

City of Boston Natural Hazard Mitigation Plan

A Component Plan of Boston's Comprehensive Emergency Management Program



Draft 2014 Plan Update

Revised Draft for MEMA and FEMA Review

March 31, 2015

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ACKNOWLEDGEMENTS AND CREDITS

This Hazard Mitigation Plan update was prepared by the City of Boston with the assistance of 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 update was funded in part by the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP) and by the City of Boston.

Massachusetts Emergency Management Agency

Director: Kurt Schwartz

Department of Conservation and Recreation

Commissioner: Jack Murray

Boston Hazard Mitigation Executive Steering Committee

Rene Fielding	Mayor's Office of Emergency Management, Co-chair
Brian Swett	Office of Environmental and Energy Services, Co-chair
Chris Busch	Boston Redevelopment Authority
Aldo Ghirin	Boston Parks and Recreation
John Hanlon	Office of Budget Management, Capital Planning
Para Jayasinghe	Department of Public Works
Paul Shoemaker	Boston Public Health Commission
Carl Spector	Environment Department
John Sullivan	Boston Water and Sewer Commission

Credits

Boston Project Coordinator:	Elaine M. Sudanowicz
MAPC Project Manager:	Martin Pillsbury
MAPC Lead Planner:	James Freas
MAPC Mapping/GIS:	Susan Brunton Barry Fradkin
MAPC Planning Intern:	Sarah Danley

Social and Environmental	Seth Tuler
Research Institute (SERI)	Tom Webler Elizabeth Oriel

MAPC Officers

President:	Michelle Ciccolo
Vice President:	Lynn Duncan
Secretary:	Marilyn Contreras
Treasurer:	Taber Keally
Executive Director:	Marc. D. Draisen

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

CONTRIBUTORS

Chris Busch, Senior Waterfront Planner, Boston Redevelopment Authority

Emma DeSimone, Regional Catastrophic Planner, Mayor's Office of Emergency Management

Glenn Field, Warning Coordination Meteorologist, NOAA – National Weather Service, Taunton

Rene Fielding, Mayoral Cabinet Chief and Director, Mayor's Office of Emergency Management

Lynda Fraley, Risk Management, Office of Budget Management

Edward S. Fratto, Executive Director, Northeast States Emergency Consortium

Aldo Ghirin, Senior Planner, Boston Parks and Recreation

Sean Grady, Logistics Coordinator, Mayor's Office of Emergency Management

John Hanlon, Deputy Director, Capital Planning, Office of Budget Management

Loie Hayes, Coordinator, Boston Climate Action Network

Haidee Janak, Program Manager, Air Pollution Control Commission, Environment Department

Para Jayasinghe, P.E. Chief Engineer, Public Works Department

Christina Maryland, Director of Communications and External Affairs, Mayor's Office of Emergency Management

Paul Morey, Hurricane and Earthquake Program Manager, Risk Management Branch, FEMA Region 1

William Murtagh, Program Coordinator, NOAA - Space Weather Prediction Center, Boulder, Colorado

Stacey Schwartz, GIS Analyst, Mayor's Office of Emergency Management

Paul Shoemaker, Associate Director, Environmental Health Division, Boston Public Health Commission

Carl Spector, Executive Director, Air Pollution Control Commission, Environment Department

Elaine M. Sudanowicz, Interagency Coordinator – Mayor's Office of Emergency Management

John P. Sullivan, P.E. Chief Engineer – Boston Water and Sewer Commission

Brian Swett, Mayoral Cabinet Chief and Director, Mayor's Office of Environmental and Energy Services

Robert M. Thompson, Meteorologist-in-Charge, NOAA - National Weather Service, Taunton

Gregor Trinkaus-Randall, Preservation Specialist, Massachusetts Board of Library Commissioners and Co-Chair, Coordinated Statewide Emergency Preparedness (COSTEP-MA)

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

TABLE OF CONTENTS

Section #	Section	Page
I.	Executive Summary	1
II.	Introduction	7
III.	Planning Process and Public Participation	<u>19</u>
IV.	Risk Assessment	<u>25</u>
V.	Hazard Mitigation Goals	<u>91</u>
VI.	Hazard Mitigation Strategy	<u>93</u>
VII.	Plan Adoption and Maintenance	<u>143</u>
VIII.	List of References	<u>147</u>
<u>Appendix A</u>	<u>Climate Change Resiliency and Preparedness Checklist</u>	<u>153</u>
<u>Appendix B</u>	Report on VCAPS Working Groups	<u>163</u>
<u>Appendix C</u>	Hazard Mapping	<u>181</u>
<u>Appendix D</u>	Critical Facilities Inventory	<u>191</u>
<u>Appendix E</u>	Description of Faraday Cages	<u>293</u>
<u>Appendix F</u>	Meeting Agendas	<u>295</u>
<u>Appendix G</u>	Documentation of Public Participation	<u>311</u>
<u>Appendix H</u>	Documentation of Plan Adoption	<u>323</u>
<u>Appendix I</u>	Climate Ready Boston and Appendices	<u>325</u>

LIST OF FIGURES

Figure #	Figure Title	Page
1	New Development Projects under BRA Article 80 Review	14
<u>2</u>	<u>Boston Climate Change Preparedness and Resiliency Guidelines</u>	<u>18</u>
<u>3</u>	Change in Frequency of Extreme Downpours, 1948 - 2011	<u>27</u>
<u>4</u>	Boston Sea Level Rise Trends, 1920-2011	<u>28</u>
<u>5</u>	Boston Harbor and Vicinity Mean High Water Plus 7.5 Feet	<u>29</u>
<u>6</u>	Extreme Temperature Scenarios	<u>30</u>
<u>7</u>	<u>March 2010 Precipitation Measured at the Muddy River</u>	<u>33</u>
<u>8</u>	<u>Neponset River Gage Height, March-April 2010</u>	<u>34</u>
<u>9</u>	<u>Charles River Gage Height, March-April 2010</u>	<u>35</u>
<u>10</u>	<u>Mother Brook Gage Height, March 2010</u>	<u>36</u>
<u>11</u>	<u>Muddy River Gage Height, March 2010</u>	<u>36</u>
<u>12</u>	<u>Muddy River Elevation, December 9, 2010</u>	<u>39</u>
<u>13</u>	<u>Map of Coastal Structures in Boston Harbor</u>	<u>43</u>
<u>14</u>	Storm Surge, January 2, 2014	<u>48</u>
<u>15</u>	Wind Zones in the United States	<u>51</u>
<u>16</u>	Historic Hurricane Tracks	<u>54</u>
<u>17</u>	Maximum Wind Gusts, October 29, 2012 (Superstorm Sandy)	<u>56</u>
<u>18</u>	Tornado Risk by Month for the City Of Boston, MA (1950-2011)	<u>58</u>

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

<u>19</u>	Satellite Image of March 2013 Nor'easter	<u>60</u>
<u>20</u>	Northeast Earthquakes, 1/1/12 to 12/5/12	<u>69</u>
<u>21</u>	Boston Study Region Liquefaction Potential	<u>70</u>
<u>22</u>	Boston Study Region Soils	<u>70</u>
<u>23</u>	Observed Count of URM Buildings by Tract for Boston	<u>72</u>
<u>24</u>	Boston Property Parcels with Liquefaction Potential	<u>72</u>
<u>25</u>	Atlantic Based Tsunami Potential Threat	<u>74</u>
<u>26</u>	Atlantic Based Tsunami Travel Times	<u>76</u>
<u>27</u>	<u>Massachusetts Wildfires by Municipality</u>	<u>80</u>
<u>28</u>	Asian Longhorn Beetle Suppression Area in Boston	<u>85</u>
<u>29</u>	Boston Existing Urban Tree Canopy	<u>99</u>

LIST OF TABLES

Table #	Table Title	Page
1	Plan Review and Update	5
2	Previous Federal/State Disaster Declarations	8
3	FEMA and HUD Funded Mitigation Projects	9
4	Boston Demographic Characteristics	11
5	Boston Land Use	12
<u>6</u>	<u>New Developments in Boston 2005-2015</u>	<u>15</u>
<u>7</u>	<u>New Developments in Flood Hazard Zones</u>	<u>16</u>
<u>8</u>	Boston Executive Steering Committee	<u>22</u>
<u>9</u>	Hazard Risks Summary	<u>25</u>
<u>10</u>	Hazard Rating Assessment used in the Boston HIRA Report	<u>26</u>
<u>11</u>	Global Sea-Level Rise Scenarios	<u>28</u>
<u>12</u>	Historic Riverine Flood Events	<u>33</u>
<u>13</u>	Work Orders for Flood Events	<u>40</u>
<u>14</u>	Repetitive Loss Properties Summary	<u>41</u>
<u>15</u>	Coastal Flood/Storm Surge Records from NCDC	<u>42</u>
<u>16</u>	<u>Coastal Structure Type and Condition Rating</u>	<u>44</u>
<u>17</u>	<u>Coastal Structure Repair/Rehabilitation Costs</u>	<u>44</u>
<u>18</u>	<u>Coastal Structure Type and Condition Rating Definitions</u>	<u>45</u>
<u>19</u>	<u>Rates of Coastal Erosion, Short and Long Term</u>	<u>46</u>
<u>20</u>	<u>DCR Inventory of Dams</u>	<u>49</u>
<u>21</u>	Historic Hurricane Records	<u>53</u>
<u>22</u>	Hurricane Disaster Declarations	<u>54</u>
<u>23</u>	Blizzards and Severe Winter Storm Records	<u>63</u>
<u>24</u>	Historical Earthquakes, 1727-2012	<u>68</u>
<u>25</u>	<u>Landslide Intensity</u>	<u>73</u>
<u>26</u>	Extreme Temperatures in Boston, 2005-2010	<u>78</u>

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

<u>27</u>	Summary of Critical Facilities in Hazard Zones	<u>87</u>
<u>28</u>	Estimated Wind Damages from Hurricanes	<u>88</u>
<u>29</u>	Estimated Damages from Earthquakes	<u>89</u>
<u>30</u>	Estimated Damages from Flooding	<u>90</u>
<u>31</u>	Existing Mitigation Measures	<u>110</u>
<u>32</u>	Status of Mitigation Measures from the 2005 Plan	<u>122</u>
<u>33</u>	Other Mitigation Measures Not Included the 2008 Plan	<u>123</u>
<u>34</u>	Proposed Mitigation Measures	<u>126</u>
<u>35</u>	Prioritization of Proposed Mitigation Measure	<u>134</u>

|

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

I. EXECUTIVE SUMMARY

Hazard mitigation planning is a process that identifies actions to reduce the dangers to life and property from natural hazard events. This plan is a framework for the City of Boston's wide range of hazard mitigation efforts. This plan meets the guidelines for the hazard mitigation planning program administered by the Federal Emergency Management Agency (FEMA) in partnership with the Massachusetts Emergency Management Agency (MEMA) and the Department of Conservation and Recreation (DCR).

While cities are not required by FEMA to adopt hazard mitigation plans, the Federal Disaster Mitigation Act of 2000 requires all municipalities that wish to be eligible to receive FEMA hazard mitigation grants to adopt a local multi-hazard mitigation plan, and to update the plan every five years. Boston's first hazard mitigation plan was approved by FEMA in March 2008, and this 2014 Plan Update provides the first five-year update. An approved Hazard Mitigation Plan makes the City eligible for FEMA's Hazard Mitigation Grant Program, Flood Assistance Mitigation grants, and Pre-Disaster Mitigation Grants.

Planning Process

Planning for the Boston Hazard Mitigation Plan 2014 Update was led by the Boston Hazard Mitigation Executive Steering Committee, comprised of representatives of key City departments and commissions with responsibility for various aspects of hazard mitigation. The Executive Steering Committee was the main vehicle for coordinating input on all hazards to be addressed in this plan. The committee reviewed the types of impacts and the areas where natural hazards most affect the City, based on both historic trends and expected future impacts of climate change. The committee coordinated internal consultations between several City agencies, and organized a series of five workshops that were facilitated by the Social and Environmental Research Institute (SERI). The committee also established the City's goals for addressing these natural hazard impacts, and developed a list of proposed hazard mitigation measures.

Public participation in this planning process is important for improving awareness of the potential impacts of natural hazards, building support for the mitigation actions the City plans to take, and identifying additional potential impacts and actions. The City's public participation process included two public meetings hosted by the Boston Conservation Commission, the first on April 18, 2012, before the plan update was drafted, and the second on September 18, 2013, to provide an opportunity for comments on the draft plan update. In addition, the draft plan update was posted on the City's website for public review prior to the second public meeting. Direct outreach was also conducted with key institutions and state agencies. Any comments received were reviewed and incorporated by the local hazard mitigation team. Revisions to the draft plan included the addition of recommendations for multi-language public education, updating several city projects, and revising the priorities for mitigation for invasive insects, trees, and green infrastructure.

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

Risk Assessment

This 2014 Plan Update assesses the potential impacts to the City from multiple natural hazards, including flooding, high winds, winter storms, extreme heat, brush fire, and geologic hazards. Of these hazards, flooding presents the most historically widespread hazard to the City, but coastal storm damage and record breaking extreme heat events are of increasing concern given the recent and projected trends in changes to the climate.

The Executive Steering Committee, with members from all of the City's relevant departments and commissions, was the main vehicle for gathering local data on past and current trends for all natural hazards for the risk assessment. While historic trends in natural hazards are fully incorporated into this plan update, the City has taken steps to also take into consideration the potential future impacts of climate change. While not (yet) required by federal plan guidelines, given the City's commitment to addressing climate change through its *Boston Climate Action Plan* (2011), the Hazard Mitigation Executive Steering Committee established a strong priority for incorporating climate change considerations into this Hazard Mitigation Plan 2014 Update. The need for this approach is also reinforced at the state level by the recent adoption of the *Massachusetts Climate Adaptation Report* (2011). In assessing climate change issues for this plan update, the City drew upon the latest available scientific research, and made many relevant reports available on its web site (see Section VIII).

In order to assist Boston in the task of bringing climate change issues into its hazard mitigation plan update, the City and MAPC partnered with the Social and Environmental Research Institute (SERI). The City of Boston Office of Emergency Management organized a series of four collaborative stakeholder planning sessions on infrastructure, regulations, buildings and facilities, and public safety. The sessions used a unique methodology known as *Vulnerability-Consequence Adaptation Planning Scenarios* (VCAPS). Many of the insights gleaned from this process informed the plan update, and the details of these sessions are summarized in the document.

One of the key tools the City used to assess vulnerability was FEMA's HAZUS-MH program. The Mayor's Office of Emergency Management (OEM) asked MEMA for the Northeast States Emergency Consortium (NESEC) to conduct a HAZUS-MH Level II analysis of the City of Boston. The City collaborated with NESEC to implement HAZUS-MH with more locally specific data. The analyses provide a quantified estimate of the damages that would result from key natural hazard events in the City, although these analyses did not take climate projections into account.

The City of Boston invited the academic, scientific, and technical community to contribute ongoing research studies to the natural hazard mitigation planning process. The City took advantage of academic and research studies, such as the flood hydrology studies of Dr. Ellen Marie Douglas at UMASS Boston and earthquake studies by Dr. Laurie Baise, Tufts University and Dr. James Kaklamanos, Merrimack College. In addition the City has partnered with the US Army Corps of Engineers, which is conducting a Hurricane Evacuation Study that will delineate areas impacted by several hurricane scenarios.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Hazard Mitigation Goals

The Boston Hazard Mitigation Executive Committee established the following Hazard Mitigation Goals for the 2014 Plan Update:

Goal 1 Protect the health and safety of the public.

- Encourage people to be prepared before, during and after a hazard event.
- Ensure that services related to public health can function during and after a hazard, e.g., sanitation, water, debris removal, hospitals and emergency services.
- Ensure that evacuation can happen in an organized and efficient manner.
- Minimize secondary impacts from hazards, such as the release of pollutants. e.g., by covering salt piles.
- Promote public communications
- Establish a multi-cultural and multi-language public awareness program

Goal 2: Protect existing properties and structures.

- Provide resources for residents and businesses to make their buildings and properties more disaster resistant.
- Educate the public on measures they can take to protect their property.
- Maintain existing mitigation structures.
- Ensure that future development / redevelopment does not make existing properties more vulnerable to hazards.
- Ensure that critical facilities are protected from hazards.
- Protect natural areas to ensure that they buffer impacts to built areas during a natural disaster.
- Preserve and restore the functions of natural resource systems.

Goal 3: Ensure that essential services can function during and after a hazard event.

- Ensure that critical infrastructure is protected from natural hazards.
- Ensure that people (key service providers and employees) can get into the City to provide services.
- Ensure that interdepartmental communication is seamless.
- Maintain the Emergency Operations Plan (EOP) and supporting annexes.

Goal 4: Work regionally to mitigate impacts from natural hazards and to respond and recover from hazard events.

- Continue to participate in regional efforts.
- Cooperate with other agencies, communities, and private entities.
- Understand priorities and capabilities of other entities to allow for resource-sharing, mutual aid, and entering into memoranda of understanding (MOU).

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Goal 5: Determine priorities for directing resources for hazard mitigation and response.

- Prioritize mitigation projects.
- Continue to program mitigation projects in the Capital Investment Plan.
- Pursue various funding sources.
- Encourage private property-owners to implement measures to protect their own property.

Goal 6: Maintain Hazard Awareness.

- Track and compile hazard related data.
- Understand the potential implications of climate change on the frequency and extent of natural hazard events and incorporate that knowledge into hazard mitigation efforts.
- Maintain publicly available information on natural hazard risks in the City.
- Integrate hazard mitigation into other City initiatives and plans.

Hazard Mitigation Strategy

The Boston Hazard Mitigation Executive Steering Committee identified a number of mitigation measures that would serve to reduce the City's vulnerability to natural hazard events. Many of these are related to improving and maintaining the integrity of the drainage system through addressing maintenance and reconstruction issues. In keeping with the City's priorities for climate preparedness, there is also a strong emphasis on coastal damages and extreme heat. Efforts to increase public awareness are also an important component of the plan update.

The hazard mitigation strategy recognizes that our understanding of natural hazards and the steps that can be taken to mitigate their damages will change over time. Global climate change and the accompanying changes to sea level, average temperatures, and extreme events will increase the City's vulnerability in the future, and local officials will work together across municipal lines and with state and federal agencies, institutions, and the business community in order to understand and address these challenges.

To support this work in October 2013 the City of Boston released *Climate Ready Boston: Municipal Vulnerability to Climate Change*, the report of the Mayor's Climate Preparedness Task Force examining the preparedness of municipal facilities, operations, services, and policies for the effects of climate change. Individual departments identified vulnerabilities, established priorities, and planned next steps. The appendices to this report contain prioritized actions targeted to the City's agencies, including: Administration and Finance, Boston Centers for Youth & Families, Boston Housing Authority, Boston Public Health Commission, Department of Innovation and Technology, Property Management, Public Works Department, Boston Police Department, Boston Public Schools, Boston Redevelopment Authority, Boston Transportation Department, Housing and Neighborhood Development, Environment Department, Office of Food Initiatives, Inspectional Services Department, Office of

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Emergency Management, and the Parks & Recreation Department. The report with appendices is attached to this Hazard Mitigation Plan Update as Attachment H.

Plan Review and Update Process

The major components of the plan review and update process are summarized in Table 1:

Boston has made progress on implementing mitigation measures identified in its 2008 Hazard Mitigation Plan. While some of the measures identified in that plan are complete, others still require the identification of funding source to support construction, equipment, and additional manpower. Moving forward into the next five year implementation period, there will be additional opportunities to incorporate hazard mitigation into the City's decision making processes.

Table 1 Plan Review and Update

Chapter	Reviews and Updates
III – Public Participation	The Boston Hazard Mitigation Executive Steering Committee placed an emphasis on public participation for the update of the Hazard Mitigation Plan, discussing strategies to enhance participation opportunities at its first meeting and identifying key stakeholders. During plan development, the plan was discussed at two public meetings hosted by the Conservation Commission. The draft plan update was also available on the City's website for public comment.
IV – Risk Assessment	MAPC gathered the most recently available hazard data and met with City staff to identify changes in local hazards. City department heads and staff reviewed critical infrastructure in order to create an up-to-date list. The City used the most recently available version of HAZUS and implemented it with enhanced local data with the help of NESEC. The impacts of climate change and potential mitigation were explored in a series of stakeholder workshops organized by the Social and Environmental Research Institute.
V - Goals	The Hazard Mitigation Goals were reviewed and endorsed by the Boston Hazard Mitigation Executive Steering Committee.
VI – Hazard Mitigation Strategy	The list of existing mitigation measures was updated to reflect their current status as well as to add new mitigation activities in the City since adoption of the previous plan. Recommended mitigation measures from the 2008 plan were reviewed and assessed as to whether they were completed, on-going, or deferred. The Boston Hazard Mitigation Executive Steering Committee determined whether to carry forward measures, modify them, or delete them for the 2014 plan update. The 2014 Hazard Mitigation Plan update also adds new mitigation measures. The Committee re-prioritized all of these measures based on current conditions.
VII – Plan Adoption and Maintenance	This section of the plan includes a process for on-going plan implementation that will assist the City in incorporating hazard mitigation into other municipal planning, budgeting, and regulatory programs. It also includes a five year update process that will better prepare the City to update the plan again in 2018.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

II. INTRODUCTION

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 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.

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.

Federal hazard mitigation planning and grant programs are administered by the Federal Emergency Management Agency (FEMA) in collaboration with the states. These programs are administered in Massachusetts by the Massachusetts Emergency Management Agency (MEMA) in partnership with the Department of Conservation and Recreation (DCR). Massachusetts has taken a regional approach to hazard mitigation planning and has engaged the regional planning agencies to provide technical assistance to help cities and towns prepare their plans. Under this program, the City of Boston prepared this plan with the technical assistance of the Metropolitan Area Planning Council (MAPC). MAPC is also providing assistance to seven other Inner Core communities to update their local Hazard Mitigation Plans, which were first adopted in 2008 as part of a Metro-Boston Multi Hazard Mitigation Plan. These local Hazard Mitigation Plan updates are designed to meet the requirements of the Disaster Mitigation Act for each community.

Federal/State Disaster Declarations

The City of Boston has experienced 21 natural hazard incidents that triggered federal or state disaster declarations since 1991. These are listed in Table 2 below. The majority of these events involved flooding.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 2 Previous Federal/State Disaster Declarations

DISASTER NAME (DATE OF EVENT)	TYPE OF FEDERAL ASSISTANCE PROVIDED	DECLARED AREAS IN MA
Hurricane Bob (August 1991)	FEMA Public Assistance Project Grants Hazard Mitigation Grant Program	Counties of Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
No-Name Storm (October 1991)	FEMA Public Assistance Project Grants FEMA Individual Household Program Hazard Mitigation Grant Program	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
March Blizzard (March 1993)	FEMA Public Assistance Project Grants	Statewide
January Blizzard (January 1996)	FEMA Public Assistance Project Grants	Statewide
October Flood (October 1996)	FEMA Public Assistance Project Grants FEMA Individual Household Program Hazard Mitigation Grant Program	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
June Flood (June 1998)	FEMA Individual Household Program Hazard Mitigation Grant Program Community Development Block Grant-HUD	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
South Boston Fire (Oct 29, 2000)	Small Business Administration	City of Boston
March Flood (March 2001)	FEMA Individual Household Program Hazard Mitigation Grant Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
Roxbury Fire (Jun 9, 2002)	Small Business Administration	City of Boston
February Snowstorm (Feb 17-18, 2003)	FEMA Public Assistance Project Grants	Statewide
January Blizzard (January 22-23, 2005)	FEMA Public Assistance Project Grants	Statewide
Hurricane Katrina (August 29, 2005)	FEMA Public Assistance Project Grants	Statewide
May Rainstorm/Flood (May 12-23, 2006)	Hazard Mitigation Grant Program	Statewide
April Nor'easter (April 15-27, 2007)	azard Mitigation Grant Program	Statewide

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

DISASTER NAME (DATE OF EVENT)	TYPE OF FEDERAL ASSISTANCE PROVIDED	DECLARED AREAS IN MA
Hyde Park Fire (Jan 5, 2008)	Small Business Administration	City of Boston
Fenway Business District Fire (January 6, 2009)	Small Business Administration	City of Boston
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
Tropical Storm Irene (August 27-28, 2011)	FEMA Public Assistance	Statewide
Hurricane Sandy (October 27-30, 2012)	FEMA Public Assistance	Barnstable, Bristol, Dukes, Nantucket, Plymouth, and Suffolk

Source: database provided by MEMA and the City of Boston

FEMA and HUD Funded Mitigation Projects

Over the last 20 years the City of Boston has received funding from FEMA and HUD for hazard mitigation projects in the Muddy River. These funds were from the Community Development Block Grant (CDBG) program and the Hazard Mitigation Grant Program (HMGP). This project totaled \$6,101,830 with \$4,342,715 covered by federal grants and \$1,239,547 by City funding. Project funding is summarized in Table 3.

Table 3 FEMA and HUD-Funded Mitigation Projects

Project Title (Funding Source)	Scope of Work	Total Cost	Federal Funding	City Funding
Muddy River Improvements – 2 projects (Community Development Block Grant)	Design and construction of improvements to the Muddy River in Boston and Brookline. Reduce future flooding along Muddy River.	\$3,103,643	\$2,583,643	\$490,000
Charlesgate Channel Improvements (Hazard Mitigation Grant Program)	Debris, accumulated sediment and other flow restrictions will be removed from a length of the Muddy River.	\$2,998,187	\$1,759,071	\$749,547

Source: Massachusetts Emergency Management Agency (MEMA)

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Community Profile

Boston was incorporated as a town in 1630 and then a city in 1822. Since its incorporation as a city, Boston has annexed six neighboring cities and towns to reach its current size of 49.55 square miles. The City is located in Suffolk County. The City has a mayor-council form of government. The City's website is at www.cityofboston.gov.

With a population in 2010 of 617,594, Boston is the largest city not only in Massachusetts, but in all six New England states, and the 21st largest city in the United States.

Boston is an economic focal point for Massachusetts as well as the greater New England Region, serving as a center for financial institutions, higher education and medical health services. A total of 561,126 people are employed in the City. The Boston economy constitutes 24% of the state's economy and 10% for all of New England. The Financial District is home to many nationally significant firms, the Longwood Medical Area has a regionally significant concentration of healthcare industry firms, South Boston is home to the newly established Innovation District with a growing roster of new high tech companies, and the colleges and universities all over the City are significant sources of jobs as well as important bases for the regional economy. The importance of the City's medical and educational facilities is substantial with twenty inpatient hospitals and twenty-five public health clinics providing over 110,000 health service jobs. Boston's thirty-two universities, colleges, graduate schools and community colleges have a combined enrollment of approximately 140,000 students, comprising 31% of the state's college students.

As the seat of state government, critical state and federal facilities are located in Boston. A number of Federal agencies also have offices in the City. These include: FEMA Region 1, Environmental Protection Agency Region 1, the U.S. Coast Guard, the Federal Bureau of Investigation, the Dept. of Housing and Urban Development, and many others.

In addition to the people who live and work in the City, Boston attracts an average of 12 million tourists annually from around the country and around the world. Major attractions include the Museum of Science, Museum of Fine Arts, Quincy Marketplace, Boston Convention and Exhibition Center, Hynes Auditorium, TD Boston Garden, numerous theaters, Fenway Park, and the Harbor Islands.

Boston is one of the oldest cities in the country and many events of historical significance occurred here and are marked by buildings and other features of national significance. These include large and well-known sites and structures such as the USS Constitution, famous burying grounds, the Paul Revere House, the Old State House, and Old North Church. But there are many smaller, lesser-known, but historically important sites scattered around the City.

The City is an at-large member on the Executive Board of a FEMA funded effort directed by the Coordinated Statewide Emergency Preparedness (COSTEP) to develop hazard

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

mitigation strategies for cultural sites, museums, and libraries statewide with considerable potential benefit for the many such institutions in Boston.

Boston also serves as the center of the region's transit system, with subway lines, commuter rail lines, bus service, ports and Logan International Airport. Logan International is the largest transportation center in New England. It handled over 28 million passengers and 600,000 flights in 2011, according to MASSPORT. Major ports operated by MASSPORT in Boston include the Port of Boston, Conley Terminal, Cruiseport and the Boston Autoport. Two interstates (I-90 and I-93) converge in Boston. A number of state routes also pass through Boston, including Routes 1, 2, 3, 9, 20, 28, and 30. The MBTA, MassDOT, Mass. Highway District 6, DCR, MWRA, and MASSPORT Authority participated in the process.

Boston's distinct neighborhoods have strong identities. For the purpose of this plan we refer to city neighborhoods as defined by the Boston Redevelopment Authority (BRA): Allston, Back Bay, Beacon Hill/West End, Brighton, Charlestown, Chinatown/Leather District, Dorchester, Downtown, East Boston, Fenway/Kenmore, Hyde Park, Jamaica Plain, Mattapan, Mission Hill, North End, Roslindale, Roxbury, South Boston, South End/Bay Village, and West Roxbury.

Boston borders 14 communities: Quincy, Milton, Canton, Dedham, Needham, Newton, Brookline, Watertown, Cambridge, Somerville, Everett, Chelsea, Revere, and Winthrop.

Population and Housing Characteristics

In 2010, the City's population was 617,594 and the number of housing units was 272,481 (see Tables 4A and 4B below). Ten percent of the population is over 65 years, and 22 percent have a disability.

Table 4A - Boston Characteristics, 2010

Population = 617,594

- 5.2% are under age 5
- 10.1% are over age 65
- 16.8% speak English less than "very well" (over age 5)
- 35.9% of households have no vehicle
- 21.9% have a disability (over age 5)
- 7.5% live in group quarters

Number of Housing Units = 272,481

- 66.1% are renter-occupied housing units
- 57.2% of housing units were built before 1940

Source: U.S. Census, 2010., 2006-2010 American Community Survey

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 4B - Boston Characteristics by Neighborhood (2010)

Neighborhood	Population	Pop. under age 5	Pop. over age 65	Pop. living in group quarters	Number of housing units	Renter-occupied units
Allston/Brighton	29,196	2.2%	3.6%	19.1%	11,095	87.1%
Back Bay	18,088	3.1%	11.3%	8.6%	12,266	67.0%
Bay Village	1,312	2.1%	21.3%	2.3%		
Beacon Hill	9,023	3.2%	10.4%	0.1%	6,013	66.3%
Charlestown	16,439	6.7%	10.2%	0.8%	8,648	53.7%
Chinatown	4,444				2,114	
Dorchester	114,235	6.9%	9.5%	1.1%	45,133	65.6%
Downtown	11,215	2.1%	11.8%	40.5%	5,390	62.0%
East Boston	40,508	7.6%	8.8%	0.6%	15,854	72.5%
Fenway	33,796	0.9%	4.6%	41.3%	12,836	90.9%
Hyde Park	30,637	5.8%	12.9%	1.0%	11,816	42.0%
Jamaica Plain	37,468	6.0%	10.6%	3.3%	16,797	55.6%
Mattapan	22,600	6.3%	11.9%	1.7%	9,150	60.2%
Mission Hill	16,305	3.2%	9.1%	9.4%	6,628	88.6%
North End	10,131	2.0%	12.8%	1.7%	6,728	75.1%
Roslindale	28,680	6.7%	12.1%	1.4%	11,927	50.0%
Roxbury	48,454	7.0%	9.1%	6.1%	20,005	80.4%
South Boston	33,311	4.4%	9.7%	5.9%	16,409	59.8%
S. Boston Waterfront	1,889	2.4%	3.2%	11.2%	1,214	62.3%
South End	24,577	4.9%	10.6%	3.9%	13,648	60.8%
West End	4,080	4.3%	16.6%	2.8%	2,896	76.2%
West Roxbury	30,446	7.0%	18.0%	2.2%	13,547	36.4%

Source: U.S. Census, 2010, prepared by BRA

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 5 shows the acreage and percentage of land in 10 categories. If the three residential categories are aggregated, residential uses make up 37.49% of the area of the City (3,192.78 acres).

Table 5 - Boston 2005 Land Use

Land Use Type	Acres	Percent
High Density Residential (>4 DU/acre)	1,1786.9	37.3%
Medium Density Residential (2 – 4 DU/acre)	565.33	1.79%
Low Density Residential (<2 DU/acre)	41.45	.13%
Non-Residential, Developed	6,350.3	20.09%
Commercial	3,302.61	10.45%
Industrial	1,311.02	4.15%
Transportation	3,419.21	10.82%
Agriculture	63	.2%
Undeveloped	3,157.25	9.99%
Undeveloped Wetland	1,604.48	5.08%
Total	31,601.54	100.00

Source: MacConnell Land Use, 2005, Mass. GIS

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Development Trends

Boston has a history of land reclamation. According the City's *Open Space Plan*, the City grew from 1,000 acres to 30,000 acres due to land reclamation and annexation. As a result, large areas of Boston are built on fill. As discussed later, the amount of filled land affects the City's vulnerability to certain natural hazards, particularly earthquakes.

While the City is essentially built out, there are a significant number of infill projects, redevelopments, and major renovations occurring citywide (see Figure 1). Boston's development and analysis for proposed future development is coordinated by the Boston Redevelopment Authority. Currently, one of the most active area of development in the City is the Innovation District in the South Boston waterfront.

Development trends throughout the metropolitan region are tracked by MAPC'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 285 developments in the City of Boston since 2005, of which 189 are completed and 96 were under construction as of March 2015. The geographic distribution of these projects by Boston neighborhoods is summarized in Table 6 (several adjacent neighborhoods have been combined). The neighborhoods with the most new commercial developments are the Fenway/Longwood Medical Area, South Boston/South Boston Waterfront, Chinatown/Downtown/North End/West End, and Back Bay/South End.

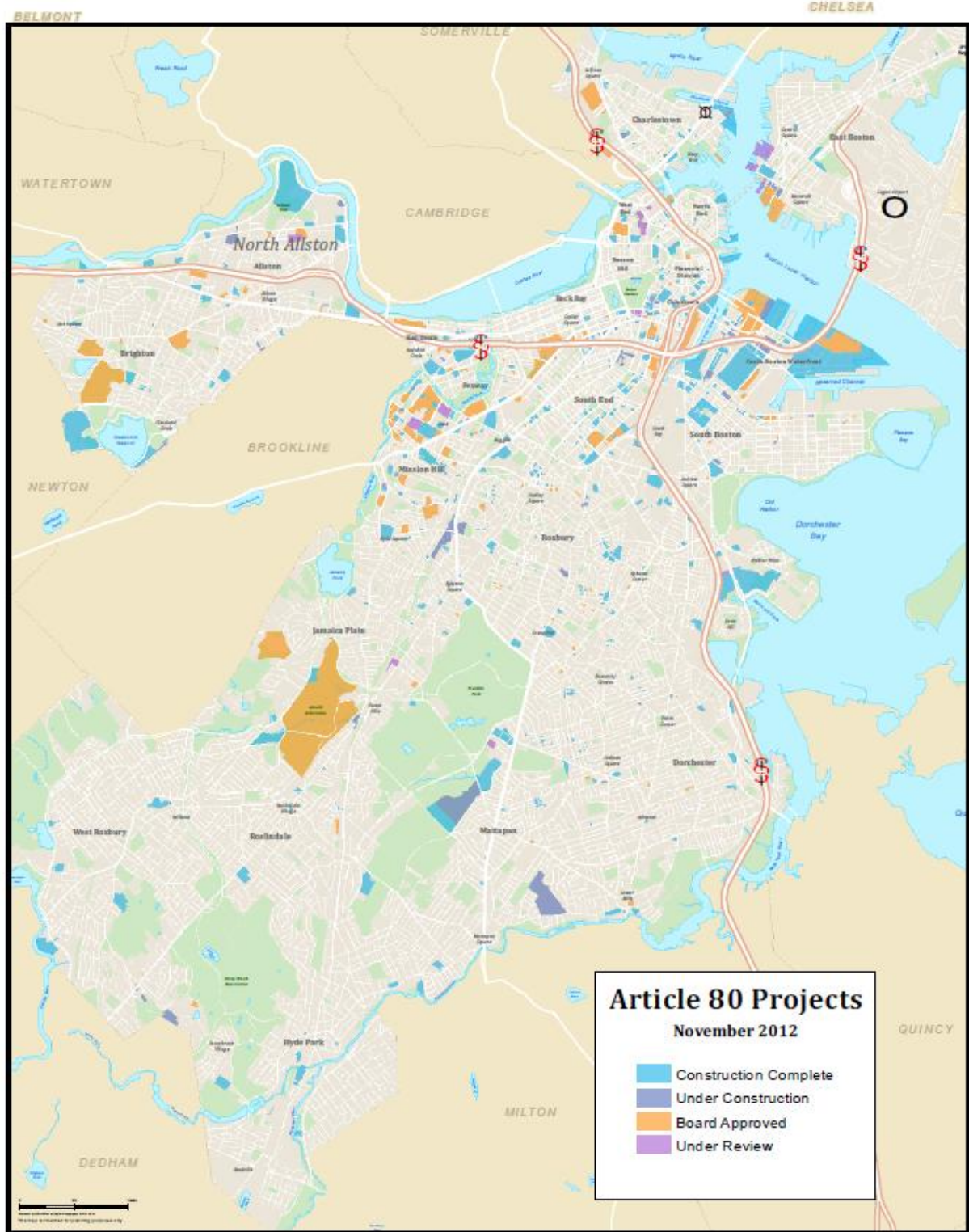
The database also includes several attributes of the new development, including acres, housing units, employment, commercial space, and hotel rooms. The 189 completed developments include a total 9,126 housing units, 9.5 million square feet of commercial space, and 1,458 hotel rooms. The projects currently under construction include 7,008 housing units, 8.3 million square feet of commercial space, and 909 hotel rooms.

Boston faces a number of challenges when addressing natural hazards. These include:

- Boston is an older, dense city with aging infrastructure and narrow streets.
- The City has a high amount of impervious surfaces.
- Boston has a large percentage of populations that may need special assistance during a natural disaster. Vulnerable populations may include those without cars, those that do not speak English well, those with a disability, the very young, and the elderly.
- Boston's housing is old and much was constructed before modern-day building codes.
- Large portions of the City are built on fill.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Figure 1 - New Development Projects under BRA Article 80 Review



Source: Boston Redevelopment Authority

**CITY OF BOSTON HAZARD MITIGATION PLAN
DRAFT 2014 UPDATE**

Table 6 Summary of Boston Developments 2005-2015

DEVELOPMENTS COMPLETED 2005-2014	# PROJECTS	ACRES	HOUSING UNITS	EMPLOYMENT	COMMERCIAL (SQ FEET)	HOTEL ROOMS
<u>Allston/Brighton</u>	<u>9</u>	<u>24.0</u>	<u>746</u>	<u>1003</u>	<u>887,496</u>	<u>0</u>
<u>Back Bay/South End</u>	<u>24</u>	<u>21.0</u>	<u>1531</u>	<u>1459</u>	<u>1,199,802</u>	<u>150</u>
<u>Charlestown</u>	<u>8</u>	<u>11.2</u>	<u>754</u>	<u>42</u>	<u>219,932</u>	<u>0</u>
<u>Chinatown/Downtown/North End/West End</u>	<u>36</u>	<u>39.0</u>	<u>1872</u>	<u>2578</u>	<u>1,595,142</u>	<u>1308</u>
<u>Dorchester/Mattapan</u>	<u>21</u>	<u>59.3</u>	<u>1092</u>	<u>500</u>	<u>344,470</u>	<u>0</u>
<u>East Boston</u>	<u>5</u>	<u>37.0</u>	<u>276</u>	<u>26</u>	<u>85,725</u>	<u>0</u>
<u>Fenway/Longwood Medical Area</u>	<u>22</u>	<u>33.7</u>	<u>517</u>	<u>9482</u>	<u>2,410,390</u>	<u>0</u>
<u>Hyde Park/Roslindale/West Roxbury</u>	<u>9</u>	<u>9.1</u>	<u>233</u>	<u>100</u>	<u>155,000</u>	<u>0</u>
<u>Jamaica Plain</u>	<u>15</u>	<u>13.9</u>	<u>349</u>	<u>295</u>	<u>167,381</u>	<u>0</u>
<u>Mission Hill/Roxbury</u>	<u>22</u>	<u>21.6</u>	<u>804</u>	<u>349</u>	<u>447,248</u>	<u>0</u>
<u>South Boston/South Boston Waterfront</u>	<u>18</u>	<u>35.1</u>	<u>951</u>	<u>1820</u>	<u>2,005,304</u>	<u>0</u>
SUBTOTAL Construction Complete	189	305	9,126	17,653	9,517,890	1,458
UNDER CONSTRUCTION 2015						
<u>Allston/Brighton</u>	<u>7</u>	<u>193.9</u>	<u>566</u>	<u>0</u>	<u>622,000</u>	<u>0</u>
<u>Back Bay/South End</u>	<u>8</u>	<u>34.8</u>	<u>787</u>	<u>303</u>	<u>1,235,790</u>	<u>0</u>
<u>Charlestown</u>	<u>2</u>	<u>0.3</u>	<u>54</u>	<u>563</u>	<u>290,790</u>	<u>0</u>
<u>Chinatown/Downtown/North End/West End</u>	<u>12</u>	<u>10.6</u>	<u>1208</u>	<u>3510</u>	<u>2,690,760</u>	<u>500</u>
<u>Dorchester/Mattapan</u>	<u>11</u>	<u>55.3</u>	<u>820</u>	<u>323</u>	<u>593,000</u>	<u>0</u>
<u>East Boston</u>	<u>2</u>	<u>6.3</u>	<u>18</u>	<u>0</u>	<u>0</u>	<u>177</u>
<u>Fenway/Longwood Medical Area</u>	<u>10</u>	<u>15.7</u>	<u>588</u>	<u>696</u>	<u>1,052,685</u>	<u>96</u>
<u>Hyde Park/Roslindale/West Roxbury</u>	<u>6</u>	<u>4.8</u>	<u>210</u>	<u>67</u>	<u>24,676</u>	<u>0</u>
<u>Jamaica Plain</u>	<u>7</u>	<u>15.9</u>	<u>722</u>	<u>66</u>	<u>119,000</u>	<u>0</u>
<u>Mission Hill/Roxbury</u>	<u>18</u>	<u>15.2</u>	<u>1063.6</u>	<u>7</u>	<u>412,899</u>	<u>0</u>
<u>South Boston/South Boston Waterfront</u>	<u>15</u>	<u>30.8</u>	<u>971</u>	<u>408</u>	<u>1,249,593</u>	<u>136</u>
SUBTOTAL Under Construction	96	383	7,008	5,943	8,291,193	909
TOTAL ALL PROJECTS	285	689	16,133	23,596	17,809,083	2,367

**CITY OF BOSTON HAZARD MITIGATION PLAN
DRAFT 2014 UPDATE**

In order to characterize any change in the city's vulnerability associated with new developments, a GIS mapping analysis was conducted which overlaid the development sites with the FEMA Flood Insurance Rate Map (see Table 7). The analysis reveals that of the 196 developments completed since 2005, eight were in a flood zone, and six of those were in a Zone X (0.2%, annual chance flood hazard, or "500 year" flood zone). Of the 96 new developments currently under construction, only two are in a flood zone, one of which is in Zone X and one in Zone AE (1% annual chance flood hazard, or "100 year" flood zone). These 10 projects represent 3.5% of the 285 new developments completed or under construction in Boston since 2005. Even those projects that are located within a flood zone must meet the standards of the City's *Floodplain Overlay Zoning District*, which set floor elevation standards for construction in a flood hazard district and prohibits certain activities and uses (see page 104).

Table 7 – New Developments in Flood Zones

<u>Neighborhood</u>	<u>Development</u>	<u>#</u>	<u>FLOOD ZONE</u>
<u>DEVELOPMENTS COMPLETED 2005-2014</u>		-	-
<u>Hyde Park</u>	<u>Hyde Park Ave PMDI Artists</u>		<u>AE</u> <u>1% Annual Chance Flood</u>
<u>North End</u>	<u>Battery Wharf</u>		<u>AE</u> <u>1% Annual Chance Flood</u>
<u>Charlestown</u>	<u>CNY-Parcel 4-Harborview Point</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
<u>Downtown</u>	<u>500 Atlantic Avenue</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
<u>East Boston</u>	<u>Portside Pier 1 Shipyard & Marina</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
<u>Hyde Park</u>	<u>The Village At Cleary Square</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
<u>Hyde Park</u>	<u>Boston Renaissance Charter School</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
<u>S. Bos. Waterfront</u>	<u>Channel Center: Phase II</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
Subtotal Zone AE		<u>2</u>	-
Subtotal Zone X		<u>6</u>	-
<u>TOTAL ALL FLOOD ZONES</u>		<u>8</u>	-
<u>DEVELOPMENTS UNDER CONSTRUCTION IN 2015</u>		-	-
<u>Dorchester</u>	<u>General Academic Building No. 1</u>		<u>AE</u> <u>1% Annual Chance Flood</u>
<u>Downtown</u>	<u>Russia Wharf</u>		<u>X</u> <u>0.2% Annual Chance Flood</u>
Subtotal Zone AE		<u>1</u>	-
Subtotal Zone X		<u>1</u>	-
<u>TOTAL ALL FLOOD ZONES</u>		<u>2</u>	-
<u>ALL DEVELOPMENTS 2005-2015</u>		-	-
Subtotal Zone AE		<u>3</u>	-
Subtotal Zone X		<u>7</u>	-
<u>TOTAL ALL PROJECTS</u>		<u>10</u>	-

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Although the vast majority of Boston's new development is not located within a designated flood hazard zone, some of the waterfront development is located in areas that may be subject to future sea level rise impacts due to climate change (see Risk Assessment section, pages 27-31). To address this concern and reduce future vulnerability in 2013 the Boston Redevelopment Authority adopted *Climate Change Preparedness and Resiliency Guidelines* into the Article 80 development review process (see Figure 2). The guidelines include a detailed checklist will assist project proponents in analyzing project proposals within the framework of climate change, as a step in safeguarding the future of new buildings in Boston in the event of extreme weather conditions (see checklist in Appendix A)..

The guidelines cover sea-level rise, higher average temperatures, more frequent and longer extreme heat events and droughts, more severe freezing rain and heavy rainfall events, and increased wind gusts. In addition, the guidelines will require analysis of secondary weather event impacts such as interruptions to utilities, communications systems, and transportation networks. All development projects subject to Article 80 Small and Large project review, including all Institutional Master Plan amendments will be asked to adhere to the guidelines and complete the climate preparedness checklist, which will be reviewed by the Boston Interagency Green Building Committee.

ADD PHOTOS OF NEW DEVELOPMENT

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Figure 2 - Boston Climate Change Preparedness and Resiliency Guidelines

Analyze project impacts on the surrounding environment that are attributable to forecasted climate conditions over the full duration of the expected life of the project. Utilizing the best available science, identify changes in the climate and environment and how such changes will affect the project's environmental impacts including the survivability, integrity and safety of the project and its inhabitants.

Climate change conditions may include, but not be limited to, sea-level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe freezing rain and heavy rainfall events, and increased wind gusts. Include analysis of secondary and cascading impacts including more frequent and longer interruptions of utility services including electrical, gas, and telecommunication systems, and disruptions of transportation systems and networks.

A. Complete and submit an initial Climate Change Preparedness and Resiliency Checklist with the Project Notification Form (PNF) filing. The Checklist requires all projects to consider the impacts of future climate conditions, over the expected life of the project, due to Extreme Heat and Weather and, for projects in or near floodplains or areas prone to flooding, due to Rising Sea-Levels. For any environmental impacts due to climate change that are identified, describe planning, design, and / or construction strategies that will be employed to avoid, eliminate or mitigate any adverse impacts. Consideration of environmental impacts due to climate change should not be limited to those listed on the Checklist.

B. Incorporate Climate Change Preparedness and Resiliency strategies into all relevant components of the project such as Transportation, Infrastructure Systems, Environmental Protection, Urban Design, Landscape, Sustainable Development, Historic Resources, and Tidelands.

C. Climate Change Preparedness and Resiliency Checklist and Responses will be reviewed by the Boston Interagency Green Building Committee (IGBC). The Project Proponent will be notified in writing of any comments by the IGBC.

D. The Project Proponent must submit an updated and final Climate Change Preparedness and Resiliency Checklist along with a written Response to the IGBC. The Final Climate Change Preparedness and Resiliency Checklist and Response must be submitted in conjunction with the submittal of the Final Design and Approval package for review by the IGBC. No Final Design Approval/Article 80 documents shall be authorized by the BRA until the final Climate Change Preparedness and Resiliency Checklist and Response have been reviewed by the IGBC for addressing Action Items A, B, and C as set forth above.

[See the Climate Change Resiliency and Preparedness Checklist in Appendix A.](#)

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

III. PLANNING PROCESS AND PUBLIC PARTICIPATION

The City of Boston employed a six step planning framework based on FEMA's hazard mitigation planning guidance focusing on local needs and priorities but maintaining a regional perspective on 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. The City of Boston facilitated participation by the general public and other stakeholders through: the City's Hazard Mitigation Executive Steering Committee, two public meetings hosted by the Boston Conservation Commission, meeting with the Coordinated Statewide Emergency Preparedness committee (COSTEP), posting the plan to the Boston Environment Department's webpage, and invitations sent to neighborhood groups. The Main Street Business District, municipal boards and commissions, the local chamber of commerce, neighboring communities, and other local or regional entities were also invited to review the plan and provide comment. Regional coordination was facilitated by the Metro Boston Regional Hazard Mitigation Planning Committee.

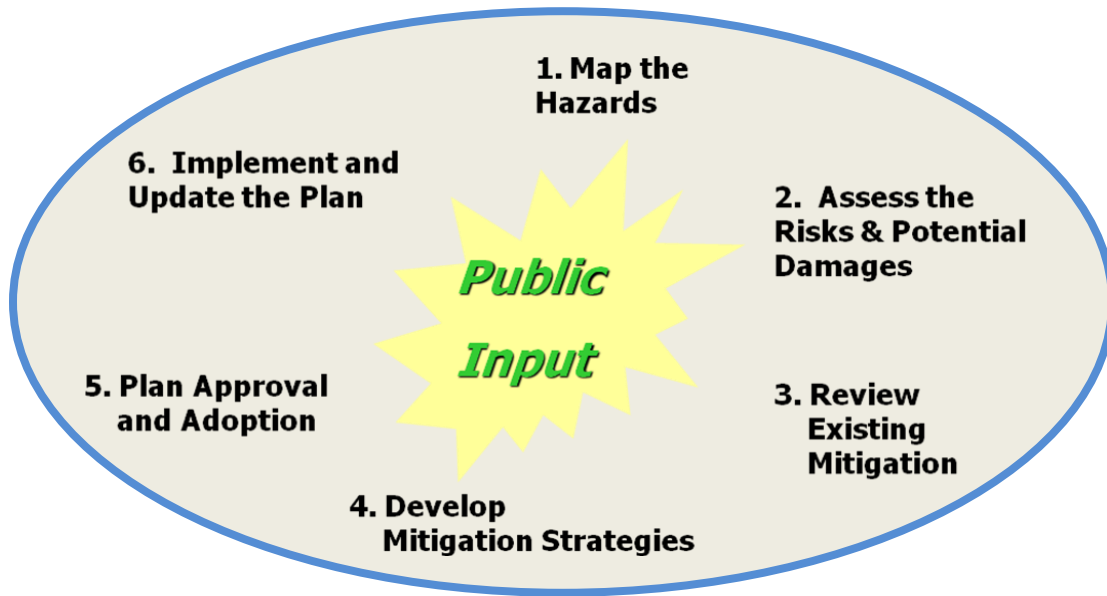
Within the planning framework described above, a number of additional activities were introduced into the planning process for the Boston Hazard Mitigation Plan 2014 Update to address the greater size and complexity presented by the City and its desire to incorporate the potential impacts of climate change into the plan update. The most significant aspects were the utilization of an overall project steering committee representing all relevant City agencies, coupled with four collaborative stakeholder working groups in partnership with SERI, who have developed a methodology for exploring natural hazard impacts and mitigation measures related to climate change.

Planning Process Summary

The six-step planning framework 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. In a plan update such as this, 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** – The City relied 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. These maps did not include climate change projections.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



2. **Assess the Risks and Potential Damages** – Critical facilities, infrastructure, vulnerable populations, and other features are mapped and compared with the hazard data from the first step to identify those that might be particularly vulnerable to these hazards. Land use data and development trends are also incorporated into this analysis. In addition, the City developed estimates of the potential impacts of certain hazard events on the community.
3. **Review Existing Mitigation** – Boston has an active history in hazard mitigation and has adopted flood plain zoning districts, wetlands protection programs, and other measures as well as enforcing the State Building Code, which has provisions related to hazard resistant building requirements. All current municipal mitigation measures were documented.
4. **Develop Mitigation Strategies** – The City of Boston worked with the municipal staff to identify new mitigation measures, utilizing information gathered from the hazard identification, vulnerability assessments, and the City’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 and 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. Once FEMA approves the plan FEMA issues a conditional approval pending adoption of the plan by the Boston City Council. More information on plan adoption can be found in Chapter IX and documentation of plan adoption can be found in Appendix [G](#).

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

- 6. Implement and 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 VII includes more detailed information on plan implementation.

Boston's Participation in the Regional Committee

The Metro Boston Hazard Mitigation Planning Committee served as an opportunity for neighboring communities to discuss hazard mitigation issues of shared concern. The committee includes representatives of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, and Somerville. The City of Boston's appointed representative to the regional committee was Elaine M. Sudanowicz from the Mayor's Office of Emergency Management. The committee met on April 13, 2010 and was attended by representatives from Boston and all the neighboring cities and towns.

In addition, as the MAPC staff worked on each community's plan, regional issues of shared concern, and other issues that may arise between neighboring communities, were discussed in greater detail in each of the local committee meetings and resulting actions are reflected in the identified mitigation measures, as noted in Chapter VI.

The Boston Hazard Mitigation Executive Steering Committee

The Boston Hazard Mitigation Executive Steering Committee was central to the planning process as it was the primary body tasked with coordinating multiple City agencies and developing a mitigation strategy for the City. Given this role, it is important that this committee included a diverse representation of knowledgeable municipal staff. The Executive Steering Committee membership can be found in Table [8](#) below.

The Executive Steering Committee provided overall direction and oversight of the planning process, while smaller working groups provided information on the impacts of hazards on the City, existing mitigation measures, and helped to develop proposed mitigation measures.

The steering committee met on February 8, 2012 and September 6, 2012. The original co-chairs for the first meeting on February 8, 2012 were James Hunt, Mayor's Office of Environmental and Energy Services, and Don McGough, Mayor's Office of Emergency Management. During the course of the plan review, they both left their positions with the City of Boston, and were replaced with the current co-chairs, Brian Swett, Mayor's Office of Environmental and Energy Services and Rene Fielding, Mayor's Office of Emergency Management.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 8 Boston Hazard Mitigation Executive Steering Committee	
Name	Representing
Brian Swett, Co-Chair	Mayor's Office of Environmental and Energy Services
Rene Fielding, Co-Chair	Mayor's Office of Emergency Management
Para Jayasinghe	Public Works Department
Paul Shoemaker	Boston Public Health Commission
Carl Spector	Environment Department
John Sullivan	Boston Water and Sewer Commission
Aldo Ghirin	Boston Parks and Recreation
Chris Busch	Boston Redevelopment Authority
John Hanlon	Office of Budget Management, Capital Planning
<i>Staff Support</i>	
Elaine M. Sudanowicz	Mayor's Office of Emergency Management
James Freas	MAPC
Martin Pillsbury	MAPC

Collaborative Working Meetings with the Social and Environmental Research Institute

The City of Boston invited the Social and Environmental Research Institute (SERI) to assist in the development of the Boston Hazard Mitigation plan because of their experience with bringing the potential consequences of climate change on natural hazards explicitly into the planning process.

SERI began the process with a meeting on stormwater issues at the Boston Water and Sewer Commission on January 30, 2012. The City then held four collaborative working meetings from March through May 2012 that brought together City staff, state agency staff, and other stakeholders to identify hazards and vulnerabilities, consider the potential impacts of climate change, and discuss the hazard mitigation strategy. Each group focused on a different area as follows:

- **Infrastructure** – roads, transit, water and sewer, parks, airport, dam, utilities, groundwater NGO
- **Buildings and Facilities** – publicly owned buildings, libraries, universities, historic and cultural institutions
- **Regulations** – zoning and other ordinances or regulations, social services, insurance, landmarks
- **Public Safety** – police, fire, emergency management, public health, emergency medical services, public housing, environmental protection

SERI's approach, known as *Vulnerability-Consequence Adaptation Planning Scenarios* (VCAPS), is based on a logic model framework, in which each hazard is discussed through a sequence of primary and secondary impacts that lead to particular consequences of concern. The results of the VCAPS working group sessions are summarized in Appendix [B](#).

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Attendance at the working meetings included representatives of key City, State, and regional agencies. A complete list of participants of all four working meetings is provided in Appendix [E](#).

Participation with COSTEP MA

COSTEP MA (Coordinated Statewide Emergency Preparedness in Massachusetts) is a collaborative of representatives of cultural and historical institutions and agencies as well as first responder and emergency management professionals from federal, state, and municipal governments. The purpose of COSTEP MA is to develop hazard mitigation strategies for cultural sites, museums, and libraries statewide, with considerable potential benefit for the many such institutions in Boston. Participating institutions in Boston include the Museum of Fine Arts, the Bostonian Society (the Old State House), Historic New England (the Otis House), the Massachusetts Historic Society, and UMASS Boston. The City of Boston is an at-large member on the Executive Board of COSTEP.

Public Meetings

The public had an opportunity to provide input to the Boston hazard mitigation planning process at two public meetings hosted by the City of Boston, one early in the planning process, and one after a draft plan was available for review. The first public meeting was held on April 18, 2012, and the second was held on September 18, 2013; both meetings were held in the Boston City Hall.

Both meetings were publicized as regular meetings of the Boston Conservation Commission in accordance with the Massachusetts Open Meeting Law. In addition, both meetings were extensively advertised through the City website, the Mayor's Office of Neighborhood Services (ONS) e-mail lists reaching a wide range of residents and other stakeholders, notification to City Main Street Program neighborhood organizations, and direct invitations to specific stakeholder groups. A number of neighborhood organizations posted the meeting notices on their websites as a result of receiving one or more of these notifications. Additionally, the City produced and circulated a flyer advertising both of the public meetings. The City of Boston encouraged citizen participation through email and followed up on inquiries. The attendance list for each meeting can be found in Appendix [F](#).

Notice was sent to numerous agencies organizations, inviting them to review and submit comments on this Boston Hazard Mitigation Plan 2014 Update. Many of these organizations were also invited to participate in the collaborative working group meetings. A list of the invitees is provided in Appendix [F](#). The following neighboring municipalities were also notified of the draft plan update and invited to comment on it: Quincy, Milton, Canton, Dedham, Needham, Brookline, Newton, Watertown, Cambridge, Somerville, Everett, Chelsea, Revere, and Winthrop.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

A City website with a description of the planning process and information on hazard mitigation, copies of reports on hazards in the City, a schedule of public meetings, and, when available, draft copies of the plan was maintained throughout the planning process.

Any comments received were reviewed and incorporated by the local hazard mitigation team. Revisions to the draft plan included the addition of recommendations for multi-language public education, updating several city projects, and revising the priorities for mitigation for invasive insects, trees, and green infrastructure.

Planning Timeline

April 13, 2011	Meeting of the Metro Boston Regional Committee
March 9, 2011	Hazard Mitigation Kickoff Meeting with MEMA and Boston
April 20, 2011	Hazard Mitigation & RiskMAP Collaboration Meeting
June 23, 2011	US Army Corp of Engineers and FEMA on Boston Hurricane Evacuation Study
November 18, 2011	Meeting with COSTEP, North Andover
January 30, 2012	Meeting with Boston Water and Sewer Commission and SERI
February 8, 2012	Boston Hazard Mitigation Executive Steering Committee
March 28, 2012	Infrastructure Stakeholders meeting with SERI
April 4, 2012	Regulations Stakeholders meeting with SERI
April 25, 2012	Buildings and Facilities Stakeholders meeting with SERI
April 18, 2012	First Public Meeting with Boston Conservation Commission
May 10, 2012	Public Safety Stakeholders meeting with SERI
July 18, 2012	Meeting with Boston and DCR
July 20, 2012	Meeting with Boston and MassDOT
September 6, 2012	Boston Hazard Mitigation Executive Steering Committee
January 16, 2013	Meeting of the local Hazard Mitigation staff team
January 31, 2013	Meeting with COSTEP, Boston
September 18, 2013	Second Public Meeting with Boston Conservation Commission
October 18, 2013	Close of Comment Period; draft revisions and final city review
December 16, 2013	Draft Plan Update submitted to MEMA
<u>January 28, 2014</u>	<u>Plan Review Tool received from MEMA</u>
March 24, 2014	Revised Draft Plan Update submitted to MEMA
<u>September 11, 2014</u>	<u>Plan Review Tool received from FEMA</u>
<u>November 18, 2014</u>	<u>Revisions to Plan Review Tool Received from MEMA</u>
<u>April 17, 2015</u>	<u>Revised Draft Plan Update submitted to MEMA</u>

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

IV. RISK ASSESSMENT

The risk assessment analyzes the potential natural hazards that could occur within Boston as well as the relationship between those hazards and land uses 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.

In addition to a review of historic trends for natural hazard events as an indicator of Boston's vulnerability, the potential future impacts of climate change are also incorporated into this plan. The City of Boston has embarked on a significant initiative to address climate change mitigation and adaptation, as documented in its 2011 climate action plan, *A Climate of Progress*.

Overview of Hazards and Impacts

According to the *Massachusetts Hazard Mitigation Plan 2010* (state plan), Massachusetts is subject to the following natural hazards (listed in order of frequency): floods, heavy rainstorms, nor'easters or winter storms, coastal erosion, hurricanes, tornados, wildfires, and earthquakes. State and federal disaster declarations are summarized in Table 2.

Table 9 summarizes the current hazard risks for Boston. This evaluation takes into account the historic frequency of the hazards; it does not consider the effect of future

Table 9 - Hazard Risks Summary			
Hazard Type	Probability	Consequence	Hazard Rating
Flooding			
<i>Inland/Riverine</i>	Possible	Critical	High (8)
<i>Coastal Storms/Storm Surge</i>	Unlikely	Critical	Medium (7)
<i>Urban Flooding</i>	Likely	Limited	Medium (7)
<i>Dam Failure</i>	Unlikely	Limited	Low (3)
Wind			
<i>Hurricanes</i>	Possible	Critical	High (8)
<i>Tornados</i>	Possible	Critical	High (8)
<i>-Nor'easters</i>	Highly Likely	Limited	Medium (6)
<i>-Thunderstorms</i>	Highly Likely	Limited	Medium (6)
Winter Storms			
<i>Severe Winter Storm</i>	Likely	Limited	Medium (7)
Geologic			
<i>Earthquakes</i>	Unlikely	Catastrophic	High (9)
<i>Landslides</i>	Possible	Minor	Low (3)
<i>Tsunami</i>	Unlikely	Critical	Medium (4)
Other Natural Hazards			
<i>Fire / Conflagration</i>	Possible	Critical	High (8)
<i>Extreme Temperatures</i>	Highly Likely	Minor	Medium (6)

Source: Massachusetts Hazard Mitigation Plan, 2010, adapted for Boston

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

climate change. The rating for each hazard type is based on two factors: the probability of occurrence and the relative severity of consequences should it occur. This analysis is drawn from the hazard rating found in the City of Boston Hazard Identification and Risk Assessment (HIRA). The rating definitions are summarized in Table 10.

Table 10 - Hazard Rating Assessment used in the Boston HIRA Report		
Probability (Weight x1)*		Average Frequency*
Ratings	Definitions	
Highly Likely (4)	Event expected to occur at least once within the next year.	On average, this event occurs once a year or more frequently.
Likely (3)	Event expected to occur at least once within the next 1-3 years.	On average, this event occurs at least once every 3 years, but less often than once a year.
Possible (2)	Event expected to occur at least once within the next 3-10 years.	On average, this event occurs at least once every 10 years, but less often than once every 3 years.
Unlikely (1)	Event expected to occur at least once within the next 11-100 years.	On average, this event occurs at least once every 100 years, but less often than once every 10 years.
Consequence (Weight x2)		
Ratings	Definitions	
Catastrophic (4)	Mass fatalities OR basic life services disrupted for up to 30 days OR more than 50% of property severely damaged.	
Critical (3)	Multiple fatalities and severe injuries OR basic life services disrupted for up to 2 weeks OR more than 25% of property severely damaged.	
Limited (2)	Some injuries OR basic life services disrupted for up to one week OR more than 10% of property severely damaged.	
Minor (1)	Minor injuries OR basic life services disrupted for 72 hours or less OR less than 10% of property severely damaged.	

*The probabilities and averages used in this table are not always based on extensive data, but in some cases reflect the collective judgment of emergency responders. Source: Boston HIRA

Impacts of Climate Change

Many of the natural hazards that Boston has historically experienced are likely to be exacerbated by climate change in future years. This is particularly true for flooding caused by extreme precipitation, coastal flooding and damage due to sea level rise, and extreme heat. These are described in more detail below.

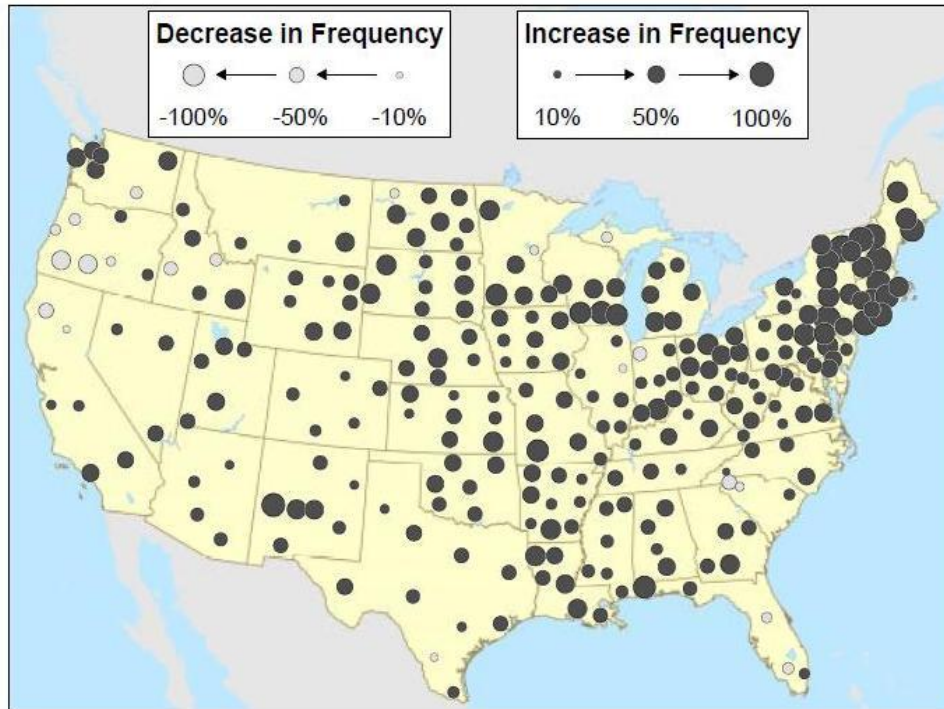
Climate Change Impacts: Extreme Precipitation

Boston's average annual precipitation is 42 inches. While total annual precipitation has not changed significantly, according to the 2012 report *When It Rains It Pours – Global Warming and the Increase in Extreme Precipitation from 1948 to 2011* intense rainstorms and snowstorms have become more frequent and more severe over the last half century in the northeastern United States. Extreme downpours are now happening 30 percent more often nationwide than in 1948 (see Figure 3). In other words, large rain or snow storms

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

that happened once every 12 months, on average, in the middle of the 20th century, now happen every nine months.

Figure 3- Change in Frequency of Extreme Downpours, 1948 – 2011



Source: *When It Rains It Pours – Global Warming and the Increase in Extreme Precipitation*, Environment America Research and Policy Center, July 2012

Not only are these intense storm events more frequent, they are also more severe: the largest annual storms now produce 10 percent more precipitation, on average, than in 1948. In particular, the report finds that *New England has experienced the greatest change with intense rain and snow storms occurring 85 percent more often than in 1948*

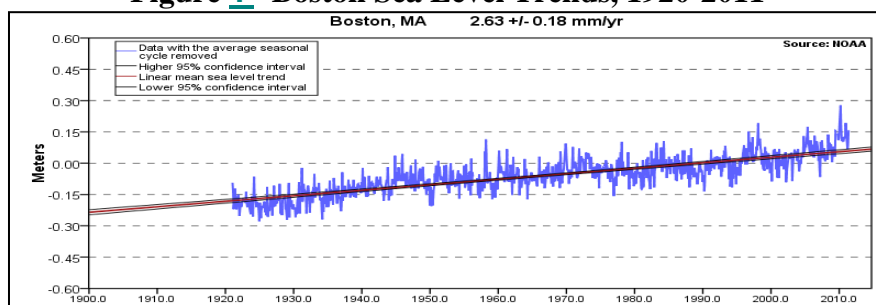
At the other extreme, changes in precipitation patterns and the projected future rising temperatures due to climate change (discussed below) will likely increase the frequency of short-term (one- to three-month) droughts and decrease stream flow during the summer.

Climate change impacts: Sea-level rise and storm surges

A higher sea level increases the frequency and extent of coastal flooding. In the past 100 years, the relative change in sea level in Boston Harbor has been a rise of about one foot (Figure 4). The change is relative, because it consists of two components: a rise in the absolute sea level and a sinking of the land. In the past 100 years, these two factors have been roughly equal, and, for the most part, represent long-term processes that have been underway since the end of the last Ice Age, approximately 14,000 years ago.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Figure 4 - Boston Sea Level Trends, 1920-2011



Source: National Oceanic and Atmospheric Administration (NOAA)

Climate change is accelerating the rate of global (absolute) sea-level rise (SLR) primarily by warming the oceans, causing the water already in them to expand, and by warming the land and air, causing ice on land (glaciers, ice sheets) to melt and flow into the ocean. A recent report as part of the U.S. National Climate Assessment states that there is “very high confidence (>9 in 10 chance) that global mean sea level will rise at least 0.2 meters (8 inches) and no more than 2.0 meters (6.6 feet) by 2100 (see Table 11).”¹ The low end of this range represents a continuation of the current trend, which has a relatively small contribution from melting ice. The higher end includes greater contributions from melting ice, for which there is an increasing amount of data, though still not enough to resolve some uncertainties. The report presents four scenarios of sea-level rise that could be used depending on the time frame of projects and the level of risk that communities are willing to accept. Whatever the actual amount of sea-level rise by the end of the century, the oceans will likely continue to rise after that.

Table 11- Global Sea-Level Rise Scenarios²

Scenario	SLR by 2100 (m)*	SLR by 2100 (ft)*
Highest	2.0	6.6
Intermediate-High	1.2	3.9
Intermediate-Low	0.5	1.6
Lowest	0.2	0.7

* Using mean sea level in 1992 as a starting point.

In addition to the rise of the global average, changes to the distribution of water around the globe will vary the amount of absolute sea-level rise that different localities experience. Changes in the temperature and salinity of water will affect ocean currents, and the melting of ice will alter the Earth’s gravitational field. Both of these mechanisms could cause Boston (and the Northeast coast overall) to see sea-level rise that, in the higher scenarios, is more than a foot greater than the global average. Early evidence of the predicted ocean-current effect was published in June 2012.³

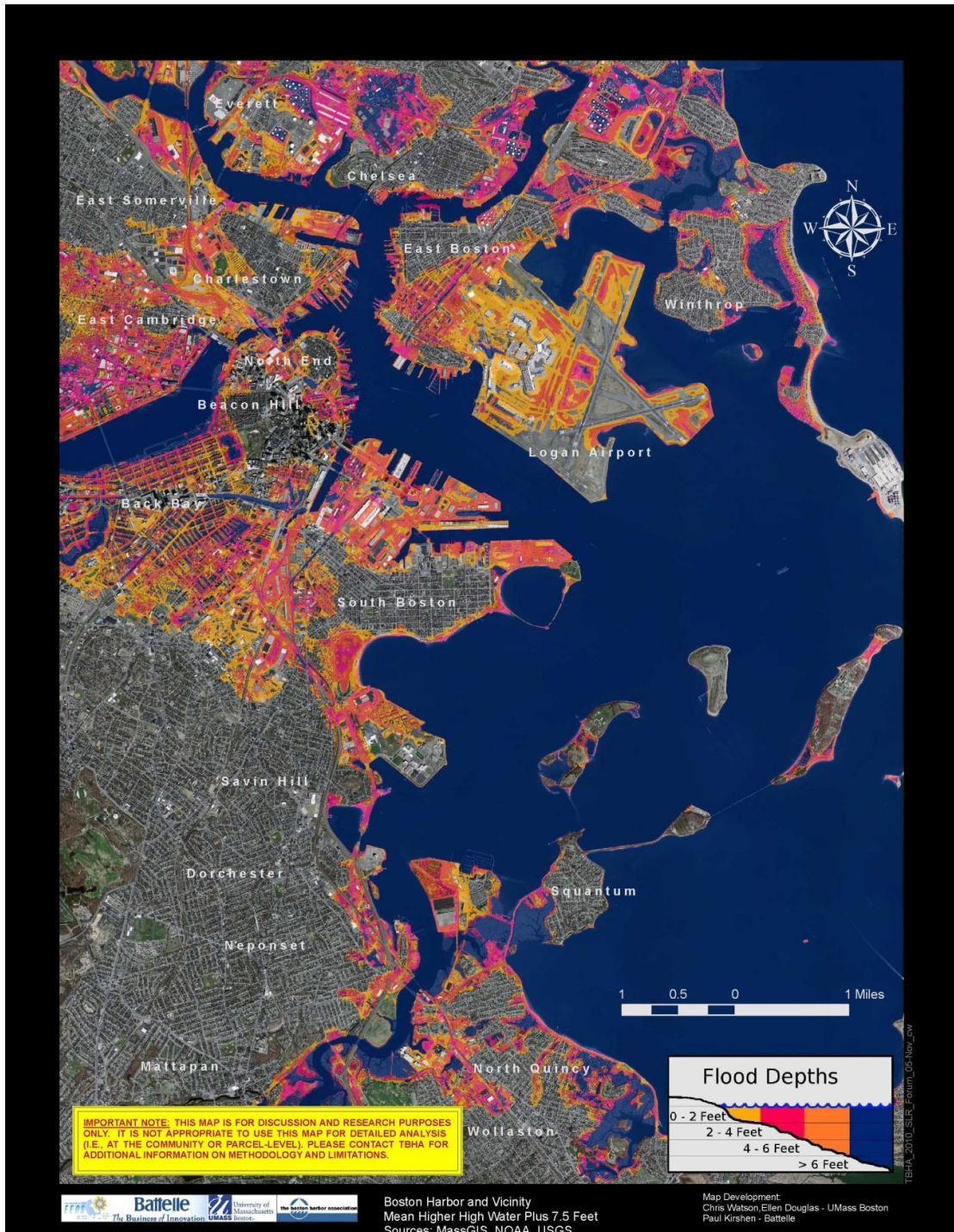
¹ Parris, Adam, et al. *Global Sea Level Rise Scenarios for the United States National Climate Assessment*, NOAA Technical Report OAR CPO-1, National Oceanic and Atmospheric Administration, December 2012.

² *ibid.*

³ Sallenger Jr, A. , K. Doran, P. Howd, “Hotspot of accelerated sea-level rise on the Atlantic coast of North America,” *Nature Climate Change* (2012) 2, 884–888, doi:10.1038/nclimate159724, June 2012. See also, Parris et al., *supra.*, for a summary of all contributing factors.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

**Figure 5 - Projected Flooding of Boston Harbor and vicinity
with water at 7.5 feet above mean higher high water⁴**



Source: Chris Watson and Ellen Douglas, U. Mass Boston, and Paul Kirshen, Battelle Laboratories

⁴ Chris Watson, Ellen Douglas, and Paul Kirshen, The Boston Harbor Association, <http://tbha.org/boston-harbor-sea-level-rise-maps>, 2010.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

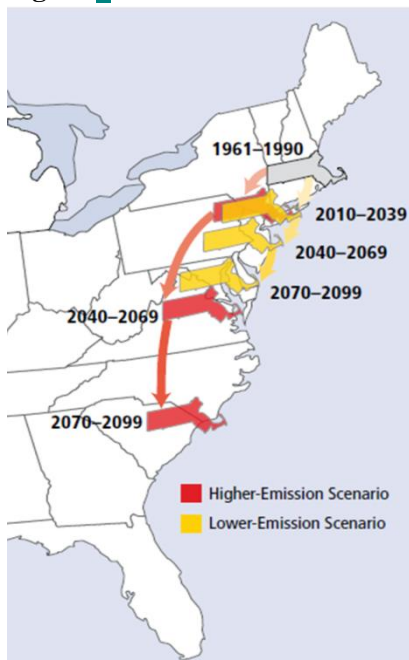
With average global sea-level rise approaching four feet under an intermediate-high scenario, another foot or so from local sea-level effects, and another half-foot of relative sea-level rise due to continuing land subsidence, the City of Boston may need to evaluate the effects of five feet or more of sea-level rise, compared to 1990 levels, by the end of the century.

Higher sea levels mean that, first, any given coastal storm will cause greater flooding than it would have at a lower sea level, and, second, that smaller, more frequent storms will cause the same amount of flooding that larger, less frequent storms used to (these are two different ways at looking at the same phenomenon.) Figure 5 shows an estimate of the amount of flooding that would be caused by a five-foot storm surge hitting Boston at high tide on top of 2.5-feet of sea-level rise (total water level, 7.5 feet above current mean higher high water). The area of flooding is much greater than today's 100-year floodplain, its rough, contemporary equivalent. Conversely, the flooding caused by the current 100-year storm—with a one-percent chance of occurring in a given year—will have about a 30-percent annual chance of occurring after one foot of sea-level rise.⁵

Climate Change Impacts: Extreme Heat

Recent temperature trends suggest greater potential impacts to come due to climate change. In the report "Confronting Climate Change in the U.S. Northeast," (2007), the Union of Concerned Scientists presented temperature projections to 2099 based on two scenarios, one with lower carbon dioxide emissions, and the other with high emissions.

Figure 6 - Extreme Heat Scenarios



Source: Union of Concerned Scientists

Flood Related Hazards

Between 1961 and 1990, Boston experienced an average of 11 days per year over 90°F. That could triple to 30 days per year by 2095 under the low emissions scenario, and increase to 60 days per year under the high emissions scenario. Days over 100°F could increase from the current average of one day per year to 6 days with low emissions or 24 days with high emissions. By 2099, Massachusetts could have a climate similar to Maryland's under the low emissions scenario, and similar to the Carolinas' with high emissions (Figure 6). Furthermore, the number of days with poor air quality could quadruple in Boston by the end of the 21st century under higher emissions scenario, or increase by half under the lower emissions scenario. This would have significant impacts on public health, particularly for those individuals with asthma and other respiratory system conditions, which typically affect the young and the old more severely.

⁵ Ellen Douglas, personal communication, 2008.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Flooding is the most prevalent serious natural hazard identified by local officials in Boston. Flooding can be caused by hurricanes, nor'easters, severe rainstorms, and thunderstorms among other causes. Sea level rise as well as more intense storms brought on by global climate change has the potential to increase the frequency and extent of flooding from all of these causes.

Overview of City-Wide Flooding

Boston is subject to three kinds of flooding: *coastal flooding* where wind and tide leads to flooding along tidal waterways; *inland/riverine flooding* where the rate of precipitation and/or amount of stormwater runoff overwhelms the capacity of natural or structured drainage systems causing overflows; *urban flooding* in which precipitation causes the water table to rise and leads to flooding of low-lying areas such as streets and underpasses. These types of flooding are often combined as storm events lead to large amounts of draining stormwater, which is blocked by the inland push of wind and tide driven water.

The city is divided into four watersheds, Boston Harbor, Charles River, Mystic River and Neponset River. All of these waterways have the potential to flood sections of the city. In addition, a number of smaller brooks and waterways have flooded in the past, most notable of these being the Muddy River and Mother Brook. In many rivers and streams, years of shoreline modifications, land reclamation, stream piping, and development have severely altered the natural flow of water in Boston. Stormwater drainage from developed areas occurs primarily through the manmade system of storm drains.



Photo: Quinn Eureka

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Inland/Riverine Flooding

Inland/riverine flooding occurs when water overflows the banks of an existing stream or river. These flood events can cause serious damage to structures and property and can threaten the lives and safety of area residents. Large amounts of impervious area in the City's four watersheds increase the frequency and severity of flooding because storm water is prevented from absorbing into the ground and flows overland directly into the waterway, increasing the volume of flow. This type of flooding most often occurs within the mapped floodplain areas. Boston has a significant history of damaging flood events in many different parts of the City.

Based on the current [Suffolk County](#) FEMA Flood Insurance Rate Maps (FIRM, [effective September 24, 2009](#)) available for Boston, the following areas are in 100-year flood hazard zones, which FEMA defines as an area with a 1% annual chance of flooding.

- Most of the coastline including Deer Island, and the Harbor Islands
- In East Boston, Belle Isle Marsh, Constitution Beach and the Wood Island Bay Marsh area; the flood plain at Belle Isle Marsh is protected as part of the Belle Isle Marsh Reservation
- In Charlestown, portions of piers and land in the Navy Yard area, along the Little Mystic Channel and along the Mystic River
- Most of the wharves from the Charlestown Bridge to the Northern Avenue Bridge
- In South Boston, the MASSPORT Marine Terminal area and portions of other piers along Boston Harbor; land on the southern side of the Reserved Channel; some land between A Street and the Fort Point Channel; Castle Island; the Conley Terminal; and the coast along Dorchester Bay extending to Columbus Park and including William J. Day Boulevard
- Land along the Charles River
- Land along the Muddy River from the Charles River to Jamaica Pond
- In Dorchester, land around the Bayside Exposition Center, land along the southern coast of Columbia Point, the coast around Savin Hill including Morrissey Boulevard, the Victory Road Park and Tenean Beach area including land west of I-93, the Port Norfolk area, and land along the Neponset River including the Neponset River Reservation
- In West Roxbury, land along the Charles River including land between the river and the VFW Parkway near Bridge Street and along Millennium Park
- In Roslindale, land within the Stony Brook Reservation
- In Hyde Park and Mattapan, land along the Neponset River including the Neponset River Reservation, land along Mill Pond and Mother Brook

Based on data from the National Weather Service, National Climatic Data Center, FEMA disaster declarations, the Suffolk County FIS, and local data sources, historic flood events from 1950 through 2011 were compiled and are summarized in Table [12](#).

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Table 12 Riverine Flood Events*

Location	Date	Property Damage
Boston	03/1968	N/A
Boston	6/13/1998	\$9-\$17M
Boston	4/22/2000	\$0
Suffolk County	5/13/2006	\$0
Boston	10/28/2006	\$8,000
Allston	2/13/2008	\$5,000
Suffolk County	3/14/2010	\$10.7M
Suffolk County	8/25/2010	\$0

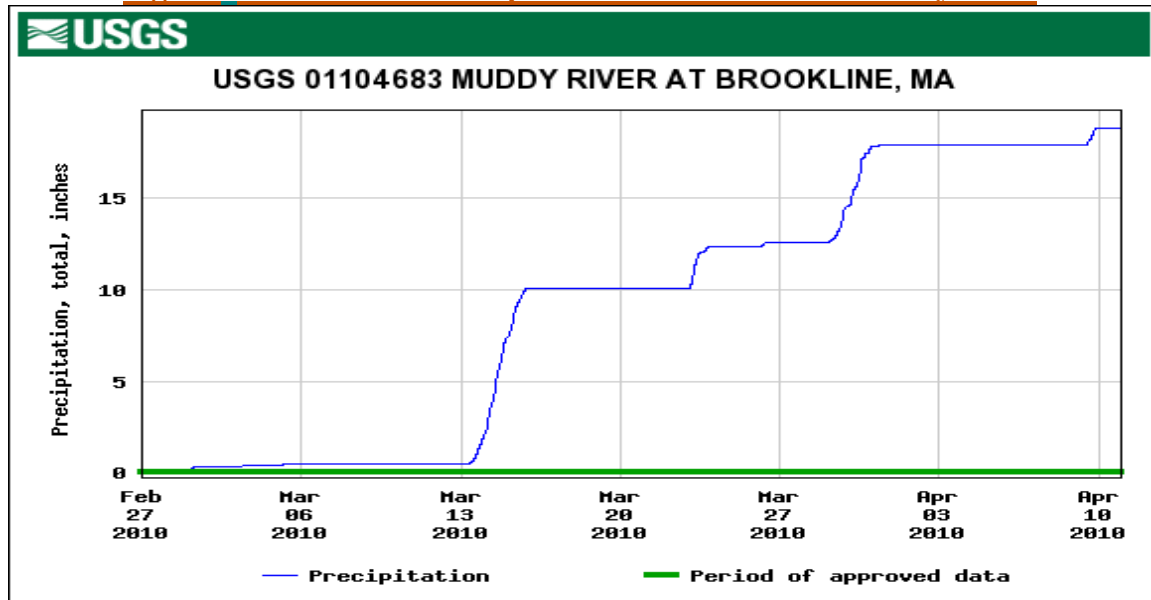
**excludes events classified as Coastal Flood or Urban/Small Stream Flood* Source: Boston HIRA

The Floods of March 2010

The most severe recent flooding occurred during the major storms of March 2010, when the City of Boston broke the record of 11 inches of rain set in 1953. During the month of March of 2010, a new total of 14.83 inches of rainfall accumulation was officially recorded by the National Weather Service (NWS).

The weather pattern that caused these floods consisted of early springtime prevailing westerly winds that moved three successive storms, combined with tropical moisture from the Gulf of Mexico, across New England. The most precipitation came with the first storm on March 14-15 and the third storm on March 31. A smaller storm occurred between these two on March 22 (see Figure 7). Torrential rain falls caused March 2010 to be the wettest month on record for the City of Boston. Historically, NWS determined that March 2010 was the fourth wettest of any month since 1872.

Figure 7 - March 2010 Precipitation Measured at the Muddy River



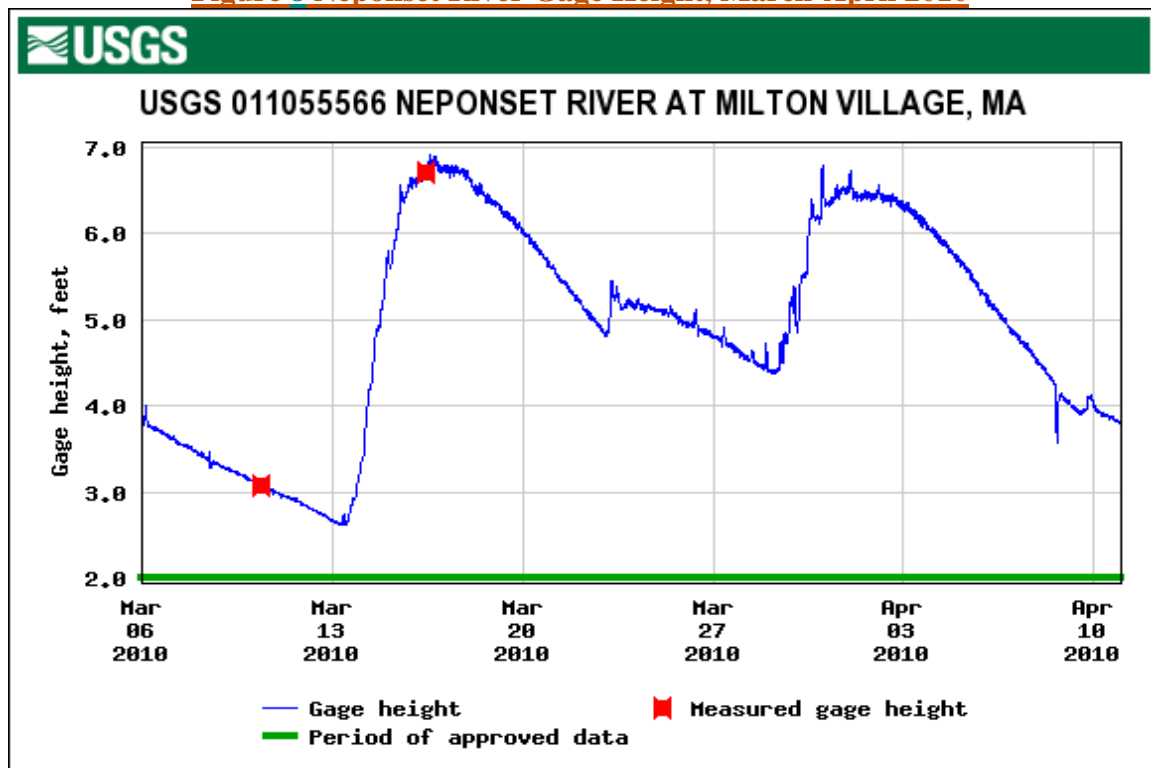
March 2010 Flood Levels by Watershed

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Neponset River Watershed

The Neponset River, with headwaters about 25 miles southeast of Boston in the Town of Foxborough, flow past the southern-most Boston neighborhoods of Hyde Park, Mattapan, and Dorchester, and forms the border between Boston and the Town of Milton to the south. The most severe flooding in recent years was in March and early April of 2010, due to successive storm events. USGS streamflow data show that there were two periods of high water in the Neponset River at the Milton Village streamflow gage, corresponding with successive storms. The river peaked at 6.9 feet on March 16 following the first storm, and again at 6.8 feet on March 31 following a second storm. See Figure 8 below.

Figure 8 Neponset River Gage Height, March-April 2010



The Charles River flows from its headwaters in Hopkinton, MA and flows past the West Roxbury neighborhood of Boston, then further downstream it flows along the northern Boston neighborhoods of Allston/Brighton, Back Bay, and Downtown Boston, forming the border between Boston the neighboring communities of Cambridge and Watertown. As was the case with the Neponset River, the storms of March 2010 caused two successive peak elevations in the Charles. As measured at the nearest USGS gage in Waltham just upstream from Boston, the Charles River rose to an elevation of 7.5 feet on March 15 following the first March storm, and rose again to an elevation of 6.5 feet on March 31 following the second storm. See Figure 9 below.

Figure 9 Charles River Gage Height, March-April 2010

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

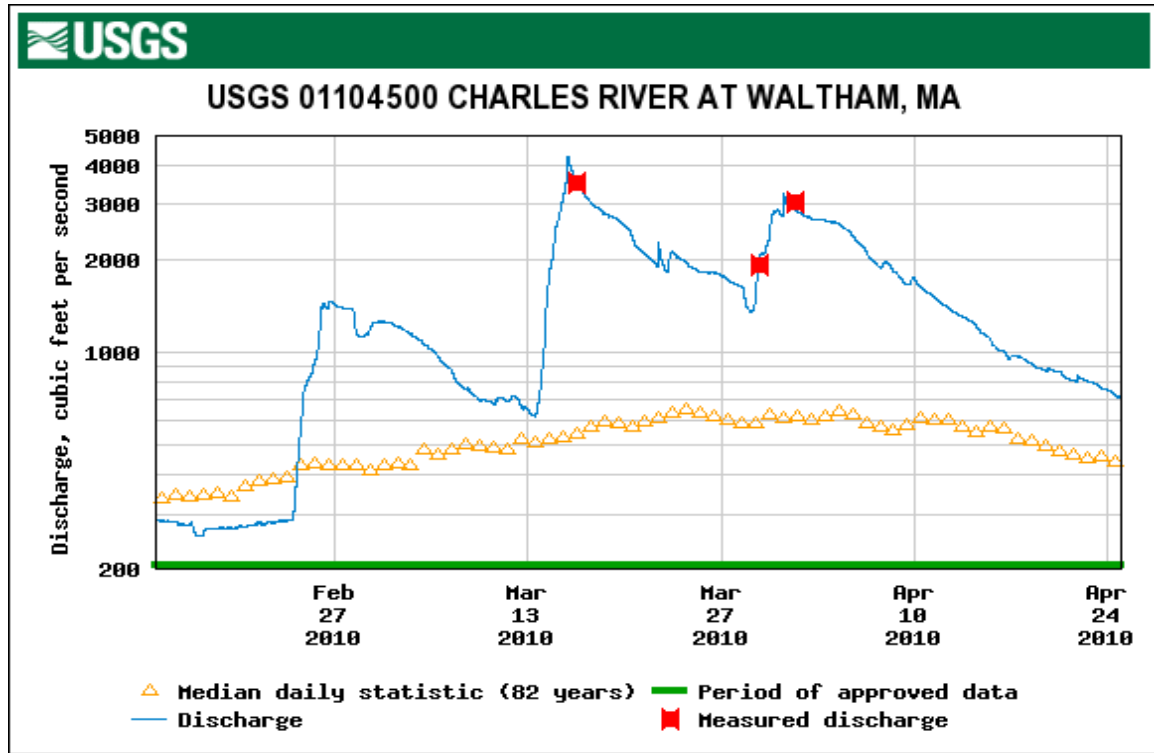
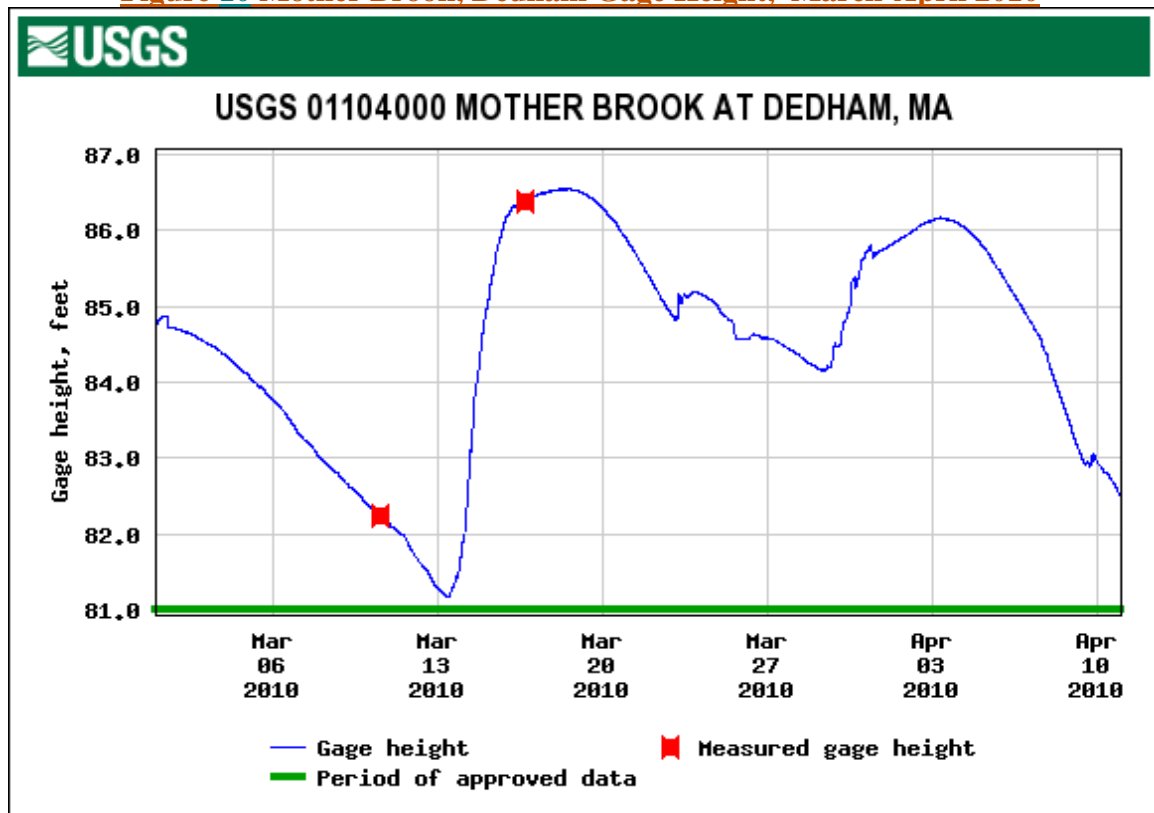


Figure 10 Mother Brook, Dedham Gage Height, March-April 2010

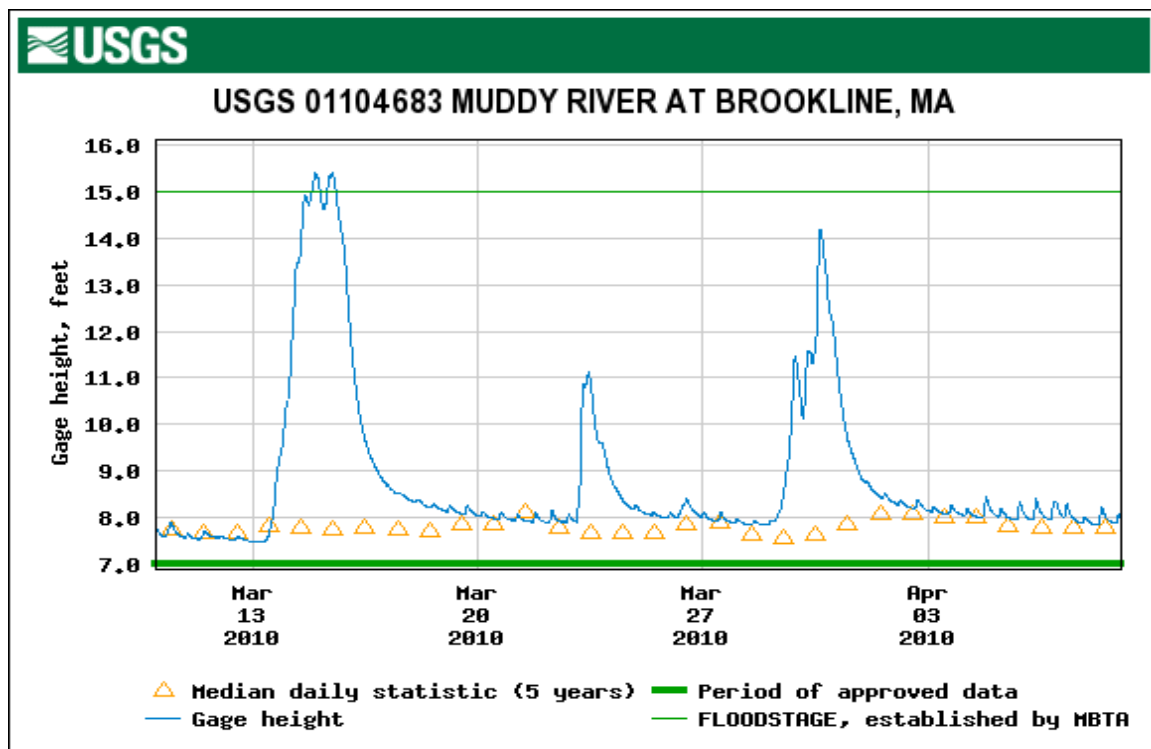


**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Mother Brook is a man-made diversion that flows from Charles River to the Neponset River through Dedham and the Hyde Park section of Boston. During the storms of 2010 Mother Brook also experienced two peak stages, reaching 86.5 feet on March 18 and 86.1 feet on April 4. See Figure 10.

The Muddy River is a tributary of the Charles River that flows from Jamaica Plain through the Fenway and Back Bay neighborhoods of Boston. The river forms the border between Boston and the Town of Brookline. During the storms of 2010 the Muddy River reached a peak elevation of 15.4 feet on March 14-15, which was slightly above flood stage of 15.0 feet (see Figure 11). The river reached an elevation of 14.1 feet on March 31, 2010.

Figure 11 Muddy River Gage Height, March-April 2010



March 2010 Flood Issues by Neighborhood

Davenport Creek flooded Minot and Adams Street, in the Adams Village neighborhood of Dorchester

Toohig Playground on Gallivan Boulevard: Before the development of Toohig Playground, a small stream was visible and flowed through a field off of Minot Street, Dorchester. The stream is underground diverted through a culvert flowing through the Adams Village Business District. The stream called Davenport Creek “works its way underground from the corner across the street from Rite Aid Drug Store, and continues through Toohig Playground. The creek continues underneath homes and streets in

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Neponset and crosses Gallivan Boulevard and emerges out of ground on Hallet Street feeding into the Neponset River in the middle of Pope John Paul II Park.”

Mother Brook Pond and Mother Brook, Neponset and Charles Rivers

Business Street, Hyde Park: During the March 2010 Flood, Business Street was reported closed due to flooding of Mother Brook from Reservation Road to River Street, Hyde Park.

Almont Park/Hunt Playground – 40 Almont Street, Mattapan: The impacted streets adjacent to the Almont Park are 78 and 80 Favre Street next to Almont Park and Messinger Street, Mattapan. Reported from 14-16 Favre Street that basement and street flooded with sewage.

New Housing Development on Metropolitan Avenue, Hyde Park: It was reported that the property adjacent to 528 Metropolitan Avenue, Hyde Park was undeveloped thickly forested land. The land was clear-cut and 6 new homes were built behind Metropolitan Avenue, Hyde Park. Rain water flows downhill from impermeable ground and collects in the yard and basement.

Morrissey Boulevard, Dorchester: On March 30 – 31, 2010, a section of Morrissey Boulevard from Tolman Street to Pope Hill was closed in both directions on Tuesday afternoon. The road was reopened late Tuesday evening. Morrissey Boulevard was closed in both directions from Freeport Street to the University of Massachusetts at Boston.



Morrissey Blvd flooding during Hurricane Sandy

Photo: Devin M., Dorchester Reporter

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Wilmot Street, Roslindale: According to residential reports by Michael Westwater and Yolanda Poma, "the Stop and Shop Supermarket and Plaza at 950 American Legion Highway placed a retention pond at the end of the plaza to catch rainwater run-off." Both 42 and 46 Wilmot Street experienced flooding from the Stop and Shop parking lot when the retaining pond overflowed.

Trailer Park, West Roxbury, 1608 VFW Parkway, Parking Lot flooded.

Muddy River – The Fenway

The Muddy River Restoration Project started in 2013. The mitigation of flooding from the Muddy River into the Fenway was as a result of the October Floods of 1996, which caused the flooding of the Green Line station at Kenmore Square. On March 30-31, 2010, Massachusetts Bay Transportation Authority crews were on standby to build sandbag dams at the Fenway MBTA station tracks in the event the Muddy River again overflows its banks.

Other More Recent Flooding Events

August 27, 2011 Heavy rain was experienced from the South End to West Roxbury at a precipitation rate of 2 inches per hour from the outer bands of Hurricane Irene which was centered 380 miles southwest of Cape Hatteras.

The City of Boston was under a Tropical Storm Watch.

October 4, 2011 Localized roadway ponding was caused due to heavy rainfall throughout the Boston's neighborhoods.

June 5-6, 2012 A coastal flood advisory was in effect due to astronomically high tides which caused Morrissey Boulevard to be closed.

September 5, 2012 Isolated thunderstorms and heavy rain caused Boston streets to be flooded. ASOS recorded 1.10 inches of rainfall at Logan IAP.

July 23, 2013 Severe thunderstorms and torrential rainfall closed Columbia Road in Dorchester where the roadway flooding was greater than one foot in depth. The neighborhood impacted included Quincy Street, Hancock Street, Dudley Street and Geneva Avenue.

September 1, 2013 The 400 City of Boston residents experienced a power loss due to heavy rain. A flash flood warning was issued at 8:27am.

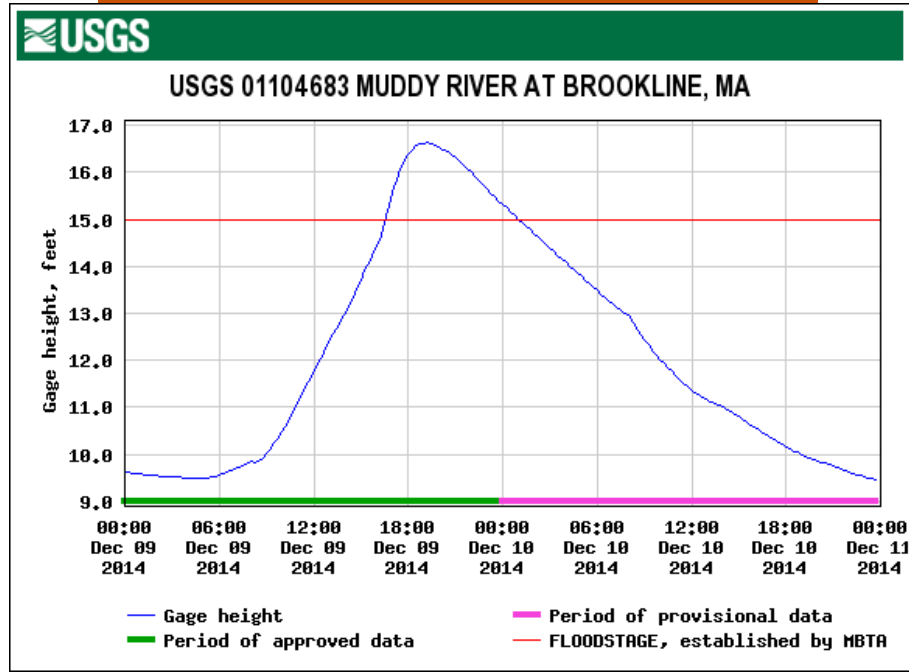
December 19, 2013 The Storrow Drive Tunnel was closed due to flooding.

December 10, 2014 Storrow Drive westbound had several inches of standing water slowing traffic through the evening commute. The Muddy River's elevation is normally seven to eight feet, but on December 9, 2010, after 4 inches of precipitation, the river rose

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

to 16.4 feet, which is 1.4 feet above flood stage determined by the MBTA. Transit workers were deployed to the Green Line tunnel's entrance to created barricades using sandbags to prevent the river from overflowing into the station and cause flooding similar to what occurred in 1996.

Figure 12 Muddy River Elevation, December 9, 2010



MBTA Workers deploying sandbags at the Green Line tunnel (MBTA photo)

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

Based on the record of previous occurrences, inland/riverine flooding in Boston is a high frequency event 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).

Urban Flooding

Urban flooding can occur virtually anywhere in the City. In many places this hazard amounts to little more than a nuisance but in some circumstances groundwater-sourced flooding or urban flooding can cause serious property damage and put people at risk. Flooding in road underpasses can cause cars to become trapped, and basement flooding can damage property and lead to mold growth, which can lead to breathing problems. Managing groundwater in Boston can be complicated. In some many of the areas of the City built on fill, such as the Back Bay, the building foundations rest on wooden piers sunk deep into the ground, and the historically high water table must be maintained to prevent these piers from rotting. The Boston Groundwater Trust works to ensure that the appropriate policies are in place to ensure stormwater infiltration in these areas.

Trees can provide significant mitigation of urban flooding. On average, a tree's leaves can retain 100 gallons of water. Planting trees can provide a cost savings over installing larger culverts and pipes. Milwaukee, Philadelphia and Austin have avoided large capital improvement projects by investing in green infrastructure, including planting trees and directing water to planted stormwater retention areas. The City of Boston's "Complete Streets" Project provides guidelines for green infrastructural improvements and larger growing spaces for trees (see examples of Complete Streets projects on page 80).

One indicator of flooding impacts is the number of work orders issued by the Boston Water and Sewer Commission (BWSC) for crews to respond to flooding problems throughout the City. Tables [13A](#) and [13B](#) summarize the flood-related work orders identified by the BWSC from January 2009 to November 2012. Each work order can impact hundreds or possibly thousands of residents.

Table [13A](#) - BWSC Flood-Related Work Orders, Jan. 2009 to Nov. 2012

Neighborhood	Work Orders	Neighborhood	Work Orders
Allston/Brighton	301	Jamaica Plain	272
Back Bay/Beacon Hill	205	Mattapan	209
Bay Village	113	North Dorchester	152
Beacon Hill	42	North End	160
Charlestown	198	Roslindale	209
Chinatown	43	Roxbury	401
East Boston	170	South Boston	228
Fenway/Kenmore	233	South Dorchester	338
Financial District	165	South End	159
Government Center	46	West End	59
Hyde Park	270	West Roxbury	130
Other (Newton)	3	Total	4,087

Source: Boston HIRA, Boston Water and Sewer Commission

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 13B BWSC Flood-Related Work Orders, Jan. 2009-Nov. 2012

Year	Number of Work Orders
2009	1,067
2010	1,424
2011	1,261
2012	335
Total	4,087

Source: Boston HIRA, Boston Water and Sewer Commission

Based on the record of previous occurrences, on average urban flooding in Boston occurs at least once every 3 years, but less often than once a year.

Potential Flood Hazard Areas

The frequency and locations of flood hazard events in Boston can be estimated based on a number of sources of information. One of these is the National Flood Insurance Rate Maps. The FIRM flood zones are shown on Map 3. A new series of updated FIRM maps has recently been prepared by FEMA, and should be released in 2015. The new maps may result in some areas being designated in flood hazard zones that have not previously been so designated.

Another indicator of flood risk is the number of 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 for 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 23 repetitive loss properties in Boston. These include single-family homes, 2-4 family residences, condos, other residential and non-residential properties. From 1978 to 2012, these 23 properties experienced a total of 55 losses, resulting in \$945,191 in claims for both building losses and contents losses. Table 14 shows the breakdown of structure type by number and amount of losses over this period.

Table 14 - Repetitive Loss Properties Summary

	Number of Claims	Building Losses	Contents Losses	Total Losses
Single Family	13	\$137,259.39	\$30,385.02	\$167,644.41
2-4 Family	6	39,240.46	5,350.00	44,590.46
Condo	2	28,136.75	29,480.25	57,617.00
Other Residential	11	119,531.01	0	119,531.01
Non-Residential	23	191,071.05	364,737.93	555,808.98
TOTAL	55	\$515,238.66	\$429,953.20	\$945,191.86

Source: Federal Emergency Management Agency, National Flood Insurance Program via DRC

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Coastal Flooding, Astronomical High Tides and Storm Surge Impact

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. Boston has exposure to coastal flooding along the entire length of the harbor. Also, the high tide and storm surge can limit the ability of stormwater to drain from inland waterways. Coastal flood and storm surge records for Boston are shown in Table 15 below.

Storm surge is defined as "an abnormal rise in sea level accompanying a hurricane or other intense storm, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic tide from the observed storm tide," according to the NOAA/NWS description in Boston's Storm Ready certification.

Table 15 - Coastal Flood/Storm Surge Records, 1993 - 2013

Date	Type	Deaths	Injuries	Property Damage
12/13/1993	Coastal Flood	0	0	50K
12/16/1993	Coastal Flood	0	0	0
12/20/1995	Coastal Flood	0	0	0
3/5/2001	Coastal Flood	0	0	15.0M
11/6/2002	Storm Surge	0	0	10K
1/4/2003	Storm Surge	0	0	550K
12/6/2003	Storm Surge	0	0	50K
1/23/2005	Storm Surge	0	0	825K
5/24/2005	Storm Surge	0	0	95K
1/31/2006	Coastal Flood	0	0	155K
2/12/2006	Storm Surge/Tide	0	0	80K
4/15/2007	Coastal Flood	0	0	5K
4/16/2007	Coastal Flood	0	0	5K
4/17/2007	Coastal Flood	0	0	20K
10/18/2009	Coastal Flood	0	0	0
1/2/2010	Coastal Flood	0	0	0
3/14/2010	Coastal Flood	0	0	0
12/27/2010	Coastal Flood	0	0	50K
11/23/2011	Coastal Flood	0	0	0
8/28/11	Storm Surge	0	0	0
06/03/2012	Coastal Flood	0	0	0
06/04/2012	Coastal Flood	0	0	0
10/29/2012	Coastal Flood	0	0	3.0M
02/09/2013	Coastal Flood	0	0	30K
03/07/2013	Coastal Flood	0	0	0

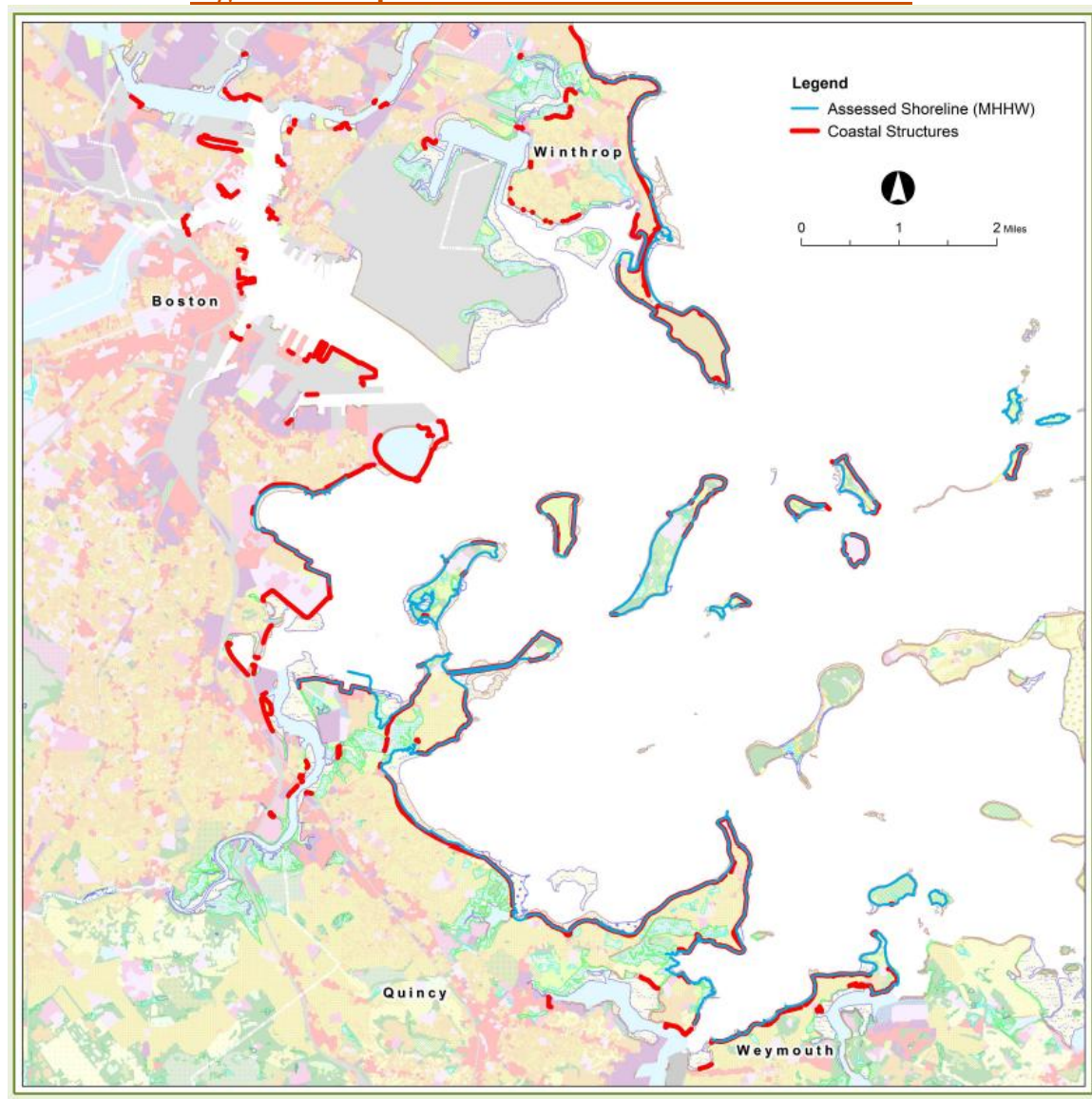
NOAA Satellite and Information Service, National Climatic Data Center, US Department of Commerce

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Coastal erosion is caused by multiple factors, including wind, waves, tides, sea level fluctuation, human alteration, and other factors that influence the movement of sand and material within a shoreline system. The loss (erosion) and gain (accretion) of coastal land is a visible result of the way shorelines are reshaped in the face of these dynamic conditions.

The neighborhoods of Charlestown, East Boston, Boston, Dorchester and South Boston make up the coastal portion of the City of Boston. The estimated length of shoreline is 15 miles that is directly exposed to open ocean. The City is protected from major coastal storms by both natural and man-made shoreline structures that require maintenance to insure the long term protection of its coastline. (see Figure 13).

Figure 13: Map of Coastal Structures in Boston Harbor



Source: MA Coastal Erosion Commission, May 2014

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

The Massachusetts Coastal Inventory and Assessment Project investigated the publicly owned coastal protection structures in the City of Boston for their ability to provide adequate protection from major coastal storms. Since more than half of Boston's coastline is protected by man-made structures, these areas do not normally erode, but the condition of these structures is an indication of the impacts and damages caused by coastal hazards. The results of the investigation are summarized below.

Within the City of Boston, there are 110 structures which provide significant coastal protection. East Boston has 18 structures, Charlestown has 16 structures, Boston has 13 structures, South Boston has 36 structures, and Dorchester has 27 structures. The structures were categorized by their type and by their structural condition based on a preliminary field assessment. The ratings of structures by type and condition as well as their length can be seen in Table 16 below. Definitions of ratings are in Table 18.

Table 16 Coastal Structure Type and Condition Rating

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Length
		A	B	C	D	F	
Bulkhead / Seawall	59	4	29	16	9	1	36804
Revetment	40	3	26	9	2		31905
Breakwater							
Groin / Jetty							
Coastal Dune	1		1				850
Coastal Beach	10		9	1			14614
	110	7	65	26	11	1	84173

Source: Mass. Coastal Infrastructure Inventory and Assessment Project Massachusetts DCR, Office of Waterways

The costs of repair and reconstruction are summarized by structure type and by condition in Table 17. In the City of Boston' there are a total of 110 structures which would require approximately \$ 46 million to bring all the coastal structures to "A" Rating. Most critical will be the structures in the "D" and "F" classifications as those are assumed to undergo some level of damage or failure during the next major coastal storm event. To reconstruct these structures, identified in the preliminary survey as being in poor condition, an estimated \$ 23 million would be required to upgrade the City's coastal protection.

Table 17 Coastal Structure Repair/Reconstruction Cost

Primary Structure (1)	Total Structures	Structure Condition Rating					Total Cost
		A	B	C	D	F	
Bulkhead / Seawall	59	\$ 4,686,429	\$ 8,665,714	\$ 20,382,001	\$ 814,216		\$ 34,548,360
Revetment	40	\$ 4,484,796	\$ 3,903,108	\$ 1,361,760			\$ 9,749,664
Breakwater							
Groin / Jetty							
Coastal Dune	1	\$ 148,512					\$ 148,512
Coastal Beach	10	\$ 1,411,625	\$ 491,040				\$ 1,902,665
	110	\$ 10,731,362	\$ 13,059,862	\$ 21,743,761	\$ 814,216		\$ 46,349,201

Source: Mass. Coastal Infrastructure Inventory and Assessment Project Massachusetts DCR, Office of Waterways

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 18 Coastal Structure Type and Condition Rating Definitions

Preliminary Condition Assessment		Definition Based Upon Perceived Immediacy of Action and Potential to Cause Damage if Not Corrected	Level of Action Required
A	Excellent	Like new condition. Structure expected to withstand major coastal storm without damage. Stable landform (beach, dune or bank). Adequate system exists to provide protection from major coastal storm	None
B	Good	Structure observed to exhibit very minor problems, superficial in nature. Minor erosion to landform is present. Structure / landform adequate to provide protection from a major coastal storm with no damage. Actions taken to prevent / limit future deterioration and extend life of structure	Minor
C	Fair	Structure is sound but may exhibit minor deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure adequate to withstand major coastal storm with little to moderate damage. Actions taken to reinforce structure to provide full protection from major coastal storm and for extending life of structure. Moderate wind or wave damage to landform exists. Landform may not be sufficient to fully protect shoreline during a major coastal storm. Actions taken to provide additional material for full protection and extended life	Moderate
D	Poor	Structure exhibits advanced levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure has strong risk of significant damage and possible failure during a major coastal storm Structure should be monitored until repairs/reconstruction can be initiated. Actions taken to reconstruct structure to regain full capacity to resist a major coastal storm. Landform eroded, stability threatened. Landform not adequate to provide protection during major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.	Major
F	Critical	Conditions of structure/landform may warrant emergency stabilization as failure may result in potential loss of property and/or life. Landform eroded, loss of integrity Structure exhibits critical levels of deterioration, section loss, cracking, spalling, undermining, and/or scour. Structure provides little or no protection from a major coastal storm. Actions taken to totally reconstruct structure to regain full capacity. Landform stability is severely compromised, rate of erosion/material loss may be increasing, and landform does not provide adequate protection from a major coastal storm. Actions taken to recreate landform to adequate limits for full protection from a major coastal storm.	Immediate

Source: Mass. Coastal Infrastructure Inventory and Assessment Project Massachusetts DCR, Office of Waterways

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

The Massachusetts Coastal Erosion Commission issued a draft report in January 2015 which includes an assessment of rates of costal erosion for all coastal communities. Based on GIS analysis of historic of short term trends (30 years) and long term trends (150 years). The Commission's report finds that Boston has an overall short term average of shoreline accretion (as opposed to erosion) of 0.3 feet per year, and a long term trend of accretion of 0.2 feet per year (see Table 19). Nevertheless there are localized areas where erosion is a concern. Some of the major hotspots with vulnerable populations or other important features are Columbia Point, Long Island, Rainford Island, Moon Island, parts of the East Boston coastline, the Reserve Channel, Fort Point Channel, and Pier 5 in Charlestown.

Table 19 Rates of Coastal Erosion, Short and Long Term

Town	Town sub-region	Short-Term Rate		Long-Term Rate	
		Mean (ft/yr)	Std Dev (ft/yr)	Mean (ft/yr)	Std Dev (ft/yr)
Aquinnah		-0.3	2.8	-0.5	1.6
Barnstable	Entire town	0.4	5.2	-0.4	2.2
	CCB	1.1	7.2	-0.2	2.3
	NS	-0.3	2.1	*-0.7	2.0
Beverly		-0.3	0.7	-0.1	0.3
Boston		0.3	2.0	0.2	1.7

Source: MA Coastal Erosion Commission, Vol. 1 Report and Recommendations, Jan. 2015

Even in the absence of a coastal storm, astronomical high tides periodically flood and close Morrissey Boulevard adjacent to Dorchester Bay. Sea-level rise will increase the frequency of such flooding. The National Climatic Data Center depicts an increased frequency of coastal flooding events, listing 13 coastal floods and 4 storm surge tide events since 2007.

The National Weather Service-Taunton anticipates that it is probable for the Boston tide gage to exceed the value of at least 16 to 17 feet MLLW given a 4 to 6 foot storm surge on a high spring tide cycle. A NWS Boston High Water Seminar held November 22, 2013 started planning an exercise (to be held in 2014) for a scenario with a storm tide reaching 18 feet above MLLW, easily attainable with a six-foot storm surge on a high spring tide cycle. In this scenario, a major concern is the restriction of access to a major transportation boulevard adjacent to the interstate highway system and the most impacted residents reside in Savin Hill and Columbia Point in Dorchester. The scenario is based on seven coastal flooding incidents:

On February 25-26, 2010, northeast winds built up seas along the east-facing coastline and combined with astronomical high tides to produce in moderate coastal flooding.

On November 23, 2011, high astronomical tides combined with weak wave action produced minor coastal flooding along the east-facing shore of Massachusetts. Minor coastal flooding during high tide closed Morrissey Boulevard.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

On June 4, 2012, Boston experienced high spring astronomical high tides. Coastal flooding lasted through several high tide cycles with heavy rainfall. Morrissey Boulevard was closed due to minor coastal inundation. On Long Wharf, 14 to 16 inches of water flooded restaurants there.

October 29, 2012, Superstorm Sandy brought high winds and coastal flooding to Boston, closing the ramp for Morrissey Boulevard (Exit 14) off of I-93 and flooding the Harborwalk at Columbia Point. Savin Hill Beach experienced splash over the seawall.



Storm Surge at Long Wharf, February 2013

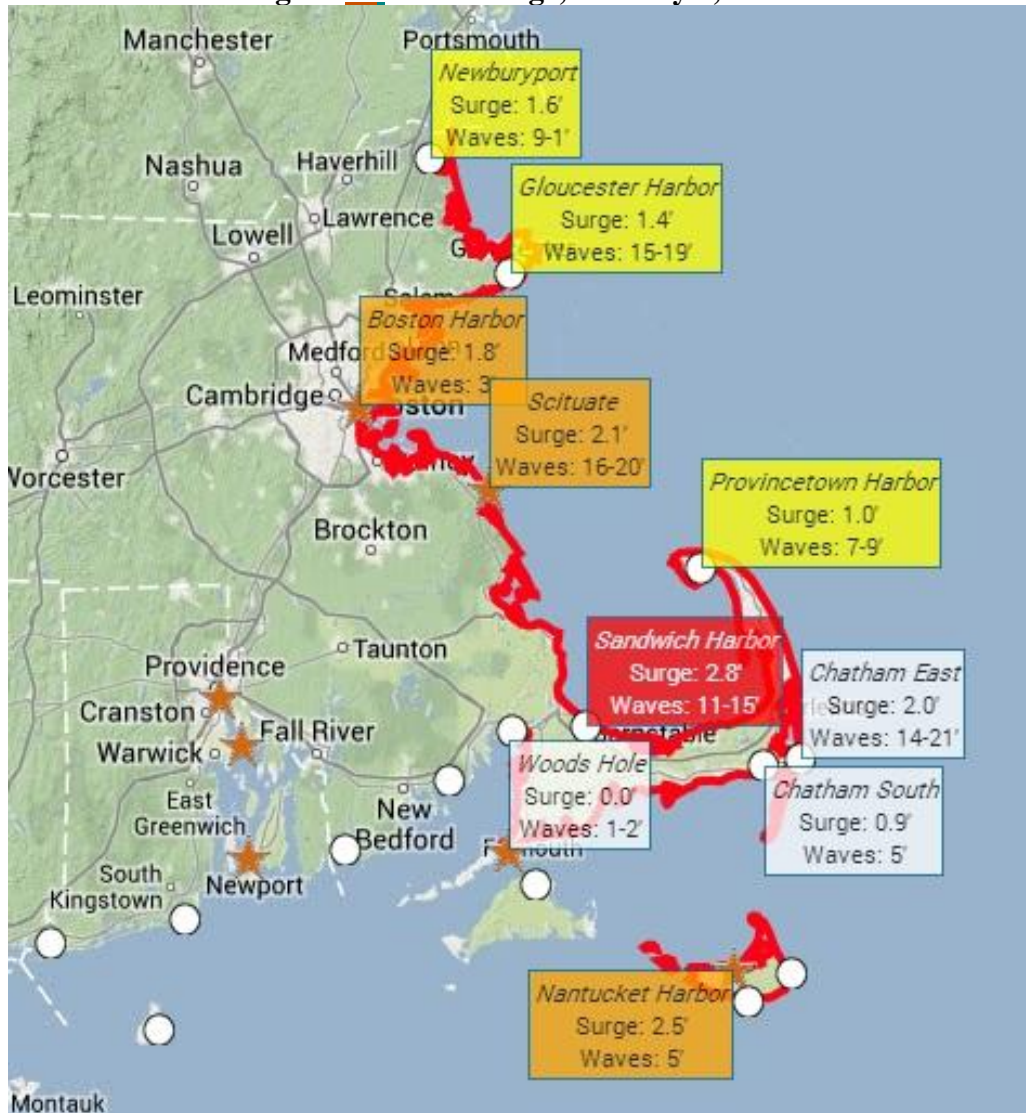
During the February 8-9, 2013 Blizzard, moderate coastal flooding occurred during high tide on Saturday morning along Boston's waterfront, including Long Wharf. Waves built to 30 feet just 15 miles off shore due to the astronomical high tide and high winds.

On March 7-8, 2013, widespread moderate coastal flooding during 5 tide cycles closed Morrissey Boulevard in both directions from the University of Massachusetts – Boston to Freeport Street, as well as Exit 14 from I-93 northbound.

On January 2, 2014 the City of Boston declared a Snow Emergency. Morrissey Boulevard was closed to traffic at 10:30am due to tidal flooding. Moderate storm surge was predicted to be 1.8 feet with 3 foot waves [\(see Figure 14\)](#).

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Figure 14 Storm Surge, January 2, 2014



National Weather Service – Taunton, MA, January 2, 2014

Based on the record of previous occurrences, coastal flooding in Boston is a high frequency event 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).

Dam Failure

Dam failure can occur as a result of structural failure, independent of a hazard event, or as the result of the impacts of a hazard event such as flooding associated with storms or an earthquake. In the event of a dam failure, the number of fatalities and amount of property damages depends on the amount of warning provided to the population and the number of people and value of property in the path of the dam's floodwaters. Dam failure in general is infrequent but has the potential for severe impacts.

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

According to the inventory dams maintained by the Massachusetts Department of Conservation and Recreation, Office of Dam Safety, there are five dams located in Boston, and one located in Somerville upstream of Boston on the Mystic River (see Table 20).

Table 20 DCR Inventory of Dams

Dam Name	River	Owner -Type	Hazard Potential
Amelia Earhart Dam	Mystic River	DCR Flood Control	Low Hazard
Baker Chocolate Dam	Neponset River	DCR Flood Control	Significant Hazard
Charles R. Dam	Charles River	DCR Flood Control	Significant Hazard
Chestnut Hill Res.	Offstream	DCR-MWRA Operated	High Hazard
Southwest Campus	Sawmill Brook	City of Boston-Municipal	Small Unregulated Dam
Westinghouse Dam	Mother Brook	DCR Flood Control	Significant Hazard

Source: Mass. DCR Inventory of Dams

Table 20 shows that DCR categorizes dams according to the potential extent of hazard in the event of dam failure. DCR defines dam hazard classifications as follows:

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

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

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

Neponset River Dam Failure August 1955

The only known case of a dam failure in Boston occurred in 1955 on the Neponset River. On August 11 and 12, 1955, Hurricane Connie produced 4-6 inches of rainfall over most of southern New England, saturating the ground and elevating river and reservoir levels above normal levels. A few days later, on August 17-19, Hurricane Diane delivered up to nearly 20 inches over a two-day period. These two storms contributed to making August 1955 the wettest month on record in Boston. Both the Neponset and Charles Rivers flooded.

As a result of the back-to-back storms, over 200 dams in New England had partial to complete failure. The U.S. Army Corps of Engineers deployed 1200 pieces of heavy equipment in response. One of the failed dams was the Neponset River Dam. To mitigate future flooding of the Neponset River, the Commonwealth of Massachusetts passed a

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

bond bill in September 1956 authorizing a major overhaul of the Neponset between Fowl Meadow and the Baker Dam.

Dam Failure Impact

The greatest impact of the Neponset dam failure was the spreading of sediment contaminated with polychlorinated biphenyls (PCBs) from Mother Brook into the Neponset River estuary. According to the U.S. Geologic Survey, “PCBs from this source area likely continued to be released after the flood and during subsequent rebuilding of downstream dams. Today (2007), PCBs are mostly trapped behind these dams; however, some PCBs either diffuse or are entrained back into the water column and are transported downstream by river water into the estuary or volatilize into the atmosphere. In addition to the continuing release of PCBs from historically contaminated bottom sediment, PCBs are still originating from source areas along Mother and Meadow Brook as well as other sources along the river and Boston Harbor.” (Source: Breault, R.F., 2011, Concentrations, loads, and sources of polychlorinated biphenyls, Neponset River and Neponset River Estuary, eastern Massachusetts: U.S. Geological Survey Scientific Investigations Report 2011–5004)

Other dams in Boston include the following:

Charles River Dam – The Charles River Dam effectively controls water levels in the river in order to minimize the potential for riverine flooding from upstream flows from the Charles River watershed. The dam also protects against storm surges traveling upstream from Boston Harbor. The dam is actively monitored by DCR and is in good condition. The dam's pumps were recently completely overhauled as a mitigative measure. Six prime 2700 horsepower diesel pumps and 2 transmissions were overhauled.

A potential future impact of climate change on the dam is the possibility of a coastal storm surge overtopping the dam due to a combination of sea level rise and higher storm surges. The finished floor elevation inside the dam's pump station is 122.17 (MDC base). The new surge model being developed by the Army Corps of Engineers indicates that a Category 3 hurricane would be above that level.

Amelia Earhart Dam (Mystic River) – Another DCR managed facility, the Amelia Earhart Dam similarly protects against riverine flooding from the upstream Mystic River watershed and storm surges from the lower Mystic River and Boston Harbor.

Neponset River Dams – The Neponset River forms the boundary of the City of Boston and the Town of Milton. There are two major dams on the Neponset River adjacent to the City of Boston. The first is located in the vicinity of the former Walter Baker Complex and the second at the Bay State Paper Company in the Hyde Park area. Failure of either of these two dams would be unlikely to lead to loss of life.

Chestnut Hill Bradley Basin Dam – Located at the Chestnut Hill Reservoir, this dam is owned and maintained by DCR, and is in good condition.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Based on the record of previous occurrences, dam failures in Boston are very low frequency events as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur less often than once in 100 years (Less than 1% probability per year).

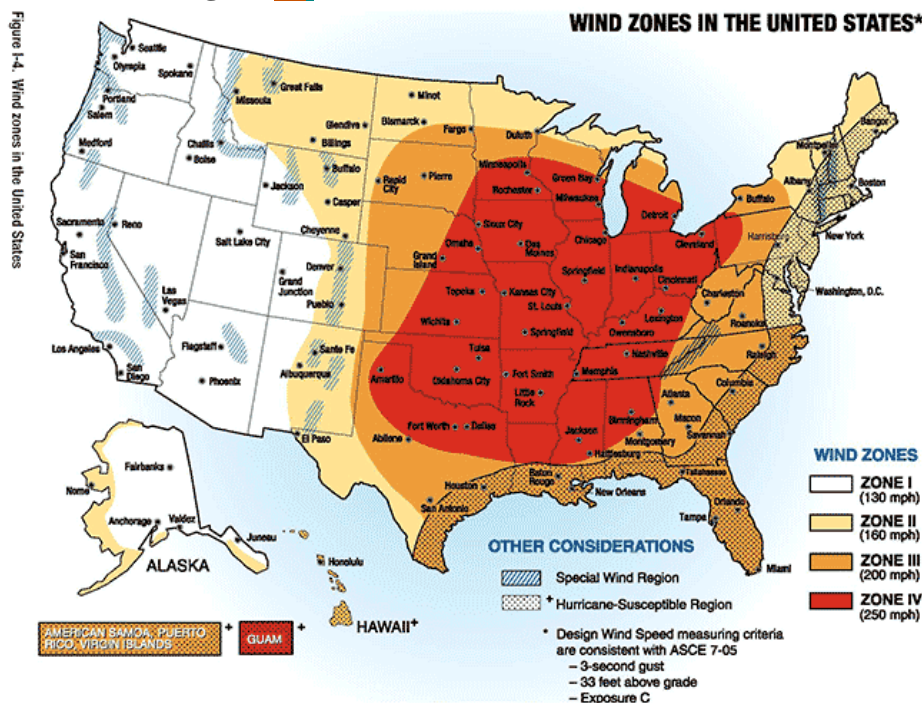
Wind Related Hazards

Wind-related hazards include hurricanes and tornados as well as high winds during severe rainstorms and thunderstorms. The typical wind speed in the Boston area ranges from around 11 miles per hour to 14 over the course of the year, but independent of storm events, gusts of up to 40 mph can occur.

As with many communities, falling trees caused by high winds can down power lines and cause power outages. Hazardous situations can be mitigated by routine maintenance and care of street and park trees. Many cities operate on a 6-7 year pruning cycle, although this number is often closer to 10, due to lack of funding for forestry staff and crews. Trees are vulnerable to strong winds due to insufficient planting spaces and soil volumes. New standards for street tree plantings need to be developed and adopted as part of mitigation planning. Information on wind related hazards can be found on Map 5 in Appendix C.

According to the national classification of wind zones in the US, Boston lies within Zone II, with maximum winds of 160 mph. Boston is also within the Hurricane-Susceptible Region, as is all of the East Coast and Gulf of Mexico (see Figure 15).

Figure 15 Wind Zones in the United States



CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Hurricanes and Tropical Storms

A hurricane is "a tropical cyclone in the Atlantic, Caribbean Sea, Gulf of Mexico, or eastern Pacific, which the maximum 1-minute sustained surface wind is 64 knots (74 mph) or greater," according to the NOAA/NWS definition included in Boston's Storm Ready certification. Given its location near the coast, the City is highly vulnerable to hurricanes. A hurricane is strongest as it travels over the ocean and is particularly destructive to coastal property as the storm hits the land. Hurricanes generally occur between June and November. A tropical storm is "a tropical cyclone in which the maximum 1-minute sustained surface wind ranges from 34 to 63 knots (39 to 73 mph)."

A hurricane or storm track is the line that delineates the path of the eye of a hurricane or tropical storm. Two recorded storm tracks have passed directly through Boston: a tropical storm that passed through Hyde Park, Mattapan, Roxbury, Dorchester, South Boston, and East Boston; and a hurricane that passed through Allston/Brighton. However, the City experiences the impacts of the wind and rain of hurricanes and tropical storms even when the storm track passes nearby, but not directly through the City. Storms that track west of the City result in stronger winds in Boston, while those that pass to the east may bring more rainfall. The hazard mapping indicates that the 100 year wind speed is 110 miles per hour. Major tropical storms and hurricanes that passed through or near Boston are summarized in Table 21, and historic hurricane tracks are shown in Figure 16 below.

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

Scale No. (Category)	Winds(mph) Storm	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

Tropical storms are not included in the Saffir/Simpson scale, but by definition they feature wind speeds under 74 mph, or lower than a Category 1 hurricane.

Of the 28 hurricanes and tropical storms listed in Table 21 below, the Hurricane of 1944 from September 9 – 16, 1944 and the Tropical Storm of 1902 from June 12 – 17, 1902 tracked directly through the City of Boston. It is important to note, that Hurricane Irene from August 21 – 30, 2011 and most recently Hurricane Sandy from October 22 – 31, 2012 fortunately did not track directly over the City of Boston. Hurricane Sandy was a Category 3 hurricane at its peak intensity and weakened to a Category 2 off the northeastern Atlantic coast. Hurricane Sandy became the largest Atlantic hurricane on

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 21 - Historic Hurricane Records for Boston and New England

Hurricane Sandy	October 29-30, 2012
Tropical Storm Irene	August 28, 2011
Hurricane Earl	September 4, 2010
Hurricane Hanna	August 28, 2008 to September 8, 2008
Tropical Storm Barry	May 31, 2007 to June 5, 2007
Tropical Storm Hermine	August 27 - 31, 2004
Hurricane Bertha	July 5 - 17, 1996
Hurricane Bob	August 16 - 29, 1991
Hurricane Gloria	September 27, 1985
Hurricane Donna	September 12, 1960
Hurricane Diane	August 17-19, 1955
Hurricane Edna*	September 11, 1954
Hurricane Carol*	August 31, 1954
Hurricane Doug	September 11-12, 1950
Great Atlantic Hurricane 1944*	September 9 - 16, 1944
Great New England Hurricane*	September 21, 1938
Tropical Storm of 1923	October 15 – 19, 1923
Extratropical Storm of 1916	May 13 – 18, 1916
Hurricane of 1916	July 10 - 22, 1916
Hurricane of 1915	July 31, 1915 to August 5, 1915
Hurricane of 1908	May 24 - 31, 1908
Tropical Storm of 1902	June 12 - 17, 1902
Hurricane of 1897	September 20 - 25, 1897
Hurricane of 1888	August 14 - 24, 1888
Tropical Storm of 1888	September 6 -13, 1888
Hurricane of 1876	September 12 - 19, 1876
Hurricane of 1869	September 7 – 9, 1869
Hurricane of 1861	November 1 – 3, 1861

*Category 3

Source: National Oceanic and Atmospheric Administration

Hurricane Irene Impact and Extent of Damage

Irene weakened to a Category 1 hurricane as it made landfall along the Outer Banks of North Carolina. The most severe impact in New England was experienced from catastrophic inland flooding in Western Massachusetts, Vermont and New Hampshire. In Boston, tropical storm force winds from the northeast quadrant of Irene toppled trees, including some of Boston's most treasured historic trees onto homes and vehicles and downed electrical power lines and street lighting wiring, leaving thousands of residents without electrical power, blocking roadways, and closing off emergency access. Emergency responders, coordinating tree cutting operations with utility crews, prioritized response according to public safety hazards.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

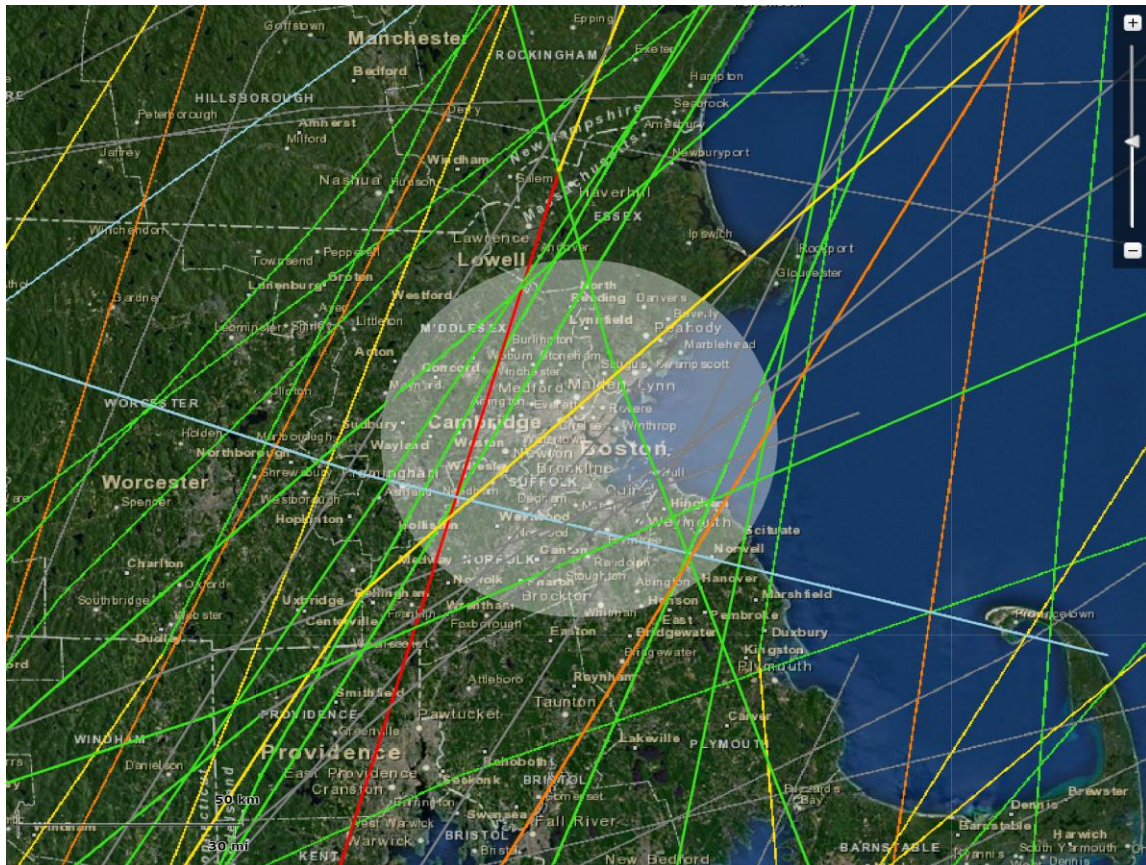
record with winds spanning 1,100 miles. Strong tropical force winds from the northeast quadrant of the post tropical cyclone, Sandy developed into a super storm nor'easter that impacted the City of Boston. Preliminary estimates assess costs at \$4.8 million for the City of Boston as compared to a total of \$75 billion in all impacted states, making Sandy the second most expensive hurricane in U.S. history. Only Hurricane Katrina was more costly. The most recent federal disaster declarations for hurricanes impacting the City of Boston are shown in Table 22

Table 22 - Hurricane Disaster Declarations

Disaster	Title	Dates
DR-751	Hurricane Gloria	9/27/1985
DR-914	Hurricane Bob	8/19/1991
EM-3252	Hurricane Katrina Evacuation	8/29/2005-10/1/2005
EM-3315	Hurricane Earl	9/1/2010-9/4/2010
EM-3350	Hurricane Sandy	10/29/12-10/30

Source: Federal Emergency Management agency (FEMA)

Figure 16 - Historic Hurricane Tracks In or Near Boston



**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Tree Damage from Hurricane Irene

Approximately, 2,000 calls to 911 were recorded for downed trees. The storm caused structural damage to 42 homes. In addition, the 24 Hour Constituent Hotline received 1,199 storm-related requests and 650 reports of downed wires that did not involve fallen trees. A total of 1,027 locations were responded to during the storm.

Hurricane Sandy Impact and Extent of Damage

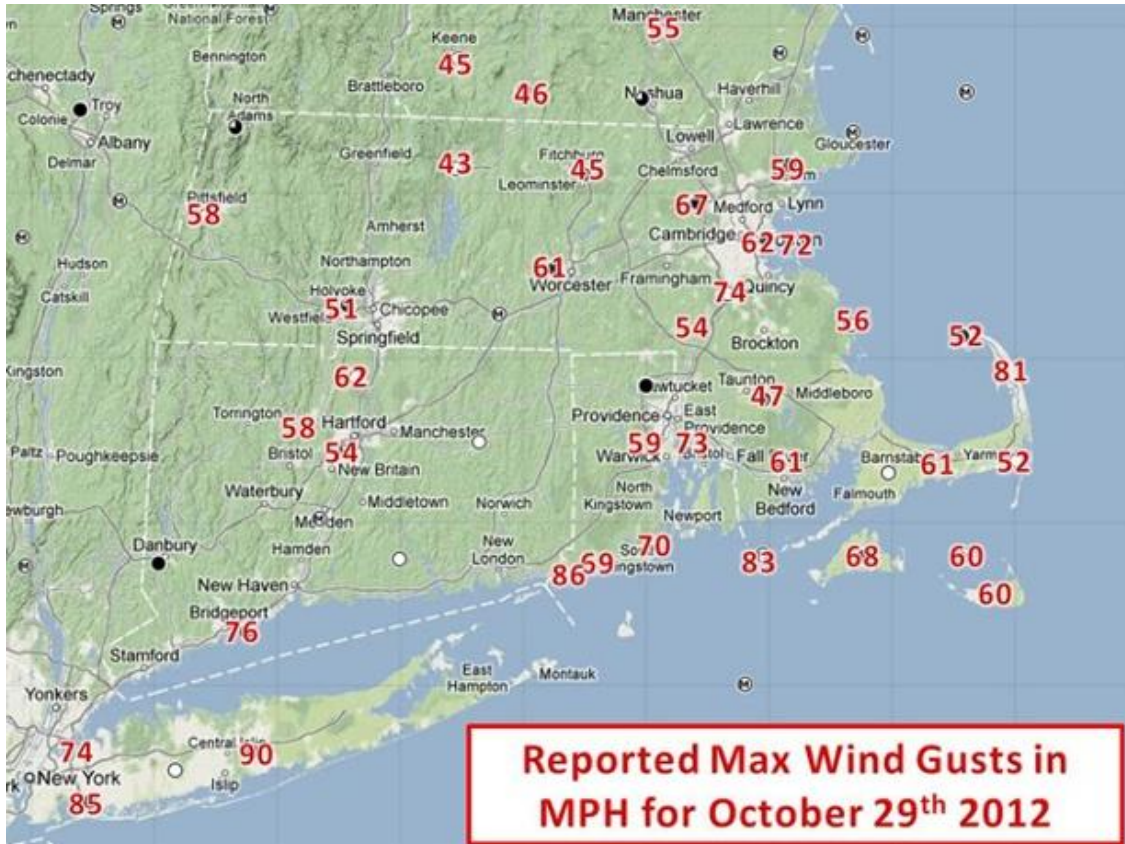
Although Superstorm Sandy made landfall in New Jersey, its effects were felt in Boston. A pre-landfall emergency declaration was in place for all of Massachusetts and precautions included a shutdown of the MBTA. High winds from the northeast quadrant of the storm toppled trees, power lines and ripped roofs off of houses and schools ([see Figure 17](#)). Coastal inundation flooded the Boston's Harborwalk. A sailboat ran aground at Carson Beach, South Boston.

Sandy caused \$2 million of damage to Boston's municipal buildings , primarily from wind damaged to roofs and water damage to ceilings and plaster walls. Approximately, 770 calls to 911 reported downed wires, street and sidewalk debris, transformer fires, flooding, road closures and partial structural collapse. The 24 Hour Constituent Hotline received 1,573 storm related requests, including 78 for flooding at 68 locations; 344 for downed wires at 291 locations; 790 for damaged or downed tree at 608 locations; 326 for street debris at 303 locations; and 35 for power outages.

Hurricanes are a city-wide hazard for Boston. Based on the record of previous occurrences, hurricanes in Boston are medium frequency events as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur from once in 5 years to once in 50 years (2% to 20% probability per year).

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Figure 17 Maximum Wind Gusts 10/29/12 (Superstorm Sandy)



Boat beached during Superstorm Sandy on Carson Beach

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Tornados

Tornado Risk and Vulnerability

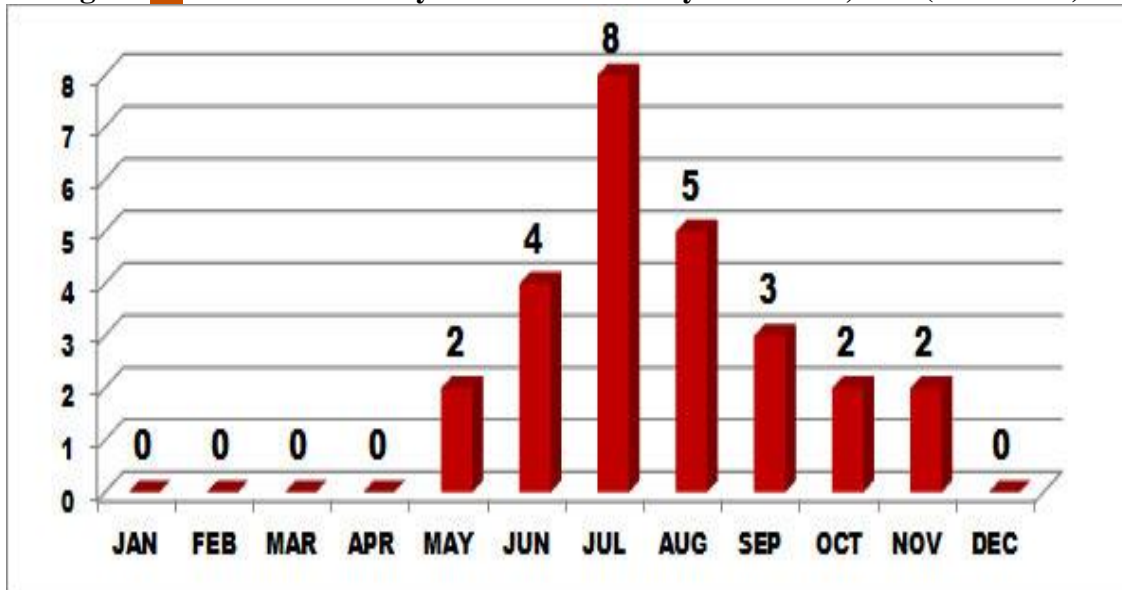
A tornado is "a violently rotating column of air, usually pendant to a cumulonimbus, with circulation reaching the ground. It nearly always starts as a funnel cloud and may be accompanied by a loud roaring noise," according to the NOAA/NWS definition included in the City of Boston's Storm Ready certification. The City of Boston is at high risk for high winds from severe thunderstorms but at moderate risk of tornado activity. From August 21, 1951 to date there have been no reported tornados that touched-down within the City of Boston. However, on Monday, July 28, 2014 a tornado struck the City of Revere, MA which is located adjacent to Boston to the north. There were several minor injuries but no deaths. The tornado was F-2 in magnitude and was on the ground for approximately four minutes in Revere. Since 1951 there have been 101 tornados within 50 miles of central Boston. Two of these were rated as an F3 and were within 36 miles of central Boston. A 1971 F1 tornado in the City of Newton injured six people and caused one death (HIRA). The strongest tornado in Massachusetts history was the Worcester Tornado in 1953 (NESEC). More recently a tornado caused significant damage in Springfield, resulting in 4 deaths in June of 2011. During that tornado outbreak, tornado warnings were issued for Middlesex and Norfolk counties including the Town of Dedham. The City of Boston took precautions warning residents of the trailer park in West Roxbury of the tornado warning due to the vulnerability of these mobile homes.

On July 18, 2012 the National Weather Service in Taunton issued a Tornado Warning for Suffolk and Essex Counties. At 2:09 PM a waterspout was observed in Boston Harbor from Logan International Airport. According to Glenn Field, Warning Coordination Meteorologist at NOAA's National Weather Service office in Taunton, MA, "a supercellular storm structure, complete with rotating wall cloud, formed out by Woburn and the rotation seen on radar prompted issuance of a tornado warning. The storm intensified further as it moved out to sea and we still think there was likely to have been an unreported waterspout farther off the coast, beyond the camera range. One and a half inch hail was reported in Nahant, 1.25 inch hail in Revere and Peabody. There was a funnel cloud reported by a very well trained amateur radio coordinator in Peabody. Federal Street was impassable from flooding in Lynn and there were a few trees downed as well."

Tornados are most common in the summer, and most form in the afternoon or evening. The most probable month for a tornado is July, but the tornado season for the City of Boston runs from May through November (see Figure 18). Tornados are often associated with strong thunderstorms.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Figure 18: Tornado Risk by Month for the City Of Boston, MA (1950-2011)



Source: Tornado climatology information compiled by [Dr. Greg Forbes](#), Severe Weather Expert for The Weather Channel.

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, 2010

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Wall Cloud over Boston Harbor, July 18, 2012

Photo: Mark Garfinkel – Boston Herald

There is little historical data with which to estimate possible tornado damage. Government Center, Copley Square, Prudential Center, Financial District and the new Innovation District are at greater potential risk from tornado winds due to the density and height of the buildings. These buildings can generally sustain moderately high winds, but their glass facades may be vulnerable. The façades of unreinforced masonry buildings are more susceptible. Tornado damage in Massachusetts is estimated from \$500 to \$227,600,000 per the Massachusetts Tornado History Project estimates that damages from Massachusetts tornadoes ranges from \$500 to \$228 million. [Tornadoes are a city-wide hazard for Boston](#)

[Based on the record of previous occurrences, tornadoes in Boston are a very low frequency events as defined by the 2013 Massachusetts State Hazard Mitigation Plan. This hazard may occur less often than once in 100 years \(Less than 1% probability per year\).](#)

Nor'easters

A classic nor'easter is a strong low pressure system that forms over land or is positioned just off the coastal waters of New England. Nor'easters are relatively common in the winter months in New England, occurring one to two times a year, and are notorious for producing heavy snow, rain and tremendous waves that crash onto Atlantic beaches causing beach erosion and structural damage. The characteristics of a nor'easter produce strong northeasterly winds blowing in from the ocean ahead of the storm and over the

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

coastal areas. These strong northeast winds typically cause coastal flooding, coastal erosion and gale to hurricane force winds. The storm radius of a nor'easter can be as much as 1,000 miles (see Figure 19) and these storms feature sustained winds of 10 to 40 mph with gusts of up to 70 mph.

Figure 19- Satellite Image of March 2013 Nor'easter



Source: The Geostationary Operational Environmental Satellite Program (GOES), a joint effort of NASA and NOAA..

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, October 2011, and February 2013 were large nor'easters, as was the major winter storm of March 2013. The latter two storms are described [in the section on winter storms](#) below: [Nor'easters are a city-wide hazard for Boston.](#)

[Based on the record of previous occurrences, nor'easters in Boston 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 \(greater than 20% per year\).](#)

Thunderstorms

While less severe than the other types of storms, a thunderstorm, which features lightning, strong winds, and rain or hail, can lead to localized damage and represent a

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

hazard risk for communities. Hail is defined as "showery precipitation in the form of irregular pellets or balls of ice more than 5 mm in diameter, falling from a cumulonimbus cloud," according the NOAA/NWS description included in Boston's Storm Ready certification. Hail is considered a secondary impact to thunderstorms, and therefore is not analyzed as a separate hazard.

Hail size 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
Golfball	1.75
Hen's Egg	2.00
Tennis Ball	2.50
Baseball	2.75
Tea Cup	3.00
Grapefruit	4.00
Softball	4.50

Thunderstorms sometime give rise to tornados. On average, thunderstorms storms are only around 15 miles in diameter and last for about 30 minutes. The National Weather Service-Taunton issues a severe thunderstorm warning when a severe thunderstorm is indicated on radar or a spotter reports a thunderstorm producing 1 inch or larger hail in diameter and/or winds equal to or exceeding 58 miles an hour.

On August 19, 2011, the National Weather Service Doppler radar indicated a strong thunderstorm at about 4 p.m., capable of producing penny-sized hail with gusty winds of up to 60 mph. Heavy downpours, thunder and lightning were reported in the City of Boston. As a safety precaution for a major public event, participants at Greenfest on City Hall Plaza were evacuated successfully into City Hall as high winds; lightning and heavy rain fell directly over Government Center. During the same thunderstorm, a State Police trooper and his canine were struck by lightning in their vehicle at Boston's Logan International Airport in East Boston.

During severe thunderstorms buildings in Boston have been struck by lightning. On May 7, 2011, a three alarm fire broke out when lightning struck a third floor rear porch in the

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Ashmont Hill section of Dorchester. On July 18, 2012, a lightning strike briefly knocked out power to the building housing WBZ-TV and WBZ News Radio 1030. The potent lightning strike, during a live news broadcast took the station off air. The same thunderstorm created a lightning strike that set a home on fire in the Codman Hill/Lower Mills section of Dorchester. In Roslindale Square, lightning hit a transformer and the business district lost power when wires fell on parked cars and residential property.

[Thunderstorms are a city-wide hazard for Boston.](#)

Lightning creates hazardous conditions for pedestrians. On July 20, 2008, during a soccer game, 10 people were hospitalized following a lightning strike when taking shelter under a tree on Talbot Avenue, Dorchester. On May 5, 2010 lightning struck a cell tower on River Street in Hyde Park and the powerful electrical bolt traveled through the ground striking a man working on a lift. On August 5, 2010, a man was struck by lightning and succumbed to his injuries while walking along the Sugar Bowl in South Boston. During the July 4th 2012 celebrations, the Boston Esplanade was evacuated as a public safety measure during the Fourth of July Boston Pops Concert, and two people were struck by lightning at Thomas Park in South Boston.

[Based on the record of previous occurrences, thunderstorms in Boston 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 \(greater than 20% per year\).](#)



Lightning Strike During Esplanade Concert, July 4, 2012

Photo: Patrick Flanagan

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

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 winter storm becomes a true disaster, and necessitates intense large-scale emergency response. Occasionally winter storms also hinder the tidal exchange in tidally restricted watersheds and result in localized flooding within these areas. Ice build-up at gate structures can damage tide gates and increase the hazard potential as a result of malfunctioning tide gates. Winter storms are a combination hazard because they often involve wind, ice and heavy snow fall. Heavy wet snow is considered a secondary impact of winter storms and therefore are not analyzed as a separate hazard.

The average annual snowfall for the northern portion of Boston (including Jamaica Plain, Roxbury, Mattapan, north Dorchester, South End, South Boston, Allston/Brighton, Back Bay, Beacon Hill, the Financial District, North End, East Boston, and Charlestown) falls within a range of 38.1 to 48 inches while the southern portion of the City, including Roslindale, West Roxbury, and Hyde Park, are in the range of 48.1 - 72 inches of snow annually.

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 cause collapse or cave-in of building roofs. Blizzards include all the hazards associated with heavy snow storms also accompanied by winds of at least 35 miles per hour and temperatures below 20 degrees Fahrenheit. 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. Severe winter storms and blizzards in Boston since 1978 are summarized in Table 23, and the winter storms of 2013 are described below.

Table 23
Blizzards and Severe Winter Storms in Boston

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 2004
Severe Snow Storm	January 2005
Severe Snow Storm	December 2010
Severe Snow Storm	January 2011
Blizzard	February 2013

Source: National Oceanic and Atmospheric Administration

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

The Blizzard of February 2013

On Friday, February 8, 2013, two major storm systems combined off the North Atlantic coast forming severe Nor'east blizzard conditions for the City of Boston. The low pressure and central pressure systems created an intense winter Nor'east blizzard cyclone of historic proportions with a signature classic shaped comma being well defined. Very intense convective snow fell north of the low pressure system creating a 48 hour snow storm. The City of Boston was under a Blizzard Warning. Officially, the City of Boston recorded the 5th largest snow accumulation of 24.9 inches at Boston's Logan International Airport breaking a record in over 100 years of recordkeeping. Along the coast, the City of Boston was under a Coastal Flood Warning. There was a moderate risk of coastal flooding in Boston Harbor from the powerful coastal Nor'east blizzard. Morrissey Boulevard was flooded by coastal inundation and was closed. A Hurricane Force Wind Watch was in effect for coastal waters of Eastern Massachusetts, and Gale Warning for Boston Harbor. The strongest winds were off shore. The City of Boston experienced a gust of 76 mph.

The Nor'east Coastal Snow storm of March 2013

On March 6, 2013, a slow moving strong mid-Atlantic storm developed into a very powerful coastal nor'easter located 323 miles off of Nantucket. The City of Boston was under a Winter Storm Warning, Coastal Flood Warning, and Wind Advisory. A Gale Warning was issued for Boston Harbor. The nor'easter stalled off the coast which significantly increased snow fall amounts for the City of Boston. The snowfall recorded at Logan Airport was 13.1 inches; Brighton at 15.0; Jamaica Plain at 18.0 and West Roxbury at 14.8. Sustained 38 mph winds were recorded at Boston ASOS Logan Airport with peak winds gusts of 48 mph. The impact of extremely long duration and onshore northeast winds contributed to coastal inundation causing DCR to close coastal roadways and Morrissey Boulevard during the astronomical high tide cycles.

Managing snow can be a challenging and expensive task. Generally the denser areas of the City, such as Beacon Hill, Charlestown, and the North End pose greater challenges to snow removal. Narrow streets and on-street parking, particularly double and triple parking can prevent adequate plowing and impede access for emergency vehicles. Residents and property owners often have little land to place snow that accumulates on their driveways, parking lots and sidewalks, so they often shovel snow onto roadways. In recent years, the City has used about 100,000 tons of salt on its roads each winter. Most, if not all, of the salt is imported from overseas. The City has been seeking additional supply options so as to not rely on one vendor. There are seven locations for salt storage and about 34,000 tons are stored at each one. Boston has a 'black pavement policy' meaning that every street is to be cleared. The City is divided into 15 plow districts. Approximately 350 pieces of equipment are used for snow control. The main objective is to ensure that streets are passable for emergency vehicles. The greatest impacts are seen when the City is hit by back-to-back storms where the short period of time does not allow for existing snow to melt. The result has been street closures. Time of day of a storm is

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

also a concern. Overnight storms are easier to plow since there are fewer vehicles on the road. Daytime storms on a weekday are much more of a challenge.

According to the NOAA/NWS definition included in Boston's Storm Ready certification, an ice storm is characterized by "damaging accumulations of ice are expected during freezing rain situations. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of 1/4" or greater." Ice storms can arise in any part of the city and are a city-wide hazard. Expected impacts can include impaired transportation conditions, impaired delivery of emergency services, iced trees and downed limbs, and loss of power and communications due to ice coated lines or falling tree limbs.

Impacts from winter weather – in addition to non-passable streets and sidewalks – include downed power lines causing loss of electric power service, catch basins being buried and sometimes clogged, water service pipes bursting, and shut-off valves being buried (more common when cold and windy), fire hydrants being buried by snow, older water mains bursting, and dangerous icicles forming on buildings. Snow can also block building ventilation, increasing the risk of indoor carbon monoxide poisoning and place a heavy load on roofs.

The City's overall vulnerability to winter storms is primarily related to restrictions to travel on roadways, temporary road closures, school closures, and potential restrictions on emergency vehicle access. Other vulnerabilities include power outages due to fallen trees and utility lines, and damage to structures due to heavy snow loads.

Based on the record of previous occurrences, winter storm events in Boston 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).

Ice Jams

Although known to occur in central and western Massachusetts, ice jams are not a hazard for Boston. The Army Corps of Engineers Cold Regions Research and Engineering Laboratory database on ice jams shows no record of ice jams in Boston from 1913 to 2013.

Geologic Hazards

Geologic hazards include earthquakes, landslides, sinkholes, subsidence, and unstable soils such as fill, peat, and clay. Although the most recent building codes have higher seismic standards, many older structures are more vulnerable to seismic hazards. Information on geologic hazards can be found on Map 4 of the hazard mitigation map series (Appendix [C](#)).

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Earthquakes

An earthquake is the vibration, sometimes violent, of the earth's surface that follows a release of energy in the earth's crust due to fault fracture and movement. A fault is a fracture in the earth's crust along which two blocks of the crust have slipped with respect to each other. Faults are divided into three main groups, depending on how they move. Normal faults occur in response to pulling or tension: the overlying block moves down the inclined dip of the fault plane. Thrust (reverse) faults occur in response to squeezing or compression: the overlying block moves up the inclined dip of the fault plane. Strike-slip (lateral) faults occur in response to either type of stress; the blocks move horizontally along a vertical fault past one another. Most faulting along spreading zones is normal, along subduction zones is thrust, and along transform faults is strike-slip.

The focal depth of an earthquake is the depth from the Earth's surface to the region where an earthquake's energy originates (the focus). Earthquakes with focal depths from the surface to about 43.5 miles are classified as shallow. Earthquakes with focal depths from 43.5 to 186 miles are classified as intermediate. The focus of deep earthquakes may reach depths of more than 435 miles. The focuses of most earthquakes are concentrated in the crust and upper 20 miles of the Earth's crust. The depth to the center of the Earth's core is about 3,960 miles, so even the deepest earthquakes originate in relatively shallow parts of the Earth's interior.

The epicenter of an earthquake is the point on the Earth's surface directly above the focus, and the focus is the area of the fault where a sudden rupture initiates. The location of an earthquake is commonly described by the geographic position of its epicenter and by its focal depth. Earthquakes beneath the ocean floor sometimes generate immense sea waves or tsunamis if the earthquake causes upward or downward movement of the sea floor. The tsunami originates where this movement takes place.

The cause of earthquakes in eastern North America is the forces moving the tectonic plates over the surface of the Earth. New England is located in the middle of the North American Plate. One edge of the North American plate is along the west coast where the plate is pushing against the Pacific Ocean plate. The eastern edge of the North American plate is at the middle of the Atlantic Ocean, where the plate is spreading away from the European and African plates. New England's earthquakes appear to be the result of the cracking of the crustal rocks due to compression as the North American plate is being very slowly squeezed by the global plate movements.

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

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

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

Source: Nevada Seismological Library (NSL), 2005

Damage to structures in an earthquake can be caused by several geologic mechanisms, including ground motion, surface faulting, and ground failure in which weak or unstable soils, such as those composed primarily of saturated sand or silts, liquefy (a process called liquefaction). The effects of an earthquake increase with earthquake magnitude, decrease with distance from the earthquake epicenter, and are highly dependent on the type of geologic materials present at a site. Even if the epicenter of an earthquake is not located in the City of Boston, it is important to note that due to the harder, cooler rocks that comprise the eastern U.S. (compared to the western U.S.), distant earthquakes are more widely felt in the metropolitan Boston area.

According to Dr. John Ebel, Director of the Boston College Weston Observatory, the bedrock of the northeastern United States is much colder as compared to that of the western US. Our colder bedrock is why the 5.8 magnitude earthquake in Mineral, Virginia on August 23, 2011 and the 4.0 magnitude earthquake 3 miles west of Hollis Center, Maine on October 16, 2012 both resulted in tremors being felt in the City of Boston. A summary of earthquakes affecting the City is found in Table [24](#).

According to the Northeast States Emergency Consortium, from 1668 to 2007, 355 earthquakes were recorded in Massachusetts. The region has experienced larger earthquakes, including a magnitude 6.0 quake that struck in 1755 off the coast of Cape Anne. The closest recorded earthquake epicenter was at the Braintree/Quincy border, southwest of the Route 3 interchange with Interstate Route 93. This quake occurred in 1979 with a magnitude of 2.2, which is the smallest quake normally felt by people.

The Northeast States Emergency Consortium documented 165 earthquakes within 250 miles of the NESEC northeast region from January 1 through December 5, 2012. These earthquakes ranged from 0.3 to 4.5, and 30 of them were 2.5 or greater (see Figure [20](#) below). NESEC also notes that of particular interest in 2012 was a sequence or “swarm” of 12 offshore earthquakes that occurred off the continental slope east of Massachusetts,

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

ranging from magnitude 0.5 to 4.5. The 4.5 event occurred 250 miles east of Boston on April 12, 2012. Because of the proximity to Boston and other coastal cities such as Portsmouth, NH and Portland, ME, the NESEC State Geologists and State Directors of Emergency Management have requested that the US Geological Survey (USGS) conduct an immediate and thorough review and advise them on the potential for future activity in this offshore region. The USGS investigation is currently underway.

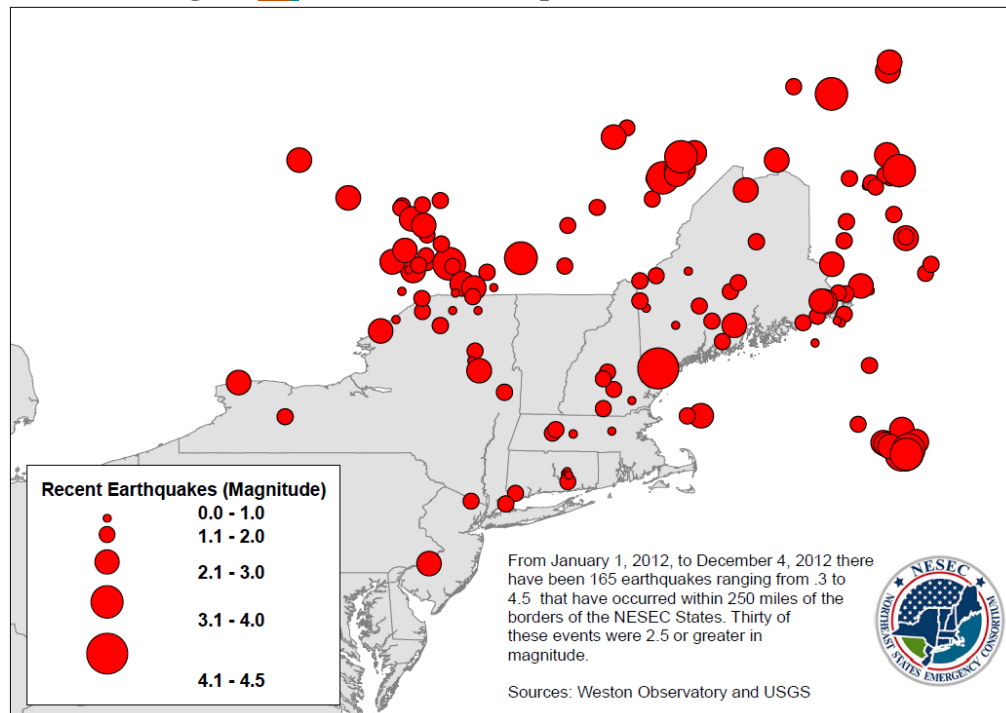
Table 24 - Historical Earthquakes in Boston or Surrounding Area, 1727-2012*

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	12/27/1974	2.3
VA - Mineral	8/23/2011	5.8
MA - Nantucket	4/12/2012	4.5
ME - Hollis	10/17/2012	4.0

**Historical earthquakes without recorded magnitude were classified based on intensity using the Modified Mercalli Scale (intensity V or higher). Source: HIRA*

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Figure 20 -Northeast Earthquakes, 1/1/12 to 12/5/12



Sources: NESEC, from Weston Observatory and USGS

Earthquake Impacts – Earthquakes have multiple impacts beyond the obvious building collapse. Buildings may suffer structural damage which 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 building may be structurally engineered to withstand an earthquake, but if the equipment inside is not properly secured; the function of the hospital could be affected. Earthquakes can also trigger landslides.

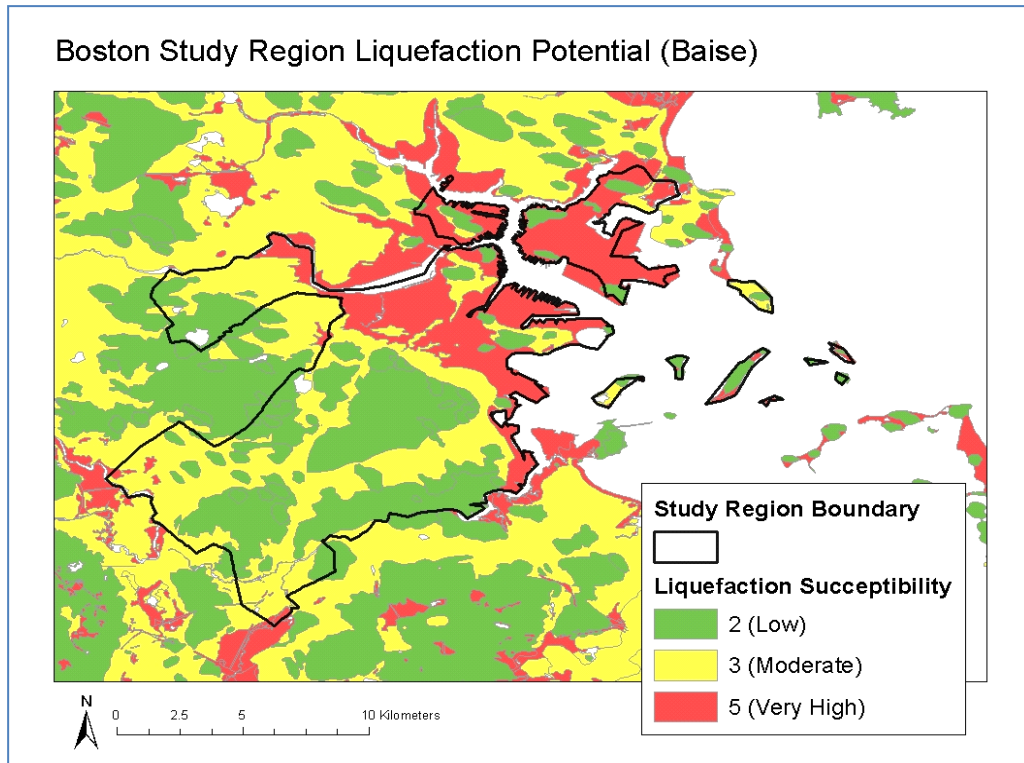
Liquefaction – Liquefaction poses a particular risk for Boston because of the extensive area of the City built on filled land (see Figures 21 and 22). During an earthquake these soils become unstable, effectively liquefying, destabilizing the buildings above leading to collapse, ruptured utilities, and other related impacts.

Potential earthquake damages to Boston have been estimated using HAZUS-MH. Total damages are estimated at \$3.4 billion for a 5.0 magnitude earthquake with an epicenter in downtown Boston, and \$345 million for a 6.5 magnitude earthquake with an epicenter in central New Hampshire. Other potential earthquake impacts are detailed in Table 29.

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 2013 classifies earthquakes as "very low" frequency events that occur less frequently than once in 100 years, or a less than 1% per year.

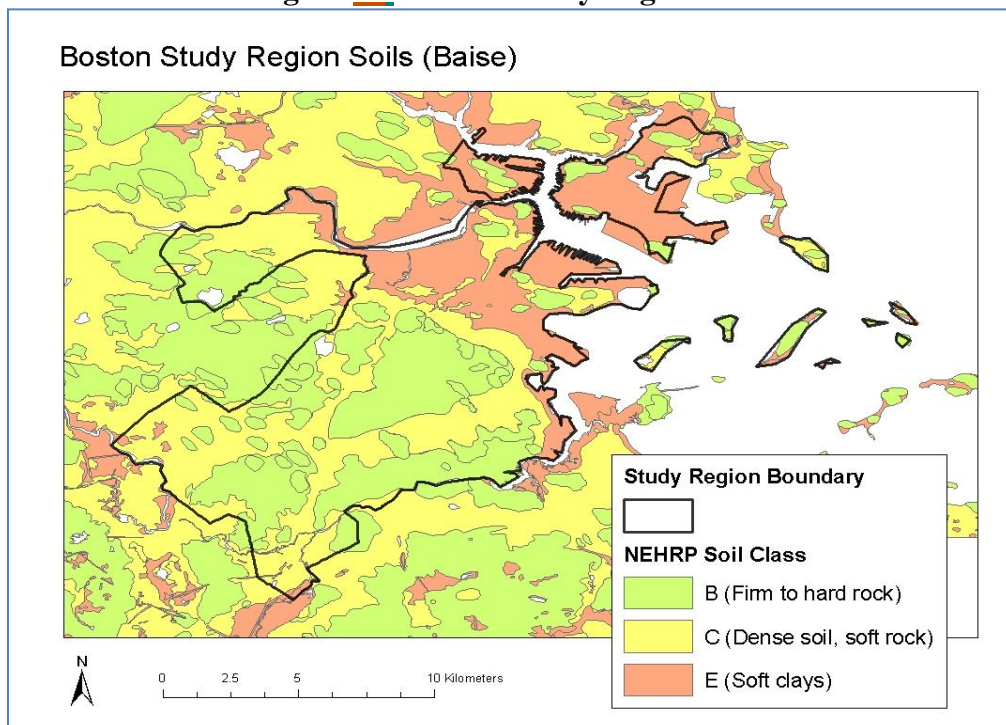
**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Figure 21 - Boston Study Region Liquefaction Potential



Source: Baise, Laurie G., Rebecca B. Higgins ; and Charles M. Brankman, Tufts University

Figure 22 - Boston Study Region Soils



Source: Baise, Laurie G., Rebecca B. Higgins ; and Charles M. Brankman, Tufts University

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Unreinforced Masonry Buildings – Many older masonry structures lack structural components that would prevent collapse in the event of an earthquake. Based on research conducted by the Northeast States Emergency Consortium utilizing property assessment data on the structural classifications of buildings in Boston, there are as many as 18,919 unreinforced masonry buildings (URM) in the City (see Figure 23). These buildings include historic structures such as the Old Statehouse, Faneuil Hall, and most of the buildings on Beacon Hill and Back Bay. In addition, a number of the fire stations, police stations, and schools are vulnerable masonry buildings.



Old State House, example of an Unreinforced Masonry Building

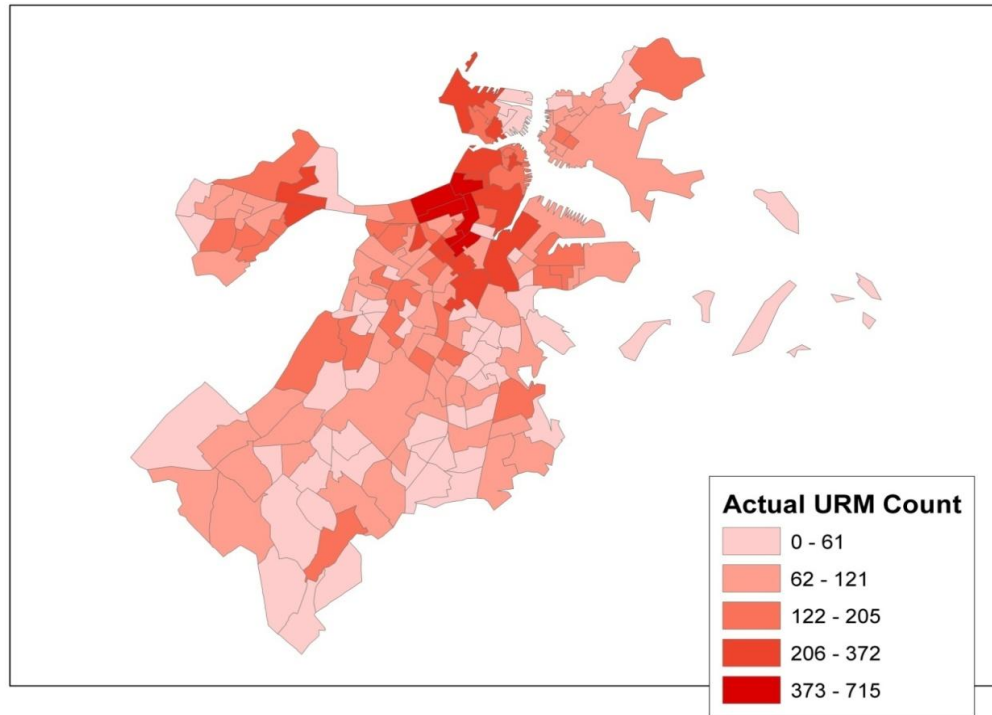
Beyond these unreinforced masonry buildings, roughly 50% of the residential building stock in the City was built before 1940 thereby pre-dating the building code and applicable earthquake damage mitigation design standards.

Although earthquakes are potential city-wide hazard, the areas of the City with the greatest overall vulnerability to earthquake damage are those where unreinforced masonry buildings are located in areas with high liquefaction potential. Figure 24 shows these areas as mapped by NESEC.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Figure 23

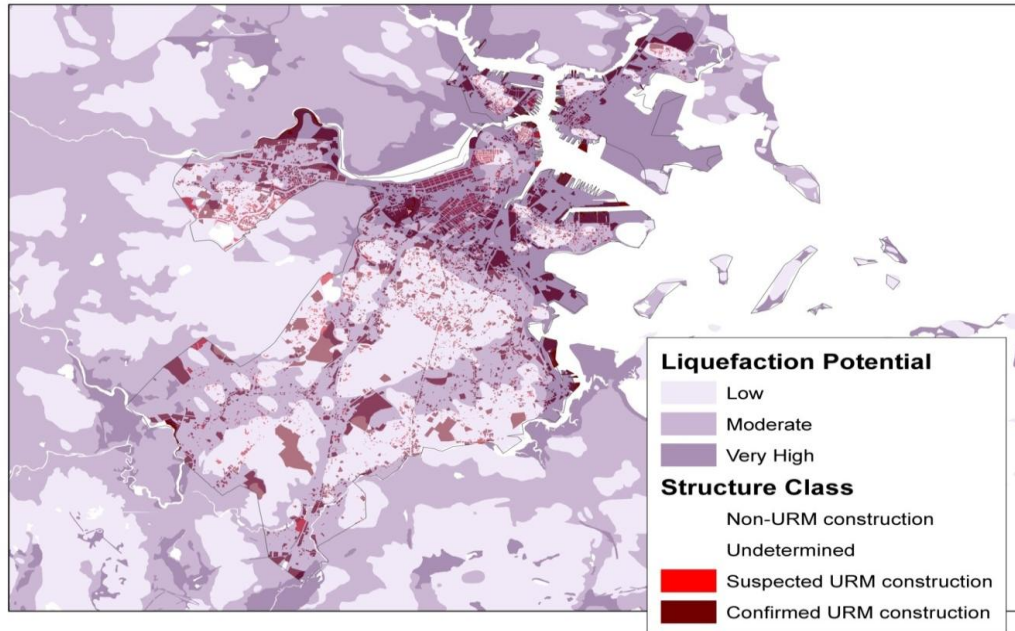
Observed Count of URM Buildings by Tract for Boston



Source: Northeast States Emergency Consortium

Figure 24

City of Boston Property Parcels with Liquefaction Potential



Source: Northeast States Emergency Consortium

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Landslides

Typically, a landslide occurs when the condition of a slope changes from stable to unstable. Natural precipitation such as heavy snow accumulation, torrential rain and run-off may saturate soil creating instability enough to contribute to a landslide. The lack of vegetation and root structure that stabilizes soil and human activity can destabilize hilly terrain.

There is no universally accepted measure of landslide extent but it has been represented as a measure of the destructiveness of a landslide. Table 25 represents the estimated intensity for a range of landslides. For a given landslide volume, fast moving rockfalls have the highest intensity while slow moving landslides have the lowest intensity.

Table 25. Landslide Intensity

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

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

The City of Boston is at relatively low risk for landslides. However, the City of Boston has experienced small landslides in our neighborhoods. The hilly terrains throughout many of Boston's neighborhoods have an older infrastructure of retaining walls, unreinforced masonry, granite boulders or stone slopes. Under proper conditions these structures are subject to erosion and collapse in the form of a landslide.

The City of Boston has experienced the collapse of a retaining wall in the Orient Height section of East Boston. Most recently, a large 40 foot rock cliff landslide collapsed carrying mud and large boulders onto Olive Street in the Brighton neighborhood of Boston, following three major back-to-back weekend winter storms that culminated on Sunday, February 24, 2013.

Based on past occurrences and the Massachusetts Hazard Mitigation Plan 2013, landslides are of Very Low frequency, events that can occur less frequently than once in 100 years (less than 1% per year).

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

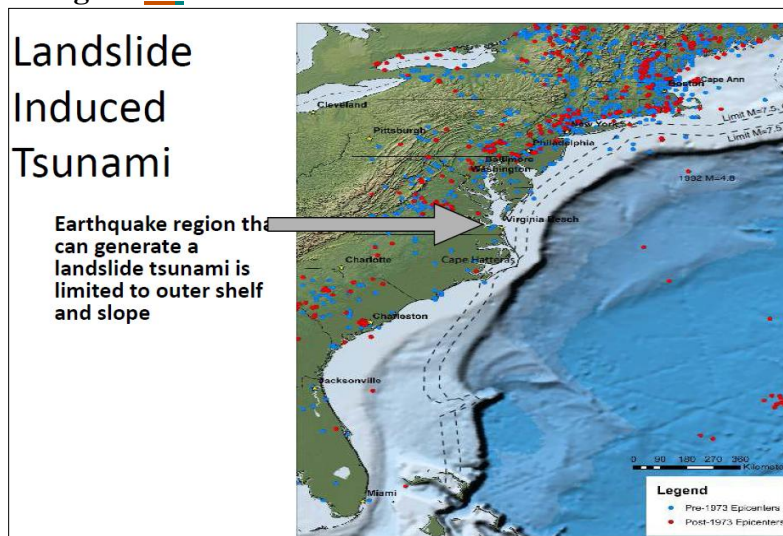
Atlantic Based Tsunami

The Federal Emergency Management Agency defines tsunami as a series of enormous seismic sea waves created by an underwater disturbance caused by geologic activity in the form of earthquakes, volcanic eruptions, underwater landslides or meteorites striking the Earth. A tsunami can move hundreds of miles per hour in the open ocean and smash into land with waves as high as 100 feet or more. Earthquake induced movement of the ocean floor most often generates tsunamis. If a major earthquake or landslide occurs close to shore, the first wave in a series could reach the shore in a few minutes, even before a warning is issued. Coasts that are at greater risk are areas less than 25 feet above sea level and within a mile of the shoreline.

Tsunami wave action over the shore is variable and mainly dependent of the combination of both submarine and land topography in the area and the orientation of the arriving waves. The extent of damage and impact from tsunami depends upon the source and severity of onset on the tide cycle. As such, the Boston Harbor Islands, Deer Island Sewerage Treatment Plant, Boston's Inner Harbor, Dorchester Bay and the City of Boston's coastal neighborhoods are all vulnerable to coastal inundation from tsunami.

According to the West Coast and Alaska Tsunami Warning Center (WCATWC), an Atlantic based tsunami threat level for the US east coast is low when compared to the US Pacific and Caribbean coasts. Although the probability is low, a tsunami threat does exist and it is not out of the realm of possibility for the Atlantic. Geophysics specialists and geologists from the U.S. Geologic Survey and the Woods Hole Oceanographic Institute have researched Georges Bank Lower Slope of the western North Atlantic and the relationship there between submarine landslides and earthquakes (see Figure 25). "The US Atlantic coast would be particularly vulnerable to devastation from tsunami because of the high density of population and infrastructure along its low lying coastal areas and estuaries." Uri S ten Brink, et.al., Marine Geology 264, 2009, p.65)

Figure 25 - Atlantic Based Tsunami Potential Threat



CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Further, Dr. ten Brink confirms that “the likelihood that a tsunami will hit this coast is fairly low. However, the most likely source will be a landslide that happens underwater at an area of about 215 miles offshore Boston in an area known as the Continental Slope. This is the area that separates the very wide and shallow shelf. The shelf is about 100 to 150 meters deep from the deep ocean.” The US Geologic Survey is researching the probability of a landslide on the Continental Shelf.

The City of Boston's justification to include Atlantic-based Tsunami on the east coast is based upon one of three possible scenarios for the City. First, a submarine landslide off the continental slope 215 miles off shore of the City of Boston. Such an underwater landslide occurred in 1929, when a 7.2 magnitude earthquake created large waves that killed 28 people in Newfoundland. Second, there is a subduction zone in the Caribbean called the Puerto Rico Trench that could create an east coast tsunami. A third scenario is from earthquake and volcanic activity in the form of a submarine landslide in the Canary Islands. This scenario involves the collapse of the western flank of the Cumbre Vieja Volcano located at La Palma, Canary Islands, potentially generating a giant wave which scientists have termed a megatsunami. The wave would radiate out across the Atlantic Ocean and inundate the eastern seaboard of North America including the American, the Caribbean, and northern coasts of South America some six to eight hours later. The impact from such an event is being analyzed as to how high the waves would actually become once crossing the Atlantic Ocean to the City of Boston and Eastern Massachusetts.

The NOAA National Weather Service -Taunton organized a NWS-WCATWC Tsunami Awareness Emergency Manager Workshop attended by the City of Boston on February 23, 2010. As a follow-up, the City of Boston participated in an Atlantic Tsunami Warning LANDEX 10 Exercise with the WCATWC on March 4, 2010. LANDEX 10 simulated a major earthquake, subsea landslide and tsunami generated 170 southeast of Boston. The Mayor's Office of Emergency Management (OEM) regularly monitors NWS-WCATWC Warning/Advisory Tsunami Alerts. Since 2010, the NWS-WCATWC issued Warnings and Advisories which have not resulted in a tsunami in the Atlantic to date.

Tsunami Vulnerability and Impact

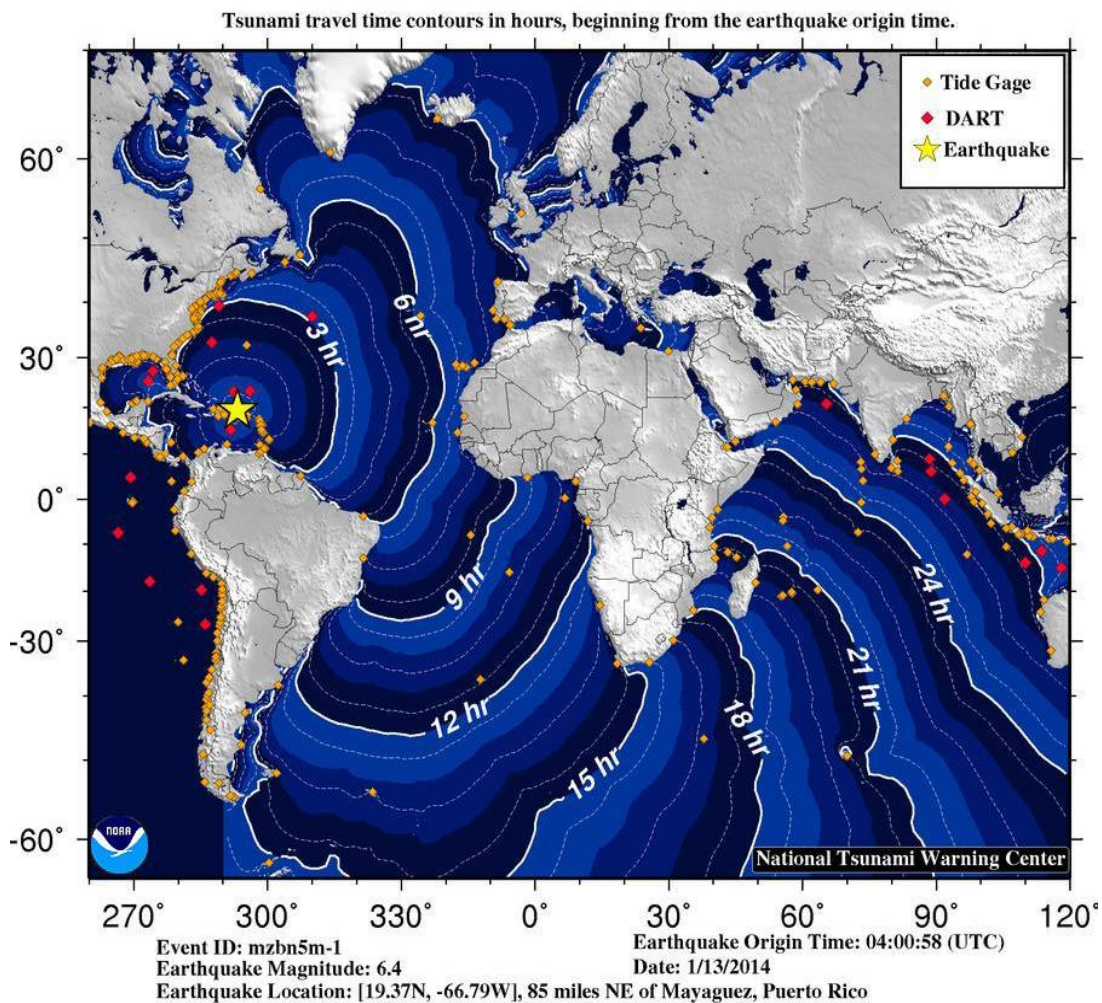
A tsunami generated in the Atlantic could severely impact populations and critical infrastructures along Boston's inner and outer harbor and Dorchester Bay. All of Boston's coastal neighborhoods are surrounded by hilly drumlins that would likely be above the inundation level of a tsunami. provide some elevation protection from tsunami. However, the population density of those living along and their ability to evacuate the coast increases their risk from tsunami. These residents and businesses include special needs populations, assisted living facilities, public housing, higher education, major modes of transportation, oil and natural gas refineries and steam power generation for Boston's hospitals. The City of Boston plans to conduct further loss estimation on the

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

impacts of tsunami inundation along the entire Boston coastline when the new Tsunami HAZUS-MH tool is available.

Response to an approaching tsunami could easily require a one-mile coastal evacuation zone. Accurately predicting the timing of landfall is of the utmost importance for successful vertical evacuation. If the tsunami struck late evening/early morning, then it would be challenging to warn and evacuate residents quickly. Travel time for a tsunami could be as little as a few hours, as shown in Figure 26. In this example a 6.4 magnitude earthquake struck at 11:01pm EST, Sunday, January 12, 2014, located 85 miles northeast of Mayaguez, Puerto Rico. Fortunately, the earthquake did not generate a tsunami. The WCATWC issued tsunami travel times between 3 to 6 hours. If a tsunami alert had been issued it would have affected Boston between 2:00am EST to 5:00am on Monday morning, January 14, 2014.

Figure 26 - Atlantic Based Tsunami Travel Times



Relatively few tsunami waves have been recorded on the Atlantic coast. One of the most serious was on November 18, 1929, when a 7.3M earthquake generated a tsunami that

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

killed 29 people in Newfoundland and Nova Scotia. The National Oceanic and Atmospheric Administration (NOAA) lists the following known or suspected East Coast tsunamis:⁶

1. Nov 1, 1755/ Lisbon, Portugal/ Tsunami in Newfoundland and the Caribbean. Computer models suggest 10' waves along the East Coast of the USA.
2. Oct 11, 1918/ Puerto Rico/ Waves recorded on Atlantic City, NJ, tidal gage.
3. Nov 18, 1929/ Grand Banks/ Tsunami in Newfoundland and Nova Scotia. Newfoundland Waves recorded on Atlantic City, NJ / Ocean City, Maryland / and Charleston, South Carolina tidal gages.
4. Aug 4, 1946/ Dominican Republic/ Waves recorded on Atlantic City, NJ, Daytona Beach, FL, and Bermuda tidal gages.
5. Aug 8, 1946/ Dominican Republic / Waves recorded on Atlantic City, NJ, tidal gage.
6. Nov 14, 1840/ Mid Atlantic Region / Tsunami in the Delaware River.
7. Nov 17, 1872 / Maine/ Maine
8. Jan 9, 1926/ Maine/ Maine
9. May 19, 1964/ Northeast USA/ Northeast USA

Severe coastal storms can produce meteo-tsunamis, tsunami-like wave phenomenon of meteorological origin. Climate change may increase the frequency of these. On June 13, 2013, thirty different tide gages and one buoy measured a tsunami-like wave from Barnegat Light, New Jersey to Southeastern Massachusetts, probably due to severe thunderstorms generating meteo-tsunami waves. Rogue waves knocked people into the ocean, damaged boat moorings, and caused minor coastal inundation.

Based on past occurrences and the Massachusetts Hazard Mitigation Plan 2013, Tsunamis are of Very Low frequency, events that can occur less frequently than once in 100 years (less than 1% per year).

Extreme Temperatures

Extreme temperatures can impact public health, economic activity, cultural artifacts, and governance functions when electrical and transport systems are disrupted. Ecological impacts may also occur as high temperatures can cause a deterioration of water quality. In Boston extreme heat events are most common in July. The highest temperature recorded was 104°F, on July 4, 1911, followed more recently with a high of 103°F on

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

July 22, 2011. According to the Northeast Regional Climate Center at Cornell University, 2012 was the warmest year in the US to date, and the third hottest summer. Extreme cold is most common in January with the lowest recorded temperature being -18°F in February, 1934. [Extreme temperatures are a city-wide hazard for Boston.](#) Table 26 shows the recent history of extreme temperatures in Boston.

Table 26 Extreme Temperatures in Boston, 2005-2012

Year	Number of Days $\geq 90^{\circ}\text{F}$	Number of Days $\leq 5^{\circ}\text{F}$
2005	14	8
2006	11	None
2007	18	2
2008	8	None
2009	6	None
2010	24	None
2011	13	2
2012	12	1

Extreme Heat

Extreme heat is the primary cause of weather-related fatalities in the United States. Historically, from 1979–2003, excessive heat exposure caused 8,015 deaths in the United States. During this period, more people in this country died from extreme heat than from hurricanes, lightning, tornados, floods, and earthquakes combined. In 2001, 300 deaths were caused by excessive heat exposure.

During the summer months, the City of Boston is especially vulnerable to heat-related hazards. On summer days, the City can be as much as 16°F degrees warmer than surrounding areas. The City's development and infrastructure, which is largely made up of asphalt, concrete, and metal, traps the heat. This is known as the "Urban Heat Island" effect.

The Boston Public Health Commission defines severe heat as air temperature of 90°F or higher. Extending over multiple days, each day's maximum temperature would be considered extreme and constitute a natural hazard event. In 2010, there were 24 days in the City of Boston with recorded temperatures 90° F or greater.

Heat waves are particularly dangerous for children, seniors, people with cardiovascular disease, and people taking psychotropic and other medications. According to the Centers for Disease Control, social isolation and the inability to care for oneself put a person at greater risk for heat-related illness. However, even young and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather or do not take appropriate precautions.

Exposure to extremely high temperatures impacts human health through heat stress and decreased air quality, which aggravates other respiratory diseases, such as emphysema. The elderly and other vulnerable populations generally suffer greater impacts and many

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

elders die in extreme heat waves, especially with limited access to air-conditioning. Evacuations from buildings without air-conditioning or other cooling capability are crucial to avoid heat stress, both for people at work and those at home. Cooling centers may be stressed to capacity.

The probability of large-scale power outages is higher during extended heat waves. Outages in apartment complexes and congregate care facilities could result in loss of air conditioning services and subsequently displace large numbers of individuals who will require a location to escape the heat.

With increasing temperatures and summer extreme heat events, trees play a critical role in protecting public health by regulating local temperatures. In areas of the city where the public cannot afford to escape the summer heat by leaving town or finding access to air conditioning, trees reduce the urban heat island effect and keep people cool. Tree distribution and canopy coverage across the city needs to be evaluated for opportunities to plant and protect trees. Public outreach is equally important to educate the public on stewardship and the value of trees.

Extreme Cold

Extreme cold is a dangerous situation that can bring on health emergencies, especially in susceptible populations such as homeless individuals, children, and the elderly. Wind chill factor, the combined effect of cold temperatures and wind speed, adds to the threat posed by low temperatures. Boston's Emergency Operations Plan notes that:

- Extreme cold conditions may last for several days.
- Frozen and burst pipes can be secondary events caused by extreme cold.
- The City of Boston has programs in place to prepare for extreme cold weather.

The City of Boston recognizes an extreme cold weather situation to exist when the National Weather Service (NWS) forecasts a wind chill of 0° F or below for three hours or more. During an extreme cold weather situation, depending upon the prevailing conditions, the City of Boston will issue any one of three types of alerts:

1. Extreme Cold Weather Advisory (Boston): When the NWS forecasts a wind chill of 0° F to -14° F for three hours or more
2. Wind Chill Advisory (NWS): When the NWS forecasts a wind chill of -15° F to -24° F for three hours or more
3. Wind Chill Warning (NWS): When the NWS forecasts a wind chill of -25° F or colder for three hours or more

Based on past occurrences extreme temperatures are of medium frequency, defined by the Massachusetts Hazard Mitigation Plan 2013 as events that occur from once in 5 years to once in 50 years (2% to 20% probability per year).

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

Fire Hazards

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 region such fires rarely grow to the size of those 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. Some of the park areas in the City may have conditions suitable for brush fires, particularly those with large stands of phragmites (wetland grasses). These fires can lead to urban conflagrations.

Wildfires in Massachusetts are measured by the number of fires and the sum of acres burned. The most recent data available for wildfires, shown in Figure 27 below, indicates that the wildfire extent in Boston was between 0.25 ;and 9.0 acres burned, with the City experiencing fewer than 20 wildfires between 2001-2009.

~~According to the US Drought Monitor, due to the lack of winter precipitation, the City of Boston's Drought Severity Level was D2 Severe Drought in April 2012. The abnormally dry and moderately dry conditions prevailed in the City until September 25, 2012.~~

On April 19, 2012, a brush fire broke out in a wooded area near Trenton Road in Dedham and burned between 50 to 100 acres along the Neponset River Reservation, bordering on the City of Boston. Due to the high winds and wind direction black ash could be seen floating in the air throughout the Boston neighborhoods of West Roxbury, Hyde Park, Jamaica Plain, Mattapan, and Dorchester. Likewise, the ash was located in Milton and Quincy along the Rt. 28 corridor.

~~As of the February 11, 2014 edition of the NOAA Drought Monitor, Eastern Massachusetts was classified as "Abnormally Dry," with a "Long Term" designation that signifies condtions typically greater than six months (see Figure 19).~~

~~Figure 10 US Drought Monitor, February 11, 2014 (New England excerpt)~~

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

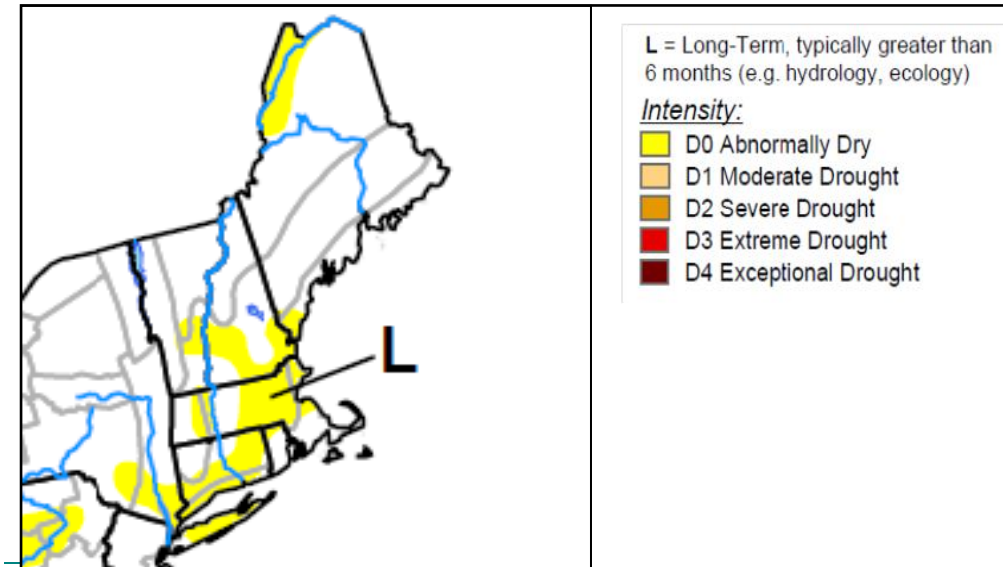
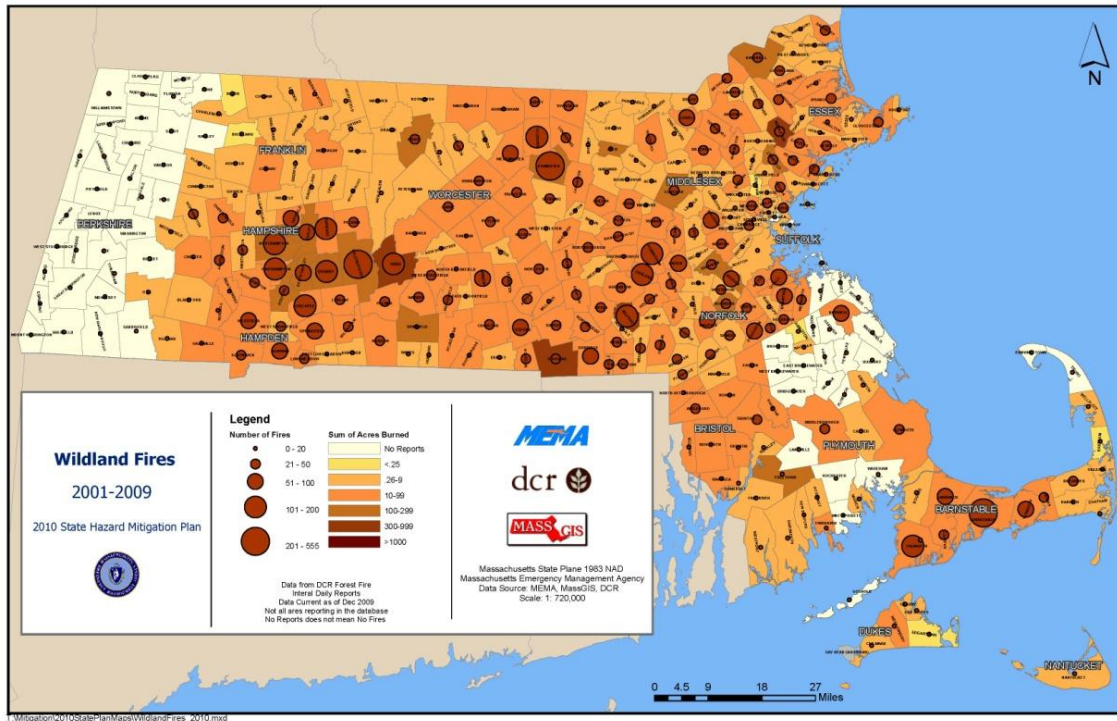


Figure 27. MA Wildfires 2001-2009



Potential vulnerabilities to wildfire include injuries and loss of human life, damage to structures and other improvements, and impacts on natural resources. Given the immediate response times to reported wildfires in Boston, the likelihood of injuries and casualties is minimal. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases. Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

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

Urban Conflagrations

Urban conflagrations are large building-to-building fires that spread over a relatively large urban area. While not typically included as a natural hazard, urban conflagrations can be sparked by a natural hazard event like an earthquake, tornado, or lightning strike.

The National Fire Protection Association (NFPA) uses the term conflagration to describe a fire with major building-to-building flame spread over some distance. Numerous factors increase the chance of conflagration in an urban setting, including:

- ☐ closely built structures;
- ☐ the use of untreated wood shingles as exterior covering for roofs or walls;
- ☐ poor water supplies, weaknesses in automatic or manual fire suppression systems;
- ☐ dilapidated structures, especially abandoned buildings in large numbers;
- ☐ large-scale combustible construction or demolition projects;
- ☐ wild land / urban interfaces; and
- ☐ built-up areas near high-hazard locations, where a transportation or industrial fire or explosion could quickly involve large numbers of buildings.

Most urban conflagrations have two or more of the factors listed above. The City of Boston contains many of the above-listed conditions, increasing the possibility of Boston experiencing conflagration.

Conflagration may occur naturally (e.g., lightning strike) or be started by people, either intentionally (arson) or by accident (e.g., smoker's carelessness or lack of fire knowledge [incorrect use of space heaters]). In order for the Boston Fire Department (BFD) to classify a fire as a conflagration, the fire needs to be self-sustaining and last an extended period (approximately eight hours).

Boston has experienced numerous conflagrations over the years causing millions of dollars in damage, displacing hundreds of businesses, and leaving hundreds of people homeless. The largest property loss to conflagration to date was the Great Boston Fire of 1872, which destroyed 776 buildings and caused \$75,000,000 (approximately \$3.5 billion in current dollars). Although many building codes were changed in the aftermath of this and subsequent fires, much of Boston's housing stock predates those changes. In 1964, a rear porch fire on Bellflower Street (Dorchester) lined with three deckers caused another conflagration that damaged or destroyed 35 multi-family dwellings (there were fires reported on over 250 roofs). In 1987, a small plane crashed into a Lonsdale Street (Dorchester) house damaging or destroying 9 homes and 12 vehicles because of the ensuing fires.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Conflagration is a low probability, high impact event for the City of Boston. Several reasons for this are Boston's narrow streets, tightly spaced buildings, access issues and building construction that predates modern fire codes. Boston's geographic neighborhood layout, with Charlestown and East Boston separated from the rest of the City by bridges and tunnels can delay the arrival of first responders. Closely spaced wooden three-deckers (three-family homes) are common across numerous neighborhoods in the City. Most vulnerable are the non-masonry, balloon frame architecture and wood construction attached row houses.

Vulnerability to conflagration in the City of Boston includes the potential for human injury and/or death from burns, smoke inhalation, and psychological trauma. Personnel responding to the conflagration are particularly susceptible to upper respiratory problems because of the gases and toxins present in a fire. Property and infrastructure affected by a conflagration are vulnerable to structural collapses, specifically with structures built before modern fire codes.

Space Weather and Solar Storms

The level of activity of the Sun—sunspots, flares, amount of radiation, and other phenomena—goes through an approximately 11-year cycle of increase and decrease. Solar astronomers count the cycle from 1755 to 1766 as the first cycle, and we are now in cycle 24. According to NOAA's Space Weather Prediction Center, the next maximum in solar activity is expected to occur in 2013, although the maximum will be of less-than-average intensity.⁷

NOAA divides disturbances on Earth caused by solar activity into three major categories: geomagnetic storms, solar radiation storms, and radio blackouts. For each category, disturbances are described by a rating scale that goes from 1 (minor) to 5 (extreme).⁸ At the extreme end, solar storms can produce:

- Widespread voltage control problems and protective system problems in power systems, with some electrical grids experiencing complete collapse or blackouts
- Degradation of functionality of global positioning system (GPS), aviation air traffic control systems, telecommunication systems, and satellite communication

The primary concern for emergency responders is a geomagnetic storm. In March 1989, a major geomagnetic storm caused a chain reaction that took only 92 seconds to cause the entire electrical grid of the province of Quebec to blackout leaving over 6 million people without power for over 9 hours. The rapid onset did not allow operators any reaction time to evaluate what was occurring or to take corrective action. Our society may be becoming more vulnerable to such storms. The Northeast U.S. is particularly vulnerable

⁷ <http://www.swpc.noaa.gov/SolarCycle/>

⁸ <http://www.swpc.noaa.gov/NOAA scales/index.html#GeomagneticStorms>

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

due to its high geomagnetic latitude, the local geology, and the interconnectivity of the grid.

In the case of electric power grids, both the manner in which systems are operated and the accumulated design decisions engineered into present-day networks around the world have tended to significantly enhance geomagnetic storm impacts. The result is to increase the vulnerability of this critical infrastructure to space weather disturbances.⁹

If a major geomagnetic “superstorm”—about ten times larger than an ordinary G5—occurred today, over 300 large transformers in the United States could be at risk of permanent damage, with the potential to cut power to 130 million people.¹⁰ Repair times could range from weeks to years depending on the size and types of the transformers damaged. In a solar cycle, there are typically three or four G5 events. There is about a 10 percent chance of a “superstorm” in each solar cycle.¹¹

Invasive Species

The Asian longhorned beetle (ALB, *Anoplophora glabripennis*) is a destructive wood-boring pest of maple and other hardwoods. ALB is believed to have been introduced into the United States from wood pallets and other wood packing material accompanying cargo shipments from Asia. The tree species preferred as hosts by the Asian Longhorned Beetle are hardwoods including several maple species (Norway, sugar, silver, and red maple), box elder, horse chestnut, buckeye, elm, London plane, birch, and willow.

The Asian Longhorned Beetle is classified in the wood boring beetle family, Cerambycidae. Adults are 1 to 1 ½ inches in length with long antennae and are shiny black with small white markings on the body and antennae. Once the eggs hatch, small white larvae bore their way through the bark into the tree, feeding on the sensitive vascular layer beneath. The larvae continue to feed deeper into the tree's heartwood forming tunnels, or galleries, in the trunk and branches. This damage weakens the integrity of the tree and will eventually kill it if the infestation is severe enough.

Over the course of a year, a larva will mature and then pupate near the surface, under the bark. From the pupa, an adult beetle emerges, chewing its way out of the tree; forming characteristic round holes approximately 3/8ths of an inch in diameter. Many of these

⁹ Kappenman, J. *Geomagnetic Storms and Their Impacts on the U.S. Power Grid*. Goleta: Metatech Corporation, 2010

¹⁰ See *Severe Space Weather Events--Understanding Societal and Economic Impacts: A Workshop Report*, National Academy of Sciences, 2008, http://www.nap.edu/catalog.php?record_id=12507, and http://science.nasa.gov/science-news/science-at-nasa/2009/21jan_severespaceweather/.

¹¹ See Riley, P. "On the probability of occurrence of extreme space weather events" *Space Weather*, vol. 10, S02012, doi:10.1029/2011SW000734, 2012, and Love, J. "Credible occurrence probabilities for extreme geophysical events: Earthquakes, volcanic eruptions, magnetic storms". *Geophysical Research Letters*, vol. 39, L10301, doi:10.1029/2012GL051431, 2012.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

holes will appear on a heavily infested tree frequently accompanied by frass (sawdust) and sap oozing from the holes. The emergence of beetles typically takes place from June through October with adults then flying in search of mates and new egg-laying sites to complete their life cycle.

In August 2008, ALB was discovered in Worcester County, Massachusetts, and in July 2010, ALB was found in the City of Boston. On July 2, 2010, an arborist at the Faulkner Hospital in Jamaica Plain discovered six red maples trees that were exhibiting signs of ALB infestation. The trees were removed on July 3, 2010.

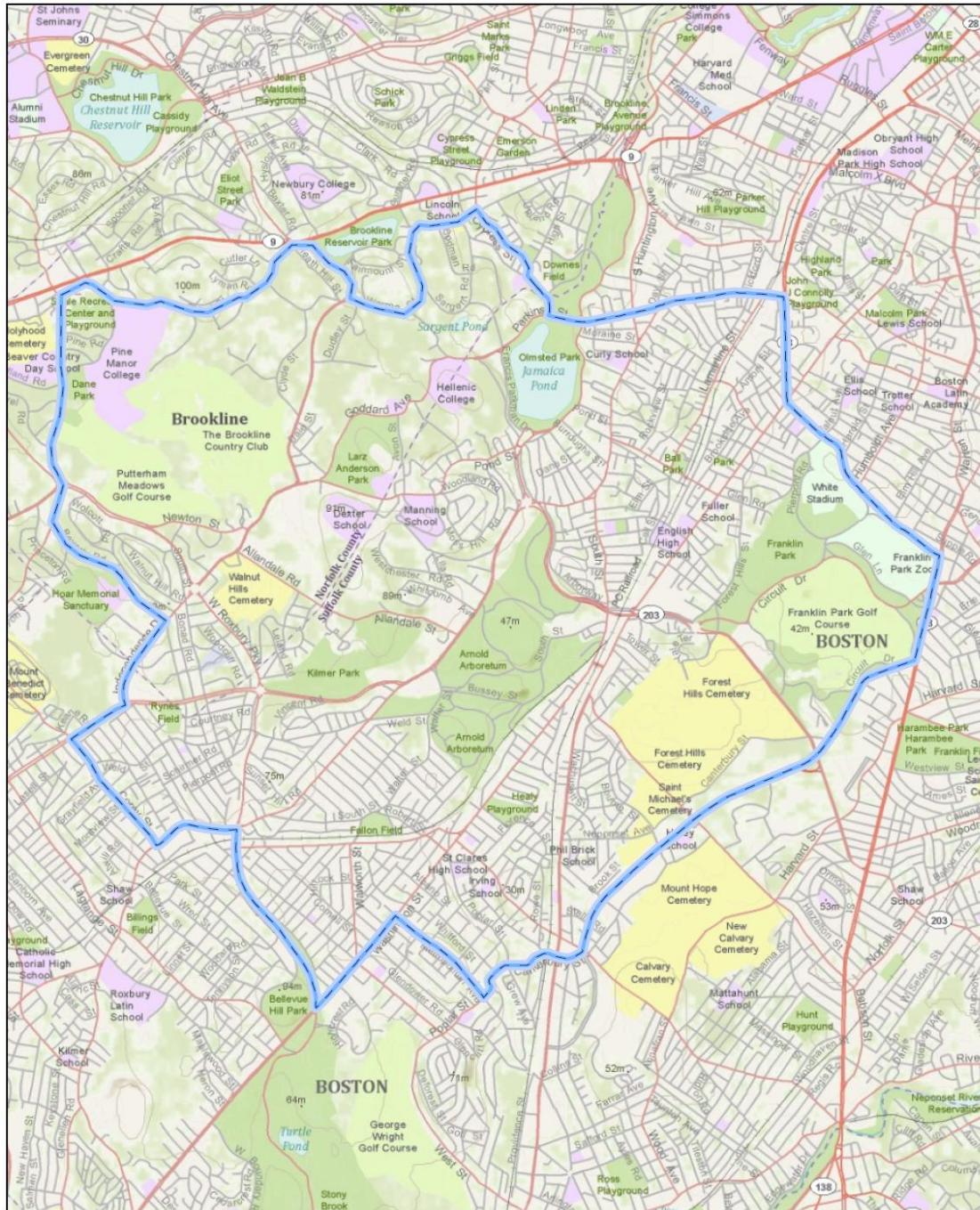
The Asian Long Horned Beetle Suppression Zone neighborhoods encompass parts of West Roxbury, Roslindale, Jamaica Plain, and Roxbury (see Figure 28). In 2011, the ALB Eradication Program shared their plans for a three-year treatment program in Boston in which all host trees within ¼ mile of the infestation was treated with imidacloprid. The 2012 spring update determined that since the onset, more than 70,000 trees have been surveyed and no other ALB damage has been identified.

On August 31, 2012, discovered for the first time in Massachusetts, the Emerald Ash Borer (EAB) was detected in the Town of Dalton. The Emerald Ash Borer has spread to Eastern Massachusetts and was detected on November 22, 2013 off of Route 125 in North Andover, MA. [The first detection Emerald Ash Borer within the City of Boston was on July 16, 2014, when it was found in the Arnold Arboretum, and confirmed on July 18, 2014.](#)

EAB is a very tiny, emerald-green metallic flying beetle native to Asia that prefers the northern hardwood of ash trees which is a common species in the Berkshires as well as in eastern Massachusetts. The eastward spread of *Agrilus planipennis* from western Massachusetts is inevitable because the EAB is a tiny flying insect. However, the City of Boston inventory of Ash trees is limited and the City is no longer planting the variety of *Fraxinus* species of Ash trees. The City of Boston remains vigilant in the continued monitoring to prevent the spread and eradication of invasive species protect our trees.

Figure 28 – Asian Longhorn Beetle Suppression Area in Boston

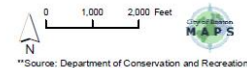
CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



City of Boston

Asian Long Horned Beetle Suppression Area

Source: City of Boston



The Boston Parks and Recreation Department recently expanded an elm bark beetle program to fight the transmission of Dutch elm disease. The City placed experimental traps at 24 locations in the Emerald Necklace and Copley Square in an effort to protect elm trees from destructive elm bark beetles.

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

Vulnerability Assessment

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

Critical Infrastructure in Hazard Areas

Critical facilities include facilities that perform important functions during a natural disaster, such as shelters, emergency operation centers, and public utilities, as well as locations that house sensitive populations, such as schools or nursing homes. In Boston 2733 critical facilities have been identified for this plan update, a significant increase over 892 facilities identified in the 2008 plan. These facilities are listed in the Critical Facilities Inventory in Appendix [D](#).

The critical facilities are included on the maps that also portray the areas subject to natural hazards, to indicate the potential vulnerabilities of the critical facilities to natural hazards. Because of their large size, the full-scale map series is available in digital format, but a reduced-scale set of eight city-wide maps is included in Appendix [C](#) of this plan.

Because such a large portion of Boston was constructed on fill and low lying areas and because of the City's extensive coast line, a significant number of critical facilities are located in hazard zones, and some are located in more than one hazard zone, termed multi-hazard zones. The Critical Facilities Inventory in Appendix [D](#) displays which hazard zones each facility is located in, and the number of facilities located in each category of hazard zone is summarized in Table [27](#) below. Of the 2733 critical facilities inventoried, 57 are located within a flood hazard area (as identified on FEMA's Flood Insurance Rate Maps), and 870 are located within an area potentially subject to storm surges (as identified on the US Corps of Engineers "SLOSH" maps).

There are 46 multi-hazard sites that are located in both a flood hazard and a storm surge area. In addition to the critical facilities sites, components of the City's transportation infrastructure are also located within or partially within both hurricane surge zones and areas at high risk for liquefaction. This includes Storrow Drive, Soldiers Field Road, I-90, and I-93 (see Maps 4, 5, and 8 in Appendix [C](#)).

Table [27](#) Summary of Critical Facilities Located in Hazard Zones

Hazard Zones	Number of	Percent of Total
--------------	-----------	------------------

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

	Critical Facilities	Facilities (2733)
FLOOD ZONES		
Zone A	1	--
Zone AE	29	1.1%
0.2% Chance	27	1.0%
TOTAL in All Flood Zones	57	2.1%
HURRICANE SURGE ZONES		
1	49	1.7%
2	677	24.7%
3	1	--
4	143	5.3%
TOTAL in All Surge Zones	870	31.8
LANDSLIDE SUSCEPTIBILITY		
Low	456	17
Moderate	2271	83
Not Classified	6	--
TOTAL in All Zones	2,727	100%
AVG. ANNUAL SNOWFALL		
Low (36 – 48 inches/year)	1,853	67.8%
High (48-72 inches/year)	850	32.2%
TOTAL in All Zones	2733	100%

Damage Assessments

An estimate of damages for hurricanes, earthquakes, and flooding was performed by the Northeast States Emergency Consortium was the HAZUS-MH™ software.

HAZUS- MH™ (multiple-hazards) is a computer program developed by FEMA to estimate potential losses from earthquakes, floods, and hurricane winds. Loss estimates produced by HAZUS-MH™ are based on current scientific and engineering knowledge of the effects of hurricane winds, floods and earthquakes. There are three levels at which HAZUS-MH™ can be run. Level I uses default data on building types, utilities, transportation, from national databases, including the U.S. Census. The analysis in the 2008 plan used Level I data. For this 2014 plan update, the Northeast States Emergency Consortium used Level II data, which is based on a city-specific inventory of critical facilities and infrastructure that was updated in 2011.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

For more information on the HAZUS-MH™ software, go to
<http://www.fema.gov/plan/prevent/hazus/index.shtm>

Estimated Wind Damages from Hurricanes

Table 28 shows the estimated potential wind damages to the City of Boston from several historic hurricanes, should they occur today. The hurricanes analyzed include:

- The Hurricane of 1938 (not named)
- Hurricane Carol, 1954
- Hurricane Irene, 2011

HAZUS-MH™ Hurricane estimates damage caused by wind only, and does not include damage caused by flooding, storm surge, or collateral impacts such as power outages. The HAZUS-MH™ analysis for hurricanes does not include estimates of casualties.

Table 28
Estimated Wind Damages from Hurricanes (2012 \$)

	1938 Hurricane	Hurricane Carol (1954)	Hurricane Irene (2011)
Direct Economic Losses for Buildings			
Building Damage (Structural and Non-Structural)	\$298,978,000	\$631,972,000	\$7,839,000
Building Contents Damage	\$32,408,000	\$82,636,000	\$704,000
Business Interruption (Income Losses)	\$40,784,000	\$104,996,000	\$67,000
Total Building-Related Losses	\$372,170,000	\$819,604,000	\$8,610,000
Displaced Households and People³			
Number of Displaced Households	756	2,176	0
Number of Displaced People	1,746	5,027	0
Estimated Debris Generated (Tons)			
Tree (To be Disposed at Public Expense)	7,437	12,077	540
Reinforced Concrete and Steel	0	3	0
Brick, Wood, Glass, Plaster and Other	61,673	127,106	1,604
Total Debris	69,110	139,186	2,144

Source: NESEC, HAZUS-MH Level II analysis for the City of Boston

Estimated Damages from Earthquakes

Table 29 shows the estimated potential damages to the City of Boston from several historic earthquakes, should they occur today. The earthquakes analyzed include:

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

- A magnitude 5.0 earthquake epicentered in downtown Boston. A magnitude 2.0 earthquake occurred at this location on December 27, 1974.
- A magnitude 6.0 earthquake epicentered in the Atlantic Ocean about 24 miles east of Cape Ann. A magnitude 6.0 earthquake occurred at this location on November 18, 1755.
- A magnitude 6.5 earthquake epicentered in central New Hampshire. A magnitude 6.5 earthquake occurred at this location on June 11, 1638.

This earthquake report estimates damage caused directly by the earthquake, and does not include damage caused by collateral impacts such as hazardous materials releases.

Table 29
Estimated Damages from Earthquakes

	5.0 Magnitude Downtown	6.0 Magnitude Cape Ann	6.5 Magnitude New Hampshire
Direct Economic Losses for Buildings²			
Building Damage (Structural, Non-Structural)	\$1,920,605,000	\$234,978,000	\$246,399,000
Building Contents Damage	\$1,019,422,000	\$83,158,000	\$73,999,000
Business Interruption (Income Loss)	\$509,999,000	\$113,579,000	\$136,705,000
Total Building-Related Losses	\$3,450,026,000	\$431,715,000	\$457,103,000
Displaced Households and People³			
Number of Displaced Households	4,125	509	554
Number of Displaced People	9,529	1,176	1,280
Casualties			
Minor Injuries (no hospitalization required)	728	107	159
Injuries Requiring Hospitalization (but not life-threatening)	357	21	24
Life-Threatening Injuries	373	11	2
Deaths	100	5	4
Estimated Debris Generated (Tons)			
Reinforced Concrete and Steel	289	50	60
Brick, Wood, Glass, Plaster,	304	82	91
Total Debris	593	132	151

Source: NESEC, HAZUS-MH Level II analysis for the City of Boston

**CITY OF BOSTON HAZARD MITIGATION PLAN
DRAFT 2014 UPDATE**

Estimated Damages from Riverine and Stream Flooding

Table 30 shows the estimated potential damages to the City of Boston from a 100-year storm. The analysis was conducted for each of the major watersheds that cover the City, including the Charles River, Mother Brook, Muddy River, and Mystic River. The total direct economic losses from all watersheds combined is more than \$212 billion, as shown in Table 30. The HAZUS-MH™ analysis for flooding does not include estimates of casualties.

**Table 30
Estimated Damages from Riverine and Stream Flooding
100 Year Storm**

	Charles River Watershed	Mother Brook Watershed	Muddy River Watershed	Mystic River Watershed	TOTAL
Direct Economic Losses for Buildings²					
Building Damage (Structural)	\$4,727,000	\$44,045,000	\$24,341,000	\$2,792,000	\$75,905,000
Building Contents Damage	\$10,899,000	\$60,985,000	\$55,867,000	\$5,919,000	\$133,670,000
Business Interruption (Income Losses)	\$969,000	\$538,000	\$883,000	\$288,000	\$2,678,000
Total Building-Related Losses	\$16,595,000	\$105,568,000	\$81,091,000	\$8,999,000	\$212,253,000
Displaced People³					
Number of Displaced People	467	2,040	7,373	245	10,125
Debris Generated (Tons)					
Finishes (Drywall, Flooring, Insulation, etc.)	113	3,807	3,052	113	7085
Structures (Framing, Walls, Exterior Cladding)	1	812	0	1	814
Foundations	2	537	0	2	541
Total Debris	116	5,156	3,052	116	8,440

Source: NESEC, HAZUS-MH Level II analysis for the City of Boston

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

V. HAZARD MITIGATION GOALS

At its February 8, 2012 meeting, the Boston Hazard Mitigation Executive Steering Committee meeting established the goals and objectives for natural hazard mitigation planning in Boston. The committee reviewed and confirmed the goals at their subsequent meeting.

Goal 1 Protect the health and safety of the public.

- Encourage people to be prepared before, during and after a hazard event.
- Ensure that services related to public health can function during and after a hazard, e.g., sanitation, water, debris removal, hospitals and emergency services.
- Ensure that evacuation can happen in an organized and efficient manner.
- Minimize secondary impacts from hazards, such as the release of pollutants. e.g., by covering salt piles.
- Promote public communications

Goal 2: Protect existing properties and structures.

- Provide resources for residents and businesses to make their buildings and properties more disaster resistant.
- Educate the public on measures they can take to protect their property.
- Maintain existing mitigation structures.
- Ensure that future development / redevelopment does not make existing properties more vulnerable to hazards.
- Ensure that critical facilities are protected from hazards.

Goal 3: Increase resilience by protecting and enhancing natural resources

- Make green infrastructure a central part of the City's development strategy
- Protect natural areas to ensure that they buffer impacts to built areas during a natural disaster.
- Protect and increase urban tree canopy
- Manage stormwater with Low Impact Development techniques
- Preserve and restore the functions of natural resource systems such as wetlands.
- Promote green roofs and cool roofs

Goal 4: Ensure that essential services can function during and after a hazard event.

- Ensure that critical infrastructure is protected from natural hazards.
- Ensure that people (key service providers and employees) can get into the City to provide services.
- Ensure that interdepartmental communication is seamless.
- Maintain the Emergency Operations Plan (EOP) and supporting annexes.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Goal 5: Work regionally to mitigate impacts from natural hazards and to respond and recover from hazard events.

- Continue to participate in regional efforts.
- Cooperate with other agencies, communities, and private entities.
- Understand priorities and capabilities of other entities to allow for resource-sharing, mutual aid, and entering into memoranda of understanding (MOU).

Goal 6: Determine priorities for directing resources for hazard mitigation and response.

- Prioritize mitigation projects.
- Continue to program mitigation projects in the Capital Investment Plan.
- Pursue various funding sources.
- Encourage private property-owners to implement measures to protect their own property.

Goal 7: Maintain Hazard Awareness.

- Track and compile hazard related data.
- Understand the potential implications of climate change on the frequency and extent of natural hazard events and incorporate that knowledge into hazard mitigation efforts.
- Maintain publicly available information on natural hazard risks in the City.
- Integrate hazard mitigation into other City initiatives and plans.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

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 requires evaluating previous and current community actions to mitigate 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.

Introduction

The City of Boston's Natural Hazard Mitigation Strategy reduces or eliminates potential losses from hazards identified in the Natural Hazard Risk Assessment. The strategy focuses on existing and potential mitigation actions that will mitigate the effects of natural hazards. The Mitigation Strategy is a coordinated effort City of Boston Departments and intergovernmental stakeholders. These stakeholders recommended a comprehensive range of inventive and effective natural hazard mitigation actions.

Mitigation Strategy Goals

- Establish mitigation goals and objectives that aim to reduce or eliminate long-term vulnerability to natural-hazards.
- Identify and analyze a comprehensive range of hazard-specific mitigation actions that aim to achieve the goals and objectives of the natural hazard mitigation strategy.
- Depict projects that prioritize, implement, and administer mitigation actions.

FEMA Requirements:

The Boston Hazard Mitigation Executive Steering Committee developed the mitigation strategy consistent with the process and steps presented in the Federal Emergency Management Agency's (FEMA) How-To-Guide: Developing the Mitigation Plan (FEMA 386-3). This section satisfies the following requirements:

Requirement §201.6(c)(3)(i): [The hazard mitigation strategy *shall* include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Requirement §201.6(c)(3)(ii): [The mitigation strategy *shall* include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

on new and existing buildings and infrastructure. [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements and the Community Rating System as appropriate.

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section *shall* include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization *shall* include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

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.

Hazard mitigation measures can generally be sorted into six categories, according to FEMA's Local Multi-Hazard Mitigation Planning Guidance:

- **Prevention:** Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built, and direct 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:** Modification or removal of existing buildings or infrastructure to protect them from a hazard. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass.
- **Public Education and Awareness:** Actions to inform and educate citizens, elected officials, and property owners about the potential risks from hazards and ways to mitigate them. Such actions include outreach projects, real estate disclosure requirements, hazard information centers, and school-age and adult education programs.
- **Natural Resource Protection and Green Infrastructure:** Actions that, in addition to minimizing hazard losses, preserve or restore the functions of natural systems. These actions include low impact development, sediment and erosion control, stream corridor restoration, watershed management, urban forest and vegetation management, and wetland restoration and preservation.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

- **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, protection of emergency response infrastructure.

Funding to implement hazard mitigation projects may come from a variety of federal, state, and local sources. 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.

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

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

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

Other potential funding sources include the U.S. Army Corps of Engineering, the Small Business Administration.

Existing Mitigation Measures

The City of Boston achieved Emergency Management Accreditation from the National Emergency Management Accreditation Program. The City implements an extensive set of existing mitigation measures related to all kinds of natural hazards. These are described below, and summarized in Table [31](#).

As there are a significant number of state facilities in the City of Boston, some of the mitigation measures are the responsibility of state agencies and authorities. These are also included in Table [31](#).

Existing Multi-Hazard Mitigation Measures

Emergency Operations Plan (EOP) – Every community in the Commonwealth of Massachusetts is required to have a plan. Boston’s plan addresses mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies, including flooding, hurricanes, tornados, dam failures, earthquakes, and winter storms. Boston’s EOP was last updated in 2012.

Office of Emergency Management (OEM) - The Mayor’s Office of Emergency Management coordinates emergency management and homeland security programs for the City of Boston. OEM works to mitigate, plan, and prepare for emergencies; educate the public about preparedness; coordinate resources for emergency response and recovery efforts; collect and disseminate critical information; and seek further opportunities to

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

support the overall preparedness of Boston. In addition, OEM plays a critical role in emergencies by maintaining situational awareness of the incident as well as coordinating inter-agency response. OEM also manages Boston's Emergency Operations Center during a time of need. OEM coordinates with other federal, state, and local entities throughout the region to ensure that proper hazard mitigation measures implemented.

Local Emergency Management Planning Committee (LEPC) – The LEPC meets regularly to coordinate emergency management planning across various City departments, community institutions, and the private sector. Its membership includes representatives of law enforcement; emergency medical services, emergency management, fire service, public health, public works, environmental agencies, hospitals/healthcare, transportation, media, community groups, facilities using Extremely Hazardous Substance(s) (EHS), and elected state and local officials.

Communications - Redundant and diverse methods are used to alert the public prior to or during an emergency as described in the Boston EOP Emergency Public Information Annex and the Boston Communications and Warning Plan. This approach benefits the entire community, including people with access and functional needs, as it offers multiple options to access critical and timely information thus enabling all people to take the necessary steps under the circumstances. Methods of alert include but are not limited to the following: captioned television broadcasts, e-mail alerts, cell phones with text messaging capability, alpha-numeric pagers, personal digital assistants (PDA), National Oceanic and Atmospheric Administration weather radios with visual and tactile alerts, text radios, electronic message boards on highways and in other public places, alerts that are inclusive of and compatible with TTYs and accessible to individuals with hearing impairments, and written flyers that are brought door-to-door or posted in public places.

The City of Boston's emergency notification system, ALERTBoston, alerts residents about an emergency in their area by using listed phone numbers. This is a voluntary program where residents are able to register in advance and specify notification preferences. Residents may enter various modes of communication for contact, such as text messages, cell phones, business phones, social media, and e-mail.

Text messaging is used to transmit emergency notifications, updates, and other important information to individuals who register for the service. This service should be available to individuals with limited English proficiency, providing an option of selecting an alternative language for the message during the sign-up process. Alert types may include life safety, fire, weather, accidents involving utilities or roadways, team activation notifications, or disaster notification (such as notification of a terrorist attack).

As a StormReady community, the City of Boston provides information to the National Weather Service about the potential impact of natural hazards. This information is used to provide the public with weather reports that allow for pre-planning and preparedness in an effort to protect life and property in the wake of a natural disaster.

The national Emergency Alert System (EAS) was designed to ensure that if one link in the dissemination of alert information is broken, the public has alternate sources for warning. EAS provides capacity for the following:

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

- Broadcast radio, television, and cable systems to send and receive emergency information quickly and automatically, even if their facilities are unattended.
- Authorized local and state personnel to distribute important emergency information.
- Direct monitoring of the National Weather Service (NWS) for local weather and other emergency alerts. Local broadcast stations, cable systems, and other EAS participants can then rebroadcast the alerts, providing an almost immediate relay of local emergency messages to the public.
- Automatic interruption of regular programming and relaying of the emergency messages in languages used by the EAS participant. EAS network participants are mandated to broadcast national EAS alerts. However, use of EAS for local broadcasting is encouraged, but not mandatory.

Boston coordinates EAS warnings with MEMA, who is responsible for implementing the EAS.

Not all broadcasts of emergency information trigger the EAS. Pursuant to 47 Code 38 of Federal Regulations (CFR), §79.2, the Federal Communications Commission (FCC) adopted separate requirements to meet the needs of people with disabilities in cases where radio and television broadcasters and cable service providers provide non-EAS emergency announcements and alerts.

Disaster Preparedness Information – The City of Boston provides information and education to the public concerning threats to life, safety, and property. Ready Boston is the city-wide community preparedness campaign, managed by the Office of Emergency Management (OEM), designed to educate and inform the public about the hazards they face, what they can do to prepare and what they can do to minimize or protect themselves in the face of hazards. Ready Boston educates and informs residents through various outlets. By using web and social media, the City has been successful in informing the public about emergencies, protective measures and keeping them educated about preparedness. OEM conducts emergency preparedness public presentations, exhibitions and workshops throughout the year to continually educate the public.

Through Ready Boston, the City also provides outreach that empowers Boston Public School students to help their families plan for emergencies through the Student Tools for Emergency Planning (STEP) program. Ready Boston also encourages adult residents to get involved with emergency response and recovery by volunteering as a member of the Community Emergency Response Team (CERT).

Residents have the option of signing up for ALERTBoston to receive emergency alerts via text, email TTY or voice messages. This program allows residents to opt-in to receive specific alerts about emergencies that impact the City. Many news outlets inform residents about ALERTBoston, while encouraging them to register for this free service.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

The City collaborates with numerous public and private agencies to initiate outreach, ensuring diverse populations are appropriately educated and advised. In an effort to ensure that information is accessible for non-English speaking populations, the City website provides a tool that allows the site to be translated multiple languages. This capability helps in the City's continued efforts to inform and educate diverse populations where language barriers may exist. In addition to providing information on the website, OEM works with various City agencies to ensure the elderly and residents with functional or accessibility needs have access to this information through public speaking workshops and presentations. For example, in November 2011 OEM conducted an emergency preparedness workshop with deaf and hard-of-hearing residents using interpreters and a PowerPoint presentation.

Capital Improvement Planning – The criteria used to prioritize capital improvement projects in Boston's 2014-18 Capital Planning Budget Procedures Manual includes consideration for natural hazard mitigation and reductions in energy consumption and greenhouse gas emissions. Section C of the Manual specifies that "planning for all new municipal construction and major renovation of City-owned facilities and other major City projects shall include an estimate of annual energy use and greenhouse gas emissions. Such planning shall also include an evaluation of the risks posed by the likely effects of climate change through 2050 to the project itself and related infrastructure and a description of the potential steps to avoid, minimize, or mitigate those risks." Section D of the Manual also describes natural hazard mitigation planning and FEMA's requirement for municipal adoption of plans to maintain eligibility for FEMA grant funding. It requires that "opportunities for mitigating natural hazards that could be eligible for FEMA project funding should be identified." One of these criteria is the extent to which a project mitigates an environmental hazard or is otherwise consistent with the City's hazard mitigation goals.

Emergency Power Generators – The City recently completed a Local Energy Assurance Plan that studied the need for emergency power generators in critical public facilities and emergency shelters. The findings indicate that there are 134 facilities which would require electrical power during an emergency, ranging from police and fire stations to emergency shelters and the City's Emergency Operations Center (EOC). Of these facilities, 14 currently have generators with sufficient power capacity to maintain normal operations, 44 have on-site generators capable of running lights and elevators, and the final 76 do not have any power generation capacities. There are some portable generators available to be shared as necessary amongst these critical facilities.

Energy and Environment Services - The mission of the Environmental and Energy Services Cabinet is twofold: to preserve and enhance the resources of Boston's built and natural environment and to promote affordable, efficient, reliable and safe energy systems for Boston residents. The Cabinet oversees the Inspectional Services Department, the Environment Department, the Parks and Recreation Department; serves as chair of the Mayor's Energy Management Board; and oversees programs and policies on climate change, green buildings, groundwater, park planning, recycling, renewable energy, and certain transportation issues. The Environment Department maintains

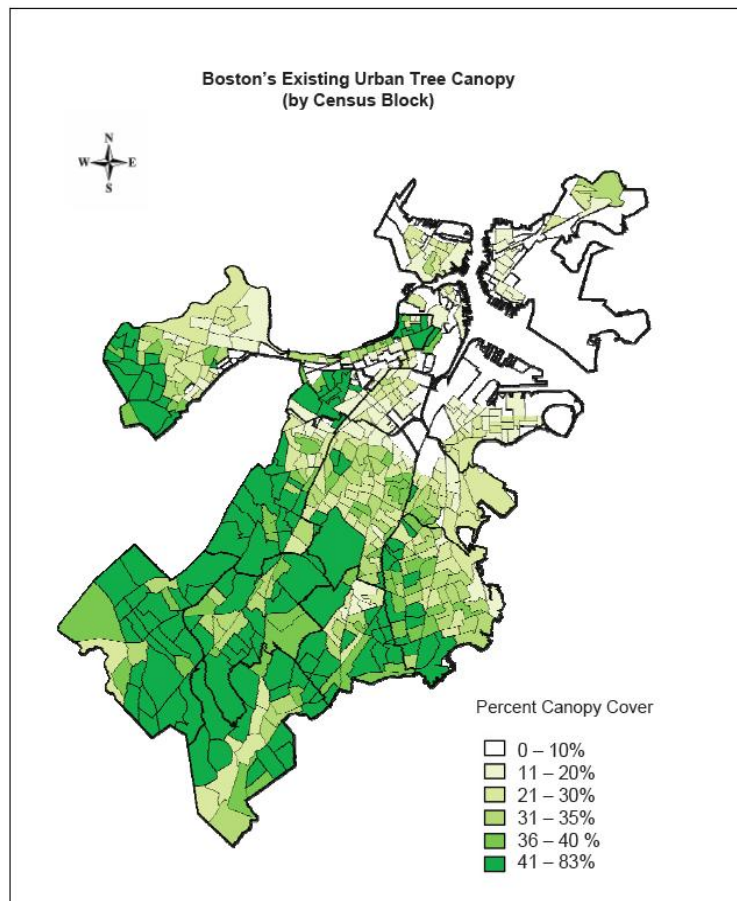
CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Boston's historic sites, buildings, landscapes, and waterways through protective designation and review processes.

Green Building - Article 37 in the City's zoning code requires the utilization of green building design and practices in new large projects to reduce environmental impacts to conserve natural resources, and promote sustainable development. Many green building measures directly mitigate the impact of natural hazards, for example by reducing urban heat island effect, reducing storm water runoff, reducing energy demand, and raising building elevations above floodplains, among other provisions.

Grow Boston Greener is a collaborative effort of the City of Boston, the Massachusetts Department of Conservation and Recreation, and [Boston Natural Areas Network](#) (BNAN) to increase the urban tree canopy cover in the city by planting and caring for trees. The Grow Boston Greener program was launched on Arbor Day, April 30, 2007. An inventory of the City's trees showed that Boston had an overall tree canopy cover of 29% (see Figure 29). The GBG vision is to plant an additional 100,000 trees by 2020 to increase the urban tree canopy to 35% and make Boston a cooler, cleaner, healthier city. The goals of GBG are to increase tree canopy, mitigate heat island effect, reduce energy consumption, improve air quality and improve storm water management.

Figure 29 - Boston Existing Urban Tree Canopy



CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Mayor's Executive Order on Climate Action - In 2007 Mayor Thomas Menino signed an Executive Order on Climate Action that established the framework for the City's subsequent planning and implementation. Some of the key provisions of the Executive Order include:

- Adopting goals for reduction of greenhouse gases
- Establishing the Mayor's Community Climate Action Task Force
- Requiring an updated Climate Action Plan every three years
- Preparing an integrated plan to reduce the risks from the effects of climate change, including natural hazard mitigation.

Climate Action Plan – The 2011 update to Boston's climate action plan, *A Climate of Progress*, includes a climate adaptation framework, which is focused “on preparing for the greatest near-term risks: sea-level rise, increased frequency and intensity of heat waves, and increased intensity of storms,” and addressing their health, economic, and social consequences. Although it uses a slightly different vocabulary, components of the adaptation plan have considerable overlap with natural hazard mitigation, and integration of the climate plan with the natural hazard mitigation plan is one important element. The adaptation plan follows three basic guidelines:

- Climate adaptation is as important as climate mitigation.
- Information on the effects of climate change is sufficient to start planning now, but flexibility and openness to new information are essential.
- Climate adaptation must be thoroughly integrated into all planning and project review conducted by the City.

Climate Ready Boston: In October 2013, the City released *Climate Ready Boston: Municipal Vulnerability to Climate Change*, the report of the Mayor's Climate Preparedness Task Force examining the preparedness of municipal facilities, operations, services, and policies for the effects of climate change. Individual departments identified vulnerabilities (based on the TBHA estimates of the effects of sea-level rise and UCS projections of temperature change, see above), established priorities, and planned next steps. Based on the departmental assessments, the Task Force had five key findings:

- Climate preparedness must be an important and explicit criterion in the City's capital planning. The City's critical IT, communications, and transportation centers need particular attention.
- The effects of rising temperatures should be a high priority.
- Municipal emergency plans should be reviewed and practiced in light of the expanded risks posed by climate change.
- Close coordination with regional, Commonwealth, and federal partners is necessary to address cross-jurisdictional infrastructure vulnerability.
- Education, engagement, and communication—within City government and with the community—are essential for preparing for both the short-term and long-term effects of climate change.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

The report and actions arising from it will be used as a source in implementing the City's Hazard Mitigation Plan. It is attached to this Hazard Mitigation Plan Update as Attachment G.

Downtown Waterfront Municipal Harbor Plan: In March 2013 the Boston Redevelopment Authority launched the new Downtown Waterfront Municipal Harbor Plan and zoning recommendations for the Greenway District with a series of public meetings and tours. BRA officials Peter Meade and Kairos Shen noted that the removal of the Central Artery roadway opens up opportunities for reconnecting neighborhoods to the waterfront, and for planning in a more environmentally sensitive manner. The focus of the plan is on encouraging development appropriate for an area sensitive to sea level rise.

Existing Flood Hazard Mitigation Measures

Boston Water and Sewer Commission – The Boston Water and Sewer Commission (BWSC), one of the most important flood mitigation agents in the City, actively manages the storm drain system, tracks data on water levels and makes this information publicly available, investigates reports of flooding, and develops solutions ranging from new management actions to capital projects like dredging, drainage reconstruction, and other physical improvements.

Boston Conservation Commission – The Boston Conservation Commission reviews all projects that remove, fill, dredge, or alter protected wetland resource areas. The Commission ensures that appropriate erosion and sediment controls are in place during and after construction activities, and that functions and values of coastal and inland resource areas are protected.

National Flood Insurance Program (NFIP) – Boston participates in the NFIP with 935 policies in force as of December 12, 2013. The FEMA database on flood insurance policies and claims (<http://www.fema.gov/business/nfip/statistics/pcstat.shtm>) provides the following information for the City of Boston:

Flood insurance policies in force (as of November 30, 2012)	1,125
Coverage amount of flood insurance policies	\$265,710,800
Premiums paid	\$1,025,240
Total losses (all losses submitted regardless of the status)	261
Closed losses (Losses that have been paid)	164
Open losses (Losses that have not been paid in full)	0
CWOP losses (Losses that have been closed without payment)	97
Total payments (Total amount paid on losses)	\$1,028,242.49

The City complies with FEMA's NFIP requirements by enforcing floodplain regulations, adopting up-to-date floodplain maps in its zoning code, and providing information to property owners and builders regarding floodplains and building requirements.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Catch Basin / Drain Maintenance - Boston cleans its catch basins typically every three years. The BWSC has created a GIS-based database of information on its catch basins and is developing a city-wide catch basin preventive maintenance plan. A city-wide cleaning set the baseline, and now the amounts of debris removed are recorded and used to determine the future cleaning schedule. Extra maintenance occurs in areas that tend to flood. Some drains are cleaned in advance of forecasted significant storms. The Department of Conservation and Recreation (DCR), a state agency, aims to clean the catch basins in Boston for which it is responsible once per year.

Street Sweeping – The Boston Public Works Department (PWD) sweeps posted arterial roads year-round to the curb weather-permitting. During the winter months, sweeping operations may be suspended until snow is cleared and removed to the curb. Non-posted streets are swept every week to two weeks from April through November each year. However, in the neighborhoods of the North End, Beacon Hill and the South End street sweeping is done from March through December.

Erosion and Sediment Control / Stormwater Management– The Boston Water & Sewer Commission requires developers to assess methods to retain stormwater on site for new construction and renovation projects requiring BWSC review. BWSC requires Best Management Practices (BMP) to include erosion control measures during construction and has developed and implemented a Stormwater Construction Inspection Guide and staffed an enforcement program to address construction sediment issues. Developers are also required to design infiltration systems, Low Impact Development (LID) techniques and particle separators in accordance with BWSC Site Plan Requirements and Massachusetts Department of Environmental Protection Stormwater management policies.

Green Infrastructure/Natural Flood Control - Various low-lying areas around the City have been protected from development and provide flood storage capacity. The most significant greenway is the Emerald Necklace, a continuous greenway that extends from Franklin Park in Mattapan to the Back Bay. Other significant open space resources in Boston include the urban wilds and the wetlands along the Neponset River. Several protected sites that help mitigate stormwater impacts include a parcel along Bussey Brook that is leased by the Arnold Arboretum, the western campus of the Boston State Hospital site at the Boston Nature Center, and a 100-foot buffer zone along Canterbury Brook on the eastern campus.

Inflow/Infiltration Removal – Reducing inflow and infiltration (I&I) is an issue for the sanitary sewer system. I&I is excess water that flows into sewer pipes, and consists of two kinds of flows: inflow is stormwater that flows into sewers via roof drain downspouts, foundation drains, storm drain cross-connections, and through holes in manhole covers; infiltration is groundwater that seeps into sewer pipes through holes, cracks, joint failures, and faulty connections. Both types of “extraneous” flows. I&I is a concern for flooding because the additional water flowing into a sewer system can exceed its capacity, leading to the discharge of untreated wastewater. The BWSC’s I&I reduction

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

program is based on the results of a comprehensive flow analysis in 1982 and further sewer system evaluation studies looking at identifying sources of I&I. BWSC conducts ongoing rehabilitation work and projects for I&I removal, including repairing leaky pipes and disconnecting roof leaders, sump pumps, and improper connections to the sewer system. In some places, reducing I&I can lead to localized flooding because water that once drained into the sewer system must find other paths.

Combined Sewer Separation - The Boston Water and Sewer Commission and the MWRA have been working to separate the storm water and wastewater systems since the 1980's as part of the cleanup of Boston Harbor. This reduces public health impacts during heavy rains.

Floodplain Management - Boston's *Floodplain Overlay Zoning District (Zoning Article 25)* is administered by the Boston Redevelopment Authority. These regulations set floor elevation standards for construction in a flood hazard district and prohibit certain activities and uses, such as mobile homes and storage of flammable materials. Under the separate authority of the Massachusetts Wetlands Protection Act, the Boston Conservation Commission also reviews projects proposed in the 100-year floodplain and the two agencies expect applicants to give consideration to future sea level rise over the design life of the project, particularly in determining the ground-level floor elevation for buildings, as well as the location of building mechanical equipment, utilities, storage areas for hazardous materials, underground garage portals, exhaust and ventilation infrastructure, and building entry points.

Development Review - Many projects undergo two coordinated public review processes – the City's Article 80 zoning review and state review under the Massachusetts Environmental Policy Act (MEPA). These reviews incorporate Chapter 91 review, flood plain issues, water access, storm water and drainage. Under the MEPA process, a number of city, regional and state entities and the public are able to review the project and provide input. BWSC also participates in this review and will also make recommendations on additional drainage provisions. BWSC must sign off on site plans before building permits can be issued.

Greenbelt Protection District – These districts are areas along the City's greenbelt roadways designated to protect open space areas and scenic resources. There are nine areas designated as Greenbelt Protection Overlay Districts:

1. William J. Day Boulevard in Dorchester and South Boston
2. Veterans of Foreign Wars Parkway in West Roxbury
3. American Legion Highway in Roslindale
4. Jamaicaway in Jamaica Plain, Roxbury, and West Roxbury
5. Arborway in Jamaica Plain and West Roxbury
6. West Roxbury Parkway in West Roxbury
7. Enneking Parkway, in West Roxbury and Hyde Park
8. Turtle Pond Parkway, in West Roxbury and Hyde Park
9. Dedham Parkway, in Hyde Park

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Massachusetts State Building Code – The Massachusetts State Building Code contains detailed regulations regarding flood proofing, snow loads, wind loads, and earthquake resistant design. The code was amended in the 1980's to include stricter seismic standards, so the vast majority of buildings in Boston pre-date that change and were not built to the stricter standards. The code requires that new buildings and substantial improvements in flood hazard areas must be elevated so that the lowest floor is at or above base flood elevation. In coastal flood hazard areas subject to high velocity wave action (V Zones), new buildings and substantial improvements must be elevated so that the lowest floor is two feet above the base flood elevation.

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, although new dams are not likely to be developed in Boston.

City of Boston Open Space Plan – Adopted in 2008, this plan lays out strategies for preserving and expanding the open space and natural resource amenities of the City, with potential benefit for flood mitigation efforts. Particularly important are policies outline in the plan that call for the involvement of Parks and Recreation Department staff, with a range of environmental science and design expertise, to work with other agencies, particularly the BRA, on neighborhood plans and development review.

Open space areas in the City are essential “green infrastructure” for flood mitigation. The City, in concert with a number of State agencies and neighboring municipalities, has managed to preserve or create open space areas in floodplains and other areas of the City. These include natural areas and parks along the rivers, “urban wilds” and other park spaces that can serve as stormwater retention areas during storms, and small green spaces in road medians, along sidewalks, and in other urban spaces that can allow for some infiltration of stormwater.

Underground Utility Protection - The electric system for Boston's street lights is protected from flooding by being buried 33 inches deep, with openings at the bottom to allow water to drain out. Fire crews maintain the fire box system. Private utilities own and operate other underground utilities, including the electric grid, telecommunications systems, and natural gas distribution. Those utilities are responsible for maintaining and protecting their systems in the event of flooding or other hazards.

Flood Prevention Education - The BWSC provides information on its website and in flyers sent with bills on various items such as keeping catch basin grates clear of debris and sediment and backflow valves to protect properties in areas that flood. The Mayor's office reminds residents to keep catch basin grates clear of leaves.

Emerald Necklace Park System – One of the original functions of this park system, designed in the 19th century, was to provide stormwater management and flood storage. Its ongoing maintenance to meet this purpose represents an important mitigation measure.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Muddy River Flood Control – The significance of past flooding in the Muddy River area has led to a number of mitigation actions that have focused on this area. Working with the U.S. Army Corps of Engineers (USACE), the State and the Town of Brookline, the City is pursuing a \$93 million project that will improve flood control, water quality, and habitat in the Muddy River. The project will increase the river’s hydraulic capacity and establish management practices to reduce the sediment and debris load entering the waterway. A \$30.9 million construction contract was awarded for Phase I of the project on Aug. 10, 2012, and a groundbreaking ceremony was held in October 2012. DCR controls much of the land and roadways in this area and is responsible for maintaining drainage infrastructure as well as conducting street sweeping and other sediment and debris management activities.

DCR Properties – The state Department of Conservation and Recreation is responsible for the maintenance of many parks, roadways, and other properties throughout the City. These include important transportation corridors such as Day Boulevard, Morrissey Boulevard, and Storrow Drive. Some particular facilities of note are pumps in the tunnels along Storrow Drive, tide gates for mitigating flooding of Morrissey Boulevard, and dredging near the Belle Isle Marsh, and a range of other projects and management activities.

Storm Ready Certification – The City was recently recertified as a Storm Ready Community through the National Weather Service, good through May 20, 2015. To receive this certification, the City demonstrated that it:

- Established a 24-hour warning point and emergency operations center
- Had more than one way to receive severe weather warnings and forecasts and to alert the public
- Created a system to monitor weather conditions locally
- Promoted the importance of public readiness through community seminars
- Developed a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Charles River Dam - DCR raises and lowers water levels at the Charles River Dam based on weather forecasts. For flood control purposes, they need to begin lowering water levels well ahead of a predicted storm. DCR has established operating parameters for control of water levels. If they raise or lower water levels outside of these parameters, they inform local emergency management personnel. The Charles River Dam has diesel pumps to use when needed. Otherwise DCR prefers to use the gates on the dams for changing the water levels. The operation of the dam is coordinated with MEMA and ACOE, and DCR works with these two agencies when there is a storm.

MassDOT and MBTA facilities: MassDOT, with funding from the Federal Highway Administration, is starting a pilot project, “Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options of the Central Artery.” The project will focus on four critical study areas of the Central Artery, including the Sumner and Callahan Toll Plaza in East Boston, the Greenway, the Ted Williams Tunnel Boat Section

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

in South Boston, and the MBTA Aquarium Station on the Blue Line. A hydrodynamic model will be used to analyze the vulnerability of the Central Artery to sea level rise and extreme weather events. MassDOT will investigate options for adaptation, and establish an emergency response plan for tunnel protection and/or shutdown in the event of a major storm. Key climate variables will be storm event frequency, storm surge height, and sea level rise. The investigation of adaptation options will include cost-benefit analysis. The project will focus on climate impacts and adaptive capacity of the Central Artery for today and the year 2030. Climate scenarios will also be developed for 2070 and 2100, which will result in high-level adaptive options only.

Existing Wind Hazard Mitigation Measures

Massachusetts State Building Code – The City enforces the Massachusetts State Building Code whose provisions include design standards for wind speeds of 100 miles per hour (780 CMR Eighth Edition, Table R301.2(4)). The code’s provisions are the most cost-effective mitigation measure against high winds other than a tornado. However, if a tornado were to occur, the potential for severe damages would be extremely high.

Tree Maintenance - The Parks and Recreation Department has regulatory and operational responsibilities for public shade trees. The Department’s maintenance program includes pruning, disease control, removals, and storm damage repairs. NSTAR prunes trees on their utility Rights-of-Way. Utility companies also prune trees in their transmission corridors.

Existing Winter Storm Hazard Mitigation Measures

Snow disposal –The City contracts for snow removal services and maintains a “black pavement” policy requiring all streets to be cleared to serve emergency vehicles. The Public Works Department coordinates with City agencies to identify snow disposal areas.

Sidewalk Clearance – The City requires by ordinance that property owners keep the public sidewalks in front of their property clear of snow and ice.

Snow Event Communications – City Hall, the BWSC, and other City agencies provide information and warnings with regard to such issues as freezing pipes, the danger of roof collapse under snow loads, the need to keep ventilation grates clear of snow, and other matters.

Fire Hydrant Location Mapping – The City’s fire hydrants have been located with GPS and mapped to assist with locating them in the event that they are buried in snow. The Mayor’s Office of New Urban Mechanics recently launched an ‘Adopt a Hydrant’ smartphone application that allows community members to adopt a hydrant, taking responsibility for ensuring hydrants are accessible to firefighters after a snowstorm.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Existing Geologic Hazard Mitigation Measures

Massachusetts State Building Code – Section 1612.1 of the State Building Code on designing for earthquake loads (780 CMR 1612.0) states that its purpose is “to minimize the hazard to life of 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”. Further, 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.

The code requires that every new structure be assigned a Seismic Design Category (SDC), and designed and constructed to resist effects of earthquake motions. The SDC is based upon the Occupancy Category and the severity of the design earthquake ground motion as expressed by S_s and S_1 . Table 1604.11 in the code provides these values for each city and town in Massachusetts; for Boston the values are 0.29 S_s and 0.068 S_1 . The S_s and S_1 coefficients correspond to the Maximum Considered Earthquake (MCE), which is defined as "collapse prevention" motion. On the East Coast, the MCE is equivalent to an event with return period of 2,500 years (or an event with 2% probability of being exceeded in 50 years).

The Seismic Design Category defines the required level of structural analysis and construction detailing. SDC determines permissible structural systems, limitations on height and irregularity, requirements for design of components for seismic resistance, and types of lateral force analyses that should be performed. The Occupancy Category ranges from I to IV, depending upon the consequences of a potential failure and the need for operational accessibility following a seismic event. Section 1612.2.5 of the code assigns all buildings to seismic hazard exposure groups. Group II includes buildings that have a substantial public hazard due to occupancy or use, including those in which more than 300 people congregate, and, Group III are those buildings having essential facilities that are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

On November 5 and 6, 2012, the City of Boston’s Inspectional Services Department (ISD), Boston Fire Prevention, Boston Public Works Department, Boston Redevelopment Authority (BRA), and the Boston Landmark’s Commission participated in a two-day National Earthquake Technical Assistance Program (NETAP) opportunity coordinated by the Mayor’s Office of Emergency Management and FEMA. There were a total of 56 course participants who successfully completed the FEMA 154 Rapid Visual Screening of Buildings for Potential Seismic Hazards and ATC 20 Post Earthquake Safety Evaluation of Buildings. The training focuses on how to identify potentially hazardous buildings before an earthquake occurs by providing methods to rapidly identify, inventory and rank buildings according to their expected safety and usability during and after earthquakes. The second day focused on rapid and detailed evaluation procedures

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

for evaluating earthquake damaged buildings and posting them with color-coded placards as inspected, limited entry, or unsafe.

Of the 56 attendees, 46 represented the ISD Commissioner and his entire leadership team, senior managers, building and structures, planning and zoning, electrical, plumbing and gas inspectors and health inspectors from all divisions of Boston Inspectional Services Department. The additional 10 participants were civil engineers from the Boston Public Works Department; the State Fire Marshall and Boston Fire Building Inspectors; and staff architects representing the Boston Redevelopment Authority and the Boston Landmarks Commission.

Existing Other Hazard Mitigation Measures

Development Review – The Fire Department reviews of all major development projects to ensure that proper fire safety provisions are incorporated.

Cooling and Warming Centers – The City maintains a network of cooling and warming centers that may be used by residents who do not have access to cool spaces during extreme heat events. The City also operates accompanying communications and transportation networks to support the provision of these services to residents in need.

Long Island – During extreme temperature events, vulnerable homeless people are offered the opportunity to stay at facilities located on Long Island.

Complete Streets Program

The City of Boston is currently designing and constructing projects in Boston's neighborhoods that have embraced the Complete Streets guidelines. Many of these projects incorporate improvements to stormwater management and introduction of more trees and landscaping that will help mitigate both stormwater and urban heat impacts. A summary of the current projects follows:

Alford Street Bridge, Charlestown

Alford Street Bridge (State Route 99 over the Mystic River) is being reconstructed with a new deck and superstructure. The machinery of this twin leaf double bascule bridge is being reconditioned with new components and the substructure is being repaired. The rehabilitation was designed to withstand a 1,500 year seismic event.

Project Manager: Boston Public Works

Status: In construction

Audubon Circle, Fenway

The new design of Audubon Circle, a historically significant gateway from the north into Boston and the Emerald Necklace park system, will re-emphasize the historic circle with benches, walls, trees and planters that will green the space and treat stormwater from the streets and sidewalks. Status: Design

Project Manager: Boston Transportation Department

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Boylston Street, Fenway

The redevelopment of Boylston Street between Fenway Park and the Longwood Medical Area will capture setback space to create wider sidewalks with street trees and other greenscape elements, in keeping with the Emerald Necklace that bookends the space, and to add bike lanes.

Project Manager: Boston Transportation Department

Status: Design

Broad Street- Crossroads Initiative, Downtown

This important Crossroad's widened tree-lined sidewalks will better connect well-traveled State Street, Faneuil Hall Marketplace and Government Center to the new Rose Kennedy Greenway at the harbor's edge. The project includes a unique passive irrigation system for the landscaping, and structural soil.

Status: Completed

Project Manager: Boston Redevelopment Authority

Causeway Street- Crossroads Initiative, Bullfinch Triangle

The key goals of the Causeway Street project are to transform the corridor into a great pedestrian-oriented boulevard and reconnect the West End and North End neighborhoods. The design will improve traffic operations and safety, provide significant upgrades to existing bicycle accommodations, and improve pedestrian amenities and convenience.

Project Manager: Public Works Department

Status: Design

Central Square, East Boston

The square includes vast expanses of pavement and an oval park in the center that is difficult to access. The redesigned square will reclaim much of the pavement for pedestrian use by narrowing the streets, expanding the park, and widening the sidewalks to create spaces for outdoor seating, cafes, and greenscape elements.

Project Manager: Boston Transportation Department

Status: Design

Centre and South Streets, Jamaica Plain

Centre and South Streets form Jamaica Plain's primary small-business spine. New concept designs are proposed for Monument Square, Hyde Square and the Mozart Park area to widen sidewalks, create shorter crosswalks, and introduce greenery.

Project Manager: Boston Transportation Department

Status: Design

Cummins Highway, Roslindale

Cummins Highway from Washington Street (Roslindale Square) to Harding Road will be fully reconstructed including the installation of new sidewalks, roadway resurfacing, a new traffic signal at Brown Avenue, new tree plantings, and bike lanes.

Project Manager: Boston Public Works

Status: Completed

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Frederick Douglass Street Improvements, South End/Roxbury

Streets in the Frederick Douglass neighborhood will be reconstructed with new sidewalks, a new street lighting system with LED lights, and new tree plantings

Project Manager: Boston Public Works

Status: Completed

| Existing mitigation measures and their status are summarized in Table [31](#).

Table 31 - Boston Existing Mitigation Measures			
Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
MULTIPLE HAZARDS			
1) Emergency Operations Plan (EOP)	City-wide	Effective	Update annually
2) Massachusetts State Building Code	City-wide	Effective	None
3) Evacuation and Emergency Preparation guides; preparedness information	City-wide	Effective	None
4) Communications Equipment-- Phone alert system, reverse 911, Alert Boston, twitter	City-wide	Effective	None
5) Criteria for City CIP projects include "mitigates an environmental hazard"	City-wide	Effective	None
6) Fire Marine Unit moves the boat to the dam locks if a hurricane is forecast	Boston Harbor	Effective	None
7) Boston Police Harbor Patrol relocated to Pier 10	Boston Harbor	New Pier and Security Gates. Former Dry Dock turned into park	None
8) PWD requires non-conductive covers on all manholes	City-wide	Effective	None
9) Local Emergency Planning Committee (LEPC)	City-wide	Effective	None
FLOOD HAZARDS			
10) BWSC 3-year Capital Improvement Program (2011-13), coordinated with other agencies, updated annually	City-wide	Effective	Update annually

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
11) Boston Water and Sewer Operations/ Maintenance Activities – catch basin, drain cleaning, street sweeping	City-wide	Effective	None
12) Pre-storm preparations (e.g. sandbags, inspections of key vulnerable sites)	City-wide	Effective	None
13) BWSC requirements for Erosion and Sediment Control and Storm Water plans	City-wide	Effective	None
14) Various low-lying areas around the City have been protected from development and provide flood storage capacity.	Emerald Necklace, Boston Urban Wilds, Neponset River wetlands, parcel along Bussey Brook leased by Arnold Arboretum; Boston State Hospital site at Boston Nature Center; 100-foot buffer on Canterbury Bk.	Effective	None
15) Inflow/ Infiltration (I/I) Removal projects -- BWSC undertook flow analysis and sewer system evaluations to determine I/I sources. This led to rehabilitation work and projects for I/I removal.	City-wide	Effective	None
16) Floodplain Overlay District (Article 25)	Areas identified on FIRM maps	Effective	Integration of climate change effects
17) MEPA and Article 80 development review	City-wide	Effective	None
18) Green building zoning requirements, encourage low impact development techniques	City-wide	Effective	None
19) Article 29 (Greenbelt Protection Overlay District) requires open space preservation	Designated districts	Effective	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
20) Conservation Protection Subdistricts and Article 80 review	Designated districts (total of 34)	Site plan required in Conservation Protection Subdistrict	None
21) Grow Boston Greener - goal of 100,000 trees by 2020	Citywide	Effective	None
22) Underground electric utility protection.	City-wide	Effective	None
23) Public information—BWSC website, newsletters and Mayor’s Office provide information on flood prevention, and stormwater mitigation and snow and ice removal from catch basins	City-wide	Effective	None
24) Mitigating health and safety impacts after flooding—ISD will order electricity shut off and condemn food	City-wide	Effective	None
25) Combined Sewer Separation Projects	Dorchester, Stony Brook, Fort Point Channel, Morrissey Blvd. Conduit	All completed	None
26) Muddy River Flood Control, Water Quality and Habitat Enforcement and Historic Landscape Preservation Project	Muddy River watershed	Project is underway	Complete project
27) Charlesgate area in Boston dredged	Muddy River watershed	Effective	None
28) Muddy River maintenance (DCR removes leaves spring and fall; DCR and City street sweeping, catch basin cleaning)	Muddy River watershed	Effective	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
29) Remote monitoring of Stony Brook conduit water levels (new SB at Parker St and old SB at Northeastern)	Muddy River watershed	Effective	None
30) Risk Assessment for Boston Fire Alarm building's perimeter security	Boston Fire Alarm building site	Rear and side security installed	Fencing to be installed.
31) Longwood Area BWSC study of locations that experience flooding	Longwood Medical Area	Study has been completed	Drainage improvements are underway
32) DCR maintenance of Storrow Drive pumps, pipes, and catch basins	Storrow Drive area	Effective	None
33) Storrow Drive Reconstruction Project	Storrow Drive area	Project is in design and permitting phase	Implement the project
34) St. Botolph Street BWSC storm system	St. Botolph St. area, Back Bay	Project Completed	None
35) Archdale Area, Roslindale—maintaining natural flood storage capacity	Archdale Area	Effective	None
36) Archdale Area, Roslindale—Ravine provides flood storage, releases to Bussey Brook	Archdale Area	Effective	None
37) Archdale Area, Roslindale—MWRA connection to Stony Brook	Archdale Area	Has been used 5 times since construction (in 2008); effective	None
38) Canterbury Brook, Mattapan—DCAM mitigation project	Canterbury Brook	TBD	TBD
39) Neponset River Area, Dorchester—natural land protected, provides flood storage	Neponset River Area	Effective	None
40) Neponset River Area, Dorchester—sediment has been removed from river to increase capacity	Neponset River Area	Effective	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
41) Neponset River -- DCR studying impacts of removing Tilestone and Hollingsworth Dams and Baker dams for ecological restoration and creation of fish ladder	Neponset River, Dorchester area	USACE Aquatic Ecosystem Restoration Program -- Ongoing study	Implement findings of study
42) Pine Neck Creek – BWSC installed rip-rap, restored salt marsh	Pine Neck Creek between I-93 and Port Norfolk	Effective	None
43) Day Boulevard, South Boston—DCR repaired M Street seawall	Day Boulevard	DCR completed seawall restoration	None
44) Belle Isle Marsh—DCR flood control project. State designation as Area of Critical Environmental Concern	Belle Isle Marsh, Jefferies Point, and Orient Heights, E. Boston	Flood control and dredging on-going	Continued implementation of project
45) East Boston Greenway Corridor—Bremen Street park will preserve flood storage capacity	East Boston Greenway Corridor	Effective	None
46) East Boston Greenway Corridor storm water system	East Boston Greenway	Effective	None
47) Havre Street, East Boston sewer relief project	East Boston	Under construction	Complete project
48) Centre Terrace, Wedgemere—BWSC improvements for up to 10 year storm	Centre Terrace area	Effective	None
49) Centre Terrace, Wedgemere—BWSC inspects grates	Centre Terrace area	Effective	None
50) Centre Terrace, Wedgemere, West Roxbury—Detention basin built in private development	Centre Terrace area	Effective, designed for 50-year storm	None
51) George Wright Golf Course, Hyde Park—inspections of catch basins	George Wright Golf Course	Effective	None
52) Engine 20, Dorchester: Elevation of new boiler and relocated to same level as generator	Dorchester	Sump pump maintenance; BWSC built holding tank	Additional floodproofing of buildings may be required

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
53) Charlestown Underpass Stormwater Drainage Improvements	Charlestown	Effective	Monitor roadway conditions
54) DCR raises and lowers water level at Charles River Dam based on weather forecast.	Charles River Dam area	Effective	None
55) BWSC can open gate at Fens Gatehouse when water levels are high to bypass conduit	Fens area	Effective	None
56) DCR Dam Safety Regulations	State-wide	Effective	None
57) Parks and Recreation Flood Mitigation Sustainable Design Guidelines	City-wide	Adopted March 2011	None
58) Sewer Lateral Financial Assistance Program	City-wide	Effective	None
59) Expanded capacity for remote monitoring of water levels in streams and major trunk lines.	City-Wide	Effective	None
60) Davenport Creek – Adams Village drainage improvements	Adams Village	Effective	None
61) Drainage improvements at American Legion Highway at Wilmot St, near Stop and Shop	Roslindale	Effective	None
62) Business Street – improve stormwater drainage and backflow valves	Hyde Park	Effective	None
WIND HAZARDS			
63) Parks and Rec. Dept. regular tree maintenance	City-wide	Effective	None
64) NSTAR clearing of downed wires	City-wide	Effective	None
65) ISD regular inspections of construction sites	City-wide	Effective	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
66) Underground lights systems; street lights rated for high winds	City-wide	Effective	None
67) Critical repairs are being made annually to Long Island Bridge	Long Island	Effective	None
WINTER HAZARDS			
68) Traffic plan during snow storms	City-wide	Effective	None
69) Regulations requiring sidewalk clearing by abutter and parking bans	City-wide	Effective	None
70) City contract with vendor for snow melters on emergency basis	City-wide	Effective	None
71) Snow plowing strategy	City-wide	Effective	None
72) Fire hydrant locations are recorded with GPS and flagged for snow removal	City-wide	Effective	None
73) Public education on frozen pipes, snow loads on roofs, and keeping ventilation clear of snow	City-wide	Effective	None
74) Building Code requires new roofs to be designed to handle snow loads	City-wide	Effective	None
75) ISD can order building owners to remove icicles or cordon off area	City-wide	Effective	None
76) Emergency Operations Center can be used as back-up storm control center	City-wide	Effective	None
77) Snow Common Operational Picture (SNOWCOP) - Snow removal GPS mitigation tracking	City-wide	Effective	None
78) Pre-treat streets in advance of icing conditions	City-wide	Effective	None
79) PWD Coordinates with City Agencies to Identify Snow Dumps	City-wide	Effective	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
80) PWD Coordinates with State on Clearing Snow off Bridges	City-wide	Effective	None
81) Acquired new closed loop Salting Equipment for more effective salting using less salt (500 lbs/lane per mile).	City-wide	Effective	None
GEOLOGIC HAZARDS			
82) State Building Code addresses earthquake standards	City-wide	Effective	None
83) Communications in Police Headquarters secured to withstand earthquake. Back-up at Frontage Road.	Police HQ and Frontage Road	Effective	None
84) Three police stations rebuilt or renovated to modern building standards	Districts 3, 5, 7	Effective	None
COASTAL DAMAGE			
85) Long Island—Boston Property and Construction Management is stabilizing SW part of island	Long Island	TBD	TBD
86) Moon Island—Seawall inspections and assessment	Moon Island	Completed	Repair Granite Seawall
87) East Eagle Street, East Boston—USACE study in 1989	East Eagle Street	A portion of the site conveyed to NSTAR for implementation	None
88) MWRA/DCAM land, East Boston—PWD is working to address erosion	Western shore of East Boston	DCAM and USACE completed mitigation work	None
89) Reserved Channel—sewer separation under design. Debris being cleaned.	Reserved Channel	In construction, completion due 2015	None
90) Boston Harbor: USACE and MASSPORT are studying the feasibility and environmental impact of deepening the main shipping channel and Reserved Channel	Boston Harbor: main shipping channel, Reserved Channel and approach to Navy dry dock	Ongoing feasibility study and dredging analysis	Federal funding authorization required for implementation

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
91) Participation in the National Flood Insurance Program (NFIP)	Areas identified on the FIRM maps.	There are 1,101 policies in force.	Consider applying for Community Rating System
92) RiskMAP Updated	Flood Plain Expansion	Effective	None
93) Morrissey Boulevard, Dorchester—tide gates have been updated	Dorchester	DCR - Design Underway	Complete project
94) Dorchester- Dr. Rev. Bill Loesch Park Drainage Improvements	Dorchester	Effective - Completed and Rededicated August 11, 2012	None
95) Dorchester- Franklin Park Drainage Improvements	Dorchester	To be scheduled	Implementation of project
96) Hyde Park—George Wright Drainage Improvements	Hyde Park	Ongoing program	None
97) Jamaica Plain – South Street Mall Drainage Improvements	Jamaica Plain	Completed in 2010	None
98) Mattapan – Almont Park / Hunt’s Playground Infrastructure Drainage Improvements	Mattapan	Completed June 2013	None
99) Mattapan – Erie Ellington Park Drainage Improvements	Mattapan	Completed	None
100) North End- DeFilippo Wall Infrastructure Drainage Improvements	North End	In design	Implementation of project
101) Roxbury- Franklin Park Site Drainage Improvements and Ventilation	Roxbury	Completed September 2013	None
102) Mattapan- Walker Playground Drainage infrastructure	Mattapan	Completed June 2011	None
103) South End – Statler Park Infrastructure Drainage Improvements	South End	Completed	None
104) West Roxbury- Hynes Field Drainage Improvements	West Roxbury	Complete	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
105) West Roxbury- Billings Field Drainage Improvements	West Roxbury	In construction- BWSC contract #221 issued on Oct. 19, 2011	None
106) North Dorchester Bay CSO Project	Dorchester	Completed by MWRA	None
107) Lawrence Avenue, Dorchester pipe enlargement	Dorchester	Project awarded for \$350K, to be completed 2013	None
108) Back Street Sewer and Storm Drain Project Groundwater Restoration	Back Bay	Completed	None
109) Newmarket Square Storm Drains, Sewer Separation and Water Mains	Newmarket Square	In construction; to be completed in 2014	None
110) City of Boston Utility Coordination Software (COBUCS) Utility Coordination Measure	City-wide	Effective	None
111) PWD Operations Center at Frontage Rd.; Coordination of PWD Assets and Resources during an incident.	City-wide	Effective	None
112) MassDEP has 6-8 Emergency Oil Boom Trailers to mitigate hazardous spills in Boston Harbor. BPD Truck Team, BPD HAZMAT Unit, and BPD Harbor Patrol Unit can transport Oil Boom Trailers to site of disaster	City-wide	Effective	None
113) Health in All Policies ensure that equitable health impacts and climate change considerations are factored into City decision-making	City-wide	BPHC in partnership with multiple agencies and community partners	A pilot rapid Health Impact Assessment was completed for a BPHC property scheduled for redevelopment, partner agencies meet regularly; two workshops were conducted.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
114) Community outreach and education on emergency preparedness to grow resilient communities able to cope with natural hazards	City-wide	Effective/Partial Implementation by BPHC – Public Health Preparedness (PHP)	Complete implementation
115) Partnership with UMass Boston on two emergency management professional development certificate programs: (1) Inclusive Emergency Planning and (2) All Hazards Protection and Response. DelValle and UMass Courses focus on socially vulnerable populations.	City-wide	Effective / Ongoing implementation by BPHC – Public Health Preparedness (PHP)	Effective, fully implemented
116) Boston Medical Reserve Corps (BMRC) Recruitment, Development, and Preparedness to support PHP in its role as the Emergency Support Function 8 (Public Health and Medical Services) Coordinator for the City of Boston. This mitigation measure will reduce the public health consequences of emergencies.	City-wide	Effective, implemented by BPHC – Public Health Preparedness (PHP)	None
117) Response to flooding at 201-211 River Street, Mattapan – repairs and upgrade sump pump capacity	201-211 River Street, Mattapan	Completed by BPHC and effective – no flooding last year	None
118) Surveillance for new or emerging infectious diseases that pose a threat to public health: effective using multiple streams of data. Feedback provided to partners so they can take appropriate steps to reduce spread of disease.	City-wide	Effective / Ongoing implementation by BPHC – Communicable disease	None

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 31 - Boston Existing Mitigation Measures

Type	Area Covered	Effectiveness/ Implementation	Improvements/ Changes Needed
119) Public education on how to reduce disease risk: materials for the public and for health care providers to share with the public. Fact sheets, educational sessions.	City-wide	Effective / Ongoing implementation by BPHC – Communicable disease	None
120) Information and clinical guidance provided to healthcare providers. Health alerts. Use of existing health care contacts.	City-wide	Effective / Ongoing implementation by BPHC – Communicable disease	None
121) Vaccine distribution on a limited basis in situations where that may be indicated.	City-wide	Effective / Ongoing implementation by BPHC – Communicable disease	None
122) Community Emergency Response Teams (CERT) Preparedness Fairs	City-wide	Effective / Ongoing implementation by OEM	None

Implementation Progress on the Previous Plan

During the planning process, City staff reviewed mitigation measures identified in the 2008 Metro-Boston Multi-Hazard Mitigation Plan Boston Annex and determined whether measures had been implemented, deferred, or were still in process. All in-process measures are carried forward into the 2014 plan update. Deferred measures were deleted or carried forward into the 2014 plan update based on an assessment of the continued relevance or effectiveness of the measure and the cause of the deferral. The status of these mitigation measures is shown in Table 32 below.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

**Table 32
Status of Proposed Mitigation Measures from the 2008 Plan**

Mitigation Measures	Priority	Implementation Responsibility	2013 Status
Muddy River Restoration	High	Fed., State, City, Town of Brookline Boston Parks and Recreation	Phase I construction began 2013
Protect Fire Alarm Building	High	Fire Dept.	The Boston Property and Construction Management Dept. has filed a Notice of Intent with the Conservation Commission for site improvements
Storrow Drive and Bowker Overpass continued maintenance	High	DCR and MassDOT	In process: on-going maintenance
Storrow Drive and Bowker Overpass reconstruction	High	DCR and MassDOT	In-Process - reconstruction work has begun
Rebuild Charlestown – Rutherford Avenue Underpass tunnel	High	BTD and MassDOT	In process; public review process
Conduct earthquake study	High	OEM, NESEC, HAZUS-MH and DPW	HAZUS study complete—conceptual design
Purchase fire boat	High	Fire Dept.	Dive Boat purchased– Oct. 2010 69 Fire Boat purchased Sept. 2011
Rehabilitate Long Island Bridge	High	Public Works Department	Repair work is on-going
Acquire snow melting technology	High	DPW and MASSPORT	Pilot testing with MASSPORT Logan Did not receive HMGP funding
Improve communications system	High	Multiple Depts. UASI Public Safety	Upgrades on-going UASI Grants for update
Canterbury Brook Dredging	Medium	DCAM, BWSC, MWRA	DCAM to complete dredging
Long term solution to stabilize bank at East Eagle Street	Medium	Public Facilities- PCM	Permanent access and utility easement of 338 East Eagle Street Conveyance to NSTAR on Feb 10, 2011. Land 16,808 square feet; Permanent easement 13,742 square feet
Stabilize bank or establish new bank at Columbia Point	Medium	UMass and DCAM	Preliminary feasibility study in design

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Beyond the mitigation measures proposed in the 2008 Hazard Mitigation Plan, the City has since then proceeded with a number of other measures, summarized in Table [33](#).

Table 33 Status of Other Mitigation Measures Not Included in the 2008 Plan	
Mitigation Measures	2013 Status
Establish larger primary emergency operations center	Identified new location
Purchase generators for fire stations without one	Three phase installation program complete by early 2014
Portable generators for City departments/facilities	Boston DOE LEAP Study
Maintain and update Emergency Operations Plan (EOP), evacuation plans, other relevant plans and protocols.	OEM Updated plan
Move the Police Harbor Patrol site	Completed
Retrofit man-hole covers with non conductive covers	Ongoing replacement program
Colleges of Fenway project to restudy and map Muddy River Watershed	USACE working on Phase 1 RFP
Sediment removal and dam operations on Neponset River in Dorchester	Neponset River Greenway
Expand capacity to monitor water levels remotely	Completed real-time monitoring automated rain gauge
Moon Island: implement recommendations from the Assessment	Designer selected; project schedule TBD
Erie Street, Dorchester – new larger storm drain with easement on Erie St.	Completed by Boston Water and Sewer Commission

Regional and Inter-Community Considerations

Some of Boston’s hazard mitigation issues are inter-community issues that involve cooperation between two or more municipalities, or are regional issues involving a state, regional, or federal agency.

The City of Boston has been working with Brookline on flood mitigation efforts in the Muddy River. As mitigation issues are identified for other rivers in the border areas of the City, particularly as climate change results in new hazard profiles for these waterways, the City will look for opportunities to partner with neighboring communities.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

The drainage systems that serve Boston and surrounding communities 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 Boston Water and Sewer Commission, the Department of Conservation and Recreation (DCR), and Massachusetts Department of Transportation (MDOT), and in the case of combined sewer systems, the Massachusetts Water Resources Authority (MWRA). The planning, construction, operations, and maintenance of these structures are integral to the flood hazard mitigation efforts of all the communities. These agencies must be considered the City's regional partners in hazard mitigation. In the sections that follow, the plan identifies actions where cooperation with non-city agencies may be necessary.

Proposed Hazard Mitigation Measures

Identification of Potential Mitigation Measures

The City of Boston solicited suggestions for mitigation measures from City officials and members of the Hazard Mitigation Executive Steering Committee because these individuals have the most comprehensive knowledge of local conditions. Mitigation measures from the 2008 plan that had not yet been completed were considered as well as new and modified mitigation measures not included in the previous plan. The Hazard Mitigation Executive Steering Committee reviewed and refined the list of proposed mitigation measures at its September 6, 2012 meeting and in subsequent review of the draft plan update. City officials provided the best available information on the mitigation measures, their estimated cost, and time frame for implementation.

This section describes new mitigation measures planned for the next five years. The proposed mitigation measures are listed in Table [34](#) below, along with priority, lead implementation, time frame, estimated cost, and potential funding source.

Introduction to Table [34](#), Summary of Proposed Mitigation Measures

Mitigation Measure – A brief description of each mitigation measure is provided.

Priority – As described in the following section “Prioritization of Mitigation Activities” and shown in Table [34](#) below, the prioritization of mitigation measures is based on multiple factors that were considered in assigning an overall rank of high, medium, or low to each mitigation measure. The ranking of each mitigation measure is shown in column 2 of Table [34](#)

Implementation Responsibility – The Executive Steering Committee designated implementation responsibility by City agency staff and department managers. It is likely that some mitigation measures will require that several departments work together and assigning staff is the 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

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

design, or already designed and awaiting funding. Funding opportunities could affect the time frame for implementation.

Estimated Cost - The cost data, if available, represent current rough estimates only.

Potential Funding Sources – This column identifies likely sources of funding for each measure. Agencies with implementation responsibility in most cases will be responsible for pursuing funding opportunities. Funding sources may be internal or external to the City. Many measures may require several funding sources. Identification of a potential funding source does not guarantee that a project will be eligible for or selected for funding.

Abbreviations Used in Table 34

Federal

FEMA Mitigation Grants includes:

FMA = Flood Mitigation Assistance Program.

HMGP = Hazard Mitigation Grant Program.

PDM = Pre-Disaster Mitigation Program

ACOE = U. S. Army Corps of Engineers

EPA = U.S. Environmental Protection Agency

NPS = National Park Service

USCG = US Coast Guard

USDA = United States Department of Agriculture

State

CZM = Coastal Zone Management

DCR = MA Department of Conservation and Recreation

DEP = MA Department of Environmental Protection (State Revolving Fund)

Mass DOT = Massachusetts Department of Transportation

MBTA = Massachusetts Bay Transit Authority

City

BFD = Boston Fire Department

BRA = Boston Redevelopment Authority

BPHC = Boston Public Health Commission

BWSC = Boston Water and Sewer Commission

EDIC = Boston Economic Development and Industrial Corporation

ISD = Boston Inspectional Services Department

OEM = Mayor's Office of Emergency Management

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
Flood Hazard Mitigation Measures					
1) Muddy River Restoration – <u>flood control</u>	HIGH	Fed., State, Boston Parks and Rec., Town of Brookline	2017	\$92 M	Federal, state, and local funding
2) Storrow Drive reconstruction <u>and drainage improvements</u>	HIGH	DCR	2018	\$45 – 135 M	State, Federal transportation funds
3) Charlestown Underpass –replace tunnel with urban boulevard <u>and drainage improvements</u>	HIGH	Boston Transportation Dept.	TBD	\$100 M	Federal Highway Administration
4) <u>Dredging to address</u> Canterbury Brook flooding in Mattapan (DCAM)	HIGH	DCAM	2017	> \$1 M	State, DCAM
5) Morrissey Boulevard rehabilitation, including tidal flooding and drainage improvements	HIGH	DCR	2018	\$25 M	State – DCR/Federal
6) Longwood Medical Area drainage improvements	MED	BWSC	2014	\$178,425	BWSC
7) Floodproof basement and elevate utilities for Engine 20, Dorchester	MED	BFD	2016	\$100 - \$250K	City/BFD
8) Assess the vulnerability of Central Artery and Mass. Pike to riverine and coastal flooding, particularly with climate change, <u>in order to develop mitigation measures</u>	HIGH	MassDOT	2014-15	Staff time for assessment	State/MassDOT

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
9) Assess the vulnerability of the MBTA system to coastal and riverine flooding and to heat waves, particularly with climate change <u>in order to develop mitigation measures</u>	HIGH	MBTA	2014-15	Staff time for assessment	MBTA
10) Assess vulnerability of the electrical grid, particular major distribution lines and substations to natural hazards likely to be increased by climate change <u>in order to develop mitigation measures</u>	HIGH	Electric Utilities	2014-2016	TBD	Electric Utilities
11) Assess Stormwater Management Drainage System <u>in order to</u> recommend Improvements <u>to</u> storm drains <u>at the</u> Uphams Corner, McKim and Lower Mills Branch Libraries	MED	BWSC	2015	Staff time for assessment	BWSC
12) <u>Assess Boston Marine Industrial Park</u> Stormwater Management System and <u>implement</u> Improvements	MED	BRA	2016-17	\$1.5-2M	City/BRA
13) Lawrence Street, Roxbury – construct large drain on easement	MED	BWSC	2014	\$350,000	BWSC
Wind Hazard Mitigation Measures					
14) Assessment of mast arms <u>for wind vulnerability</u> at signalized intersections <u>on</u> State Major Arterials and Roadways	LOW	MassDOT	2017	Staff time for assessment	State-MassDOT
15) Public education on	MED	OEM will develop	2016	Staff Cost	City/OEM

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
Hurricane and Tornado Awareness, using Red Cross Tornado APP for iPhone and Android smart phones.		outreach as part of ALERT BOSTON			
16) New street tree planting standards on spacing and soil volume to increase wind resilience	MED	???	2016-17	Staff cost	City
Geologic Hazard Mitigation Measures					
17) Purchase Android-based mobile GPS Tablets for ISD Inspectors (60 units) <u>(preparedness)</u>	MED	ISD & DoIT	2015-16	\$6,000	City/ISD DoIT & Federal
18) Conduct Study for Retrofit of Unreinforced masonry buildings <u>to improve earthquake resilience of</u> municipal buildings	MED	Office of Property Management with various City Departments	2015-18	Less than \$10K	City/OPM
<u>19)</u> Add Quake Smart Program and Earthquake Alert APP <u>(preparedness)</u>	MED	OEM with various City Departments	2015-18	Staff time	City/OEM
<u>20)</u> Purchase ASA/DHS FINDER for Fire Dept. <u>(Preparedness)</u>	HIGH	Boston Fire Dept.	2017	TBD once COTS	Federal
21) Increase public education on earthquakes using Red Cross Earthquake APP for iPhones and Android Smart Phones and participate in annual Northeast SHAKEOUT	MED	OEM will develop outreach as part of ALERT BOSTON		Staff Cost	2015
Coastal Damage Mitigation Measures					

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
22) Moon Island seawall rehabilitation to mitigate coastal hazards	MED	Property and Construction Management	2016	\$1.5M	City
23) Stabilize bank or establish new bank at Columbia Point to mitigate coastal hazards	MED	UMass Boston, state	2016	Less than \$1 M	State/UMASS/DCR and private funding
24) Long term solution to stabilize bank at East Eagle Street to mitigate coastal hazards	MED	US Army Corps of Engineers	2016	Less than \$1 M	Federal USACOE
25) Assess feasibility of strengthening seawalls and/or adding vegetation for shoreline stabilization along Morrissey Blvd. to mitigate coastal hazards	MED	DCR	2016	Staff time for assessment	State/DCR
26) Stabilize coastal bank along the eastern side of Long Island, adjacent to the Public Health Commission's campus to mitigate coastal hazards	MED	Property and Construction Management	2017	\$7,000 to \$10,000 per linear foot	City/PCM and State/DCR
27) Assess Boston Harbor waterfront for additional sea and flood wall protection to mitigate coastal hazards	MED	Collaboration of BRA, EDIC, DCR, CZM, MassDOT, USCG, Navy, NPS TBHA, Businesses	2017	Staff time for assessment	City/BRA/EDIC and State/DCR/CZM/DOT Federal/USGS/Navy
28) Assess impact of tidal flooding at McCormack and Dever schools, 315 Mt. Vernon Street, Columbia Point, Dorchester to developio mitigate measures	MED	Property and Construction Management	2018	Less than \$10K	City/PCM
Extreme Heat Mitigation Measures					

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
29) Tree Planting program to mitigate extreme heat and stormwater impacts to mitigate extreme heat	HIGH	Boston Parks and Recreation	2014-18	TBD	City/BPR
30) Cool Roofs Program – Green Roofs and White Roofs to mitigate extreme heat	MED	Boston Environment Dept.	2014-18	TBD	City/Env't. Dept.
Fire Hazard Mitigation Measures					
31) Assess feasibility of NFPA FireWise Program for urban environmental education of homeowners on reducing brush and mulch fires	MED	BFD, Fire Prevention Division	2015	Staff time	City/BFD
32) Boston Fire Prevention Programs (preparedness)	MED	BFD Fire Prevention Division	2014-18	Staff time	City/BFD
33) Boston Fire Life Safety Plan Program (preparedness)	HIGH	Boston Fire Dept., Office of Field Services	2014-18	Staff time	City/BFD
34) Boston Fire LEPC Tier II Manager (preparedness)	HIGH	Boston Fire Dept., Office of Field Services LEPC	2014-18	License and Staff time	City/BFD State
Solar Storm Mitigation Measures					
35) Inventory equipment vulnerable to Solar Storm EMPs	MED	OEM Logistics	2014-15	Staff time	City/OEM
36) Build Faraday Cages to store and protect redundant radio and communication equipment, lap tops, and batteries.	MED	OEM and City Departments	2014-15	Cage without redundant equipment \$40 - \$50,000 Cages with equipment \$500,000	City/OEM
Other Hazard Mitigation Measures					

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
37) Prevent outbreaks of West Nile Virus and Eastern Equine Encephalitis by treating catch basins with mosquito larvacides	MED	BPHC and Suffolk County Mosquito Control	2014-18	\$35,954 for materials per treatment, plus staff time (ISD, BHA, BPHC, DCR & Zoo NE) for application	BPHC and Suffolk County Mosquito Control
38) Assess the risk of water-reactive chemicals stored in flood-prone buildings <u>to mitigate flood hazards</u>	LOW	BFD HAZMAT and BFD LEPC	2015	Staff time for assessment	City/BFD
39) Monitor Outbreak of Invasive Species and Eradicate Asian Longhorned Beetle treating host trees with imidacloprid	MED	USDA	2014-16	\$55,000 per year	Federal –USDA APHIS
Multi-Hazard Mitigation Measures					
40) Participate in the Community Rating System	MED	Boston Environment Dept.	2015	Staff time	City/Env't. Dept.
41) Update Storm Ready Certification with NWS	MED	Boston OEM	2016	Staff time	City/OEM
42) Continue incremental repairs of the Long Island Bridge	HIGH	PWD	2014-17	\$6M Annually	City/PWD
42) Adopt a tree retention ordinance to preserve existing trees or equally compensate for the loss of the tree's caliper <u>(mitigation for both flooding and extreme heat)</u>	HIGH	TBD	2014-15	Staff time	City
43) Community Preparedness Workshops	HIGH	OEM	2014-18	Staff time	City/OEM

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
and Outreach (preparedness)					
44) Establish a multi-cultural and multi-language public awareness program on natural hazards and mitigation	HIGH	OEM	2016-18	Staff time	City/OEM
45) Conduct a survey of emergency generators at critical infrastructure facilities, municipal buildings, shelters and youth hostels	HIGH	OEM	2016-18	Staff time	City/OEM
46) Evaluate feasibility of mobilizing passenger ferries for evacuation (preparedness)	MED	OEM	2017	Staff time	City/OEM
Climate Change Adaptation Mitigation Measures					
47) Convene a Cabinet level <i>Climate Preparedness Task Force</i> to review current activities and policies and provide guidance for further development (preparedness)	HIGH	Climate Preparedness Task Force	2014-15	Staff time for review and guidance	City
48) Identify ways for institutions and businesses to reduce their vulnerability to climate change and for the City of Boston to support those efforts	HIGH	Green Ribbon Commission	2014-15	Staff time for Commission support	City
49) Survey the preparedness of existing buildings and other assets (e.g. MBTA stations) for climate change (preparedness)	HIGH	Boston Redevelopment Authority	2014-15	Staff time for survey	City/BRA

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 34 - Proposed Mitigation Measures					
Mitigation Measure	Priority	Lead Implementation	Time Frame	Estimated Cost	Potential Funding Sources
<u>50)</u> Include climate change preparedness in Article 80 Development Review <u>to enhance flood mitigation</u>	HIGH	Boston Redevelopment Authority	2014-15	Staff time for drafting Article 80 guidelines and checklist	City/BRA
<u>51)</u> Adopt a Wetlands Ordinance that includes sea-level rise and develop new floodplain maps that incorporate projected climate change <u>to mitigate flood hazards</u>	MED	Boston Conservation Commission	2014-15	Staff time for drafting ordinance and preparing maps	City/BCC
<u>52)</u> Develop guidelines and prioritization for better enforcement of flood proofing standards <u>to mitigate flood hazards</u>	MED	Inspectional Services Department and Boston Public Health Commission	2014-15	Staff time for drafting guidelines	City/ISD/BPHC
<u>53)</u> Review emergency operation planning for storms and flooding <u>(preparedness)</u>	HIGH	Office of Emergency Management	2014-15	Staff time for assessment	City/OEM

Prioritization of Mitigation Activities

The last step in developing the mitigation strategy is to assign a level of priority to each mitigation measure. Prioritization is based on current estimates of the existing and potential hazard impacts and of the costs of action and inaction.

Prioritization of mitigation measures was conducted by members of the Boston Hazard Mitigation Steering Committee, as shown in Table 35. The priority of each mitigation measure represents the judgment of the Steering Committee based on multiple factors, including the hazard risk that the measure addresses, the geographic extent or criticality of the location affected by the measure, the potential benefit, and the estimated relative cost or complexity of the measure.

The estimated benefit created by a mitigation measure was based on a qualitative estimate based on local knowledge of hazard areas, 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. Estimated costs were ranked in terms of High (greater than \$10,000,000), Medium (\$2,000,000 to \$10,000,000), or Low (less than \$2,000,000, or staff time). Based on these factors, each mitigation measure was assigned

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

an overall priority (High, Medium or Low). The time frame for each mitigation measure is also indicated.

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
Flood Hazard Mitigation Measures					
1) Muddy River Restoration- <u>flood control</u>	Fenway	High	High	High	2014-18
2) Storrow Drive reconstruction <u>and drainage improvements</u>	Back Bay	High	High	High	2017
3)Charlestown Underpass – replace tunnel with urban boulevard <u>and drainage improvements</u>	Charlestown	High	Medium	High	2018
4) <u>Dredging to address</u> Canterbury Brook flooding– (DCAM)	Mattapan	Medium	Medium	High	2015
5) Morrissey Blvd. rehabilitation, including tidal flooding and drainage improvements	Dorchester	High	Med/High	High	2018
6) Longwood Medical Area drainage improvements – <u>Under BWSC Construction Contract Improvements scheduled for construction 2013.</u>	Fenway/LMA	Medium	Low	Medium	2014
7) Floodproof basement and elevate	Dorchester	Low	Medium	Low	2016

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
utilities for Flood prevention for Engine 20, Dorchester					
8) Assess the vulnerability of Central Artery and Mass. Pike to riverine and coastal flooding, particularly with climate change, <u>in order to develop mitigation measures</u>	City-wide	Medium	Low	High	2014-15
9) Assess the vulnerability of the MBTA system to coastal and riverine flooding and to heat waves, particularly with climate change <u>in order to develop mitigation measures</u>	City-wide	Medium	Low	High	2014-15
10) Assess the vulnerability of the electrical grid, particular major distribution lines and substations to natural hazards likely to be increased by climate change <u>in order to develop mitigation measures</u>	City-wide	High	Medium	High	2014-16
11) Assess Stormwater Management Drainage System <u>in order to</u> recommend	Dorchester	Medium	Low	Medium	2015

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
improvements <u>to storm drains at</u> the Uphams Corner, McKim and Lower Mills Branch Libraries					
12) <u>Assess Boston Marine Industrial Park</u> Stormwater Management System Assessment and <u>implement</u> Improvements	South Boston	Medium	Medium	Medium	2016-2017
13) Lawrence Street, Roxbury – construct large drain on easement	Roxbury	Medium	Medium	Medium	2016
Wind Hazard Mitigation Measures					
14) Assessment of mast arms <u>for wind vulnerability at</u> signalized intersections on Major Arterials on State Roadways	City-wide	Medium	Low	Low	2016
15) Public Education on Hurricanes and Tornadoes, using Red Cross Tornado APP for iPhone and Android smart phones.	City-wide	Medium	Low	Medium	2015
16) New street tree planting standards on spacing and soil volume to increase wind resilience	City-wide	Medium	Low	Medium	2015-16
Geologic Hazard Mitigation Measures					

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
17) Purchase Android-based mobile GPS Tablets for ISD Inspectors (preparedness)	City-wide	Medium	Medium	Medium	2015-16
21) 18) Conduct study for retrofit of unreinforced masonry to improve earthquake resilience of municipal buildings	City-wide	Medium	Medium	Medium	2014-18
19) Participate in the Quake Smart Program	City-wide	Medium	Medium	Medium	2015-18
20) Purchase ASA/ DHS FINDER for Fire Dept. (preparedness)	City-wide	High	TBD once COTS	High	2017
21) Increase public education on earthquakes using Red Cross Earthquake APP for iPhones and Android Smart Phones and participate in annual Northeast SHAKEOUT	City-wide	Medium	Medium	Medium	2016
Coastal Damage Mitigation Measures					
22) Moon Island seawall rehabilitation	Moon Island	Medium	Medium	Medium	2017
23) Stabilize bank or establish new bank at Columbia Point to mitigate coastal hazards	Columbia Point	Medium	Low	Medium	2016
24) Long term solution to stabilize bank at East Eagle Street to mitigate coastal hazards	East Boston	Medium	Low	Medium	2016
25) Assess feasibility	Dorchester	Medium	Low	Medium	2016

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
of strengthening seawalls and/or adding vegetation for shoreline stabilization along Morrissey Blvd. to mitigate coastal hazards					
26) Stabilize coastal bank along the eastern side of Long Island, adjacent to the Public Health Commission's campus to mitigate coastal hazards	Long Island	Medium	Medium	Medium	2017
27) Assess Boston Harbor waterfront for additional sea and flood wall protection to mitigate coastal hazards	Boston Harbor coastline	Medium	Medium	Medium	2017
28) Assess impact of tidal flooding at McCormack and Dever public schools, 315 Mt. Vernon St, Dorchester to develop mitigation actions	Columbia Pt, Dorchester	Medium	Low	Medium	2017
Extreme Heat Mitigation Measures					
29) Tree Planting program to mitigate extreme heat and stormwater impacts	City-wide	High	High	High	2014-18
30) Cool Roofs Program – Green Roofs and White Roofs to mitigate extreme heat	City-wide	Medium	Low	Medium	2014-18
Fire Hazard Mitigation Measures					

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
31) Assess feasibility of NFPA FireWise Program for urban environmental education of homeowners on reducing brush and mulch fires	City-wide	Medium	Low	Medium	2016
32) Boston Fire Prevention Programs (preparedness)	City-Wide	Medium	Low	Medium	2015
33) Life Safety Plan Program (preparedness)	City-Wide	High	Low	High	2014-18
34) Boston Fire LEPC Tier II Manager (preparedness)	City-Wide	High	Low	High	2014-18
Solar Storm Mitigation Measures					
35) Inventory equipment vulnerable to Solar Storm EMPs	City-wide	High	Low	Medium	2014-15
36) Build Faraday Cages to protect redundant radio and communication equipment, lap tops, and batteries.	City-wide	High	Medium	Medium	2014-15
Other Hazard Mitigation Measures					
37) Prevent outbreaks of West Nile Virus and Eastern Equine Encephalitis by treating catch basins with mosquito larvacides	City-wide	Medium	Low	Medium	2014-18
38) LEPC Assess the risk of water-reactive chemicals stored in	City-wide	Low	Low	Low	2015

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
flood-prone buildings <u>to mitigate flood hazards</u>					
39) Monitor Outbreak of Invasive Species and Eradicate Asian Longhorned Beetle treating host trees with imidacloprid	City-Wide	Medium	Low	Medium	2015
Multi-Hazard Mitigation Measures					
40) Participate in the Community Rating System	City-wide	Medium	Low	Medium	2015
41) Update Storm Ready Certification with NWS	City-wide	Medium	Low	Medium	2016
42) Continue incremental repairs of the Long Island Bridge	Long Island	Medium	Medium	High	2014-17
43 42) Adopt a tree retention ordinance to preserve existing trees or equally compensate for the loss of the tree's caliper (<u>mitigation for both flooding and extreme heat</u>)	City-wide	High	Low	High	2014-15
43) Community Preparedness Workshops and Outreach (<u>preparedness</u>)	City-wide	High	Low	High	2014-18
44) Establish a multi-cultural and multi-language public awareness program <u>on natural hazards</u>	City-wide	High	Medium	High	2015-17

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
and mitigation					
45) Conduct a survey of emergency generators at critical infrastructure facilities, municipal buildings, shelters and youth hostels In order to upgrade as needed	City-wide	Medium	Low	Medium	2015-16
46) Evaluate feasibility of mobilizing passenger ferries for evacuation (preparedness)	Waterfront	Medium	Low	Medium	2016
Climate Change Adaptation Mitigation Measures					
47) Convene a Cabinet level <i>Climate Preparedness Task Force</i> to review current activities and policies and provide guidance for further development (preparedness)	City-wide	High	High	High	2014-15
48) Identify ways for institutions and businesses to reduce their vulnerability to climate change and for the City of Boston to support those efforts	City-wide	High	High	High	2014-15
49) Survey the preparedness of existing buildings and other assets (e.g. MBTA stations) for climate change	City-wide	High	Medium	High	2014-15

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Table 35 - Prioritization of Proposed Mitigation Measures					
Mitigation Actions by Hazard Risk	Geographic Extent	Estimated Benefit	Estimated Cost	Overall Priority	Time Frame
<u>(preparedness)</u>					
<u>50)</u> Include climate change preparedness in Article 80 Development Review <u>to enhance flood mitigation</u>	City-wide	High	Low	High	2014-15
<u>51)</u> Adopt a Wetlands Ordinance that includes sea-level rise and develop new floodplain maps that incorporate projected climate change <u>to mitigate flood hazards</u>	City-wide	High	Low	High	2014-15
<u>52)</u> Develop guidelines and prioritization for better enforcement of flood proofing standards <u>to mitigate flood hazards</u>	City-wide	High	Low	High	2014-15
<u>53)</u> Review emergency operation planning for storms and flooding <u>(preparedness)</u>	City-wide	High	Low	High	2014-15

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

VII. PLAN ADOPTION AND MAINTENANCE

Plan Adoption

The Boston Hazard Mitigation Plan 2014 Update was adopted by the Boston City Council on [ADD DATE]. See Appendix [H](#) 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 many of the recommended mitigation measures from the City's previous Hazard Mitigation Plan have been implemented, since that plan was adopted in 2008 there has not been a formal local process to guide implementation of the plan or integrate it with other City plans and programs. Such a process is needed over the next five years for the implementation of this plan update, and will be structured as described below.

The Boston Hazard Mitigation Steering Committee oversaw the preparation of this plan update. This group will continue to meet on an as-needed basis to function as the Local Hazard Mitigation Implementation Group, and maintain and update the plan in accordance with the City's policies and procedures as described below. The City will continue public participation during the next 5-year planning cycle. Yearly reviews of the plan as well as the Five Year Comprehensive Update (as described below under policy # OEM-2012-005), will be publicly noticed in accordance with City and state open meeting laws, and the current plan will be available to the public on the City's website. Any comments received will be reviewed and considered by the Hazard Mitigation Steering Committee.

Implementation Schedule

The Boston Office of Emergency Management's (OEM) Emergency Management Plans Maintenance Policy (OEM-2011-001, effective December 9, 2011, as revised by OEM 2011-001-REV A, revision date August 6, 2011) establishes the following policy for plan maintenance:

3. POLICY

- a. Emergency management plans contain information on policies, roles, and responsibilities, operational procedures, and several other topics involved in the planning and response to incidents. These plans are "living documents" that involve the coordination of multiple City departments and the information contained in the plans will become obsolete as department roles and standard operating procedures (SOP's) change.
- b. Roles and Responsibilities
 - i. Boston Emergency Management Advisory Council (BEMAC): Responsible for

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

final review and approval of the City's Emergency Operation Plan.

ii. Office of Emergency Management: The OEM is charged with maintenance of emergency management plans and keeping annexes, appendices, attachments, and figures current. Plan revisions will be coordinated by the OEM Director who will ensure that an annual review is conducted for each plan in accordance with the schedule listed in this policy.

iii. City Departments: City of Boston Departments Offices, and Commissions that have a role in any of the plans covered by this policy will be responsible for reviewing and updating the plan in accordance with the schedule listed in this policy.

iv. External Agencies: Any outside agency with a role in any of the plans covered by this policy is responsible for reviewing and updating the pan when requested.

c. Each plan will be reviewed annually according to the following schedule:

Hazard Mitigation – June 1

Each plan will also be reviewed following any exercise or activation of the plan that identifies potential improvements.

4. PROCEDURE

- a. Plans will be reviewed according to a specified procedure which is outlined below:
 - v. Hazard Mitigation Plan – This plan will be reviewed in accordance with OEM's Hazard Mitigation Program Policy (policy # OEM-2012-005)

The above referred policy, OEM's Hazard Mitigation Program Policy (OEM-2012-005, effective April 15, 2012) specifies a Hazard Mitigation Plan Review procedure at Section 3c, as follows:

- i. Yearly Review: the City of Boston, through the direction of the Boston Hazard Mitigation Steering Committee, will perform an annual review of its Hazard Mitigation Plan. This comprehensive examination will include: a prioritization and re-evaluation of mitigation project; a re-prioritization of projects, as appropriate; an assessment of each project's current status; and recommendations for improvements and/or changes. The Boston Hazard Mitigation Steering Committee will produce an annual Hazard Mitigation Status Report that represents the results of the annual review
- ii. Five Year Comprehensive Update: Per Federal Emergency Management Agency (FEMA) regulations, the Hazard Mitigation Plan will undergo a comprehensive

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

review and update every five years. The Plan will be forwarded first to the Massachusetts Emergency Management Agency and the Massachusetts Department of Conservation and Recreation for initial review; then to FEMA for final approval, and lastly to the Boston City Council for adoption

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 City’s approved plan status and its eligibility for FEMA mitigation grants. Because of the time required to secure a planning grant, prepare an updated plan, and complete the approval and adoption of an updated plan, the Hazard Mitigation Steering Committee will begin the process by the end of Year 3.

Integration of the Plans with Other Planning Initiatives

Upon approval of the Boston Hazard Mitigation Plan 2014 Update 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 Hazard Mitigation Executive Steering Committee will review and discuss the plan with the following departments:

- Office of Emergency Management
- Boston Water and Sewer Commission
- Boston Public Works Department
- Boston Redevelopment Authority
- Boston Public Health Commission
- Boston Fire Department
- Boston Police Department
- Boston Conservation Commission
- Boston Parks and Recreation

Other groups that will be coordinated with include large institutions, Chamber of Commerce, land conservation organizations and watershed groups. The plan will also be posted on the City’s website after reviewing it 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.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

VIII. LIST OF REFERENCES

Capital Improvement Program, Boston Water and Sewer Commission

Boston Fire Alarm Risk Assessment and Protective Measures Plan, URS Corporation.
March 7, 2006.

Infrastructure Systems, Services and Climate Change: Integrated Impacts and Response Strategies for the Boston Metropolitan Area. Also referred to as “CLIMB”. Tufts University, University of Maryland, Center for Transportation Studies, and MAPC
August 13, 2004.

Massachusetts State Hazard Mitigation Plan. Commonwealth of Massachusetts, 2010.

Supplemental Final Environmental Impact Report. Phase 1 Muddy River Flood Control, Water Quality and Habitat Enhancement and Historic Preservation Project. EOEA #11865. February 2005. Prepared by CDM for the City of Boston and Town of Brookline.

“Massachusetts: Confronting Climate Change in the Northeast,” Union of Concerned Scientists, 2007

“Boston, Massachusetts: Identifying and Becoming More Resilient to Impacts of Climate Change” (July 2011) National Resources Defense Council

When It Rains It Pours – Global Warming and the Increase in Extreme Precipitation, Environment America Research and Policy Center, July 2012

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

FEMA, *Flood Insurance Rate Maps for Boston, MA*, 2010

Massachusetts StormSmart Coasts, website: <http://ma.stormsmartcoasts.org/>

New England Seismic Network, Boston College Weston Observatory, website: <http://aki.bc.edu/index.htm>

Northeast States Emergency Consortium, website: <http://www.nesec.org/>

U. S. Census, 2010

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

The following were also consulted regarding specific categories of hazards:

CLIMATE CHANGE PROCESS METHODOLOGY

Dr. Thomas Weblar and Dr. Seth Tuler, Social and Environmental Research Institute,
City of Boston –SERI Diagramming Climate Change-Related Vulnerability-Consequence
Adaptation Planning Scenarios (VCAPS).

HAZUS-MH: EARTHQUAKE, FLOOD, HURRICANE STUDIES OF BOSTON

Edward S. Fratto, Executive Director Northeast States Emergency Consortium

CIVIL ENGINEERING AND SOIL LIQUEFACTION

Dr. Laurie Baise, Civil Engineer, Tufts University Department of Civil and
Environmental Engineering – Recent Study completed on Soil Liquefaction on the City
of Boston. Follow-on Study on mapping soil typing into NEHRP categories.

EARTHQUAKES

Dr. John Ebel, Weston Observatory – BC Earth and Environmental Sciences
Justin Starr - Weston Observatory – BC Earth and Environmental Sciences
Dr. James Kaklamanos, Merrimack College, Dept. of Civil and Environmental
Engineering – Recent Seismic Study on Boston

EXTREME SEASONAL WEATHER – STORM READY

Glenn A. Field, Warning Coordination Meteorologist, NOAA NWS-Taunton

EXTREME HEAT

Tufts University Department of Urban and Environmental Policy and Planning.
“Preparing for Heat Waves in Boston: A Cool Way to Attack Global Warming” May 7,
2010 (student paper).

FLOOD HYDROLOGY

Dr. Ellen Marie Douglas, Assistant Professor of Hydrology, UMASS-Boston Coastal Sea
Level Rise in Boston Harbor

GROUNDWATER MONITORING and RECHARGE

Elliott Laffer, Executive Director, Boston Groundwater Trust
Christian Simonelli, BGwT Technical and Recharge Coordinator
B.F. Thomas and R.M. Vogel Department of Civil and Environmental Engineering, Tufts
University, “The Impact of Stormwater Recharge Practices on Boston Groundwater
Levels,”

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Bibliography of Climate Change Related Reports

Adler, Michael. Samantha Harris, Megan Krey, Loni Plocinski, and Jeanette Rebecchi. "Preparing for Heat Waves in Boston: A Cool Way to Attack Global Warming" Tufts University Department of Urban and Environmental Policy and Planning, Medford, MA. Prepared for the City of Boston Environment Department. May 7, 2010.

Baise, Laurie G., Rebecca B. Higgins ; and Charles M. Brankman. "Liquefaction Hazard Mapping – Statistical and Spatial Characterization of Susceptible Units." Department of Civil and Environmental Engineering, Tufts University, Medford, MA. Journal of Geotechnical and Geoenvironmental Engineering ASCE June 2006 705-715.

Bayat, E.E., Mishac K. Yegian, A. Alshawabken and S. Gokyer. "A New Mitigation Technique for Preventing Liquefaction-Induced Building Damages During Earthquakes." WCCE-ECCE-TCCE Joint Conference on Earthquakes

Brankman, Charles M. and Lauri G. Baise. "Liquefaction Susceptibility Mapping in Boston, Massachusetts" Environmental and Engineering Geoscience, Vol.XIV, No.1, February 2008, pp. 1-16.

Barkan, Roy. Department of Geophysics and Planetary Sciences, Tel Aviv University; Uri S. ten Brink, U.S. Geological Survey, Woods Hole, MA. and Jian Lin, Department of Geology and Geophysics, Woods Hole Oceanographic Institution, Woods Hole, MA. "Far Field Tsunami Simulations of the 1755 Lisbon Earthquake: Implications for Tsunami Hazard to the U.S. East Coast and the Caribbean." Marine Geology 264 (2009) 109-122.

Chaytor, Jason D., David C. Twichell, and Uri S. ten Brink. "A Reevaluation of the Munson-Nygren-Retriever Submarine Landslide Complex, Georges Bank Lower Slope, Western North Atlantic" U.S. Geological Survey, USGS Woods Hole Coastal and Marine Science Center, Wood Hole, MA. 1-10.

Douglas, Ellen M. Paul H. Kirshen, Michael Paolisso, Chris Watson, Jack Wiggin, Ashley Enrici and Matthias Ruth. "Coastal Flooding, Climate Change and Environmental Justice: Identifying Obstacles and Incentives for Adaptation in Two Metropolitan Boston Massachusetts Communities." Mitigation and Adaptation Strategies for Global Change, October 21, 2011. pp. 1-42.

Dutzik, Tony. Frontier Group. "In the Path of the Storm: Weather-Related Disasters, Extreme Precipitation, and the Implications for New England and the U.S. in a Warming World." Presentation to EPA Region 1, September 12, 2012. PowerPoint pp. 1-34.

Fratto, Edward S. "Independent HAZUS-MH Analysis for Riverine Flooding, Hurricane Winds and Earthquakes in the City of Boston." Northeast States Emergency Consortium (NESEC). 2010-2012.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Fratto, Edward S. “Identification of Unreinforced Masonry Buildings (URM) in the Northeast – Pilot Study Validation City of Boston, November 2012.” and “HAZUS-MH Hazard Screening of City of Boston Housing Authority (BHA) Facilities.” Northeast States Emergency Consortium. July 2012.

Hansen, James., Makiko Sato and Reto Ruedy. “The New Climate Dice: Public Perception of Climate Change”. Science Briefs. NASA. July 2012. pp. 1-6.

Hansen, James., Makiko Sato and Reto Ruedy. “Increasing Climate Extremes and the New Climate Dice.” Science Briefs. NASA. August 10, 2012. pp. 1-6.

Hines, E.M.; Laurie G. Baise and S.S. Swift. Department of Civil and Environmental Engineering, Tufts University, Medford, MA. “Ground-Motion Suite Selection for Eastern North America” Journal of Structural Engineering ASCE March 2011 358-366.

Kirshen, Paul., Kelly Knee, Ruth Matthias. “Climate Change and Coastal Flooding in Metro Boston: Impacts and Adaptation Strategies.” Climatic Change DOI 10.1007/s10584-008-9398-9 Springer Science and Business Media B.V. 2008.

Kirshen, Paul., Chris Watson, Ellen Douglas, Allen Gontz, Jawon Lee and Yong Tian. “Coastal Flooding in the Northeastern United States due to Climate Change.” Mitigation Adaptation Strategies Global Change (2008) 13:437-451 DOI 10.1007/s11027-007-9130-5. Springer Science and Business Media B.V. 2007.

Madsen, Travis of Frontier Group and Nathan Willcox, Environmental America Research and Policy Center. “When It Rains, It Pours – Global Warming and the Increase in Extreme Precipitation from 1948 to 2011.” Summer 2012 pp. 1-43.

Nocera, Frank M., David R. Vallee and Matthew A. Saunders. University of Massachusetts, Amherst “A Study of Moderate Coastal Flood Events along the Eastern Massachusetts Shoreline.” NOAA/National Weather Service Forecast Office, Taunton, MA. 1-9.

Patrick, Stewart M. “Man-Made Cities and Natural Disasters: The Growing Threat” Council on Foreign Relations. August 14, 2012 pp. 1-3.

Sallenger Jr., Asbury H., Kara S. Doran and Peter A. Howd. “Hotspot of Accelerated Sea-Level Rise on the Atlantic Coast of North America. Nature Climate Change Letters published on-line June 24, 2012. DOI:10.1038/NCLIMATE1597, pp. 1-5.

Stuart, Neil A. Richard H. Grumm John Cannon and Walt Drag. “The Use of Ensemble and Anomaly Data to Anticipate Extreme Flood Events in the Northeastern United States.” NOAA National Weather Service – Albany NY, State College, PA., Gray, ME, and Taunton, MA. pp. 1- 9.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ten Brink, Uri S., and David Twichell. USGS Woods Hole Science Center, Woods Hole, MA, and Homa J. Lee and Eric L. Geist, USGS, Western Coastal and Marine Geology, Menlo Park, CA. "Assessment of Tsunami Hazard to the U.S. East Coast using relationship between submarine landslides and earthquakes." *Marine Geology* 264 (2009) 65-72.

Thomas, Brian F. and Richard M. Vogel. "The Impact of Stormwater Recharge Practices on Boston Groundwater Levels." Department of Civil and Environmental Engineering, Tufts University, Medford, MA. pp. 1-11.

Twichell, David C., Jason D. Chaytor, Uri S. ten Brink and Brian Buckowski. U.S. Geological Survey, Woods Hole, MA. and Woods Hole Oceanographic Institution, Woods Hole, MA. *Marine Geology* 264 (2009) 4-15.

Viegas, Gisela M., Laurie G. Baise, and Rachel E. Abercrombie. "Regional Wave Propagation in New England and New York." *Bulletin of the Seismological Society of America*, Vol. 100, No. 5A, pp. 2196-2218, October 2010.

Vogel, Richard M., Chad Yaindl, and Meghan Walter. "Nonstationarity: Flood Magnification and Recurrence Reduction Factors in the United States." *Journal of the American Water Resources Association JAWRA* Vol. 47, No. 3. June 2011. pp. 464-474.

Ward, Steven N. Institute of Geophysics and Planetary Physics, University of California, Santa Cruz, CA and Simon Day, Benfield Greig Hazard Research Centre, Department of Geological Sciences, University College, London, U.K. "Cumbre Vieja Volcano – Potential Collapse and Tsunami at La Palma, Canary Islands." *American Geophysical Union* 2001. 1-4.

Whitmore, Paul. Uri S. ten Brink, Michael Caropolo, Victor Huerfano-Moreno, William Knight, William Sammler, and Al Sandrik. "NOAA/West Coast and Alaska Tsunami Warning Center Atlantic Ocean Response Criteria" *Science of Tsunami Hazards*, Vol. 28, No. 2 pp.86- 107 (2009)

Yegian, Mishac. Northeastern University. "New Method for Alleviating Soil Liquefaction to Undergo Field Tests." *Civil Engineering Technology* May 2012 pp. 38-39.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

APPENDIX A

**Boston Redevelopment Authority
Climate Change Preparedness and Resiliency Checklist for
New Construction**

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at <http://www.cityofboston.gov/climate>

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (<http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/>)
3. Army Corps of Engineers guidance on sea level rise (<http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf>)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (<http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf>)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 ([http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf](http://www.bostonredevelopmentauthority.org/planning/Hotspot%20of%20Accelerated%20Sea-level%20Rise%202012.pdf))
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 ([http://www.greenribboncommission.org/downloads/Building Resilience in Boston SML.pdf](http://www.greenribboncommission.org/downloads/Building%20Resilience%20in%20Boston%20SML.pdf))

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Climate Change Resiliency and Preparedness Checklist

A.1 - Project Information

Project Name:

Project Address Primary:

Project Address Additional:

Project Contact (name / Title /
Company / email / phone):

A.2 - Team Description

Owner / Developer:

Architect:

Engineer (building systems):

Sustainability / LEED:

Permitting:

Construction Management:

Climate Change Expert:

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

<u>PNF / Expanded PNF Submission</u>	<u>Draft / Final Project Impact Report Submission</u>	<u>BRA Board Approved</u>	<u>Notice of Project Change</u>
<u>Planned Development Area</u>	<u>BRA Final Design Approved</u>	<u>Under Construction</u>	<u>Construction just completed:</u>

A.4 - Building Classification and Description

List the principal Building Uses:

List the First Floor Uses:

What is the principal Construction Type – select most appropriate type?

Wood Frame

Masonry

Steel Frame

Concrete

Describe the building?

Site Area:

SF

Building Area:

SF

Building Height:

Ft.

Number of Stories:

Ftrs.

First Floor Elevation (reference
Boston City Base):

Elev.

Are there below grade
spaces/levels, if yes how many:

No /
Number of Levels

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:

New Construction

Core & Shell

Healthcare

Schools

Retail

Homes Midrise

Homes

Other

Select LEED Outcome:

Certified

Silver

Gold

Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:

Yes / No

Certified:

Yes / No

A.6 - Building Energy

What are the base and peak operating energy loads for the building?

Electric:

(kW)

Heating:

(MMBtu/hr)

What is the planned building
Energy Use Intensity:

(kbut/SF or
kWh/SF)

Cooling:

(Tons/hr)

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:

(kW)

Heating:

(MMBtu/hr)

Cooling:

(Tons/hr)

What is nature and source of your back-up / emergency generators?

Electrical Generation:

(kW)

Fuel Source:

System Type and Number of Units:

Combustion
Engine

Gas Turbine

Combine Heat
and Power

(Units)

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 - Analysis

What is the full expected life of the project?

Select most appropriate:

10 Years

25 Years

50 Years

75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:

10 Years

25 Years

50 Years

75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:

10 Years

25 Years

50 Years

75 Years

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

<u>/</u> <u>Deg.</u>

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

<u>Deg.</u>	<u>Days</u>	<u>Events / yr.</u>
-------------	-------------	---------------------

What Drought characteristics will be used for project planning – Duration and Frequency?

<u>Days</u>	<u>Events / yr.</u>
-------------	---------------------

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

<u>Inches / yr.</u>	<u>Inches</u>	<u>Events / yr.</u>
---------------------	---------------	---------------------

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

<u>Peak Wind</u>	<u>Hours</u>	<u>Events / yr.</u>
------------------	--------------	---------------------

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:

<u>%</u>

How is performance determined:

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:

<u>High performance building envelop</u>	<u>High performance lighting & controls</u>	<u>Building day lighting</u>	<u>EnergyStar equip. / appliances</u>
<u>High performance HVAC equipment</u>	<u>Energy recovery ventilation</u>	<u>No active cooling</u>	<u>No active heating</u>

Describe any added measures:

What are the insulation (R) values for building envelop elements?

Roof:

R =

Walls / Curtain Wall Assembly:

R =

Foundation:

R =

Basement / Slab:

R =

Windows:

R = / U =

Doors:

R = / U =

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

<u>On-site clean energy / CHP system(s)</u>	<u>Building-wide power dimming</u>	<u>Thermal energy storage systems</u>	<u>Ground source heat pump</u>
<u>On-site Solar PV</u>	<u>On-site Solar Thermal</u>	<u>Wind power</u>	<u>None</u>

Describe any added measures:

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

Select all appropriate:

<u>Connected to local distributed electrical</u>	<u>Building will be Smart Grid ready</u>	<u>Connected to distributed steam, hot, chilled water</u>	<u>Distributed thermal energy ready</u>
--	--	---	---

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Will the building remain operable without utility power for an extended period?

	<u>Yes / No</u>	<u>If yes, for how long:</u>	<u>Days</u>
<u>If Yes, is building "Islandable?"</u>			
<u>If Yes, describe strategies:</u>			

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

<u>Select all appropriate:</u>	<u>Solar oriented – longer south walls</u>	<u>Prevailing winds oriented</u>	<u>External shading devices</u>	<u>Tuned glazing.</u>
	<u>Building cool zones</u>	<u>Operable windows</u>	<u>Natural ventilation</u>	<u>Building shading</u>
	<u>Potable water for drinking / food preparation</u>	<u>Potable water for sinks / sanitary systems</u>	<u>Waste water storage capacity</u>	<u>High Performance Building Envelop</u>
<u>Describe any added measures:</u>				

What measures will the project employ to reduce urban heat-island effect?

<u>Select all appropriate:</u>	<u>High reflective paving materials</u>	<u>Shade trees & shrubs</u>	<u>High reflective roof materials</u>	<u>Vegetated roofs</u>
<u>Describe other strategies:</u>				

What measures will the project employ to accommodate rain events and more rain fall?

<u>Select all appropriate:</u>	<u>On-site retention systems & ponds</u>	<u>Infiltration galleries & areas</u>	<u>vegetated water capture systems</u>	<u>Vegetated roofs</u>
<u>Describe other strategies:</u>				

What measures will the project employ to accommodate extreme storm events and high winds?

<u>Select all appropriate:</u>	<u>Hardened building structure & elements</u>	<u>Buried utilities & hardened infrastructure</u>	<u>Hazard removal & protective landscapes</u>	<u>Soft & permeable surfaces (water infiltration)</u>
<u>Describe other strategies:</u>				

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

	<u>Yes / No</u>
--	-----------------

Describe site conditions?

<u>Site Elevation – Low/High Points:</u>	<u>Boston City Base Elev.(Ft.)</u>
--	-------------------------------------

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Building Proximity to Water:

Is the site or building located in any of the following?

Coastal Zone:

Velocity Zone:

Flood Zone:

Area Prone to Flooding:

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:

Future floodplain delineation updates:

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. Otherwise you have completed the questionnaire; thank you!

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:

Frequency of storms:

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:

First Floor Elevation:

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

If Yes, to what elevation

If Yes, describe:

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

Systems located above 1st Floor.

Water tight utility conduits

Waste water back flow prevention

Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

If yes, to what height above 100 Year Floodplain:

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

Yes / No

If Yes, describe:

Will the building remain occupiable without utility power during an extended period of inundation:

Yes / No

If Yes, for how long:

days

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:

Yes / No

Hardened /
Resilient Ground
Floor Construction

Temporary
shutters and or
barricades

Resilient site
design, materials
and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:

Yes / No

Surrounding site
elevation can be
raised

Building ground
floor can be
raised

Construction been
engineered

Describe additional strategies:

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:

Yes / No

Solar PV

Solar Thermal

Clean Energy /
CHP System(s)

Potable water
storage

Wastewater
storage

Back up energy
systems & fuel

Describe any specific or
additional strategies:

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

APPENDIX B

**Results of the Boston
Vulnerability Consequences Adaptation Scenarios**

**By the
Social and Environmental Research Institute**

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



**Results from Participatory Hazard Mitigation
and Climate Change Adaptation Planning
Workshops in Boston Massachusetts**



The Social and Environmental Research Institute

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

2

ABOUT SOCIAL AND ENVIRONMENTAL RESEARCH INSTITUTE (SERI)

SERI conducts research on a broad range of social and environmental issues, while emphasizing topics related to participatory and discursive approaches to environmental policy. The Institute conducts applied research projects that realize the practical gains provided by theory and that provide concrete benefits to individuals, society, and the environment. SERI is a non-profit 501(c)(3) institute founded in 1995 and located in Greenfield Massachusetts.

ACKNOWLEDGMENTS

This material is based upon work supported by MIT Sea Grant and the National Oceanic and Atmospheric Administration. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of MIT Sea Grant or the National Oceanic and Atmospheric Administration (NOAA).

AUTHORS AND INVESTIGATORS

Dr. Thomas Webler
Dr. Seth Tuler
Elizabeth Oriel MSc

© 2012 by Social and Environmental Research Institute under a Creative Commons Attribution-ShareAlike license: <http://creativecommons.org/licenses/by-sa/3.0/>



RECOMMENDED CITATION:

Webler, T., Tuler, S.P., and Oriel, E. (2012). *Results from participatory hazard mitigation and climate change adaptation planning workshops in Boston Massachusetts*. Social and Environmental Research Institute: Greenfield MA. Available at: www.seri-us.org/content/MA-Coastal-Hazard-Mitigation-Planning

CREDITS

Cover photos: top: Boston Skyline from Atlantic Ocean. Credit: Willem van Bergen (CCShareAlike license)
bottom: Muddy River, Fenway. Credit: Thomas Webler.

Introduction

Boston is the economic, social, and cultural heart of New England. The greater metropolitan area is home to over 3.2 million people and 99 municipalities. Like most coastal communities, Boston, Massachusetts has experienced extreme weather events, including severe coastal storms and heat waves. Although the City is protected from strong seas by the Boston Harbor Islands, it sits at the confluence of three rivers, which makes it more vulnerable to floodwaters from inland storms. Because much of Boston is built on landfill, flooding and saturated soils can cause serious problems and collateral damage.



Photo: Satellite view of Boston.
Credit: Public domain.

Flooding is already a major problem and it is likely to get worse. Snowfall and ice accumulations from winter storms are significant, threatening the structural integrity of buildings, disrupting traffic and normal economic operations. In the summertime, heat waves present a problem for the metropolitan area. They compromise air quality, magnify fire risks, threaten people's health, and drive people

to seek comfort at parks, pools, and beaches.

Expectations are that the City will face increased exposure to sea level rise and extreme weather, such as coastal storms, winter storms, and heat waves, in years to come from changes in the climate. These weather hazards pose profound risks to the economy, public health, coastal resources, natural features, water systems, and infrastructure.

To better understand and mitigate the impacts of extreme weather events city officials in Boston began updating the City's hazard mitigation plan (HMP) in 2010. Hazard mitigation plans are typically revised every 5 years. Normally the HMP is based on past events and trends to forecast future impacts. But the City decided it was important to consider projected increases in the severity of storms, sea level rise, and heat due to global climate change.

From January through May 2012, the Social and Environmental Research Institute (SERI), with funding from MIT Sea Grant, facilitated five meetings to discuss the implications of climate change for weather-related hazards in Boston. The Massachusetts Emergency Management Agency (MEMA) encourages a regional planning methodology and awarded the Metropolitan Area Planning Council

This report was prepared by the Social and Environmental Research Institute.

The statements, findings and conclusions in this report do not necessarily reflect those of the City of Boston, the MAPC, MIT Sea Grant, or NOAA.

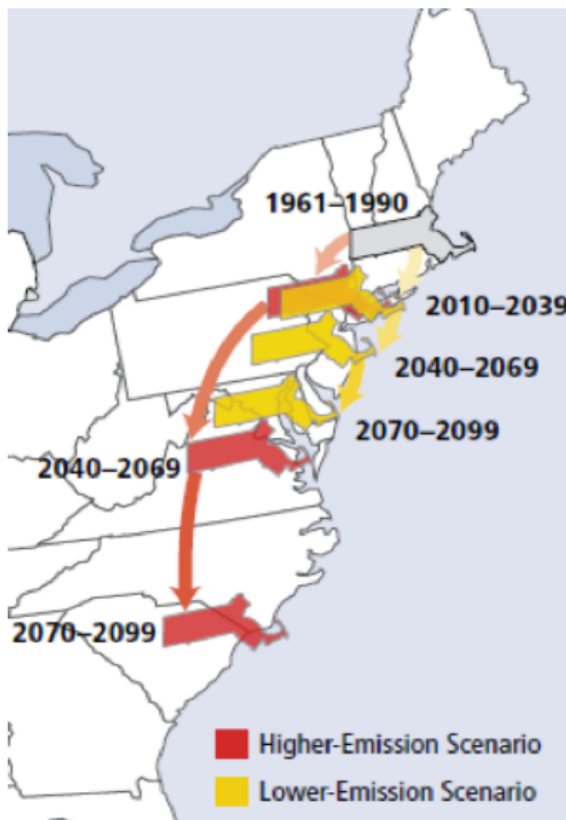
(MAPC) a planning grant to update the City's HMP, which is part of a seven inner core city effort. The Office of Emergency Management coordinated the inter-governmental stakeholder collaboration and organized the meetings. Multiple stakeholders, including city and state officials, representatives from non-profits, major institutions, non-governmental organizations and others participated in these meetings. The meetings combined reviews of climate models and data for the region with discussion of local expertise on flooding, winter storm and extreme heat impacts to commerce, vulnerable populations, coastal infrastructure and the City in general.

Using a mediated modeling process called the Vulnerability and Consequences Adaptation Planning Scenarios (VCAPS)

process SERI staff documented the vulnerability of Boston to extreme weather events, exacerbated by future climate change, and identified actions that the City is undertaking to increase its resilience. Stakeholders at the meetings were asked to describe the fundamental cause-effect relationships linking weather events, such as severe coastal storms and heat waves. SERI staff diagrammed the stakeholders' understandings of how these weather-related hazards created damaging consequences. City and state stakeholders provided input about specific management actions that could mitigate the impacts associated with these weather events. SERI developed the VCAPS process with funding from the National Oceanic and Atmospheric Administration (NOAA) and MIT Sea Grant. The results of the workshops are presented here in both diagram and narrative-formats.

Climate Change Impacts Expected for Boston

The climate in Boston is changing and will continue to over the coming decades, barring significant global effort to reduce carbon emissions. Temperatures will increase, sea level will rise, and more frequent and severe storms will impact the City (Massachusetts Executive Office of Energy and Environmental Affairs 2011, Frumhoff et al. 2006). By the year 2050, the Intergovernmental Panel for Climate Change (IPCC) reports that under a high emissions scenario the ambient global temperature will increase by 5 to 10°F (IPCC 2007, 2012). The way such impacts might be experienced in Massachusetts under three different scenarios is shown in the Tables, which are reprinted from the



CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

5

Parameter	Current Conditions (1961–1990)	Predicted Range of Change by 2050	Predicted Range of Change by 2100
Annual temperature ¹ (°C/°F)	8/46	2 to 3 / 4 to 5	3 to 5/5 to 10**
Winter temperature ¹ (°C/°F)	-5/23	1 to 3 / 2 to 5	2 to 5 / 4 to 10
Summer temperature ¹ (°C/°F)	20/68	2 to 3 / 4 to 5	2 to 6 / 4 to 10
Over 90 °F (32.2 °C) temperature ² (days/yr)	5 to 20	—	30 to 60
Over 100 °F (37.7 °C) temperature ² (days/yr)	0 to 2	—	3 to 28
Ocean pH ^{3,4}	7 to 8	—	-0.1 to -0.3*
Annual sea surface temperature (°C/°F)	12/53 ⁵	2/3 (in 2050) ⁵	4/8
Annual precipitation ¹	103/41 cm/in.	5% to 8%	7% to 14%**
Winter precipitation ¹	21/8 cm/in.	6% to 16%	12% to 30%**
Summer precipitation ¹	28/11 cm/in.	-1% to -3%	-1% to 0%**
Streamflow—timing of spring peak flow ¹ (number of calendar days following January 1)	85	-5 to -8	-11 to -13**
Droughts lasting 1–3 months ¹ (#/30 yrs)	13	5 to 7	3 to 10**
Snow days (number of days/month) ¹	5	-2	-2 to -4**
Length of growing season ¹ (days/year)	184	12 to 27	29 to 43

Table 1: Changes in Massachusetts' Climate

Sources: 1-Hayhoe et al., 2006; 2-Frumhoff et al., 2007; 3-IPCC, 2007; 4-MWRA, unpublished; 5-Nixon et al., 2004
 Note: All numbers have been rounded to the nearest whole number. Unless otherwise indicated, the predictions for the year listed as 2050 are for the period between 2035–2064. * Global data; **Predictions for period between 2070–2099

Source	Projections by 2050		Projections by 2100		
	Low Emissions	High Emissions	Low Emissions	Mid Emissions	High Emissions
Pfeffer et al 2008	—	—	78/31	83/33	201/79
Rahmstorf 2007	20/8	40/16	50/20	80/32	140/55
IPCC 2007	—	—	18/7	48/19	59/23
Current sea-level trend (A1F1 scenario)	16/6		29/11		

Table 2: Projected Sea Level Rise (centimeters/inches)

Note: All numbers have been rounded to the nearest whole number.

Massachusetts climate change adaptation report, by the Climate Change Adaptation Advisory Committee (Massachusetts Executive Office of Energy and Environmental Affairs 2011, pgs 13 and 16).

Boston could see the annual number of days over 90°F rise from the historical 5-20 to an estimated 30-60. By 2050 Boston may

be experiencing the present day weather of Philadelphia.

Annual precipitation could increase 5-8%, with most of it falling in winter. What are presently 100-year flood events will occur every 2-3 years by 2050 due to this increase in precipitation. Winter precipitation could rise as much as 16%.

Forecasts for sea level rise (SLR) are contingent on what happens with Greenland's ice cap and future emissions, but conservative estimates are that Boston will see 8-16" of SLR by 2050.

Background on the Hazard Mitigation Planning (HMP) Process

The Federal Disaster Mitigation Act of 2000 established a framework for municipalities to create plans for managing hazards. Plans must be updated every five years to ensure eligibility for Federal Emergency Management Agency (FEMA) funded hazard mitigation grant projects. The Disaster Mitigation Act came in response to impacts of severe storms, coastal erosion, and flooding events during the last decades and amended the Robert T. Stafford Disaster and Emergency Assistance Act, in accordance with 44 CFR Part 201. The new Act requires that state, local and tribal entities coordinate mitigation actions and projects.

Boston has become a leader in climate change adaptation planning and thus is thoroughly addressing climate change hazards in all its governmental efforts. The City of Boston is exceeding federal standards by including climate change in the HMP.

Boston's Hazard Mitigation Planning Process

The City of Boston's Hazard Mitigation Plan is written by the Metropolitan Area Planning Council (MAPC), while the Office of Emergency Management is responsible for coordination of intergovernmental stakeholder collaboration. In 2010, the City of Boston established a multi-agency

Hazard Mitigation Executive Leadership Steering Committee to oversee the process of updating the HMP. The co-chairs of the Leadership Committee are the Mayor's Cabinet Chiefs and Directors of the Office of Office of Emergency Management and the Office of Energy and Environment.

HMPs usually project future disasters from an inventory of past events. The City decided a more accurate plan incorporates scientific knowledge about projected climatic changes to arrive at a more accurate forecast of future weather-related events. Boston is a leader in hazard mitigation, climate change adaptation, and climate change mitigation planning. The Climate Action Leadership Committee authored a report in April 2010 called *Sparkling Boston's Climate Revolution* and followed this up a year later with *A Climate of Progress*, which was an update to the climate action plan (Climate Action Leadership Committee and Community Advisory Committee 2010, Climate Action Leadership Committee and Community Advisory Committee 2012).

On August 5, 2010, the Mayor's Office of Emergency Management formally requested approval from the state director of the Massachusetts Emergency Management Agency and was granted permission to have an independent hazard risk analysis conducted on the City of Boston. The Northeast States Emergency Consortium (NESEC) Emergency Management Risk Assessment Center conducted a HAZUS MH-Level II analysis of the City's vulnerabilities to floods, hurricanes, and earthquakes.

As part of the effort to integrate climate change adaptation planning with hazard mitigation planning MAPC and the City

organized with SERI the series of five meetings using VCAPS. The Office for Emergency Management's Interagency Coordinator invited participants to multi-stakeholder meetings to discuss local hazards and presented the findings of NESEC's analysis. MAPC gave an introductory presentation at the start of each meeting. Brief overviews of predictions about climate change in the region were also presented. Due to the experimental nature of this effort, MAPC and the City decided to use climate projections only to characterize three types of hazards: flooding, winter storms, and heat waves.

The VCAPS Process

The VCAPS (Vulnerability and Consequences Adaptation Planning Scenarios) process combines structured discussion with interactive concept mapping to create visual summaries of local knowledge about vulnerability and resilience. It helps government staff and stakeholders depict how a community is impacted by weather related hazards and the actions that could help reduce those impacts.

A typical VCAPS process begins by identifying a small set of concerns or hazards that the community would like to explore. This focuses and defines the boundaries of the discussion, ensuring that the exercise is relevant to decisions. The discussion centers on one concern at a time. During the discussion, a VCAPS diagram is constructed by the research team while listening to the facilitated dialogue in the room.

The participants at a meeting choose which hazards to focus upon. Groups

sometime define the hazards quite broadly (e.g. super storms) or quite narrowly (e.g. coastal erosion).

After selecting the hazard VCAPS diagramming progresses to trace pathways that describe how that hazard affects the community and its environment. A pathway model is made that documents the sequence of steps that lead to harmful consequences. For example, precipitation causes run-off, which leads to storm sewer overflows, which leads to flooding of underground transformers, which leads to electrocution. Each box in this diagram is called an "intermediary outcome." There are normally many intermediary outcomes in a pathway.



Photo: Signal box near Museum of Fine Arts
Credit: T. Webler 2012

At some point, the pathway of outcomes ends in a consequence. A consequence is an outcome for which it is not necessary to

ask the question, “Why do we care if this happens?” To take the example above about runoff, it is not obvious why we should care about run-off, the mobilization of debris, the clogging of a sewer drain, or flooding of basements. But if flooding leads to electrocution, then electrocution is a consequence, because it is obvious that we all care about loss of life.

Management actions are also identified in the diagram. These are actions that can be taken to change the way the stressor affects the community. VCAPS differentiates between actions taken by private individuals and groups and actions taken by public organizations or government. The diagrams can include actions that are already in place or those that are proposed by the participants.

Contextual factors are the final component in the VCAPS diagram. These are specific qualities associated with an intermediary outcome or consequences that amplify the effect of the hazard. For instance, the mobilization of debris by run-off is made worse when there is more debris on the streets, therefore an amplifying contextual factor might be: “time since last street sweeping.”

VCAPS in Boston

Five meetings were held with different groups of City employees and NGO representatives from January through May 2012, focusing on three weather related hazards:

- flooding from precipitation and storm surges,
- winter storms and
- extreme heat.



Photo: Boston sewer drain cover near Museum of Fine Arts. Credit: T. Webler 2012.

Organization of the five collaborative stakeholder working group meetings

To make meeting size reasonable and still involve a cross-section of City employees at each meeting, we organized five meetings around the following focus groups:

- Water and Sewer
- Infrastructure
- Regulatory
- Building and Facilities
- Public Safety

The first meeting was largely among members of the Boston Water and Sewer Commission, but the subsequent meetings involved representatives from numerous government agencies and private groups, such as: Ground Water Trust, Homeless Services Bureau, Environment Department, Historic Preservation, Housing Authority, Boston Public Health Commission, Massachusetts Water Resource Authority, Northeast States Emergency Consortium, Coastal Zone Management, Massport-Logan IAP, Inspectional Services, Boston Public

Library, Northeast Document Conservation Center, Massachusetts Board of Library Commissioners, University of Massachusetts Boston, Department of Neighborhood Development, Police and Fire Departments, among others.

The meetings began with presentations on climate change and historical HAZUS-MH Level II hazard data for Boston.

Participants then broke into small groups to discuss the City's vulnerabilities to flooding, winter storms and extreme heat. By design, the focus of each meeting was to consider these hazards from the different management sectors, and each meeting began where the last one left off by asking participants to continue revising and elaborating details in the VCAPS diagrams. SERI and MAPC facilitators worked to make sure all outcomes and consequences were considered. To aid in this task, they developed a list of types of outcomes and consequences: commerce, health and safety, governance, ecology, property, communication systems, transportation systems, power grid, and water treatment. The variety of perspectives at the meetings provided not only broad spectrum and in-depth expertise, but also priorities for hazard mitigation and climate change adaptation management actions.

During the discussions, SERI diagrammed the causal pathways and added contextual factors and management actions to the diagrams as participants mentioned them. The remainder of this report will be a summary of those results. VCAPS diagrams that relate to these abbreviated narratives are attached to this report as Appendices.

Flooding

Boston participants identified two climate stressors responsible for flooding: increased precipitation and sea level rise (SLR). People mentioned that flooding is already a problem in areas of the city and recognized that this will become more frequent and worse. SLR is already noticeable by the increasing frequency with which the piers flood near the Aquarium.

Morrissey Boulevard was identified as an area with cyclical, repetitive flooding, due to astronomically high tides. Flooding here is important because the road is a major arterial and is a primary evacuation route. Raising roadways was mentioned as a mitigation action of high priority to maintain safe evacuation routes, as was installing riprap and building natural ecosystem-based buffers with native vegetation.

Several roadways rely on pumps to clear floodwaters. The reliability of these pumps and their electricity supply are essential. Participants noted several locations where pumps will need to be installed as flooding increases.



Photo: Flooding at Long Wharf during Sandy. 2012.
Credit: Matt Conti (Creative Commons 3.0 license).
Original source material at: NorthEndWaterfront.com

Public housing complexes near the coast are already susceptible to flooding in basements and rely heavily on sump pumps to keep the basements dry. The public housing department recognized a need to relocate important utilities from basements to higher floors of some buildings.

Run-off from soils, pavements, and roofs can be blocked at catch basins by roadway debris and leaves. This leads to localized flooding or “ponding” in the roadways. Where curb heights are low, this water can migrate into basements of nearby buildings. Public health is impacted from mold that grows as a result of this flooding as the air quality in homes declines. Cleaning catch basins, which is done by staff of the Boston Water and Sewer Commission (BWSC) is a mitigation action that can prevent further hazards in that chain of consequences. Another mitigation action is encouraging property owners to install sump pumps to clear out flooding in basements. The VCAPS diagrams differentiate upstream and downstream actions clearly and this provides officials with an easy-to-understand anatomy of mitigation actions to prevent unwanted consequences.

While progress continues to be made in separating stormwater and sanitary wastewater systems, there are still places where they connect. Stormwater that enters the groundwater can infiltrate into sanitary wastewater lines at those intersections or through cracks in drainage pipes all throughout the system. This is a problem during storms because it increases the amount of sanitary wastewater that needs to be treated by Massachusetts Water Resources Authority (MWRA) at Deer Island.

Rising groundwater that comes from storms and SLR can help ensure that historical wooden pilings are protected from rotting, but too much groundwater in the wrong places can cause serious problems. First, it can mobilize pollutants that are presently stable. Second, it can come into contact with district heating pipes, resulting in explosions. Third, it can flood the subway.

One of the worse scenarios that the group discussed is if sea levels rises enough to overwhelm the Charles River dam. This would lead to flooding of Back Bay, creating numerous problems for the City.

As part of the discussion about flooding participants focused on short and long-range consequences and management actions. Managing long-range issues such as sea level rise’s impact on Deer Island Sewage Treatment Plant seemed outside the range considered for this plan. However, members of MWRA did discuss the vulnerability of the system due to pipes of a certain size and elevation above sea level. Some of this hardware will need to be replaced. These discussions of long-term hazards were crucial, not only to meet FEMA’s request to include long-range impacts, but also for the city and state officials to develop plans for a quite different coastline only a few decades in the future.

Winter Storms

Winter storms deposit heavy snow and ice on roofs, sidewalks, utility lines/poles, trees, and roads. Weight of snow on roofs can cause buildings to collapse. If utility lines come down, electricity and communication services are disrupted.

Snow and ice accumulation may also disrupt the transportation system in multiple ways. First, traffic can be impeded by illegally parked cars, roads narrowed by snow and plowed snow, falling trees and tree limbs, and traffic accidents. Roads blocked by private vehicles can disrupt the public transportation system.

Second, falling trees and limbs can damage utility lines and poles, disrupting power and disabling traffic signals. Public buses and trolleys that rely on electricity for power will be stranded, exposing riders to harsh conditions.

Third, snow or ice followed by rain can cause flooding of low-lying areas, blocking roads. Flooding can also occur when catch basins and drainage are blocked from plowed snow.



Photo: Snow storm buried cars on Beacon Hill, January 2005. Credit: Nat Tarbox (Creative Commons 2.0 license). Original at: <http://www.flickr.com/photos/nattarbox/1792406300/>

Emergency advisories to leave work early have caused “super rush hours.” A consequence can be that people become stranded, as snow builds up while people are stuck in vehicles as they attempt to return home. Abandoned vehicles can block roads, making emergency response

more difficult and further disrupting the transportation system.

Sidewalks are also compromised by winter storms. When sidewalks, ramps, etc. are blocked, mobility of pedestrians is impaired. People may resort to walking in streets, which can lead to injuries from falls or vehicular accidents. Others may be afraid or unable to leave home.

Homebound people may run out of food or medications. Fire hydrants can be inaccessible.

In Boston property owners are mandated to clear sidewalks, to help clear fire hydrants and are asked to check on and assist their neighbors. The MBTA also asks people to assist clearing bus stops. However, it is illegal to put snow back on roads.

Structures may collapse or be damaged. If public buildings are damaged, important government services may be disrupted. Commercial activity basically shuts down during extreme winter storms.

Mitigation measures in relation to winter storms were categorized into pre, during and post event. The pre-event category included all prevention actions such as improving communication systems to treating roads.

Heat Waves

Heat waves threaten human health for acute periods of time, but they can happen repeatedly over the summer. To mitigate heat, people rely on air conditioning and fans, which stresses the power grid, leading to electricity disruptions.

Loss of power disables cooling systems, but also threatens human health in other

ways. For instance, more and more people are receiving health care at home. Loss of power can render inoperative medical devices and alarms. Evacuations from buildings without electricity or air-conditioning are crucial to avoid heat stress, at work and at home.

Transportation systems suffer with the loss of electricity. With traffic signals out transport can be disrupted and dangerous. This makes it harder for people to reach cooling centers. Moreover, people can be stranded far from home on trains and subways.

Heat waves disproportionately affect the elderly and people with respiratory diseases, such as emphysema. Over time, poor air quality increases asthma rates.

Cooling centers may be stressed to capacity. As crowding within shelters increases both those seeking shelter and staff can experience severe stress. In worst case scenarios personal safety may be an issue. This can be a particular problem within shelters with “blended” populations (e.g., ethnic groups, elderly, children, addicts, disabled).

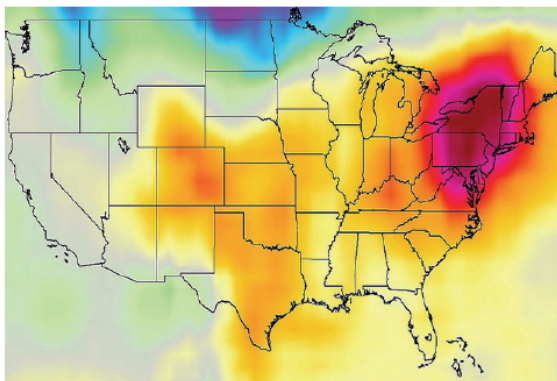


Photo: National temperature map June 2012
Credit: Public domain (Jet Propulsion Lab)

Heat waves can impact economic activity, cultural artifacts, and governance

functions, particularly when electrical and transport systems are disrupted. For instance, historical documents in public libraries are vulnerable to harm from humidity.

People seek relief from heat at cooling centers or public beaches and pools. Heat can promote bacteria growth leading to the closure of beaches. Illegally open fire hydrants can have serious implications for fire suppression because of decreases in water pressure.

Heat events can also result in damage to infrastructure. For example, it can cause rail lines and bridges to expand. Public transportation may be disrupted if this happens.

Further Discussion

The following crosscutting issues arose during the meetings.

Interactions across sectors

The three weather-related hazards have complex impacts, can result in collateral damage, and yet many outcomes and consequences appear in all three hazards. To simplify the complexity, we identified seven sub-systems that are central to the city's functionality. These are:

- Buildings
- Communication
- Ecosystems
- Electricity
- Emergency shelters
- Transportation
- Water treatment

By producing diagrams for each of these sub-systems, SERI was able to capture the key ideas without having too much repetition in the diagrams.

Regional Coordination

Throughout the VCAPS process, stakeholders regularly addressed the importance of mitigating the impacts of different weather events. In some cases these issues are most effectively addressed with regionally coordinated strategies. The reason for this is that watersheds cross municipal boundaries. Consideration of hydrology at the level of the watershed can help identify regional strategies that will most effectively address these shared concerns.

Vulnerable Populations

Participants in the VCAPS meetings emphasized the impacts of weather-related stressors on vulnerable populations, which include the elderly, homeless, those receiving medical care at home, disabled, and those in public housing. Flooding from sea level rise and from heavy rain events already occurs in the coastal public housing complexes. Vacating first floors and raising all furnaces and transformers from public housing basements were identified as possible solutions. Communication systems in extreme heat and intense rains may fail which will cut off elderly from important information and perhaps from assistance.

Discussion of Management Actions

As part of the diagramming of flooding, winter storm, and severe heat hazards, SERI and MAPC encouraged the meeting participants to discuss management

actions that could be promoted now and that would increase resilience to storms events. A significant number of management actions was identified by the group.

The participants identified four general types of actions: actions taken as part of routine planning activities (preparatory actions), actions taken in response to specific threats or events (pre-storm/event actions), actions taken during an event (during storm/event actions), and actions taken to recover from the impacts of storms (post-storm/event actions). An example of a pro-active preparatory action is the City's hazard mitigation planning process. The participants also indicated whether the action was already being done, was a new strategy worthy of further consideration, or has already been implemented.



Photo: The Muddy River. 2012
Credit: T. Webler.

This information provides a picture of the full range of management actions that can be taken by the City, either separately or together. In some cases, coordination among City departments, between the City and other municipalities, or between the City and other regional entities is necessary to tackle hazards.

Conclusion

Examination of local hazards with city and state officials, interested citizens and members of the private sector can illuminate vulnerabilities and highlight potential mitigation projects for municipalities to adopt.

VCAPS is one approach to help elicit and organize this knowledge in a format that can empower local action. The five meetings sponsored by the City of Boston, the Metropolitan Area Planning Commission, and SERI drew upon local experience to document vulnerabilities and mitigation actions.

Like other municipalities across the country, the City of Boston will continue to experience increased exposure to extreme weather. The state, county, and city systems that are in place to manage, cope, and adapt to this weather can be improved upon and will need to innovate more efficient and effective systems to prepare for weather related hazards and to restore services. Such systems ought to be informed with the knowledge and experience of city employees and local stakeholders. VCAPS is one tool to bring this is to fruition.

References

Climate Action Leadership Committee and Community Advisory Committee 2010. *Sparkling Boston's Climate Revolution*. Available at:

http://www.cityofboston.gov/Images_Documents/BCA-full_rp_rpt_r5_tcm3-19958.pdf.

Climate Action Leadership Committee and Community Advisory Committee 2012.

Sparkling Boston's Climate Revolution: Recommendations of the Climate Action Leadership Committee and Community Advisory Committee. Available at:

http://www.cityofboston.gov/Images_Documents/BCA-full_rp_rpt_r5_tcm3-19958.pdf (last visited August 17, 2011).

Frumhoff, PC, JJ McCarthy, JM Melillo, SC Moser, and DJ Wuebbles, 2006. *Climate Change in the U.S. Northeast: A report of the Northeast Climate Impacts Assessment*. Cambridge, MA: Union of Concerned Scientists.

IPCC 2012. Summary for Policymakers. In: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. NY: Cambridge University Press.

IPCC 2007. *Climate Change 2007: Synthesis Report* (editors: Pachauri, RK & Reisinger, A.). Geneva, Switzerland: IPCC.

Massachusetts Executive Office of Energy and Environmental Affairs 2011.

Massachusetts climate change adaptation report. Report of the Climate Change Adaptation Advisory Committee. Boston: Massachusetts Executive Office of Energy and Environmental Affairs.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

**APPENDIX C
HAZARD MAPPING**

The MAPC GIS (Geographic Information Systems) Lab produced a series of maps for the City of Boston depicting the location of multiple natural hazard zones and critical facilities. . 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.

Due to the large amount of data, all of the hazard information could not be compiled onto a single map. In order to clearly show the data, the data is displayed on a series of seven maps that depict the following. This series of seven maps is included in this Appendix.

1. Population Density
2. Developable Land
3. Flood Zones
4. Earthquakes/Landslides
5. Hurricanes/Tornados
6. Average Snowfall
7. Composite Natural Hazards

In order to make the detailed mapped data more usable for the City, the map series was further divided into nine geographic areas that cover the following neighborhoods:

- 1 Harbor Islands
- 2 Charlestown, East Boston
- 3 Bay Village, Beacon Hill, Leather District, Chinatown, Downtown, North End
- 4 Back Bay, Fenway, Longwood Medical Area
- 5 Allston, Brighton
- 6 South Boston, South Boston Waterfront, South End
- 7 Jamaica Plain, Mission Hill, Roxbury
- 8 Dorchester, Mattapan
- 9 Hyde Park, Roslindale, West Roxbury

With these nine areas having seven maps each, there are a total of 63 maps in the series. Due to their large size, printed copies these larger scale maps are not included in this report. Electronic (PDF file) versions are on file with the City of Boston. Reduced “tabloid” page-sized (11x17 inch) copies of the maps can be printed from these PDF files. The City also has on file the original GIS files for the map series, which can be used for printing full sized (36 inch) copies of the maps, as well as for conducting GIS analysis in conjunction with other map layers. A description of the map series follows.

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

The sources of data and general description of each of these themes follows:

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.

Flood Zones – The map of flood zones used the FEMA Q3 Flood Zones as its source. For more information, refer to http://www.fema.gov/fhm/fq_q3.shtm. The definitions of the flood zones are described in detail on FEMA's web site at http://www.fema.gov/fhm/fq_term.shtm. The flood zone map for each community also shows repetitive loss sites, critical infrastructure and municipally owned and protected open space. 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/nfip/replps.shtm>.

Earthquakes and Landslides – This information came from NESEC and from Tufts University. For most communities, there was no data for earthquakes because only the epicenters of an earthquake are mapped. Mapping of areas susceptible to liquefaction was provided by William Lettis and Associates, Inc. and Tufts University. Liquefaction means that loosely packed, water-logged sediments lose strength and therefore move in large masses or lose bearing strength. This map was prepared using geological maps and soil borings.

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/pp1183/pp1183.html>.

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 and hurricane surge areas.

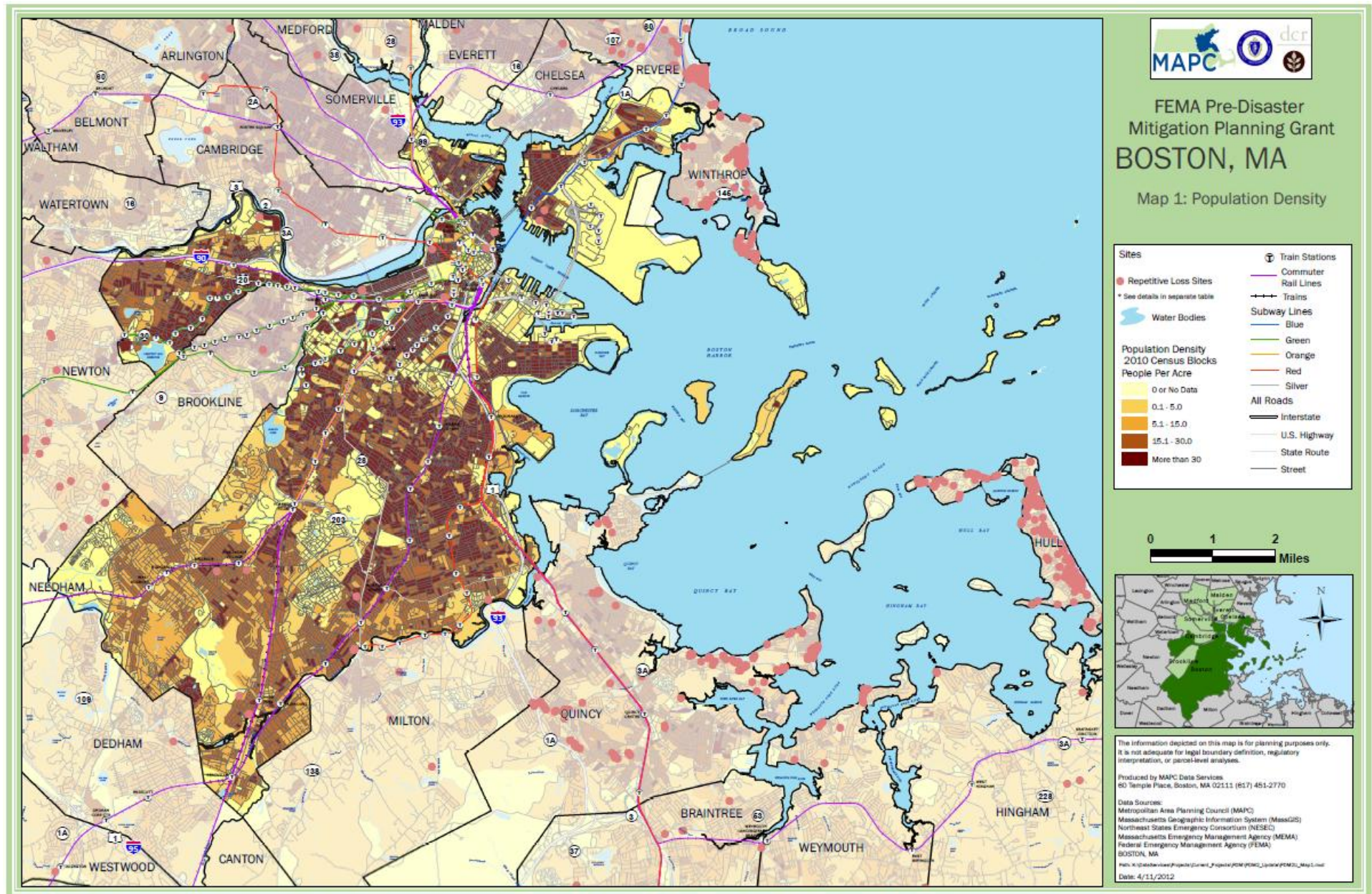
Hurricane storm surge is an abnormal rise in sea level accompanying a hurricane or other intense storm. Along a coastline a hurricane will cause waves on top of the surge. Hurricane Surge is estimated with the use of a computer model called SLOSH. SLOSH stands for Sea Lake and Overland Surge from Hurricanes. 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.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

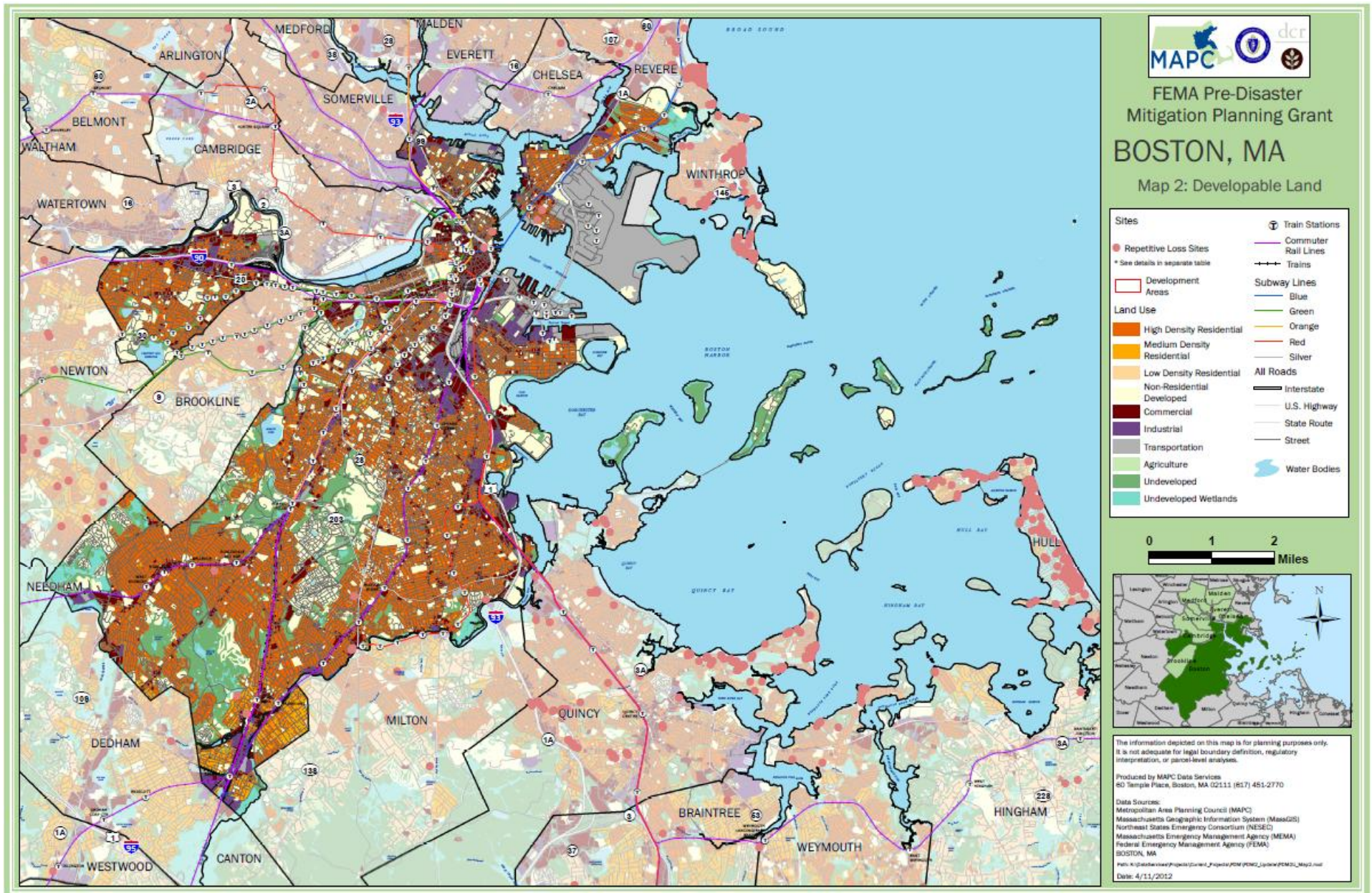
Average Snowfall - - This map shows the average snowfall, repetitive loss structures and open space. It also shows storm tracks for nor'easters, if any storms tracked through the community.

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.

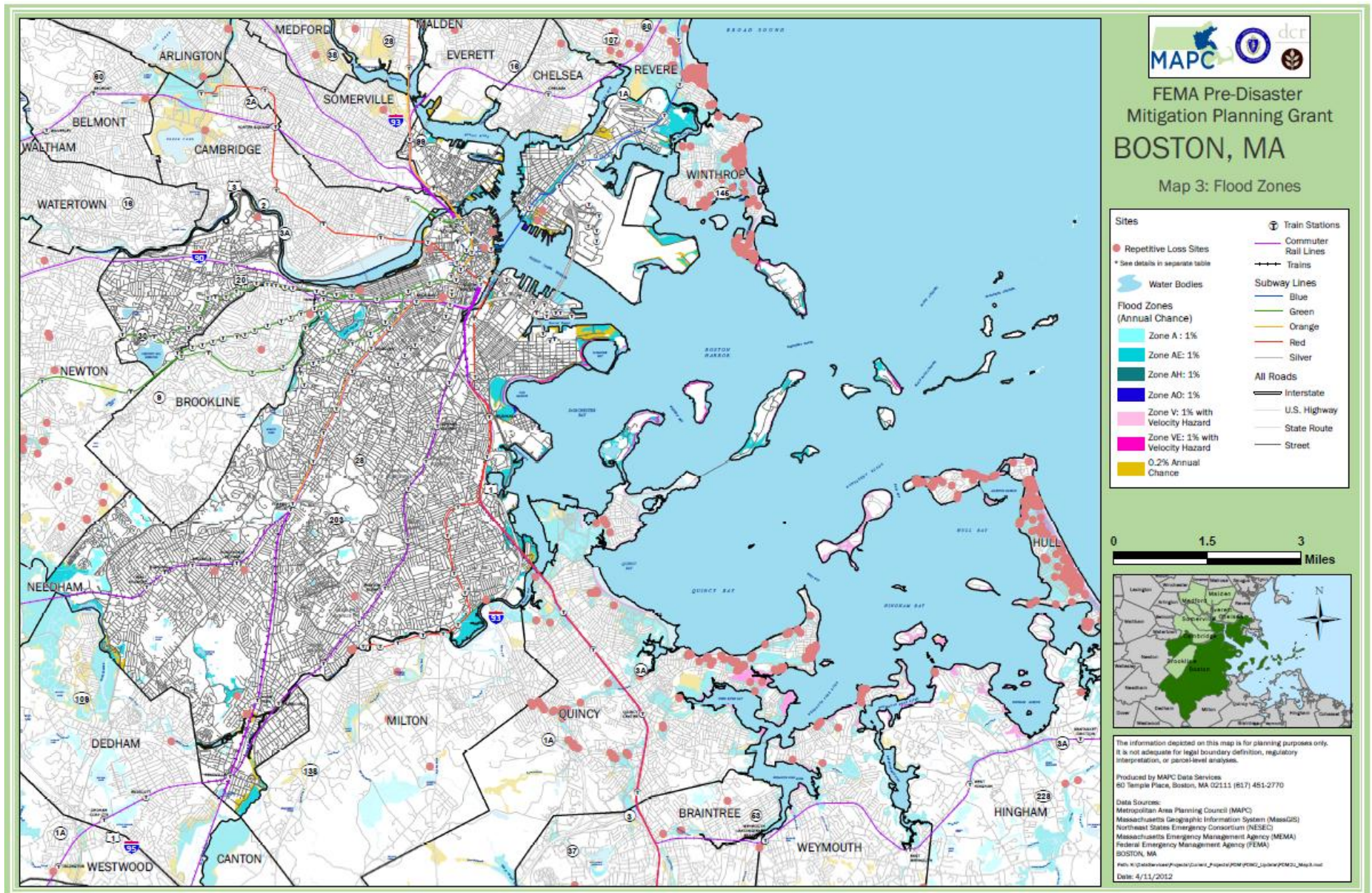
CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



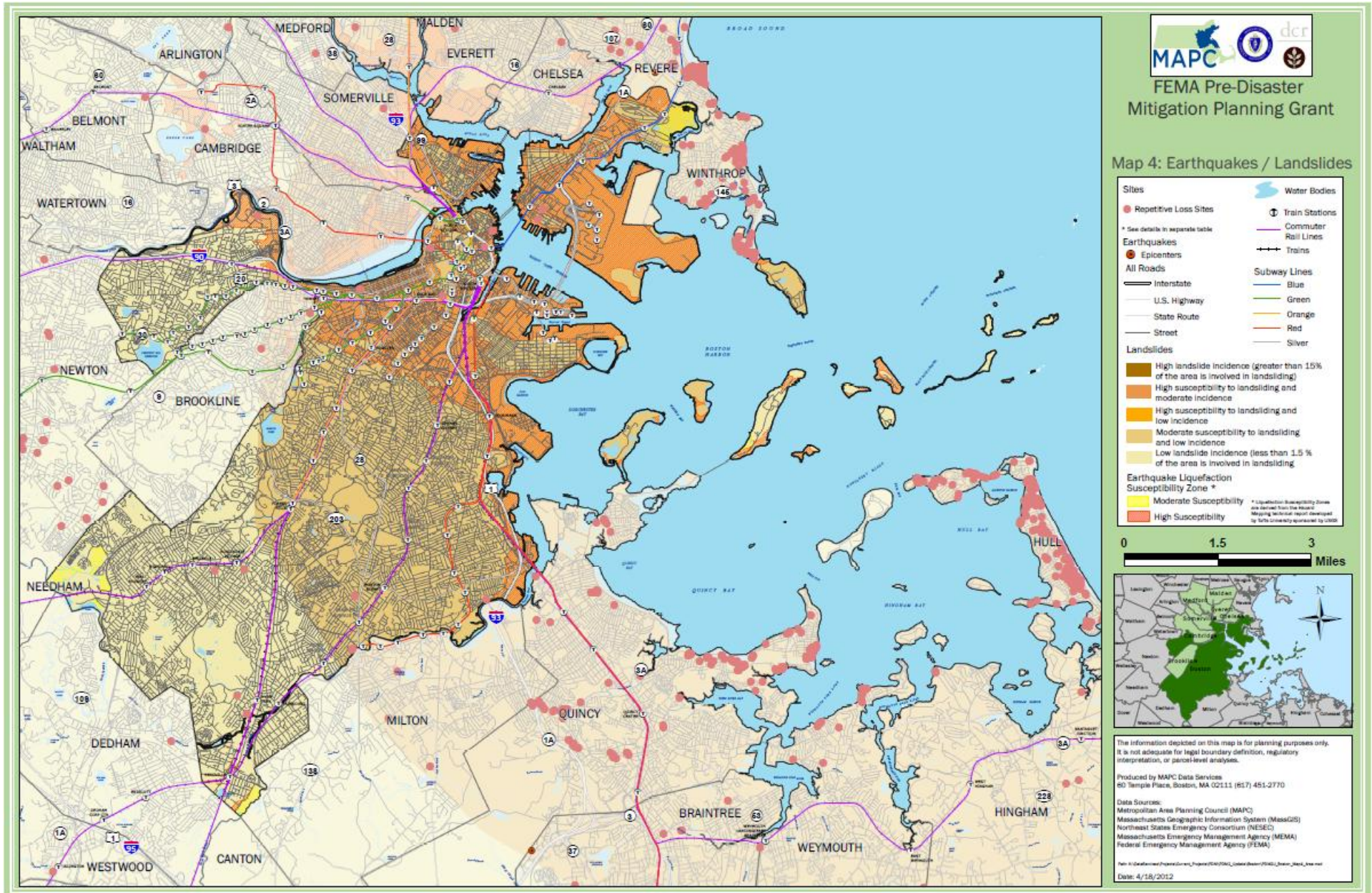
CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



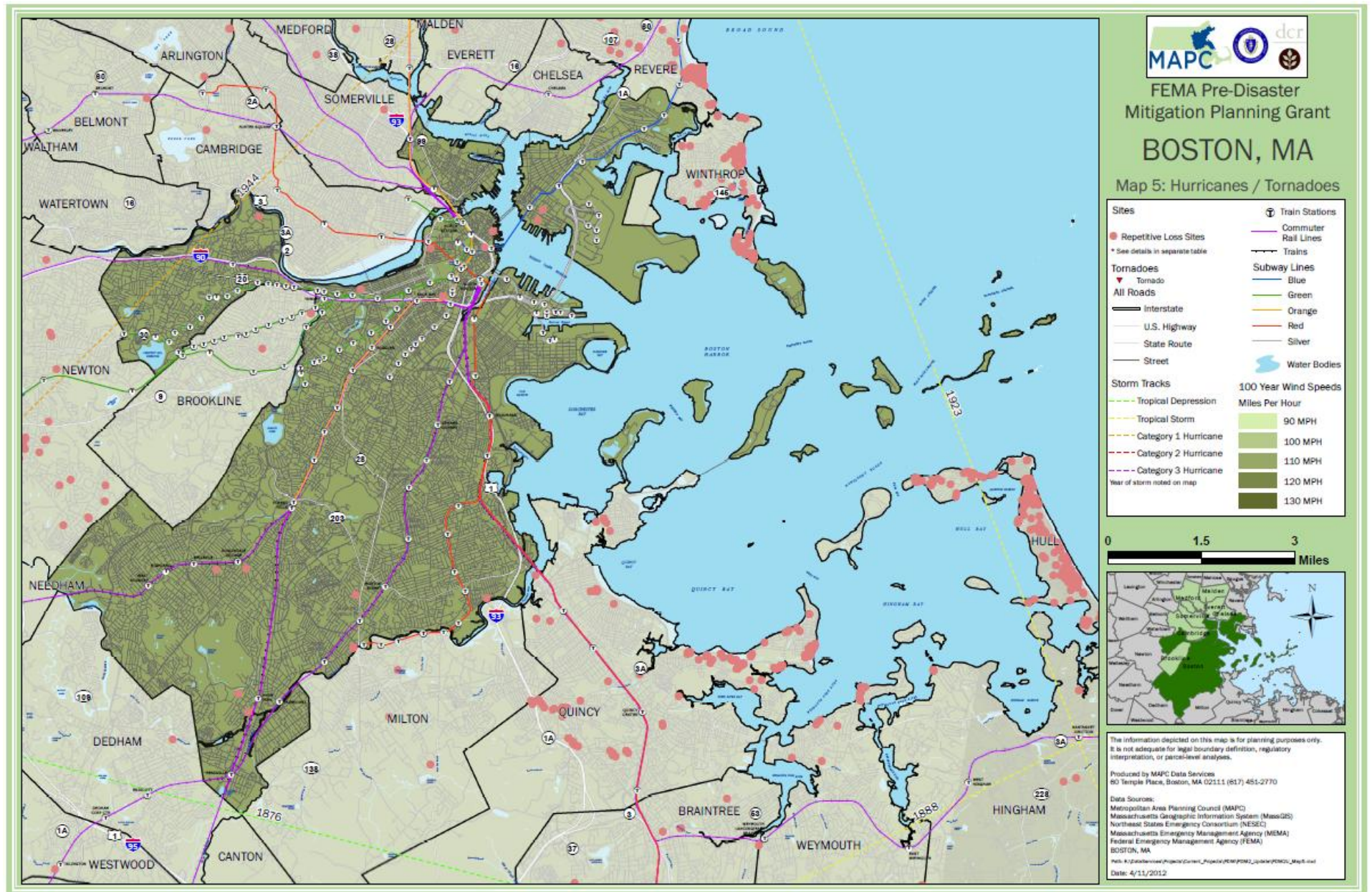
CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



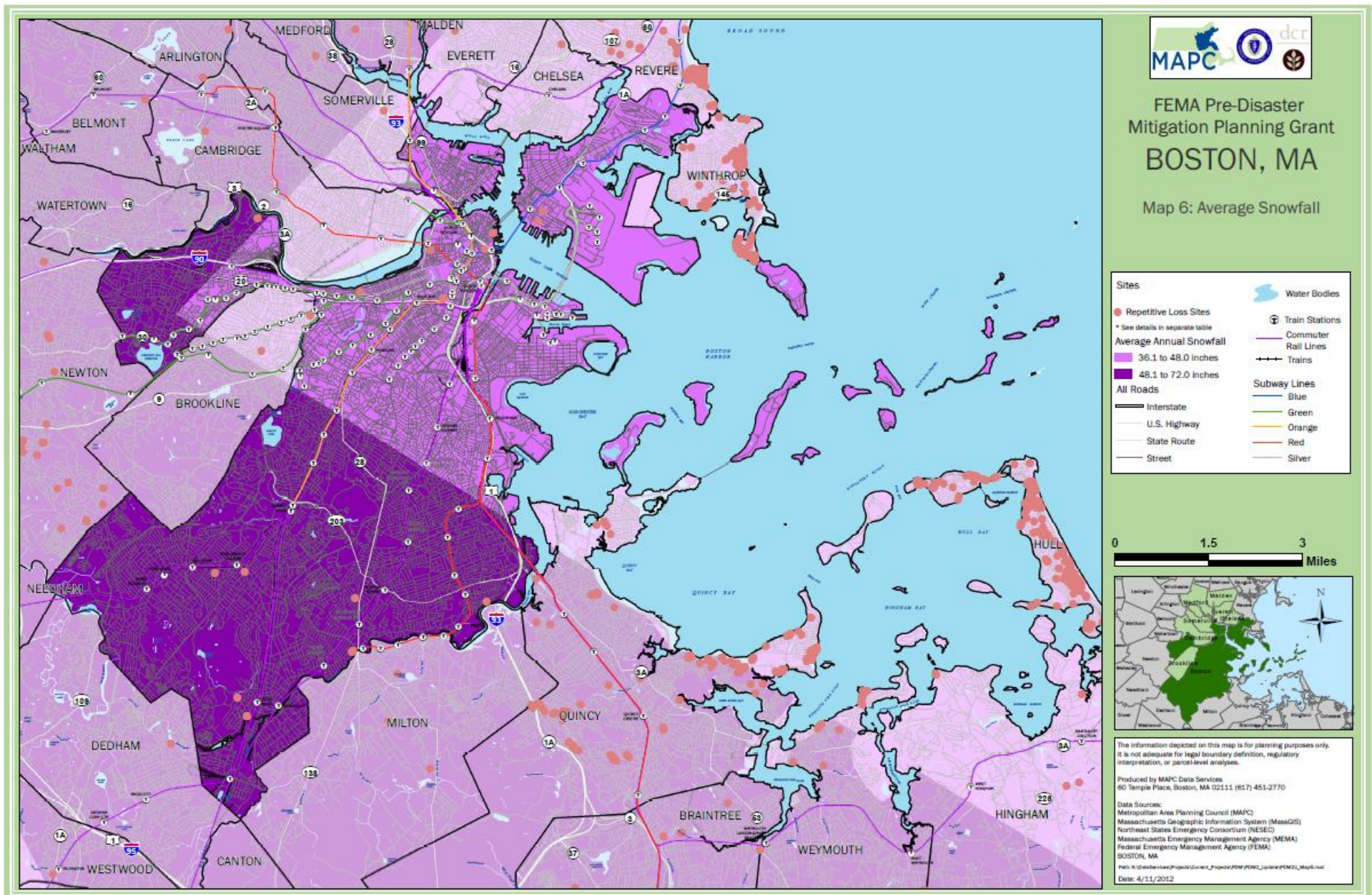
CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



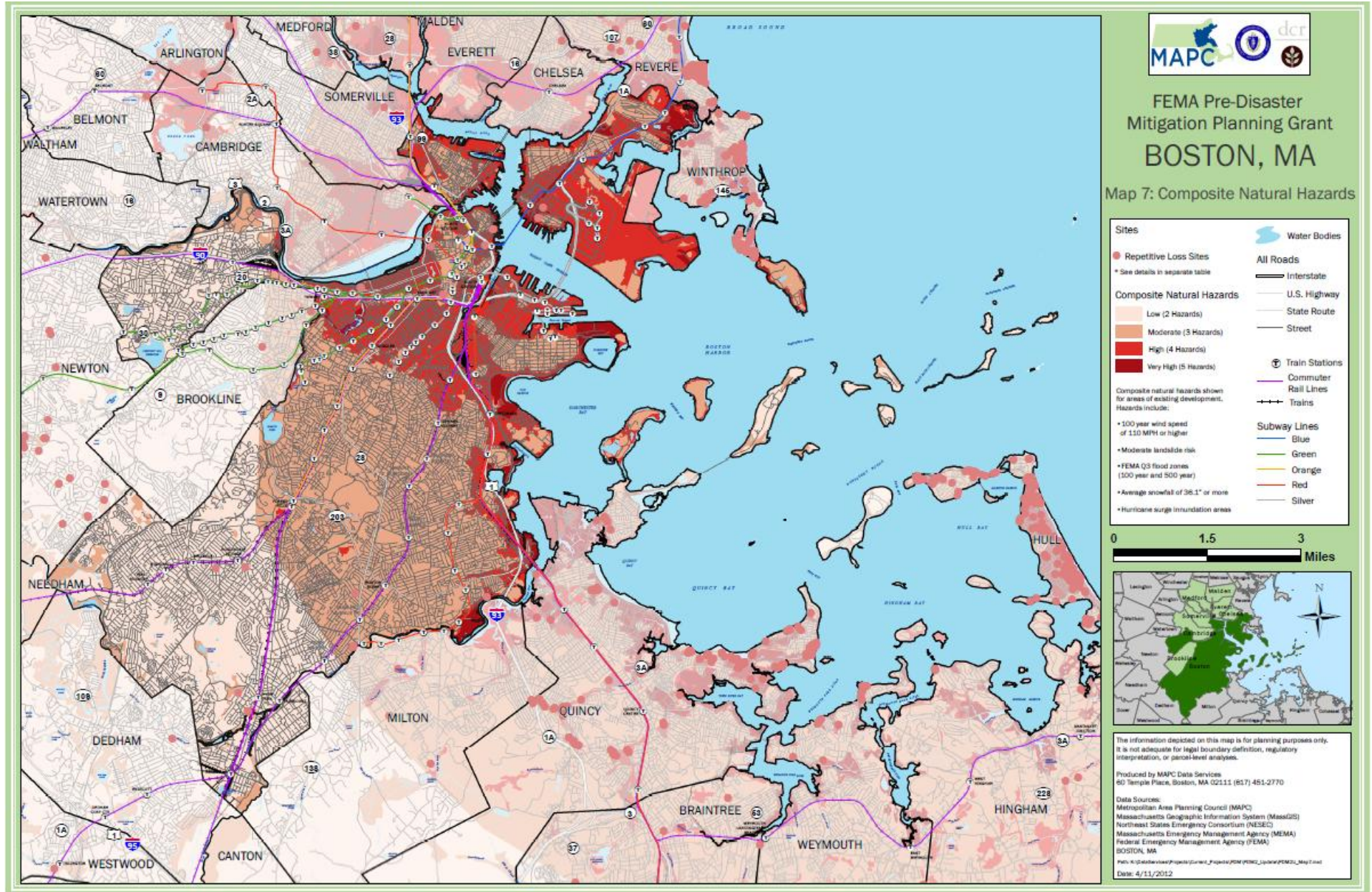
**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

**APPENDIX D
Critical Facilities Inventory**

CITY OF BOSTON HAZARD MITIGATION PLAN

REVISED DRAFT 2014 UPDATE

Explanation of Columns in the Critical Facilities InventoryTable

Column 1: ID #: Individual site ID number

Column 2: Name: Name of the site. This information was provided by the community.

Column 3: Type of Facility: Type of site. This information was provided by the community.

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. For more information on how landslide susceptibility was mapped, refer to <http://pubs.usgs.gov/pp/p1183/pp1183.html>.

Column 5: Flood Zone: Risk of flooding, information based on the Flood Insurance Rate Maps (FIRM). 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: Snowfall Category: Average annual snowfall data from NESEC.

Low category is 36 – 48 inches per year

High category is 48 – 72 inches per year.

Column 7: Hurricane Surge Area: Whether the site is located within a hurricane surge area and the potential degree of inundation during a hurricane. The following explanation of hurricane surge areas is taken from the U.S. 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. There are about 40 SLOSH models from Maine to Texas. 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." <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).

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1	Emergency Operations Center	Emergency Operation Center	Moderate	No	High	0
2	Water & Sewer Operations Center	Emergency Operation Center	Moderate	No	Low	2
3	Biranda -Creamer Building	Emergency Operation Center	Moderate	No	Low	2
4	Police Headquarters	Emergency Operation Center	Moderate	No	Low	0
5	Fire Alarm	Emergency Operation Center	Moderate	No	Low	2
6	City Hall	Emergency Operation Center	Moderate	No	Low	0
7	ENGINE CO. 2, 19	Fire Stations	Moderate	No	Low	0
8	ENGINE CO. 3	Fire Stations	Moderate	No	Low	2
9	ENGINE CO. 4, 24	Fire Stations	Moderate	No	Low	0
10	ENGINE CO. 5	Fire Stations	Moderate	No	Low	0
11	ENGINE CO. 7, 17	Fire Stations	Moderate	No	Low	0
12	ENGINE CO. 8, 1	Fire Stations	Moderate	No	Low	0
13	ENGINE CO. 9, 2	Fire Stations	Moderate	No	Low	1
14	ENGINE CO. 14, 4	Fire Stations	Moderate	No	Low	0
15	ENGINE CO. 16	Fire Stations	Moderate	No	High	0
16	ENGINE CO. 17, 7	Fire Stations	Moderate	No	Low	0
17	ENGINE CO. 18, 6	Fire Stations	Moderate	No	High	0
18	ENGINE CO. 20	Fire Stations	Moderate	No	High	2
19	ENGINE CO. 21	Fire Stations	Moderate	No	Low	0
20	ENGINE CO. 22	Fire Stations	Moderate	No	Low	2
21	ENGINE CO. 24, 23	Fire Stations	Moderate	No	High	0
22	ENGINE CO. 29, 11	Fire Stations	Low	No	High	0
23	ENGINE CO. 30, 25	Fire Stations	Low	No	High	0
24	ENGINE CO. 32, 9	Fire Stations	Moderate	No	Low	2
25	ENGINE CO. 33, 15	Fire Stations	Moderate	No	Low	2
26	ENGINE CO. 37, 26	Fire Stations	Moderate	No	Low	2
27	ENGINE CO. 39, 18	Fire Stations	Moderate	No	Low	4
28	ENGINE CO. 41, 14	Fire Stations	Low	No	Low	0
29	ENGINE CO. 42	Fire Stations	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
30	ENGINE CO. 48, 28	Fire Stations	Low	No	High	0
31	ENGINE CO. 49	Fire Stations	Low	No	High	0
32	ENGINE CO. 50	Fire Stations	Moderate	No	Low	0
33	ENGINE CO. 51	Fire Stations	Low	No	High	0
34	ENGINE CO. 52, 29	Fire Stations	Moderate	No	High	0
35	ENGINE CO. 53, 16	Fire Stations	Low	No	High	0
36	ENGINE CO. 55	Fire Stations	Low	No	High	0
37	ENGINE CO. 56, 21	Fire Stations	Moderate	No	Low	4
38	ENGINE CO. 28, 10 (Division 2 Headquarters)	Fire Stations	Moderate	No	High	0
39	ENGINE CO. 10	Fire Stations	Moderate	No	Low	0
40	AIR SUPPLY UNIT	Fire Stations	Moderate	No	Low	2
41	BOSTON POLICE DEPARTMENT	Fire Stations	Moderate	VE	Low	0
42	BOSTON POLICE DEPARTMENT DISTRICT E-18	Police Stations	Low	No	High	0
43	BOSTON POLICE DEPARTMENT DISTRICT B3	Police Stations	Moderate	No	High	0
44	BOSTON POLICE DEPARTMENT DISTRICT E-5	Police Stations	Low	No	High	0
45	BOSTON POLICE DEPARTMENT DISTRICT C-11	Police Stations	Moderate	No	High	4
46	BOSTON POLICE DEPARTMENT DISTRICT E-13	Police Stations	Moderate	No	High	0
47	BOSTON POLICE DEPARTMENT DISTRICT B-2	Police Stations	Moderate	No	Low	0
48	BOSTON POLICE DEPARTMENT - HEADQUARTERS	Police Stations	Moderate	No	Low	0
49	BOSTON POLICE DEPARTMENT DISTRICT D-4	Police Stations	Moderate	No	Low	2
50	BOSTON POLICE DEPARTMENT DISTRICT C-6	Police Stations	Moderate	No	Low	0
51	BOSTON POLICE - HARBOR PATROL	Police Stations	Moderate	No	Low	2
52	BOSTON POLICE DEPARTMENT DISTRICT D-14	Police Stations	Low	No	High	0
53	Boston Police Department: District A-1	Police Stations	Moderate	No	Low	0
54	MASSACHUSETTS STATE POLICE - BRIGHTON	Police Stations	Low	No	High	0
55	BOSTON POLICE DEPARTMENT DISTRICT A-7	Police Stations	Moderate	No	Low	2
56	MASS PORT AUTHORITY POLICE - BOSTON AUTOPORT	Police Stations	Moderate	AE	Low	2
57	Boston Police-Transportation	Police Stations	Moderate	No	Low	2
58	Question- BPD sign posted but unlisted site	Police Stations	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
59	Replace Station E-5 MA000111 ID11 correction	Police Stations	Low	No	High	0
60	Boston Police Academy	Police Stations	Low	No	High	0
61	55 Bunker Hill St Vine St Police Station 617 343 4888	Police Stations	Moderate	No	Low	2
62	Replace Station C-6 MA000028 ID9 correction	Police Stations	Moderate	No	Low	4
63	Station 6, Ambulance 6	EMS Facility Sites	Moderate	No	Low	0
64	Station 1, Ambulance 1	EMS Facility Sites	Moderate	No	Low	0
65	Station 5, Paramedic 5	EMS Facility Sites	Low	No	High	0
66	Station 3, Ambulance 3	EMS Facility Sites	Moderate	No	High	0
67	Station 7, Ambulance 7	EMS Facility Sites	Moderate	No	Low	4
68	Station 23, Paramedic 3	EMS Facility Sites	Moderate	No	High	0
69	Station 12	EMS Facility Sites	Moderate	No	High	0
70	Station 14, Ambulance 14	EMS Facility Sites	Low	No	High	0
71	Station 16, Ambulance 16	EMS Facility Sites	Moderate	No	Low	0
72	Station 13, Ambulance 13	EMS Facility Sites	Moderate	No	High	0
73	Station 2, Ambulance 2	EMS Facility Sites	Moderate	No	Low	0
74	Station 15, Ambulance 15	EMS Facility Sites	Moderate	No	Low	1
75	Station 18, Ambulance 18	EMS Facility Sites	Low	No	High	0
76	Station 11, Ambulance 11	EMS Facility Sites	Moderate	No	High	4
77	Station 10	EMS Facility Sites	Moderate	No	Low	2
78	Tufts Station, Ambulance 4	EMS Facility Sites	Moderate	No	Low	2
79	Special Operations	EMS Facility Sites	Moderate	No	High	0
80	Boston Health Care for the Homeless Program	Community Health Centers	Moderate	No	Low	2
81	Bowdoin Street Health Center	Community Health Centers	Moderate	No	High	0
82	Brookside Community Health Center	Community Health Centers	Moderate	No	High	0
83	Codman Square Health Center	Community Health Centers	Moderate	No	High	0
84	Dimock Community Health Center	Community Health Centers	Moderate	No	High	0
85	Dorchester House Multi-Service Center	Community Health Centers	Moderate	No	Low	0
86	East Boston Neighborhood Health Center	Community Health Centers	Moderate	No	Low	1
87	Fenway Community Health Center	Community Health Centers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
				0.2 PCT ANNUAL CHANCE		
88	Geiger Gibson Community Health Center	Community Health Centers	Moderate		Low	2
89	Greater Roslindale Medical & Dental Center	Community Health Centers	Low	No	High	0
90	Harvard Street Adolescent Child Life Center	Community Health Centers	Moderate	No	High	0
91	Harvard Street Neighborhood Health Center	Community Health Centers	Moderate	No	High	0
92	Joseph M. Smith Community Health Center - Allston	Community Health Centers	Low	No	High	4
93	Martha Eliot Health Center	Community Health Centers	Moderate	No	Low	0
94	Mattapan Community Health Center	Community Health Centers	Moderate	No	High	0
95	MGH Charlestown HealthCare Center	Community Health Centers	Moderate	No	Low	0
96	Neponset Health Center	Community Health Centers	Moderate	No	High	0
97	North End Community Health Center	Community Health Centers	Moderate	No	Low	0
98	Roxbury Comprehensive Community Health Center	Community Health Centers	Moderate	No	Low	0
99	Sidney Borum Jr. Health Center	Community Health Centers	Moderate	No	Low	0
100	South Boston Community Health Center - 386 W Broadway	Community Health Centers	Moderate	No	Low	0
101	South Boston Community Health Center - 409 W Broadway	Community Health Centers	Moderate	No	Low	0
102	South Cove Community Health Center	Community Health Centers	Moderate	No	Low	0
103	South Cove Community Health Center - South Street Center	Community Health Centers	Moderate	No	High	0
104	South End Associates	Community Health Centers	Moderate	No	Low	0
105	South End Community Health Center	Community Health Centers	Moderate	No	Low	2
106	Southern Jamaica Plain Health Center	Community Health Centers	Moderate	No	High	0
107	Upham's Corner Health Center - 415 Columbia Rd	Community Health Centers	Moderate	No	Low	0
108	Upham's Corner Health Center - 500 Columbia Rd	Community Health Centers	Moderate	No	Low	0
109	Upham's Corner Health Center - 636 Columbia Rd	Community Health Centers	Moderate	No	Low	0
110	Whittier Street Health Center	Community Health Centers	Moderate	No	Low	0
111	Arbour Hospital	Hospitals	Moderate	No	High	0
112	Franciscan Children's Hospital & Rehab Center	Hospitals	Moderate	No	Low	0
113	Hebrew Rehabilitation Center	Hospitals	Low	No	High	0
114	Jewish Memorial Hospital	Hospitals	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
115	Kindred Hospital	Hospitals	Low	No	Low	0
116	Lemuel Shattuck Hospital	Hospitals	Moderate	No	High	0
117	Radius Hospital	Hospitals	Moderate	No	Low	0
118	ShrinerÆs Burn Instituteá	Hospitals	Moderate	No	Low	0
119	Spaulding Rehabilitation Hospital	Hospitals	Moderate	No	Low	2
120	Beth Isreal Deaconess medical Center - East Campus	Hospitals	Moderate	No	Low	0
121	Boston Medical Center - Menino Campus	Hospitals	Moderate	No	Low	2
122	Brigham and Women's Hospital	Hospitals	Moderate	No	Low	0
123	Carney Hospital	Hospitals	Moderate	No	High	0
124	Children's Hospital Boston	Hospitals	Moderate	No	Low	0
125	Dana-Farber Cancer Institute	Hospitals	Moderate	No	Low	0
126	Faulkner Hospital	Hospitals	Low	No	High	0
127	Massachusetts Eye and Ear Infirmary	Hospitals	Moderate	No	Low	2
128	Caritas St. Elizabeth's Hospital	Hospitals	Low	No	High	0
129	Tufts Medical Center	Hospitals	Moderate	No	Low	2
130	VA Bos. Healthcare System - Jamaica Plain	Hospitals	Moderate	No	Low	0
131	VA Bos. Healthcare System - W. Roxbury	Hospitals	Low	No	High	0
132	Beth Israel Deaconess Medical Center - West Campus	Hospitals	Moderate	No	Low	0
133	Boston Medical Center - East Newton Campus	Hospitals	Moderate	No	Low	2
134	New England Baptist Hospital	Hospitals	Moderate	No	Low	0
135	BOSTON VETERAN CENTER	Hospitals	Moderate	No	Low	2
136	Veterans Affairs Boston Healthcare System Outpatient Clinic	Medical Facility	Moderate	No	Low	2
137	ERICH LINDEMANN MENTAL HEALTH CENTER	Hospitals	Moderate	No	Low	0
138	URGENT CARE MEDICAL CLINIC	Hospitals	Moderate	No	Low	2
139	Beth Israel Deaconess Medical Center	Hospitals	Moderate	No	Low	0
140	Arbour Hospital	Hospitals	Moderate	No	High	0
141	Question Simon C Fireman Research Center	Hospitals	Moderate	No	Low	2
142	Children's Hospital Boston	Hospitals	Moderate	No	Low	0
143	Children's Hospital Boston	Hospitals	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
144	Children's Hospital Boston	Hospitals	Moderate	No	Low	0
145	Dana-Farber Cancer Institute	Hospitals	Moderate	No	Low	0
146	Children's Hospital Boston	Hospitals	Moderate	No	Low	0
147	Dana-Farber Cancer Institute	Hospitals	Moderate	No	Low	0
148	Children's Hospital Karp Family Research Lab	Hospitals	Moderate	No	Low	0
149	Beth Isreal Deaconess Medical West	Hospitals	Moderate	No	Low	0
150	Children's Hospital Boston	Hospitals	Moderate	No	Low	0
151	Dana-Farber Cancer Institute	Hospitals	Moderate	No	Low	0
152	Dana-Farber Cancer Institute	Hospitals	Moderate	No	Low	0
153	Boston Public Health Commission Medical Facilities	Hospitals	Moderate	No	Low	4
154	Boston Public Health Commission Medical Facilities	Hospitals	Moderate	No	Low	2
155	New England Plastic Surgical	Hospitals	Low	No	High	0
156	MGH at the Navy Yard	Hospitals	Moderate	No	Low	2
157	MGH Nessel Cancer Services	Hospitals	Moderate	No	Low	2
158	Massachusetts General Hospital	Hospitals	Moderate	No	Low	2
159	Question-Chinese Hospital?	Hospitals	Low	No	Low	0
160	MGH Ruth Sleeper Hall	Hospitals	Moderate	No	Low	2
161	MGH West End House	Hospitals	Moderate	No	Low	2
162	Tufts Medical Center	Hospitals	Moderate	No	Low	0
163	Boston Medical Center - East Newton Campus	Hospitals	Moderate	No	Low	2
164	Boston Medical Center - East Newton Campus	Hospitals	Moderate	No	Low	4
165	Boston Medical Center - East Newton Campus	Hospitals	Moderate	No	Low	2
166	New England Medical Rehabilitation	Hospitals	Moderate	No	Low	2
167	Tufts Medical Center	Hospitals	Moderate	No	Low	2
168	Tufts Medical Center	Hospitals	Moderate	No	Low	2
169	Question-Boston Medical Center - East Newton Campus	Hospitals	Moderate	No	Low	2
170	Tufts Medical Center	Hospitals	Moderate	No	Low	0
171	Brigham and Women's Hospital	Hospitals	Moderate	No	Low	0
172	APAC Child And Family Service Ctr Child Care	Child Care	Low	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
173	Bright Horizon's Children's Center-Allston	Child Care	Low	No	Low	0
174	Brighton/Allston Afterschool Enrichment Prog.	Child Care	Low	No	Low	0
175	Fairy Tale Children's Center Inc.	Child Care	Moderate	No	Low	0
176	HUNTINGTON AVE YMCA @ GARDNER PILOT ACADEMY	Child Care	Low	No	High	0
177	Jackson-Mann Community Center School-Afterschool	Child Care	Low	No	Low	0
178	Pine Village Preschool	Child Care	Low	No	High	0
179	Rivendell Child Care Center	Child Care	Low	No	Low	0
180	Wonder Years, Inc.	Child Care	Low	No	Low	0
181	Allson Brighton St. Gabriel's Head Start	Child Care	Low	No	Low	0
182	Edison After School Program	Child Care	Low	No	High	0
183	Allston/Brighton APAC, Inc.	Child Care	Low	No	Low	0
184	Leventhal-Sidman JCC/Brookline Preschool	Child Care	Low	No	High	0
185	Oak Square YMCA @ Winship	Child Care	Low	No	High	0
186	Camp Connolly	Child Care	Low	No	High	0
187	Franciscan Family Child Care Center	Child Care	Low	No	High	0
188	St. E's Children's Center	Child Care	Low	No	High	0
189	Yal-Day-New Day Care Center	Child Care	Low	No	High	0
190	Acorn Center for Early Education/Care	Child Care	Moderate	No	Low	2
191	ARC-EN-CIEL Day Care and Montessori School	Child Care	Low	No	High	0
192	Blackstone's New Adventure	Child Care	Moderate	No	Low	2
193	Associated Early Care Education Inc. - Castle Square	Child Care	Moderate	No	Low	2
194	Boston University Children's Center	Child Care	Moderate	No	Low	0
195	Bright Horizons @ Seaport	Child Care	Moderate	No	Low	2
196	Bright Horizons @ Seaport SACC Backup	Child Care	Moderate	No	Low	2
197	Bright Horizons @125 Summer Street	Child Care	Moderate	No	Low	0
198	Bright Horizons at One Financial Center	Child Care	Moderate	No	Low	0
199	Bright Horizons Children's Center	Child Care	Moderate	No	Low	2
200	Bright Horizons Children's Center at the Prudential Center	Child Care	Moderate	No	Low	0
201	Bright Horizons Family Center at Landmark	Child Care	Moderate	AE	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
202	Bright Horizons Family Solution @ Beacon Hill	Child Care	Moderate	No	Low	0
203	Buds and Blossoms Early Education and Care Center	Child Care	Moderate	No	Low	2
204	Children's Hospital Child Care Center	Child Care	Moderate	No	Low	0
205	Children's Place at Goodwin Procter	Child Care	Moderate	No	Low	2
206	Children's Quarters Charlestown Navy Yard	Child Care	Moderate	No	Low	2
207	Commonwealth Children's Center - RM 105A	Child Care	Moderate	No	Low	0
208	Eagle's Nest Learning Center	Child Care	Moderate	No	Low	2
209	Early Childhood Learning Lab	Child Care	Moderate	No	Low	2
210	Ellis Memorial Early Education and Care Program-STE 101	Child Care	Moderate	No	Low	2
211	Ellis Memorial Children's Center	Child Care	Moderate	No	Low	2
212	Ellis Memorial SAP at Madison Park Village	Child Care	Moderate	No	Low	2
213	Families First Day Care	Child Care	Moderate	No	Low	2
214	Government Center Child Care	Child Care	Moderate	No	Low	0
215	Government Center Child Care Corp - O'Neil Federal Bldg	Child Care	Moderate	No	Low	2
216	Harborview Children's Center	Child Care	Moderate	No	Low	1
217	Huntington Ave YMCA @ Hurley School	Child Care	Moderate	No	Low	0
218	Huntington Ave Day Camp	Child Care	Moderate	No	Low	2
219	Infants and Other People	Child Care	Moderate	No	Low	2
220	Kids Palace Learning Center, LLC.	Child Care	Moderate	No	Low	2
221	Kinder Care Learning Center	Child Care	Moderate	No	Low	2
222	Little Wonders Child Care Center	Child Care	Moderate	No	High	0
223	MGH Back Up Children's Center - WARREN LOBBY SUITE 130	Child Care	Moderate	No	Low	2
224	Millenium Day Car II	Child Care	Moderate	No	Low	0
225	Millennium Day Care	Child Care	Moderate	No	Low	4
226	North End Children's Center @ North End Health Center	Child Care	Moderate	No	Low	0
227	North End Head Start	Child Care	Moderate	No	Low	0
228	Old South Preschool	Child Care	Moderate	No	Low	2
229	Park Street Kids, Inc.	Child Care	Moderate	No	Low	0
230	Pine Village Preschool	Child Care	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
231	Roxbury YMCA @ Blackstone School	Child Care	Moderate	No	Low	2
232	RTH Children's Center	Child Care	Moderate	No	Low	0
233	Russell J. Call Children's Center	Child Care	Moderate	No	Low	2
234	Salvation Army After School Program	Child Care	Moderate	No	Low	2
235	Soldiers Field Park Children's Center	Child Care	Moderate	No	Low	2
236	South End Head Start	Child Care	Moderate	No	Low	0
237	Spruce Street Nursery School	Child Care	Moderate	No	Low	0
238	Sunrise Learning Academy LLC	Child Care	Moderate	No	Low	0
239	Sunshine Childcare	Child Care	Moderate	No	Low	2
240	Tartt's Day Care Center II	Child Care	Moderate	No	Low	2
241	The Children's Center at Ropes & Gray	Child Care	Moderate	No	Low	0
242	The Children's Place At	Child Care	Moderate	No	Low	2
243	The Frances Jacobson Early Childhood Center	Child Care	Moderate	No	Low	0
244	Torit Language Center Montessori	Child Care	Moderate	No	Low	0
245	Transportation Children's Center - RM 3330	Child Care	Moderate	No	Low	2
246	United South End Settlements Child Development Program	Child Care	Moderate	No	Low	2
247	Wang YMCA of Chinatown - SACC	Child Care	Moderate	No	Low	0
248	Youth Education Program (YEP)	Child Care	Moderate	No	Low	2
249	Anchor After School Program NAVY YARD	Child Care	Moderate	No	Low	2
250	Boys & Girls Club of Boston @ Charlestown Club	Child Care	Moderate	No	Low	0
251	Bright Horizons Childrens Center at the Schraffts	Child Care	Moderate	AE	Low	1
252	Charlestown Cooperative Nursery School	Child Care	Moderate	No	Low	0
253	Good Shepherd Preschool	Child Care	Moderate	No	Low	0
254	J.F.K. Head Start and Day Care Program	Child Care	Moderate	No	Low	2
255	Kent After School Program	Child Care	Moderate	No	Low	4
256	MGH Children's Center - CAPTAINS QUARTERS	Child Care	Moderate	No	Low	2
257	A Child's View	Child Care	Moderate	No	Low	0
258	ABCD Walnut Grove Head Start	Child Care	Moderate	No	High	0
259	ASPIRE After School Program / Alliance for inclusion &	Child Care	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
	Prevention					
260	Au Co Preschool / Viet Aid After School Programs	Child Care	Low	No	High	0
261	Basics Tutorial - Mather School	Child Care	Moderate	No	Low	0
262	Basics Tutorial - Thomas Kenny School	Child Care	Moderate	No	High	0
263	Basics Tutorial - William Monroe Trotter Sch.	Child Care	Moderate	No	High	0
264	Bird Street After School Program @ Russell Elementary School	Child Care	Moderate	No	Low	0
265	Boys and Girls Clubs Of Dorchester	Child Care	Moderate	No	Low	0
266	Bradshaw Children's Learning Program	Child Care	Moderate	No	High	0
267	Citizen Schools, Inc; (McCormack)	Child Care	Moderate	No	Low	2
268	College Bound Dorchester Early Education at Little House	Child Care	Moderate	No	Low	0
269	College Bound Dorchester Early Education at Log School	Child Care	Moderate	No	High	0
270	College Bound Dorchester/Ruth Darling Child Cape Center	Child Care	Moderate	No	Low	0
271	Columbia Point Infant Toddler Day Care	Child Care	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
272	Crispus Attucks Children's Center	Child Care	Moderate	No	High	0
273	Dimock Headstart	Child Care	Moderate	No	Low	0
274	Eagle's Nest @ Boston College High School	Child Care	Moderate	No	Low	4
275	ABCD EARLY HEADSTART	Child Care	Moderate	No	High	0
276	Basics Tutorial - John Holland School	Child Care	Moderate	No	High	0
277	Huntington Avenue YMCA @ Everett School	Child Care	Moderate	No	Low	0
278	Huntington Avenue YMCA @ King K-8 School	Child Care	Moderate	No	Low	0
279	Huntington AvenueYMCA @Winthrop	Child Care	Moderate	No	Low	0
280	Murphy Community Center	Community Center	Moderate	No	High	2
281	Neponset Child Care	Child Care	Moderate	No	High	0
282	Project Hope Children's Center	Child Care	Moderate	No	Low	0
283	Small Wonders Nursery School	Child Care	Moderate	No	High	4
284	The Paul R. McLaughlin Center	Child Care	Moderate	No	Low	4

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
285	UCCC @ Bird Street Youth Center	Child Care	Moderate	No	Low	0
286	Yawkey Konbit Kreyol Center	Child Care	Moderate	No	High	0
287	Hyde Park YMCA @ E. Greenwood	Child Care	Low	No	High	0
288	Hyde Park YMCA OST Program	Child Care	Low	No	High	0
289	Little Voices Early Care and Education	Child Care	Low	No	High	0
290	South Side Head Start II	Child Care	Low	No	High	0
291	Basics Tutorial - Mattahunt School	Child Care	Moderate	No	High	0
292	Galivan Community Center	BCYF community center	Moderate	No	High	0
293	Grove Hall Child Development Center	Child Care	Moderate	No	High	0
294	Hyde Park YMCA @ Chittick School	Child Care	Low	No	High	0
295	Jubilee Academy Preschool	Child Care	Moderate	No	High	0
296	La Ronde De Marie Claire Early Learning Center	Child Care	Moderate	No	High	0
297	Marie Claire Quality Childcare Center Infant Palace	Child Care	Moderate	No	High	0
298	Mattapan Head Start	Child Care	Moderate	No	High	0
299	Mildred Ave Community Center ASP	BCYF community center	Moderate	No	High	0
300	NECUB - Day Care	Child Care	Moderate	No	High	0
301	Spark Center / Group and School Age Program	Child Care	Moderate	No	High	0
302	St.Paul's Victory Assembly of God Learning Resource Center	Child Care	Moderate	No	High	0
303	The Tabitha House	Child Care	Moderate	No	High	0
304	Children's Learning Center	Child Care	Low	No	High	0
305	Alliance for Inclusion & Prevention Inc.	Child Care	Low	No	High	0
306	Haley School & Boston Nature Center Afterschool Program	Child Care	Moderate	No	High	0
307	Little People's Playhouse	Child Care	Moderate	No	High	0
308	Little People's Playhouse SACC	Child Care	Low	No	High	0
309	Roslindale Community Center After School	Child Care	Low	No	High	0
310	Southside Head Start	Child Care	Low	No	High	0
311	The Hill School	Child Care	Low	No	High	0
312	Therapeutic After School Program (TASP)	Child Care	Low	No	High	0
313	Village Preschool	Child Care	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
314	West Roxbury YMCA @ Phineas Bates	Child Care	Low	No	High	0
315	West Roxbury YMCA@Sacred Heart Preschool & School Age	Child Care	Low	No	High	0
316	ABCD Head Start	Child Care	Moderate	No	Low	0
317	ABCD Head Start @ Lenox Street	Child Care	Moderate	No	Low	0
318	Above & Beyond SACC Program @ Moreland Street	Child Care	Moderate	No	Low	0
319	Bird Street Before and After school Program @ Orchard Gardens	Child Care	Moderate	No	Low	0
320	Bird Street Cmty Ctr. ASP@ Higginson-Lewis K2-8 Before and After School Program	Child Care	Moderate	No	Low	0
321	Boys and Girls Clubs @ Yawkey Club	Child Care	Moderate	No	Low	0
322	Children's Services of Roxbury Early Care & Education Center	Child Care	Moderate	No	Low	0
323	Dimock Early Headstart	Child Care	Moderate	No	High	0
324	Eliot Educational Center	Child Care	Moderate	No	Low	0
325	Goodwill Mellon Academy	Child Care	Moderate	No	Low	2
326	Hawthorne After School Program	Child Care	Moderate	No	Low	0
327	Huntington Avenue YMCA @ Mason School	Child Care	Moderate	No	Low	4
328	Paige Academy	Child Care	Moderate	No	Low	0
329	Paige Academy School Age Child Care	Child Care	Moderate	No	Low	0
330	Rosa Parks Day Care Center	Child Care	Moderate	No	Low	0
331	Roxbury Weston Programs Inc. SACC/CATCH	Child Care	Moderate	No	Low	0
332	Roxbury YMCA Child Care Center	Child Care	Moderate	No	Low	0
333	S.M.I.L.E Pre School Team	Child Care	Moderate	No	Low	0
334	Smile Preschool	Child Care	Moderate	No	Low	0
335	Sunnyside Day Nursery	Child Care	Moderate	No	Low	0
336	The Abantwana Learning Center	Child Care	Moderate	No	High	0
337	The Edgerley Family Community Children's Center	Child Care	Moderate	No	High	0
338	The Gate House Head Start Program	Child Care	Moderate	No	High	0
339	Twelfth Baptist Church After School Program	Child Care	Moderate	No	Low	0
340	UCCC @ Ellis	Child Care	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
341	UCCC @ Emerson	Child Care	Moderate	No	Low	0
342	UCCC @ Nathan Hale	Child Care	Moderate	No	Low	0
343	Vine St. Community Centers - SACC Program	Child Care	Moderate	No	Low	0
344	Children's Happy Day School	Child Care	Low	No	High	0
345	Kids Club Childcare and Preschool Center Inc	Child Care	Low	No	High	0
346	Kids Stop	Child Care	Low	No	High	0
347	May Behavioral Health Children's After Sch. Pro	Child Care	Low	No	High	0
348	Ohrenberger Community Center School Age Child Care	Child Care	Low	No	High	0
349	Parkway Preschool Center	Child Care	Low	No	High	0
350	Sunny Bear Academy	Child Care	Low	No	High	0
351	The Childrens House of Owls Head	Child Care	Low	No	High	0
352	The Light House Early Learning Center	Child Care	Low	No	High	0
353	Tot Spot Child Development Center	Child Care	Low	No	High	0
354	W.Roxbury/Roslindale YMCA @ Joyce Kilmer	Child Care	Low	No	High	0
355	Welcome Child Care & Preschool Center, Inc	Child Care	Low	No	High	0
356	West Roxbury YMCA @ Lyndon	Child Care	Moderate	No	Low	0
357	Willow Path Childcare	Child Care	Low	No	High	0
358	Scamper Camp	Child Care	Low	No	High	0
359	East Boston - Head Start/Elbow	Child Care	Moderate	No	Low	1
360	East Boston Head Start Social Center	Child Care	Moderate	No	Low	1
361	East Boston Head Start St. Johns	Child Care	Moderate	No	Low	0
362	East Boston Head Start-Bennington	Child Care	Moderate	No	Low	0
363	East Boston Montessori School	Child Care	Moderate	No	Low	2
364	East Boston YMCA @ Alighieri	Child Care	Moderate	No	Low	2
365	East Boston YMCA @ Curtis Guild	Child Care	Moderate	No	Low	0
366	East Boston YMCA @ Samuel Adams	Child Care	Moderate	No	Low	0
367	East Boston YMCA Children's Center & O.S.T. @ Bremen St.	Child Care	Moderate	AE	Low	1
368	East Boston YMCA O.S.T. @ Kennedy School	Child Care	Moderate	No	Low	0
369	East Boston YMCA O.S.T. @ McKay	Child Care	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
370	Harbor Area Early Childhood Service	Child Care	Moderate	No	Low	0
371	Jeffries Point Child Care	Child Care	Moderate	No	Low	0
372	Oh Yes Orient Heights Young Explorers	Child Care	Moderate	No	Low	0
373	Shining Star Day Care	Child Care	Moderate	No	Low	2
374	Swift Waters After School Programs	Child Care	Moderate	No	Low	0
375	Terri's Little Pumpkins II, Inc.	Child Care	Moderate	No	Low	4
376	YMCA East Boston @ Ashley Street Camp	Child Care	Moderate	No	Low	2
377	Citizen Schools @ The Gavin Middle School	Child Care	Moderate	No	Low	0
378	Condon Community Center	BCYF community center	Moderate	No	Low	0
379	Julie's Family Learning Program	Child Care	Moderate	No	Low	0
380	Old Colony Headstart	Child Care	Moderate	No	Low	2
381	South Baptist Head Start	Child Care	Moderate	No	Low	0
382	South Boston Clubhouse After School Day Care	Child Care	Moderate	No	Low	0
383	South Boston Head Start	Child Care	Moderate	No	Low	2
384	South Boston Head Start @ West Broadway	Child Care	Moderate	No	Low	0
385	South Boston Neighborhood House	Child Care	Moderate	No	Low	0
386	South Boston Neighborhood House Preschool	Child Care	Moderate	No	Low	2
387	ALEXANDER HAMILTON	Child Care	Low	No	High	0
388	BOSTON CHILDREN'S SCHOOL ANNEX	Child Care	Moderate	No	Low	2
389	LITTLE PEOPLE'S PLAYHOUSE II	Child Care	Low	No	High	0
390	BRIGHT BEGINNINGS PRESCHOOL	Child Care	Moderate	No	High	0
391	NOTRE DAME MONTESSORI SCHOOL	Child Care	Moderate	No	Low	4
392	BEACON HILL NURSERY SCHOOL	Child Care	Moderate	No	Low	0
393	NAZARETH CHILD CARE CENTER	Child Care	Moderate	No	High	0
394	LITTLE FOLKS COMMUNITY DAY CAR	Child Care	Moderate	No	Low	0
395	WESLEY CHILD CARE CENTER	Child Care	Moderate	No	High	0
396	N.I.C.E. INC.	Child Care	Moderate	No	High	0
397	TRANSPORTATION CHILDREN'S CENT	Child Care	Moderate	No	Low	0
398	GROVE HALL CHILD DEVELOPMENT C	Child Care	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
399	LITTLE SCHOLARS' WORKSHOP, INC	Child Care	Moderate	No	High	0
400	BOSTON CHILDREN'S SCHOOL	Child Care	Moderate	No	Low	0
401	COOPER COMMUNITY CHILD DEVELOP	Child Care	Moderate	No	Low	0
402	BRIDGE CHILDREN'S CENTER	Child Care	Moderate	No	Low	2
403	CHILDREN'S AIDS PROGRAM (SPARK)	Child Care	Moderate	No	High	0
404	CITY HALL DAY CARE	Child Care	Moderate	No	Low	0
405	CITY OF BOSTON/ELLEN JACKSON	Child Care	Moderate	No	Low	0
406	CITY OF BOSTON/PERKIN COMM. CTR.	Child Care	Moderate	No	High	0
407	ELLEN JACKSON DAYCARE CTR.	Child Care	Moderate	No	Low	0
408	FANEUIL AFTER SCHOOL	Child Care	Low	No	High	0
409	JAMAICA PLAIN FOR FOURS	Child Care	Low	No	High	0
410	RED OAK AFTER SCHOOL PROGRAM	Child Care	Moderate	No	Low	0
411	SMALL WONDERS	Child Care	Low	No	High	0
412	SPARKS CENTER	Child Care	Moderate	No	Low	2
413	TINY TOTS	Child Care	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
414	CHILD FOCUS CENTER	Child Care	Moderate	No	Low	0
415	UMASS/BOSTON EARLY LEARNING CE	Child Care	Moderate	No	Low	2
416	TARTT'S DAY CARE CENTER AND PR	Child Care	Moderate	No	Low	0
417	PAIGE ACADEMY AT RCC	Child Care	Moderate	No	Low	0
418	Ethos	Elderly Services	Moderate	No	High	0
419	ABCD Mattapan Family Service Center	Elderly Services	Moderate	No	High	0
420	ABCD North End/West End Neighborhood Service Center	Elderly Services	Moderate	No	Low	0
421	Boston Medical Center	Elderly Services	Moderate	No	Low	2
422	Caritas Good Samaritan Hospice	Elderly Services	Low	No	Low	0
423	Greater Boston Chinese Golden Age Center	Elderly Services	Moderate	No	Low	2
424	Developmental Evaluation and Adjustment Facilities (DEAF)	Elderly Services	Low	No	Low	0
425	ESAC (Ecumenical Social Action Committee, Inc.)	Elderly Services	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
426	Ethos	Elderly Services	Moderate	No	High	0
427	Fenway Community Development Corporation	Elderly Services	Moderate	No	Low	2
428	Fenway Community Development Corporation	Elderly Services	Moderate	No	Low	2
429	Greater Boston Legal Services	Elderly Services	Moderate	No	Low	2
430	HEARTH, Inc.	Elderly Services	Moderate	No	Low	2
431	Inquilinos Boricuas en Accion (IBA)	Elderly Services	Moderate	No	Low	2
432	John F. Kennedy Family Service Center, Inc.	Elderly Services	Moderate	No	Low	0
433	Kit Clark Senior Services Inc.	Elderly Services	Moderate	No	High	0
434	La Alianza Hispana	Elderly Services	Moderate	No	Low	0
435	MAB Community Services, Inc.	Elderly Services	Moderate	No	Low	0
436	Massachusetts Association of Older Americans	Elderly Services	Moderate	No	Low	0
437	Friendship Works	Elderly Services	Moderate	No	Low	0
438	Nuestra Comunidad Development Corporation	Elderly Services	Low	No	High	0
439	South Boston Neighborhood House	Elderly Services	Moderate	No	Low	0
440	United South End Settlements	Elderly Services	Moderate	No	Low	2
441	Upham's Corner Health Center	Elderly Services	Moderate	No	Low	0
442	Ethos	Elderly Services	Moderate	No	High	0
443	Greater Chinese Golden Age Center	Elderly Services	Moderate	No	Low	2
444	Kit Clark Senior Services	Elderly Services	Moderate	No	High	0
445	Chinese Golden Age Center	Elderly Services	Moderate	No	Low	2
446	Ethos	Elderly Services	Moderate	No	High	0
447	Kit Clark Seniorá Services	Elderly Services	Moderate	No	High	0
448	UphamÆs Corner Health Center	Elderly Services	Moderate	No	Low	0
449	Boston Senior Home Care	Elderly Services	Moderate	No	Low	2
450	Central Boston Elder Services	Elderly Services	Moderate	No	Low	0
451	Ethos	Elderly Services	Moderate	No	High	0
452	LGBT Aging Project	Elderly Services	Moderate	No	High	0
453	Massachusetts Society for the Prevention of Cruelty to Children	Elderly Services	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
454	Amory Street	Elderly Services	Moderate	No	High	0
455	Annapolis	Elderly Services	Low	No	High	0
456	Ashmont	Elderly Services	Moderate	No	High	0
457	Ausonia	Elderly Services	Moderate	No	Low	2
458	Bellflower	Elderly Services	Moderate	No	Low	2
459	M.M. Collins	Elderly Services	Moderate	No	High	0
460	Davison	Elderly Services	Moderate	No	High	0
461	Eva White	Elderly Services	Moderate	No	Low	4
462	Foley Apartm	Elderly Services	Moderate	No	Low	0
463	Franklin Fie	Elderly Services	Moderate	No	High	0
464	Frederick Do	Elderly Services	Moderate	No	Low	2
465	General Warr	Elderly Services	Moderate	No	Low	0
466	Groveland Ap	Elderly Services	Moderate	No	High	0
467	Hampton Hous	Elderly Services	Moderate	No	Low	2
468	Hassan Apart	Elderly Services	Low	No	High	0
469	Heritage Apa	Elderly Services	Moderate	No	Low	2
470	Holgate Apar	Elderly Services	Moderate	No	High	0
471	J.J. Meade	Elderly Services	Moderate	No	High	0
472	John J. Carr	Elderly Services	Low	No	High	0
473	Joseph C. Ma	Elderly Services	Low	No	High	0
474	Lower Mills	Elderly Services	Moderate	No	High	0
475	M.L.K Jr. To	Elderly Services	Moderate	No	Low	0
476	Monsignor Po	Elderly Services	Moderate	No	Low	0
477	Pasciucco Ap	Elderly Services	Moderate	No	Low	0
478	Patricia Whi	Elderly Services	Low	No	High	0
479	Peabody/Engl	Elderly Services	Moderate	No	High	0
480	Rockland Tow	Elderly Services	Low	No	High	0
481	Roslyn Apart	Elderly Services	Low	No	High	0
482	Spring Stree	Elderly Services	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
483	St. Botolph	Elderly Services	Moderate	No	Low	2
484	Torre Unidad	Elderly Services	Moderate	No	Low	2
485	Walnut Park	Elderly Services	Moderate	No	High	0
486	91-95 Washin	Elderly Services	Low	No	Low	0
487	Washington M	Elderly Services	Moderate	No	Low	2
488	West Ninth S	Elderly Services	Moderate	No	Low	2
489	ABCD Mattapan Center	Elderly Services	Moderate	No	High	0
490	La Alianza Hispana	Elderly Services	Moderate	No	Low	0
491	Inquilinos Boricuas en Accion	Elderly Services	Moderate	No	Low	2
492	South Boston Neighborhood House	Elderly Services	Moderate	No	Low	0
493	United South End Settlements	Elderly Services	Moderate	No	Low	2
494	Veronica B. Smith	Elderly Services	Low	No	High	0
495	Beacon House-KCSS	Elderly Services	Moderate	No	High	0
496	Arch-KCSS	Elderly Services	Moderate	No	Low	0
497	Morville-KCSS	Elderly Services	Moderate	No	Low	2
498	Emmanuel Church of Boston-Ethos	Elderly Services	Moderate	No	Low	2
499	Main-KCSS	Elderly Services	Moderate	No	Low	2
500	Bellflower-KCSS	Elderly Services	Moderate	No	Low	2
501	Codman-KCSS	Elderly Services	Low	No	High	0
502	Kit Clark-KCSS	Elderly Services	Moderate	No	High	0
503	Lower Mills-KCSS	Elderly Services	Moderate	No	High	0
504	Haitian Multi-Service Yawkey Center-KCSS	Elderly Services	Moderate	No	High	0
505	Vietnamese Center-KCSS	Elderly Services	Low	No	High	0
506	Heritage-KCSS	Elderly Services	Moderate	No	Low	2
507	Christopher Columbus-KCSS	Elderly Services	Moderate	No	Low	2
508	La Alianza Hispana-KCSS	Elderly Services	Moderate	No	Low	0
509	Ruggles-KCSS	Elderly Services	Moderate	No	Low	2
510	Walnut House-KCSS	Elderly Services	Moderate	AE	High	2
511	St. Patrick's-KCSS	Elderly Services	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
512	Amory-Ethos	Elderly Services	Moderate	No	High	0
513	Church of the Holy Spirit-Ethos	Elderly Services	Moderate	No	High	0
514	Condon-KCSS	Elderly Services	Moderate	No	Low	0
515	Curley-KCSS	Elderly Services	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
516	Cardinal Medeiros Center-KCSS	Elderly Services	Moderate	No	Low	2
517	People's Baptist-KCSS	Elderly Services	Moderate	No	Low	2
518	Anna Bissonnette House- KCSS	Elderly Services	Moderate	No	Low	2
519	Unity Towers-KCSS	Elderly Services	Moderate	No	Low	2
520	Farnsworth-Ethos	Elderly Services	Moderate	No	Low	2
521	Back of the Hill Apartments- Ethos	Elderly Services	Moderate	No	Low	0
522	Nate Smith House-Ethos	Elderly Services	Moderate	No	High	0
523	Victorian House-CGAC	Elderly Services	Low	No	High	0
524	Joseph Malone-Ethos	Elderly Services	Low	No	High	0
525	Roslindale House-Ethos	Elderly Services	Low	No	High	0
526	Woodbourne Apartments- Ethos	Elderly Services	Moderate	No	High	0
527	Rockingham Glen-Ethos	Elderly Services	Low	No	High	0
528	Roche Center-Ethos	Elderly Services	Low	No	High	0
529	Hong Lok House-CGAC	Elderly Services	Moderate	No	Low	0
530	Boston Rehabilitation Association	Elderly Services	Low	No	Low	0
531	McNamara House Apartments	Elderly Services	Moderate	No	Low	0
532	Brighton Garden Apartments	Elderly Services	Moderate	No	Low	2
533	Wallingford Housing Apartments	Elderly Services	Low	No	High	0
534	Convenant House Apartments	Elderly Services	Moderate	No	High	0
535	Patricia White Apartments	Elderly Services	Low	No	High	0
536	Reservoir Towers	Elderly Services	Low	No	High	0
537	Beacon House	Elderly Services	Moderate	No	High	0
538	Bowdoin School Apartments	Elderly Services	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
539	Anderson Apartments	Elderly Services	Moderate	No	Low	0
540	Spencer House	Elderly Services	Moderate	No	High	0
541	Constitution Co-Op Development	Elderly Services	Moderate	No	Low	4
542	Charles Newton Apartments	Elderly Services	Moderate	No	Low	4
543	Building 104	Elderly Services	Moderate	No	Low	2
544	Ferrin Street Apartments	Elderly Services	Moderate	No	Low	0
545	Anchorage Apartments	Elderly Services	Moderate	No	Low	2
546	Mary Colbert	Elderly Services	Moderate	No	Low	0
547	Basilica	Elderly Services	Moderate	No	Low	2
548	Hong Luck	Elderly Services	Moderate	No	Low	0
549	Quincy Tower	Elderly Services	Moderate	No	Low	0
550	South East	Elderly Services	Moderate	No	Low	0
551	South Cove West	Elderly Services	Moderate	No	Low	2
552	Savin Hill Apartments	Elderly Services	Moderate	No	Low	4
553	Keystone Apartments	Elderly Services	Moderate	No	High	0
554	Adams Templeton Apartments	Elderly Services	Moderate	No	High	0
555	Templeton Apartments	Elderly Services	Moderate	No	High	0
556	Kelly House Apartments	Elderly Services	Moderate	No	Low	0
557	Catherine Clark Apartments	Elderly Services	Moderate	No	Low	0
558	Cardinal Mederios Manor	Elderly Services	Moderate	No	Low	0
559	Ameff Housing	Elderly Services	Moderate	No	High	0
560	Garridon School	Elderly Services	Moderate	No	High	0
561	Harbor Point- Housing-Harbour Point Dept of Public Safety	Elderly Services	Moderate	No	Low	2
562	Talbot and Bernard Apartments	Elderly Services	Moderate	No	High	0
563	Fieldstone Apartments	Elderly Services	Moderate	No	High	0
564	Geneva Avenue	Elderly Services	Moderate	No	High	0
565	Chauncy House	Elderly Services	Moderate	No	Low	0
566	Mason Place	Elderly Services	Low	No	High	0
567	Stearns	Elderly Services	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
568	Landfall Apartments	Elderly Services	Moderate	AE	Low	1
569	Landfall West Apartments	Elderly Services	Moderate	No	Low	0
570	Barnes School Apartments	Elderly Services	Moderate	No	Low	0
571	Victory Gardens Apartments	Elderly Services	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
572	Chevrus Apartments	Elderly Services	Moderate	No	Low	0
573	Woodbury Cunard Apartments	Elderly Services	Moderate	No	Low	2
574	The Lyman School Apartments	Elderly Services	Moderate	No	Low	2
575	Kenmore Abbey Apartments	Elderly Services	Moderate	No	Low	2
576	St. Cecilia's House	Elderly Services	Moderate	No	Low	2
577	Morville House	Elderly Services	Moderate	No	Low	2
578	Norway Housing Apartments	Elderly Services	Moderate	No	Low	2
579	Symphony Plaza East Apartments	Elderly Services	Moderate	No	Low	0
580	Symphony Plaza West Apartments	Elderly Services	Moderate	No	Low	2
581	Hemenway Apartments	Elderly Services	Moderate	No	Low	2
582	Wait Street Apartments	Elderly Services	Moderate	No	Low	0
583	Blake Estates Associates I & II	Elderly Services	Low	No	High	0
584	Georgetown Housing	Elderly Services	Low	No	High	0
585	Riley House	Elderly Services	Low	No	High	0
586	Forbes Building	Elderly Services	Moderate	No	High	0
587	Nate Smith	Elderly Services	Moderate	No	High	0
588	Farnsworth House Apartments	Elderly Services	Moderate	No	Low	2
589	Woodbourne Housing	Elderly Services	Moderate	No	High	0
590	Jamaica Plain CO-OP Apartments	Elderly Services	Moderate	No	High	0
591	Angela Westover	Elderly Services	Moderate	No	High	0
592	The Foley Apartments	Elderly Services	Moderate	No	High	0
593	Mattapan School House Association	Elderly Services	Low	No	High	0
594	Mattapan Center for Life	Elderly Services	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
595	Flynn House	Elderly Services	Moderate	No	Low	0
596	Back of the Hill	Elderly Services	Moderate	No	Low	0
597	Casa Maria Apartments	Elderly Services	Moderate	No	Low	2
598	Villa Michelangelo Apartments	Elderly Services	Moderate	No	Low	0
599	Conway Court	Elderly Services	Low	No	High	0
600	Longfellow House	Elderly Services	Low	No	High	0
601	Roslindale House	Elderly Services	Low	No	High	0
602	Council of Elders Towers	Elderly Services	Moderate	No	Low	2
603	Smith House Apartments	Elderly Services	Moderate	No	Low	0
604	Marcus Garvey Gardens Apartments	Elderly Services	Moderate	No	Low	0
605	Robert L. Fortes Apartments	Elderly Services	Moderate	No	Low	2
606	Restoration House Apartments	Elderly Services	Moderate	No	Low	0
607	Baker Manor	Elderly Services	Moderate	No	Low	0
608	Walnut House	Elderly Services	Moderate	No	Low	0
609	Castle Cove Apartments	Elderly Services	Moderate	No	Low	4
610	Flaherty Apartments	Elderly Services	Moderate	No	Low	0
611	John Boyle O'Reilly School	Elderly Services	Moderate	No	Low	0
612	Ebenezer House Apartments	Elderly Services	Moderate	No	Low	2
613	Franklin Square House	Elderly Services	Moderate	No	Low	2
614	Concord House Apartments	Elderly Services	Moderate	No	Low	2
615	St. Botolph Terr. Apartments	Elderly Services	Moderate	No	Low	0
616	St. Helena's House	Elderly Services	Moderate	No	Low	2
617	St. Cecilia's House	Elderly Services	Moderate	No	Low	2
618	Blackstone	Elderly Services	Moderate	No	Low	0
619	Anderson Park Apartments	Elderly Services	Moderate	No	Low	0
620	Amy Lowell Apartments	Elderly Services	Moderate	No	Low	0
621	Rockingham Glen Apartments	Elderly Services	Low	No	High	0
622	Cheriton Grove Apartments	Elderly Services	Low	No	High	0
623	Boston Medical Center Elders Living at Home Program -	Homeless Shelters	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
	Woods Mullen Shelter					
624	CRITTENTON HASTINGS HOUSE	Homeless Shelters	Low	No	High	0
625	MASS. DEPT. OF TRANSITIONAL ASSISTANCE	Homeless Shelters	Moderate	No	Low	2
626	SANCTA MARIA HOME	Homeless Shelters	Moderate	No	Low	2
627	CARDINAL MEDEIROS CENTER	Homeless Shelters	Moderate	No	Low	2
628	LIFEHOUSE	Homeless Shelters	Moderate	No	Low	0
629	KIT CLARK SENIOR SERVICES	Homeless Shelters	Moderate	No	High	0
630	New England Center for Homeless Veterans ááá	Homeless Shelters	Moderate	No	Low	0
631	TRAVELERS AID SOCIETY	Homeless Shelters	Moderate	No	Low	2
632	BROOKVIEW HOUSE TRANSITIONAL HSNG PRGM.	Homeless Shelters	Moderate	No	High	0
633	ROXBURY FAMILY SHELTER	Homeless Shelters	Moderate	No	Low	0
634	24 HOUR CHILD/AT RISK HOTLINE	Homeless Shelters	Moderate	No	Low	1
635	HOLY FAMILY	Homeless Shelters	Moderate	No	Low	0
636	CARDINAL MEDEIROS CENTER áááá	Homeless Shelters	Moderate	No	Low	2
637	CATHOLIC CHARITIES	Homeless Shelters	Moderate	No	High	0
638	MASS BAY CHAPTER AMERICAN RED CROSS	Homeless Shelters	Moderate	No	Low	0
639	DONATION ASSISTANCE	Homeless Shelters	Moderate	0.2 PCT ANNUAL CHANCE	Low	1
640	BOSTON NIGHT CENTER	Homeless Shelters	Moderate	No	Low	0
641	BOSTON YMCA EMERGENCY ROOMS PROGRAM	Homeless Shelters	Moderate	No	Low	2
642	PROJECT PLACE PROGRAM FOR THE HOMELESS	Homeless Shelters	Moderate	No	Low	2
643	TRANSITION THRIFT STORE	Homeless Shelters	Moderate	No	High	0
644	WOMEN UNIT SHELTER	Homeless Shelters	Moderate	No	Low	2
645	REVISION HOUSE	Homeless Shelters	Moderate	No	High	0
646	SAINT FRANCIS HOUSE DAY CENTER	Homeless Shelters	Moderate	No	Low	0
647	KINGSTON HOUSE	Homeless Shelters	Moderate	No	Low	0
648	BOSTON YWCA BETTY'S PLACE	Homeless Shelters	Moderate	No	Low	2
649	QUEEN OF PEACE	Homeless Shelters	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
650	HARBORLIGHT SALVATION ARMY SHELTER	Homeless Shelters	Moderate	No	Low	2
651	CHARDON STREET SHELTER	Homeless Shelters	Moderate	No	Low	0
652	PINE STREET INN	Homeless Shelters	Moderate	No	Low	2
653	PROJECT HOPE SISTERS OF THE ASSUMPTION	Homeless Shelters	Moderate	No	Low	0
654	CHILDREN'S SERVICES OF ROXBURY	Homeless Shelters	Moderate	No	Low	0
655	CASA NUEVA VIDA	Homeless Shelters	Moderate	No	High	0
656	PILGRIM CHURCH SHELTER-CHILDREN'S SERVICES	Homeless Shelters	Moderate	No	Low	0
657	CROSSROADS FAMILY SHELTER	Homeless Shelters	Moderate	No	Low	2
658	METROPOLITAN BOSTON HOUSING PARTNERSHIP, INC.	Homeless Shelters	Moderate	No	Low	2
659	LIFEHOUSE HOUSING SEARCH, INC.	Homeless Shelters	Moderate	No	Low	0
660	BOSTON FAMILY SHELTER	Homeless Shelters	Moderate	No	Low	2
661	SOJOURNER HOUSE	Homeless Shelters	Moderate	No	Low	0
662	ROSIE'S PLACE	Homeless Shelters	Moderate	No	Low	2
663	ST. MARY'S HOME	Homeless Shelters	Moderate	No	Low	0
664	NAZARETH HOUSE	Homeless Shelters	Moderate	No	Low	0
665	Emergency Shelter Commission	Homeless Shelters	Moderate	No	Low	0
667	HOLY FAMILY SHELTER	Homeless Shelters	Moderate	No	Low	0
669	FAMILY HOUSE SHELTER	Homeless Shelters	Moderate	No	High	0
670	ALPHONSUS HOUSE	Homeless Shelters	Moderate	No	Low	0
671	DIMMOCK UMMIS BOSTON CARES	Homeless Shelters	Moderate	No	Low	0
672	CASA ESPERANZA	Homeless Shelters	Moderate	No	Low	0
673	WOMENS LUNCH PLACE	Homeless Shelters	Moderate	No	Low	2
674	SOLOMAN CARTER FULLER HEALTH	Homeless Shelters	Moderate	No	Low	4
675	WOMENS HOPE (VICTORY PROG)	Homeless Shelters	Moderate	No	Low	0
676	TEEN LIVING AT INDEPENDENCE	Homeless Shelters	Moderate	No	Low	0
677	METRO BOSTON HOUSING PARTNERSHIP	Homeless Shelters	Moderate	No	Low	2
678	FINEX	Homeless Shelters	Moderate	No	High	0
679	CHARLESTOWN RECOVERY HOUSE	Homeless Shelters	Moderate	No	Low	2
680	DENNIS MCLAUGHLIN HOUSE	Homeless Shelters	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
681	RENEWAL HOUSE	Homeless Shelters	Moderate	No	Low	0
682	HRDI FIRST ACADEMY	Homeless Shelters	Moderate	No	Low	0
683	MILLENIUM HOUSE SECOND HOME	Homeless Shelters	Moderate	No	Low	0
684	INTERIM HOUSE (JOHN FLOWERS RECOVERY)	Homeless Shelters	Moderate	No	High	0
685	ENTRE FAMILIA *REHAB	Homeless Shelters	Moderate	No	High	0
686	PORTIS FAMILY HOME	Homeless Shelters	Moderate	No	High	0
687	SHEPHARD HOUSE	Homeless Shelters	Moderate	No	Low	0
688	HAMILTON HOUSE	Homeless Shelters	Moderate	No	Low	0
689	WEST END HOUSE * Lindemann Hospital	Homeless Shelters	Moderate	No	Low	0
690	MERIDIAN HOUSE	Homeless Shelters	Moderate	No	Low	0
691	BRIDGE OVER TROUBLED WATERS	Homeless Shelters	Moderate	No	Low	0
692	MILLENIUM HOUSE SECOND HOME DAY CARE	Homeless Shelters	Moderate	No	Low	0
693	ANSWER HOUSE	Homeless Shelters	Moderate	No	Low	0
694	SHILOH HOUSE	Homeless Shelters	Moderate	No	High	0
695	NEW HORIZON HOUSE	Homeless Shelters	Moderate	No	High	0
696	ALTERNATIVE (MONMOUTH SQR)	Homeless Shelters	Moderate	No	Low	0
697	CHILDREN'S SERVICES	Homeless Shelters	Moderate	No	Low	0
698	CUSHING HOUSE	Homeless Shelters	Moderate	No	Low	2
699	DIMMOCK MARY ELIZA MAHONEY SHELTER	Homeless Shelters	Moderate	No	High	0
700	PROJECT HOPE	Homeless Shelters	Moderate	No	Low	0
701	VICTROY HOUSE	Homeless Shelters	Moderate	No	High	0
702	SULLIVAN HOUSE	Homeless Shelters	Moderate	No	High	0
703	GAVIN HOUSE	Homeless Shelters	Moderate	No	Low	0
704	HELLO HOUSE- MEN	Homeless Shelters	Moderate	No	Low	2
705	GRANADA HOUSE	Homeless Shelters	Low	No	High	0
706	MASS MENTAL HEALTH CENTER Hospital	Homeless Shelters	Moderate	No	Low	0
707	HOPE HOUSE	Homeless Shelters	Moderate	No	Low	2
708	ELIZABETH STONE HOUSE- FIRST ACADEMY	Homeless Shelters	Moderate	No	High	0
709	UNITED HOMES SECOND HOMES	Homeless Shelters	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
710	NEW VICTORIES	Homeless Shelters	Moderate	No	Low	0
711	PARKWELL NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
712	FAIRMOUNT REST HOME INCORPORATED	Nursing Homes/Assisted Living	Low	No	High	0
713	PARK PLACE REHABILITATION AND SKILLED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
714	ROSCOMMON WEST ROXBURY EXTENDED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
715	ROSCOMMON EXTENDED CARE CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
716	STANDISH VILLAGE AT LOWER MILLS	Nursing Homes/Assisted Living	Moderate	No	High	0
717	THE FOLEY SENIOR RESIDENCES	Nursing Homes/Assisted Living	Moderate	No	High	0
718	EDELWEISS VILLAGE	Nursing Homes/Assisted Living	Low	No	High	0
719	DEUTSCHES ALTENHEIM GERMAN CENTRE FOR EXTENDED CARE	Nursing Homes/Assisted Living	Low	No	High	0
720	THE BOSTON HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
721	ROSCOMMON ON THE PARKWAY EXTENDED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
722	BOSTONIAN NURSING CARE AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Moderate	No	High	4
723	STONEHEDGE REHABILITATION AND SKILLED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
724	MELVILLE REST HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
725	SAINT JOSEPH NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
726	HEBREW REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
727	SOPHIA SNOW HOUSE	Nursing Homes/Assisted Living	Low	No	High	0
728	SPRINGHOUSE	Nursing Homes/Assisted Living	Low	No	High	0
729	ANNS REST HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
730	LAUREL RIDGE REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
731	ARMENIAN NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
732	BURGOYNE REST HOME	Nursing Homes/Assisted Living	Moderate	No	Low	0
733	CUSHING MANOR COMMUNITY SUPPORT FACILITY	Nursing Homes/Assisted Living	Moderate	No	Low	0
734	ROGERSON HOUSE	Nursing Homes/Assisted Living	Moderate	No	High	0
735	MOUNT PLEASANT HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
736	GODDARD HOUSE SKILLED NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
737	BENJAMIN HEALTHCARE CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
738	SHERRILL HOUSE	Nursing Homes/Assisted Living	Moderate	No	Low	0
739	LANDMARK AT LONGWOOD	Nursing Homes/Assisted Living	Moderate	No	Low	0
740	THE BAYVIEW	Nursing Homes/Assisted Living	Moderate	No	Low	0
741	RUGGLES ASSISTED LIVING	Nursing Homes/Assisted Living	Moderate	No	Low	2
742	HARBORLIGHTS REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	0
743	MARIAN MANOR	Nursing Homes/Assisted Living	Moderate	No	Low	0
744	CHESTNUT PARK AT CLEVELAND CIRCLE	Nursing Homes/Assisted Living	Low	No	High	0
745	SUSAN BAILIS ASSISTED LIVING COMMUNITY	Nursing Homes/Assisted Living	Moderate	No	Low	0
746	BRIGHTON HOUSE REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Low	No	Low	0
747	PROVIDENCE HOUSE AT COREY PARK	Nursing Homes/Assisted Living	Low	No	Low	0
748	COREY HILL NURSING HOME	Nursing Homes/Assisted Living	Low	No	Low	0
749	SOUTH COVE MANOR NURSING AND REHABILITATION CTR.	Nursing Homes/Assisted Living	Moderate	No	Low	4
750	HALE HOUSE	Nursing Homes/Assisted Living	Moderate	No	Low	2
751	WINGATE AT BRIGHTON	Nursing Homes/Assisted Living	Low	No	High	0
752	PRESENTATION NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
753	NORTH END REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	2
754	ZELMA LACEY HOUSE OF CHARLESTOWN	Nursing Homes/Assisted Living	Moderate	No	Low	2
755	DON ORIONE HOME	Nursing Homes/Assisted Living	Moderate	No	Low	0
756	HANCOCK SKILLED NURSING & REHAB CTR	Nursing Homes/Assisted Living	Moderate	No	Low	0
757	JORDAN REHABILITATION & NURS CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	0
758	POND VIEW NURSING FACILITY	Nursing Homes/Assisted Living	Moderate	No	Low	0
759	RECUPERATIVE SERVICES UNIT	Nursing Homes/Assisted Living	Low	No	High	0
760	Alumni Stadium-Conte Forum (Boston College Eagles)	Public Venues	Low	No	High	0
761	Fenway Park	Public Venues	Moderate	No	Low	2
762	Mathews Arena (Northeastern Huskies)	Public Venues	Moderate	No	Low	2
763	Case Athletic Gymnasium (The Roof)-Nickerson Field	Public Venues	Moderate	No	Low	0
764	Lavietes Pavilion (Harvard Crimson)	Public Venues	Low	No	High	1
765	TD Garden Center	Public Venues	Moderate	No	Low	1
766	Boston Convention & Exhibition Ctr	Public Venues	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
767	Hynes Veterans Mem'l Convention Ctr	Public Venues	Moderate	No	Low	0
768	George R White Schoolboy Stadium	Public Venues	Moderate	No	High	0
769	Reginald Lewis Athletic Center	Public Venues	Moderate	No	Low	0
770	Matthews Arena	Public Venues	Moderate	No	Low	2
771	Harvard Stadium-Murr Center	Public Venues	Low	No	High	2
772	Briggs Cage	Public Venues	Low	No	High	1
773	Blodgett Pool	Public Venues	Low	No	High	2
774	Gordon Indoor Track & Tennis	Public Venues	Low	No	High	1
775	Dillon Field House	Public Venues	Low	No	High	1
776	Bright Hockey Center	Public Venues	Low	No	High	1
777	Palmer Dixon Courts	Public Venues	Low	No	High	1
778	Suffolk Downs	Public Venues	Moderate	No	Low	0
779	Adult Literacy Resource Center	Special-Institutional	Low	No	High	0
780	Ancient & Honorable Artillery	General Institution	Moderate	No	Low	2
781	Angell Memorial Animal Hospital\MSPCA Library, Archives	Animal Hospital	Moderate	No	High	0
782	Baruj Benacerraf Library	Special-Medical	Moderate	No	Low	0
783	Boston, City Clerk	Town Hall	Moderate	No	Low	0
784	Boston Athenaeum	Special	Low	No	Low	0
785	Boston Museum	Museum	Moderate	No	Low	0
786	Boston Opera House	Various	Low	No	High	0
787	Boston Public Library	Public Library	Moderate	No	Low	2
788	Boston University Art Gallery	Gallery	Moderate	No	Low	0
789	Bostonian Society	General Institution	Moderate	No	Low	0
790	Kessler Health Education Library	Special-Medical	Moderate	No	Low	0
791	Bunker Hill Community College Art Gallery	Gallery	Moderate	No	Low	0
792	Central Libraryssachusetts Department of Public Health	Special-Medical	Moderate	No	Low	0
793	Chapter 91 Waterways Research Room	Various	Moderate	No	Low	0
794	The Children's Hospital Boston Library	Special-Medical	Moderate	No	Low	0
795	Children's Museum Resource Center	Museum	Moderate	No	Low	1

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
796	Christian Science Monitor Library	Special	Moderate	No	Low	2
797	Commonwealth Museum	Museum	Moderate	No	Low	0
798	Congregational Library	Religious Institution/Archive	Low	No	High	0
799	Dr. Arnold L. Segel Library Center	Religious Institution/Archive	Moderate	No	Low	0
800	Ingersoll Bowditch Medical Library	Special-Medical	Low	No	High	0
801	Federal Reserve Bank of Boston Research Library	Special	Moderate	No	Low	2
802	Franklin Park Zoo Library	Special	Moderate	No	High	0
803	Frederick Ayer Mansion	Historic House/Site	Moderate	No	Low	2
804	Gibson House Museum	Historic House/Site	Moderate	No	Low	2
805	Harvard Musical Association Library	Special	Moderate	No	Low	0
806	Isabella Stewart Gardner Museum	Museum	Moderate	No	Low	2
807	Jewish Community Relations Council of Greater Boston	Religious Institution/Archive	Moderate	No	Low	0
808	John F. Kennedy Presidential Library & Museum	Museum	Moderate	No	Low	4
809	Main Gallery	Gallery	Low	No	High	2
810	Mary Baker Eddy Library	Religious Institution/Archive	Moderate	No	Low	2
811	Mass. Cultural Council	General Institution	Moderate	No	Low	2
812	Massachusetts Historical Society	Historical Society	Moderate	No	Low	4
813	Massachusetts Water Resources Authority Library	Special	Moderate	No	Low	2
814	Museum of Fine Arts, Boston	Museum	Moderate	No	Low	2
815	Museum of Science	Museum	Moderate	No	Low	4
816	New England Aquarium Library	Special	Moderate	AE	Low	2
817	New England Historic Genealogical Society	Historical Society	Moderate	No	Low	2
818	Nichols House Museum	Museum	Moderate	No	Low	0
819	Old South Meeting House	Historic House/Site	Moderate	No	Low	0
820	Paul E. Woodard Health Sciences Library	Special-Medical	Moderate	No	Low	0
821	Paul Revere Memorial Association	General Institution	Moderate	No	Low	0
822	Percy Howe Memorial Library	Special	Moderate	No	Low	2
823	South End Historical Society	Historical Society	Moderate	No	Low	2
824	Spaulding Rehabilitation Hospital Medical Library	Special-Medical	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
825	State Laboratory Institute Medical Center Library	Special-Medical	Moderate	No	High	0
826	State Library of Massachusetts	Special	Moderate	No	Low	0
827	State Transportation Library	Special	Moderate	No	Low	2
828	Suffolk County House of Corrections Library	Special	Moderate	No	Low	2
829	The Boston Baha'i Community	Religious Institution/Archive	Moderate	No	Low	2
830	The Cutler Majestic Theater at Emerson College	Various	Moderate	No	Low	0
831	The Freedom Trail Foundation	General Institution	Moderate	No	Low	0
832	The French Library	Special	Moderate	No	Low	2
833	Samuel Crocker Lawrence Library	Special	Moderate	No	Low	2
834	Trinity Church in the City of Boston	Religious Institution/Archive	Moderate	No	Low	2
835	USS Constitution Museum	Museum	Moderate	No	Low	2
836	Vilna Shul, Boston's Center for Jewish Culture	Religious Institution/Archive	Moderate	No	Low	0
837	World Education/SABES Resource Center	Special	Moderate	No	Low	1
838	The Forest Hills Educational Trust	Various	Moderate	No	High	0
839	Doheney Libraries	Various	Low	No	High	0
840	Stohlman Library	Various	Low	No	High	0
841	Boston CSJ Archives	Various	Low	No	High	0
842	Boston National Historic Park	Historic House/Site	Moderate	AE	Low	2
843	Colpoys Library	Various	Moderate	No	High	0
844	Dorchester Historical Society	Various	Moderate	No	Low	0
845	East Library	Various	Low	No	High	0
846	Bettencourt Medical Library	Various	Moderate	No	High	0
847	Wayne S. Wright Community Resource Center Lib	Various	Moderate	No	Low	0
848	Arnold Arboretum	Various	Moderate	No	High	0
849	Loring-Greenough House	Various	Low	No	High	0
850	Roslindale Historical Society	Various	Low	No	High	0
851	City of Boston Archives-Mass. Professional Psychology Library	Various	Low	No	High	0
852	Religious institution	Faith Based	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
853	Religious institution	Faith Based	Moderate	No	High	0
854	Religious institution	Faith Based	Moderate	No	High	0
855	Religious institution	Faith Based	Moderate	No	Low	0
856	Religious institution	Faith Based	Moderate	No	High	0
857	Religious institution	Faith Based	Moderate	No	High	0
858	Religious institution	Faith Based	Moderate	No	High	0
859	Religious institution	Faith Based	Moderate	No	Low	0
860	Religious institution	Faith Based	Moderate	No	High	0
861	Religious institution	Faith Based	Moderate	No	Low	0
862	Religious institution	Faith Based	Moderate	No	High	0
863	Religious institution	Faith Based	Moderate	No	Low	0
864	Religious institution	Faith Based	Moderate	No	Low	0
865	Religious institution	Faith Based	Moderate	No	Low	0
866	Religious institution	Faith Based	Moderate	No	Low	0
867	Religious institution	Faith Based	Moderate	No	Low	0
868	Religious institution	Faith Based	Moderate	No	High	0
869	Religious institution	Faith Based	Moderate	No	High	0
870	Religious institution	Faith Based	Moderate	No	Low	2
871	Religious institution	Faith Based	Moderate	No	Low	0
872	Religious institution	Faith Based	Moderate	No	High	0
873	Religious institution	Faith Based	Low	No	High	0
874	Religious institution	Faith Based	Moderate	No	High	0
875	Religious institution	Faith Based	Moderate	No	High	0
876	Religious institution	Faith Based	Moderate	No	Low	0
877	Religious institution	Faith Based	Moderate	No	Low	0
878	Religious institution	Faith Based	Low	No	High	0
879	Religious institution	Faith Based	Moderate	No	High	0
880	Religious institution	Faith Based	Moderate	No	High	0
881	Religious institution	Faith Based	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
882	St Joseph & Lazarus Church	Faith Based	Moderate	No	Low	4
883	Religious institution	Faith Based	Moderate	No	High	0
884	Religious institution	Faith Based	Moderate	No	Low	0
885	Religious institution	Faith Based	Moderate	No	Low	0
886	Religious institution	Faith Based	Moderate	No	High	0
887	Religious institution	Faith Based	Moderate	No	Low	0
888	Religious institution	Faith Based	Moderate	No	High	0
889	Religious institution	Faith Based	Moderate	No	High	0
890	Religious institution	Faith Based	Low	No	High	0
891	Religious institution	Faith Based	Moderate	No	Low	0
892	Religious institution	Faith Based	Low	No	High	0
893	Religious institution	Faith Based	Low	No	High	0
894	Religious institution	Faith Based	Moderate	No	High	0
895	Religious institution	Faith Based	Moderate	No	High	0
896	Religious institution	Faith Based	Moderate	No	Low	0
897	Religious institution	Faith Based	Moderate	No	Low	2
898	Religious institution	Faith Based	Moderate	No	Low	0
899	Religious institution	Faith Based	Moderate	No	Low	2
900	Religious institution	Faith Based	Low	No	High	0
901	Religious institution	Faith Based	Moderate	No	Low	0
902	Religious institution	Faith Based	Moderate	No	Low	0
903	Religious institution	Faith Based	Moderate	No	High	0
904	Religious institution	Faith Based	Moderate	No	High	0
905	Religious institution	Faith Based	Moderate	No	Low	0
906	mosque	Faith Based	Moderate	No	High	0
907	Religious institution	Faith Based	Moderate	No	Low	4
908	Religious institution	Faith Based	Moderate	No	Low	0
909	Religious institution	Faith Based	Moderate	No	Low	2
910	Religious institution	Faith Based	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
911	Religious institution	Faith Based	Low	No	Low	0
912	Religious institution	Faith Based	Moderate	No	Low	0
913	Religious institution	Faith Based	Moderate	No	High	0
914	Religious institution	Faith Based	Moderate	No	Low	0
915	Religious institution	Faith Based	Moderate	No	High	0
916	Religious institution	Faith Based	Moderate	No	High	0
917	Religious institution	Faith Based	Low	No	High	0
918	Religious institution	Faith Based	Moderate	No	Low	0
919	Religious institution	Faith Based	Moderate	No	High	0
920	Religious institution	Faith Based	Moderate	No	Low	2
921	Religious institution	Faith Based	Moderate	No	Low	0
922	Religious institution	Faith Based	Moderate	No	Low	0
923	Religious institution	Faith Based	Moderate	No	Low	2
924	Religious institution	Faith Based	Moderate	No	High	0
925	Religious institution	Faith Based	Moderate	No	High	0
926	Religious institution	Faith Based	Moderate	No	Low	0
927	Religious institution	Faith Based	Moderate	No	High	0
928	Religious institution	Faith Based	Moderate	No	Low	0
929	Religious institution	Faith Based	Moderate	No	Low	4
930	Religious institution	Faith Based	Low	No	Low	0
931	Religious institution	Faith Based	Moderate	No	High	0
932	Religious institution	Faith Based	Moderate	No	Low	2
933	Religious institution	Faith Based	Moderate	No	Low	2
934	Religious institution	Faith Based	Moderate	No	Low	0
935	Religious institution	Faith Based	Low	No	High	0
936	Religious institution	Faith Based	Low	No	High	0
937	Religious institution	Faith Based	Low	No	High	0
938	Religious institution	Faith Based	Low	No	High	0
939	Religious institution	Faith Based	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
940	Religious institution	Faith Based	Moderate	No	High	0
941	Religious institution	Faith Based	Moderate	No	High	0
942	Religious institution	Faith Based	Low	No	High	0
943	Religious institution	Faith Based	Moderate	No	Low	0
944	Religious institution	Faith Based	Low	No	High	0
945	Religious institution	Faith Based	Moderate	No	High	0
946	Religious institution	Faith Based	Moderate	No	Low	0
947	Religious institution	Faith Based	Low	No	High	0
948	Religious institution	Faith Based	Moderate	No	Low	0
949	Religious institution	Faith Based	Moderate	No	High	0
950	Religious institution	Faith Based	Moderate	No	Low	0
951	Religious institution	Faith Based	Moderate	No	Low	2
952	Religious institution	Faith Based	Moderate	No	Low	0
953	Religious institution	Faith Based	Moderate	No	High	0
954	Religious institution	Faith Based	Moderate	No	Low	4
955	Religious institution	Faith Based	Moderate	No	Low	0
956	Religious institution	Faith Based	Moderate	No	Low	0
957	Religious institution	Faith Based	Moderate	No	High	0
958	Religious institution	Faith Based	Moderate	No	High	0
959	Religious institution	Faith Based	Moderate	No	High	0
960	Religious institution	Faith Based	Moderate	No	High	0
961	Religious institution	Faith Based	Moderate	No	Low	4
962	Religious institution	Faith Based	Moderate	No	Low	2
963	Religious institution	Faith Based	Moderate	No	Low	2
964	Religious institution	Faith Based	Moderate	No	Low	2
965	Religious institution	Faith Based	Moderate	No	Low	2
966	Religious institution	Faith Based	Moderate	No	High	0
967	Religious institution	Faith Based	Moderate	No	Low	0
968	Religious institution	Faith Based	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
969	Religious institution	Faith Based	Moderate	No	High	0
970	Religious institution	Faith Based	Moderate	No	High	0
971	Religious institution	Faith Based	Moderate	No	High	0
972	Religious institution	Faith Based	Low	No	High	0
973	Religious institution	Faith Based	Low	No	Low	0
974	Religious institution	Faith Based	Moderate	No	Low	2
975	Religious institution	Faith Based	Moderate	No	High	0
976	Religious institution	Faith Based	Moderate	No	Low	2
977	Religious institution	Faith Based	Moderate	No	High	0
978	Religious institution	Faith Based	Moderate	No	Low	0
979	Religious institution	Faith Based	Moderate	No	Low	0
980	Religious institution	Faith Based	Moderate	No	High	0
981	Religious institution	Faith Based	Low	No	High	0
982	Church	Faith Based	Moderate	No	High	0
983	Religious institution	Faith Based	Moderate	No	High	0
984	Religious institution	Faith Based	Moderate	No	High	0
985	Religious institution	Faith Based	Moderate	No	High	0
986	Religious institution	Faith Based	Moderate	No	Low	2
987	Religious institution	Faith Based	Moderate	No	Low	0
988	Religious institution	Faith Based	Moderate	No	Low	2
989	Religious institution	Faith Based	Moderate	No	Low	2
990	Religious institution	Faith Based	Moderate	No	High	0
991	Religious institution	Faith Based	Moderate	No	High	0
992	Religious institution	Faith Based	Low	No	High	0
993	Religious institution	Faith Based	Low	No	High	0
994	Religious institution	Faith Based	Moderate	No	Low	0
995	Religious institution	Faith Based	Moderate	No	High	0
996	Religious institution	Faith Based	Moderate	No	Low	0
997	Religious institution	Faith Based	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
998	Religious institution	Faith Based	Moderate	No	High	0
999	Religious institution	Faith Based	Moderate	No	High	0
1000	West End Library	Public Library	Moderate	No	Low	0
1001	Codman Square Library	Public Library	Moderate	No	High	0
1002	Hyde Park Library	Public Library	Low	No	High	0
1003	Connolly Library	Public Library	Moderate	No	High	0
1004	Dudley Library	Public Library	Moderate	No	Low	0
1005	Kirstein Business Branch Library	Public Library	Moderate	No	Low	0
1006	North End Library	Public Library	Moderate	No	Low	0
1007	South End Library	Public Library	Moderate	No	Low	2
1008	Allston Library	Public Library	Low	No	Low	0
1009	Brighton Library	Public Library	Low	No	High	0
1010	Faneuil Library	Public Library	Low	No	High	0
1011	Charlestown Library	Public Library	Moderate	No	Low	0
1012	Adams Street Library	Public Library	Moderate	No	High	0
1013	Fields Corner Library	Public Library	Moderate	No	High	0
1014	Lower Mills Library	Public Library	Moderate	No	High	0
1015	Uphams Corner Library	Public Library	Moderate	No	Low	0
1016	East Boston Library	Public Library	Moderate	No	Low	0
1017	Orient Heights Library	Public Library	Moderate	No	Low	0
1018	Jamaica Plain Library	Public Library	Moderate	No	High	0
1019	Mattapan Library	Public Library	Moderate	No	High	0
1020	Roslindale Library	Public Library	Low	No	High	0
1021	Egleston Square Library	Public Library	Moderate	No	High	0
1022	Parker Hill Library	Public Library	Moderate	No	Low	0
1023	West Roxbury Library	Public Library	Low	No	High	0
1024	South Boston Library	Public Library	Moderate	No	Low	0
1025	Washington Village Library	Public Library	Moderate	No	Low	2
1026	All Saints' Episcopal Church	Faith Based	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1027	Annunciation Greek Orthodox Cathedral of New England	Faith Based	Moderate	No	Low	2
1028	Azusa Christian Community Center	Faith Based	Moderate	No	High	0
1029	Bethel AME Church	Faith Based	Moderate	No	High	0
1030	Bethel Pentecostal Haitian Church	Faith Based	Moderate	No	High	0
1031	Bethel Tabernacle Pentecostal Church	Faith Based	Moderate	No	High	0
1032	Bethlehem Apost. Faith Holiness Church of God	Faith Based	Moderate	No	High	0
1033	Bible Baptist Church	Faith Based	Moderate	No	Low	0
1034	Bible Way Christian Center	Faith Based	Moderate	No	Low	0
1035	Born Again House of Prayer Ministry, Inc.	Faith Based	Moderate	No	High	0
1036	Boylston Congregational Church	Faith Based	Moderate	No	High	0
1037	Calvary Baptist Church	Faith Based	Moderate	No	High	0
1038	Calvary Church International	Faith Based	Moderate	No	Low	0
1039	Cathedral of the Holy Cross	Faith Based	Moderate	No	Low	2
1040	Central Congregational Church of J.P.	Faith Based	Moderate	No	High	0
1041	Chief Cornerstone Church of God Apostolic	Faith Based	Moderate	No	High	0
1042	Chinese Christian Church of Praise & Worship	Faith Based	Moderate	No	Low	2
1043	Christ the King Parish	Faith Based	Moderate	No	High	0
1044	Church of God Bethel of Boston	Faith Based	Moderate	No	High	0
1045	Church of God Valley of Blessing	Faith Based	Moderate	No	Low	4
1046	Church of the Nazarene Ebenezer	Faith Based	Moderate	No	High	0
1047	City of Praise Family Church	Faith Based	Moderate	No	High	0
1048	Columbus Avenue AME Zion Church	Faith Based	Moderate	No	Low	2
1049	Community Church of Neponset	Faith Based	Moderate	No	High	2
1050	Concord Baptist Church	Faith Based	Moderate	No	Low	2
1051	Congregaci3n Le3n de Jud3	Faith Based	Moderate	No	Low	2
1052	Covenant Congregational Church	Faith Based	Moderate	No	High	0
1053	Cuarta Iglesia de Jesucristo El Buen Samaritano, Inc.	Faith Based	Moderate	No	High	0
1054	Day Spring Christian Church	Faith Based	Moderate	No	High	0
1055	Deeper Life Bible Church	Faith Based	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1056	Deliverance Shiloh Apostolic Church, The	Faith Based	Moderate	No	High	0
1057	Dorchester Cape Verdian SDA Church	Faith Based	Moderate	No	High	0
1058	Ebenezer Baptist Church	Faith Based	Moderate	No	Low	2
1059	Ebenezer Haitian Church of the Nazarene	Faith Based	Moderate	No	High	0
1060	Eglise Baptiste du Bon Berger	Faith Based	Moderate	No	High	0
1061	Eglise Baptiste Pierre Angulaire	Faith Based	Moderate	No	High	0
1062	Eglise Christ Vivant	Faith Based	Moderate	No	High	0
1063	Eglise de Dieu Haitienne de Boston	Faith Based	Moderate	No	High	0
1064	Eglise Haitienne du Nazaréen - Amis de la Sagesse	Faith Based	Moderate	No	High	0
1065	En el Nombre de Jesus	Faith Based	Moderate	No	High	0
1066	Ephese Seventh Day Adventist Church	Faith Based	Moderate	No	High	0
1067	Faith Urban Assembly	Faith Based	Moderate	No	High	0
1068	Fellowship Church of God	Faith Based	Moderate	No	High	0
1069	Final Thrust Church	Faith Based	Moderate	No	High	0
1070	First Baptist Church in Dorchester (The)	Faith Based	Moderate	No	High	0
1071	First Baptist Church of Jamaica Plain	Faith Based	Moderate	No	High	0
1072	First Church in Jamaica Plain	Faith Based	Moderate	No	High	0
1073	First Parish Church in Dorchester	Faith Based	Moderate	No	Low	0
1074	First Star Holiness Church, Inc.	Faith Based	Moderate	No	High	0
1075	Friendship Apostolic Church	Faith Based	Moderate	No	High	0
1076	Full Life Gospel Center	Faith Based	Moderate	No	High	0
1077	Global Ministries Christian Church	Faith Based	Moderate	No	High	0
1078	Gospel Proclaiming Mission	Faith Based	Moderate	No	Low	0
1079	Grace and Hope Mission Inc	Faith Based	Moderate	No	High	0
1080	Grace Church of All Nations	Faith Based	Moderate	No	High	0
1081	Grant AME Church	Faith Based	Moderate	No	Low	0
1082	Greater Friendship Missionary Baptist Church	Faith Based	Moderate	No	High	0
1083	Greater Harvest Worship Center	Faith Based	Moderate	No	High	0
1084	Greater Life Baptist Church	Faith Based	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1085	Greenwood Memorial United Methodist Church	Faith Based	Moderate	No	High	0
1086	Holy Sanctuary of Deliverance	Faith Based	Moderate	No	High	0
1087	Holy Trinity Catholic Church	Faith Based	Moderate	No	Low	2
1088	Iglesia Adventista del 7mo Dia de Betel	Faith Based	Moderate	No	High	0
1089	Iglesia Canaan Defensores de la Fe, Jamaica Plain	Faith Based	Moderate	No	High	0
1090	Iglesia de Cristo Miel Ministerios ELIM, Boston	Faith Based	Moderate	No	Low	2
1091	Iglesia de Cristo Misionera, Inc.	Faith Based	Moderate	No	High	0
1092	Iglesia de Cristo Misionera, MI	Faith Based	Moderate	No	High	0
1093	Iglesia de Cristo Misionera, Mission Hill	Faith Based	Moderate	No	Low	0
1094	Iglesia de Dios Pentecostal	Faith Based	Moderate	No	Low	2
1095	Iglesia de Dios Pentecostal "La Senda Antigua"	Faith Based	Moderate	No	High	0
1096	Iglesia de Dios Pentecostal "Roca de Consolacion"	Faith Based	Moderate	No	High	0
1097	Iglesia de Dios Pentecostal Arca de Refugio C.L.A.	Faith Based	Moderate	No	High	0
1098	Iglesia de Dios Pentecostal Esmirna, M.I.	Faith Based	Moderate	No	High	0
1099	Iglesia de Dios Pentecostal M.I. "Puerta de Salvacion"	Faith Based	Moderate	No	High	0
1100	Iglesia de Dios Pentecostal Monte de los Olivos AICU	Faith Based	Moderate	No	High	0
1101	Iglesia de Dios Pentecostal, M.I., J.P.	Faith Based	Moderate	No	High	0
1102	Iglesia de Dios, Inc., Jamaica Plain	Faith Based	Moderate	No	High	0
1103	Iglesia de Dios, M.B., Mission Hill	Faith Based	Moderate	No	Low	0
1104	Iglesia Monte de Santidad	Faith Based	Moderate	No	High	0
1105	Iglesia Oasis de Vida	Faith Based	Moderate	No	High	2
1106	Iglesia Pentecostal Cristo El Rey	Faith Based	Moderate	No	High	0
1107	Iglesia Pentecostal Fuente de Vida	Faith Based	Moderate	No	Low	0
1108	Iglesia Reformada Emanuel	Faith Based	Moderate	No	High	0
1109	International Outreach Ministries	Faith Based	Moderate	No	High	0
1110	Jamaica Plain Spanish Seventh Day Adventist Church	Faith Based	Moderate	No	High	0
1111	Jesu Cristo La Unica Esperanza	Faith Based	Moderate	No	High	0
1112	Joy and Gladness Pentecostal Church, Inc.	Faith Based	Moderate	No	High	0
1113	Jubilee Christian Fellowship	Faith Based	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1114	Lord and Christ Fellowship	Faith Based	Moderate	No	High	0
1115	Lower Light Gospel Center	Faith Based	Moderate	No	High	0
1116	Macedonia Baptist Church	Faith Based	Moderate	No	High	0
1117	Men and Women of Crossroads Ministries	Faith Based	Moderate	No	High	0
1118	Mercy and Grace Ministries	Faith Based	Moderate	No	High	0
1119	Mission Church	Faith Based	Moderate	No	Low	0
1120	Mount Calvary Baptist Church (The)	Faith Based	Moderate	No	Low	2
1121	Mount Calvary Holy Assembly No. 1, Inc.	Faith Based	Moderate	No	High	0
1122	New Bethel Apostolic Church of Jesus Christ	Faith Based	Moderate	No	High	0
1123	New Hope Baptist Church	Faith Based	Moderate	No	Low	2
1124	New Life Restoration Temple	Faith Based	Moderate	No	High	0
1125	New Mount Calvary	Faith Based	Moderate	No	High	0
1126	Octava Iglesia Jesucristo el Buen Samaritano	Faith Based	Moderate	No	Low	2
1127	Our Lady of Lourdes Catholic Church	Faith Based	Moderate	No	High	0
1128	Our Lady of the Cedars of Lebanon Church	Faith Based	Low	No	High	0
1129	Pentecostal House of Prayer for All People	Faith Based	Moderate	No	High	0
1130	Peoples Baptist Church	Faith Based	Moderate	No	Low	2
1131	Power in the Word Chapel	Faith Based	Moderate	No	High	0
1132	Prayer Room Pentecostal Church of Faith	Faith Based	Moderate	No	High	0
1133	Primera Iglesia Bautista Hispana, Jamaica Plain	Faith Based	Moderate	No	High	0
1134	Primera Iglesia de Dios Pentecostal, M.I.	Faith Based	Moderate	No	High	0
1135	Primera Iglesia de Dios, Inc.	Faith Based	Moderate	No	High	0
1136	Primera Iglesia Presbiteriana (E.U.A.)	Faith Based	Moderate	No	High	0
1137	Quinta Iglesia /Jesu El Buen Samaritano	Faith Based	Moderate	No	High	0
1138	Revival Deliverance Temple Church	Faith Based	Moderate	No	High	0
1139	River of Life Church	Faith Based	Moderate	No	High	0
1140	Salvation Army South End Community & Worship Center	Faith Based	Moderate	No	Low	2
1141	Second Church in Dorchester	Faith Based	Moderate	No	High	0
1142	Shawmut Community Church of God	Faith Based	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1143	Shawmut Springs Church	Faith Based	Moderate	No	Low	0
1144	Solid Rock, The	Faith Based	Moderate	No	High	0
1145	South End Neighborhood Church of Emmanuel	Faith Based	Moderate	No	Low	2
1146	Spanish Church of God of Boston (The)	Faith Based	Moderate	No	Low	0
1147	St. Ambrose Catholic Church	Faith Based	Moderate	No	High	0
1148	St. Andrews United Methodist Church	Faith Based	Moderate	No	High	0
1149	St. Ann's Catholic Church, Dorchester	Faith Based	Moderate	No	High	0
1150	St. Augustine's and St. Martin's Episcopal Church	Faith Based	Moderate	No	Low	0
1151	St. Brendan's Catholic Church	Faith Based	Moderate	No	High	0
1152	St. Cyprian's Episcopal Church	Faith Based	Moderate	No	Low	2
1153	St. Gregory's Catholic Church	Faith Based	Moderate	No	High	0
1154	St. John the Baptist Hellenic Orthodox Church	Faith Based	Moderate	No	Low	2
1155	St. John's Episcopal Church, Jamaica Plain	Faith Based	Moderate	No	High	0
1156	St. Mark's Catholic Church	Faith Based	Moderate	No	High	0
1157	St. Peter's Catholic Church, Dorchester	Faith Based	Moderate	No	Low	0
1158	St. Stephen's Episcopal Church	Faith Based	Moderate	No	Low	2
1159	St. Thomas Aquinas Catholic Church	Faith Based	Moderate	No	High	0
1160	The Temple of Restoration Church	Faith Based	Moderate	No	High	0
1161	Trinity Latvian Evangelical Lutheran Church in Boston	Faith Based	Moderate	No	High	0
1162	Trinity Temple	Faith Based	Moderate	No	Low	0
1163	Ukrainian Orthodox Church of St. Andrew	Faith Based	Moderate	No	High	0
1164	Unidos En Cristo	Faith Based	Moderate	No	High	0
1165	United Emmanuel Holiness Church, Inc.	Faith Based	Moderate	No	Low	2
1166	Universal Church of God in Christ Outreach Ministry	Faith Based	Moderate	No	High	0
1167	Victory Christian Fellowship Ministries	Faith Based	Moderate	No	High	0
1168	Vietnamese Alliance Church	Faith Based	Moderate	No	High	0
1169	Vietnamese Assemblies of God of Boston	Faith Based	Moderate	No	Low	0
1170	Wesley United Methodist Church	Faith Based	Moderate	No	High	0
1171	Wesleyan Church of Dorchester	Faith Based	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1172	Word of Life Tabernacle	Faith Based	Moderate	No	High	0
1173	Orient Heights Community Center	Municipal Building	Moderate	No	Low	2
1174	Harborside Community Center - Umana Barnes	Community Center	Moderate	No	Low	2
1175	Paris Street Pool*	BCYF community center	Moderate	No	Low	2
1176	Paris Street Community Center	Community Center	Moderate	No	Low	1
1177	Golden Age Center	BCYF community center	Moderate	No	Low	2
1178	Stillman Tennis Center	BCYF community center	Moderate	No	Low	2
1179	Charlestown Community Center	BCYF community center	Moderate	No	Low	4
1180	Kent Center	Community center	Moderate	No	Low	0
1181	Nazarro Community Center	BCYF community center	Moderate	No	Low	0
1182	BCNC/Quincy*	BCYF community center	Moderate	No	Low	0
1183	Thomas Johnson Center	Community Center	Moderate	No	Low	0
1184	Condon Community Center	BCYF community center	Moderate	No	Low	0
1185	Walsh Center	Community Center	Moderate	No	Low	0
1186	Tynan Community Center	Community Center	Moderate	No	Low	0
1187	Curley Center	BCYF community center	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
1188	Vine Street Community Center	Community Center	Moderate	No	Low	0
1189	Blackstone Community Center	BCYF community center	Moderate	No	Low	2
1190	Tobin Community Center	Community Center	Moderate	No	Low	0
1191	Shelburne Center	Community Center	Moderate	No	Low	0
1192	Jamaica Plain Community Center	Community Center	Moderate	No	High	0
1193	Agassiz - closed?	BCYF community center	Moderate	No	High	0
1194	Holland Community Center	BCYF community center	Moderate	No	High	0
1195	Perkins Community Center	Community Center	Moderate	No	High	0
1196	Cleveland Community Center	BCYF community center	Moderate	No	High	0
1197	Murphy Community Center	Community Center	Moderate	No	High	2
1198	Gallivan Community Center	BCYF community center	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1199	Hyde Park Community Center	BCYF community center	Low	No	High	0
1200	Curtis Hall Community Center	BCYF community center	Moderate	No	High	0
1201	Roslindale Community Center	BCYF community center	Low	No	High	0
1202	Flaherty Pool*	BCYF community center	Low	No	High	0
1203	Archdale Community Center	BCYF community center	Moderate	No	High	0
1204	Roche Center	Community Center	Low	No	High	0
1205	West Roxbury*	BCYF community center	Low	No	High	0
1206	Draper Pool*	BCYF community center	Low	No	High	0
1207	Ohrenberger Community Center	BCYF community center	Low	No	High	0
1208	Jackson-Mann Community Center	BCYF community center	Low	No	Low	0
1209	Mirabella Pool*	BCYF community center	Moderate	No	Low	1
1210	Clougherty Pool*	BCYF community center	Moderate	No	Low	0
1211	Grove Hall Community Center	BCYF community center	Moderate	No	High	0
1212	Mason Pool*	BCYF community center	Moderate	No	Low	2
1213	Orchard Gardens	BCYF community center	Moderate	No	Low	0
1214	BOSTON PRE-RELEASE CENTER	Correctional Facilities	Moderate	No	High	0
1215	SPECTRUM GIRLS DETENTION CENTER	Correctional Facilities	Moderate	No	High	0
1216	Shattuck Hospital Correction Unit	Correctional Facilities	Moderate	No	High	0
1217	SUFFOLK COUNTY HOUSE OF CORRECTION	Correctional Facilities	Moderate	No	Low	2
1218	SUFFOLK COUNTY SUPERIOR COURT	Correctional Facilities	Moderate	No	Low	0
1219	Suffolk County Jail	Correctional Facilities	Moderate	No	Low	2
1220	John Joseph Moakley United States Courthouse	Court House	Moderate	No	Low	1
1221	US Bankruptcy Court - John W. McCormack Court House	Court House	Moderate	No	Low	0
1222	US Bankruptcy Court Clerk	Court House	Moderate	No	Low	2
1223	Boston Housing Court - Edward W. Brooke Courthouse	Court House	Moderate	No	Low	2
1224	Boston Municipal Court Dept - Edward W. Brooke Courthouse	Court House	Moderate	No	Low	2
1225	Charlestown Division, Boston Municipal Court Department	Court House	Moderate	No	Low	0
1226	Dorchester Division, Boston Municipal Court Department	Court House	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1227	South Boston Division, Boston Municipal Court Department	Court House	Moderate	No	Low	0
1228	Suffolk Juvenile Court - Edward W. Brooke Courthouse	Court House	Moderate	No	Low	2
1229	Suffolk Probate & Family Court - Edward W. Brooke Courthouse	Court House	Moderate	No	Low	2
1230	West Roxbury Division, Boston Municipal Court Department	Court House	Moderate	No	High	0
1231	Brighton Division, Boston Municipal Court Department	Court House	Low	No	High	0
1232	Roxbury Division, Boston Municipal Court Department	Court House	Moderate	No	Low	0
1233	BOSTON OPERATIONS CENTER BOSTON EDISON	Electric-Gas-Oil plants, substations	Moderate	No	Low	2
1234	TRIGEN BOSTON ENERGY	Electric-Gas-Oil plants, substations	Moderate	No	Low	2
1235	TRIGEN BOSTON ENERGY CORP	Electric-Gas-Oil plants, substations	Moderate	No	Low	0
1236	New Boston Generating Station L Street	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1237	New Boston Generating Station L Street	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1238	SITHE NEW BOSTON STATION LLC M Street Jet	Electric-Gas-Oil plants, substations	Moderate	No	Low	0
1239	Gillette Co	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1240	Dewar Street 483	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1241	MBTA No 106	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1242	K Street No 1	Electric-Gas-Oil plants, substations	Moderate	No	Low	0
1243	New Boston Generating Station L Street	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1244	K Street No 2 No 385	Electric-Gas-Oil plants,	Moderate	No	Low	4

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
		substations				
1245	Gillette Co	Electric-Gas-Oil plants, substations	Moderate	No	Low	4
1246	Scotia No 71	Electric-Gas-Oil plants, substations	Moderate	No	Low	0
1247	Carver No 514N	Electric-Gas-Oil plants, substations	Moderate	No	Low	0
1248	Kingston St	Electric-Gas-Oil plants, substations	Moderate	No	Low	2
1249	High Street 53	Electric-Gas-Oil plants, substations	Moderate	No	Low	0
1250	Chatham Street 12	Electric-Gas-Oil plants, substations	Moderate	No	Low	2
1251	Roslindale Post Office	Post Office	Low	No	High	0
1252	Suffolk University	Colleges	Moderate	No	Low	0
1253	Benjamin Franklin Institute of Technology	Colleges	Moderate	No	Low	2
1254	Bunker Hill Community College	Colleges	Moderate	No	Low	0
1255	MGH Institute of Health Professions	Colleges	Moderate	No	Low	2
1256	Emmanuel College	Colleges	Moderate	No	Low	2
1257	School of the Museum of Fine Arts-Boston	Colleges	Moderate	No	Low	2
1258	Simmons College	Colleges	Moderate	No	Low	2
1259	Boston University	Colleges	Moderate	No	Low	2
1260	The Boston Conservatory	Colleges	Moderate	No	Low	2
1261	Wheelock College	Colleges	Moderate	No	Low	0
1262	Roxbury Community College	Colleges	Moderate	No	Low	0
1263	University of Massachusetts-Boston	Colleges	Moderate	No	Low	0
1264	Boston University Research	Colleges	Moderate	No	Low	4
1265	Boston University School of Law	Colleges	Moderate	No	Low	0
1266	Boston University Sargent College	Colleges	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1267	Boston University School of Management	Colleges	Moderate	No	Low	2
1268	Boston University Admissions	Colleges	Moderate	No	Low	2
1269	Boston University Rental Office	Colleges	Moderate	No	Low	2
1270	Boston University Trustees	Colleges	Moderate	No	Low	0
1271	Boston University	Colleges	Moderate	No	Low	0
1272	Boston University School of Medicine	Colleges	Moderate	No	Low	4
1273	Boston University Public Health	Colleges	Moderate	No	Low	2
1274	Simmons College	Colleges	Moderate	No	Low	0
1275	Harvard University	Colleges	Moderate	No	Low	0
1276	Tufts University	Colleges	Moderate	No	Low	2
1277	MASCO Colleges of the Fenway	Colleges	Moderate	No	Low	0
1278	Harvard Business School	Colleges	Low	No	Low	4
1279	New England College of Business and Finance	Colleges	Moderate	No	Low	0
1280	North Bennet Street School	Colleges	Moderate	No	Low	0
1281	Empire Beauty School-Boston	Colleges	Moderate	No	Low	0
1282	Urban College of Boston	Colleges	Moderate	No	Low	0
1283	Bay State College	Colleges	Moderate	No	Low	2
1284	Butera School of Art	Colleges	Moderate	No	Low	2
1285	Emerson College	Colleges	Moderate	No	Low	0
1286	Fisher College	Colleges	Moderate	No	Low	2
1287	Gibbs College-Boston	Colleges	Moderate	No	Low	2
1288	New England Law-Boston	Colleges	Moderate	No	Low	0
1289	Kaplan Career Institute	Colleges	Moderate	No	Low	2
1290	Boston Architectural College	Colleges	Moderate	No	Low	0
1291	Massachusetts College of Art and Design	Colleges	Moderate	No	Low	0
1292	Massachusetts College of Pharmacy and Health Sciences	Colleges	Moderate	No	Low	0
1293	New England College of Optometry	Colleges	Moderate	No	Low	2
1294	Northeastern University	Colleges	Moderate	No	Low	2
1295	The New England Conservatory of Music	Colleges	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1296	Wentworth Institute of Technology	Colleges	Moderate	No	Low	4
1297	Berklee College of Music	Colleges	Moderate	No	Low	0
1298	Kaplan Career Institute	Colleges	Moderate	No	Low	2
1299	New England School of Photography	Colleges	Moderate	No	Low	2
1300	The Art Institute of Boston at Lesley University	Colleges	Moderate	No	Low	0
1301	Laboure College	Colleges	Moderate	No	High	0
1302	Everest Institute-Brighton	Colleges	Low	No	Low	0
1303	Saint John's Seminary	Colleges	Low	No	High	0
1304	Boston College	Colleges	Moderate	No	Low	2
1305	Pine Manor College	Colleges	Moderate	No	Low	0
1306	Massachusetts School of Professional Psychology	Colleges	Low	No	High	0
1307	Boston Baptist College	Colleges	Low	No	High	0
1308	Guild Elementary	Schools	Moderate	No	Low	0
1309	Kennedy Patrick Elem	Schools	Moderate	No	Low	0
1310	Otis Elementary	Schools	Moderate	No	Low	4
1311	O'Donnell Elementary	Schools	Moderate	No	Low	0
1312	East Boston High	Schools	Moderate	No	Low	0
1313	Umana Middle School Academy	Schools	Moderate	No	Low	2
1314	Alighieri Elementary	Schools	Moderate	No	Low	2
1315	East Boston EEC	Schools	Moderate	No	Low	2
1316	McKay K-8	Schools	Moderate	No	Low	2
1317	Adams Elementary	Schools	Moderate	No	Low	0
1318	Harvard/Kent Elem	Schools	Moderate	No	Low	4
1319	Charlestown High	Schools	Moderate	No	Low	0
1320	Edwards Middle	Schools	Moderate	No	Low	0
1321	Warren/Prescott	Schools	Moderate	No	Low	0
1322	Eliot K-8	Schools	Moderate	No	Low	0
1323	Quincy Upper School	Schools	Moderate	No	Low	4
1324	Joshua Quincy School (K-5)	Schools	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1325	Snowden International	Schools	Moderate	No	Low	2
1326	McKinley Elementary and South End Academy	Schools	Moderate	No	Low	2
1327	Joseph J Hurley Elementary	Schools	Moderate	No	Low	4
1328	Blackstone Elementary	Schools	Moderate	No	Low	2
1329	Emerson Elementary - Closed	Schools	Moderate	No	Low	0
1330	Mason Elementary	Schools	Moderate	No	Low	4
1331	Clap Elementary	Schools	Moderate	No	Low	0
1332	Gavin Middle -closed	Schools	Moderate	No	Low	0
1333	Perkins Elementary	Schools	Moderate	No	Low	2
1334	Excel High School	Schools	Moderate	No	Low	0
1335	Tynan Elementary	Schools	Moderate	No	Low	0
1336	Oliver Hazard Perry Elementary School	Schools	Moderate	No	Low	4
1337	Russell Elementary	Schools	Moderate	No	Low	0
1338	Orchard Gardens K-8	Schools	Moderate	No	Low	0
1339	Dearborn Middle	Schools	Moderate	No	Low	0
1340	Boston Day & Evening Academies	Schools	Moderate	No	Low	0
1341	Carter Developmental Center	Schools	Moderate	No	Low	2
1342	Madison Park High School	Schools	Moderate	No	Low	0
1343	O'Bryant Math & Sci.	Schools	Moderate	No	Low	0
1344	James P Timilty Middle	Schools	Moderate	No	Low	0
1345	Hale Elementary	Schools	Moderate	No	Low	0
1346	Higginson/Lewis K-8	Schools	Moderate	No	Low	0
1347	Haynes Early Education Center	Schools	Moderate	No	Low	0
1348	Trotter Elementary	Schools	Moderate	No	High	0
1349	Boston Latin Academy	Schools	Moderate	No	Low	0
1350	Ellis Elementary	Schools	Moderate	No	High	0
1351	Winthrop Elementary	Schools	Moderate	No	Low	0
1352	King K-8	Schools	Moderate	No	Low	0
1353	Lilla G. Frederick Middle School	Schools	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1354	East Zone ELC	Schools	Moderate	No	Low	0
1355	Holland Elementary	Schools	Moderate	No	High	0
1356	Mather Elementary	Schools	Moderate	No	Low	0
1357	Harbor School	Schools	Moderate	No	High	0
1358	Marshall Elementary	Schools	Moderate	No	High	0
1359	Henderson Elementary	Schools	Moderate	No	High	0
1360	Murphy School K-8	Schools	Moderate	No	High	2
1361	Kenny Elementary	Schools	Moderate	No	High	0
1362	Dorchester Academy	Schools	Moderate	No	High	0
1363	Taylor Elementary	Schools	Moderate	No	High	0
1364	Boston International HS, Newcomers Academy	Schools	Moderate	No	High	0
1365	Dr. Catherine Ellison-Rosa Parks Early Ed School	Schools	Moderate	No	High	0
1366	Mildred Avenue K-8	Schools	Moderate	No	High	0
1367	Tech Boston Academy (9-12)	Schools	Moderate	No	High	0
1368	Fifield Elementary	Schools	Moderate	No	High	0
1369	Lee Elementary & Lee Academy	Schools	Moderate	No	High	0
1370	Holmes Elementary	Schools	Moderate	No	High	0
1371	Middle School Academy	Schools	Moderate	No	High	0
1372	Young Achievers K-8	Schools	Moderate	No	High	0
1373	Mattahunt Elementary School	Schools	Moderate	No	High	0
1374	Chittick Elementary	Schools	Low	No	High	0
1375	Greenwood Elihu Elem	Schools	Low	No	High	0
1376	Social Justice Academy, Engineering School, Community Academy of Science & Health	Schools	Low	No	High	0
1377	Philbrick Elementary	Schools	Low	No	High	0
1378	Haley Elementary	Schools	Moderate	No	High	0
1379	Boston Teachers Union School	Schools	Moderate	No	High	0
1380	Rogers Middle	Schools	Low	No	High	0
1381	Roosevelt Upper (2-7)	Schools	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1382	Channing Elementary	Schools	Low	No	High	0
1383	Grew Elementary	Schools	Low	No	High	0
1384	Conley Elementary	Schools	Low	No	High	0
1385	Washington Irving Middle	Schools	Low	No	High	0
1386	Sumner Elementary	Schools	Low	No	High	0
1387	Boston International High School	Schools	Moderate	No	High	0
1388	Hernandez Elementary School	Schools	Moderate	No	High	0
1389	English High	Schools	Moderate	No	High	0
1390	Mendell Elementary	Schools	Moderate	No	High	0
1391	JFK Elementary School	Schools	Moderate	No	High	0
1392	Hennigan Elementary	Schools	Moderate	No	Low	0
1393	West Zone ELC	Schools	Moderate	No	Low	0
1394	New Mission High & Mission Hill K-8	Schools	Moderate	No	Low	0
1395	Tobin K-8	Schools	Moderate	No	Low	0
1396	Farragut Elementary	Schools	Moderate	No	Low	0
1397	Boston Latin School	Schools	Moderate	No	Low	0
1398	Kennedy Health Careers Acad	Schools	Moderate	No	Low	2
1399	Fenway High, Boston Arts Academy	Schools	Moderate	No	Low	2
1400	McKinley Prep High Sch	Schools	Moderate	No	Low	2
1401	McKinley Middle	Schools	Moderate	No	Low	2
1402	Curley Lower (K1-5)	Schools	Moderate	No	High	0
1403	Curley Upper (6-8)	Schools	Moderate	No	High	0
1404	Agassiz Elementary -Closed	Schools	Moderate	No	High	0
1405	Manning Elementary	Schools	Low	No	High	0
1406	Bates Elementary	Schools	Low	No	High	0
1407	Mozart Elementary	Schools	Low	No	High	0
1408	Kilmer Upper (4-8)	Schools	Low	No	High	0
1409	Beethoven Elementary	Schools	Low	No	High	0
1410	Joyce Kilmer	Schools	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1411	Urban Science Academy; Brook Farm/Media High	Schools	Low	No	High	0
1412	Lyndon K-8	Schools	Low	No	High	0
1413	Edison K-8	Schools	Low	No	High	0
1414	Lyon K-8	Schools	Low	No	High	0
1415	Lyonry 9-12	Schools	Low	No	High	0
1416	Winship Elementary	Schools	Low	No	High	0
1417	Boston Community Leaders Academy & Another Course to College	Schools	Low	No	High	0
1418	Brighton High	Schools	Low	No	High	0
1419	Baldwin ELC	Schools	Low	No	Low	0
1420	Horace Mann & Jackson/Mann K-8	Schools	Low	No	Low	0
1421	Gardner Elementary School	Schools	Low	No	High	0
1422	Ohrenberger Elementary	Schools	Low	No	High	0
1423	Everett Elementary	Schools	Moderate	No	Low	0
1424	Boston Adult Tech Acad	Schools	Moderate	No	High	0
1425	Greenwood Sarah K-8	Schools	Moderate	No	High	0
1426	Burke High	Schools	Moderate	No	High	0
1427	Dever Elementary	Schools	Moderate	No	Low	4
1428	McCormack Middle	Schools	Moderate	No	Low	2
1429	Condon Elementary	Schools	Moderate	No	Low	0
1430	Franklin D. Roosevelt School/Hemenway Building	Schools	Low	No	High	0
1431	Bradley Elementary	Schools	Moderate	No	Low	0
1432	Not in Use	Schools	Moderate	No	High	0
1433	Not in Use	Schools	Moderate	No	Low	0
1434	Not in Use	Schools	Moderate	No	High	0
1435	Roxbury Preparatory Charter School	Schools	Moderate	No	Low	0
1436	Smith Leadership Academy Charter Public School	Schools	Moderate	No	High	0
1437	Uphams Corner Charter School	Schools	Moderate	No	Low	2
1438	British School of Boston	Schools	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1439	EDCO Collaborative - EDCO YOUTH ALT	Schools	Moderate	No	Low	2
1440	Academy Of the Pacific Rim Charter Public School	Schools	Low	No	High	0
1441	Boston Collegiate Charter School (Middle and High School)	Schools	Moderate	No	Low	0
1442	Boston Day and Evening Academy Charter School	Schools	Moderate	No	Low	0
1443	Boston Preparatory Charter Public School	Schools	Low	No	High	0
1444	Boston Renaissance Charter Public School	Schools	Low	No	High	0
1445	Codman Academy Charter Public School	Schools	Moderate	No	High	0
1446	Conservatory Lab Charter School	Schools	Low	No	High	0
1447	Edward Brooke Charter School	Schools	Low	No	High	0
1448	Excel Academy Charter School	Schools	Moderate	No	Low	0
1449	Health Careers Academy Charter School	Schools	Moderate	No	Low	2
1450	MATCH Charter Public High School	Schools	Moderate	No	Low	0
1451	Neighborhood House Charter School	Schools	Moderate	No	High	0
1452	Cathedral High	Schools	Moderate	No	Low	2
1453	Advent	Schools	Moderate	No	Low	2
1454	St John Elementary	Schools	Moderate	No	Low	0
1455	Berea SDA Acad	Schools	Moderate	No	High	0
1456	Pope John Paul II Academy (Lower Mills)	Schools	Moderate	No	High	0
1457	Pope John Paul II Academy (Mattapan)	Schools	Moderate	No	High	0
1458	Pope John Paul II Academy (Neponset)	Schools	Moderate	No	High	0
1459	Mt St Joseph Academy	Schools	Low	No	High	0
1460	St Brigid Elementary	Schools	Moderate	No	Low	0
1461	St Kevin Elementary	Schools	Moderate	No	Low	0
1462	St Peter Elementary	Schools	Moderate	No	Low	0
1463	Commonwealth	Schools	Moderate	No	Low	2
1464	The Learning Project	Schools	Moderate	No	Low	2
1465	Newman School	Schools	Moderate	No	Low	2
1466	E Boston Central Catholic	Schools	Moderate	No	Low	2
1467	Neighborhood School	Schools	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1468	Our Lady Of Lourdes	Schools	Moderate	No	High	0
1469	St Mary Of Czestochowa	Schools	Moderate	No	Low	4
1470	Paige Academy	Schools	Moderate	No	Low	0
1471	Nativity Prep School	Schools	Moderate	No	High	0
1472	O L Perpetual Help Elem	Schools	Moderate	No	Low	0
1473	Sacred Heart Elementary	Schools	Low	No	High	0
1474	Gate Of Heaven Elementary	Schools	Moderate	No	Low	0
1475	St Columbkille Elem	Schools	Low	No	High	0
1476	Catholic Memorial	Schools	Low	No	High	0
1477	Roxbury Latin	Schools	Low	No	High	0
1478	Mother Caroline Academy	Schools	Moderate	No	High	0
1479	Hollow Reed School	Schools	Moderate	No	High	0
1480	Italian Home For Children	Schools	Low	No	High	0
1481	Parkside Christian	Schools	Moderate	No	High	0
1482	New Beginnings Academy	Schools	Low	No	High	0
1483	Dr. Solomon Carter Fuller	Schools	Moderate	No	Low	4
1484	Kennedy Hope Academy	Schools	Low	No	Low	0
1485	Park Street School	Schools	Moderate	No	Low	2
1486	Manville School	Schools	Moderate	No	Low	0
1487	Blessed Mother Teresa School	Schools	Moderate	No	Low	0
1488	Shaloh House Day	Schools	Low	No	High	0
1489	Holy Name Elementary	Schools	Low	No	High	0
1490	St Anne Elementary	Schools	Low	No	High	0
1491	St Theresa Elementary	Schools	Low	No	High	0
1492	Pope John Paul II Academy (Dorchester Central)	Schools	Moderate	No	High	0
1493	St Brendan Elementary	Schools	Moderate	No	High	0
1494	Cathedral Elementary	Schools	Moderate	No	Low	2
1495	St Peter Academy	Schools	Moderate	No	Low	0
1496	Seaport Campus School	Schools	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1497	Epiphany School	Schools	Moderate	No	High	0
1498	The Kingsley	Schools	Moderate	No	Low	2
1499	The Winsor	Schools	Moderate	No	Low	0
1500	Boston University Academy	Schools	Moderate	No	Low	0
1501	Kennedy Day School	Schools	Low	No	Low	0
1502	Boston College High	Schools	Moderate	No	Low	0
1503	Boston Trinity Academy	Schools	Low	No	High	0
1504	German International School Boston	Schools	Low	No	High	0
1505	Pope John Paul II Academy (Columbia Road)	Schools	Moderate	No	Low	0
1506	St Matthew Elementary	Schools	Moderate	No	High	0
1507	The Knight Children's Center	Schools	Moderate	No	High	0
1508	Children's Learning Ctr	Schools	Low	No	High	0
1509	Boston Collegiate Charter School (Lower School)	Schools	Moderate	No	Low	2
1510	MATCH Charter Public Middle School	Schools	Moderate	No	High	0
1511	BOSTON RENAISSANCE CHARTER SCHOOL	Schools	Low	0.2 PCT ANNUAL CHANCE	High	0
1512	ROXBURY CHARTER HIGH PUBLIC SCHOOL	Schools	Moderate	No	Low	0
1513	EGLESTON COMM HIGH SCHOOL	Schools	Moderate	No	High	0
1514	UPHAMS CORNER CHARTER SCHOOL	Schools	Moderate	No	Low	4
1515	COMMUNITY ACADEMY	Schools	Moderate	No	Low	2
1516	SAVIO PREPARATORY HIGH SCHOOL	Schools	Moderate	No	Low	0
1517	OUR LADY OF THE PRESENTATION	Schools	Low	No	High	0
1518	ST MARY STAR-SEA ELEM SCHOOL	Schools	Moderate	No	Low	0
1519	ST PATRICK SCHOOL	Schools	Moderate	No	Low	0
1520	HOLDEN SCHOOL, INC	Schools	Moderate	No	Low	0
1521	MESIVTA HIGH SCHOOL OF GREATER	Schools	Low	No	High	0
1522	COPPER BEECH MONTESSORI SCHOOL	Schools	Moderate	No	High	0
1523	COMPASS INC	Schools	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1524	JOHN WINTHROP SCHOOL	Schools	Moderate	No	Low	2
1525	City On A Hill Charter Public School	Schools	Moderate	No	Low	0
1526	COUNSELING AND INTERVENTION CENTER	Emergency Site	Low	No	High	0
1527	West Street Substation	Power Substation	Moderate	No	Low	0
1528	Alford Street Substation	Power Substation	Moderate	0.2 PCT ANNUAL CHANCE	Low	4
1529	Sullivan Square Pump Station	Water Pumping Station	Moderate	No	Low	2
1530	Sullivan Square Pump Station	Water Pumping Station	Moderate	No	Low	2
1531	Unknown	Sewer Pumping Station	Moderate	No	Low	3
1532	Austin Street Pumping Station	Water Pumping Station	Moderate	No	Low	0
1533	Storrow Drive Pumping Station	Water Pumping Station	Moderate	0.2 PCT ANNUAL CHANCE	Low	1
1534	Storrow Drive Pumping Station	Water Pumping Station	Moderate	No	Low	1
1535	Congress Street Pumping Station	Water Pumping Station	Moderate	No	Low	2
1536	Kneeland Street Pumping Station	Water Pumping Station	Moderate	No	Low	2
1537	Northern Pumping Station	Sewer Pumping Station	Moderate	No	Low	2
1538	Private Pumping Station	Sewer Pumping Station	Moderate	AE	Low	1
1539	Commonwealth Avenue Pumping Station	Water Pumping Station	Moderate	No	Low	2
1540	MBTA Pumping Station	Water Pumping Station	Moderate	No	Low	2
1541	Pump Station #7	Water Pumping Station	Moderate	No	Low	2
1542	Trilling Pumping Station	Sewer Pumping Station	Moderate	No	Low	1
1543	Northern Pumping Station	Water Pumping Station	Moderate	No	Low	1
1544	Summer Street Pumping Station	Sewer Pumping Station	Moderate	No	Low	2
1545	Park Drive Pumping Station	Water Pumping Station	Moderate	AE	Low	2
1546	Symphony Hall Pumping Station	Water Pumping Station	Moderate	No	Low	4
1547	Public Alley 710 Pumping Station	Sewer Pumping Station	Moderate	No	Low	2
1548	Union Park Pumping Station	Sewer Pumping Station	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1549	Union Park Pumping Station	Water Pumping Station	Moderate	No	Low	1
1550	Ward Street Pumping Station	Sewer Pumping Station	Moderate	No	Low	0
1551	MBTA Pumping Station	Water Pumping Station	Moderate	No	Low	0
1552	Columbus Park Pumping Station	Sewer Pumping Station	Moderate	No	Low	4
1553	Knotting Hill Pumping Station Water	Sewer Pumping Station	Low	No	High	0
1554	Port Norfolk Pumping Station	Sewer Pumping Station	Moderate	No	High	0
1555	Unknown	Sewer Pumping Station	Low	No	High	0
1556	Deer Island Treatment Plant	Water Treatment Facility	Moderate	No	Low	0
1557	Constitution Beach CSO	Sewer Pumping Station	Moderate	No	Low	2
1558	Fox Point CSO Facility	Sewer Pumping Station	Moderate	No	Low	4
1559	Commercial Point CSO Facility	Sewer Pumping Station	Moderate	No	High	4
1560	Fox Point CSO Facility	Sewer Pumping Station	Moderate	No	High	2
1561	Caruso Pumping Station	Sewer Pumping Station	Moderate	No	Low	4
1562	MWRA Water Meter #81	Water Meter	Low	No	High	2
1563	MWRA Water Meter #81	Water Meter	Low	No	High	2
1564	Prescott Street Substation	Power Substation	Moderate	No	Low	1
1565	Salem Street Substation	Power Substation	Moderate	No	Low	0
1566	William C. Kelly Square Substation	Power Substation	Moderate	No	Low	1
1567	Salem Street Substation	Power Substation	Moderate	No	Low	0
1568	Hawkins Street Substation	Power Substation	Moderate	No	Low	0
1569	Chatham Street Substation	Power Substation	Moderate	No	Low	2
1570	High Street Substation	Power Substation	Moderate	No	Low	0
1571	High Street Substation	Power Substation	Moderate	No	Low	0
1572	Congress Street Substation	Power Substation	Moderate	No	Low	1
1573	Warrenton Street Substation	Power Substation	Moderate	No	Low	0
1574	Lincoln Street Substation	Power Substation	Low	No	Low	0
1575	Lincoln Street Substation	Power Substation	Low	No	Low	0
1576	Commonwealth Avenue Substation	Power Substation	Low	No	Low	0
1577	Linden Street Substation	Power Substation	Low	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1578	Chestnut Hill Avenue Substation	Power Substation	Low	No	High	0
1579	Unknown	Power Substation	Moderate	No	Low	2
1583	Scotia Street Substation	Power Substation	Moderate	No	Low	0
1584	Saint Juan Street Substation	Power Substation	Moderate	No	Low	2
1585	Dorchester Avenue Substation	Power Substation	Moderate	No	Low	2
1586	Southampton Street Substation	Power Substation	Moderate	No	Low	2
1587	Cottrell Street Substation	Power Substation	Moderate	No	Low	2
1588	Tremont Street Substation	Power Substation	Moderate	No	Low	0
1589	Amory Street Substation	Power Substation	Moderate	No	Low	0
1590	Hoyt Street Substation	Power Substation	Moderate	No	Low	4
1591	Dewar Street Substation	Power Substation	Moderate	No	Low	4
1592	Humbolt Street Substation	Power Substation	Moderate	No	High	0
1593	Washington Street Substation	Power Substation	Moderate	No	High	0
1594	Charles River Dam New	Dam	No	AE	High	0
1595	Charles River Dam Old	Dam	No	AE	High	0
1596	Chestnut Hill Reservoir Dam	Dam	Low	No	High	0
1597	Westinghouse Dam	Dam	No	AE	High	0
1598	Southwest Campus Dam	Dam	No	AE	High	0
1599	Tileston & Hollingsworth Dam	Dam	Low	AE	High	0
1600	Neponset River Baker Chocolate Dam	Dam	No	AE	High	0
1601	Bridge - MERIDIAN ST	Bridge	Moderate	AE	Low	0
1602	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1603	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1604	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1605	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1606	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1607	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1608	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	High	0
1609	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1610	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1611	Cellco Partnership	Microwave Towers	Low	No	High	0
1612	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1613	Cellco Partnership	Microwave Towers	Low	No	High	0
1614	Cellco Partnership	Microwave Towers	Low	No	High	0
1615	Cellco Partnership	Microwave Towers	Low	No	High	0
1616	Cellco Partnership	Microwave Towers	Low	No	High	0
1617	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1618	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1619	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1620	Cellco Partnership	Microwave Towers	Low	No	High	0
1621	Cellco Partnership	Microwave Towers	Low	No	High	0
1622	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1623	Cellco Partnership	Microwave Towers	Low	No	High	0
1624	CELLCO PARTNERSHIP	Microwave Towers	Low	No	High	0
1625	Cellco Partnership	Microwave Towers	Low	No	High	0
1626	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	High	0
1627	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	High	0
1628	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Low	No	High	0
1629	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Low	No	High	0
1630	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Low	No	High	0
1631	Massachusetts Water Resources Authority	Microwave Towers	Low	No	High	0
1632	Massachusetts Water Resources Authority	Microwave Towers	Low	No	High	0
1633	Massachusetts Water Resources Authority	Microwave Towers	Low	No	High	0
1634	Massachusetts Water Resources Authority	Microwave Towers	Low	No	High	0
1635	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Low	No	High	0
1636	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Low	No	High	0
1637	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	High	0
1638	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1639	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	High	0
1640	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	High	0
1641	METROPOLITAN AREA NETWORKS, INC	Microwave Towers	Low	No	High	0
1642	METROPOLITAN AREA NETWORKS, INC	Microwave Towers	Low	No	High	0
1643	NSTAR Electric Company	Microwave Towers	Low	No	High	0
1644	NSTAR Electric Company	Microwave Towers	Low	No	High	0
1645	Boston, City of	Microwave Towers	Moderate	No	High	0
1646	Boston, City of	Microwave Towers	Moderate	No	High	0
1647	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1648	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1649	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	2
1650	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	2
1651	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	AE	High	2
1652	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	AE	High	2
1653	Partners HealthCare	Microwave Towers	Low	No	High	0
1654	Partners HealthCare	Microwave Towers	Low	No	High	0
1655	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	High	0
1656	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	High	0
1657	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	High	0
1658	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	High	0
1659	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1660	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1661	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1662	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1663	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1664	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1665	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
1666	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
1667	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1668	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
1669	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1670	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1671	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1672	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
1673	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1674	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1675	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1676	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1677	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1678	Cellco Partnership	Microwave Towers	Moderate	No	Low	4
1679	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	4
1680	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	4
1681	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	4
1682	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	4
1683	Cellco Partnership	Microwave Towers	Moderate	No	High	0
1684	Cellco Partnership	Microwave Towers	Moderate	No	High	0
1685	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1686	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1687	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1688	Boston, City of	Microwave Towers	Moderate	No	High	0
1689	Boston, City of	Microwave Towers	Moderate	No	High	0
1690	Boston, City of	Microwave Towers	Moderate	No	High	0
1691	Boston, City of	Microwave Towers	Moderate	No	High	0
1692	UNIVERSITY OF MASSACHUSETTS	Microwave Towers	Moderate	No	Low	0
1693	UNIVERSITY OF MASSACHUSETTS	Microwave Towers	Moderate	No	Low	0
1694	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1695	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1696	WHDH-TV	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1697	GREATER BOSTON RADIO INC	Microwave Towers	Moderate	No	Low	2
1698	NASSAU BROADCASTING II, L.L.C.	Microwave Towers	Moderate	No	Low	2
1699	Greater Boston Radio, Inc.	Microwave Towers	Moderate	No	Low	2
1700	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	2
1701	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	2
1702	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	2
1703	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	2
1704	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	2
1705	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1706	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1707	Bank of America N.A.	Microwave Towers	Moderate	No	Low	2
1708	Bank of America N.A.	Microwave Towers	Moderate	No	Low	2
1709	ART Licensing Corp.	Microwave Towers	Moderate	No	High	0
1710	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1711	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	High	0
1712	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	2
1713	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	2
1714	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1715	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1716	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1717	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1718	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1719	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1720	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1721	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1722	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1723	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1724	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1725	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1726	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1727	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1728	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1729	New England Baptist Hspital	Microwave Towers	Moderate	No	Low	0
1730	New England Baptist Hospital	Microwave Towers	Moderate	No	Low	0
1731	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	4
1732	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	4
1733	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	4
1734	Massachusetts Water Resources Authority	Microwave Towers	Moderate	No	Low	4
1735	CUENCA, PETER N	Microwave Towers	Moderate	No	Low	2
1736	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Low	No	High	0
1737	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1738	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1739	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1740	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1741	FIBERTOWER NETWORK SERVICES CORP.	Microwave Towers	Moderate	No	Low	2
1742	Harvard University	Microwave Towers	Moderate	No	Low	0
1743	Harvard University	Microwave Towers	Moderate	No	Low	0
1744	Broadband 2 Wireless	Microwave Towers	Moderate	No	Low	0
1745	MVA.NET LTD	Microwave Towers	Moderate	No	Low	0
1746	MVA.NET LTD	Microwave Towers	Moderate	No	Low	0
1747	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1748	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1749	Boston, City of	Microwave Towers	Moderate	No	Low	0
1750	Boston, City of	Microwave Towers	Moderate	No	Low	2
1751	Boston, City of	Microwave Towers	Moderate	No	Low	2
1752	Boston, City of	Microwave Towers	Moderate	No	Low	2
1753	Boston, City of	Microwave Towers	Moderate	No	Low	2
1754	Boston, City of	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1755	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	2
1756	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	2
1757	Boston, City of	Microwave Towers	Moderate	No	Low	2
1758	Boston, City of	Microwave Towers	Moderate	No	Low	2
1759	PRESIDENT AND FELLOWS OF HARVARD COLLEGE	Microwave Towers	Moderate	No	Low	0
1760	PRESIDENT AND FELLOWS OF HARVARD COLLEGE	Microwave Towers	Moderate	No	Low	0
1761	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1762	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1763	New England Baptist Hspital	Microwave Towers	Moderate	No	Low	0
1764	New England Baptist Hospital	Microwave Towers	Moderate	No	Low	0
1765	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1766	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1767	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1768	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1769	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1770	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1771	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	0
1772	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	0
1773	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	0
1774	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	0
1775	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1776	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1777	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1778	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1779	Harvard University	Microwave Towers	Moderate	No	Low	0
1780	Harvard University	Microwave Towers	Moderate	No	Low	0
1781	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
1782	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
1783	Partners HealthCare	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1784	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1785	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1786	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1787	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1788	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1789	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
1790	Partners Heathcare	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	0
1791	Partners Healthcare	Microwave Towers	Moderate	0.2 PCT ANNUAL	Low	0
1792	Partners HealthCare	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	0
1793	Partners HealthCare	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	0
1794	Partners Healthcare	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	0
1795	DANA FARBER CANCER INSTITUTE	Microwave Towers	Moderate	No	Low	0
1796	DANA FARBER CANCER INSTITUTE	Microwave Towers	Moderate	No	Low	0
1797	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	2
1798	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	2
1799	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1800	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1801	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1802	Boston, City of	Microwave Towers	Moderate	No	Low	2
1803	Boston, City of	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1804	Harvard Medical School	Microwave Towers	Moderate	No	Low	2
1805	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1806	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1807	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1808	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1809	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1810	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
1811	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1812	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1813	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	AE	Low	2
1814	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	AE	Low	2
1815	NSTAR Electric Company	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	4
1816	NSTAR Electric Company	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	4
1817	NSTAR Electric Company	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	4
1818	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1819	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1820	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
1821	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
1822	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1823	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1824	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1825	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1826	BOSTON CATHOLIC TELEVISION CENTER INC	Microwave Towers	Moderate	No	Low	2
1827	BOSTON CATHOLIC TELEVISION CENTER INC	Microwave Towers	Moderate	No	Low	2
1828	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	AE	Low	2
1829	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	AE	Low	2
1830	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1831	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1832	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
1833	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
1834	FIBERTOWER NETWORK SERVICES CORP.	Microwave Towers	Moderate	No	Low	4
1835	Cellco Partnership	Microwave Towers	Moderate	No	Low	4
1836	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	4
1837	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1838	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1839	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1840	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1841	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1842	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1843	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1844	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1845	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1846	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
1847	Broadband 2 Wireless	Microwave Towers	Moderate	No	Low	2
1848	Broadband 2 Wireless	Microwave Towers	Moderate	No	Low	2
1849	Partners Healthcare	Microwave Towers	Moderate	No	Low	2
1850	Partners HealthCare	Microwave Towers	Moderate	No	Low	2
1851	Partners Healthcare	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1852	Partners Healthcare	Microwave Towers	Moderate	No	Low	2
1853	Harvard Medical School	Microwave Towers	Moderate	No	Low	2
1854	TowerStream Corp	Microwave Towers	Moderate	No	Low	2
1855	Towerstream Corp	Microwave Towers	Moderate	No	Low	2
1856	MUZAK LLC	Microwave Towers	Low	A	High	0
1857	Partners Healthcare Systems, Inc.	Microwave Towers	Moderate	No	Low	2
1858	Partners Healthcare Systems, Inc.	Microwave Towers	Moderate	No	Low	2
1859	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1860	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1861	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1862	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1863	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
1864	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
1865	Partners Heathcare	Microwave Towers	Moderate	No	Low	2
1866	Partners Healthcare	Microwave Towers	Moderate	No	Low	2
1867	Partners Healthcare Systems, Inc.	Microwave Towers	Moderate	No	Low	2
1868	Partners Healthcare Systems, Inc.	Microwave Towers	Moderate	No	Low	2
1869	Partners Healthcare	Microwave Towers	Moderate	No	Low	2
1870	Partners Healthcare	Microwave Towers	Moderate	No	Low	2
1871	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	2
1872	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	2
1873	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1874	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1875	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1876	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1877	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1878	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
1879	Broadband 2 Wireless	Microwave Towers	Moderate	No	Low	0
1880	Industrial Tower and Wireless, LLC.	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1881	Industrial Tower and Wireless, LLC.	Microwave Towers	Moderate	No	Low	2
1882	Industrial Tower and Wireless, LLC.	Microwave Towers	Moderate	No	Low	2
1883	Industrial Tower and Wireless, LLC.	Microwave Towers	Moderate	No	Low	2
1884	ZGS BOSTON, INC.	Microwave Towers	Moderate	No	Low	4
1885	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1886	Partners HealthCare	Microwave Towers	Moderate	No	Low	0
1887	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1888	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1889	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
1890	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1891	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1892	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
1893	Cellco Partnership	Microwave Towers	Low	No	Low	0
1894	CELLCO PARTNERSHIP	Microwave Towers	Low	No	Low	0
1895	Cello Partnership	Microwave Towers	Low	No	Low	0
1896	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Moderate	No	Low	0
1897	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Moderate	No	Low	0
1898	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1899	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1900	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1901	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1902	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1903	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1904	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1905	JCE LICENSES, L.L.C.	Microwave Towers	Moderate	No	Low	0
1906	BringCom Incorporated	Microwave Towers	Moderate	No	Low	0
1907	BringCom Incorporated	Microwave Towers	Moderate	No	Low	0
1908	BOSTON CATHOLIC TELEVISION CENTER INC	Microwave Towers	Moderate	No	Low	0
1909	BOSTON CATHOLIC TELEVISION CENTER INC	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1910	BOSTON CATHOLIC TELEVISION CENTER INC	Microwave Towers	Moderate	No	Low	0
1911	BOSTON CATHOLIC TELEVISION CENTER, INC.	Microwave Towers	Moderate	No	Low	0
1912	BOSTON CATHOLIC TELEVISION CENTER, INC.	Microwave Towers	Moderate	No	Low	0
1913	BOSTON CATHOLIC TELEVISION CENTER, INC.	Microwave Towers	Moderate	No	Low	0
1914	GREATER BOSTON RADIO INC	Microwave Towers	Moderate	No	Low	0
1915	AMFM RADIO LICENSES, L.L.C.	Microwave Towers	Moderate	No	Low	0
1916	TowerStream Corp	Microwave Towers	Moderate	No	Low	0
1917	TowerStream Corp	Microwave Towers	Moderate	No	Low	0
1918	TowerStream Corp	Microwave Towers	Moderate	No	Low	0
1919	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1920	Commonwealth of Massachusetts, Department of State Police	Microwave Towers	Moderate	No	Low	0
1921	Commonwealth of Massachusetts, Department of State Police	Microwave Towers	Moderate	No	Low	0
1922	Boston, City of	Microwave Towers	Moderate	No	Low	0
1923	Community WISP, Inc.	Microwave Towers	Moderate	No	Low	0
1924	Community WISP, Inc.	Microwave Towers	Moderate	No	Low	0
1925	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
1926	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1927	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1928	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1929	Greater Boston Radio, Inc.	Microwave Towers	Moderate	No	Low	0
1930	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	0
1931	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1932	Community WISP Inc	Microwave Towers	Moderate	No	Low	0
1933	Boston Properties Limited Partnership	Microwave Towers	Moderate	No	Low	0
1934	Boston Properties Limited Partnership	Microwave Towers	Moderate	No	Low	0
1935	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1936	Omega Communications Corporation	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1937	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1938	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1939	GREATER BOSTON RADIO INC	Microwave Towers	Moderate	No	Low	0
1940	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1941	BRICKYARD VFX, L.L.C.	Microwave Towers	Moderate	No	Low	0
1942	BRICKYARD VFX, L.L.C.	Microwave Towers	Moderate	No	Low	0
1943	GREATER BOSTON RADIO INC	Microwave Towers	Moderate	No	Low	0
1944	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1945	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
1946	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	0
1947	GREATER BOSTON RADIO, INC.	Microwave Towers	Moderate	No	Low	0
1948	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1949	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1950	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1951	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
1952	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
1953	CUENCA, PETER N	Microwave Towers	Moderate	No	Low	0
1954	HEMISPHERE BROADCASTING CORPORATION	Microwave Towers	Moderate	No	Low	0
1955	ENTRAVISION HOLDINGS, LLC	Microwave Towers	Moderate	No	Low	0
1956	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	0
1957	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	0
1958	ION MEDIA BOSTON LICENSE, INC., DEBTOR-IN-POSSESSION	Microwave Towers	Moderate	No	Low	0
1959	MUZAK LLC	Microwave Towers	Moderate	No	Low	0
1960	WHDH-TV	Microwave Towers	Moderate	No	Low	0
1961	WHDH-TV	Microwave Towers	Moderate	No	Low	0
1962	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	0
1963	WHDH-TV	Microwave Towers	Moderate	No	Low	0
1964	PRESIDENT AND FELLOWS OF HARVARD COLLEGE	Microwave Towers	Moderate	No	Low	0
1965	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1966	PRESIDENT AND FELLOWS OF HARVARD COLLEGE	Microwave Towers	Moderate	No	Low	0
1967	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
1968	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
1969	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	0
1970	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1971	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
1972	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1973	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
1974	BRICKYARD VFX, L.L.C.	Microwave Towers	Moderate	No	Low	0
1975	BRICKYARD VFX, L.L.C.	Microwave Towers	Moderate	No	Low	0
1976	AMFM RADIO LICENSES, L.L.C.	Microwave Towers	Moderate	No	Low	2
1977	SPECIAL AGENT SYSTEMS, INC.	Microwave Towers	Moderate	No	Low	2
1978	AlarmNet, Inc.	Microwave Towers	Moderate	No	Low	2
1979	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
1980	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
1981	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
1982	CBS CORPORATON	Microwave Towers	Moderate	No	Low	2
1983	CBS CORPORATON	Microwave Towers	Moderate	No	Low	2
1984	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1985	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1986	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1987	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1988	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1989	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1990	PIPELINE WIRELESS, LLC	Microwave Towers	Moderate	No	Low	2
1991	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
1992	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1993	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1994	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
1995	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
1996	PIPELINE WIRELESS, LLC	Microwave Towers	Moderate	No	Low	2
1997	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
1998	PIPELINE WIRELESS, LLC	Microwave Towers	Moderate	No	Low	2
1999	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
2000	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
2001	FIBERTOWER NETWORK SERVICES CORP	Microwave Towers	Moderate	No	Low	2
2002	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
2003	PIPELINE WIRELESS, LLC	Microwave Towers	Moderate	No	Low	2
2004	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	2
2005	PIPELINE WIRELESS, LLC	Microwave Towers	Moderate	No	Low	2
2006	SmartRoute Systems, Inc.	Microwave Towers	Moderate	No	Low	2
2007	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	0
2008	MVA.NET LTD	Microwave Towers	Moderate	No	Low	2
2009	MVA.NET LTD	Microwave Towers	Moderate	No	Low	2
2010	SmartRoute Systems, Inc.	Microwave Towers	Moderate	No	Low	2
2011	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	Microwave Towers	Moderate	No	Low	0
2012	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	Microwave Towers	Moderate	No	Low	0
2013	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2014	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2015	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2016	Emerson College	Microwave Towers	Moderate	No	Low	2
2017	Emerson College	Microwave Towers	Moderate	No	Low	2
2018	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2019	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2020	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2021	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2022	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2023	Boston Gas	Microwave Towers	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2024	Community WISP, Inc.	Microwave Towers	Moderate	No	Low	0
2025	Community WISP Inc	Microwave Towers	Moderate	No	Low	0
2026	MPX INC	Microwave Towers	Moderate	No	Low	4
2027	MPX INC	Microwave Towers	Moderate	No	Low	4
2028	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	2
2029	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2030	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2031	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2032	Tufts University	Microwave Towers	Moderate	No	Low	2
2033	Tufts University	Microwave Towers	Moderate	No	Low	2
2034	Grand Circle LLC	Microwave Towers	Moderate	No	Low	1
2035	Grand Circle LLC	Microwave Towers	Moderate	No	Low	1
2036	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	1
2037	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	1
2038	TRUSTEES OF BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	2
2039	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2040	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2041	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2042	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2043	AT&T CORP.	Microwave Towers	Moderate	No	Low	2
2044	AT&T CORP.	Microwave Towers	Moderate	No	Low	2
2045	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
2046	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	2
2047	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	0
2048	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	0
2049	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	0
2050	BOSTON UNIVERSITY	Microwave Towers	Moderate	No	Low	2
2051	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2052	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2053	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2054	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2055	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2056	BOSTON UNIVERSITY	Microwave Towers	No	AE	High	0
2057	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	2
2058	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	Microwave Towers	Moderate	No	Low	2
2059	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY	Microwave Towers	Moderate	No	Low	2
2060	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2061	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2062	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	2
2063	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	2
2064	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	2
2065	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	2
2066	WATERTOWN, TOWN OF	Microwave Towers	Moderate	No	Low	0
2067	CELLCO PARTNERSHIP	Microwave Towers	Low	No	Low	0
2068	Cello Partnership	Microwave Towers	Low	No	Low	0
2069	BOSTON CATHOLIC TELEVISION CENTER INC	Microwave Towers	Moderate	No	Low	4
2070	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	Low	0
2071	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	Low	0
2072	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2073	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2074	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2075	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2076	Verizon New England, Inc.	Microwave Towers	Moderate	No	Low	0
2077	EMERSON COLLEGE	Microwave Towers	Moderate	No	Low	0
2078	EMERSON COLLEGE	Microwave Towers	Moderate	No	Low	0
2079	HARVARD RADIO BROADCASTING CO., INC.	Microwave Towers	Moderate	No	Low	0
2080	HARVARD RADIO BROADCASTING CO., INC.	Microwave Towers	Moderate	No	Low	0
2081	MCC BROADCASTING COMPANY, INC.	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2082	EMERSON COLLEGE	Microwave Towers	Moderate	No	Low	0
2083	EMERSON COLLEGE	Microwave Towers	Moderate	No	Low	0
2084	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2085	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2086	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2087	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2088	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2089	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2090	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2091	FiberTower Network Services Corp.	Microwave Towers	Low	No	Low	0
2092	FiberTower Network Services Corp.	Microwave Towers	Low	No	Low	0
2093	Emerson College	Microwave Towers	Moderate	No	Low	0
2094	Emerson College	Microwave Towers	Moderate	No	Low	0
2095	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
2096	NSTAR Electric Company	Microwave Towers	Moderate	No	Low	0
2097	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2098	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2099	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2100	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2101	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2102	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2103	BOSTON UNIVERSITY	Microwave Towers	Low	No	Low	0
2104	BOSTON UNIVERSITY	Microwave Towers	Low	No	Low	0
2105	MPX INC	Microwave Towers	Moderate	No	Low	0
2106	MPX INC	Microwave Towers	Moderate	No	Low	0
2107	ADT SECURITY SERVICES INC	Microwave Towers	Moderate	No	Low	0
2108	Bank of America N.A.	Microwave Towers	Moderate	No	Low	0
2109	Bank of America N.A.	Microwave Towers	Moderate	No	Low	0
2110	Bank of America N.A.	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2111	Massachusetts Water Resources Authority	Microwave Towers	Moderate	No	Low	0
2112	Massachusetts Water Resources Authority	Microwave Towers	Moderate	No	Low	0
2113	Massachusetts Water Resources Authority	Microwave Towers	Moderate	No	Low	0
2114	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2115	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2116	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2117	IDT Spectrum, LLC	Microwave Towers	Moderate	No	Low	0
2118	IDT Spectrum, LLC	Microwave Towers	Moderate	No	Low	0
2119	AlarmNet, Inc.	Microwave Towers	Moderate	No	Low	2
2120	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2121	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2122	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	2
2123	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	2
2124	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	2
2125	BOSTON, CITY OF	Microwave Towers	Moderate	No	Low	2
2126	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2127	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2128	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2129	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	High	0
2130	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	High	0
2131	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	High	0
2132	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	High	0
2133	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2134	MASSPORT AUTHORITY	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
2135	MASSPORT AUTHORITY	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2136	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2137	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2138	Mount Auburn Hospital	Microwave Towers	Low	No	High	0
2139	Mount Auburn Hospital	Microwave Towers	Low	No	High	0
2140	Mount Auburn Hospital	Microwave Towers	Low	No	High	0
2141	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Moderate	No	Low	0
2142	Broadband 2 Wireless	Microwave Towers	Moderate	No	Low	0
2143	Broadband 2 Wireless	Microwave Towers	Moderate	No	Low	0
2144	IDT Spectrum, LLC	Microwave Towers	Moderate	No	Low	0
2145	IDT Spectrum, LLC	Microwave Towers	Moderate	No	Low	0
2146	TowerStream Corp	Microwave Towers	Moderate	No	Low	0
2147	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
2148	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
2149	Towerstream Corp	Microwave Towers	Moderate	No	Low	0
2150	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	0
2151	Pipeline Wireless, LLC	Microwave Towers	Moderate	No	Low	0
2152	PIPELINE WIRELESS, LLC	Microwave Towers	Moderate	No	Low	0
2153	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2154	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2155	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2156	IDT Spectrum, LLC	Microwave Towers	Moderate	No	Low	4
2157	IDT Spectrum, LLC	Microwave Towers	Moderate	No	Low	4
2158	MVA.NET LTD	Microwave Towers	Moderate	No	Low	0
2159	MVA.NET LTD.	Microwave Towers	Moderate	No	Low	0
2160	MVA.NET LTD	Microwave Towers	Moderate	No	Low	0
2161	MVA.NET LTD	Microwave Towers	Moderate	No	Low	0
2162	MVA.NET LTD	Microwave Towers	Moderate	No	Low	0
2163	AT&T CORP.	Microwave Towers	Moderate	No	Low	4
2164	AT&T CORP.	Microwave Towers	Moderate	No	Low	4

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2165	Omega Communications Corporation	Microwave Towers	Moderate	No	Low	0
2166	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2167	AT&T CORP.	Microwave Towers	Moderate	No	Low	0
2168	CBS CORPORATON	Microwave Towers	Moderate	No	Low	0
2169	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	0
2170	WCVB HEARST-ARGYLE TV, INC.	Microwave Towers	Moderate	No	Low	0
2171	CBS CORPORATON	Microwave Towers	Moderate	No	Low	0
2172	CBS CORPORATON	Microwave Towers	Moderate	No	Low	0
2173		Microwave Towers	Moderate	No	Low	0
2174	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	Low	0
2175	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	Low	0
2176	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	Low	0
2177	NEXTLINK WIRELESS INC.	Microwave Towers	Moderate	No	Low	0
2178	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2179	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2180	ION MEDIA BOSTON LICENSE, INC., DEBTOR-IN-POSSESSION	Microwave Towers	Low	No	High	0
2181	CBS RADIO EAST INC.	Microwave Towers	Low	No	High	0
2182	HEMISPHERE BROADCASTING CORPORATION	Microwave Towers	Low	No	High	0
2183	NSTAR Electric Company	Microwave Towers	Low	No	Low	0
2184	NSTAR Electric Company	Microwave Towers	Low	No	Low	0
2185	NSTAR Electric Company	Microwave Towers	Low	No	Low	0
2186	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2187	New Cingular Wireless PCS, LLC	Microwave Towers	Low	No	Low	0
2188	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2189	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2190	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2191	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2192	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2193	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2194	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2195	MASSACHUSETTS, COMMONWEALTH OF	Microwave Towers	Moderate	No	Low	0
2196	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2197	MASSACHUSETTS WATER RESOURCES AUTHORITY	Microwave Towers	Moderate	No	Low	0
2198	SmartRoute Systems, Inc.	Microwave Towers	Moderate	No	Low	0
2199	WHDH-TV	Microwave Towers	Moderate	AE	Low	2
2200	Boston, City of	Microwave Towers	Moderate	No	Low	0
2201	Boston, City of	Microwave Towers	Moderate	No	Low	0
2202	Boston, City of	Microwave Towers	Moderate	No	Low	0
2203	Boston, City of	Microwave Towers	Moderate	No	Low	0
2204	Boston, City of	Microwave Towers	Moderate	No	Low	0
2205	Boston, City of	Microwave Towers	Moderate	No	Low	0
2206	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2207	Cellco Partnership	Microwave Towers	Moderate	No	Low	0
2208	CELLCO PARTNERSHIP	Microwave Towers	Moderate	No	Low	0
2209	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2210	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2211	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2212	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2213	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2214	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2215	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2216	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2217	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2218	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2219	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2220	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2221	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2222	WHDH-TV	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2223	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2224	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2225	WHDH-TV	Microwave Towers	Moderate	No	Low	0
2226	MASSACHUSETTS GENERAL HOSPITAL	Microwave Towers	Moderate	No	Low	2
2227	MASSACHUSETTS GENERAL HOSPITAL	Microwave Towers	Moderate	No	Low	2
2228	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
2229	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
2230	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
2231	Partners HealthCare	Microwave Towers	Moderate	AE	Low	2
2232	Partners HealthCare	Microwave Towers	Moderate	AE	Low	2
2233	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	0
2234	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2235	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2236	RHODE ISLAND PUBLIC TELECOM. AUTHORITY	Microwave Towers	Low	No	Low	0
2237	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2238	RHODE ISLAND PUBLIC TELECOM. AUTHORITY	Microwave Towers	Low	No	Low	0
2239	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2240	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2241	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2242	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2243	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2244	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2245	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2246	WGBH EDUCATIONAL FOUNDATION	Microwave Towers	Low	No	Low	0
2247	NSTAR Electric Company	Microwave Towers	Low	No	Low	0
2248	NSTAR Electric Company	Microwave Towers	Low	No	Low	0
2249	SmartRoute Systems, Inc.	Microwave Towers	Moderate	No	Low	2
2250	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0
2251	FiberTower Network Services Corp.	Microwave Towers	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2252	CBS RADIO EAST INC.	Microwave Towers	Low	No	High	4
2253	CBS RADIO STATIONS INC.	Microwave Towers	Low	No	High	2
2254	NBC TELEMUNDO LICENSE CO.	Microwave Towers	Low	No	High	2
2255	CBS CORPORATON	Microwave Towers	Low	No	High	0
2256	CBS CORPORATON	Microwave Towers	Low	No	High	0
2257	CBS CORPORATON	Microwave Towers	Low	No	High	0
2258	CBS CORPORATON	Microwave Towers	Low	No	High	0
2259	CBS CORPORATON	Microwave Towers	Low	No	High	0
2260	CBS CORPORATON	Microwave Towers	Low	No	High	0
2261	CBS CORPORATON	Microwave Towers	Low	No	High	0
2262	CBS CORPORATON	Microwave Towers	Low	No	High	0
2263	CBS CORPORATON	Microwave Towers	Low	No	High	0
2264	CBS CORPORATIOIN	Microwave Towers	Low	No	High	0
2265	PROVIDENCE TV LICENSEE CORP.	Microwave Towers	Low	No	High	0
2266	CBS CORPORATON	Microwave Towers	Low	No	High	0
2267	MASSACHUSETTS GENERAL HOSPITAL	Microwave Towers	Moderate	No	Low	2
2268	MASSACHUSETTS GENERAL HOSPITAL	Microwave Towers	Moderate	No	Low	2
2269	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2270	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2271	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2272	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2273	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2274	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2275	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2276	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2277	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
2278	Partners Healthcare	Microwave Towers	Moderate	No	Low	0
2279	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	0
2280	Partners HealthCare Systems, Inc.	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2281	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2282	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2283	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2284	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2285	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2286	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2287	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2288	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2289	SmartRoute Systems, Inc.	Microwave Towers	Moderate	No	Low	2
2290	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2291	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2292	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2293	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2294	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2295	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2296	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
2297	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	4
2298	Cellco Partnership	Microwave Towers	Moderate	No	Low	2
2299	Cellco Partnership	Microwave Towers	Moderate	No	Low	2
2300	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
2301	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
2302	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
2303	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	1
2304	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	1
2305	Towerstream Corp	Microwave Towers	Moderate	No	Low	2
2306	Towerstream Corp	Microwave Towers	Moderate	No	Low	2
2307	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	4
2308	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	4
2309	Museum of Science	Microwave Towers	Moderate	0.2 PCT	Low	1

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
				ANNUAL CHANCE		
2310	Museum of Science	Microwave Towers	Moderate	0.2 PCT ANNUAL CHANCE	Low	1
2311	Keane Corporation	Microwave Towers	Moderate	No	Low	0
2312	Keane Corporation	Microwave Towers	Moderate	No	Low	0
2313	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2314	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	4
2315	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
2316	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	4
2317	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2318	NEXTEL COMMUNICATIONS OF THE MID ATLANTIC INC	Microwave Towers	Moderate	No	Low	2
2319	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2320	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	2
2321	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	1
2322	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	1
2323	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
2324	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	2
2325	MASSACHUSETTS GENERAL HOSPITAL	Microwave Towers	Moderate	No	Low	2
2326	Cellco Partnership	Microwave Towers	Moderate	No	Low	2
2327	Cellco Partnership	Microwave Towers	Moderate	No	Low	2
2328	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	1
2329	MASSACHUSETTS PORT AUTHORITY	Microwave Towers	Moderate	No	Low	1
2330	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	0
2331	MASSPORT AUTHORITY	Microwave Towers	Moderate	No	Low	0
2332	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2333	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2334	FIBERTOWER NETWORK SERVICES CORP	Microwave Towers	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2335	FiberTower Network Services Corp.	Microwave Towers	Moderate	No	Low	0
2336	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2337	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2338	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2339	New Cingular Wireless PCS, LLC	Microwave Towers	Moderate	No	Low	0
2340	MASSACHUSETTS GENERAL HOSPITAL	Microwave Towers	Moderate	No	Low	0
2341	NSAC, LLC	BRS_EBS_TRANS	Moderate	No	Low	2
2342	THE PRESIDENT & FELLOWS of HARVARD COLLEGE	BRS_EBS_TRANS	Moderate	No	Low	0
2343	EMERSON COLLEGE	BRS_EBS_TRANS	Moderate	No	Low	0
2344	Spectrasite Communications, Inc. through American Tower	Antenna_Registrate	Moderate	No	High	0
2345	BOSTON FIRE DEPARTMENT	Antenna_Registrate	Moderate	No	High	0
2346	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	High	0
2347	BOSTON FIRE DEPARTMENT	Antenna_Registrate	Moderate	No	High	0
2348	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	0
2349	BOSTON FIRE DEPARTMENT	Antenna_Registrate	Moderate	No	High	0
2350	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	0
2351	Massachusetts Water Resources Authority	Antenna_Registrate	Moderate	No	Low	4
2352	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	2
2353	Massachusetts Bay Transportation Authority	Antenna_Registrate	Low	No	High	0
2354	Spectrasite Communications, Inc. through American Tower	Antenna_Registrate	Moderate	No	Low	2
2355	Massachusetts Port Authority	Antenna_Registrate	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
2356	Massachusetts Port Authority	Antenna_Registrate	Moderate	AE	Low	2
2357	Tower Point Holdings, LLC	Antenna_Registrate	Moderate	No	Low	2
2358	BOSTON UNIVERSITY COMMUNICATIONS INC	Antenna_Registrate	Moderate	No	Low	0
2359	BOSTON FIRE DEPARTMENT	Antenna_Registrate	Moderate	No	Low	0
2360	Beacon Capital Partners	Antenna_Registrate	Moderate	No	Low	2
2361	JOHN HANCOCK MUTUAL LIFE INSURANCE COMPANY	Antenna_Registrate	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2362	JOHN HANCOCK MUTUAL LIFE INSURANCE COMPANY	Antenna_Registrate	Moderate	No	Low	2
2363	JOHN HANCOCK MUTUAL LIFE INSURANCE COMPANY	Antenna_Registrate	Moderate	No	Low	2
2364	TRUSTEES OF BOSTON UNIVERSITY	Antenna_Registrate	Moderate	No	Low	2
2365	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	0
2366	Dewey Square Tower Associates	Antenna_Registrate	Moderate	No	Low	0
2367	Dewey Square Tower Associates	Antenna_Registrate	Moderate	No	Low	0
2368	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	2
2369	Massachusetts Turnpike Authority	Antenna_Registrate	Low	No	Low	0
2370	WinStar Wireless Fiber Corp.	Antenna_Registrate	Moderate	No	Low	0
2371	BROOKFIELD FINANCIAL PROPERTIES	Antenna_Registrate	Moderate	No	Low	4
2372	One Beacon Street Limited Partnership	Antenna_Registrate	Moderate	No	Low	0
2373	CBS Communications Services Inc.	Antenna_Registrate	Low	No	High	4
2374	NEW BOSTON GARDEN CORP	Antenna_Registrate	Moderate	No	Low	2
2375	BOSTON FIRE DEPARTMENT	Antenna_Registrate	Moderate	AE	Low	2
2376	J & F REALTY TRUST	Antenna_Registrate	Moderate	No	Low	2
2377	T-Mobile Northeast LLC	Antenna_Registrate	Moderate	No	Low	0
2378	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	4
2379	Massachusetts Bay Transportation Authority	Antenna_Registrate	Moderate	No	Low	2
2380	SBC TOWER HOLDINGS LLC	Antenna_Registrate	Moderate	No	Low	0
2383	NORTHEASTERN UNIVERSITY	FM Antenna	Moderate	No	Low	2
2384	HEMISPHERE BROADCASTING CORPORATION	FM Antenna	Moderate	No	Low	0
2385	HEMISPHERE BROADCASTING CORPORATION	FS Antenna	Moderate	No	Low	0
2386	GREATER BOSTON RADIO, INC.	FM Antenna	Moderate	No	Low	0
2387	GREATER BOSTON RADIO, INC.	FS Antenna	Moderate	No	Low	0
2388	GREATER BOSTON RADIO, INC.	FM Antenna	Moderate	No	Low	0
2389	CBS RADIO INC. OF BOSTON	FM Antenna	Moderate	No	Low	0
2390	CBS RADIO INC. OF BOSTON	FS Antenna	Moderate	No	Low	0
2391	TRUSTEES OF BOSTON UNIVERSITY	FS Antenna	Moderate	No	Low	2
2392	EMERSON COLLEGE	FM Antenna	Moderate	No	Low	4

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2393	WGBH EDUCATIONAL FOUNDATION	FX Antenna	Moderate	No	Low	2
2395	BOSTON OPERATIONS CENTER BOSTON EDISON	Tier 2 Sites 2010-Trigen	Moderate	No	Low	2
2396	TRIGEN BOSTON ENERGY	Tier 2 Sites 2010-Trigen	Moderate	No	Low	2
2397	TRIGEN BOSTON ENERGY CORP	Trigen	Moderate	No	Low	0
2398	TRIGEN-BOSTON ENERGY CORP	Tier 2 Sites 2010-Trigen_ASG	Moderate	No	Low	0
2399	New Boston Generating Station L Street	Generating Plants	Moderate	No	Low	4
2400	New Boston Generating Station L Street	Generating Plants	Moderate	No	Low	4
2401	SITHE NEW BOSTON STATION LLC M Street Jet	Tier 2 Sites 2010-Generating Plants	Moderate	No	Low	0
2402	Gillette Co	Tier 2 Sites 2010-Generating Plants	Moderate	No	Low	4
2403	Dewar Street 483	Tier 2 Sites 2010-Substations_ASG	Moderate	No	Low	4
2404	MBTA No 106	Tier 2 Sites 2010-Substations_ASG	Moderate	No	Low	4
2405	K Street No 1	Tier 2 Sites 2010-Substations_ASG	Moderate	No	Low	0
2406	New Boston Generating Station L Street	Substations	Moderate	No	Low	4
2407	K Street No 2 No 385	Tier 2 Sites 2010-Substations	Moderate	No	Low	4
2408	Gillette Co	Tier 2 Sites 2010-Substations	Moderate	No	Low	4
2409	Scotia No 71	Tier 2 Sites 2010-Substations	Moderate	No	Low	0
2410	Carver No 514N	Substations	Moderate	No	Low	0
2411	Kingston St	Substations	Moderate	No	Low	2
2412	High Street 53	Substations	Moderate	No	Low	0
2413	Chatham Street 12	Substations	Moderate	No	Low	2
2414	Hawkins Street 2	Substations	Moderate	No	Low	2
2415	Arbour Hospital	Primary	Moderate	No	High	0
2416	Franciscan Children's Hospital & Rehab Center	Primary	Moderate	No	Low	0
2417	Hebrew Rehabilitation Center	Primary	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2418	Jewish Memorial Hospital & Radius Hospital	Primary	Moderate	No	Low	0
2419	Kindred Hospital	Primary	Low	No	Low	0
2420	Lemuel Shattuck Hospital	Primary	Moderate	No	High	0
2421	ShrinerÆs Burn Instituteá	Primary	Moderate	No	Low	0
2422	Spaulding Rehabilitation Hospital	Primary	Moderate	No	Low	2
2423	Beth Isreal Deaconess medical Center - East Campus	Primary	Moderate	No	Low	0
2424	Boston Medical Center - Menino Campus	Primary	Moderate	No	Low	2
2425	Brigham and Women's Hospital	Primary	Moderate	No	Low	0
2426	Carney Hospital	Primary	Moderate	No	High	0
2427	Children's Hospital Boston	Primary	Moderate	No	Low	0
2428	Dana-Farber Cancer Institute	Primary	Moderate	No	Low	0
2429	Faulkner Hospital	Primary	Low	No	High	0
2430	Massachusetts Eye and Ear Infirmary	Primary	Moderate	No	Low	2
2431	St. Elizabeth's Hospital	Primary	Low	No	High	0
2432	Tufts Medical Center	Primary	Moderate	No	Low	2
2433	VA Bos. Healthcare System - Jamaica Plain	Primary	Moderate	No	Low	0
2434	VA Bos. Healthcare System - W. Roxbury	Primary	Low	No	High	0
2435	Beth Israel Deaconess Medical Center - West Campus	Primary	Moderate	No	Low	0
2436	Boston Medical Center - East Newton Campus	Primary	Moderate	No	Low	2
2437	New England Baptist Hospital	Primary	Moderate	No	Low	0
2438	BOSTON VETERAN CENTER	Primary	Moderate	No	Low	2
2439	Veterans Affairs Boston Health Care System	Primary	Moderate	No	Low	2
2440	Erich L Lindemann Mental Health Center	Primary	Moderate	No	Low	0
2441	Urgent Care Medical Unit	Primary	Moderate	No	Low	2
2442	Boston Public Health Commission Medical Facilities	Primary	Moderate	No	Low	4
2443	MGH at the Navy Yard	Primary	Moderate	No	Low	2
2444	Mass General Hospital	Primary	Moderate	No	Low	2
2445	PARKWELL NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2446	FAIRMOUNT REST HOME INCORPORATED	Nursing Homes/Assisted Living	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2447	PARK PLACE REHABILITATION AND SKILLED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2448	ROSCOMMON WEST ROXBURY EXTENDED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2449	ROSCOMMON EXTENDED CARE CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
2450	STANDISH VILLAGE AT LOWER MILLS	Nursing Homes/Assisted Living	Moderate	No	High	0
2451	THE FOLEY SENIOR RESIDENCES	Nursing Homes/Assisted Living	Moderate	No	High	0
2452	EDELWEISS VILLAGE	Nursing Homes/Assisted Living	Low	No	High	0
2453	DEUTSCHES ALTENHEIM GERMAN CENTRE FOR EXTENDED CARE	Nursing Homes/Assisted Living	Low	No	High	0
2454	THE BOSTON HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
2455	ROSCOMMON ON THE PARKWAY EXTENDED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2456	BOSTONIAN NURSING CARE AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Moderate	No	High	4
2457	STONEHEDGE REHABILITATION AND SKILLED CARE CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2458	MELVILLE REST HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
2459	SAINT JOSEPH NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
2460	HEBREW REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2461	SOPHIA SNOW HOUSE	Nursing Homes/Assisted Living	Low	No	High	0
2462	SPRINGHOUSE	Nursing Homes/Assisted Living	Low	No	High	0
2463	ANNS REST HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
2464	LAUREL RIDGE REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
2465	ARMENIAN NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2466	BURGOYNE REST HOME	Nursing Homes/Assisted Living	Moderate	No	Low	0
2467	CUSHING MANOR COMMUNITY SUPPORT FACILITY	Nursing Homes/Assisted Living	Moderate	No	Low	0
2468	ROGERSON HOUSE	Nursing Homes/Assisted Living	Moderate	No	High	0
2469	MOUNT PLEASANT HOME	Nursing Homes/Assisted Living	Moderate	No	High	0
2470	GODDARD HOUSE SKILLED NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	High	0
2471	BENJAMIN HEALTHCARE CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	0
2472	SHERRILL HOUSE	Nursing Homes/Assisted Living	Moderate	No	Low	0
2473	LANDMARK AT LONGWOOD	Nursing Homes/Assisted Living	Moderate	No	Low	0
2474	THE BAYVIEW	Nursing Homes/Assisted Living	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2475	RUGGLES ASSISTED LIVING	Nursing Homes/Assisted Living	Moderate	No	Low	2
2476	HARBORLIGHTS REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	0
2477	MARIAN MANOR	Nursing Homes/Assisted Living	Moderate	No	Low	0
2478	CHESTNUT PARK AT CLEVELAND CIRCLE	Nursing Homes/Assisted Living	Low	No	High	0
2479	SUSAN BAILIS ASSISTED LIVING COMMUNITY	Nursing Homes/Assisted Living	Moderate	No	Low	0
2480	BRIGHTON HOUSE REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Low	No	Low	0
2481	PROVIDENCE HOUSE AT COREY PARK	Nursing Homes/Assisted Living	Low	No	Low	0
2482	COREY HILL NURSING HOME	Nursing Homes/Assisted Living	Low	No	Low	0
2483	SOUTH COVE MANOR NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	4
2484	HALE HOUSE	Nursing Homes/Assisted Living	Moderate	No	Low	2
2485	WINGATE AT BRIGHTON	Nursing Homes/Assisted Living	Low	No	High	0
2486	PRESENTATION NURSING AND REHABILITATION CENTER	Nursing Homes/Assisted Living	Low	No	High	0
2487	NORTH END REHABILITATION AND NURSING CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	2
2488	ZELMA LACEY HOUSE OF CHARLESTOWN	Nursing Homes/Assisted Living	Moderate	No	Low	2
2489	DON ORIONE HOME	Nursing Homes/Assisted Living	Moderate	No	Low	0
2490	HANCOCK SKILLED NURSING & REHAB CTR	Nursing Homes/Assisted Living	Moderate	No	Low	0
2491	JORDAN REHABILITATION & NURS CENTER	Nursing Homes/Assisted Living	Moderate	No	Low	0
2492	POND VIEW NURSING FACILITY	Nursing Homes/Assisted Living	Moderate	No	Low	0
2493	RECUPERATIVE SERVICES UNIT	Nursing Homes/Assisted Living	Low	No	High	0
2494	APAC Child And Family Service Ctr Child Care	Child Care	Low	No	Low	0
2495	Bright Horizon's Children's Center-Allston	Child Care	Low	No	Low	0
2496	Brighton/Allston Afterschool Enrichment Prog.	Child Care	Low	No	Low	0
2497	Fairy Tale Children's Center Inc.	Child Care	Moderate	No	Low	0
2498	HUNTINGTON AVE YMCA @ GARDNER PILOT ACADEMY	Child Care	Low	No	High	0
2499	Jackson-Mann Community Center School-Afterschool	Child Care	Low	No	Low	0
2500	Pine Village Preschool	Child Care	Low	No	High	0
2501	Rivendell Child Care Center	Child Care	Low	No	Low	0
2502	Wonder Years, Inc.	Child Care	Low	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2503	Allson Brighton St. Gabriel's Head Start	Child Care	Low	No	Low	0
2504	Edison After School Program	Child Care	Low	No	High	0
2505	Allston/Brighton APAC, Inc.	Child Care	Low	No	Low	0
2506	Leventhal-Sidman JCC/Brookline Preschool	Child Care	Low	No	High	0
2507	Oak Square YMCA @ Winship	Child Care	Low	No	High	0
2508	Camp Connolly	Child Care	Low	No	High	0
2509	Franciscan Family Child Care Center	Child Care	Low	No	High	0
2510	St. E's Children's Center	Child Care	Low	No	High	0
2511	Yal-Day-New Day Care Center	Child Care	Low	No	High	0
2512	Acorn Center for Early Education/Care	Child Care	Moderate	No	Low	2
2513	ARC-EN-CIEL Day Care and Montessori School	Child Care	Low	No	High	0
2514	Blackstone's New Adventure	Child Care	Moderate	No	Low	2
2515	Associated Early Care Education Inc. - Castle Square	Child Care	Moderate	No	Low	2
2516	Boston University Children's Center	Child Care	Moderate	No	Low	0
2517	Bright Horizons @ Seaport	Child Care	Moderate	No	Low	2
2518	Bright Horizons @ Seaport SACC Backup	Child Care	Moderate	No	Low	2
2519	Bright Horizons @125 Summer Street	Child Care	Moderate	No	Low	0
2520	Bright Horizons at One Financial Center	Child Care	Moderate	No	Low	0
2521	Bright Horizons Children's Center	Child Care	Moderate	No	Low	2
2522	Bright Horizons Children's Center at the Prudential Center	Child Care	Moderate	No	Low	0
2523	Bright Horizons Family Center at Landmark	Child Care	Moderate	AE	Low	2
2524	Bright Horizons Family Solution @ Beacon Hill	Child Care	Moderate	No	Low	0
2525	Buds and Blossoms Early Education and Care Center	Child Care	Moderate	No	Low	2
2526	Children's Hospital Child Care Center	Child Care	Moderate	No	Low	0
2527	Children's Place at Goodwin Procter	Child Care	Moderate	No	Low	2
2528	Children's Quarters Charlestown Navy Yard	Child Care	Moderate	No	Low	2
2529	Commonwealth Children's Center - RM 105A	Child Care	Moderate	No	Low	0
2530	Eagle's Nest Learning Center	Child Care	Moderate	No	Low	2
2531	Early Childhood Learning Lab	Child Care	Moderate	No	Low	2

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2532	Ellis Memorial Early Education and Care Program-STE 101	Child Care	Moderate	No	Low	2
2533	Ellis Memorial Children's Center	Child Care	Moderate	No	Low	2
2534	Ellis Memorial SAP at Madison Park Village	Child Care	Moderate	No	Low	2
2535	Families First Day Care	Child Care	Moderate	No	Low	2
2536	Government Center Child Care	Child Care	Moderate	No	Low	0
2537	Government Center Child Care Corp - O'Neil Federal Bldg	Child Care	Moderate	No	Low	2
2538	Harborview Children's Center	Child Care	Moderate	No	Low	1
2539	Huntington Ave YMCA @ Hurley School	Child Care	Moderate	No	Low	0
2540	Huntington Ave Day Camp	Child Care	Moderate	No	Low	2
2541	Infants and Other People	Child Care	Moderate	No	Low	2
2542	Kids Palace Learning Center, LLC.	Child Care	Moderate	No	Low	2
2543	Kinder Care Learning Center	Child Care	Moderate	No	Low	2
2544	Little Wonders Child Care Center	Child Care	Moderate	No	High	0
2545	MGH Back Up Children's Center - WARREN LOBBY SUITE 130	Child Care	Moderate	No	Low	2
2546	Millenium Day Care II	Child Care	Moderate	No	Low	0
2547	Millennium Day Care	Child Care	Moderate	No	Low	4
2548	North End Children's Center @ North End Health Center	Child Care	Moderate	No	Low	0
2549	North End Head Start	Child Care	Moderate	No	Low	0
2550	Old South Preschool	Child Care	Moderate	No	Low	2
2551	Park Street Kids, Inc.	Child Care	Moderate	No	Low	0
2552	Pine Village Preschool	Child Care	Moderate	No	Low	2
2553	Roxbury YMCA @ Blackstone School	Child Care	Moderate	No	Low	2
2554	RTH Children's Center	Child Care	Moderate	No	Low	0
2555	Russell J. Call Children's Center	Child Care	Moderate	No	Low	2
2556	Salvation Army After School Program	Child Care	Moderate	No	Low	2
2557	Soldiers Field Park Children's Center	Child Care	Moderate	No	Low	2
2558	South End Head Start	Child Care	Moderate	No	Low	0
2559	Spruce Street Nursery School	Child Care	Moderate	No	Low	0
2560	Sunrise Learning Academy LLC	Child Care	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2561	Sunshine Childcare	Child Care	Moderate	No	Low	2
2562	Tartt's Day Care Center II	Child Care	Moderate	No	Low	2
2563	The Children's Center at Ropes & Gray	Child Care	Moderate	No	Low	0
2564	The Children's Place At	Child Care	Moderate	No	Low	2
2565	The Frances Jacobson Early Childhood Center	Child Care	Moderate	No	Low	0
2566	Torit Language Center Montessori	Child Care	Moderate	No	Low	0
2567	Transportation Children's Center - RM 3330	Child Care	Moderate	No	Low	2
2568	United South End Settlements Child Development Program	Child Care	Moderate	No	Low	2
2569	Wang YMCA of Chinatown - SACC	Child Care	Moderate	No	Low	0
2570	Youth Education Program (YEP)	Child Care	Moderate	No	Low	2
2571	Anchor After School Program NAVY YARD	Child Care	Moderate	No	Low	2
2572	Boys & Girls Club of Boston @ Charlestown Club	Child Care	Moderate	No	Low	0
2573	Bright Horizons Childrens Center at the Schraffts	Child Care	Moderate	AE	Low	1
2574	Charlestown Cooperative Nursery School	Child Care	Moderate	No	Low	0
2575	Good Shepherd Preschool	Child Care	Moderate	No	Low	0
2576	J.F.K. Head Start and Day Care Program	Child Care	Moderate	No	Low	2
2577	Kent After School Program	Child Care	Moderate	No	Low	4
2578	MGH Children's Center - CAPTAINS QUARTERS	Child Care	Moderate	No	Low	2
2579	A Child's View	Child Care	Moderate	No	Low	0
2580	ABCD Walnut Grove Head Start	Child Care	Moderate	No	High	0
2581	ASPIRE After School Program/Alliance for inclusion & Prevention	Child Care	Moderate	No	High	0
2582	Au Co Preschool / Viet Aid After School Programs	Child Care	Low	No	High	0
2583	Basics Tutorial - Mather School	Child Care	Moderate	No	Low	0
2584	Basics Tutorial - Thomas Kenny School	Child Care	Moderate	No	High	0
2585	Basics Tutorial - William Monroe Trotter Sch.	Child Care	Moderate	No	High	0
2586	Bird St. After School Program @ Russell Elementary School	Child Care	Moderate	No	Low	0
2587	Boys and Girls Clubs Of Dorchester	Child Care	Moderate	No	Low	0
2588	Bradshaw Children's Learning Program	Child Care	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2589	Citizen Schools, Inc; (McCormack)	Child Care	Moderate	No	Low	2
2590	College Bound Dorchester Early Education at Little House	Child Care	Moderate	No	Low	0
2591	College Bound Dorchester Early Education at Log School	Child Care	Moderate	No	High	0
2592	College Bound Dorchester/Ruth Darling Child Cape Center	Child Care	Moderate	No	Low	0
2593	Columbia Point Infant Toddler Day Care	Child Care	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
2594	Crispus Attucks Children's Center	Child Care	Moderate	No	High	0
2595	Dimock Headstart	Child Care	Moderate	No	Low	0
2596	Eagle's Nest @ Boston College High School	Child Care	Moderate	No	Low	4
2597	ABCD EARLY HEADSTART	Child Care	Moderate	No	High	0
2598	Basics Tutorial - John Holland School	Child Care	Moderate	No	High	0
2599	Huntington Avenue YMCA @ Everett School	Child Care	Moderate	No	Low	0
2600	Huntington Avenue YMCA @ King K-8 School	Child Care	Moderate	No	Low	0
2601	Huntington AvenueYMCA @Winthrop	Child Care	Moderate	No	Low	0
2602	Murphy Community Center	Community Center	Moderate	No	High	2
2603	Neponset Child Care	Child Care	Moderate	No	High	0
2604	Project Hope Children's Center	Child Care	Moderate	No	Low	0
2605	Small Wonders Nursery School	Child Care	Moderate	No	High	4
2606	The Paul R. McLaughlin Center	Child Care	Moderate	No	Low	4
2607	UCCC @ Bird Street Youth Center	Child Care	Moderate	No	Low	0
2608	Yawkey Konbit Kreyol Center	Child Care	Moderate	No	High	0
2609	Hyde Park YMCA @ E. Greenwood	Child Care	Low	No	High	0
2610	Hyde Park YMCA OST Program	Child Care	Low	No	High	0
2611	Little Voices Early Care and Education	Child Care	Low	No	High	0
2612	South Side Head Start II	Child Care	Low	No	High	0
2613	Basics Tutorial - Mattahunt School	Child Care	Moderate	No	High	0
2614	Galivan Community Center	BCYF community center	Moderate	No	High	0
2615	Grove Hall Child Development Center	Child Care	Moderate	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2616	Hyde Park YMCA @ Chittick School	Child Care	Low	No	High	0
2617	Jubilee Academy Preschool	Child Care	Moderate	No	High	0
2618	La Ronde De Marie Claire Early Learning Center	Child Care	Moderate	No	High	0
2619	Marie Claire Quality Childcare Center Infant Palace	Child Care	Moderate	No	High	0
2620	Mattapan Head Start	Child Care	Moderate	No	High	0
2621	Mildred Ave Community Center ASP	BCYF community center	Moderate	No	High	0
2622	NECUB - Day Care	Child Care	Moderate	No	High	0
2623	Spark Center / Group and School Age Program	Child Care	Moderate	No	High	0
2624	St.Paul's Victory Assembly of God Learning Resource Center	Child Care	Moderate	No	High	0
2625	The Tabitha House	Schools	Moderate	No	High	0
2626	Children's Learning Center	Schools	Low	No	High	0
2627	Alliance for Inclusion & Prevention Inc.	Schools	Low	No	High	0
2628	Haley School & Boston Nature Center Afterschool Program	Child Care	Moderate	No	High	0
2629	Little People's Playhouse	Child Care	Moderate	No	High	0
2630	Little People's Playhouse SACC	Child Care	Low	No	High	0
2631	Roslindale Community Center After School	Child Care	Low	No	High	0
2632	Southside Head Start	Child Care	Low	No	High	0
2633	The Hill School	Child Care	Low	No	High	0
2634	Therapeutic After School Program (TASP)	Child Care	Low	No	High	0
2635	Village Preschool	Child Care	Low	No	High	0
2636	West Roxbury YMCA @ Phineas Bates	Child Care	Low	No	High	0
2637	West Roxbury YMCA@Sacred Heart Preschool & School Age	Child Care	Low	No	High	0
2638	ABCD Head Start	Child Care	Moderate	No	Low	0
2639	ABCD Head Start @ Lenox Street	Child Care	Moderate	No	Low	0
2640	Above & Beyond SACC Program @ Moreland Street		Moderate	No	Low	0
2641	Bird Street Before and After school Program @ Orchard Gardens	Child Care	Moderate	No	Low	0
2642	Bird Street Cmty Ctr. ASP@ Higginson-Lewis K2-8 Before and After School Program	Child Care	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2643	Boys and Girls Clubs @ Yawkey Club	Child Care	Moderate	No	Low	0
2644	Children's Services of Roxbury Early Care & Education Center	Child Care	Moderate	No	Low	0
2645	Dimock Early Headstart	Child Care	Moderate	No	High	0
2646	Eliot Educational Center	Schools	Moderate	No	Low	0
2647	Goodwill Mellon Academy	Schools	Moderate	No	Low	2
2648	Hawthorne After School Program	Child Care	Moderate	No	Low	0
2649	Huntington Avenue YMCA @ Mason School	Child Care	Moderate	No	Low	4
2650	Paige Academy	Schools	Moderate	No	Low	0
2651	Paige Academy School Age Child Care	Child Care	Moderate	No	Low	0
2652	Rosa Parks Day Care Center	Child Care	Moderate	No	Low	0
2653	Roxbury Weston Programs Inc. SACC/CATCH	Child Care	Moderate	No	Low	0
2654	Roxbury YMCA Child Care Center	Child Care	Moderate	No	Low	0
2655	S.M.I.L.E Pre School Team	Schools	Moderate	No	Low	0
2656	Smile Preschool	Child Care	Moderate	No	Low	0
2657	Sunnyside Day Nursery	Child Care	Moderate	No	Low	0
2658	The Abantwana Learning Center	Schools	Moderate	No	High	0
2659	The Edgerley Family Community Children's Center	Child Care	Moderate	No	High	0
2660	The Gate House Head Start Program	Child Care	Moderate	No	High	0
2661	Twelfth Baptist Church After School Program	Child Care	Moderate	No	Low	0
2662	UCCC @ Ellis	Child Care	Moderate	No	High	0
2663	UCCC @ Emerson	Child Care	Moderate	No	Low	0
2664	UCCC @ Nathan Hale	Child Care	Moderate	No	Low	0
2665	Vine St. Community Centers - SACC Program	Child Care	Moderate	No	Low	0
2666	Children's Happy Day School	Child Care	Low	No	High	0
2667	Kids Club Childcare and Preschool Center Inc	Child Care	Low	No	High	0
2668	Kids Stop	Child Care	Low	No	High	0
2669	May Behavioral Health Children's After Sch. Pro	Child Care	Low	No	High	0
2670	Ohrenberger Community Center School Age Child Care	Child Care	Low	No	High	0
2671	Parkway Preschool Center	Child Care	Low	No	High	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2672	Sunny Bear Academy	Schools	Low	No	High	0
2673	The Childrens House of Owls Head	Child Care	Low	No	High	0
2674	The Light House Early Learning Center	Schools	Low	No	High	0
2675	Tot Spot Child Development Center	Child Care	Low	No	High	0
2676	W.Roxbury/Roslindale YMCA @ Joyce Kilmer	Child Care	Low	No	High	0
2677	Welcome Child Care & Preschool Center, Inc	Child Care	Low	No	High	0
2678	West Roxbury YMCA @ Lyndon	Child Care	Moderate	No	Low	0
2679	Willow Path Childcare	Child Care	Low	No	High	0
2680	Scamper Camp	Child Care	Low	No	High	0
2681	East Boston - Head Start/Elbow	Child Care	Moderate	No	Low	1
2682	East Boston Head Start Social Center	Child Care	Moderate	No	Low	1
2683	East Boston Head Start St. Johns	Child Care	Moderate	No	Low	0
2684	East Boston Head Start-Bennington	Child Care	Moderate	No	Low	0
2685	East Boston Montessori School	Child Care	Moderate	No	Low	2
2686	East Boston YMCA @ Alighieri	Child Care	Moderate	No	Low	2
2687	East Boston YMCA @ Curtis Guild	Child Care	Moderate	No	Low	0
2688	East Boston YMCA @ Samuel Adams	Child Care	Moderate	No	Low	0
2689	East Boston YMCA Children's Center & O.S.T. @ Bremen St.	Child Care	Moderate	AE	Low	1
2690	East Boston YMCA O.S.T. @ Kennedy School	Child Care	Moderate	No	Low	0
2691	East Boston YMCA O.S.T. @ McKay	Child Care	Moderate	No	Low	2
2692	Harbor Area Early Childhood Service	Child Care	Moderate	No	Low	0
2693	Jeffries Point Child Care	Child Care	Moderate	No	Low	0
2694	Oh Yes Orient Heights Young Explorers	Child Care	Moderate	No	Low	0
2695	Shining Star Day Care	Child Care	Moderate	No	Low	2
2696	Swift Waters After School Programs	Child Care	Moderate	No	Low	0
2697	Terri's Little Pumpkins II, Inc.	Child Care	Moderate	No	Low	4
2698	YMCA East Boston @ Ashley Street Camp	Child Care	Moderate	No	Low	2
2699	Citizen Schools @ The Gavin Middle School	Schools	Moderate	No	Low	0
2700	Condon Community Center	BCYF community center	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2701	Julie's Family Learning Program	Schools	Moderate	No	Low	0
2702	Old Colony Headstart	Child Care	Moderate	No	Low	2
2703	South Baptist Head Start	Child Care	Moderate	No	Low	0
2704	South Boston Clubhouse After School Day Care	Child Care	Moderate	No	Low	0
2705	South Boston Head Start	Child Care	Moderate	No	Low	2
2706	South Boston Head Start @ West Broadway	Child Care	Moderate	No	Low	0
2707	South Boston Neighborhood House	Child Care	Moderate	No	Low	0
2708	South Boston Neighborhood House Preschool	Child Care	Moderate	No	Low	2
2709	ALEXANDER HAMILTON	Schools	Low	No	High	0
2710	BOSTON CHILDREN'S SCHOOL ANNEX	Schools	Moderate	No	Low	2
2711	LITTLE PEOPLE'S PLAYHOUSE II	Child Care	Low	No	High	0
2712	BRIGHT BEGINNINGS PRESCHOOL	Child Care	Moderate	No	High	0
2713	NOTRE DAME MONTESSORI SCHOOL	Child Care	Moderate	No	Low	4
2714	BEACON HILL NURSERY SCHOOL	Child Care	Moderate	No	Low	0
2715	NAZARETH CHILD CARE CENTER	Child Care	Moderate	No	High	0
2716	LITTLE FOLKS COMMUNITY DAY CARE	Child Care	Moderate	No	Low	0
2717	WESLEY CHILD CARE CENTER	Child Care	Moderate	No	High	0
2718	N.I.C.E. INC.	Child Care	Moderate	No	High	0
2719	TRANSPORTATION CHILDREN'S CENT	Child Care	Moderate	No	Low	0
2720	GROVE HALL CHILD DEVELOPMENT C	Child Care	Moderate	No	High	0
2721	LITTLE SCHOLARS' WORKSHOP, INC	Schools	Moderate	No	High	0
2722	BOSTON CHILDREN'S SCHOOL	Schools	Moderate	No	Low	0
2723	COOPER COMMUNITY CHILD DEVELOP	Schools	Moderate	No	Low	0
2724	BRIDGE CHILDREN'S CENTER	Schools	Moderate	No	Low	2
2725	CHILDREN'S AIDS PROGRAM (SPARK)	Hospitals	Moderate	No	High	0
2726	CITY HALL DAY CARE	Child Care	Moderate	No	Low	0
2727	CITY OF BOSTON/ELLEN JACKSON		Moderate	No	Low	0
2728	CITY OF BOSTON/PERKIN COMM. CTR.	Community center	Moderate	No	High	0
2729	ELLEN JACKSON DAYCARE CTR.	Child Care	Moderate	No	Low	0

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

ID#	NAME	TYPE	LANDSLIDE	FLOOD ZONE	SNOW FALL	HURR SURGE
2730	FANEUIL AFTER SCHOOL	Child Care	Low	No	High	0
2731	JAMAICA PLAIN FOR FOURS	Child Care	Low	No	High	0
2732	RED OAK AFTER SCHOOL PROGRAM	Child Care	Moderate	No	Low	0
2733	SMALL WONDERS	Child Care	Low	No	High	0
2734	SPARKS CENTER	Hospitals	Moderate	No	Low	2
2735	TINY TOTS	Child Care	Moderate	0.2 PCT ANNUAL CHANCE	Low	2
2736	CHILD FOCUS CENTER	Schools	Moderate	No	Low	0
2737	UMASS/BOSTON EARLY LEARNING CE	Child Care	Moderate	No	Low	2
2738	TARTT'S DAY CARE CENTER AND PR	Child Care	Moderate	No	Low	0
2739	PAIGE ACADEMY AT RCC	Schools	Moderate	No	Low	0
2740	JOHN WINTHROP SCHOOL	Schools	Moderate	No	Low	2
2741	COPPER BEECH MONTESSORI SCHOOL	Child Care	Moderate	No	High	0

APPENDIX E
Description of Faraday Cages
(Solar Storm Mitigation)

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Faraday Cages

A Faraday Cage is described as an enclosure made of conducting materials that will block external electric fields that are both static and non-static. This cage is used to protect sensitive electronic equipment from electrostatic discharges that can occur during solar storms and Nuclear Electromagnetic Pulse (EMP) events.

An Electromagnetic Pulse will induce a voltage in sensitive electronic equipment even if the equipment is powered down. Since this voltage can be quite large in an EMP it can cause damage in the sensitive components that make up circuit boards. This voltage will permanently damage those electronic devices.

Faraday cages can be built out of a lot of material. Used microwaves (cord must be cut off), galvanized steel trash cans, old ammo cans and Conex boxes are some of the materials that can be used. The key is to wrap each item that you want to protect in an electrostatic bag or heavy duty aluminum foil and then insulate it further with a bubble wrap protective barrier. Then this “protected” device can be placed into the galvanized steel container (microwave, ammo can etc...). The individual protected item cannot directly touch any of the steel container. This is why the device is wrapped in the protective bubble wrap.

The best approach is a layered approach of placing smaller items in a smaller container like an ammo can and then placing this receptacle in a larger container like a galvanized steel trash can. The trash receptacle can then be placed in the Conex box. Since we will never know when an EMP can occur from either a Solar Pulse or a Nuclear detonation, the best method of protection is to place redundant equipment into a Faraday Cage. Items that should be considered would include the following:

- 1.) Licensed Radio Equipment
- 2.) Amateur Radio Equipment
- 3.) FRS/GMRS radios
- 4.) Solar Battery Chargers
- 5.) Computer equipment (laptops)
- 6.) Portable Hard drives with key information on it
- 7.) Generators
- 8.) Digital Cameras
- 9.) LED Flashlights
- 10.) Inverters
- 11.) Electronic Medical Equipment
- 12.) Batteries for the Electronic equipment

Local preparations for this type of event should revolve around public safety departments ensuring that they have redundant communications gear, laptop computers and charging devices for both stored in localized Faraday cages. At a minimum the redundant devices mentioned plus other mentioned above should be wrapped in heavy duty aluminum foil and then wrapped in bubble wrap. Once items are secured, these devices can then be stored in a galvanized steel trash can with a tight fitting lid. For extra protection these trash cans can then be stored in a steel Conex box. This layered approach will provide the best opportunity for these devices to survive the EMP.

APPENDIX F

DOCUMENTATION OF THE PLANNING PROCESS

- Metro Boston Hazard Mitigation Team
- Hazard Mitigation Executive Steering Committee
- Boston Water and Sewer Commission
- Regulation Working Group
- Facilities Working Group
- Infrastructure Working Group
- Public Safety Working Group
- Attendance at the Collaborative Working Group Meetings
- Natural Hazard Mitigation Meeting on the NOAA Tide Gauge during Hurricane Sandy

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Don Boyce
DIRECTOR



Edward M. Lambert Jr.
COMMISSIONER



Marc D. Draisen
EXECUTIVE DIRECTOR

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

Metro Boston Hazard Mitigation Planning Team

First Meeting

Wednesday, April 13, 10:00 AM

Everett City Hall, Keverian Room (3rd floor)
484 Broadway (Route 99), Everett

AGENDA

**METRO BOSTON
HAZARD MITIGATION
PLANNING TEAM**

Boston
Brookline
Cambridge
Chelsea
Everett
Malden
Medford
Somerville

10:00 WELCOME & INTRODUCTIONS

10:10 OVERVIEW OF HAZARD MITIGATION PLANNING & GRANTS

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

10:30 UPDATING THE METRO BOSTON HAZARD MITIGATION PLAN

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

**11:00 GETTING STARTED: MAPPING AND CRITICAL FACILITIES DATABASE
FOR THE METRO BOSTON PLAN UPDATE**

- Susan Brunton, GIS Analyst, MAPC

11:20 NEXT STEPS

11:30 ADJOURN

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

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**Meeting Agenda
Boston Hazard Mitigation Plan
Steering Committee**

February 8, 2012 10:30 AM - 12:00 PM
Boston City Hall
Conference Room 608

1. Explain the Hazard Mitigation Planning process and purpose
2. Discuss and Confirm Goals & Objectives (2008 Goals & Objectives on reverse)
3. Discuss public engagement under this process
4. Discuss the schedule and staff participation
5. Share maps and SERI process

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, and Somerville. MAPC is working with the eight 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, floodplain mapping, or a community's Comprehensive Emergency Management Plan (CEMP) 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.

60 Temple Place, Boston, MA 02111 • 617-451-2770 • Fax 617-482-7185 • www.mapc.org

Michelle Ciccolo, *President* • Lynn Duncan, *Vice President* • Marilyn Contreas, *Secretary* • Taber Keally, *Treasurer* • Marc Draisen, *Executive Director*

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**Meeting Agenda
Boston Hazard Mitigation Plan
Steering Committee**

September 6, 2012 10:30 AM - 12:00 PM
Boston City Hall
Conference Room 608

1. Overview of the Hazard Mitigation Planning purpose and process
2. Discuss Hazard Mitigation Measures for the plan
 - a. Review, modify as needed, and confirm list of Hazard Mitigation measures
 - b. Identify additional information needed by department
 - c. Review, modify as needed, and confirm priorities for Hazard Mitigation measures
3. Additional information needed on status of existing Hazard Mitigation Measures
4. Discuss public engagement
 - a. City web site
 - b. Outreach to stakeholders & neighboring communities
 - c. Second public meeting
5. Next steps

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, and Somerville. MAPC is working with the eight 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, floodplain mapping, or a community's Comprehensive Emergency Management Plan (CEMP) 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.

60 Temple Place, Boston, MA 02111 • 617-451-2770 • Fax 617-482-7185 • www.mapc.org

Michelle Ciccolo, President • Lynn Duncan, Vice President • Marilyn Contreas, Secretary • Taber Keally, Treasurer • Marc Draisen, Executive Director

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**Meeting Agenda
Boston Hazard Mitigation Planning Team**

January 30, 2012 11:00 AM - 2:00 PM

Boston Water & Sewer Commission

980 Harrison Avenue

3rd Floor Engineering Conference Room

The purposes of this meeting are to:

1. Explain the Hazard Mitigation Planning process and purpose,
2. explain the VCAPS process as it is broadly used to characterize vulnerability to climate change in different places,
3. work with meeting attendees to build template diagram(s) that will serve as the baseline for describing vulnerability to flooding in Boston in terms of the causes and impacts, and
4. decide how to move ahead with constructing more detailed VCAPS diagrams with larger group of participants that will focus on identifying mitigation actions across a range of physical improvements, management activities, and regulatory changes.

11:00 Introductions (10 min)

11:10 Clarify purpose and agenda (5 min)

11:15 Explain VCAPS and give examples, answer questions (15 min)

11:30 Build VCAPS template diagram (1 hour)

12:30 BREAK (15 min)

12:45 Build second/third VCAPS template diagram(s) or continue to refine first diagram (45 min)

1:30 Discuss next steps: How to move ahead? Strategy and logistics. Who will be involved in moving these diagrams to the next level? When will it happen? How will it feed the HMP process?

2:00 Adjourn

60 Temple Place, Boston, MA 02111 • 617-451-2770 • Fax 617-482-7185 • www.mapc.org

Michelle Ciccolo, President • Lynn Duncan, Vice President • Marilyn Contreas, Secretary • Taber Keally, Treasurer • Marc Draisen, Executive Director

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**Meeting Agenda
Boston Hazard Mitigation Plan Update
Infrastructure Group
Boston, MA**

March 28, 2012 10:00 AM - 12:30 PM
Boston City Hall
BRA Boardroom, 9th Floor, Room 900

In order to make this meeting time as efficient as possible, we ask that all meeting participants review the following materials in advance of the meeting:

- Attendance list
- Worksheet on existing mitigation measures and those proposed in the 2008 plan
- HAZUS info sheet and outcomes summary
- SERI Stormwater Narrative

1. Overview of Project Scope and Status – 5 minutes
2. Introduce Boston Hazard Mitigation Planning map series and digitized ortho photo – 10 minutes
3. Boston HAZUS Results -15 minutes
4. Review SERI's diagramming process and present outcomes from BWSC meeting – 20 minutes
5. Characterize hazards from flooding, extreme temps, winter storms – 45 minutes
6. List Potential Mitigation Measures utilizing the diagram and maps – 30 minutes
7. Present outcomes of group work – 20 minutes
8. Wrap up – 5 min

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, and Somerville. MAPC is working with the eight 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, floodplain mapping, or a community's Comprehensive Emergency Management Plan (CEMP) 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.

60 Temple Place, Boston, MA 02111 • 617-451-2770 • Fax 617-482-7185 • www.mapc.org

Michelle Ciccolo, President • Lynn Duncan, Vice President • Marilyn Contreas, Secretary • Taber Keally, Treasurer • Marc Draisen, Executive Director

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**Meeting Agenda
Boston Hazard Mitigation Plan Update
Regulation Group
Boston, MA**

April 4, 2012 10:00 AM - 12:30 PM
Boston City Hall
BRA Boardroom, 9th Floor, Room 900

In order to make this meeting time as efficient as possible, we ask that all meeting participants review the following materials in advance of the meeting:

- Worksheet on existing mitigation measures and those proposed in the 2008 plan
- SERI Stormwater Narrative

1. Overview of Project Scope and Status – 5 minutes
2. Introduce Boston Hazard Mitigation Planning map series and digitized ortho photo – 10 minutes
3. Boston HAZUS Results -15 minutes
4. Review SERI's diagramming process and present and discuss outcomes from previous meetings – 40 minutes
5. Characterize the real estate development process as it relates to the potential impacts of flooding and hurricanes/northeasters – 35 minutes
6. List Potential Mitigation Measures utilizing the diagram– 30 minutes
7. Present outcomes of group work –10 minutes
8. Wrap up – 5 min

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, and Somerville. MAPC is working with the eight 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, floodplain mapping, or a community's Comprehensive Emergency Management Plan (CEMP) 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.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**DRAFT
Meeting Agenda
Boston Hazard Mitigation Plan Update
Regulation Group
Boston, MA**

April 25, 2012 10:00 AM - 12:30 PM
Boston City Hall
BRA Boardroom, 9th Floor, Room 900

1. Overview of Project Scope and Status
2. Boston HAZUS Results (Potential Impacts of Flooding, Hurricanes, & Earthquakes)
3. Unreinforced Masonry Building Pilot Study (Specific Impacts of Earthquakes & Other Hazards)
4. Discuss Outcomes of Previous Meetings
5. Identify Potential Mitigation Measures
6. Wrap up

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, and Somerville. MAPC is working with the eight 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, floodplain mapping, or a community's Comprehensive Emergency Management Plan (CEMP) 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.

60 Temple Place, Boston, MA 02111 • 617-451-2770 • Fax 617-482-7185 • www.mapc.org

Michelle Ciccolo, *President* • Lynn Duncan, *Vice President* • Marilyn Contreas, *Secretary* • Taber Keally, *Treasurer* • Marc Draisen, *Executive Director*

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



Smart Growth & Regional Collaboration

**Meeting Agenda
Boston Hazard Mitigation Plan Update
Public Safety Group
Boston, MA**

May 10, 2012 10:00 AM - 12:30 PM
Boston City Hall
BRA Boardroom, 9th Floor, Room 900

1. Overview of Project Scope and Status
2. Boston HAZUS Results (Potential Impacts of Flooding, Hurricanes, & Earthquakes)
3. Presentation: Fire as a Natural Hazard – Hylton Haynes, National Fire Protection Association
4. Discuss Outcomes of Previous Meetings – SERI Presentation
5. Where are the areas of concern for each hazard? – Mapping exercise
 1. Flooding
 2. Wind
 3. Snow
 4. High Temperatures
 5. Fire
 6. Earthquake
6. Wrap up

Project Overview - MAPC received a grant to update *Hazard Mitigation Plans* for the communities of Boston, Brookline, Cambridge, Chelsea, Everett, Malden, Medford, Melrose, and Somerville. MAPC is working with the eight 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, floodplain mapping, or a community's Comprehensive Emergency Management Plan (CEMP) 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.

60 Temple Place, Boston, MA 02111 • 617-451-2770 • Fax 617-482-7185 • www.mapc.org

Michelle Ciccolo, President • Lynn Duncan, Vice President • Marilyn Contreas, Secretary • Taber Keally, Treasurer • Marc Draisen, Executive Director

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Attendance at the Collaborative Working Group Meetings	
Name	Representing
Infrastructure Group, March 28, 2012	
Donald Burgess	BTD
Chris Busch	BCC
William Foley	BWSC
Aldo Ghirin	Boston Parks and Recreation
Valeria Gingrich	CZM
William Gode	DCR—Flood Control-Charles River Dam
Pat Haswell	Veolia
Michael Hornbrook	MWRA
Heather Hume	MBTA
Para Jayasinghe	PWD
Marcis Kempe	MWRA
Joseph Lima	Houghton Chemical
Rick McCullogh	MassDOT
Joseph Pelczarski	EEA/CZM
Don Silvia	Veolia
Christian Simonelli	BGWT
Maurice Smith	PWD
Carl Spector	EM
John Sullivan	BWSC
Brad Wellock	MASSPORT
Elaine Sudanowicz	OEM
James Freas	MAPC
Martin Pillsbury	MAPC
Sarah Danly	MAPC
Elizabeth Oriel	SERI
Seth Tuler	SERI
Tom Webler	SERI
Regulation Group April 4, 2012	
Kathryn Aldrich	Disability Comm.
Chris Busch	BED
John Dalzell	BRA
Neenah Estrella-Luna	Northeastern University
Lynda Fraley	OBM
Jim Greene	ESC
Elliott Laffer	BGWT
Ellen Lipsey	BLC
Michael Mackan	ISD
Tula Mahl	Elderly Affairs
Paul Osborn	BRA/EDIC
Greg Rooney	BTD
Christian Simonelli	BGWT

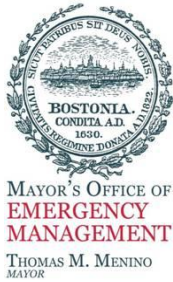
**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Attendance at the Collaborative Working Group Meetings	
Carl Spector	BED
Jack Tracy	BPHC
Elaine Sudanowicz	OEM
James Freas	MAPC
Martin Pillsbury	MAPC
Elizabeth Oriel	SERI
Seth Tuler	SERI
Tom Webler	SERI
Buildings and Facilities Group <i>April 25, 2012</i>	
Robert Burger	UMB
Bill Cai	BHA
Mike Catsos	NESEC
Martha Clark	COSTEP MA
Michael Comeau	COSTEP MA
Robert Dillon	BPHC
Lori Foley	COSTEP MA
Lynda Fraley	OBM
Ed Fratto	NESEC
Ben Haavik	Historic New England
James Lane	ISD
Carlene Laurent	PCMD
Harold McGonagle	ISD
Anne Marie McLaughlin	UMB
Jim Meade	BPL
Steve O'Brien	BPHC
Gordon Otis	Aon
Matt Ottinger	Boston History Society, Old State House
Lisa Pena	NFS
Belkis Roman	BPHC
John Sinagra	COB PMD
James Smith	DND
Joseph Spinelli	BHA
Gregor Trinkaus-Randall	MBLC
Kevin Wood	BHA
Elaine Sudanowicz	OEM
James Freas	MAPC
Elizabeth Oriel	SERI
Seth Tuler	SERI
Thomas Webler	SERI
Public Safety Group <i>May 10, 2012</i>	
Lydia Agro	BHA
Michael Colanti	BPHC/EMS
Rick Deraney	BPS

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Attendance at the Collaborative Working Group Meetings	
Emma DeSimone	OEM
John Dolan	BFD
Rene Fielding	OEM
Richard Gagnon	BSOB
John Hardman	BFD
Hylton Haynes	NFPA
Joseph McNiff	BPD
Stephen Melia	BHA
Paul Shoemaker	BPHC
Albe Simenas	Mass DEP
Carl Spector	BED
John Sullivan	BWSC
Eric Weston	School Police
Elaine Sudanowicz	OEM
James Freas	MAPC
Martin Pillsbury	MAPC
Sarah Danly	MAPC
Elizabeth Oriel	SERI
Seth Tuler	SERI

CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE



NOAA National Weather Service – Taunton Natural Hazard Mitigation Meeting with the City of Boston on the NOAA Boston Harbor Tide Gage during Hurricane Sandy

On December 11, 2012, NWS-Taunton briefed the City of Boston on their concern that a storm like Sandy but a little further north and coincident with a high spring tide could cause the Boston Harbor Tide Gage to exceed its high water mark of 15.25 feet above Mean Lower Low Water (MLLW) established during the 1978 Blizzard.

The timing of super-nor'easter Sandy's move toward Boston during low tide was advantageous to the City of Boston. If it were not for the timing and direction of Sandy, the City of Boston would have experienced greater coastal inundation resulting in damaging flooding. As OEM closely monitored Hurricane Sandy move up the Atlantic coast, there was a very strong Canadian High over Newfoundland and a very strong low pressure system moving west over the Appalachians. Like two gears running opposite of the other the high and the low pushed Sandy into New York and New Jersey and not directly toward the City of Boston. It is well within the realm of possibility that the Boston tide gage will exceed that value to at least the tune of 16 or 17 feet MLLW given a 4 to 6 foot storm surge on a high spring tide. In fact, a 6 foot storm surge (very infrequent but not unheard of) on top of a 12 foot MLLW astronomical high tide, which occurs a few times each year, would result in a very problematic 18 foot MLLW storm tide for Boston Harbor. One would expect to see an increasing risk of attaining such a value in a storm with continued sea level rise.

The meeting was held in the Environment Department at Boston City Hall, Conference Room 603 from 2:00 pm until 4:00pm. The individuals who participated in the meeting include:

Leah Bamberger, Administrative Assistant, Mayor's Office of Environmental and Energy Services
Nicole M. Belk, Senior Hydrologist, NOAA NWS Forecast Office - Taunton
Chris Busch, Senior Waterfront Planner, Boston Redevelopment Authority
Rene Fielding, Mayoral Cabinet Chief and Director, Mayor's Office of Emergency Management
Stephanie Krueel, Flood Plain Manager and Executive Director, Boston Conservation Commission
Carl Spector, Executive Director, Air Pollution Control Commission, Environment Department
Elaine M. Sudanowicz, Interagency Coordinator, Mayor's Office of Emergency Management
John Sullivan, Chief Engineer, Boston Water and Sewer Commission
Brian Swett, Mayoral Cabinet Chief and Director, Office of Environmental and Energy Services
Robert M. Thompson, Meteorologist-in-Charge, NOAA NWS Forecast Office - Taunton

Elaine M. Sudanowicz
Interagency Coordinator
Mayor's Office of Emergency Management

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

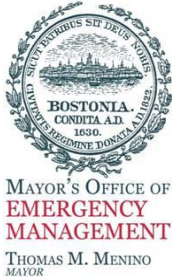
Friday, November 22, 2013 from 8:00am to 4:30pm at Boston College

High Water Scenario for Boston

Two events in just the past three years had the potential to produce major, if not more aptly termed, extreme, coastal flooding of the City of Boston. These events, one on February 26, 2010 and another being Hurricane Sandy, had the potential with a relatively modest adjustment in track and/or timing to set a new record high water level in Boston Harbor. Each event had the potential to exceed the Blizzard of February 1978 high water mark by one to one and a half feet. The City of Boston along with state and federal partners have begun to take a serious look at the coastal flood potential due to sea level rise and have begun to establish strategic planning to address and mitigate this threat. Recent events have illustrated, however, that the risk of very debilitating coastal flooding is already with us. The purpose of this seminar is to look at plans and resources to assist with more tactical responses if the City of Boston were to be threatened next week or next month with major coastal flooding exacerbated by heavy rainfall in the lower Charles River Basin.

This seminar is structured about the review of plans and resources to address a 17 to 17.5 foot Mean Lower Low Water (MLLW) storm tide in Boston Harbor. This scenario will assume a storm surge of 5.5 to 6 feet on top of a spring tide of 11 to 11.5 feet MLLW. Spring tides of 11 feet or greater typically occur several times every month when the gravitational pull of the sun and moon are in synch (full and new moon cycles with the highest levels when the moon is also at perigee in its orbit). Inundation maps suggest relatively widespread inundation of normally dry land in Boston with such a scenario. One would also expect serious flooding via backwater in harbor-directed drainage systems – a largely unseen but potentially extreme impact as discovered during Sandy in New York City. Such an event would be expected to have water lapping over at least portions of the Charles River Dam structure given a 1 to 2 foot wind wave in inner Boston Harbor. A tropical cyclone on a track like Sandy only 150 to 200 miles further north or a major winter nor'easter similar to the Blizzard of 2013 during the spring high tide cycle is each capable of yielding such a scenario. Such storms have historically also produced heavy precipitation. For the backdrop scenario to this seminar, we will assume that the storm dumps about 6 inches of rain in the lower Charles River Basin within a 12 hour period just prior to the peak storm tide. Such would be out of the ordinary but definitely plausible. The capability of the Charles River Dam to pump water out of the river is substantial, and this scenario would not be expected to exceed the design capacity of this facility. Nevertheless, such a high water scenario would place operations of the Charles River Dam in uncharted territory with respect to actual experience. Similarly, the combination of such high storm tides and fresh water runoff may place stresses on the Mystic and Neponset basins beyond the memory of most, if not all, people living today.

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



**City of Boston
Natural Hazard Mitigation Plan
Resolution Review Meeting**

On Wednesday, January 16, 2013, the City of Boston's Office of Emergency Management (OEM) and the Environment Department met with the Metropolitan Area Planning Council (MAPC) for the purpose of resolving any outstanding issues during the review and preliminary crosswalk of the City of Boston Natural Hazard Mitigation Plan.

The meeting was held in the Environment Department at Boston City Hall, Room 805 from 10:00 am until 11:30am. The individuals who participated in the meeting include:

Emma DeSimone, Regional Catastrophic Planner, OEM

Christina Maryland, Director of Communication and External Affairs, OEM

Cadet Brian C. Mulvey, Massachusetts Maritime Academy, Intern OEM

Martin Pillsbury, Manager of Regional Planning Services, MAPC

Carl Spector, Executive Director, Air Pollution Control Commission, Environment Department

Elaine M. Sudanowicz, Interagency Coordinator, OEM

Elaine M. Sudanowicz
Interagency Coordinator
Mayor's Office of Emergency Management

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

**APPENDIX G
DOCUMENTATION OF PUBLIC PARTICIPATION**

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

HAZARD MITIGATION PLAN

PUBLIC MEETING

Natural hazards can be devastating for the City of Boston and its residents.



The Boston Hazard Mitigation Plan presents a strategy for reducing the City's vulnerability to the impacts of natural hazard events such as flooding, hurricanes, and winter storms.

Join the Boston Conservation Commission in a discussion about the Boston Hazard Mitigation Plan

DATE: WEDNESDAY, APRIL 18, 2012

TIME: 6:00PM

LOCATION: BOSTON CITY HALL, ROOM 801

For more information or those requiring special accommodations, please contact:
Elaine Sudanowicz via phone 617.635.1400 or
email elaine.sudanowicz@cityofboston.gov



**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

<p style="text-align: center;">Attendance at Public Meeting Boston Conservation Commission April 18, 2012</p>	
Name	Organization or Neighborhood
<i>First Public Meeting, April 18, 2012</i>	
Chris Busch	Conservation Commission
Charles Button	Conservation Commission
John Lewis	Conservation Commission
Vivien Li	Conservation Commission
Toni Pollak	Conservation Commission
Glenn Field	National Weather Service; Taunton
Rene Fielding	City of Boston
Lori Foley	Heritage Preservation
Lorie Hayes	Boston Climate Action Network
Tucker Husband	Mission Hill/Longwood
Anne Marie McLaughlin	UMass Boston
Richard Parr	A Better City
Gregor Trinkaus-Randall	COSTEP
Kenneth Ward	Jamaica Plain
Zara Zsido	Roxbury
Elaine Sudanowicz	OEM
James Freas	MAPC
Martin Pillsbury	MAPC
Sarah Danly	MAPC

PUBLIC MEETING

HAZARD MITIGATION PLAN REVIEW

Natural hazards can be devastating for the City of Boston and its residents.



The Boston Hazard Mitigation Plan presents a strategy for reducing the City's vulnerability to the impacts of natural hazard and climate change events, such as heat waves, flooding, hurricanes, and winter storms.

Join the Boston Conservation Commission in a review of the
BOSTON HAZARD MITIGATION PLAN (DRAFT)

DATE: Wednesday, September 18, 2013

TIME: 6:00PM

LOCATION: Boston City Hall, Room 801

For more information or those requiring special accommodations, please contact:
Elaine Sudanowicz via phone: 617.635.1400 or
email: elaine.sudanowicz@cityofboston.gov



CITY OF BOSTON HAZARD MITIGATION PLAN REVISED DRAFT 2014 UPDATE

Facebook Posting for Sept. 18, 2013 Public Meeting



LEGAL NOTICES	LEGAL NOTICES	LEGAL NOTICES
<p align="center">PUBLIC HEARING NOTICE</p> <p>In accordance with the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40, the Boston Conservation Commission will hold a public hearing in Boston City Hall Room 801 on Wednesday, September 18, 2013 at 6:00PM to review the following project to determine what conditions, if any, the Commission will impose in order to protect the interests of the public and private water supply, ground water, prevention of pollution, flood control, prevention of storm damage, protection of fisheries and land containing shellfish, and protection of wildlife habitat:</p> <p>Review of the Draft Boston Hazard Mitigation Plan http://www.cityofboston.gov/environment/mitigationplan.asp</p> <p>For the Commission, Stephanie Krueel, Executive Secretary</p> <p align="right">Sept 10</p>		

Boston Herald Legal Notice, September 10, 2013

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**



**CITY OF BOSTON
THE ENVIRONMENT DEPARTMENT**

Boston City Hall, Room 805 • Boston, MA 02201 • 617/635-3850 • FAX: 617/635-3435

**PUBLIC HEARING
September 18, 2013**

In accordance with the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40, the BOSTON CONSERVATION COMMISSION will hold a public hearing in Boston City Hall, Room 801 on September 18, 2013 to review the following projects to determine what conditions, if any, the Commission will impose in order to protect the interests of the public and private water supply, ground water, prevention of pollution, flood control, prevention of storm damage, protection of fisheries and land containing shellfish, and protection of wildlife habitat:

6:00 PM Review of the Draft Boston Hazard Mitigation Plan

7:00 PM Notice of Intent for DEP File No. 006-1359 from Shipyard Quarters Marina, Rehabilitation and Reconfiguration of berth slips, access docks and wave attenuators, 1 13th St, Piers 6 & 8, Charlestown, Boston Harbor (Land Under Ocean)

7:30 PM Request for Extension of OOC for DEP File No. 006-0971, Charles River Basin Shoreline Vegetation Management Plan

7:35 PM *Updates and General Business*

- Requests for Certificates of Compliance
 - DEP File No. 006-1185 from Massport for Boston Fish Pier Parking Modifications, 212 Northern Ave
 - DEP File No. 006-1194 from Massport for Electrification of Berths at Fish Pier, 212 Northern Ave
 - DEP File No. 006-1217 from Massport for Cruiseport Terminal Interior Enhancements, One Black Falcon Ave
 - DEP File No. 006-1226 from Massport for Conley Terminal Electrical Infrastructure Modernization and Expansion
 - DEP File No. 006-1242 from Massport for Castle Island Shoreline Improvements
 - DEP File No. 006-1270 from Massport for Fish Pier Repairs, 212 Northern Ave (fenders, bollards, & ladders)
 - DEP File No. 006-1272 from Massport for Seafarer's Way Project, Conley Terminal
 - DEP File No. 006-1319 from Massport for State Police Trailer Installation, Fish Pier, 212 Northern Ave
 - DEP File No. 006-1327 from United States Postal Service for Loading Dock Improvements at 25 Dorchester Ave
 - DEP File No. 006-1245 from Harbor Towers Trustees, Seawall Repairs & Maintenance, 85 East India Row
- Meeting Minutes: August 7, 2013

Sign Language interpreters are available upon prior request. The Commission will hold a public meeting immediately following the last hearing or as appropriate following any hearing. Plans and filings with the Commission may be viewed at the Environment Department, Boston City Hall, Room 805, during regular business hours, 9 AM to 5 PM Monday through Friday. For more information, call 617-635-4417.

For the Commission,

Stephanie Kruei, Executive Secretary

Nancy L. Girard, Commissioner

Thomas M. Menino, Mayor

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

Attendance at Public Meeting Boston Conservation Commission September 18, 2013	
Name	Organization or Neighborhood
Charles Button	Conservation Commission / West Roxbury
Stephen Kunian	Conservation Commission / Back Bay
John Lewis	Conservation Commission / Back Bay
Vivien Li	Conservation Commission / Back Bay
Antonia Pollak	Conservation Commission / Charlestown
John Sullivan	Conservation Commission / Dorchester
Stephanie Krue	Executive Secretary / Roslindale
Rick Corsi	MA Dept of Conservation & Recreation
Judy Kolligian	Boston Climate Action
Nan Johnson	FEMA Region 1 / Financial District / Cambridge
Brigitte Ndikum-Nyada	FEMA Region 1/ Financial District
Julia Sable	Museum of Science
Lorie Hayes	Boston Climate Action Network / Mission Hill
Tucker Husband	Mission Hill / Longwood
Melissa Daes	MIT / Jamaica Plain
Zara Zsido	Lower Roxbury
Tom Palmer	Newton / Boston
Peter Davidoff	Boston
Richard Gagnon	State House
Anthony DeOliveira	Roxbury
Nancy Nee	Dorchester
Ninya Loeppky	Jamaica Plain
Dean Matsuno	Roslindale
Stephen Mitchell	Downtown / Financial District
Justin Porter	West End
Sherry Grancy	Charlestown
Jack Boyle	Charlestown
Deborah DelBuono	Charlestown
Karen Zell	Charlestown Navy Yard
Tanya Guidi	Flagship Wharf
Richard Burt	Charlestown
Elaine Sudanowicz	OEM / Dorchester
Martin Pillsbury	MAPC

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

List of Cooperative Stakeholders Invited to the Public Meetings

First Name	Last Name	Title/Role	Organization
Brian	Swett	Mayor's Cabinet Chief and Director	Mayor's Office of Environmental and Energy
Rene	Fielding	Mayor's Cabinet Chief and Director	Mayor's Office of Emergency Management
Jim	Hunt	Mayor's Cabinet Chief (former)	Mayor's Office of Environmental and Energy
Don	McGough	Mayor's Cabinet Chief (former)	Mayor's Office of Emergency Management
Vivian	Li	President	The Boston Harbor Association, et.al.
Sarah	Hamilton	Vice President MASCO	Longwood Medical Area
Kelley	Brilliant	Executive Director	Fenway Alliance
Claire	Ramsbottom	Executive Director	Colleges of the Fenway
Michael	Dolan	Emergency Property Management	Colleges of the Fenway
Greg	Vasil	CEO	Greater Boston Real Estate Board
Paul	Guzzi	President and CEO	Greater Boston Chamber of Commerce
Rick	Dimino	President and CEO	A Better City
Richard	Parr	Director of Policy	A Better City
Kairos	Shen	Director of Planning	Boston Redevelopment Authority
John	Erwin	Executive Director	Conference of Boston Teaching Hospitals
Patricia	Noga	Senior Director - Clinical Affairs	Massachusetts Hospital Association
Barry	Wante	Director of Emergency Management	Brigham and Women's Hospital
Megan	McClaire	Health Impact Assessment HIA	Boston Public Health Commission
Shannon	O'Malley	Health Impact Assessment HIA	Boston Public Health Commission
PJ	McCann	Health Impact Assessment HIA	Boston Public Health Commission
Edward	Fratto	Executive Director	Northeast States Emergency Consortium
Glenn	Field	Warning Coordination Meteorologist	National Weather Service - Taunton
Robert	Thompson	Meteorologist-in-Charge	National Weather Service - Taunton
Matthew	Walsh	Civil Engineer	US Army Corps of Engineers - New England
David	Aronstein	Program Director	Boston Alliance for Community Health
June	Kevorkian	Director of Programs	Boston Consortium of Higher Education
John	Tommaney	Director Emergency Management	Boston College
AnneMarie	McLaughlin	Emergency Mgt and Bus Continuity	UMASS Boston
George	Noonan	Director/Chief Public Safety	Emerson College
Stephen	Morash	Dir. of Emergency Response Planning	Boston University
Julia	Sable	Education Associate	Museum of Science - Boston
Nora	Donnelly	Conservation and Collections Mgr	Museum of Fine Arts - Boston
Lori	Foley	Vice President - Emergency Programs	Heritage Preservation and COSTEP
Ellen	Douglas	Assistant Professor of Hydrology	UMASS Boston
Uri S.	ten Brink	Professor of Geophysics (Tsunami)	U.S. Geological Survey; Woods Hole Oceanographic Institution
Laurie	Baise	Professor of Civil Engineering	Tufts Dept of Civil and Environmental Engineering
John	Ebel	Director of Seismology	Weston Observatory - Earth and Environmental Sciences, Boston College

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

First Name	Last Name	Title/Role	Organization
Justin	Starr	Associate Director of OPS	Weston Observatory - Earth and Environmental Sciences, Boston College
Dr. James	Kaklamanos	Merrimack College	Dept. of Civil and Environmental Engineering
Richard	Vogel	Professor	Tufts Dept of Civil and Environmental Engineering
Brian	Thomas	Doctoral Candidate	Tufts Dept of Civil and Environmental Engineering
Elliott	Laffer	Executive Director	Boston Groundwater Trust
Christian	Simonelli	Technical Recharge Coordinator	Boston Groundwater Trust
Paul	Kirshen	Professor	University of New Hampshire (Sea Level Rise)
Marcia	Brooks	Project Director	Media Access Group WGBH (Disabilities All Access)
Barry	Wante	Director of Emergency Management	Brigham and Women's Hospital
Paul	Guzzi	Chamber President and CEO	Greater Boston Chamber of Commerce
Catherine	D'Mato	President and CEO	Greater Boston Food Bank
Carol	Tienken	Chief Operating Officer	Greater Boston Food Bank
Henry	Lee	Founder and Beacon Hill Activist	Friends of the Public Garden
David	Eppstein	Vice President of Operations	MASCO
Craig	Altemose	Founder and Executive Director	Better Future Project (350.org)
Katie	Reed	Executive Director	Allston Village Main Streets
Sandra	Kennedy	Executive Director	Bowdoin Geneva Main Streets
Rosie	Hanlon	Executive Director	Brighton Main Streets
Courney	Ho	Executive Director	Chinatown Main Streets
Joyce	Stanley	Executive Director	Dudley Square Main Streets
Clark	Moulaison	Executive Director	East Boston Main Streets
Betsy	Cowan	Executive Director	Egleston Square Main Streets
Evelyn	Darling	Executive Director	Fields Corner Main Streets
Shelly	Goehring	Executive Director	Four Corners Main Streets
Axel	Starke	Executive Director	Grove Hall Main Streets
Carlos	Schillaci	Director	Hyde/Jackson Square Main Streets
Patrice	Gattozzi	Executive Director	Hyde Park Main Streets
Randace	Rauscher Moore	Executive Director	Jamaica Plain Centre/South Main Streets
Christine	Rose	Executive Director	Mission Hill Main Streets
Jody	Burr	Executive Director	Roslindale Village
Dan	Larner	Executive Director	St. Mark's/Ashmont Area Main Streets
Zach	Cohen	Executive Director	Upham's Corner Main Streets
Jennifer	Effron	Executive Director	Washington Gateway Main Streets
Joni	Walter	Executive Director	West Roxbury Main Streets
Lorraine	Downey	Environmental/community activist	Member of the Board TBHA
Carole	Mathieson	Associate Director	Jamaica Plain
Ken	Ward	Neighborhood Activist	Jamaica Plain
Ellen	Spring	Neighborhood Activist	Dorchester
Paul F.	Sullivan	Neighborhood Activist	Mission Hill

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

First Name	Last Name	Title/Role	Organization
Pat	Simpson	Boston Citizen's Corp Volunteer	Charlestown
Stephen	Spinetto	Boston Citizen's Corp Volunteer	Charlestown
Elizabeth	Charney	Boston Citizen's Corp Volunteer	Jamaica Plain
Joel R.	Wolf	Neighborhood Activist	Back Bay
Jan	Galkowski	Quantitative Engineer - Climate	Westwood Environmental Action Committee
Loie	Hayes	Coordinator	Boston Climate Action Network (BostonCAN)
Zara	Zsido	Environmental Community Activist	Boston Climate Action Network (BostonCAN)
Ninya	Loeppky	Environmental Community Activist	Boston Climate Action Network (Boston CAN)
Petra	Hall	Environmental Community Activist	Boston Climate Action Network (Boston CAN)
Viki	Bok	Environmental Community Activist	Boston Climate Action Network (Boston CAN)
Sheila M.	Green	Director of Public Relations	Conventures, Inc. (Boston Harbor Waterfront)
Matthew	Cahill	Program Coordinator	Boston Natural Areas Network (BNAN), Boston Urban Forest Program
Kyle	Greaves	Director	Urban Ecology Institute, Sustainable Cities Program
Bill	Toomey	Director	The Nature Conservancy, Forest Health Protection Program
Dr. Neenah	Estrella-Luna	Professor of Law and Policy	Northeastern University, Sustainability and Climate Change
Ulla	Hester	Area Planner and Development	MASCO, Longwood Medical Area
George D.	Naslas	Vice President	Weston and Sampson, Inc.
Anthony	Dutzik	Senior Policy Analyst	Frontier Group (Extreme Weather)
Mishac	Yegian	Professor	Northeastern University (Soil Liquefaction Mitigation)
Carl	Spector	Director of Air Quality Control	Office of Environmental and Energy Services
Elaine M.	Sudanowicz	Interagency Coordinator	Office of Emergency Management
James	Freas	Regional Planner (former)	Metropolitan Area Planning Council
Martin	Pillsbury	Director of Environmental Planning	Metropolitan Area Planning Council

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

[This page intentionally left blank]

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

**APPENDIX H
DOCUMENTATION OF PLAN ADOPTION**

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**

<CITY LETTERHEAD>

**CERTIFICATE OF ADOPTION
CITY COUNCIL
CITY OF BOSTON, MASSACHUSETTS**

**A RESOLUTION ADOPTING THE CITY OF BOSTON
HAZARD MITIGATION PLAN**

WHEREAS, the City of Boston, MA established an Executive Steering Committee to prepare the Boston Hazard Mitigation Plan 2014 Update; and

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

WHEREAS, a duly-noticed public meeting was held by the Boston Conservation Commission on September __, 2013, and

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

NOW, THEREFORE BE IT RESOLVED that the Boston City Council adopts the *Boston Hazard Mitigation Plan 2014 Update*, in accordance with M.G.L. 40 §4 or the charter and ordinances of the City of Boston.

ADOPTED AND SIGNED this Date. _____

Name(s) / Title(s)

Signature(s)

ATTEST

APPENDIX I

Climate Ready Boston Municipal Vulnerability to Climate Change October 2013

**CITY OF BOSTON HAZARD MITIGATION PLAN
REVISED DRAFT 2014 UPDATE**