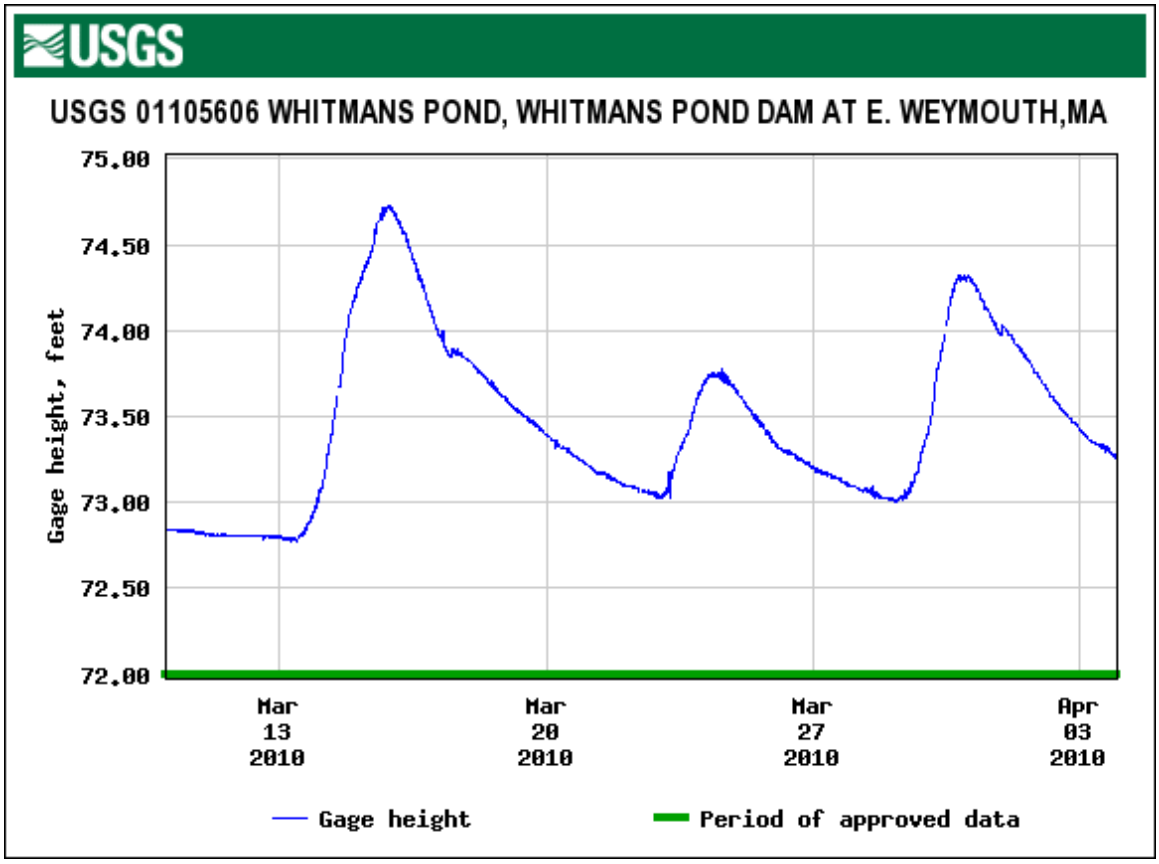
WESTERN PLYMOUTH	10/15/2005	Flood	0	0	100,000
WESTERN PLYMOUTH	10/15/2005	Flood	0	0	140,000
EASTERN PLYMOUTH / PART OF NORFOLK	10/25/2005	Flood	0	0	35,000
EASTERN PLYMOUTH / PART OF NORFOLK	12/9/2005	Flood	0	0	40,000
SOUTHERN PLYMOUTH	5/13/2006	Flood	0	0	500,000
PLYMOUTH CO.	5/13/2006	Flood	0	0	0
PLYMOUTH CO.	6/7/2006	Flood	0	0	30,000
PLYMOUTH CO.	6/23/2006	Flood	0	0	2,000
PLYMOUTH CO.	8/20/2006	Flood	0	0	5,000
PLYMOUTH CO.	10/28/2006	Flood	0	0	10,000
PLYMOUTH CO.	3/2/2007	Flood	0	0	10,000
PLYMOUTH CO.	3/17/2007	Flood	0	0	8,000
PLYMOUTH CO.	4/15/2007	Flood	0	0	25,000
PLYMOUTH CO.	2/13/2008	Flood	0	0	0
PLYMOUTH CO.	3/8/2008	Flood	0	0	5,000
PLYMOUTH CO.	3/8/2008	Flood	0	0	0
PLYMOUTH CO.	9/27/2008	Flood	0	0	50,000
PLYMOUTH CO.	5/24/2009	Flood	0	0	0
PLYMOUTH CO.	8/29/2009	Flood	0	0	0
PLYMOUTH CO.	3/14/2010	Flood	0	0	16,150,000
PLYMOUTH CO.	3/29/2010	Flood	0	0	8,070,000
PLYMOUTH CO.	4/1/2010	Flood	0	0	0
PLYMOUTH CO.	7/13/2011	Flood	0	0	5,000
PLYMOUTH CO.	8/10/2012	Flood	0	0	30,000
PLYMOUTH CO.	5/11/2013	Flood	0	0	0
PLYMOUTH CO.	5/11/2013	Flood	0	0	0
PLYMOUTH CO.	6/7/2013	Flood	0	0	0
PLYMOUTH CO.	9/3/2013	Flood	0	0	0
PLYMOUTH CO.	3/30/2014	Flood	0	0	0
PLYMOUTH CO.	10/22/2014	Flood	0	0	0
PLYMOUTH CO.	11/17/2014	Flood	0	0	0
TOTAL			**0**	**0**	**25,815,000**

Source: NOAA, National Climatic Data Center

The most severe flooding since the previous plan occurred during March 2010, when a total of 14.83 inches of rainfall accumulation was recorded by the National Weather

Service (NWS). The weather pattern that consisted of early springtime prevailing westerly winds that moved three successive storms, combined with tropical moisture from the Gulf of Mexico, across New England. Torrential rainfall caused March 2010 to be the wettest month on record. One indication of the extent of flooding is the gage height at the nearest USGS streamflow gaging station, which is at the Whitman's Pond Dam in neighboring Weymouth. The USGS gage height, shown in Figure 1, exceeded 74.5 feet on March 17, 2010 and exceeded 74.0 feet on March 31, 2010. Normal gage height in March is about 72.5 feet.

Figure 1 Whitman's Pond Dam Gage Height, March-April 2010



Source, US Geological Service,

Overview of Town-Wide Flooding Impacts

Flooding in the Town of Hingham is primarily a result of precipitation and storm water run-off overwhelming the capacity of natural and structured drainage systems to convey water, causing it to overflow the system. Flooding can be caused by major storms, known as nor'easters and hurricanes. Nor'easters can occur at any time of the year but they are most common in winter. Hurricanes are most common in the summer and early fall. Nor'easters cover a larger area than hurricanes although the winds are not as high.

The frequency and locations of flood hazard events in Hingham can be estimated based on the reported loss occurrences for repetitive loss properties and from local knowledge captured through discussion with local staff and the public during identification of local flood hazard areas. Based on these factors, flooding is not a frequent occurrence in Hingham and is most frequently an issue of poor storm water drainage or coastal flooding in certain areas of the Town. The limited number of repetitive loss properties and the low frequency of reported losses on those properties support this conclusion.

The extent of flooding in Hingham varies from local roadway drainage issues that pose a minor inconvenience to more significant but less frequent events that result in damage to property. One indicator of the extent of damage is the data on claims filed with the National Flood Insurance Program. Since 1978 there have been 122 losses in Hingham, for a total of $728,243. To place this in context with other South Shore communities, Cohasset had a similar number of losses, at 116, but most other towns had significantly more losses: Marshfield had 1,478 losses, Hull had 2,232, and Scituate had 3,561 over this same period.

Inland/Riverine Flooding

Inland/Riverine flooding is associated with the non-tidal rivers and streams in the town of Hingham, which can overtop their banks and inundate adjacent areas during storm events. In many cases, those areas where flooding occurs are floodplain and wetland areas where flood events are part of the natural system, only creating a problem where these areas have been previously developed. Development also increases the amount of impervious area, which serves to exacerbate flooding as storm water is prevented from absorbing into the ground and flows overland directly into the waterway, increasing the potential volume of water.

The largest watershed area in the Town is the Weir River, which has a moderate density of development (approximately 5 – 10/acre). Flooding has occurred along points of the Weir River due to heavy rain and snowfall events, where the river has overflowed streambanks and stormwater control structures (see locally identified areas of flooding below). Vegetative debris in the waterway was cited as contributing to flooding, essentially acting as a dam as flood carried debris builds up and blocks the flow of water at certain locations, such as culverts. Other areas along the river may flood, however located on the eastern side of the river is Wompatuck State Park. In this area where flooding may occur, the floodplain and wetland areas have mostly been preserved.

Areas vulnerable to inland/riverine flooding are shown on Map 3 in Appendix B, and specific sites identified by the Town subject to flooding are listed in section below on Potential Flood Hazard Areas. The vulnerability analysis below provides estimates of flood damages for these sites ranging from $7 million to $37 million.

The inventory of Critical Facilities shows 20 sites located within flood hazard areas. These include four water supply wells, three sewer pump stations, one fire station, a

communications tower, a bridge, and several dams. While there have not been previous occurrences of significant flood damage to these sites, the town is potentially vulnerable to loss or interruption of key services such as water supply, wastewater treatment, emergency response, and communications due to potential flooding at these sites.

Coastal Flooding

Coastal flooding is associated with severe coastal storms that, through the combination of winds and tides, drive tidal waters to higher levels than normally experienced, leading to the inundation of low lying land areas and the overtopping of sea walls. Hingham has limited exposure to coastal flooding, with some locations along the Hingham Harbor experiencing flooding and shoreline erosion. A contributing issue to coastal flooding is when the presence of a high tide limits the ability of stormwater to drain from inland waterways, such as the Weir River.

The area most vulnerable to coastal flooding is a section of shoreline along the west side of Hingham Harbor which is classified VE on the FIRM map (see Map 2, Appendix B). The Critical Facilities inventory shows that there are nine facilities located within the VE zone, as shown in Table 18 below. These include several marinas, the MBTA commuter boat terminal, the Town Landing, the town beach recreation area, and two sewer pump stations. While there have not been past occurrences of significant damage, the potential vulnerability of these sites includes impacts to the local economy related to recreation (marinas, town landing), and impacts to wastewater services (sewer pump stations).

According to NOAA's National Climate Data Center, a coastal storm on January 2, 2014 caused coastal flooding on Rockland Street and Kilby Street in Hingham, with backyards flooding up to the foundations of houses.

Dams and Dam Failure

Dam failure can arise from two types of situations. Dams can fail because of structural problems independent of any storm event. Dam failure can follow an earthquake by causing structural damage. Dams can fail structurally because of flooding arising from a storm or they can overspill due to flooding.

In the event of a dam failure, the energy of the water stored behind even a small dam can cause property damage and potential loss of life if there are people or buildings downstream. The number of fatalities from a dam failure depends on the amount of warning provided to the population and the number of people in the area in the path of the dam's floodwaters. Dam failure in general is infrequent but has the potential for severe impacts.

Town staff has identified 10 dams in Hingham (below). The majority of publicly-owned dams in Hingham poses no threat because the impoundments are very small and have been categorized as low risk for hazard according the Massachusetts inventory of dams.

However, several of the few privately-owned dams have been categorized at a higher risk of hazard. These include the dams related to the town's water supply reservoirs, Fulling Millpond and Accord Pond, which are not owned by the Town because it is one of the few towns served by a privately-owned water company. However the extent of potential damages associated with dams in Hingham is limited due to their low-head construction and limited development in adjacent areas. There have been no previous occurrences of flooding caused by dam failures in the Town of Hingham.

- *Fulling Millpond* – This dam is an impoundment on the Fulling Mill Brook and is a privately-owned structure. The dam is owned by Aquarion Water Company and has been identified as a significant hazard on the Massachusetts inventory of dams.

- *Cushing Pond* - This dam is an impoundment on the Crooked Meadow River and is a privately-owned structure. The dam is owned by Jeffrey K. Alexander and has been identified as a significant hazard on the Massachusetts inventory of dams.

- *Triphammer Pond* - This dam is an impoundment on a tributary of the Weir River and is a publicly-owned structure. The dam is owned by the Town of Hingham and has been identified as a low hazard on the Massachusetts inventory of dams.

- *Accord Pond* - This dam is an impoundment on the Accord Brook and is a privately-owned structure. The dam is owned by Aquarion Water Company and has been identified as a significant hazard on the Massachusetts inventory of dams.

- *Foundry Pond* - This dam is an impoundment on the Weir River and is a publicly-owned structure. The dam is owned by the Town of Hingham and has been identified as a low hazard on the Massachusetts inventory of dams. This dam is also the location of a 1998 FEMA-funded mitigation project to improve the dam structure and spillway.

- *Skating Club Pond* - This dam is an impoundment on a tributary of the Weir River and is a publicly-owned structure. The dam is owned by the Town of Hingham and has not been identified with a hazard rating since it is not a regulated dam.

- *Holly Pond* - This dam is an impoundment on the Aaron River and is a publicly-owned structure. The dam is owned by the MA Division of Conservation Resources (DCR) and has not been identified with a hazard rating since it is not a regulated dam.

- *Woodpecker Pond* - This dam is an impoundment on Woodpecker Pond and is a publicly-owned structure. The dam is owned by the MA Division of Conservation Resources (DCR) and has been identified as a low hazard on the Massachusetts inventory of dams.
- *Hobart Street Dam* – This dam is an impoundment on Brewer Pond and is a publicly-owned structure. The dam is not included on the Massachusetts inventory of dams.

- *Cranberry Pond* - This dam is an impoundment on Cranberry Pond and is a publicly-owned structure. The dam is not included on the Massachusetts inventory of dams.

The probability of future dam failure events is classified in the Massachusetts State Hazard Mitigation Plan 2013 as very low frequency, or an event that occurs less frequently than once in 100 years (less than 1% per year).

Ice Jams

Ice jams occur in cold weather when normally flowing water begins to freeze effectively damming the waterway and causing localized flooding in the area. There is no history of ice jams leading to flooding in Hingham and Town staff did not identify this hazard as an issue for the Town. As this part of coastal Massachusetts experiences somewhat warmer winters than the western part of the State and tidal waters are less subject to freezing, this hazard is unlikely to be an issue in the Town.

Potential Flood Hazard Areas

The frequency and locations of flood hazard events in Hingham can be estimated based on a number of sources of information. The first was the National Flood Insurance Rate Maps (FIRMs). The FIRM flood zones are shown on Map 3 in Appendix B. The second was discussions with local officials and the public.

The Locally Identified Areas of Flooding included below were identified by the Hingham Hazard Mitigation Planning Team as areas where flooding is known to occur. These areas do not necessarily coincide with the flood zones from the FIRMs. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers correspond to the numbers on Map 8, "Hazard Areas". The numbers do not reflect priority order.

Locally Identified Areas of Flooding

1. Route 3A, between USS Amesbury Drive and Bradley Woods Drive
2. North Beach
3. Yacht Club
4. Kilby Street and Rockland Street
5. Bradley Park Drive
6. North Street/Water Street/Summer Street
7. Route 3A/East Street/Kilby Street
8. East Street/Joy Lane
9. Fountainbleau Drive
10. Free Street
11. Lazell Street
12. Abington Street
13. Hingham Bathing Beach

Repetitive Loss Structures

As defined by the Community Rating System (CRS) of the National Flood Insurance Program (NFIP), a repetitive loss property is any property which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see http://www.fema.gov/business/nfip/replps.shtm.

There are 10 repetitive loss structures in Hingham; two more than were identified in the 2005 plan (Table 8).

Table 8 Repetitive Loss Properties Summary

Flood Zone	Single Family Residential Structures	Multi-Family Residential Structures	Commercial, Industrial, or Institutional Structures	Total Repetitive Loss Properties
FEMA Zone AH	5	1	0	6
FEMA Zone VE	3	0	0	3
FEMA .2% annual chance				
Total: FEMA Flood Zones	**8**	**1**		**9**
Route 3A between Amesbury Dr. and Bradley Woods Dr.	0	0	0	0
North Beach	0	0	0	0
Yacht Club	0	0	0	0
Kilby St and Rockland St	0	0	0	0
Bradley Park Drive	0	0	0	0
North St/Water St/Summer St	0	0	0	0
Route 3A /East St/ Kilby St	1	0	0	1
East Street/ Joy Lane	0	0	0	0
Fountainbleau Drive	0	0	0	0
Free Street	0	0	0	0
Lazell Street	0	0	0	0
Abington Street	0	0	0	0
Hingham Bathing Beach	0	0	0	0
Total: Locally Identified Areas of Flooding	**1**	**0**	**0**	**1**
TOTAL	**9**	**1**	**0**	**10**

(Source: MA DCR, March 19, 2014)

Nine of the structures are single family homes and one is a multi-family residence. Nine of these properties are located in a FEMA designated flood zone, and one is located in an area identified by the Local Committee as an area prone to flooding. These ten properties experienced a total of 34 losses between 1978 and 2014, for a total of $440,213 in damage claims paid. One of the properties had a total of eight losses from 1978 to 2014.

As shown in Table 21, damages from the March 2010 floods in Plymouth County totaled $24.1.2 million, while total damages for all floods since 2005 totaled $25.8 million. There were no deaths or injuries reported and the flooding events associated with these floods. The vulnerability analysis for the town of Hingham conducted by MAPC estimates a range of damages from flooding of $7.5 million to $37.5 million.

Wind Related Hazards

Wind-related hazards include hurricanes and tornadoes as well as high winds during severe rainstorms and thunderstorms. As with many communities, falling trees and tree limbs that result in downed power lines and power outages are an issue in Hingham. Information on wind related hazards can be found on Map 5 in Appendix B.

Hurricanes

A hurricane is a violent wind and rainstorm with wind speeds of 74-200 miles per hour. A hurricane is strongest as it travels over the ocean and is particularly destructive to coastal property as the storm hits the land. Given its location on the coast, the town's entire area is vulnerable to hurricanes. Hurricanes occur between June and November.

Since 1900, 39 tropical storms have impacted New England (NESEC). Massachusetts has experienced approximately 32 tropical storms, nine Category 1 hurricanes, five Category 2 hurricanes and one Category 3 hurricane. This equates to a frequency of once every six years. A hurricane or storm track is the line that delineates the path of the eye of a hurricane or tropical storm.

There have been three recorded tropical storms that have tracked through Hingham, and these occurred in 1888, 1916 and 1923. The 1888 storm passed across the northern section of Hingham, the 1916 storm tracked just across the southeast portion of Town and the 1923 storm passed through the eastern section of Hingham. One tropical depression was also recorded in Hingham, and this occurred in 1876 with the storm tracking across the southern portion of Town.

The Town experiences the impacts of the wind and rain of hurricanes and tropical storms regardless of whether the storm track passed through the Town. The hazard mapping indicates that the 100 year wind speed is 110 miles per hour.

Some of the hurricanes that have passed through the region are shown in Table 9:

Table9. Hurricane Records for Massachusetts

Hurricane Event	Date
Great New England Hurricane*	September 21, 1938
Great Atlantic Hurricane*	September 14-15, 1944
Hurricane Doug	September 11-12, 1950
Hurricane Carol*	August 31, 1954
Hurricane Edna*	September 11, 1954
Hurricane Diane	August 17-19, 1955
Hurricane Donna	September 12, 1960
Hurricane Gloria	September 27, 1985
Hurricane Bob	August 19, 1991
Hurricane Earl	September 4, 2010
Tropical Storm Irene	August 28, 2011
Hurricane Sandy	October 29-30, 2012

*Category 3. Source: National Oceanic and Atmospheric Administration (NOAA)

Hurricane intensity is measured according to the Saffir/Simpson scale, which categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure, and storm surge potential. These are combined to estimate potential damage. The following gives an overview of the wind speeds, surges, and range of damage caused by different hurricane categories:

Category	Winds (mph)	Surge (ft)	Potential Damage
1	74 – 95	4 - 5	Minimal
2	96 – 110	6 - 8	Moderate
3	111 – 130	9 - 12	Extensive
4	131 – 155	13 - 18	Extreme
5	> 155	>18	Catastrophic

Source: NOAA

Hurricanes typically have regional impacts beyond their immediate tracks. Falling trees and branches are a significant problem because they can result in power outages when they fall on power lines or block traffic and emergency routes. Hurricanes are a town-wide hazard in Hingham. Potential hurricane damages to Hingham have been estimated using HAZUS-MH. Total damages are estimated at $18.8 million for a Category 2 hurricane and $176.5 Million for a Category 4 hurricane. Other potential impacts are detailed in Table 19.

Based on the record of previous occurrences, Hurricanes in Hingham are a Medium frequency event as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur from once in 5 years to once in 50 years, or a 2% to 20% chance per year.

Tornados

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. These events are spawned by thunderstorms and occasionally by hurricanes, and may occur singularly or in multiples. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. Most vortices remain suspended in the atmosphere. Should they touch down, they become a force of destruction. Tornadoes are most common in the summer, June through August, and most form in the afternoon or evening.

The frequency of tornadoes in eastern Massachusetts is low; on average, there are six tornadoes that touchdown somewhere in the Northeast region every year. The strongest tornado in Massachusetts history was the Worcester Tornado in 1953 (NESEC). The most recent tornado events in Massachusetts were in Springfield in 2011 and in Revere in 2014. The Springfield tornado caused significant damage and resulted in 4 deaths in June of 2011. The Revere tornado touched down at in Chelsea just south of Route 16 (Revere Beach Parkway) and moved north into Revere's business district along Broadway, past Revere City Hall, and ended near the intersection of Routes 1 and 60. The path was approximately two miles long and 3/8 mile wide, with wind speeds up to 120 miles per hour. According to Revere Fire Chief Gene Doherty, 65 homes had "substantial damages" and 13 homes and businesses were uninhabitable.
Tornado damage severity is measured by the Fujita Tornado Scale, in which wind speed is not measured directly but rather estimated from the amount of damage. As of February 01, 2007, the National Weather Service began rating tornados using the Enhanced Fujita-scale (EF-scale), which allows surveyors to create more precise assessments of tornado severity. The EF-scale is summarized below:

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

Source: Massachusetts State Hazard Mitigation Plan, 2013

There have been no recorded tornados within the Hingham Town limits. The town's entire area is potentially subject to tornadoes. Buildings constructed prior to current building codes may be more vulnerable to damages caused by tornadoes. Evacuation of impacted areas may be required on short notice. Sheltering and mass feeding efforts may be required along with debris clearance, search and rescue, and emergency fire and

medical services. Key routes may be blocked by downed trees and other debris, and widespread power outages are also typically associated with tornadoes.

Based on the record of previous occurrences since 1950, Tornado events in Hingham are a Medium frequency event as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur from once in 5 years to once in 50 years, or a 2% to 20% chance per year.

Nor'easters

Featuring strong northeasterly winds blowing in from the ocean over coastal areas, nor'easters are relatively common in the winter months in New England occurring one to two times a year and frequently lead to coastal flooding and erosion. The storm radius of a nor'easter can be as much as 1,000 miles and these storms feature sustained winds of 10 to 40 mph with gusts of up to 70 mph. These storms are accompanied by heavy rains or snows, depending on temperatures. The entire town is potentially subject to Nor'easters.

Previous occurrences of Nor'easters include the following which are listed in the Massachusetts State Hazard Mitigation Plan 2013:

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

Many of the historic flood events identified in the previous section were precipitated by nor'easters, including the "Perfect Storm" event in 1991. More recently, blizzards in December 2010 and October 2011 were both large nor'easters that caused significant snowfall amounts.

The high winds of Nor'easters can cause falling trees, which can result in downed power lines and power outages, as well as obstruction of key routes and emergency access. In some cases structures may also be damaged by Nor'easters' heavy winds. Heavy precipitation associated with some Nor'easters may also cause localized flooding, both riverine and urban drainage related. The entire town of Hingham could be at risk from the wind, rain or snow impacts and coastal damages from a nor'easter, depending on the track and radius of the storm

Based on the record of previous occurrences, nor'easters in Hingham are high frequency events as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur more frequently than once in 5 years (greater than 20% per year).

Severe Thunderstorms

While less severe than the other types of storms discussed, thunderstorms can lead to localized damage and represent a hazard risk for communities. Generally defined as a storm that includes thunder, which always accompanies lightning, a thunderstorm is a storm event featuring lightning, strong winds, and rain and/or hail. Thunderstorms sometime give rise to tornados. On average, these storms are only around 15 miles in diameter and last for about 30 minutes. A severe thunderstorm can include winds of close to 60 mph and rain sufficient to produce flooding. The town's entire area is potentially subject to severe thunderstorms. The town does not keep records of thunderstorms, but estimates that at least six to eight occur each year.

The best available data on previous occurrences of thunderstorms in Hingham is the National Climatic Data Center (NCDC). Between n the years 1995 and 2014 NCDC records show 18 thunderstorm events in Hingham (Table 10). These storms resulted in a total of $201,000 in property damages. There were two injuries and no deaths reported.

Table 10 Plymouth County Thunderstorm Events, 1994-2014

LOCATION	BEGIN_DATE	EVENT_TYPE	MAGNITUDE	DEATHS	INJURIES	DAMAGE
Hingham/Hull	4/4/1995	Thunderstorm	0	0	0	0
HINGHAM	7/6/1999	Thunderstorm	60	0	0	0
HINGHAM	4/9/2000	Thunderstorm	50	0	0	0
HINGHAM	6/2/2000	Thunderstorm	50	0	0	0
HINGHAM	7/18/2000	Thunderstorm	50	0	0	0
HINGHAM	8/10/2001	Thunderstorm	50	0	0	0
HINGHAM	7/23/2002	Thunderstorm	50	0	0	1,000
HINGHAM	8/21/2004	Thunderstorm	50	0	0	5,000
HINGHAM	8/14/2005	Thunderstorm	50	0	0	50,000
HINGHAM	5/21/2006	Thunderstorm	50	0	0	25,000
HINGHAM	5/21/2006	Thunderstorm	50	0	0	25,000
HINGHAM	6/20/2006	Thunderstorm	50	0	0	5,000
HINGHAM	6/23/2006	Thunderstorm	50	0	0	5,000
HINGHAM	7/28/2006	Thunderstorm	50	0	0	10,000
HINGHAM	6/1/2007	Thunderstorm	50	0	0	
HINGHAM	6/20/2010	Thunderstorm	59	0	2	50,000
HINGHAM	8/5/2010	Thunderstorm	50	0	0	5,000
HINGHAM	6/23/2012	Thunderstorm	50	0	0	20,000
TOTAL				**0**	**2**	**201,000**

Source: NOAA, National Climatic Data Center Magnitude refers to maximum wind speed.

Severe thunderstorms are a town-wide hazard for Hingham. The town's vulnerability to severe thunderstorms is similar to that of Nor'easters. High winds can cause falling trees and power outages, as well as obstruction of key routes and emergency access. Heavy precipitation may also cause localized flooding, both riverine and urban drainage related.

Based on the record of previous occurrences, severe thunderstorms in Hingham are high frequency events as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur more frequently than once in 5 years (greater than 20% per year).

Winter Storms

Winter storms are the most common and most familiar of the region's hazards that affect large geographic areas. The majority of blizzards and ice storms in the region cause more inconvenience than they do serious property damage, injuries, or deaths. However, periodically, a storm will occur which is a true disaster, and necessitates intense large-scale emergency response. Occasionally winter storms can also hinder the tidal exchange in tidally restricted watersheds and result in localized flooding within these areas. Ice build-up at gate structures can also damage tide gates and increase the hazard potential as a result of malfunctioning tide gates.

In Massachusetts, northeast coastal storms known as nor'easters occur 1-2 times per year. Winter storms are a combination hazard because they often involve wind, ice and heavy snow fall. The average annual snowfall for most of the Town is 48.1 - 72 inches. Information on winter storm related hazards can be found on Map 6 in Appendix B.

<u>Heavy Snows</u>

Severe snow accumulation can have a number of different impacts on a community. Hazardous driving conditions can impact emergency response and vulnerable citizens in need of services, heavy snow on tree branches can cause them to fall and damage electric lines, and, in extreme situations, heavy snow can collapse cave in building roofs.

The most significant winter storm in recent history was the "Blizzard of 1978," which resulted in over 3 feet of snowfall and multiple day closures of roadways, businesses, and schools. Historically, severe winter storms have occurred in the following years:

Blizzard of 1978	February 1978
Blizzard	March 1993
Blizzard	January 1996
Severe Snow Storm	March 2001
Severe Snow Storm	December 2003
Severe Snow Storm	January 2005
Severe Snow Storm	December 2010
Severe Snow Storm	January 2011
Blizzard of 2013	February 2013

Massachusetts experienced a record year for snowfall in 2008. The above-average snowfall that season increased groundwater and surface water levels to a high level, and contributed to flooding experienced in spring 2008.

Snowfall in winter 2010-11 has also approached the record mark with 60.3 inches measured at Logan for the season as of the end of January. Snow came in a series of severe storms, some of which included serious flooding in the South Shore area. The current winter snowfall record is 107.6 inches set in 1996-96.

Based on the record of previous occurrences, winter storm events in Hingham are high frequency events as defined by the Massachusetts State Hazard Mitigation Plan. This hazard may occur more frequently than once in 5 years (greater than 20% per year).

Ice Storms

The ice storm category covers a range of different weather phenomena that collectively involve rain or snow being converted to ice in the lower atmosphere leading to potentially hazardous conditions on the ground. Hail size typically refers to the diameter of the hailstones. Warnings and reports may report hail size through comparisons with real-world objects that correspond to certain diameters:

Description	Diameter (inches)
Pea	0.25
Marble or Mothball	0.50
Penny or Dime	0.75
Nickel	0.88
Quarter	1.00
Half Dollar	1.25
Walnut or Ping Pong Ball	1.50
Golf ball	1.75
Hen's Egg	2.00
Tennis Ball	2.50
Baseball	2.75
Tea Cup	3.00
Grapefruit	4.00
Softball	4.50

While ice pellets and sleet are examples of these, the greatest hazard is created by freezing rain conditions, which is rain that freezes on contact with hard surfaces leading to a layer of ice on roads, walkways, trees, and other surfaces. The conditions created by

freezing rain can make driving particularly dangerous and emergency response more difficult. The weight of ice on tree branches can also lead to falling branches damaging electric lines.

Town-specific data for previous ice storm occurrences are not collected by the Town of Hingham. The best available local data is county level data through the National Climatic Data Center (NCDC). The NCDC does not have any occurances of ice storms on record for Plymouth County. The closest recorded ice storms are for adjacent Middlesex county, which has four ice storms on record (see Table 11). No deaths or injuries were reported and the total reported property damage in the county was $3.1 million dollars.

Table 11 Middlesex County Ice Storm Events, 1998 –2008

BEGIN_DATE	EVENT_TYPE	DEATHS	INJURIES	DAMAGE
1/9/1998	Ice Storm	0	0	5,000
11/16/2002	Ice Storm	0	0	150,000
12/11/2008	Ice Storm	0	0	3,000,000
TOTAL		0	0	**3,155,000**

Source: NOAA, National Climatic Data Center.

The weight of ice can cause tree limbs to fall which can in turn cause property damage and potential injuries, as well as obstructions to transportation corridors and access by emergency vehicles. Fallen limbs and the weight of ice can also bring down power lines, causing localized power losses and posing potential injury hazards. In Plymouth County the ice storms recorded since 1994 have caused a total of $45,500 in property damage. There were no recorded injuries or deaths due to ice storms.

Ice storms are considered to be high frequency events based on past occurrences, as defined by the Massachusetts State Hazard Mitigation Plan, 2013. This hazard occurs more than once in ten years, with a greater than10 percent chance of occurring each year.

Blizzards

Blizzards include all of the hazards associated with heavy snows but also accompanied by winds of at least 35 mph and temperatures below 20 degrees Fahrenheit. Historical occurrences of blizzards are included in the above winter storm listing.

Geologic Hazards

Earthquakes

Geologic hazards include earthquakes and landslides. Although new construction under the most recent State building code generally will be built to seismic standards, there are still many structures that pre-date the current building code. Information on geologic hazards in Hingham can be found on Map 4 in Appendix B.

Damage in an earthquake stems from ground motion, surface faulting, and ground failure in which weak or unstable soils, such as those composed primarily of saturated sand or silts, liquefy. The effects of an earthquake are mitigated by distance and ground materials between the epicenter and a given location. An earthquake in New England affects a much wider area than a similar earthquake in California due to New England's solid bedrock geology (NESEC). According to the Boston College Weston Observatory, in most parts of New England, there is a one in ten chance that, a potentially damaging earthquake will occur in a 50 year time period.

According to the State Hazard Mitigation Plan, 2013.New England experiences an average of five earthquakes per year. From 1627 to 2008, 366 earthquakes were recorded in Massachusetts (NESEC). The region has experienced larger earthquakes, including a magnitude 6.0 quake that struck in 1755 off the coast of Cape Anne. More recently, a pair of damaging earthquakes occurred near Ossipee, NH in 1940, and a 4.0 earthquake centered in Hollis, Maine in October 2012 was felt in the Boston area. Historical records of significant earthquakes in the region are shown in Table 12. There have been no recorded earthquake epicenters within Hingham.

Table 12
Historical Earthquakes in Massachusetts or Surrounding Area,

Location	Date	Magnitude
MA - Cape Ann	11/10/1727	5
MA - Cape Ann	12/29/1727	NA
MA – Cape Ann	2/10/1728	NA
MA – Cape Ann	3/30/1729	NA
MA – Cape Ann	12/9/1729	NA
MA – Cape Ann	2/20/1730	NA
MA – Cape Ann	3/9/1730	NA
MA - Boston	6/24/1741	NA
MA - Cape Ann	6/14/1744	4.7
MA - Salem	7/1/1744	NA
MA - Off Cape Ann	11/18/1755	6
MA – Off Cape Cod	11/23/1755	NA
MA - Boston	3/12/1761	4.6
MA - Off Cape Cod	2/2/1766	NA
MA - Offshore	1/2/1785	5.4

MA – Wareham/Taunton	12/25/1800	NA
MA - Woburn	10/5/1817	4.3
MA - Marblehead	8/25/1846	4.3
MA - Brewster	8/8/1847	4.2
MA - Boxford	5/12/1880	NA
MA - Newbury	11/7/1907	NA
MA - Wareham	4/25/1924	NA
MA – Cape Ann	1/7/1925	4
MA – Nantucket	10/25/1965	NA
MA – Boston	12/27/74	2.3
VA –Mineral	8/23/11	5.8
MA - Nantucket	4/12/12	4.5
ME - Hollis	10/17/12	4.0

Source: Boston HIRA

The closest recorded earthquake epicenter was at the Braintree/Quincy border, south-west of the route three interchange with route 93. This quake occurred in 1979 and had a magnitude of 2.2, which is close to the smallest quake normally felt by people. Given the regional scale of earthquakes, the entire town is potentially subject to earthquakes.

Seismologists use a Magnitude scale (Richter Scale) to express the seismic energy released by each earthquake. The typical effects of earthquakes in various ranges are summarized below.

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

Source: Nevada Seismological Library (NSL), 2005

One measure of earthquake risk is ground motion, which is measured as maximum peak horizontal acceleration, expressed as a percentage of gravity (1 g). The range of peak ground acceleration in Massachusetts is from 10g to 20g, with a 2% probability of exceedance in 50 years. Hingham is in the middle part of the range for Massachusetts, at 14g, making it a relatively moderate area of earthquake risk within the state, although the state as a whole is considered to have a low risk of earthquakes compared to the rest of the country.

Earthquake Impacts – Earthquakes are a hazard with multiple impacts beyond the obvious building collapse. Buildings may suffer structural damage which may or may not be readily apparent. Earthquakes can cause major damage to roadways, making emergency response difficult. Water lines and gas lines can break, causing flooding and fires. Another potential vulnerability is equipment within structures. For example, a hospital may be structurally engineered to withstand an earthquake, but if the equipment inside the building is not properly secured, the operations at the hospital could be severely impacted during an earthquake.

Earthquakes are a potential town-wide hazard in Hingham although areas developed prior to current building codes are potentially more vulnerable to earthquake damage. In Hingham the older development is primarily in and around the town center area. Potential earthquake damages to Hingham have been estimated using HAZUS-MH. Total damages are estimated at $109 million for a 5.0 magnitude earthquake and $1.6 billion for a 7.0 magnitude earthquake. Other potential impacts are detailed in Table 20.

According to the Boston College Weston Observatory, in most parts of New England, there is a one in ten chance that a potentially damaging earthquake will occur in a 50 year time period. The Massachusetts State Hazard Mitigation Plan classifies earthquakes as "very low" frequency events that occur less frequently than once in 100 years, or a less than 1% chance of occurring each year.

Landslides

According to the USGS, "The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors." Among the contributing factors are: erosion by rivers or ocean waves over steepened slopes; rock and soil slopes weakened through saturation by snowmelt or heavy rains; earthquakes create stresses that make weak slopes fail; and excess weight from accumulation of rain or snow, and stockpiling of rock or ore, from waste piles, or from man-made structures.

Landslides can result from human activities that destabilize an area or can occur as a secondary impact from another natural hazard such as flooding. In addition to structural damage to buildings and the blockage of transportation corridors, landslides can lead to sedimentation of water bodies.

There is no universally accepted measure of landslide extent but it has been represented as a measure of the destructiveness of a landslide. The table below summarizes the estimated intensity for a range of landslides. For a given landslide volume, fast moving rock falls have the highest intensity while slow moving landslides have the lowest intensity.

Estimated Volume	**Expected Landslide Velocity**		
($m^{3)}$	Fast moving landslide (Rock fall)	Rapid moving landslide (Debris flow)	Slow moving landslide (Slide)
<0.001	Slight intensity		
<0.5	Medium intensity		
>0.5	High intensity		
<500	High intensity	Slight intensity	
500-10,000	High intensity	Medium intensity	Slight intensity
10,000 – 50,000	Very high intensity	High intensity	Medium intensity
>500,000		Very high intensity	High intensity
>>500,000			Very high intensity

Source: *A Geomorphological Approach to the Estimation of Landslide Hazards and Risks in Umbria, Central Italy*, M. Cardinali et al, 2002

The majority of the Town has been classified as having a moderate susceptibility for landslides with low incidence of landslides. According to State data, the southwestern corner of the Town is an exception where there is a just a low incidence of landslides.

Given the town's low topography on the coast and lack of high gradient slopes, there are not extensive areas that would be vulnerable to landslides. The town did not identify landslides as a significant risk.-

There are no recorded instances of landslides having occurred in the Town of Hingham. Should a landslide occur in the future, the type and degree of impacts would be highly localized, and the town's vulnerabilities could include damage to structures, damage to transportation and other infrastructure, and localized road closures. Injuries and casualties, while possible, would be unlikely given the low extent and impact of landslides in Hingham.

Based on past occurrences and the Massachusetts Hazard Mitigation Plan, landslides are of Low frequency, events that can occur less frequently than once in 50 to100 years (a 1% to 2% chance of occurring each year).

Extreme Temperatures

Extreme temperatures occur when either high temperature or low temperatures relative to average local temperatures occur. These can occur for brief periods of time and be acute, or they can occur over long periods of time where the there is prolonged period of excessively hot or cold weather.

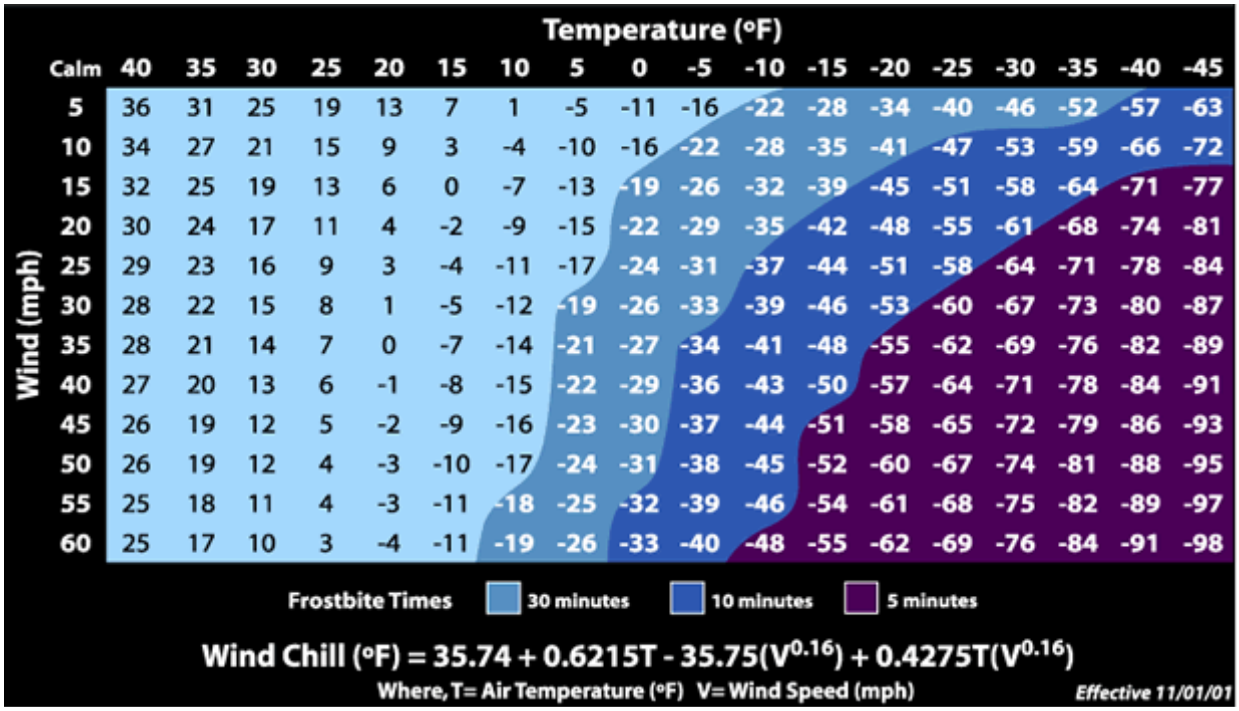
There is no universal definition for extreme temperatures. The term is relative to the usual weather in the region based on climatic averages. Extreme heat, for this climatic

region, is usually defined as a period of 3 or more consecutive days above 90 °F, which may be accompanied by high humidity.

Extreme cold is also relative to the normal climatic lows in a region. Temperatures that drop decidedly below normal and wind speeds that increase can cause harmful wind-chill factors. The wind chill is the apparent temperature felt on exposed skin due to the combination of air temperature and wind speed.

For extreme cold, temperature is typically measured using Wind Chill Temperature Index, which is provided by the National Weather Service (NWS). The latest version of the index was implemented in 2001 and it meant to show how cold conditions feel on unexposed skin. The index is provided in Figure 2 below.

Figure 2. Wind Chill Temperature Index and Frostbit Risk



While a heat wave for Massachusetts is defined as three or more consecutive days above 90°F, another measure used for identifying extreme heat events is through a Heat Advisory from the NWS. These advisories are issued with the heat index (Figure 3 below) is forecast to exceed 100 degree Fahrenheit (F) for 2 or more hours; an excessive heat advisory is issued if forecast predicts the temperature to rise above105 degree F.

Figure 3. Heat Index Chart

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

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

Hingham has four well-defined seasons. The seasons have several defining factors, with temperature one of the most significant. Extreme temperatures can be defined as those, which are far outside of the normal seasonal ranges for Massachusetts. The average temperatures for Massachusetts are: Winter (Dec-Feb) Average = 31.8°F and Summer (Jun-Aug) Average = 71°F. Extreme temperatures are a town-wide hazard.

Extreme Heat

Extreme head poses a potentially greater risk to the elderly, children, and people with certain medical conditions, such as heart disease. However, even young and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather. Hot summer days can also worsen air pollution. With increased extreme heat, urban areas of the Northeast are likely to experience more days that fail to meet air quality standards.

The Town of Hingham does not collect data on excessive heat occurrences. The best available local data are from the National Climatic Data Center, which collects data by county. From 2000 - 2011, there have been a total of 9 excessive heat events in Plymouth and adjacent Norfolk County, with no reported deaths, injuries or property damage resulting from excessive heat (see Table 13).

Table 13 – Plymouth and Norfolk County Extreme Heat Occurrences

DATE	EVENT_TYPE	DEATHS	INJURIES	DAMAGE
5/8/2000	Excessive Heat	0	0	0
5/9/2000	Excessive Heat	0	0	0
10/14/2000	Excessive Heat	0	0	0
5/3/2001	Excessive Heat	0	0	0
5/3/2001	Excessive Heat	0	0	0
5/4/2001	Excessive Heat	0	0	0
5/12/2001	Excessive Heat	0	0	0
5/12/2001	Excessive Heat	0	0	0
7/22/2011	Excessive Heat	0	0	0

Source: NOAA, National Climatic Data Center

Extreme Cold

Extreme cold is a dangerous situation that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat.

The Town of Hingham does not collect data for previous occurrences of extreme cold. The best available local data are from the National Climatic Data Center, which collects data by county. There is one extreme cold event on record in February 2015, which caused no deaths, injuries or property damage (see Table 14).

Table 14 – Plymouth County Extreme Cold & Wind Chill Occurrences

Date	Type	Deaths	Injuries	Property Damage
02/16/2015	Extreme Cold/wind Chill	0	0	0

Source: NOAA, National Climatic Data Center

Extreme temperature events are projected to be medium frequency events based on past occurrences, as defined by the Massachusetts State Hazard Mitigation Plan, 2013. Both extreme cold and hot weather events occur between once in five years to once in 50 years, or a 2 percent to 20 percent chance of occurring each year.

Brush Fires

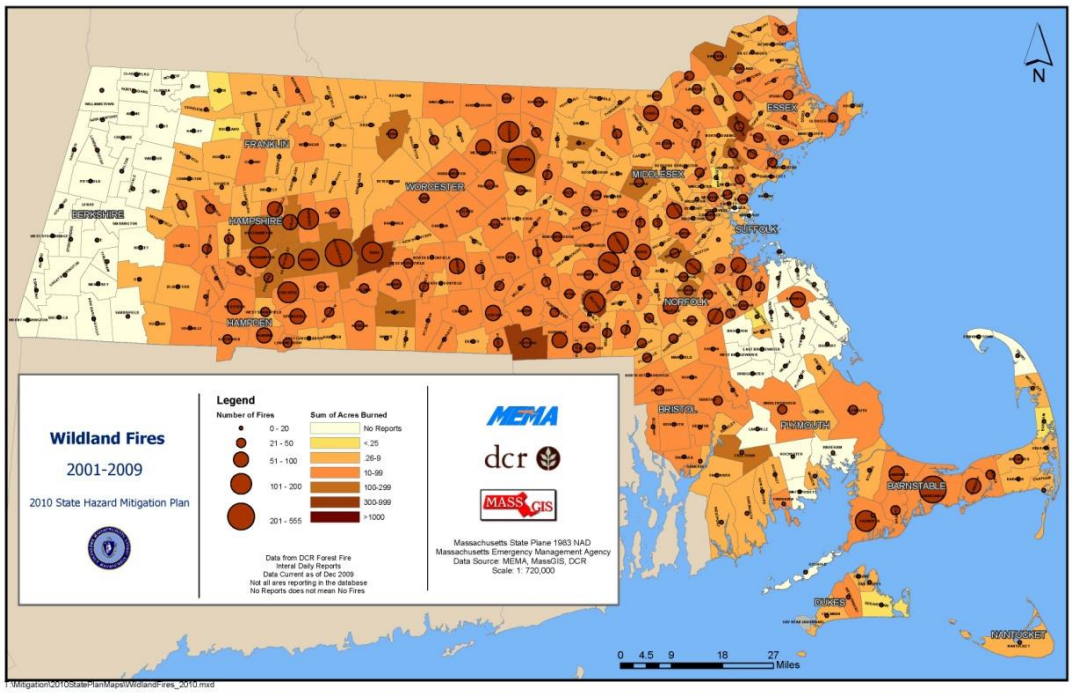
For the purposes of this plan, a brush fire is an uncontrolled fire occurring in a forested or grassland area. In the Boston Metro region these fires rarely grow to the size of a wildfire as seen more typically in the western U.S. As their name implies, these fires typically burn no more than the underbrush of a forested area. These fires present a hazard where there is the potential for them to spread into developed or inhabited areas, particularly

residential areas where sufficient fuel materials might exist to allow the fire the spread into homes.

The Hingham Fire Department responds to very few wildfires annually with an average of one to two. These fires are generally the result of either human causes, such as improper disposal of smoking materials and improperly tended campfires, or an accumulation of dried vegetation on the forest floor, like branches and leaves.

Wildfires in Massachusetts are measured by the number of fires and the sum of acres burned. The most recent data available for wildfires in Massachusetts communities, shown in Figure 4 below, indicates that the there were fewer than 20 recorded wildfires from 2001to 2009 in Hingham, with no reported acreage burned (Figure 4).

Figure 4. Massachusetts Wildfires 2001-2009



There have been no recorded wildfires in Hingham that resulted in significant property damage. The following areas of Town were identified as having the highest potential for brush fires based on past occurrences and their potential for the accumulation of dried vegetation and/or phragmites growth. The numbers correspond to the numbers on Map 8, "Hazard Areas":

i. Bare Cove Park
ii. Hobart Street Conservation Area
iii. Water Street/Eldridge Court (Phragmites)
iv. Town Forest
v. Wompatuck State Park
vi. Home Meadows (Phragmites)

Potential vulnerabilities to wildfires in Hingham include injuries and loss of human life, damage to structures and other improvements, and impacts on natural resources such as forested lands and marshlands along local waterways. However, given the moderate extent of wildfires in the town and the immediate response times to reported wildfires in Hingham, the likelihood of injuries and casualties is minimal.

As past experience has borne out, the extent of damages from wildfires in Hingham is related to burning of vegetated lands, rather than significant damage to structures and other property.

Based on past occurrences and the Massachusetts Hazard Mitigation Plan 2013, brushfires are of Medium frequency, events that occur from once in 5 years to once in 50 years (2% to 20% probability per year).

Drought

Drought is a temporary irregularity in precipitation and differs from aridity since the latter is restricted to low rainfall regions and is a permanent feature of climate. Drought is a period characterized by long durations of below normal precipitation. Drought conditions occur in virtually all climatic zones yet its characteristics vary significantly from one region to another, since it is relative to the normal precipitation in that region. Drought can affect agriculture, water supply, aquatic ecology, wildlife, and plant life.

In Massachusetts, droughts are caused by the prevalence of dry northern continental air and a decrease in coastal- and tropical-cyclone activity. During the 1960's, a cool drought occurred because dry air from the north caused lower temperatures in the spring and summer of 1962-65. The northerly winds drove frontal systems to sea along the Southeast Coast and prevented the Northeastern States from receiving moisture (U.S. Geological Survey). This is considered the drought of record in Massachusetts.

Average annual precipitation in Massachusetts is 44 inches per year, with approximately 3 to 4 inch average amounts for each month of the year. Regional monthly precipitation ranges from zero to 17 inches. Statewide annual precipitation ranges from 30 to 61 inches. Thus, in the driest calendar year (1965), the statewide precipitation total of 30 inches was 68 percent of average.

Although Massachusetts is relatively small, it has a number of distinct regions that experience significantly different weather patterns and react differently to the amounts of precipitation they receive. The DCR precipitation index divides the state into six regions: Western, Central, Connecticut River Valley, Northeast, Southeast, and Cape and Islands. Hingham is located in the Northeast Region. In Hingham drought is a potential town-wide hazard.

Five levels of drought have been developed to characterize drought severity: Normal, Advisory, Watch, Warning, and Emergency. These drought levels are based on the conditions of natural resources and are intended to provide information on the current status of water resources. The levels provide a basic framework from which to take actions to assess, communicate, and respond to drought conditions. They begin with a normal situation where data are routinely collected and distributed, move to heightened vigilance with increased data collection during an advisory, to increased assessment and proactive education during a watch. Water restrictions might be appropriate at the watch or warning stage, depending on the capacity of each individual water supply system. A warning level indicates a severe situation and the possibility that a drought emergency may be necessary. A drought emergency is one in which mandatory water restrictions or use of emergency supplies is necessary. Drought levels are used to coordinate both state agency and local response to drought situations.

As dry conditions can have a range of different impacts, a number of drought indices are available to assess these various impacts. Massachusetts uses a multi-index system that takes advantage of several of these indices to determine the severity of a given drought or extended period of dry conditions. Drought level is determined monthly based on the number of indices which have reached a given drought level. Drought levels are declared on a regional basis for each of six regions in Massachusetts. County by county or watershed-specific determinations may also be made.

A determination of drought level is based on seven indices:

1. Standardized Precipitation Index (SPI) reflects soil moisture and precipitation.
2. Crop Moisture Index: (CMI) reflects soil moisture conditions for agriculture.
3. Keetch Byram Drought Index (KBDI) is designed for fire potential assessment.
4. Precipitation Index is a comparison of measured precipitation amounts to historic normal precipitation.
5. The Groundwater Level Index is based on the number of consecutive month's groundwater levels are below normal (lowest 25% of period of record).
6. The Stream flow Index is based on the number of consecutive months that stream flow levels are below normal (lowest 25% of period of record).
7. The Reservoir Index is based on the water levels of small, medium and large index reservoirs across the state, relative to normal conditions for each month.

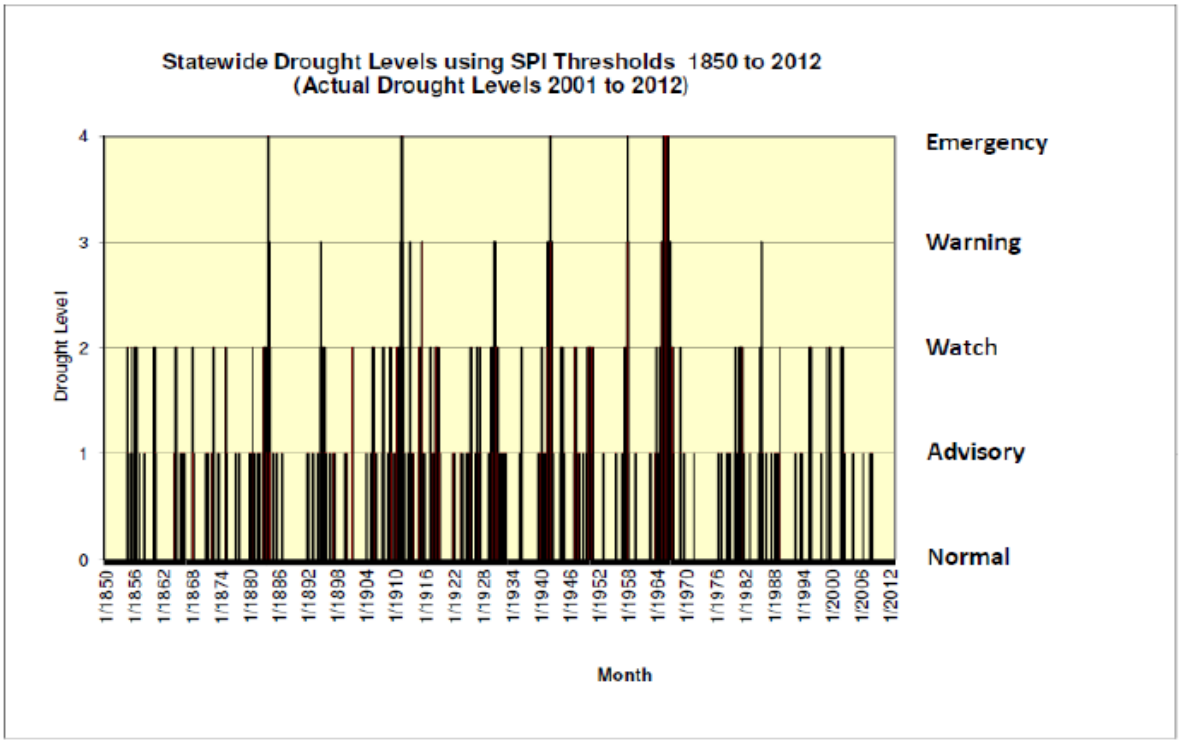
Determinations regarding the end of a drought or reduction of the drought level focus on two key drought indicators: precipitation and groundwater levels. These two factors have the greatest long-term impact on stream flow, water supply, reservoir levels, soil moisture and potential for forest fires.

Previous Occurrences

Hingham does not collect data relative to drought events. Because drought tends to be a regional natural hazard, this plan references state data as the best available data for

drought. The statewide scale is a composite of six regions of the state, Regional composite precipitation values are based on monthly values from six stations, and three stations in the smaller regions (Cape Cod/Islands and West). Because the statewide analysis may result in a muting of more extensive local drought impacts, this drought history summary will likely underestimate the spatial frequency of droughts (i.e., droughts may occur more frequently in individual regions than depicted in the statewide analysis).

Figure 5 - Statewide Drought Levels using SPI Thresholds 1850 – 2012



(Source: Mass. State Drought Management Plan 2013)

Figure 5 depicts the incidents of drought levels' occurrence in Massachusetts from 1850 to 2012 using the Standardized Precipitation Index (SPI) parameter alone. On a monthly basis, the state would have been in a Drought Watch to Emergency condition 11 percent of the time between 1850 and 2012. Table 15 summarizes the chronology of major droughts since the 1920's.

Drought Emergency

Drought emergencies have been reached infrequently, with 5 events occurring in the period between 1850 and 2012: in 1883, 1911, 1941, 1957, and 1965-1966. The 1965-1966 drought period is viewed as the most severe drought to have occurred in modern times in Massachusetts because of its long duration. On a monthly basis over the 162-year period of record, there is a one percent chance of being in a drought Emergency.

Drought Warning

Drought Warning levels not associated with drought Emergencies have occurred four times, in 1894, 1915, 1930, and 1985. On a monthly basis over the 162-year period of record, there is a two percent chance of being in a drought Warning level.

Drought Watch

Drought Watches not associated with higher levels of drought generally have occurred in three to four years per decade between 1850 and 1950. In the 1980s, there was a lengthy drought Watch level of precipitation between 1980 and 1981, followed by a drought Warning in 1985. A frequency of drought Watches at a rate of three years per decade resumed in the 1990s (1995, 1998, 1999). In the 2000s, Drought Watches occurred in 2001 and 2002. The overall frequency of being in a drought Watch is 8 percent on a monthly basis over the 162-year period of record.

Table 15 - Chronology of major droughts in Massachusetts

Date	Area affected	Recurrence interval (years)	Remarks
1929-32	Statewide	10 to >50	Water-supply sources altered in 13 communities. Multistate.
	Statewide	15 to >50	More severe in eastern and extreme western Massachusetts. Multistate.
1957-59	Statewide	5 to 25	Record low water levels in observation wells, northeastern Massachusetts.
1961-69	Statewide	35 to >50	Water-supply shortages common. Record drought. Multistate.
1980-83	Statewide	10 to 30	Most severe in Ipswich and Taunton River basins; minimal effect in Nashua River basin. Multistate.
1985-88	Housatonic River basin	25	Duration and severity unknown. Streamflow showed mixed trends elsewhere.

Probability of Future Occurrences

The state has experienced Emergency Droughts five times between 1850 and 2012. Even given that regional drought conditions may occur at a different interval than state data indicates, droughts remain primarily regional and state phenomena in Massachusetts. Emergency Drought conditions over the 162 year period of record in Massachusetts are a Low Frequency event that can occur from once in 50 years to once in 100 years (1% to 2% chance per year), as defined by the Massachusetts Hazard Mitigation Plan, 2013.

Land Use and Development Trends

Existing Land Use

The most recent land use statistics available from the state are from aerial photography done in 2005. Table 16 shows the acreage and percentage of land in 10 categories. If the three residential categories are aggregated, residential uses comprise approximately 29% of the area of the Town (~ 4200 acres). The highest percentage is low density residential, which comprises 23.1% of the land area or 3362 acres.

Table 16
2005 Land Use

Land Use Type	**Acres**	**Percent**
High Density Residential	357.38	2.46
Medium Density Residential	446.40	3.07
Low Density Residential	3362.14	23.10
Non-Residential, Developed	1153.39	7.93
Commercial	294.66	2.02
Industrial	236.24	1.62
Transportation	51.15	0.35
Agriculture	203.23	1.40
Undeveloped	5984.62	41.12
Undeveloped Wetland	2463.45	16.93
Total	***14,552.67***	***100.00***

Economic Elements

From an economic perspective, Hingham's most important assets are the Hingham Shipyard, Hingham Downtown and South Hingham by Route 3, which is home to the Derby Street Shops and the South Shore Industrial Park. The Shipyard is the site that most directly interfaces with a FEMA identified flood zone (VE Zone), although the South Shore Industrial Park does include an identified A Zone. No experiences with flooding were reported for either location.

Historic, Cultural, and Natural Resource Areas

There are six historic districts in Hingham. The districts are located primarily in three areas of Town: the Hingham Downtown (Lincoln, South, North, Central and Main Streets), Hingham Center (Main, Leavitt, Middle and Pleasant Streets) and South Hingham (High, Free and Main Streets). Most of the historic districts are outside a FEMA identified flood zone, although the districts in South Hingham are near Zone A locations by the Weir River and the Hingham Center districts abut Zone A locations by Home Meadows pond and marsh area.

Wompatuck State Park is a former ammunition depot for the U.S. military which has been converted into a 3,602 acre park that is managed by the Massachusetts Department

of Conservation and Recreation and that spans the Towns of Hingham, Cohasset, Scituate, and Norwell. A majority of the park is located in Hingham (1,540 acres) and it is heavily wooded and interspersed with wetlands systems. The park provides space of natural flood management due to its undeveloped lands and is interspersed with FEMA identified flood zones.

The Weir River Area of Critical Environmental Concern (ACEC) is located along Hingham's border with the Town of Hull. The ACEC is an area designated due to its ecological diversity – it contains one of the most extensive salt marsh systems in the greater Boston metropolitan area – and natural scenic beauty. The entire ACEC is located in FEMA identified flood zones.

Development Trends

Development trends throughout the metropolitan region are tracked byMAPC's Development Database, which provides an inventory of new development over the last decade. The database tracks both completed developments and those currently under construction. The database includes 28 developments in the Town of Hingham since 2005, of which 19 are completed and nine were under construction as of May 2015.

The database also includes several attributes of the new development, including acres, housing units, employment, and commercial space. The 28 developments in Hingham are sited on a total of 562 acres and include a total 2,535 housing units, 1.4 million square feet of commercial space, and will provide 1,845 jobs in the community (see Table 17). In order to characterize any change in the town's vulnerability associated with new developments, a GIS mapping analysis was conducted which overlaid the development sites with the FEMA Flood Insurance Rate Map. The analysis shows that none of the 19 developments completed since 2005, or 9 developments under construction are within a flood hazard zone.

Table 17 Summary of Hingham Developments 2005-2015

DEVELOPMENTS COMPLETED 2005-2014	ACRES	HOUSING UNITS	EMPLOYMENT	COMMERCIAL (SQ FEET)	PROJECT TYPE
TD Bank	2		20	4,000	Bank
Gardner Woods	24	3			Residential
Baker Hill	50	45			Residential
Blue Cross/Blue Shield	35		1,000	400,000	Office
Stevens Way	27	7			Conventional Subdivision
Black Rock	100	138			Residential condo
Ridgewood xing	23	31			Residential OSRD
350 Lincoln Street	-			5,000	Bank
Boston Golf				10,000	Golf Course with Facilities
74 Abington Street				15,000	Office Building
Hingham Institute for Savings - Addition	2			15,000	Bank
9 Sharp Street	5		20	33,000	Computer Manufacturing
New East School				90,000	Elementary School
South Shore Baptist Church	1			15,000	Church
Bone and Muscle Center	6		55	73,839	medical office building
Derby Street Shoppes	34			436,000	Retail Commercial Service
423 Lincoln				8,000	CVS
Hingham Shipyard	101	473	300	240,000	Retail, office, residential
High School Turf Fields	4				
SUBTOTAL Construction Complete	**414**	**697**	**1,395**	**1,344,839**	
DEVELOPMENTS UNDER CONSTRUCTION					
Derby Brook	9	20			Residential
Back River Condos	8	45			Residential
Weatheware at Chestnut Gardens	9	23			Residential

DEVELOPMENTS COMPLETED 2005-2014	ACRES	HOUSING UNITS	EMPLOYMENT	COMMERCIAL (SQ FEET)	PROJECT TYPE
Linden Ponds	108	1,750	450	40,000	Assisted living
Ames Chapel Renovation	2			800	Site improvements for use of the historic Ames Chapel for community events
2 Sharp St	4			5,750	Industrial warehouse
Interior fit-out (renovation)	2			3,000	Renovation of previous bank
3 pond park	4			5,000	Health Club
191 Beal St	3			5	Building addition
SUBTOTAL Under Construction	**148**	**1,838**	**450**	**54,555**	
TOTAL ALL PROJECTS	**562**	**2,535**	**1,845**	**1,399,394**	

Potential Future Development

MAPC consulted with Town staff to determine areas that are likely to be developed in the future, defined for the purposes of this plan as a ten year time horizon. These areas are shown on Map 2, "Potential Development" and are described below. The letter for each site corresponds to the letters on Map 2.

A. Hingham Shipyard – Commercial and Residential
B. Anchor Plaza – Commercial Development
C. Bridges at Hingham – Residential Development
D. Beal Street Residential Development
E. Linden Ponds, Phase 3 – Residential Development
F. Bristol Brothers Residential Development
G. South Shore Hospital – Commercial and Institutional
H. South Shore Industrial Park – Commercial and Industrial
I. South Shore Educational Collaborative – Institutional Development
J. Selectman's Housing – Residential Development

Vulnerability Assessment

The purpose of the vulnerability assessment is to estimate the extent of potential damages from natural hazards of varying types and intensities.

Future Development in Hazard Areas

Table 18 shows the relationship of these parcels to two of the mapped hazards. This information is provided so that planners can ensure that development proposals comply with flood plain zoning and that careful attention is paid to drainage issues.

Table 18: Relationship of Potential Development to Hazard Areas

Parcel	Landslide risk	Flood Zone
A. Hingham Shipyard	Moderate	5.0957% in VE
B. Anchor Plaza	Moderate	.2593% in X500
C. Bridges at Hingham	Moderate	No
D. Beal Street Residential Development	Moderate	< 0.05% in A
E. Linden Ponds, Phase 3	Moderate	No
F. Bristol Brothers Residential Development	Moderate	3.5351% in A
G. South Shore Hospital	Low	No
H. South Shore Industrial Park	Low	6.6047% in A
I. South Shore Educational Collaborative	Low	8.5833% in A
J. Selectman's Housing	Low	No

Critical Infrastructure in Hazard Areas

Critical infrastructure includes facilities that are important for disaster response and evacuation (such as emergency operations centers, fire stations, water pump stations, etc.) and facilities where additional assistance might be needed during an emergency (such as nursing homes, elderly housing, day care centers, etc.). These facilities are listed in Table 19 and are shown on all of the maps in Appendix B.

The purpose of mapping the natural hazards and critical infrastructure is to present an overview of hazards in the community and how they relate to critical infrastructure, to better understand which facilities may be vulnerable to particular natural hazards. All critical infrastructure sites are located within areas designated as having an average annual snowfall of 36" or greater.

Explanation of Columns in Table 19

Column 1: ID #: The first column in Table 10 is an ID number which appears on the maps that are part of this plan. See Appendix B.

Column 2: Name: The second column is the name of the site. If no name appears in this column, this information was not provided to MAPC by the community.

Column 3: Type: The third column indicates what type of site it is.

Column 4: Landslide Risk: The fourth column indicates the degree of landslide risk for that site. This information came from NESEC. The landslide information shows areas with either a low susceptibility or a moderate susceptibility to landslides based on mapping of geological formations. This mapping is highly general in nature. For more information on how landslide susceptibility was mapped, refer to http://pubs.usgs.gov/pp/p1183/pp1183.html**.**

Column 5: FEMA Flood Zone: The fifth column addresses the risk of flooding. A "No" entry in this column means that the site is not within any of the mapped risk zones on the Flood Insurance Rate Maps (FIRM maps). If there is an entry in this column, it indicates the type of flood zone as follows:

> **Zone A** (1% annual chance) - Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs (base flood elevations) or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.
>
> **Zone AE and A1-A30** (1% annual chance) - Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.
>
> **Zones X500** (.2% annual chance) - Zone X500 is the flood insurance rate zone that correspond to the 500-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs (base flood elevations) or depths are shown within this zone.
>
> **Zone VE** (1% annual chance) - Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply

Column 6: Locally-Identified Flood Area: The locally identified areas of flooding were identified by Town staff as areas where flooding occurs. These areas do not necessarily coincide with the flood zones from the FIRM maps. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers correspond to the numbers on Map 8, "Hazard Areas".

Column 7: Hurricane Surge Category: The seventh column indicates whether or not the site is located within a hurricane surge area and the category of hurricane estimated to be necessary to cause inundation of the area. The following explanation of hurricane surge areas was taken from the US Army Corps of Engineers web site:

> "Hurricane storm surge is an abnormal rise in sea level accompanying a hurricane or other intense storm. Along a coastline a hurricane will cause waves on top of the surge. Hurricane Surge is estimated with the use of a computer model called SLOSH. SLOSH stands for Sea Lake and Overland Surge from Hurricanes. The SLOSH models are created and run by the National Hurricane Center.
>
> The SLOSH model results are merged with ground elevation data to determine areas that will be subject to flooding from various categories of hurricanes. Hurricane categories are defined by the Saffir-Simpson Scale." See http://www.sam.usace.army.mil/hesdata/General/hestasks.htm

According to the Saffir-Simpson Scale, the least damaging storm is a Category 1 (winds of 74-95 miles per hour) and the most damaging storm is a Category 5 (winds greater than 155 miles per hour).

Column 8: Brushfire Risk: The fourth column indicates whether the site falls within an area identified by municipal staff as posing a brushfire risk.

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
1	WM L FOSTER ELEM	School	Moderate Susceptibility	No	No	0	No
k	ROCKLAND STREET #39	Hazardous Materials	Moderate Susceptibility	AE	Kilby St. and Rockland St.	1	No
3	HARBOR HOUSE	Special Needs	Moderate Susceptibility	No	No	4	No
4	HINGHAM POLICE DEPT HEADQUARTERS	Police Station	Moderate Susceptibility	No	No	0	No
5	STOP & SHOP	Grocery Store	Moderate Susceptibility	No	No	0	No
6	HEWITT'S COVE MARINA, LLC	Hazardous Materials	Moderate Susceptibility	VE	No	4	No
7	DERBY ACADEMY	School	Moderate Susceptibility	No	No	0	No
8	GLASTONBURY ABBEY	Place of Worship	Moderate Susceptibility	No	No	0	No
9	ST PAUL'S ELEMENTARY	School	Moderate Susceptibility	No	No	0	No
10	NORTH FIRE STATION	Medical Facility	Moderate Susceptibility	AE	No	0	No
11	THAXTER PARK HOUSING	Special Needs	Moderate Susceptibility	No	No	0	No
12	HINGHAM HOUSING COLLAB.	Special Needs	Moderate Susceptibility	No	No	0	No
13	EAST SCHOOL	School - Special Needs	Moderate Susceptibility	No	No	0	No
14	HARRIET RUST HOME	Special Needs	Moderate Susceptibility	No	No	0	No
15	LINCOLN APARTMENTS	Special Needs	Moderate Susceptibility	No	No	0	No
16	N.E. FRIENDS HOME	Special Needs	Moderate Susceptibility	No	No	0	No
17	GROUP RESIDENCE	Special Needs	Moderate Susceptibility	No	No	0	No
18	TOWN HALL	Emergency Operations Center	Moderate Susceptibility	No	No	0	No
19	HINGHAM HIGH SCHOOL	School	Moderate Susceptibility	No	No	0	No
20	CENTRAL FIRE STATION	Fire station	Moderate Susceptibility	No	No	0	No
21	GROUP RESIDENCE	Special Needs	Moderate Susceptibility	No	No	0	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
22	MARY MARTHA LEARNING CENTER	Special Needs	Moderate Susceptibility	No	No	0	No
23	QUEEN ANNE'S NURSING	Medical Facility	Low Susceptibility	No	No	0	No
24	PLYMOUTH RIVER SCHOOL	School	Moderate Susceptibility	No	No	0	No
25	SOUTH ELEMENTARY	School	Moderate Susceptibility	No	No	0	No
26	SOUTH FIRE STATION	Medical Facility	Moderate Susceptibility	No	No	0	No
27	AQUARION WATER TREATMENT PLANT	Hazardous Materials	Moderate Susceptibility	No	No	0	No
28	NOTRE DAME ACADEMY	School	Moderate Susceptibility	No	No	0	No
29	HINGHAM MIDDLE SCHOOL	School	Low Susceptibility	No	No	0	No
30	OLD COLONY MONTESSORI SCHOOL	School	Low Susceptibility	No	No	0	No
31	SOUTH SHORE ED. COLLAB.	School	Low Susceptibility	No	No	0	No
32	DEERFIELD SENIOR SERVICES	Special Needs	Low Susceptibility	No	No	0	No
33	ROAD TO RESPONSIBILITY	Special Needs	Low Susceptibility	No	No	0	No
34	DPW	Municipal Office	Moderate Susceptibility	No	No	0	No
35	ALLERTON HOUSE	Assisted Living	Moderate Susceptibility	No	No	4	No
36	GAS JUNCTION	Gas Line	Moderate Susceptibility	No	No	0	No
37	DCR / POLICE	Police Station	Moderate Susceptibility	No	No	4	No
38	MBTA COMMUTER BOAT	Transportation Facility	No	VE	No	0	No
39	COMMUNICATIONS TOWER	Communication Tower	Moderate Susceptibility	No	No	0	No
40	MWRA SEWER PUMP	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
41	BACK RIVER BRIDGE	Bridge	No	AE	No	0	No
42	BRIGHT HORIZONS DC	Child Care	Moderate Susceptibility	No	No	0	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
43	BROWN BEAR CHILDREN CENTER	Child Care	Moderate Susceptibility	No	No	0	No
44	SEWER PUMPSTATION (UNG)	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
45	GAS JUNCTION	Gas Line	Moderate Susceptibility	No	North Street/Water Street/Summer Street	2	No
46	POST OFFICE	Post Office	Moderate Susceptibility	No	No	0	No
47	OLD SHIP CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
48	ARMORY BLDG	Armory	Moderate Susceptibility	No	No	0	No
49	LIBRARY	Library	Moderate Susceptibility	No	No	0	No
50	EOC BACKUP	Emergency Operations Center	Moderate Susceptibility	No	No	0	No
51	GROWING TREE SCHOOL	Child Care	Low Susceptibility	No	No	0	No
52	WILDER MEMORIAL SCHOOL	Child Care	Moderate Susceptibility	No	No	0	No
53	CUSHING POND DAM	Dam	Moderate Susceptibility	AE	No	0	No
54	FULLING MILL POND DAM	Dam	Moderate Susceptibility	A	No	0	No
55	WATER TREATMENT	Water Treatment Facility	Moderate Susceptibility	No	No	0	No
56	HOLLY POND DAM	Dam	Moderate Susceptibility	No	No	0	Yes
57	ACCORD POND DAM	Dam	Low Susceptibility	A	No	0	No
58	SOUTH SHORE CONSERVATORY	School	Moderate Susceptibility	No	No	0	Yes
59	FUEL DEPOT HINGHAM	Gas Distribution	Moderate Susceptibility	No	No	0	No
60	BUS GARAGE HINGHAM	Municipal Office	Moderate Susceptibility	No	No	0	No
61	MNG MOTOR POOL	Federal Office	Moderate Susceptibility	No	No	0	No
62	SOUTH SHORE COUNTRY CLUB	Place of Assembly	Moderate Susceptibility	No	No	0	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
63	SUB STATION	Sub Station	Moderate Susceptibility	No	No	0	No
64	TRANSFER FACILITY	DPW	Moderate Susceptibility	No	No	0	No
65	HING MUNI LIGHT GARAGE	Municipal Office	Moderate Susceptibility	No	No	0	No
66	ST JOHN'S CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
67	WATER TOWER	Water Tower	Moderate Susceptibility	No	No	0	No
68	COMMUNICATION TOWERS	Communication Tower	Moderate Susceptibility	No	No	0	No
69	TRIPHAMMER POND DAM	Dam	Moderate Susceptibility	A	No	0	No
70	FOUNDARY POND DAM	Dam	Moderate Susceptibility	AE	Route 3A/East Street/Kilby Street	1	No
71	DOLLY'S NURSERY	Child Care	Moderate Susceptibility	No	No	0	No
72	George Washington Blvd. BRIDGE	Bridge	Moderate Susceptibility	No	No	4	No
73	HING DISTRICT COURT	Court House	Moderate Susceptibility	No	No	0	No
74	TOWN LANDING	Marina	No	VE	North Street/Water Street/Summer Street	1	No
75	HINGHAM YACHT CLUB	Marina	Moderate Susceptibility	VE	Yacht Club	0	No
76	SEWER PUMP	Sewer Pumping Station	Moderate Susceptibility	VE	Yacht Club	2	No
77	HOWE ST PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	North Beach	2	No
78	BEL AIR PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	AE	No	2	No
79	WALTON COVE SEWER PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	VE	No	3	No
80	BROAD COVE SEWER PUMPING STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	2	No
81	BRADLEY WOODS PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
82	BAYBERRY LIFT STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
83	TOWN BROOK PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	4	No
84	MILL ST PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	AE	North Street/Water Street/Summer Street	2	No
85	MURRAY BRIDGE	Bridge	Moderate Susceptibility	No	North Street/Water Street/Summer Street	0	No
86	WEST CORNER PUMP STATION	Sewer Pumping Station	No	AE	No	1	No
87	HS SEWER PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
88	DOWNING ST WELL	Water Supply	Moderate Susceptibility	No	No	0	No
89	TOWN HALL PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
90	LEWIS COURT PUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
91	SEWER DUMP STATION	Sewer Pumping Station	Moderate Susceptibility	No	No	0	No
92	ACCORD POST OFFICE	Post Office	Low Susceptibility	No	No	0	No
93	ACCORD RESERVOIR	Reservoir	Low Susceptibility	A	No	0	No
94	DERBY ST OVERPASS	Bridge	Low Susceptibility	No	No	0	No
95	SERENO LABS MEDICAL RESEARCH	Medical Facility	Low Susceptibility	No	No	0	No
96	ELECTRIC SUB STATION	Power Substation	Low Susceptibility	No	No	0	No
97	WATER TOWER	Water Tower	Low Susceptibility	No	No	0	No
98	CRAIG LANE WELL	Well	Moderate Susceptibility	No	No	0	No
99	SCOTLAND STREET WELL	Well	Moderate Susceptibility	AE	No	0	No
100	FREE STREET WELL	Well	Moderate Susceptibility	AE	No	0	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
101	FREE STREET WELL	Well	Moderate Susceptibility	AE	No	0	No
102	FREE STREET WELL	Well	Moderate Susceptibility	AE	No	0	No
103	FIRST BAPTIST CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
104	FAITH CHURCH OF THE NAZERINE	Place of Worship	Moderate Susceptibility	No	No	0	No
105	NEW NORTH CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
106	FIRST CHURCH OF CHRIST SCIENTIST	Place of Worship	Moderate Susceptibility	No	No	0	No
107	SOUTH SHORE BAPTIST CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
108	JEHOVA'S WITNESS CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
109	CHURCH OF THE LATTERDAY SAINTS	Place of Worship	Low Susceptibility	No	No	0	No
110	CONGREGATION SHA'ARAY SHALOM	Place of Worship	Low Susceptibility	No	No	0	No
111	RESURRECTION CHURCH	Place of Worship	Low Susceptibility	No	No	0	No
112	SECOND PARRISH CHURCH	Place of Worship	Moderate Susceptibility	No	No	0	No
113	RITE-AID PHARMACY	Pharmacy	Moderate Susceptibility	No	No	0	No
114	RITE-AID PHARMACY	Pharmacy	Low Susceptibility	No	No	0	No
115	PILGRIM SKATING ARENA	Cold Storage	Low Susceptibility	A	No	0	No
116	ST PAULS CEMETERY	Cemetery	Moderate Susceptibility	No	No	0	No
117	HINGHAM BATHING BEACH	Recreation	Moderate Susceptibility	VE	Hingham Bathing Beach	1	No
118	INNER HINGHAM HARBOR SEAWALL	Flood Protection	Moderate Susceptibility	AE	North Street/Water Street/Summer Street	2	No
119	SEAWALL AT DOWNER AVE	Flood Protection	No	VE	Yacht Club	0	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
120	HELIPORT AT HINGHAM HIGH SCHOOL	Heliport	Moderate Susceptibility	No	No	0	No
121	HELIPORT AT HINGHAM MIDDLE SCHOOL	Heliport	Low Susceptibility	No	No	0	No
122	HELIPORT AT PLYMOUTH RIVER SCHOOL	Heliport	Moderate Susceptibility	No	No	0	No
123	HELIPORT AT SOUTH SHORE COUNTRY CLUB	Heliport	Moderate Susceptibility	No	No	0	No
124	HELIPORT AT RT 3 EXIT 15	Heliport	Low Susceptibility	No	No	0	No
125	HELIPORT AT KRESS FIELD	Heliport	Low Susceptibility	No	No	0	No
126	HELIPORT AT DERBY ACADEMY	Heliport	Moderate Susceptibility	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	2	No
127	HELIPORT AT P.A.L. FIELD	Heliport	Moderate Susceptibility	No	No	0	No
128	HELIPORT AT FIRE STATION #1	Heliport	Moderate Susceptibility	No	No	0	No
129	HELIPORT AT BATHING BEACH	Heliport	Moderate Susceptibility	VE	Hingham Bathing Beach	2	No
130	LINDEN PONDS	Assisted Living	Moderate Susceptibility	No	No	0	No
131	L.P. SEWER TREATMENT FACILITY	Sewer Treatment Plant	Moderate Susceptibility	No	No	0	No
132	COMMUNICATIONS TOWER	Communication Tower	Moderate Susceptibility	No	No	0	No
133	COMMUNICATIONS TOWER	Communication Tower	Low Susceptibility	A	No	0	No
134	COMMUNICATIONS TOWER	Communication Tower	Low Susceptibility	No	No	0	No
135	NANTASKET TRAIN STATION	Transportation Facility	Moderate Susceptibility	No	No	0	No
136	WEST HINGHAM TRAIN STATION	Transportation Facility	Moderate Susceptibility	No	No	0	No
137	GREENBUSH TRAIN TUNNEL	Tunnel	Moderate Susceptibility	No	No	4	No

Table 19: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**FEMA Flood Zone**	**Locally-Identified Flood Area**	**Hurricane Surge Category**	**Brushfire Risk**
138	TELEPHONE EXCHANGE BUILDING	Telecommunications	Moderate Susceptibility	No	North Street/Water Street/Summer Street	0	No
139	DPW STORAGE	DPW	Moderate Susceptibility	No	No	0	No
140	SANDCASTLE DAY CARE	Child Care	Moderate Susceptibility	No	No	0	No
141	EOC	Emergency Operation Center	Moderate Susceptibility	No	No	0	No
142	HINGHAM LIGHT DEPT. OFFICES	Municipal Offices	Moderate Susceptibility	No	No	0	No
143	SOUTH SHORE HOSPITAL BONE & MUSCLE CTR.	Medical Facility	Low Susceptibility	No	No	0	No
144	Hingham Nursery School	Child Care	Low Susceptibility	No	No	0	No
145	Water Booster Station	Pumping Station	Moderate Susceptibility	No	No	0	No
146	Black Rock Golf Facility	Recreation	Moderate Susceptibility	No	No	0	No
147	South Shore Educational Collaborative	Special Needs	Low Susceptibility	No	No	0	No
148	Blue Cross - Blue Shield	Office Building	Low Susceptibility	No	No	0	No
149	State Park Campground	Recreation	Moderate Susceptibility	No	No	0	Yes
150	Renaissance Garden	Nursing Home	Moderate Susceptibility	No	No	0	No
151	Old Derby Animal Hospital	Animal Hospital	Low Susceptibility	No	No	0	No
152	Emergency Dispensing Site (Hingham High)	Emergency Dispensing Site	Moderate Susceptibility	No	No	0	No
153	Black Rock Waste Water Treatment Plant	Sewer Treatment Plant	Moderate Susceptibility	No	No	0	No
154	Skating Club Dam	Dam	Moderate Susceptibility	No	No	0	No
155	Hobart Street Dam	Dam	Moderate Susceptibility	No	No	0	Yes
156	Cranberry Pond Dam	Dam	Moderate Susceptibility	A	No	0	No

Damage Assessments

The purpose of the vulnerability assessment is to estimate the extent of potential damages from natural hazards of varying types and intensities. A vulnerability assessment and estimation of damages was performed for hurricanes, earthquakes, and flooding. The methodology used for hurricanes and earthquakes was the HAZUS-MH software, using the current version at the time of the analysis in April 2011. HAZUS uses 2000 US Census data; it has not yet been updated with 2010 US Census data. The methodology for flooding was developed specifically to address the issue in many of the communities where flooding was not solely related to location within a floodplain.

Introduction to HAZUS-MH

HAZUS- MH (multiple-hazards) is a computer program developed by FEMA to estimate losses due to a variety of natural hazards. The following overview of HAZUS-MH is taken from the FEMA website. For more information on the HAZUS-MH software, go to http://www.fema.gov/plan/prevent/hazus/index.shtm

> "HAZUS-MH is a nationally applicable standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing and evaluating mitigation plans and policies as well as emergency preparedness, response and recovery planning.
>
> HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods and earthquakes on populations."

There are three modules included with the HAZUS-MH software: hurricane wind, flooding, and earthquakes. There are also three levels at which HAZUS-MH can be run. Level 1 uses national baseline data and is the quickest way to begin the risk assessment process. The analysis that follows was completed using Level 1 data.

Level 1 relies upon default data on building types, utilities, transportation, etc. from national databases as well as census data. While the databases include a wealth of information on the Town of Hingham, it does not capture all relevant information. In fact, the HAZUS training manual notes that the default data is "subject to a great deal of uncertainty." However, for the purposes of this plan, the analysis is useful. This plan is attempting to only generally indicate the possible extent of damages due to certain types

of natural disasters and to allow for a comparison between different types of disasters. Therefore, this analysis should be considered to be a starting point for understanding potential damages from the hazards. If interested, communities can build a more accurate database and further test disaster scenarios.

Estimated Damages from Hurricanes

The HAZUS software was used to model potential damages to the community from a 100 year and 500 year hurricane event; storms that are .01% and .005% likely to happen in a given year and roughly equivalent to a Category 2 and Category 4 hurricane. The damages caused by these hypothetical storms were modeled as if the storm track passed directly through the Town, bringing the strongest winds and greatest damage potential.

Though there are no recorded instances of a hurricane equivalent to a 500 year storm passing through Massachusetts, this model was included in order to present a reasonable "worst case scenario" that would help planners and emergency personnel evaluate the impacts of storms that might be more likely in the future, as we enter into a period of more intense and frequent storms.

Table 20
Estimated Damages from Hurricanes

	100 Year	**500 Year**
Building Characteristics		
Estimated total number of buildings	7,000	7,000
Estimated total building replacement value (Year 2002 $) (Millions of Dollars)	$2,314	$2,314
Building Damages		
# of buildings sustaining minor damage	1,002	2,762
# of buildings sustaining moderate damage	130	1,136
# of buildings sustaining severe damage	6	237
# of buildings destroyed	3	142
Population Needs		
# of households displaced	11	234
# of people seeking public shelter	2	46
Debris		
Building debris generated (tons)	2,587.8	16,927.86
Tree debris generated (tons)	11,032.2	37,678.14
# of truckloads to clear building debris	104	691
Value of Damages (Thousands of dollars)		
Total property damage	$18,817.16	$176,461.28
Total losses due to business interruption	$2,338.86	$23,877.62

Estimated Damages from Earthquakes

The HAZUS earthquake module allows users to define an earthquake magnitude and model the potential damages caused by that earthquake as if its epicenter had been at the geographic center of the study area. For the purposes of this plan, two earthquakes were selected: magnitude 5.0 and a magnitude 7.0. Historically, major earthquakes are rare in New England, though a magnitude 5 event occurred in 1963.

Table 21
Estimated Damages from Earthquakes

	Magnitude 5.0	**Magnitude 7.0**
Building Characteristics		
Estimated total number of buildings	7,000	7,000
Estimated total building replacement value (Year 2002 $)(Millions of dollars)	$2,314	$2,314
Building Damages		
# of buildings sustaining slight damage	1,257	718
# of buildings sustaining moderate damage	377	2,560
# of buildings sustaining extensive damage	55	2,340
# of buildings completely damaged	6	2,181
Population Needs		
# of households displaced	18	1,948
# of people seeking public shelter	9	1,038
Debris		
Building debris generated (tons)	0.010 million	0.500 million
# of truckloads to clear building debris	480	
Value of Damages (Millions of dollars)		
Total property damage	$108.92	$1,603.45
Total losses due to business interruption	$9.48	$273.05

Estimated Damages from Flooding

MAPC did not use HAZUS-MH to estimate flood damages in Hingham. In addition to technical difficulties with the software, the riverine module is not a reliable indicator of flooding in areas where inadequate drainage systems contribute to flooding even when those structures are not within a mapped flood zone. In lieu of using HAZUS, MAPC developed a methodology to give a rough approximation of flood damages.

Hingham is 22.5 square miles or 14,400 acres. Approximately 72.38 acres have been identified by local officials as areas of flooding. This amounts to 3.24% of the land area in Hingham. The number of structures in each flood area was estimated by applying the percentage of the total land area to the number of structures (7,000) in Hingham; the same number of structures used by HAZUS for the hurricane and earthquake calculations.

HAZUS uses a value of $330,428 per structure for the building replacement value. This was used to calculate the total building replacement value in each of the flood areas. The calculations were done for a low estimate of 10% building damages and a high estimate of 50% as suggested in the FEMA September 2002 publication, "State and Local Mitigation Planning how-to guides" (Page 4-13). The range of estimates for flood damages is $7,494,120 - $37,470,600. These calculations are not based solely on location within the floodplain or a particular type of storm (i.e. 100 year flood). The results of the analysis are summarized in Table 22 below.

Table 22
Estimated Damages from Flooding

ID	Flood Hazard Area	Approximate Area in Acres	% of Total Land Area in Hingham	Estimated Number of Structures	Replacement Value	Low Estimate of Damages	High Estimate of Damages
1	Route 3A Marine	4.20	0.03	2	$693,900	$69,390	$346,950
2	North Beach	8.24	0.06	4	$1,387,800	$138,780	$693,900
3	Yacht Club	21.90	0.15	11	$3,469,500	$346,950	$1,734,750
4	Kilby St. and Rockland St.	19.06	0.13	9	$3,006,900	$300,690	$1,503,450
5	Bradley Park Drive	21.57	0.15	11	$3,469,500	$346,950	$1,734,750
6	North Street/Water Street/Summer Street	119.54	0.82	57	$18,966,600	$1,896,660	$9,483,300

Table 22
Estimated Damages from Flooding

ID	Flood Hazard Area	Approximate Area in Acres	% of Total Land Area in Hingham	Estimated Number of Structures	Replacement Value	Low Estimate of Damages	High Estimate of Damages
7	Route 3A/East Street/Kilby Street	156.53	1.08	76	$24,980,400	$2,498,040	$12,490,200
8	East Street/Joy Lane	2.77	0.02	1	$462,600	$46,260	$231,300
9	Fountainbleau Drive	23.01	0.16	11	$3,700,800	$370,080	$1,850,400
10	Free Street	38.66	0.27	19	$6,245,100	$624,510	$3,122,550
11	Lazell Street	5.02	0.03	2	$693,900	$69,390	$346,950
12	Abington Street	12.32	0.08	6	$1,850,400	$185,040	$925,200

Table 22
Estimated Damages from Flooding

ID	Flood Hazard Area	Approximate Area in Acres	% of Total Land Area in Hingham	Estimated Number of Structures	Replacement Value	Low Estimate of Damages	High Estimate of Damages
13	Hingham Bathing Beach	37.20	0.26	18	$6,013,800	$601,380	$3,006,900
Totals		***72.38***	***3.24***	227	$74,941,200	$7,494,120	$37,470,600

V. HAZARD MITIGATION GOALS

The Hingham Local Multiple Hazard Community Planning Team met on July 9 and 16, 2012. At that meeting, the team reviewed and discussed the goals from the 2005 Hazard Mitigation Plan for the Town of Hingham. These goals were found to continue to be reflective of the Town's priorities and concerns relative to natural hazard mitigation.

The following ten goals were endorsed by the Committee for the 2014 update of the Hingham Hazard Mitigation Plan:

1. Ensure that critical infrastructure sites are protected from natural hazards.

2. Protect existing residential and business areas from flooding.

3. Maintain existing mitigation infrastructure in good condition.

4. Continue to enforce existing zoning and building regulations.

5. Educate the public about zoning and building regulations, particularly with regard to changes in regulations that may affect tear-downs and new construction.

6. Work with surrounding communities to ensure regional cooperation and solutions for hazards affecting multiple communities such as coastal erosion.

7. Encourage future development in areas that are not prone to natural hazards.

8. Educate the public about natural hazards and mitigation measures.

9. Make efficient use of public funds for hazard mitigation.

10. Prepare to respond to various natural hazard events.

VI. HAZARD MITIGATION STRATEGY

The central component of a hazard mitigation plan is the strategy for reducing the community's vulnerabilities to natural hazard events. Responding to the analysis of risk, vulnerabilities, potential impacts, and anticipated future development, the process for developing this strategy is one of setting goals, understanding what actions the community is already taking that contribute to mitigating the effects of natural hazards and assessing where more action is needed to complement or modify existing measures. The following sections include descriptions of existing mitigation measures, a status update on mitigation measures identified in previous plans, and descriptions of proposed new mitigation measures. All mitigation measures are evaluated by their benefits and potential costs to arrive at a prioritized list of action items.

What is Hazard Mitigation?

Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, education programs, infrastructure projects and other activities. FEMA currently has three mitigation grant programs: the Hazards Mitigation Grant Program (HGMP), the Pre-Disaster Mitigation program (PDM), and the Flood Mitigation Assistance (FMA) program. The three links below provide additional information on these programs.

http://www.fema.gov/government/grant/hmgp/index.shtm

http://www.fema.gov/government/grant/pdm/index.shtm

http://www.fema.gov/government/grant/fma/index.shtm

Hazard Mitigation Measures can generally be sorted into the following groups:

- Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
- Property Protection: Actions that involve the modification of existing buildings or infrastructure to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass.
- Public Education & Awareness: Actions to inform and educate citizens, elected officials, and property owners about the potential risks from hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

- Natural Resource Protection: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms.
- Emergency Services Protection: Actions that will protect emergency services before, during, and immediately after an occurrence. Examples of these actions include protection of warning system capability, protection of critical facilities, and protection of emergency response infrastructure.
  (Source: FEMA Local Multi-Hazard Mitigation Planning Guidance)

Existing Mitigation Measures

Existing Multi-Hazard Mitigation Measures

Comprehensive Emergency Management Plan (CEMP) – Every community in Massachusetts is required to have a Comprehensive Emergency Management Plan. These plans address mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies. These plans contain important information regarding flooding, hurricanes, tornadoes, dam failures, earthquakes, and winter storms. Therefore, the CEMP is a mitigation measure that is relevant to all of the hazards discussed in this plan. The Town also maintains an electronic version that can be shared easily between departments and is portable via a USB device.

Communications Equipment – Hingham has full coverage of the Town with emergency services radio. A new system was installed in 2011 and the Town has approximately 80% of Town radios on the same frequency with plans to bring the remaining divisions, including the DPW and School Department, on line in the near future. Incident command units are available through MEMA.

Emergency Power Generators – The Town maintains emergency power generators in important public facilities and emergency shelters, including several schools, sewer pump locations, public safety buildings, several nursing homes, and several other private facilities.

Massachusetts State Building Code – The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing, and snow loads.

Local Emergency Management Planning Committee (LEPC) – The LEPC is meets as necessary and is composed of staff from a variety of Town Departments, including the

Fire, Police, Building, Conservation, Public Works and School Departments. It also includes members of the Board of Selectman and the Municipal Light Plant.

Public Education – The Town's Emergency Management Department posts on the Town's website multiple notices and publications, including MEMA notices related to winter weather and hurricane preparedness as well as offering web resource titled "Hingham Family Emergency Planning Guidelines".

Existing Flood Hazard Mitigation Measures

National Flood Insurance Program (NFIP) – Hingham participates in the NFIP with 270 policies in force as of the December 31, 2014. FEMA maintains a database on flood insurance policies and claims. This database can be found on the FEMA website at http://www.fema.gov/business/nfip/statistics/pcstat.shtm

The following information is provided for the Town of Hingham:

Flood insurance policies in force (as of May 31, 2014)	273
Coverage amount of flood insurance policies	$80,991,300
Premiums paid	$386,834
Total losses (all losses submitted regardless of the status)	125
Closed losses (Losses that have been paid)	88
Open losses (Losses that have not been paid in full)	1
CWOP losses (Losses that have been closed without payment)	36
Total payments (Total amount paid on losses)	$728,243

The Town complies with the NFIP by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements.

Since the 2005 plan, the policies in force have increased by 86 and the total losses have increased by 16. The total payments, as of May 31, 2014, were $728,243, approximately $140,000 more than the most recent figure.

Public Works Operations/Maintenance Activities – The Public Works Department actively maintains the Town's storm drain system. The following specific activities serve to maintain the capability of the drainage system through the reduction of sediment and litter build up and proper maintenance and repair.

- *Street sweeping* – Street sweeping is conducted annually.

- *Catch basin cleaning* – There are approximately 2,500 catch basins on public ways, which are cleaned bi-annually.

- *Roadway treatments* – Sand/salt mix is used for snow/ice treatment.

- *Other* – Continued repair and rehabilitation of drainage systems, clearing of culverts in advance of predicted storms, and stream flow maintenance.

Town of Hingham Master Plan – The Hingham Master Plan was completed in 2001. The plan is broad-based and focuses on all aspects of development in the Town. The plan focuses on goals across a variety of topic areas, but in particular sets goals related to stormwater management in the Natural Resources section.

Town of Hingham Open Space and Recreation Plan – The five-year update to the Hingham Open Space and Recreation Plan was completed in 2009. The plan is intended to strategize how to protect and maintain additional open space in the Town. The plan includes a seven year action plan and a number of locations are proposed for acquisition since they support flood control/storage and water recharge.

Zoning Ordinance: Flood Plain and Watershed Protection District– Zoning is intended to protect the public health and safety through the regulation of land uses. The Hingham Zoning Bylaws include Flood Plain and Watershed Protection District (Section III-C), which includes sections relating to floodplain protection. It applies to areas in the Town at or below 10' mean sea level (MSL). The purposes of this district include are to control the types of uses that can be constructed on land in the district and to restrict activities that will reduce the natural flood-water storage or flow processes.

Specifically, development is restricted as follows:

- No building, wall dam, or other structure shall be created, constructed, altered, enlarged or otherwise created or moved for any living or other purposes provided that fences, wildlife management shelters, footpaths, bicycle paths, horse paths and footbridges are permitted if they do not affect the natural flow patterns of any water course.
- Dumping, filling, excavating or transferring of any material which will reduce the natural flood-water storage capacity or interfere with the natural flow patterns of any water course within this District is prohibited.

In addition, it includes a provision that those lands along the following named streams and their tributaries: Weir River, Accord Brook, Back River, Eel River, Plymouth River, Crooked Meadow River, Fresh River, Tower Brook, Fulling Mill Brook and by other brooks and streams that lie within a horizontal distance of twenty-five (25) feet from the mean high water line along each bank are also included in this district.

Subdivision Control Law – The Town's subdivision regulations include dimensional and area grading limits, and requirements for drainage design mitigating the 10, 25, and 100 year storms for new construction.

Wetlands Bylaw – The purpose of the Wetlands Bylaw (Article 22) is to protect the foreshores, wetlands, and groundwater supply of the Town of Hingham by controlling activities deemed to have a significant effect on wetland and water quality value. The bylaw requires a 50 foot setback for habitable structures and 35' for ancillary structures from any wetland resource, bordering vegetated wetland, coastal dune or bank, and/or isolated vegetated wetland and any proposed site disturbance.

DCR dam safety regulations – The state has enacted dam safety regulations mandating inspections and emergency action plans. All new dams are subject to state permitting.

Maintenance of seawalls, jetties and other shoreline armoring structures – The Town monitors and repairs seawalls as needed and as resources allow.

Existing Wind Hazard Mitigation Measures

Massachusetts State Building Code – The Town enforces the Massachusetts State Building Code whose provisions are generally adequate to protect against most wind damage. The code's provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence. If a tornado were to occur, the potential for severe damages would be extremely high.

Zoning regulations for Communications Towers - Section V-E of the Hingham Zoning Bylaw controls for personal wireless facilities and states that Tower height shall not exceed one hundred (100) feet above the natural grade.

Existing Winter Storm Hazard Mitigation Measures

Snow disposal –The Town conducts general snow removal operations with its own equipment and has adequate snow storage/disposal space at Hingham Bathing Beach.

Existing Geologic Hazard Mitigation Measures

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

Section 1612.2.5 sets up seismic hazard exposure groups and assigns all buildings to one of these groups according to a Table 1612.2.5. Group II includes buildings which have a substantial public hazard due to occupancy or use and Group III are those buildings having essential facilities which are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

Slope Bylaw – The Town has site plan review process, and it is triggered when there is a proposed land disturbance of more than 2500 square feet in areas with slopes greater than 10%. The purpose of the review is to control and address development proposed in locations with steeper slopes.

Existing Brush Fire Hazard Mitigation Measures

Burn Permits – The Town fire department requires a permit for outdoor burning, consistent with State regulations. The permit includes explanation of the related regulations and precautions for the permit-holder to take. The permit-holder must call the fire department on each and every day that a permit-holder intends to burn. Burning of leaves, grass, hay, stumps, rubbish, building materials and tires are prohibited. Outdoor burning is only allowed from January to May, and between the hours of 10AM and 4PM.

Subdivision/Development Review – The Fire Department participates in the review of new subdivisions and development projects.

The Town of Hingham has recognized the several existing mitigation measures that require improvements or changes, and has the capacity within its local boards and departments to address those changes. These measures have been included in the proposed mitigation strategy (see pages 86 to 97 and Tables 25 & 26), with a designation of the local boards and departments responsible for implementing each one. The Hingham Department of Public Works will address roadway elevation, stream clearing, seawall repairs, bank stabilization, vegetative buffers, tree trimming, and clearing the town forest. The Conservation Commission will take the lead on Weir River Corridor Restoration and the Planning Board will address the updates to the Master Plan and the Erosion and Sedimentation Bylaw, floodplain management and acquisition of vacant flood prone lands. The Fire Department/Emergency Management will implement measures for public education on brushfires and gator fire units.

Table 23- Hingham Existing Mitigation Measures			
Type of Existing Mitigation Measures	**Area Covered**	**Effectiveness/ Enforcement**	**Improvements/ Changes Needed**
MULTIPLE HAZARDS			
Comprehensive Emergency Management Plan (CEMP)	Town-wide.	Emphasis is on emergency response.	Update.
Communications Equipment	Town-wide.	Effective.	Continue to add departments/divisions not yet on the same frequency (e.g., DPW, School Dept.)
Massachusetts State Building Code	Town-wide.	Effective for new construction.	None.
Emergency Power Generators	Town-wide.	Effective.	Upgrade generators as needed; provide generators at additional locations;
Participation in the Local Emergency Planning Committee (LEPC)	Town-wide.	A forum for inter-departmental cooperation and planning for natural and manmade disasters.	None.
Public Education	Town-wide.	Effective.	Continue to stay up to date with materials at state and federal levels.
FLOOD HAZARDS			
Participation in the National Flood Insurance Program (NFIP)	Areas identified on the FIRM maps.	There are 199 policies in force.	Encourage all eligible homeowners to obtain insurance.
Public Works Operations/Maintenance Activities	Town-wide.	Effective.	None.
Hingham Master Plan	Town-wide	Effective.	Currently initiating update process for 2001 Plan.
Hingham Open Space and Recreation Plan	Town-wide	Effective.	Completed for 2009 – 2016 period.

Table 23- Hingham Existing Mitigation Measures			
Type of Existing Mitigation Measures	**Area Covered**	**Effectiveness/ Enforcement**	**Improvements/ Changes Needed**
Zoning Ordinance: Flood Plain and Watershed Protection District	Areas in floodplains and at or below 10' MSL	Effective for new construction.	None.
Subdivision Control Law	Town-wide	Effective for new construction.	None.
Wetlands Bylaw	Resource Areas	Effective.	None.
Maintenance of seawalls, jetties and other shoreline armoring structures	Coastal Areas	Limited effectiveness.	Continue to monitor and repair, and initiate comprehensive study.
DCR Dam Safety Regulations	Dams	Effective	None.
WIND HAZARDS			
The Massachusetts State Building Code	Town-wide.	Effective for most situations except severe storms	None.
Zoning regulations for Communications Towers	Town-wide	Effective	None.
WINTER HAZARDS			
Snow Disposal Site	Town-wide	Sufficient	None.
GEOLOGIC HAZARDS			
The Massachusetts State Building Code	Town-wide	Effective	None
Slope Bylaw	Town-wide	Effective	None
BRUSH FIRE HAZARDS			
Burn Permit	Town-wide.	Effective.	None.
Subdivision/Development Review	Town-wide.	Effective.	None.

Implementation Progress on Previous Plans

At a meeting of the Hingham Hazard Mitigation Committee, Town staff reviewed the mitigation measures identified in the 2005 South Shore Regional Pre-Disaster Mitigation Plan Hingham Annex and determined whether each measure had been implemented or deferred. Of those measures that had been deferred, the committee evaluated whether the measure should be deleted or carried forward into the 2014 Hingham Hazard Mitigation Plan Update. The decision on whether to delete or retain a particular measure was based on the committee's assessment of the continued relevance or effectiveness of the measure and whether the deferral of action on the measure was due to the inability of the Town to take action on the measure.

Table 24

Mitigation Measures from the 2005 Plan

Mitigation Measures	Priority	Implementation Responsibility	Status
Emergency Management Radio Communication: Multi channel abilities, tower strength issues	Medium	Fire department	Complete (New system installed in 2011)
Phragmites control: Marsh grass cutting to control *Phragmites* for public safety and fire prevention purposes	High	DPW & Conservation Commission	Complete (work to address/reduce Phragmites growth has occurred as part of other projects to improve tidal exchanges, including culvert and tide gate improvement projects)
Home Meadow tide gate capacity improvements	High	DPW	Complete (Tide gate improved and culvert upgraded as part of Greenbush rail project.)
Comprehensive study of seawalls, dikes and jetties; replacing seawalls with riprap when it is determined to be more effective	High	DPW	In Progress (Inner Harbor Seawall Study underway to assess conditions and potential improvements. Includes Town committees and state divisions.)
Repair of the Hingham Harbor Seawalls: Steamboat Wharf, Barnes Wharf	Medium	Waterfront Committee	Partially complete (Inner Harbor Seawall Study includes assessment of wharves.)

Table 24

Mitigation Measures from the 2005 Plan

Mitigation Measures	Priority	Implementation Responsibility	Status
Foundry Pond: Dredging for enhanced flood storage	Medium	Conservation Commission	Partially complete - Revised (Town investigating river restoration project along entire length of river rather than just at the pond for stormwater and flood management. Investigation is currently focused on the area between the mouth of the river and Foundry Pond Dam. See Weir River Corridor Restoration in Plan in proposed mitigation below. Priority changed to High due to more expansive scope of project)
Brewer Pond: Dam repairs and dredging to enhance flood storage capabilities (Dam on Brewer Pond also known as Hobart Street Dam)	Medium	Conservation Commission & DPW	Partially complete – Revised) (Town is looking more strategically at stream and river restoration in Town rather than dredging in order to address drainage and flow issues. See Weir River Corridor Restoration in Plan in proposed mitigation below. Priority changed to High due to more expansive scope of project)
Cushing Dam: Evaluation of privately owned dam that could affect Main Street if breached	Medium	Private	Partially complete (Town has occasional contact with private owner of dam to check status and operations. Priority revised to Low in plan update due to coordination with dam owner.)
Brush Truck for Fire Dept	Low	Fire Department	Complete (Vehicle purchased in 2011)
MOU with DCR for Wompatuck State Park land	Medium	Fire Dept	Complete
Elevating repetitive loss properties	High	Building Department	In Progress (Pursuing elevation as needed to address repetitive loss properties.)

Table 24

Mitigation Measures from the 2005 Plan

Mitigation Measures	Priority	Implementation Responsibility	Status
Storm water runoff control: High Street, Union Street, & Free Street	Low	Building Department, Planning Dept. & Cons. Comm.	Complete (Flooding addressed through redevelopment activities including work on Baptist Church property, which treats stormwater on-site.)
Erosion Control By-law	High	Building Department, Planning Dept. & Cons Comm.	Partially Complete (Continues to be of interest and work is continuing to develop erosion bylaw.)
Town wide Inflow & Infiltration study to reduce sewer overflows	Medium	DPW	Complete (Sewer Commission recently completed Comprehensive Wastewater Management Plan and Town is pursuing grant to support additional follow-up work from plan.)
Fire Safety Public Education - educate property owners about the desirability of maintaining a setback from their houses to the edge of the brush.	Medium	Fire Dept	Partially Complete (Materials and information available on the Fire Department website. Priority changed to Low in plan update due to partial completion and low risk assessment)
Seismic Study: A study of the seismic vulnerability and upgrade needs for critical infrastructure sites	Medium	Building Dept. & DPW	Deferred & Continued (Deferred in previous plan due to lack of funding. Priority changed to Low in plan update due to low probability hazard)

The Town of Hingham's staff continually demonstrates commitment and a high level of professionalism with regard to addressing natural hazard mitigation opportunities in order to protect the lives and property of the residents and businesses located in the Town. Additionally, staff has also advanced two projects not included in the 2005 plan, which are:

- Replacement of a culvert at the World's End property to enhance the capacity of tidal flows and reduce phragmites growth

- Initiation of an engineering study of the Broad Cove culvert at Route 3A in order to address erosion and potential undermining of the roadway.

As has been previously stated, flooding represents the greatest hazard and Town staff diligently monitors and maintains the structures and enforces the regulations that contribute to minimizing the potential impacts of this hazard, within the resources available. The measures identified in the previous plan, and included above, represented a wish list of projects and initiatives that would further reduce hazard risks, but were dependent on the availability of resources.

Regional and Inter-Community Considerations

Some hazard mitigation issues are strictly local. The problem originates primarily within the municipality and can be solved at the municipal level. Other issues are inter-municipal issues that involve cooperation or a shared hazard risk between two or more municipalities. There is a third level of mitigation which is regional; involving a state, regional, or federal agency or an issue that involves three or more municipalities.

Inter-Community Considerations

Aquarion Water Company – Hingham's water is supplied by the Aquarion Water Company and the water supply source and distribution system is regional. Aquarion serves the Towns of Hingham, Hull and north Cohasset Water District. It is important that the water company be addressed in pre-disaster mitigation planning for all three communities.

Wompatuck State Park – Wompatuck State Park is owned by the State and managed by the DCR. The majority of the park is located in Hingham, but portions are also located in the Towns of Cohasset and Norwell. As a location of wildfire risk, coordination should occur in and between the three Towns and DCR.

South Shore Regional Emergency Communications Center (SSRECC) – The regional center combined four separate 911 emergency call centers and currently serves the Towns of Cohasset, Hingham, Hull and Norwell.

State and Regional Issues

Climate Change and Sea Level Change – The entirety of Massachusetts's coastal environment faces potential risk from climate change and associated sea level change. Models incorporating current trends indicate a gradual rise in global temperature, with a consequent increase in the volume of water in the world's ocean due to thermal expansion as the water warms and the addition of water from melting ice sheets and glaciers. Projections for sea level rise by the end of this century range from 1 – 2 meters. Higher temperatures and higher sea levels will result in a greater frequency and intensity of storms and higher flood levels.

Attempts to mitigate climate change or adapt to its potential impacts are largely outside the scope of this Hazard Mitigation Plan, which relies primarily on historic trends to assess risk and vulnerability. The potential changes to the State's storm damage profile caused by climate change will be well outside of historic trends, making those trends uncertain predictors of future risk and vulnerability at best.

Coastal cities and Towns and Regional Planning Agencies will need to advocate for a statewide response that includes:

- Using the best available information to map and model climate change and sea level change data related to coastal hazards in Massachusetts
- Dissemination of this information for use in hazard mitigation planning and land use policy development.

Key partners in this process will be the Executive Office of Energy and Environmental Affairs (EOEEA), which oversees the oversees six environmental and energy agencies in the Commonwealth, and the Massachusetts Office of Coastal Zone Management (CZM), which is the lead policy and technical assistance agency for the state's Coastal Zone Management Program. An important document to guiding these responses is the Massachusetts Climate Change Adaptation Report (http://www.mass.gov/eea/docs/eea/energy/cca/eea-climate-adaptation-report.pdf).

Regional Partners - In many communities, mitigating natural hazards, particularly flooding, is more than a local issue. The drainage systems that serve municipalities are a complex system of storm drains, roadway drainage structures, pump stations and other facilities owned and operated by a wide array of agencies including but not limited to the Town of Hingham, the Department of Conservation and Recreation (DCR), and Massachusetts Department of Transportation (MassDOT). The planning, construction, operations, and maintenance of these structures are integral to the flood hazard mitigation efforts of communities. These agencies must be considered the communities regional partners in hazard mitigation. These agencies also operate under the same constraints as communities do, including budgetary and staffing constraints and numerous competing priorities. In the sections that follow, the plan includes recommendations for activities where cooperation with these other agencies may be necessary. Implementation of these recommendations will require that all parties work together to develop solutions.

Proposed Hazard Mitigation Measures

Flood Hazard Mitigation Measures

- Roadway Elevation: Study potential for Bonny Briar Road to be elevated and reduce potential for flooding across the roadway. Coordinate with study of the intersection of Rockland and Kilby Streets, which is being led by the Massachusetts Department of Transportation (MassDOT).

- Private Dam Coordination: Take action to initiate and maintain dialogues with owners of private dam structures in order to monitor condition of structures and to advise on practices that reduce flooding potential from dammed waterways.

- Weir River Corridor Restoration: Acquire funding to study river restoration project for the Weir River. Restoration project would focus on re-establishing natural elements and sections of the river to reduce flooding while revitalizing the riverine ecosystem. Short-term focus is on the river section between the mouth of the river and the Foundry Pond Dam.

- Stream Clearing: Provide resources to support staff time and equipment for the removal of debris from waterways so that vegetation does not block streams, especially at choke points like culverts and bridges. Coordinate and integrate efforts with river restoration study proposed for the Weir River.

- Seawall repairs: Complete Inner Harbor Seawalls Study and use findings to guide work to repair, replace and/or enhance coastal protection structures. Options could include raising height of sea walls, replacing seawalls with rip rap or introduction of soft structures if that is determined to be more effective. Options will be determined on site specific basis.

- Bank Stabilization along Route 3A: Advance findings from Broad Cove culvert study and other work related to Route 3A between Otis Street and Hingham Bathing Beach in order to reduce coastal flooding potential, stabilize bank of roadway and mitigate impacts of erosion. This would also address an area that occasionally experiences minor flooding of the Route 3A.

- Management Plan for Sand at Hingham Bathing Beach: Develop management plan for beach sand to assist in replacing and protecting soft features that are eroded by coastal flooding. The beach is a barrier between the Hingham Harbor and Route 3A.

- Erosion Control By-law: The Town should adopt an updated Erosion Control Bylaw that meets the standards of the EPA Stormwater Phase 2 program.

Measures to Ensure Compliance with NFIP

- Floodplain Management: Continue to enforce the Floodplain Zoning District and associated building regulations for floodplain areas. Update this district to remain consistent with FEMA guidelines and floodplain mapping.

- Floodplain Mapping: Maintain up to date maps of local FEMA identified floodplains.

- Acquisition of Vacant Flood Prone Lands: Acquire priority open space parcels in floodplain areas in order to maintain flood storage and water infiltration capacity. These parcels may also be used for general conservation and recreation purposes. Guidance for property acquisition can be found in the Town's Open Space Plan, which identifies specific properties that offer opportunities for flood control and storage.

Wind Hazard Mitigation Measures

- Tree Trimming: The Town will explore the option to increase trim back width from current standard of 2 feet in order to limit future hazards. This work will include coordinating with the power company and other utilities. Additional tree planting and maintenance measures, including encouraging private property owners to plant trees set back from the public way, will be explored.

- Plant Vegetated Buffer along Route 3A by the Hingham Bathing Beach: During high wind events, sand from the Hingham Bathing Beach is blown across Route 3A and creates visibility issues. The planting of a vegetated buffer will mitigate the impacts of this wind hazard.

Winter Storm Hazard Mitigation Measures

- Vegetated Buffer along Union Street: Snow from the nearby playing fields blows across Union Street reducing visibility and has accumulated into drifts. The planting of a vegetated buffer will mitigate the impacts of this winter storm and snow hazard.

Geologic Hazard Mitigation Measures

- Seismic Study: The Town will conduct a study of the seismic vulnerability and upgrade needs for critical infrastructure sites, both public and private. This mitigation measure was carried forward from the 2005 plan.

Other Natural Hazards

- Acquire Gator Fire Units: Pursue acquisition of all terrain vehicles (gators) to improve ability to access locations with wooded locations susceptible to brushfire.

- Clearing Town Forest: Work with DPW to re-establish practice of clearing debris in the Town Forest to reduce the risk of brushfire. Estimate the resources that are needed to support restart this work.

- Brush Fire Education: Implement an education program for property owners in or near brush fire hazard areas with regard to controlling vegetation near homes to limit the ability of fires to spread to a building.

Multi-Hazard Mitigation Measures

- Update Town Master Plan: The Hingham Master Plan provides guidance to Town decision makers with regard to the course of development within the Town. As part of the planned updated, hazard mitigation objectives, such as directing new development away from identified hazard areas, should be incorporated.

- Encourage Private Residential Developments to Develop Natural Hazard Mitigation and Response Plans: There are a number of residential developments that are served by private roads and services (e.g., sewer, water, etc.) that do not fall directly within the areas that would receive mitigation from public activities and investments. These developments (likely through their homeowner's association) are encouraged to assess their vulnerabilities to natural hazards and develop mitigation response plans. These efforts should involve communication and coordination with the Town.

- Climate Change Vulnerability and Adaptation Study: The Town is interested in determining how it may be impacted by a changing climate and corresponding changes in certain hazard profiles. In particular, the Town has a specific interest in identified how rising sea levels may impact facilities and buildings along their coastline in both chronic (e.g., high tides) and acute conditions (e.g., storm surges).

Prioritization of Mitigation Activities

The last step in developing the Town's mitigation strategy is to assign a level of priority to each mitigation measure so as to guide the focus of the Town's limited resources towards those actions with the greatest potential benefit. At this stage in the process, the Local Hazard Mitigation Committee has limited access to detailed analyses of the cost and benefits of any given measure, so prioritization is based on the committee member's knowledge of the existing and potential hazard impacts and an approximate sense of the costs associated with pursuing any given measure.

Prioritization occurred through discussion at the second meeting of the local committee and through subsequent review by committee members and public comment. Priority setting was based on local knowledge of the hazard areas, including impacts of hazard events and the extent of the area impacted and the relation of a given mitigation measure to the Town's identified goals. In addition, through the discussion, the local committee also took into consideration factors such as the number of homes and businesses affected, whether or not road closures occurred and what impact closures had on delivery of emergency services and the local economy, anticipated project costs, whether the Town currently had the technical and administrative capability to carry out the mitigation measures, whether any environmental constraints existed, and whether the Town would be able to justify the costs relative to the anticipated benefits.

The table below demonstrates the prioritization. For each mitigation measure, the geographic extent of the potential benefiting area is identified, an overall benefit in terms of High, Medium or Low is estimated, a cost in terms of High (greater than $50,000), Medium ($10,000 to $49,000), or Low (less than $10,000 or staff time) is identified, and based on these factors, each mitigation measure is categorized as High, Medium or Low. The level of benefit created by a project was based on an estimate of the number of homes, businesses, or people served by the mitigation action and an estimate of the costs or damages avoided via implementation of the mitigation measure. Where a more exact estimate of cost was know, this number was used instead. With this assessment, an approximate timeframe has been identified in which the municipality would attempt to achieve the mitigation measure.

Table 25 Mitigation Measure Prioritization

Mitigation Action	Geographic Area	Benefit	Estimated Cost	Priority	Time Frame
Flood Hazard Mitigation Measures					
A) Roadway Elevation	Identified Areas	Medium	High	Medium	2014 - 2019
B) Private Dam Coordination	Identified Areas	Low	High	Low	2014 - 2016
C) Weir River Corridor Restoration	Project Area	High	High	High	2014 - 2019
D) Stream Clearing	Town Wide	High	Medium	High	2014 - 2016

Table 25 Mitigation Measure Prioritization

Mitigation Action	Geographic Area	Benefit	Estimated Cost	Priority	Time Frame
E) Seawall repairs	Project Area/ Inner Harbor	Medium	High	Medium	2014 - 2019
F) Bank Stabilization along Route 3A	Project Area	Medium	High	Medium	2014 - 2017
G) Management Plan for Sand at Hingham Bathing Beach	Project Area	Medium	Medium	Medium	2014 - 2017
H) Erosion Control By-law	Town Wide	Medium	Medium	Medium	2014 - 2017
I) Floodplain Management	Floodplains	High	Low	High	2014 - 2019
J) Floodplain Mapping	Floodplains	High	Low	High	2014 - 2019
K) Acquisition of Vacant Flood Prone Lands	Floodplains	High	Low	High	2014 - 2019
Wind Hazard Mitigation Measures					
L) Tree Trimming	Town Wide	Medium	High	Medium	2014 - 2019
M) Plant Vegetated Buffer along Route 3A by the Hingham Bathing Beach	Project Area	Low	Medium	Low	2014 - 2017
Winter Storm Hazard Mitigation Measures					
N) Vegetated Buffer along Union Street	Project Area	Low	Medium	Low	2014 - 2017

Table 25 Mitigation Measure Prioritization

Mitigation Action	Geographic Area	Benefit	Estimated Cost	Priority	Time Frame
Geologic Hazard Mitigation Measures					
O) Seismic Study	Town Wide	Low	Low	Low	2017 - 2019
Other Natural Hazards					
P) Acquire Gator Fire Units	Brush Fire Hazard Areas	Medium	Medium	Medium	2014 - 2016
Q) Clearing Town Forest	Brush Fire Hazard Areas	Medium	Medium	Medium	2014 - 2017
R) Brush Fire Education	Brush Fire Hazard Areas	Low	Low	Low	2014 - 2019
Multi-Hazard Mitigation Measures					
S) Update Town Master Plan	Town Wide	Medium	High	Medium	2014 - 2017
T) Encourage Private Residential Developments to Develop Natural Hazard Mitigation and Response Plans	Town Wide	Medium	Low	Medium	2015 - 2019
U) Climate Change Vulnerability and Adaptation Study	Town Wide	High	Medium	Medium	2016 - 2017

Introduction to Potential Mitigation Measures (Table 26)

Description of the Mitigation Measure – The description of each mitigation measure is brief and cost information is given only if cost data were already available from the community. The cost data represent a point in time and would need to be adjusted for inflation and for any changes or refinements in the design of a particular mitigation measure.

Priority – The designation of high, medium, or low priority was done at the meeting of the Local Multiple Hazard Community Planning Team meeting. The designations reflect discussion and a general consensus developed at the meeting but could change as conditions in the community change. . In determining project priorities, the local team considered potential benefits and project costs.

Implementation Responsibility – The designation of implementation responsibility was done by MAPC based on a general knowledge of what each municipal department is responsible for. It is likely that most mitigation measures will require that several departments work together and assigning staff is the sole responsibility of the governing body of each community.

Time Frame – The time frame was based on a combination of the priority for that measure, the complexity of the measure and whether or not the measure is conceptual, in design, or already designed and awaiting funding. Because the time frame for this plan is five years, the timing for all mitigation measures has been kept within this framework. The identification of a likely time frame is not meant to constrain a community from taking advantage of funding opportunities as they arise.

Potential Funding Sources – This column attempts to identify the most likely sources of funding for a specific measure. The information on potential funding sources in this table is preliminary and varies depending on a number of factors. These factors include whether or not a mitigation measure has been studied, evaluated or designed, or if it is still in the conceptual stages. MEMA and DCR assisted MAPC in reviewing the potential eligibility for hazard mitigation funding. Each grant program and agency has specific eligibility requirements that would need to be taken into consideration. In most instances, the measure will require a number of different funding sources. Identification of a potential funding source in this table does not guarantee that a project will be eligible for, or selected for funding. Upon adoption of this plan, the local committee responsible for its implementation should begin to explore the funding sources in more detail.

Additional information on funding sources – The best way to determine eligibility for a particular funding source is to review the project with a staff person at the funding agency. The following websites provide an overview of programs and funding sources.

Army Corps of Engineers (ACOE) – The website for the North Atlantic district office is http://www.nae.usace.army.mil/. The ACOE provides assistance in a number of types of projects including shoreline/streambank protection, flood damage reduction, flood plain management services and planning services.

Massachusetts Emergency Management Agency (MEMA) – The grants page http://www.mass.gov/dem/programs/mitigate/grants.htm has a useful table that compares eligible projects for the Hazard Mitigation Grant Program and the Flood Mitigation Assistance Program.

United States Department of Agriculture – The USDA has programs by which communities can get grants for firefighting needs. The following link provides some examples: http://www.rurdev.usda.gov/rd/newsroom/2002/cfg.html

Abbreviations Used in Table 26

FEMA Mitigation Grants includes:
- FMA = Flood Mitigation Assistance Program.
- HMGP = Hazard Mitigation Grant Program.
- PDM = Pre-Disaster Mitigation Program

ACOE = Army Corps of Engineers.

DHS/EOPS = Department of Homeland Security/Emergency Operations

EPA/DEP (SRF) = Environmental Protection Agency/Department of Environmental Protection (State Revolving Fund)

USDA = United States Department of Agriculture

Mass DOT = Massachusetts Department of Transportation

DCR = MA Department of Conservation and Recreation

DHCD = MA Department of Housing and Community Development

Table 26
Hingham Potential Mitigation Measures

Mitigation Action	Measure Type	Implementation Responsibility	Priority	Time Frame	Potential Funding Sources
Flood Hazard Mitigation Measures					
A) Roadway Elevation	Structural Projects	DPW	Medium	2014 - 2019	Hingham/FEMA
B) Private Dam Coordination*	Structural Projects / Property Protection	Private Property Owners / Emergency Management	Low	2014 - 2016	Private
C) Weir River Corridor Restoration	Structural Projects / Property Protection / Natural Resource Protection	Conservation Commission / Planning / DPW	High	2014 - 2019	Hingham / Division of Ecological Restoration
D) Stream Clearing	Property Protection / Natural Resource Protection	DPW	High	2014 - 2016	Hingham
E) Seawall Repairs*	Structural Projects / Property Protection / Natural Resource Protection	Harbor Master / DPW	Medium	2014 - 2019	Hingham/ACOE
F) Bank Stabilization along Route 3A	Structural Projects / Natural Resource Protection	Planning / DPW / MassDOT	Medium	2014 - 2017	Hingham / MassDOT

Table 26
Hingham Potential Mitigation Measures

Mitigation Action	Measure Type	Implementation Responsibility	Priority	Time Frame	Potential Funding Sources
G) Management Plan for Sand at Hingham Bathing Beach	Structural Projects / Property Protection / Natural Resource Protection	Harbor Master / DPW	Medium	2014 - 2017	Hingham
H) Erosion Control By-law*	Prevention	Planning / Conservation Committee	Medium	2014 - 2017	Hingham
I) Floodplain Management	Prevention	Planning	High	2014 - 2019	Hingham/DCR
J) Floodplain Mapping	Prevention	Planning	High	2014 - 2019	Hingham/DCR
K) Acquisition of Vacant Flood Prone Lands	Prevention / Natural Resource Protection	Planning	High	2014 - 2019	Hingham
Wind Hazard Mitigation Measures					
L) Tree Trimming	Property Protection	DPW	Medium	2014 - 2019	Hingham/Utility Companies
M) Plant Vegetated Buffer along Route 3A by the Hingham	Prevention	DPW	Low	2014 - 2017	Hingham

Table 26
Hingham Potential Mitigation Measures

Mitigation Action	Measure Type	Implementation Responsibility	Priority	Time Frame	Potential Funding Sources
Bathing Beach					
Winter Storm Hazard Mitigation Measures					
N) Vegetated Buffer along Union Street	Prevention	DPW	Low	2014 - 2017	Hingham
Geologic Hazard Mitigation Measures					
O) Seismic Study*	Property Protection	DPW / Building	Low	2017 - 2019	Hingham
Other Natural Hazards					
P) Acquire Gator Fire Units	Property Protection	Fire / Police / Emergency Management	Medium	2014 - 2016	Hingham
Q) Clearing Town Forest	Prevention / Natural Resource Protection	DPW	Medium	2014 - 2017	Hingham
R) Brush Fire Education	Prevention	Fire / Emergency Management	Low	2014 - 2019	Hingham

Table 26
Hingham Potential Mitigation Measures

Mitigation Action	Measure Type	Implementation Responsibility	Priority	Time Frame	Potential Funding Sources
Multi-Hazard Mitigation Measures					
S) Update Town Master Plan	Prevention	Planning	Medium	2014 - 2017	Hingham/MAPC
T) Encourage Private Residential Developments to Develop Natural Hazard Mitigation and Response Plans	Prevention	Homeowners' Associations	Medium	2014 - 2018	Private Sources
U) Climate Change Vulnerability and Adaptation Study	Prevention / Natural Resource Protection	Hingham/MAPC	Medium	2016 - 2017	Hingham/ Commonwealth of Massachusetts

** Mitigation measures carried forward from the 2005 Hingham Hazard Mitigation Plan.*

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VII. PLAN ADOPTION AND MAINTENANCE

Plan Adoption

The Hingham Hazard Mitigation Plan was adopted by the Board of Selectmen on May 5, 2016. See Appendix D for documentation. The plan was approved by FEMA on [ADD DATE] for a five-year period that will expire on [ADD DATE].

Plan Maintenance

Although several of the mitigation measures from the Town's previous Hazard Mitigation Plan have been implemented, since that plan was adopted there has not been an ongoing local process to guide implementation of the plan and incorporate it into other town planning mechanisms. Such a process is needed over the next five years for the implementation of this plan update, and will be structured as described below.

MAPC worked with the Hingham Hazard Mitigation Planning Team to prepare this plan. This group will continue to meet on a regular basis, at least annually, to function as the Local Hazard Mitigation Implementation Group, with the Fire Chief/Emergency Management Director designated as the coordinator. Additional members could be added to the local implementation group from businesses, non-profits and institutions. During the next five-year planning cycle the Town will continue to invite the public to review and comment on the plan during all aspects of the planning process, through postings on the town web site and meetings hosted by a local board in accordance with city and state open meeting laws.

Implementation Schedule

Mid-Term Survey on Progress– The coordinator of the Hazard Mitigation Implementation Team will prepare and distribute a survey in Year 3 of the plan. The survey will be distributed to all of the local implementation group members and other interested local stakeholders. The survey will poll the members on any changes or revisions to the plan that may be needed, progress and accomplishments for implementation, and any new hazards or problem areas that have been identified.

This information will be used to prepare a report or addendum to the local hazard mitigation plan in order to evaluate its effectiveness in meeting the plan's goals and identify areas that need to be updated in the next plan. The Hazard Mitigation Implementation Team, coordinated by the Fire Chief/Emergency Management Director, will have primary responsibility for tracking progress and updating the plan.

Begin to Prepare for the next Plan Update -- Given the lead time needed to secure funding and conduct the planning process, the Hazard Mitigation Implementation Team will convene the team to begin to prepare for an update of the plan, in Year Three. The team will use the information from the Mid-Term progress review to identify the needs

and priorities for the plan update and seek funding for the plan update process. Potential sources of funding may include FEMA Pre-Disaster Mitigation grants and the Hazard Mitigation Grant Program. Both grant programs can pay for 75% of a planning project, with a 25% local cost share required.

Prepare and Adopt an Updated Local Hazard Mitigation Plan – FEMA's approval of this plan is valid for five years, by which time an updated plan must be approved by FEMA in order to maintain the Town's approved plan status and its eligibility for FEMA mitigation grants. Once the resources have been secured to update the plan, the Hazard Mitigation Implementation Team may decide to undertake the update themselves, contract with the Metropolitan Area Planning Council to update the plan or to hire another consultant. However the Hazard Mitigation Implementation Team decides to update the plan, the group will need to review the current FEMA hazard mitigation plan guidelines for any changes. The update of the Hingham Hazard Mitigation Plan will be forwarded to MEMA and DCR for review and to FEMA for approval.

Integration of the Plans with Other Planning Initiatives

Upon approval of the Hingham Hazard Mitigation Plan by FEMA, the Local Hazard Mitigation Implementation Team will provide all interested parties and implementing departments with a copy of the plan and will initiate a discussion regarding how the plan can be integrated into that department's ongoing work. At a minimum, the plan will be reviewed and discussed with the following departments:

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

The Hazard Mitigation Plan will be integrated into other town plans and policies as they are updated and renewed, including the Hingham Comprehensive Plan, Open Space Plan, Comprehensive Emergency Management Plan, and Capital Investment Program.

Other groups that will be coordinated with include large institutions, Chambers of Commerce, land conservation organizations and watershed groups. The plans will also be posted on a community's website with the caveat that local team coordinator will review the plan for sensitive information that would be inappropriate for public posting. The posting of the plan on a web site will include a mechanism for citizen feedback such as an e-mail address to send comments.

VIII. LIST OF REFERENCES

In addition to the specific reports listed below, much of the technical information for this plan came from meetings with Town department heads and staff.

Town of Hingham, General By-laws.

Town of Hingham, Zoning Bylaw

NPDES Phase II Stormwater General Permit Annual Reports

Master Plan for Hingham Harbor

Town of Hingham Open Space and Recreation Plan

Town of Hingham Master Plan

Hingham's Comprehensive Wastewater Management Plan

South Shore Coastal Infrastructure Inventory and Assessment Demonstration Project (Coastal Hazards Commission) – Town of Hingham

MA Coastal Hazards Commission, Preparing For the Storm: Recommendations for Management of Risk from Coastal Hazards in Massachusetts May 2007.

Commonwealth of Massachusetts, State Hazard Mitigation Plan, 2013

FEMA Hazard Mitigation Plan Review Guide, September 2011

FEMA, Local Multi-Hazard Mitigation Planning Guidance; July 1, 2008.

FEMA, Flood Insurance Rate Maps for Hingham, MA, 2010

Metropolitan Area Planning Council, Geographic Information Systems Lab

Metropolitan Area Planning Council, Regional Plans and Data

Northeast States Emergency Consortium (NESEC)

U.S. Census, 2010

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APPENDIX A
MEETING AGENDAS

Don Boyce
DIRECTOR

dcr

Richard Sullivan
COMMISSIONER

MAPC

Marc D. Draisen
EXECUTIVE DIRECTOR

SOUTH SHORE HAZARD MITIGATION PLANNING TEAM

Braintree
Cohasset
Hingham
Hull
Marshfield
Milton
Quincy
Randolph
Scituate
Weymouth

THE COMMONWEALTH OF MASSACHUSETTS

Deval Patrick, Governor

MASSACHUSETTS EMERGENCY MANAGEMENT AGENCY
400 WORCESTER ROAD, FRAMINGHAM, MA 01702-5399 508-820-2000 FAX 508-820-1404

DEPARTMENT OF CONSERVATION AND RECREATION
251 CAUSEWAY STREET, SUITE 600-900, BOSTON, MA 02114-2104 617-626-1250 FAX 617-626-1351

METROPOLITAN AREA PLANNING COUNCIL
60 TEMPLE PLACE, 6TH FLOOR, BOSTON, MA 02111 617-451-2770 FAX 617-482-7185

South Shore Hazard Mitigation Planning Team

First Meeting

Tuesday, February 9, 10:00 AM

McCulluch Building
(Whipple Senior Center)
Weymouth, MA
(See map & directions attached)

AGENDA

10:00 WELCOME & INTRODUCTIONS

10:05 OVERVIEW OF HAZARD MITIGATION PLANNING & GRANTS

- State Hazard Mitigation Plan & FEMA Grants–Sarah White, MEMA
- Regional & Local Mitigation Plans - Martin Pillsbury, MAPC

10:20 UPDATING THE SOUTH SHORE HAZARD MITIGATION PLAN

- FEMA Requirements & Grant Eligibility
- Review of Scope of Work & Schedule –MAPC
- Questions & Discussion – Local issues & Priorities

10:50 GETTING STARTED: MAPPING AND CRITICAL FACILITIES DATABASE FOR THE SOUTH SHORE PLAN UPDATE

- Chris Brown, GIS Analyst, MAPC

11:15 NEXT STEPS / ADJOURN

If you have any questions please contact Martin Pillsbury at MAPC:
617-451-2770, ext. 2012 or mpillsbury@mapc.org

Meeting Agenda
Local Multiple Hazard Community Planning Team
Hingham, MA

October 6, 2011
Hingham Town Hall

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1) Overview of Project Scope and Status

2) Introduce Town of Hingham Hazard Mitigation Planning Map Series and Digitized Ortho Photo Map. Identify:
   a) Flood Hazard Areas
      (incl. areas with concentration of repetitive loss properties)
   b) Fire Hazard Areas
      (incl. approximate number of annual wildfires and recent incidences that resulted in property damage)
   c) Future Potential Development Areas
   d) Historical, Cultural or Natural Resource Areas
   e) Dams (incl. type and ownership)

3) Review and Assess Plan Goals (see over)

4) Discuss Public Involvement and Outreach (see over)

5) Set Date for Next Meeting to:
   a) Review Existing Mitigation Measures
   b) Review Mitigation Measures from the 2005 Plan
   c) Discuss Potential Mitigation Measures
   d) Prioritize Mitigation Measures

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Braintree, Cohasset, Hingham, Hull, Marshfield, Milton, Quincy, Hingham, Scituate, and Weymouth. MAPC is working with the ten communities to update plans to mitigate potential damages of natural hazards such as floods, winter storms, hurricanes, earthquakes, and wild fires, before such hazards occur. The federal *Disaster Mitigation Act of 2000* requires that all municipalities adopt a *Pre-Disaster Mitigation Plan* for natural hazards and update those plans every five years, in order to remain eligible for FEMA Hazard Mitigation Grants.

This FEMA planning program is separate from new or ongoing homeland security initiatives, and is focused solely on addressing natural hazards, although some of the data collected for this plan may be useful for other aspects of emergency planning as well.

Public Participation

1. MAPC presents at 2 public meeting
2. Post on Town/City website with a set public review period.
3. Distribute to specified organizations or boards/commissions for their review.

2005 Goals

1. Ensure that critical infrastructure sites are protected from natural hazards.

2. Protect existing residential and business areas from flooding.

3. Maintain existing mitigation infrastructure in good condition.

4. Continue to enforce existing zoning and building regulations.

5. Educate the public about zoning and building regulations, particularly with regard to changes in regulations that may affect tear-downs and new construction.

6. Work with surrounding communities to ensure regional cooperation and solutions for hazards affecting multiple communities such as coastal erosion.

7. Encourage future development in areas that are not prone to natural hazards.

8. Educate the public about natural hazards and mitigation measures.

9. Make efficient use of public funds for hazard mitigation.

10. Prepare to respond to various natural hazard events.

Meeting Agenda
Local Multiple Hazard Community Planning Team
Hingham, MA

July 9, 2012 and July 16, 2012

1:00 PM – 4:00 PM
Hingham Town Hall

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a. Review Existing Mitigation Measures

b. Review Mitigation Measures from the 2005 Hazard Mitigation Plan.

Flood Hazard Mitigation Measures

- Update Zoning:
- Update Subdivision Regulations:
- Adoption of a Stormwater By-law:
- Roadway Elevation:
- Dam Improvements
- Catch-Basin Cleaning Schedule:
- Stream Clearing
- Seawall repairs
- Other Measure(s)

Measures to Ensure Compliance with NFIP

- Floodplain Management:
- Floodplain Mapping:
- Acquisition of Vacant Flood Prone Lands
- Other Measure(s):

Wind Hazard Mitigation Measures

- Treework:
- Other Measure(s):

Winter Storm Hazard Mitigation Measures

- Other Measure(s):

Geologic Hazard Mitigation Measures

- Other Measure(s):

Other Natural Hazards (e.g., Brush Fire)

- Other Measure(s)

Multi-Hazard Mitigation Measures

- Emergency Power Generators
- Update Open Space Plan
- Update Town Master Plan
- GIS and Networked Computers
- Retrofit Public Buildings
- Information Brochures
- Public Education
- Other Measure(s):

c. Discuss New Potential Mitigation Measures and Priorities

d. Discuss Plan Implementation and Maintenance

e. Discuss Review of Draft and Final Review for Submission

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Braintree, Cohasset, Hingham, Hull, Marshfield, Milton, Quincy, Hingham, Scituate, and Weymouth. MAPC is working with the ten communities to update plans to mitigate potential damages of natural hazards such as floods, winter storms, hurricanes, earthquakes, and wild fires, before such hazards occur. The federal *Disaster Mitigation Act of 2000* requires that all municipalities adopt a *Pre-Disaster Mitigation Plan* for natural hazards and update those plans every five years, in order to remain eligible for FEMA Hazard Mitigation Grants.

This FEMA planning program is separate from new or ongoing homeland security initiatives, and is focused solely on addressing natural hazards, although some of the data collected for this plan may be useful for other aspects of emergency planning as well.

APPENDIX B
HAZARD MAPPING

The MAPC GIS (Geographic Information Systems) Lab produced a series of maps for each community. Some of the data came from the Northeast States Emergency Consortium (NESEC). More information on NESEC can be found at http://www.serve.com/NESEC/. Due to the various sources for the data and varying levels of accuracy, the identification of an area as being in one of the hazard categories must be considered as a general classification that should always be supplemented with more local knowledge. The documentation for some of the hazard maps was incomplete as well.

The map series consists of four panels with two maps each plus one map taken from the State Hazard Mitigation Plan.

Map 1.	Population Density
Map 2.	Potential Development
Map 3.	Flood Zones
Map 4.	Earthquakes and Landslides
Map 5.	Hurricanes and Tornadoes
Map 6.	Average Snowfall
Map 7.	Composite Natural Hazards
Map 8.	Hazard Areas

Reduced-scale copies of the map series are included in this Appendix for general reference. Full sized higher resolution PDF's of the Hingham maps can be downloaded from the MAPC File Transfer Protocol (FTP) website:

ftp://ftp.mapc.org/Hazard_Mitigation_Plans/maps/Hingham/

Map1: Population Density – This map uses the US Census block data for 2010 and shows population density as the number of people per acre in seven categories with 60 or more people per acre representing the highest density areas.

Map 2: Development – This map shows potential future developments, and critical infrastructure sites. MAPC consulted with Town staff to determine areas that were likely to be developed or redeveloped in the future. The map also depicts current land use.

Map 3: Flood Zones – The map of flood zones used the FEMA NFIP Flood Zones as depicted on the FIRMs (Federal Insurance Rate Maps) as its source. At the time this plan was developed, these flood zones had not yet been officially adopted and were therefore considered draft. This map is not intended for use in determining whether or not a specific property is located within a FEMA NFIP flood zone. The currently adopted

FIRMS for Hingham are kept by the Town. For more information, refer to the FEMA Map Service Center website http://www.msc.fema.gov. The definitions of the flood zones are described in detail on this site as well. The flood zone map for each community also shows critical infrastructure and repetitive loss areas.

Map 4: Earthquakes and Landslides **–** This information came from NESEC. For most communities, there was no data for earthquakes because only the epicenters of an earthquake are mapped.

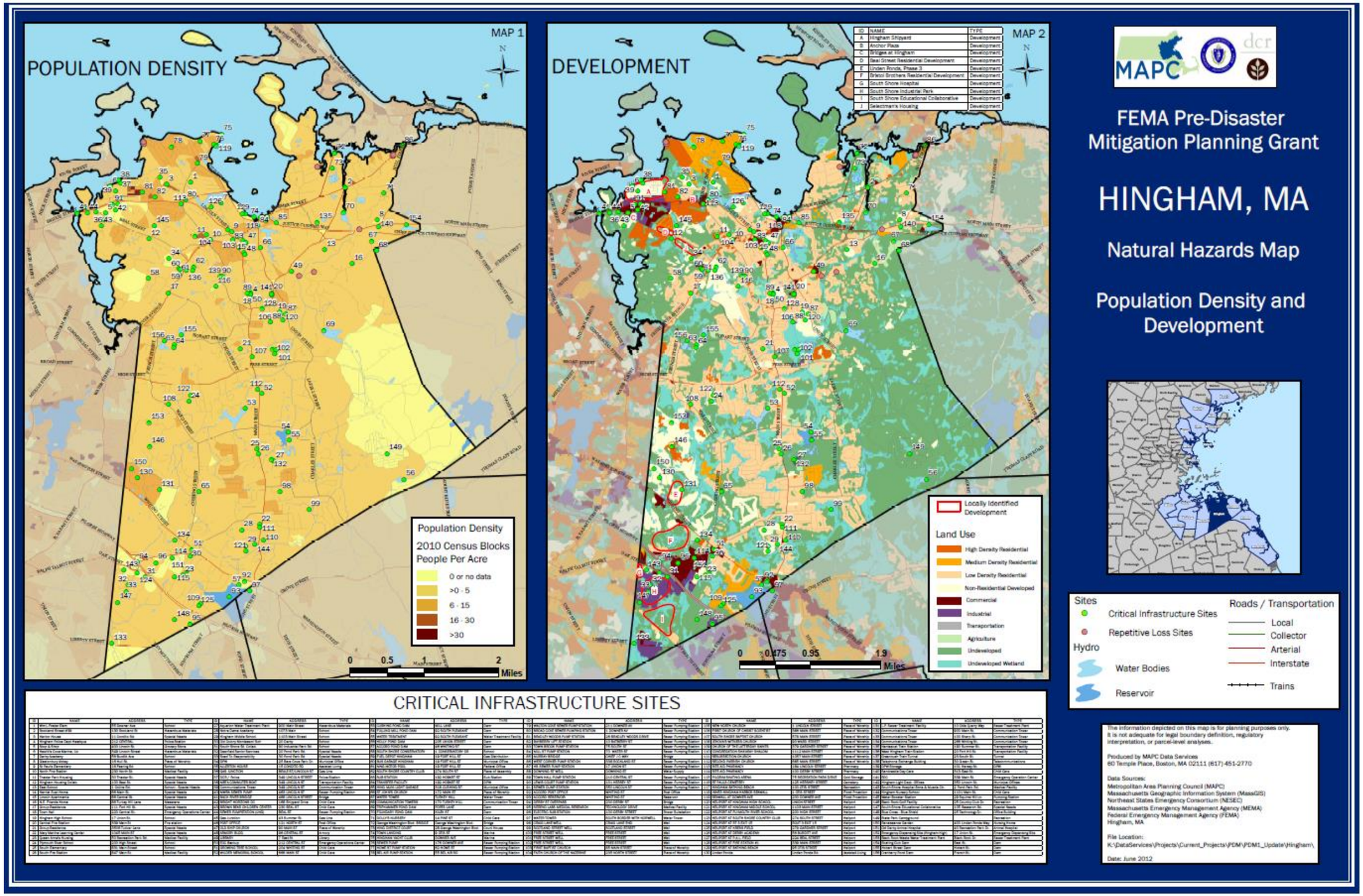
The landslide information shows areas with either a low susceptibility or a moderate susceptibility to landslides based on mapping of geological formations. This mapping is highly general in nature. For more information on how landslide susceptibility was mapped, refer to http://pubs.usgs.gov/pp/p1183/pp1183.html.

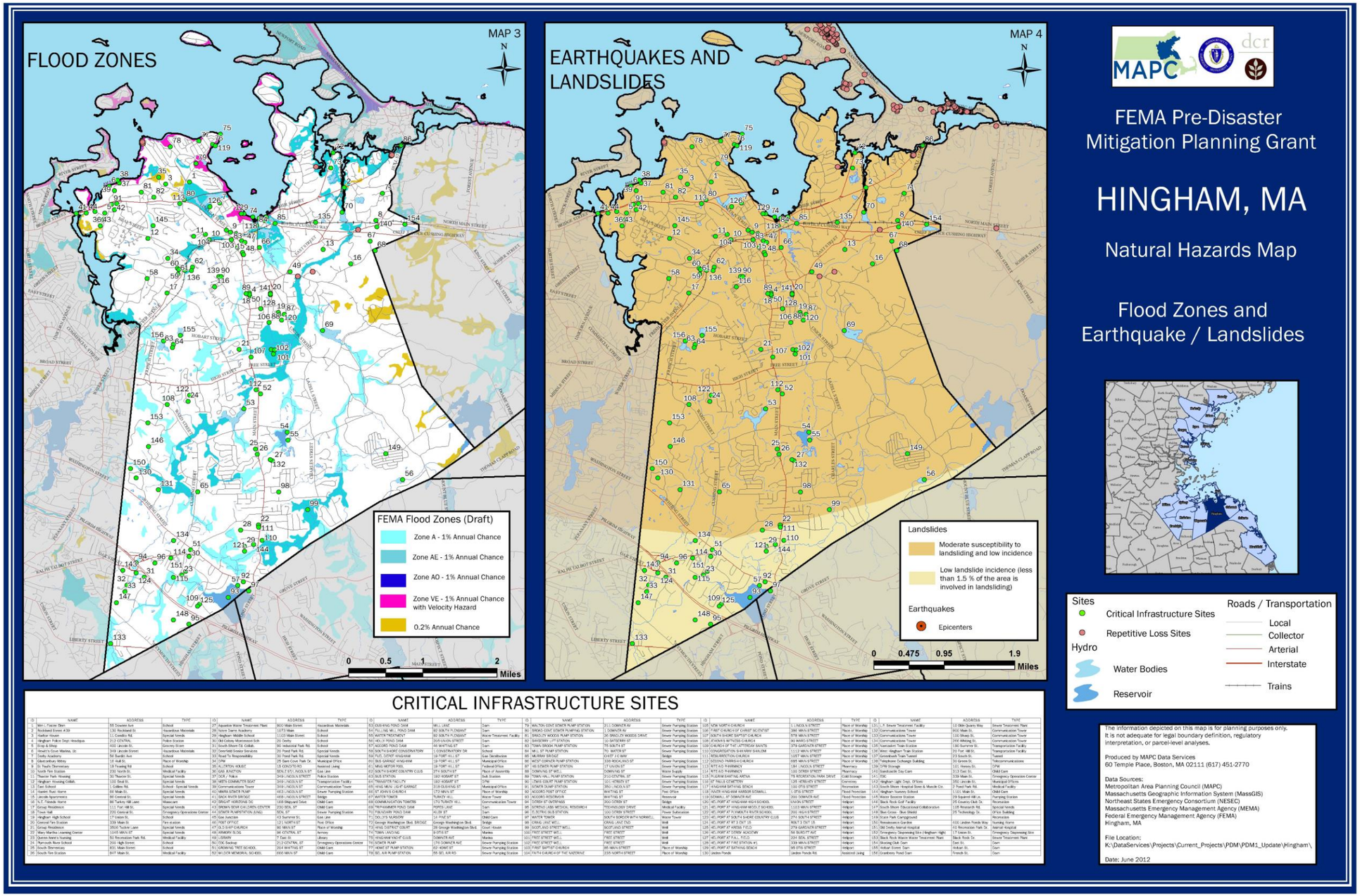
Map 5: Hurricanes and Tornadoes **–** This map shows a number of different items. The map includes the storm tracks for both hurricanes and tropical storms. This information must be viewed in context. A storm track only shows where the eye of the storm passed through. In most cases, the effects of the wind and rain from these storms were felt in other communities even if the track was not within that community. This map also shows the location of tornadoes with a classification as to the level of damages. What appears on the map varies by community since not all communities experience the same wind-related events. These maps also show the 100 year wind speed.

Map 6: Average Snowfall **- -** This map shows the average snowfall and open space. It also shows storm tracks for nor'easters, if any storms tracked through the community.

Map 7: Composite Natural Hazards **-** This map shows four categories of composite natural hazards for areas of existing development. The hazards included in this map are 100 year wind speeds of 110 mph or higher, low and moderate landslide risk, FEMA Q3 flood zones (100 year and 500 year) and hurricane surge inundation areas. Areas with only one hazard were considered to be low hazard areas. Moderate areas have two of the hazards present. High hazard areas have three hazards present and severe hazard areas have four hazards present.

Map 8: Hazard Areas **–** For each community, locally identified hazard areas are overlaid on an aerial photograph dated April, 2008. The critical infrastructure sites are also shown. The source of the aerial photograph is Mass GIS.


MAP 1
POPULATION DENSITY
N
Population Density
2010 Census Blocks
People Per Acre
0 or no data
>0 - 5
6 - 15
16 - 30
>30
0 0.5 1 2
Miles
MAP 2
DEVELOPMENT
N
Locally Identified Development
Land Use
High Density Residential
Medium Density Residential
Low Density Residential
Non-Residential Developed
Commercial
Industrial
Transportation
Agriculture
Undeveloped
Undeveloped Wetland
0 0.475 0.95 1.9
Miles
MAPC
dcr
FEMA Pre-Disaster Mitigation Planning Grant
HINGHAM, MA
Natural Hazards Map
Population Density and Development
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
Local
Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES
The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.
Produced by MAPC Data Services
60 Temple Place, Boston, MA 02111 (617) 451-2770
Data Sources:
Metropolitan Area Planning Council (MAPC)
Massachusetts Geographic Information System (MassGIS)
Northeast States Emergency Consortium (NESEC)
Massachusetts Emergency Management Agency (MEMA)
Federal Emergency Management Agency (FEMA)
Hingham, MA
File Location:
K:\DataServices\Projects\Current_Projects\PDM\PDM1_Update\Hingham\
Date: June 2012


FLOOD ZONES
MAP 3
N
FEMA Flood Zones (Draft)
Zone A - 1% Annual Chance
Zone AE - 1% Annual Chance
Zone AO - 1% Annual Chance
Zone VE - 1% Annual Chance with Velocity Hazard
0.2% Annual Chance
0 0.5 1 2
Miles
EARTHQUAKES AND LANDSLIDES
MAP 4
N
Landslides
Moderate susceptibility to landsliding and low incidence
Low landslide incidence (less than 1.5 % of the area is involved in landsliding)
Earthquakes
Epicenters
0 0.475 0.95 1.9
Miles
MAPC
dcr
FEMA Pre-Disaster Mitigation Planning Grant
HINGHAM, MA
Natural Hazards Map
Flood Zones and Earthquake / Landslides
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
Local
Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES
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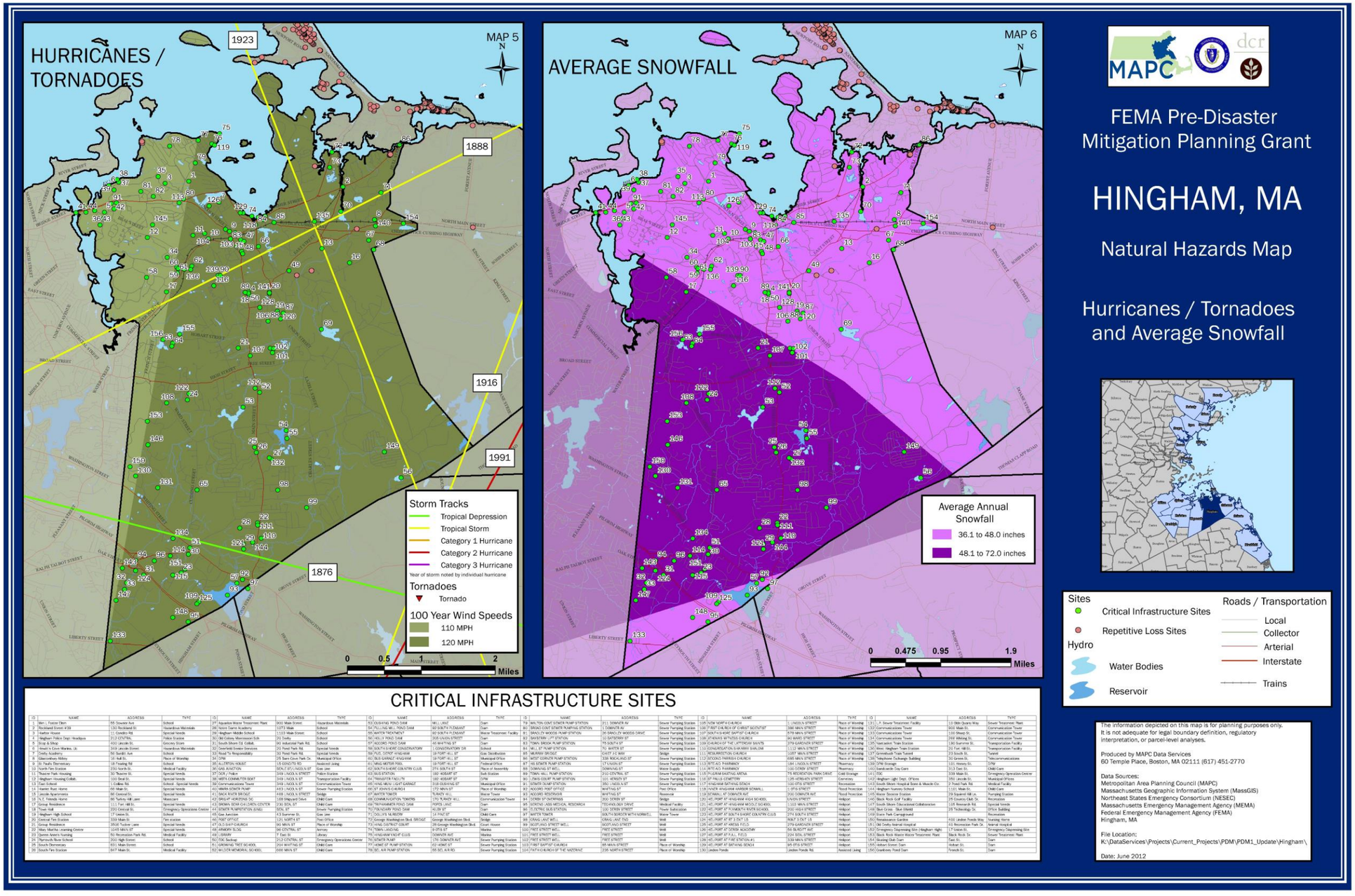
HURRICANES / TORNADOES
MAP 5
1923
1888
1916
1991
1876
Storm Tracks
Tropical Depression
Tropical Storm
Category 1 Hurricane
Category 2 Hurricane
Category 3 Hurricane
Year of storm noted by individual hurricane
Tornadoes
Tornado
100 Year Wind Speeds
110 MPH
120 MPH
0 0.5 1 2
Miles
AVERAGE SNOWFALL
MAP 6
Average Annual Snowfall
36.1 to 48.0 inches
48.1 to 72.0 inches
0 0.475 0.95 1.9
Miles
MAPC
dcr
FEMA Pre-Disaster Mitigation Planning Grant
HINGHAM, MA
Natural Hazards Map
Hurricanes / Tornadoes and Average Snowfall
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
Local
Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES
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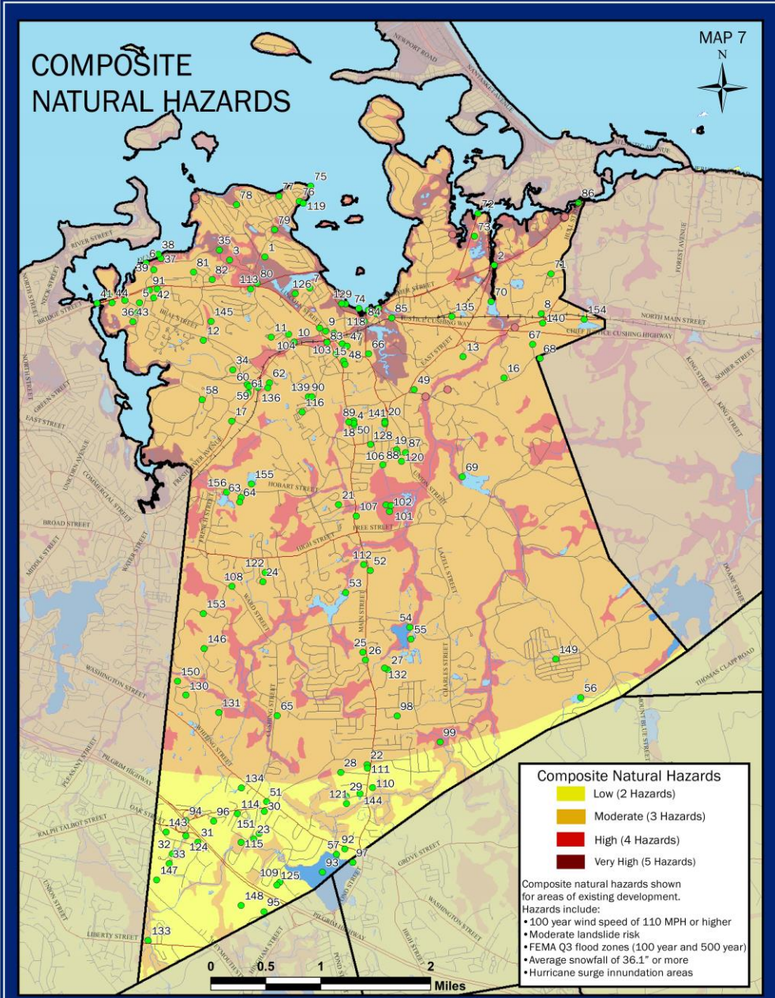

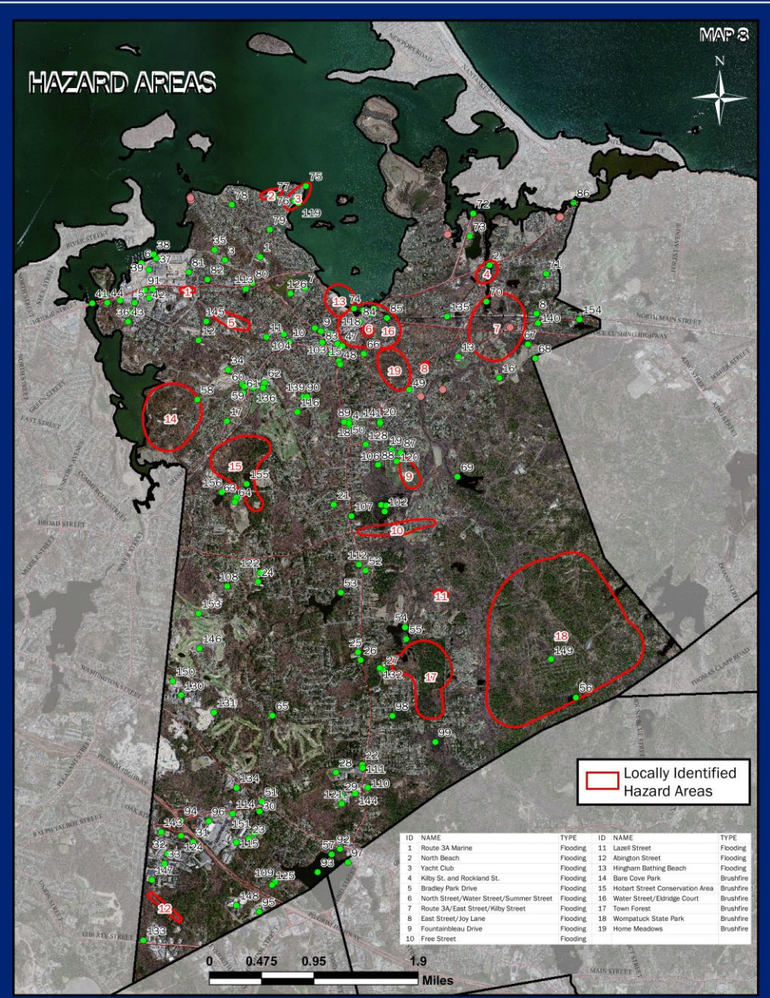

FEMA Pre-Disaster Mitigation Planning Grant

HINGHAM, MA

Natural Hazards Map

Composite Natural Hazards and Hazard Areas

Sites
- Critical Infrastructure Sites
- Repetitive Loss Sites

Hydro
- Water Bodies
- Reservoir

Roads / Transportation
- Local
- Collector
- Arterial
- Interstate
- Trains

CRITICAL INFRASTRUCTURE SITES

ID	NAME	ADDRESS	TYPE
1	Wm L Foster Elem	55 Downer Ave	School
2	Rockland Street #39	130 Rockland St	Hazardous Materials
3	Harbor House	11 Condito Rd.	Special Needs
4	Hingham Police Dept Headqua	212 CENTRAL	Police Station
5	Stop & Shop	400 Lincoln St.	Grocery Store
6	Hewitt's Cove Marina, Llc	349 Lincoln Street	Hazardous Materials
7	Derby Academy	56 Burditt Ave	School
8	Glastonbury Abbey	16 Hull St.	Place of Worship
9	St Paul's Elementary	18 Feering Rd	School
10	North Fire Station	230 North St.	Medical Facility
11	Thaxter Park Housing	30 Thaxter St.	Special Needs
12	Hingham Housing Colleb.	100 Beal St.	Special Needs
13	East School	1 Collins Rd.	School - Special Needs
14	Harriet Ruel Home	68 Main St.	Special Needs
15	Lincoln Apartments	86 Central St.	Special Needs
16	N.E. Friends Home	88 Turkey Hill Lane	Meaacare
17	Group Residence	111 Fort Hill St.	Special Needs
18	Town Hall	220 Central St.	Emergency Operations Center
19	Hingham High School	17 Union St.	School
20	Central Fire Station	339 Main St	Fire station
21	Group Residence	3506 Tucker Lane	Special Needs
22	Mary Martha Learning Center	1045 MAIN ST	Special Needs
23	Queen Anne's Nursing	50 Recreation Park Rd.	Medical Facility
24	Plymouth River School	200 High Street	School
25	South Elementary	831 Main Street	School
26	South Fire Station	847 Main St.	Medical Facility
27	Aquarion Water Treatment Plant	900 Main Street	Hazardous Materials
28	Notre Dame Academy	1073 Main	School
29	Hingham Middle School	1103 Main Street	School
30	Old Colony Montessori Sch	20 Derby	School
31	South Shore Ed. Collab.	90 Industrial Park Rd.	School
32	Deerfield Senior Services	20 Pond Park Rd.	Special Needs
33	Road To Responsibility	30 Pond Park Rd.	Special Needs
34	DPW	25 Bare Cove Park Dr.	Municipal Office
35	ALLERTON HOUSE	15 CONDITO RD	Assisted Living
36	GAS JUNCTION	BEALE ST/LINCOLN ST	Gas Line
37	DCR / Police	349 LINCOLN STREET	Police Station
38	MBTA COMMUTER BOAT	349 LINCOLN ST	Transportation Facility
39	Communications Tower	349 LINCOLN ST	Communication Tower
40	MWRA SEWER PUMP	463 LINCOLN ST	Sewer Pumping Station
41	BACK RIVER BRIDGE	468 LINCOLN STREET	Bridge
42	BRIGHT HORIZONS DC	168 Shipyard Drive	Child Care
43	BROWN BEAR CHILDREN CENTER	230 BEAL ST	Child Care
44	SEWER PUMPSTATION (UNG)	BEAL ST	Sewer Pumping Station
45	Gas Junction	43 Summer St.	Gas Line
46	POST OFFICE	121 NORTH ST	Post Office
47	OLD SHIP CHURCH	90 MAIN ST	Place of Worship
48	ARMORY BLDG	96 CENTRAL ST	Armory
49	LIBRARY	7 East St	Library
50	EOC Backup	212 CENTRAL ST	Emergency Operations Center
51	GROWING TREE SCHOOL	204 WHITING ST	Child Care
52	WILDER MEMORIAL SCHOOL	666 MAIN ST	Child Care
53	CUSHING POND DAM	MILL LN	Dam
54	FULLING MILL POND DAM	92 SOUTH PLEASANT	Dam
55	WATER TREATMENT	92 SOUTH PLEASANT	Water Treatment Facility
56	HOLLY POND DAM	205 UNION STREET	Dam
57	ACCORD POND DAM	46 WHITING ST	Dam
58	SOUTH SHORE CONSERVATORY	1 CONSERVATORY DR	School
59	FUEL DEPOT HINGHAM	19 FORT HILL ST	Bridge
60	BUS GARAGE HINGHAM	19 FORT HILL ST	Municipal Office
61	MNG MOTOR POOL	19 FORT HILL ST	Federal Office
62	SOUTH SHORE COUNTRY CLUB	274 SOUTH ST	Place of Assembly
63	SUB STATION	192 HOBART ST	Sub Station
64	TRANSFER FACILITY	192 HOBART ST	DPW
65	HING MUNI LIGHT GARAGE	318 CUSHING ST	Municipal Office
66	ST JOHN'S CHURCH	172 MAIN ST	Place of Worship
67	WATER TOWER	TURKEY HILL	Water Tower
68	COMMUNICATION TOWERS	170 TURKEY HILL	Communication Tower
69	TRIPHAMMER POND DAM	POPES LANE	Dam
70	FOUNDARY POND DAM	KILBY ST	Dam
71	DOLLY'S NURSERY	14 PINE ST	Child Care
72	George Washington Blvd. BRIDGE	George Washington Blvd.	Bridge
73	HING DISTRICT COURT	28 George Washington Blvd.	Court House
74	TOWN LANDING	9 OTIS ST	Marina
75	HINGHAM YACHT CLUB	DOWNER AVE	Marina
76	SEWER PUMP	176 DOWNER AVE	Sewer Pumping Station
77	HOME ST PUMP STATION	62 HOME ST	Sewer Pumping Station
78	BEL AIR PUMP STATION	55 BEL AIR RD	Sewer Pumping Station
79	WALTON COVE SEWER PUMP STATION	211 DOWNER AV	Sewer Pumping Station
80	BROAD COVE SEWER PUMPING STATION	1 DOWNER AV	Sewer Pumping Station
81	BRADLEY WOODS PUMP STATION	26 BRADLEY WOODS DRIVE	Sewer Pumping Station
82	BAYBERRY LIFT STATION	10 BAYBERRY ST	Sewer Pumping Station
83	TOWN BROOK PUMP STATION	75 SOUTH ST	Sewer Pumping Station
84	MILL ST PUMP STATION	70 WATER ST	Sewer Pumping Station
85	MURRAY BRIDGE	CHIEF J C WAY	Bridge
86	WEST CORNER PUMP STATION	338 ROCKLAND ST	Sewer Pumping Station
87	HS SEWER PUMP STATION	17 UNION ST	Sewer Pumping Station
88	DOWNING ST WELL	DOWNING ST	Sewer Pumping Station
89	TOWN HALL PUMP STATION	210 CENTRAL ST	Sewer Pumping Station
90	LEWIS COURT PUMP STATION	101 HERSEY ST	Sewer Pumping Station
91	SEWER DUMP STATION	350 LINCOLN ST	Sewer Pumping Station
92	ACCORD POST OFFICE	WHITING ST	Post Office
93	ACCORD RESERVOIR	WHITING ST	Reservoir
94	DERBY ST OVERPASS	200 DERBY ST	Bridge
95	SERENO LABS MEDICAL RESEARCH	TECHNOLOGY DRIVE	Medical Facility
96	ELECTRIC SUB STATION	100 DERBY STREET	Power Substation
97	WATER TOWER	SOUTH BORDER WITH NORWELL	Water Tower
98	CRAIG LANE WELL	CRAIG LANE END	Well
99	SCOTLAND STREET WELL	SCOTLAND STREET	Well
100	FREE STREET WELL	FREE STREET	Well
101	FREE STREET WELL	FREE STREET	Well
102	FREE STREET WELL	FREE STREET	Well
103	FIRST BAPTIST CHURCH	85 MAIN STREET	Place of Worship
104	FAITH CHURCH OF THE NAZERNE	235 NORTH STREET	Place of Worship
105	NEW NORTH CHURCH	1 LINCOLN STREET	Place of Worship
106	FIRST CHURCH OF CHRIST SCIENTIST	386 MAIN STREET	Place of Worship
107	SOUTH SHORE BAPTIST CHURCH	578 MAIN STREET	Place of Worship
108	JEHOVA'S WITNESS CHURCH	90 WARD STREET	Place of Worship
109	CHURCH OF THE LATTERDAY SAINTS	379 GARDNER STREET	Place of Worship
110	CONGREGATION SHAARAY SHALOM	1112 MAIN STREET	Place of Worship
111	RESURRECTION CHURCH	1057 MAIN STREET	Place of Worship
112	SECOND PARRISH CHURCH	685 MAIN STREET	Place of Worship
113	RITE AID PHARMACY	184 LINCOLN STREET	Pharmacy
114	RITE AID PHARMACY	100 DERBY STREET	Pharmacy
115	PILGRIM SKATING ARENA	75 RECREATION PARK DRIVE	Cold Storage
116	ST PAULS CEMETERY	125 HERSHEY STREET	Cemetery
117	HINGHAM BATHING BEACH	100 OTIS STREET	Recreation
118	INNER HINGHAM HARBOR SEAWALL	1 OTIS STREET	Fixed Proection
119	SEAWALL AT DOWNER AVE	200 DOWNER AVE	Fixed Proection
120	HELIPORT AT HINGHAM HIGH SCHOOL	LINCOLN STREET	Heliport
121	HELIPORT AT HINGHAM MIDDLE SCHOOL	1103 MAIN STREET	Heliport
122	HELIPORT AT PLYMOUTH RIVER SCHOOL	200 HIGH STREET	Heliport
123	HELIPORT AT SOUTH SHORE COUNTRY CLUB	274 SOUTH STREET	Heliport
124	HELIPORT AT RT 3 EXIT 15	ROUT 3 EXIT 15	Heliport
125	HELIPORT AT KRESS FIELD	279 GARDNER STREET	Heliport
126	HELIPORT AT DERBY ACADEMY	56 BURDITT AVE	Heliport
127	HELIPORT AT FALL FIELD	224 BEAL STREET	Heliport
128	HELIPORT AT FIRE STATION #1	339 MAIN STREET	Heliport
129	HELIPORT AT BATHING BEACH	95 OTIS STREET	Heliport
130	Linden Ponds	Linden Ponds Rd.	Assisted Living
131	L.P. Sewer Treatment Facility	10 Otis Quarry Way	Sewer Treatment Plant
132	Communications Tower	900 Main St.	Communication Tower
133	Communications Tower	1000 Briarp St.	Communication Tower
134	Communications Tower	266 Whiting St.	Communication Tower
135	Narrasketr Train Station	190 Summer St.	Transportation Facility
136	West Hingham Train Station	20 Fort Hill St.	Transportation Facility
137	Greenbush Train Tunnel	23 South St.	Tunnel
138	Telephone Exchange Building	30 Green St.	Telecommunications
139	DPW Storage	101 Hersey St.	DPW
140	Sandcastle Day Care	324 East St.	Child Care
141	EOC	339 Main St.	Emergency Operation Center
142	Hingham Light Dept. Offices	950 Lincoln St.	Municipal Offices
143	South Shore Hospital Bone & Muscle Ctr.	2 Pond Park Rd.	Medical Facility
144	Hingham Nursery School	1101 Main St.	Child Care
145	Water Booster Station	29 Squirrel Hill Ln.	Pumping Station
146	Black Rock Golf Facility	25 Country Club Dr.	Recreation
147	South Shore Educational Collaborative	105 Research Rd.	Special Needs
148	Blue Cross - Blue Shield	25 Technology Dr.	Office Building
149	State Park Campground		Recreation
150	Renaissance Garden	400 Linden Ponds Way	Nursing Home
151	Old Derby Animal Hospital	40 Recreation Park Dr.	Animal Hospital
152	Emergency Dispensing Site (Hingham High	17 Union St.	Emergency Dispensing Site
153	Black Rock Waste Water Treatment Plant	Black Rock Dr.	Sewer Treatment Plant
154	Skating Club Dam	East St.	Dam
155	Hobart Street Dam	Hobart St.	Dam
156	Cranberry Pond Dam	French St.	Dam

ID	NAME	TYPE
1	Route 3A Marine	Flooding
2	North Beach	Flooding
3	Yacht Club	Flooding
4	Kilby St. and Rockland St.	Flooding
5	Bradley Park Drive	Flooding
6	North Street/Water Street/Summer Street	Flooding
7	Route 3A/East Street/Kilby Street	Flooding
8	East Street/Joy Lane	Flooding
9	Fountainbleau Drive	Flooding
10	Free Street	Flooding
11	Lazell Street	Flooding
12	Abington Street	Flooding
13	Hingham Bathing Beach	Flooding
14	Bare Cove Park	Brushfire
15	Hobart Street Conservation Area	Brushfire
16	Water Street/Eldridge Court	Brushfire
17	Town Forest	Brushfire
18	Wompatuck State Park	Brushfire
19	Home Meadows	Brushfire

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Hingham, MA

File Location:
K:\DataServices\Projects\Current_Projects\PDM\PDM1_Update\Hingham\

Date: June 2012

APPENDIX C
DOCUMENTATION OF PUBLIC PARTICIPATION

PLANNING BOARD AGENDA FOR MONDAY, NOVEMBER 28, 2011

7:00 PM Discussion of proposed changes to the Subdivision Rules and Regulations

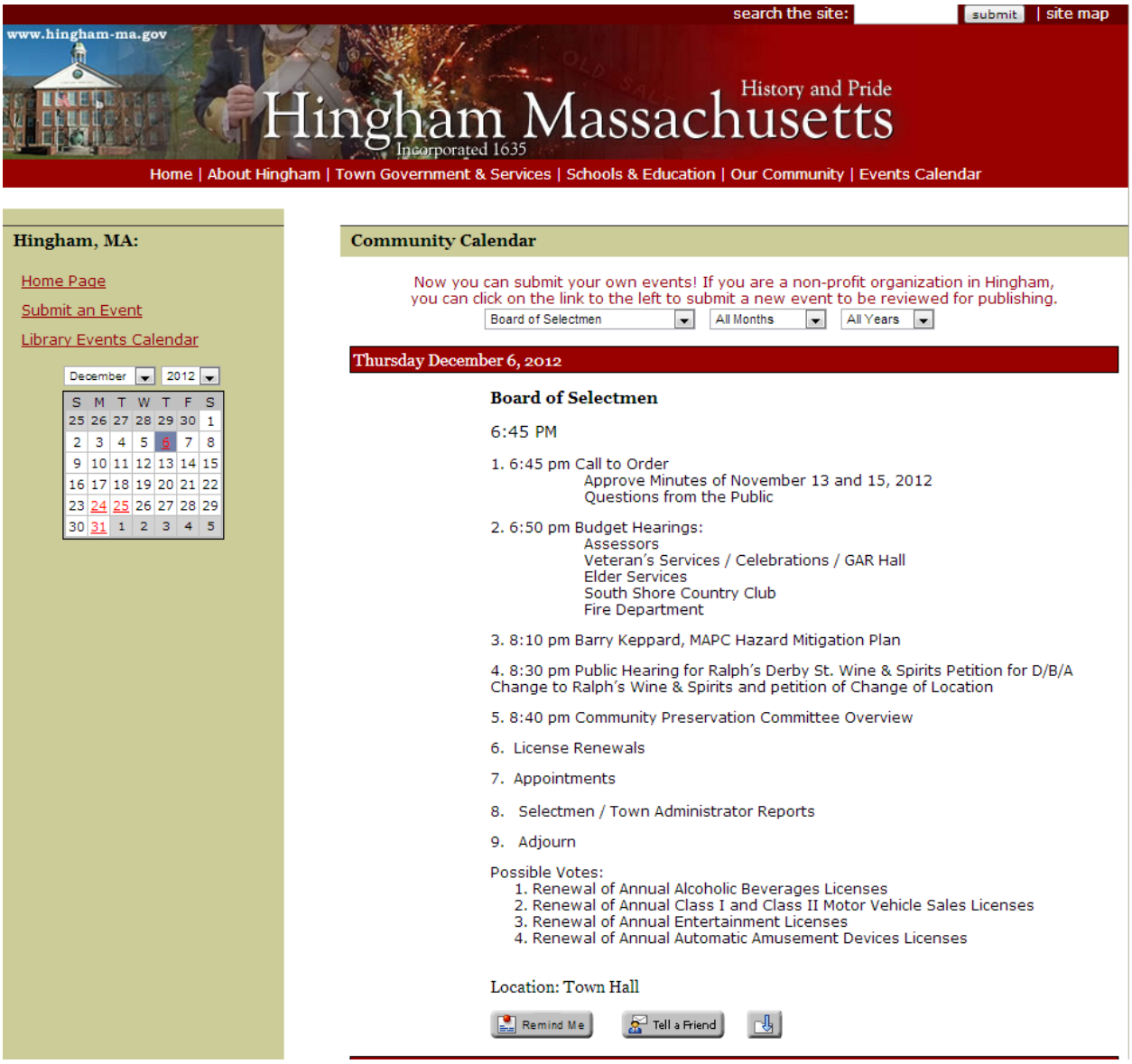
7:45 PM Review of Local Hazard Mitigation Plan with Barry Keppard (MAPC) and Discussion of CLURPA

8:15 PM Continuation of Public Hearing 987 Main Street
Request to Modify Approved 2-Lot Subdivision

Old/New Business

1. *Vote on proposed zoning amendments to submit to the Selectmen*
2. *Minutes of November 14, 2011*
3. *Form A-54 High Street (Scrivener's error correction)*
4. *Update on Baker Hill*

Location: Central North Hearing Room



search the site: submit | site map

www.hingham-ma.gov

History and Pride

Hingham Massachusetts

Incorporated 1635

Home | About Hingham | Town Government & Services | Schools & Education | Our Community | Events Calendar

Hingham, MA:

Home Page

Submit an Event

Library Events Calendar

December 2012

S	M	T	W	T	F	S
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Community Calendar

Now you can submit your own events! If you are a non-profit organization in Hingham, you can click on the link to the left to submit a new event to be reviewed for publishing.

Board of Selectmen | All Months | All Years

Thursday December 6, 2012

Board of Selectmen

6:45 PM

1. 6:45 pm Call to Order
   Approve Minutes of November 13 and 15, 2012
   Questions from the Public

2. 6:50 pm Budget Hearings:
   Assessors
   Veteran's Services / Celebrations / GAR Hall
   Elder Services
   South Shore Country Club
   Fire Department

3. 8:10 pm Barry Keppard, MAPC Hazard Mitigation Plan

4. 8:30 pm Public Hearing for Ralph's Derby St. Wine & Spirits Petition for D/B/A Change to Ralph's Wine & Spirits and petition of Change of Location

5. 8:40 pm Community Preservation Committee Overview

6. License Renewals

7. Appointments

8. Selectmen / Town Administrator Reports

9. Adjourn

Possible Votes:
1. Renewal of Annual Alcoholic Beverages Licenses
2. Renewal of Annual Class I and Class II Motor Vehicle Sales Licenses
3. Renewal of Annual Entertainment Licenses
4. Renewal of Annual Automatic Amusement Devices Licenses

Location: Town Hall

Remind Me | Tell a Friend

Public Comment solicitation Letter to Neighboring Municipalities

Subject: Draft Hingham Hazard Mitigation Plan

Greetings,

The Town of Hingham has been working on an update of the Hingham Hazard Mitigation Plan, a plan intended to reduce the Town's vulnerability to the impacts of natural hazard events such as flooding and hurricanes.

The plan identifies a set of hazard mitigation measures, which include structural improvements, regulatory changes for development in identified hazard areas, educational and outreach efforts related to natural hazards in the Town, and other actions. The Federal Emergency Management Agency (FEMA) requires that the Town have a FEMA approved hazard mitigation plan updated on a five year basis in order to qualify for various hazard mitigation grants that can be used to pay for measures identified in the plan.

We wanted to share with you that the final draft of the plan is available on the Town's website at http://www.hingham-ma.gov/em/documents/Hingham_DRAFTPLAN-December2012.pdf for review. Comments and questions may be submitted in writing to the Deputy Chief Robert Olsson, Hingham Fire Department, by March 15, 2013 in order to be considered for incorporation into the final draft of the plan that will be submitted to the Massachusetts Emergency Management Agency (MEMA) and FEMA.

Thank you,

Deputy Chief Robert Olsson
Hingham Fire Department

Sent to:

Organization	Name	Email
Town of Cohasset	Brian Joyce	Bjoyce@cohassetma.org
Town of Scituate	Laura Harbottle	Lharbottle@town.scituate.ma.us
Town Norwell	Chris Diiorio	cdiiorio@townofnorwell.net
Town of Rockland	Allan Chiocca	achiocca@rockland-ma.gov
Town of Weymouth	Bob Luongo	rluongo@weymouth.ma.us
Town of Hull	Robert Fultz	rfultz@town.hull.ma.us
Trustees of the Reservation	—	greaterboston@ttor.org
MA Office of Coastal Zone Management	Jason Burtner	jason.burtner@state.ma.us

APPENDIX D
DOCUMENTATION OF PLAN ADOPTION

TOWN OF HINGHAM
OFFICE OF SELECTMEN

Paul K. Healey, Chairman
Paul J. Gannon
Mary M. Power

Ted C. Alexiades
Town Administrator

CERTIFICATE OF ADOPTION
BOARD OF SELECTMEN
TOWN OF HINGHAM, MASSACHUSETTS

A RESOLUTION ADOPTING THE
TOWN OF HINGHAM HAZARD MITIGATION PLAN 2014 UPDATE

WHEREAS, the Town of Hingham established a Committee to prepare the Hazard Mitigation plan; and

WHEREAS, the *Town of Hingham Hazard Mitigation Plan 2014 Update* contains several potential future projects to mitigate potential impacts from natural hazards in the Town of Hingham, and

WHEREAS, a duly-noticed public meeting was held by the BOARD OF SELECTMEN ON DECEMBER 6, 2012, and

WHEREAS, the Town of Hingham authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and

NOW, THEREFORE BE IT RESOLVED that the Town of Hingham BOARD OF SELECTMEN adopts the *Town of Hingham Hazard Mitigation Plan 2014 Update*, in accordance with M.G.L. 40 §4 or the charter and bylaws of the Town of Hingham.

ADOPTED AND SIGNED this Date. May 5, 2016

Board of Selectmen