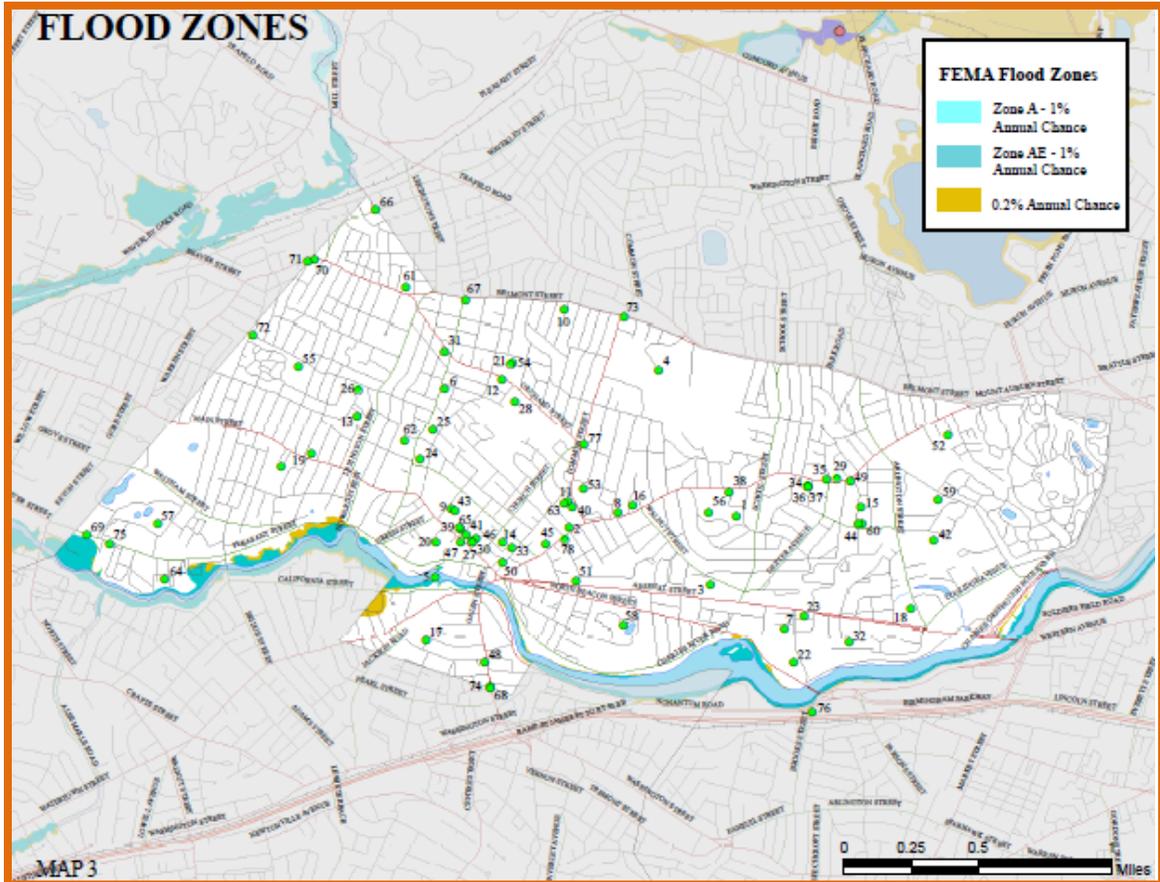


TOWN OF WATERTOWN HAZARD MITIGATION PLAN



Conditionally Approved by FEMA
May 30, 2012

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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TOWN OF WATERTOWN HAZARD MITIGATION PLAN

ACKNOWLEDGEMENTS AND CREDITS

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

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| | |
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| Chief and Emergency Management Coordinator: | Mario Orangio |
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TOWN OF WATERTOWN HAZARD MITIGATION PLAN

I. INTRODUCTION

Planning Requirements under the Federal Disaster Mitigation Act

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

Massachusetts has taken a regional approach and has encouraged the regional planning agencies to apply for grants to prepare plans for groups of their member communities. The Metropolitan Area Planning Council (MAPC) received a grant from the Federal Emergency Management Agency (FEMA) under the Pre-Disaster Mitigation (PDM) Program, to assist the Town of Watertown and five other Inner Core West communities to develop their local Hazard Mitigation Plans. The local Hazard Mitigation Plans produced under this grant are designed to meet the requirements of the Disaster Mitigation Act for each community.

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

What is Hazard Mitigation?

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

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II. COMMUNITY PROFILE

Overview

Founded in 1630, Watertown was the first inland settlement in Massachusetts and initially encompassed the present communities of Weston, Waltham and large sections of Lincoln, Belmont, and Cambridge --thus becoming one of the largest American settlements of its time. Settled by Englishmen who had set sail on the Arbella, and were led by Sir Richard Saltonstall, Watertown quickly grew to be an important center for trade, commerce, and industry. Over the years this community has played an important role in Massachusetts history, once serving as the temporary seat of government during the Revolutionary War.

Today Watertown is rich in ethnic diversity and culture, boasts a high level of citizen involvement and many amenities such as shopping malls, swimming pools, country and tennis clubs, skating rinks, eleven fine parks, and public transportation providing easy access to Boston and surrounding communities.

(Narrative supplied by the community and taken from the Community Profile on the website maintained by the Department of Housing and Community Development)

The Town is governed by a nine-member Town Council with a Town Manager acting as the Town's Chief Administrative Officer.

According to the 2006-2008 American Community Survey three-year estimate, the population was 32,023 people and there were 14,980 housing units.

The town maintains a website at <http://www.ci.watertown.ma.us/>.

Existing Land Use

The most recent land use statistics available from the state are based on aerial photography done in 1999. Table 1 shows the acreage and percentage of land in 21 categories. If the four residential categories are aggregated, residential uses make up 50.33 % of the area of the town. The highest percentage land use is High Density Residential at 48.21 % of the total area.

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Table 1
1999 Land Use

| Land Use Type | Acres | % |
|--|-----------------|-------|
| Cropland | 28.92 | 1.1 |
| Pasture | 0 | 0 |
| Forest | 25.9 | .98 |
| Non-forested wetlands | 6.03 | 0.23 |
| Mining | 0 | 0 |
| Open land | 5.1 | .19 |
| Participatory recreation | 216.07 | 8.2 |
| Spectator recreation | 0 | 0 |
| Water recreation | 3 | 0.11 |
| Multi-family residential | 55.82 | 2.12 |
| High density residential (less than ¼ acre lots) | 1271.14 | 48.21 |
| Medium density residential (¼ - ½ acre lots) | 0 | 0 |
| Low density residential (larger than ½ acre lot) | 0 | 0 |
| Salt water wetlands | 0 | 0 |
| Commercial | 261.09 | 9.9 |
| Industrial | 262.09 | 9.94 |
| Urban open | 370.56 | 14.05 |
| Transportation | 42.16 | 1.6 |
| Waste disposal | 5.88 | .22 |
| Water | 82.81 | 3.14 |
| Woody perennials | 0 | 0 |
| Total | 2,636.58 | |

For more information on how the land use statistics were developed and the definitions of the categories, please go to <http://www.mass.gov/mgis/lus.htm>.

Potential Future Land Uses

MAPC consulted with town staff to determine areas that are likely to be developed in the future. These areas are shown on Map 2, “Potential Development” and are described below. The letter for each site corresponds to the letters on Map 2.

A) Hartz Mason – Development review submittals are anticipated soon for this redevelopment project.

B) Boston Scientific site – Redevelopment anticipated.

C) Repton Phase II – The Town anticipates that there will be an expansion of this project within the next ten years.

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- D) Port Oil / Mount Auburn St – Proposed Retail, hotel, and condo redevelopment project.
- E) Perkins School – Proposal to construct two new buildings, a technology center and a new lower school building. This project is currently under review.
- F) Gore Property – Development of either a sports complex or mixed use anticipated.
- G) 140 Pleasant St – Redevelopment project with 45 condos currently under review.
- H) Ionics – Potential redevelopment site.
- I) Greenhouse – New greenhouse building for the adjacent cemetery.

Development Trends

The Town of Watertown is fully built out with all identified potential future land uses on redevelopment sites and High Density Residential land use making up the highest percentage of the Town's land area. As redevelopment occurs it will be subject to the latest building code requirements and zoning regulations pertaining to wind, earthquakes, and flooding.

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III. PUBLIC PARTICIPATION

Public participation occurred at two levels; the Greater Boston Inner Core West Multiple Hazard Community Planning Team (regional committee) and the Watertown Multiple Hazard Community Planning Team (local committee). In addition, the town held one meeting open to the general public to present the plan and hear citizen input.

Watertown's Participation in the Regional Committee

On March 14, 2008, a letter was sent notifying the communities of the first meeting of the Greater Boston Inner Core West Regional Committee and requesting that the Chief Elected Official designate two municipal employees and/or officials to represent the community. The following individuals were appointed to represent Watertown on the regional committee:

| | |
|----------------|---------------------|
| Mario Orangio | EMD/Fire Chief |
| Gerald Mee | Public Works |
| Danielle Evans | Planning Department |

The regional committee serves as an opportunity for neighboring communities to discuss hazard mitigation issues of shared concern. In addition, as the same group of MAPC staff is working on each community's plan, these issues of shared concern, and other issues that may arise between neighboring communities, are discussed in greater detail in local committee meetings and resulting actions reflected in the identified mitigation measures, as noted in Chapter VIII. The Greater Boston Inner Core West Regional Committee met on April 16, 2008 and December 15, 2008.

The Local Multiple Hazard Community Planning Team

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

The Local Multiple Hazard Community Planning Team Meetings

On May 17, 2010, and June 8, 2010 MAPC conducted the meetings of the Watertown Local Committee. The meetings were organized by Mario Orangio, Fire Chief. The purpose of the first meeting was to introduce the PDM program, develop hazard mitigation goals, and to gather information on local hazard mitigation issues, existing mitigation practices, and sites or areas related to these. The second meeting focused on verifying information gathered by MAPC staff and discussion of potential mitigation measures and prioritization. Table 2 lists the attendees at each meeting of the team. The agendas for these meetings are included in Appendix A.

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| Table 2 | |
|---|--|
| Attendance at the Watertown Local Committee Meetings | |
| Name | Representing |
| <i>May 17, 2010</i> | |
| Mario Orangio | EMD / Fire Chief |
| Steve Magoon | Director, Community Development & Planning |
| <i>June 8, 2010</i> | |
| Mario Orangio | EMD / Fire Chief |
| Steve Magoon | Director, Community Development & Planning |
| Gerald Mee | Superintendent of Public Works |

The Public Meeting

The plan was introduced to the public at a meeting of the Town Council on July 13, 2010. The meeting was held in the Watertown Town Hall. The meeting was publicized as a regular Town Council meeting. The meeting and presentation was recorded and shown on local public access television through the Watertown Community Access Center. The attendance list for the meeting can be found in Table 3.

Table 3
Attendance at the July 13, 2010 Town Council Public Meeting

| Name | Representing |
|---------------------------------------|----------------------------------|
| Mark S. Sideris, Council President | Watertown Town Council |
| Steve Corbett, Council Vice-President | Watertown Town Council |
| John A. Donohue | Watertown Town Council |
| Susan G. Falkoff | Watertown Town Council |
| Anthony Palomba | Watertown Town Council |
| Angeline Kounelis | Watertown Town Council |
| Cecilia Lenk | Watertown Town Council |
| Vincent Piccirilli | Watertown Town Council |
| John Lawn | Watertown Town Council |
| Michael J. Driscoll | Town Manager |
| Valerie Papas | Clerk of Council |
| Mario Orangio | Fire Chief |
| Steve Magoon, Director | Community Development & Planning |
| Gerald Mee | Superintendent of Public Works |
| James Freas | MAPC |
| Martin Pillsbury | MAPC |

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A number of individuals

General Public

Local Stakeholder Involvement

Town staff were encouraged to reach out to local stakeholders that might have an interest in the Hazard Mitigation Plan including neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties. These stakeholders had an opportunity to participate in the public meeting, which was subject to the requirements of the Open Meeting Law requiring that the agenda for the meeting be advertised in a local paper of general circulation and posted in a public location. Watertown Town Council agendas are also posted on the Town's website in advance of the meeting. The presentation from the public meeting was shown on community cable, easily accessible to the various local stakeholders that would have an interest in the plan.

Planning Timeline

| | |
|-------------------|---|
| March 14, 2008 | Letter to the participating municipalities initiating the project. |
| April 16, 2008 | First meeting of the Regional Committee |
| December 15, 2008 | Second Meeting of the Regional Committee |
| April 5, 2010 | First Meeting of the Local Committee |
| May 26, 2010 | Second Meeting of the Local Committee |
| June 21, 2010 | Public Meeting with the Board of Selectmen (Shown daily over a two week period following the meeting on local cable) |
| August 12, 2010 | Plan submitted to MEMA |

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IV. OVERVIEW OF HAZARDS AND VULNERABILITY

Overview of Hazards and Impacts

The Massachusetts Hazard Mitigation Plan 2007 (state plan) provides an in-depth overview of natural hazards in Massachusetts. The state plan indicates that Massachusetts is subject to the following natural hazards (listed in order of frequency); floods, heavy rainstorms, nor'easters, coastal erosion, hurricanes, tornadoes, urban and wildfires, drought and earthquakes.

Table 4 summarizes the hazard risks for Watertown. This evaluation takes into account the frequency of the hazard, historical records, and variations in land use. This analysis is based on the vulnerability assessment in the Commonwealth of Massachusetts State Hazard Mitigation Plan, 2007. The statewide assessment was modified to reflect local conditions in Watertown using the definitions for hazard frequency and severity listed below Table 4.

Table 4
Hazard Risks Summary

| Hazard | Frequency | Severity |
|---------------|------------------|-----------------|
| | | |
| Flooding | High | Serious |
| Winter storms | High | Serious |
| Hurricanes | Medium | Serious |
| Earthquakes | Low | Extensive |
| Tornadoes | Low | Serious |
| Landslides | Low | Minor |
| Brush fires | Medium | Minor |
| Dam failures | Low | Serious |

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Definitions used in the Commonwealth of Massachusetts State Hazard Mitigation Plan

Frequency

Very low frequency: events that occur less frequently than once in 1,000 years (less than 0.1% per year)

Low frequency: events that occur from once in 100 years to once in 1,000 years (0.1% to 1% per year);

Medium frequency: events that occur from once in 10 years to once in 100 years (1% to 10% per year);

High frequency: events that occur more frequently than once in 10 years (greater than 10% per year).

Severity

Minor: Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e. one or two communities); essential services (utilities, hospitals, schools, etc) not interrupted; no injuries or fatalities.

Serious: Scattered major property damage (more than 50% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services are briefly interrupted; some injuries and/or fatalities.

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

Catastrophic: Property and public infrastructure destroyed; essential services stopped, thousands of injuries and fatalities.

Flood Related Hazards

Flooding was the most prevalent serious natural hazard identified by local officials in Watertown. Flooding is generally caused by hurricanes, nor'easters, severe rainstorms, and thunderstorms.

Regionally Significant Storms

There have been a number of major rain storms that have resulted in significant flooding in northeastern Massachusetts over the last fifty years. Significant storms include:

- August 1954
- March 1968
- January 1979
- April 1987

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- October 1991 (“The Perfect Storm”)
- October 1996
- June 1998
- March 2001
- April 2004
- May 2006
- April 2007

Overview of Town-Wide Flooding

The Charles River is the predominant source of potential flood waters in Watertown. Flood zones line the riverbanks, though they are generally constricted to the area immediately adjacent to the waterway. Most actual flooding occurs upstream of the Watertown Dam. Groundwater sourced flooding of basements is also relatively common across many different parts of the Town.

Information on flood hazard areas was taken from two sources. The first was the National Flood Insurance Rate Maps. The FIRM flood zones are shown on Map 3 in Appendix B. The second was discussions with local officials. The locally identified areas of flooding described below were identified by Town staff as areas where flooding occurs. These areas do not necessarily coincide with the flood zones from the FIRM maps. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers correspond to the numbers on Map 8, “Hazard Areas”. The numbers do not reflect priority order.

Locally Identified Areas of Flooding

- 1) Charles River: During severe storms flooding can occur directly along the coast on this stretch of the Charles River, above the dam.
- 2) Cunniff Elementary School: Basement flooding from groundwater.
- 3) Watertown High School: Basement flooding from groundwater.
- 4) New Police Headquarters: Basement flooding from groundwater
- 7) Rutland Street: Basement flooding of homes from groundwater.

Repetitive Loss Structures

There are no repetitive loss structures in Watertown. As defined by the Community Rating System (CRS) of the National Flood Insurance Program (NFIP), a repetitive loss property is any property which the NFIP has paid two or more flood claims of \$1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see <http://www.fema.gov/business/nfip/replps.shtm>.

Dams and Dam Failure

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The only dam in Watertown is the Watertown Dam on the Charles River, maintained by the Massachusetts Department of Conservation and Recreation. With the relatively small size of the dam, it does not have a significant impact on flooding. The Town works with DCR at this dam and others up and downstream on the Charles River to maintain an appropriate level of flow during storm events to manage flooding to the extent possible. Failure of the Watertown Dam would not present any significant hazard.

Wind Related Hazards

Wind-related hazards include hurricanes and tornadoes as well as high winds during severe rainstorms and thunderstorms. As with many communities, falling trees that result in downed power lines and power outages are an issue in Watertown.

Between 1858 and 2000, Massachusetts has experienced approximately 32 tropical storms, nine Category 1 hurricanes, five Category 2 hurricanes and one Category 3 hurricane. This equates to a frequency of once every six years. A hurricane or storm track is the line that delineates the path of the eye of a hurricane or tropical storm. In 1861 a tropical storm track passed just west of Watertown; since then there have been no tropical storm or hurricanes recorded to have tracked through or near the Town. However, the Town does experience the impacts of the wind and rain of hurricanes and tropical storms regardless of whether the storm track passed through the town. The hazard mapping indicates that the 100 year wind speed is 110 miles per hour. There has been no recorded tornado within the Town limits. Microbursts have historically been a significant issue in Watertown with what appears to be a trend of increasing numbers over the last several years.

Winter Storms

In Massachusetts, northeast coastal storms known as nor'easters occur 1-2 times per year. Winter storms are a combination hazard because they often involve wind, ice and heavy snow fall. The average annual snowfall for most of the Town is 48- 72 inches.

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

| | |
|-------------------|---------------|
| Blizzard of 1978 | February 1978 |
| Blizzard | March 1993 |
| Blizzard | January 1996 |
| Severe Snow Storm | March 2001 |
| Severe Snow Storm | December 2003 |
| Severe Snow Storm | January 2005 |

More recently, 2008 was a record year for snowfall. By the end of the February 2008, Boston's Logan International Airport broke a new February record for total precipitation.

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In March 2008, many cities and towns in Massachusetts exceeded the highest snowfall records. The above-average snowfall that season increased groundwater and surface water levels to a high level, and contributed to flooding experienced in spring 2008.

Fire Related Hazards

Based on discussions with the Watertown Fire Chief, brush fires in Watertown are relatively rare and have generally occurred in two small forested areas in the Town with no more than one a year. None of these fires have resulted in major property damage and no loss of life has ever been reported. Brush fires are responded to as a regular fire by the Fire Department. These fires are localized brush fires likely caused by careless disposal of smoking materials. The following areas of Town were identified as having the highest incidences of brush fires. The numbers correspond to the numbers on Map 8, "Hazard Areas":

5) Whitney Hill

6) Wooded area off of Greenough Boulevard

Geologic Hazards

Geologic hazards include earthquakes, landslides, sinkhole, subsidence, and unstable soils such as fill, peat, and clay. Although new construction under the most recent building codes generally will be built to seismic standards, there are still many structures which pre-date the most recent building code.

Earthquakes

According to the State Hazard Mitigation Plan, New England experiences an average of five earthquakes per year. From 1627 to 1989, 316 earthquakes were recorded in Massachusetts. Most have originated from the La Malbaie fault in Quebec or from the Cape Anne fault located off the coast of Rockport. The region has experienced larger earthquakes, of magnitude 6.0 to 6.5 in 1727 and 1755. Other notable earthquakes occurred here in 1638 and 1663 (Tufts University). There have been no recorded earthquake epicenters within Arlington.

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

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Landslides

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

The entire Town has been classified as having a low risk for landslides.

Critical Infrastructure in Hazard Areas

Critical infrastructure includes facilities that are important for disaster response and evacuation (such as emergency operations centers, fire stations, water pump stations, etc.) and facilities where additional assistance might be needed during an emergency (such as nursing homes, elderly housing, day care centers, etc.). These facilities are listed in Table 6 and are shown on all of the maps in Appendix B.

The purpose of mapping the natural hazards and critical infrastructure is to present an overview of hazards in the community and how they relate to critical infrastructure, to better understand which facilities may be vulnerable to particular natural hazards.

Explanation of Columns in Table 5.

Column 1: ID #: The first column in Table 6 is an ID number which appears on the maps that are part of this plan. See Appendix B.

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

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

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

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

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

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| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|-----------------------------------|-----------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| 1 | Brigham House | Assisted Living | Low Susceptibility | No | No |
| 2 | Marshall Home | Assisted Living | Low Susceptibility | No | No |
| 3 | Verizon Switching Station | Communications | Low Susceptibility | No | No |
| 4 | Police-Fire Main Repeaters | Communications | Low Susceptibility | No | No |
| 5 | Watertown Dam | Dam | Low Susceptibility | AE | No |
| 6 | Milestones Child Care & Preschool | Daycare | Low Susceptibility | No | No |
| 7 | Bright Horizons on the Charles | Daycare | Low Susceptibility | No | No |
| 8 | Caterpillars to Butterflies | Daycare | Low Susceptibility | No | No |
| 9 | First Path Day Care Center | Daycare | Low Susceptibility | No | No |
| 10 | Four Seasons Preschool | Daycare | Low Susceptibility | No | No |
| 11 | Growing Places Pre-School | Daycare | Low Susceptibility | No | No |
| 12 | Kids-In-Common | Daycare | Low Susceptibility | No | No |
| 13 | Rosary Academy Learning Center | Daycare | Low Susceptibility | No | No |
| 14 | Russell Cooperative Preschool | Daycare | Low Susceptibility | No | No |
| 15 | St. Stephens | Daycare | Low | No | No |

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| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|---|-----------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| | Armenian Preschool | | Susceptibility | | |
| 16 | Stepping Stones Child Care Center, Inc. | Daycare | Low Susceptibility | No | No |
| 17 | Storyville Preschool | Daycare | Low Susceptibility | No | No |
| 18 | The Learning Zone at Super Fitness | Daycare | Low Susceptibility | No | No |
| 19 | Watertown Cooperative Nursery School | Daycare | Low Susceptibility | No | No |
| 20 | Watertown Creative Start | Daycare | Low Susceptibility | No | No |
| 21 | James Russell Lowell School - EDS | EDS | Low Susceptibility | No | No |
| 22 | Commander's Mansion - Secondary EDS | EDS | Low Susceptibility | No | No |
| 23 | Arsenal Apartment Elderly Housing | Elderly Housing | Low Susceptibility | No | No |
| 24 | Watertown Elderly Housing | Elderly Housing | Low Susceptibility | No | No |
| 25 | McSherry Gardens | Elderly Housing | Low Susceptibility | No | No |
| 26 | 100 Warren Street Elderly Housing | Elderly Housing | Low Susceptibility | No | No |

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| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|--|--------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| 27 | EOC- Secondary Fire HQ | EOC | Low Susceptibility | No | No |
| 28 | EOC- Primary DPW | EOC | Low Susceptibility | No | No |
| 29 | Fire Department #2 | Fire Station | Low Susceptibility | No | No |
| 30 | Fire Department HQ | Fire Station | Low Susceptibility | No | No |
| 31 | Fire Department #3 | Fire Station | Low Susceptibility | No | No |
| 32 | Harvard Vanguard Medical Associates | Medical | Low Susceptibility | No | No |
| 33 | Caritas Medical Group At Watertow | Medical | Low Susceptibility | No | No |
| 34 | St. Elizabeths Caritas Clinic | Medical | Low Susceptibility | No | No |
| 35 | Dr. Richard J. Kerbel | Medical | Low Susceptibility | No | No |
| 36 | Mt. Auburn Medical Associates | Medical | Low Susceptibility | No | No |
| 37 | Dr. Larry Wienrauch | Medical | Low Susceptibility | No | No |
| 38 | Dr. Aida M. Yavshayan | Medical | Low Susceptibility | No | No |
| 39 | Watertown Health Department | Municipal | Low Susceptibility | No | No |
| 40 | Watertown School Department | Municipal | Low Susceptibility | No | No |

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| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|---------------------------------------|-------------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| | Offices | | | | |
| 41 | Watertown Free Public Library | Municipal | Low Susceptibility | No | No |
| 42 | Emerson Village Nursing Home | Nursing Home | Low Susceptibility | No | No |
| 43 | Watertown Boys and Girls Club | Place of Assembly | Low Susceptibility | No | No |
| 44 | St Stephen's Armenian Cultural Center | Place of Worship | Low Susceptibility | No | No |
| 45 | Saint John's Methodist Church | Place of Worship | Low Susceptibility | No | No |
| 46 | Town Hall Annex | Municipal Office | Low Susceptibility | No | No |
| 47 | U.S. Post Office | Post Office | Low Susceptibility | No | No |
| 48 | U.S. Post Office | Post Office | Low Susceptibility | No | No |
| 49 | U.S. Post Office | Post Office | Low Susceptibility | No | No |
| 50 | NStar Power Station | Power Station | Low Susceptibility | No | No |
| 51 | NStar Power Station | Power Station | Low Susceptibility | No | No |
| 52 | MBTA Power Station | Power Station | Low Susceptibility | No | No |
| 53 | Watertown High School | School | Low Susceptibility | No | Watertown High School |
| 54 | James Russell Lowell | School | Low Susceptibility | No | No |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|--|------------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| | Elementary School | | | | |
| 55 | Cunniff Elementary School | School | Low Susceptibility | No | Cunniff Elementary School |
| 56 | Hosmer Elementary School | School | Low Susceptibility | No | No |
| 57 | Jewish Community Day School | School | Low Susceptibility | No | No |
| 58 | Perkins School for the Blind | School | Low Susceptibility | No | No |
| 59 | Atrium School | School | Low Susceptibility | No | No |
| 60 | St Stephen's Armenian School | School | Low Susceptibility | No | No |
| 61 | Beacon High School | School | Low Susceptibility | No | No |
| 62 | Watertown Middle School | School | Low Susceptibility | No | No |
| 63 | Watertown Senior Center | Senior Center | Low Susceptibility | No | No |
| 64 | John A Ryan Arena | Skating Rink | Low Susceptibility | No | No |
| 65 | Watertown Town Hall | Town Hall | Low Susceptibility | No | No |
| 66 | Local Emergency Water Connection Belmont | Water Connection | Low Susceptibility | No | No |
| 67 | Local Emergency Water Connection Belmont | Water Connection | Low Susceptibility | No | No |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|--|------------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| 68 | Local Emergency Water Connection Newton | Water Connection | Low Susceptibility | No | No |
| 69 | Local Emergency Water Connection Waltham | Water Connection | Low Susceptibility | No | No |
| 70 | Local Emergency Water Connection Waltham | Water Connection | Low Susceptibility | No | No |
| 71 | Local Emergency Water Connection Waltham | Water Connection | Low Susceptibility | No | No |
| 72 | Local Emergency Water Connection Waltham | Water Connection | Low Susceptibility | No | No |
| 73 | MWRA Meter #2 | Water Meter | Low Susceptibility | No | No |
| 74 | MWRA Water Meter #103 | Water Meter | Low Susceptibility | No | No |
| 75 | MWRA Water Meter #92 | Water Meter | Low Susceptibility | No | No |
| 76 | MWRA Water Meter #81 | Water Meter | Low Susceptibility | No | No |
| 77 | MWRA Water Isolation | Water Valve | Low Susceptibility | No | No |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 5: Relationship of Critical Infrastructure to Hazard Areas | | | | | |
|---|----------------------|----------------|-----------------------|------------------------|--------------------------------------|
| ID | NAME | TYPE | Landslide Risk | FEMA Flood Zone | Locally-Identified Flood Area |
| | Valve | | | | |
| 78 | MWRA Water Meter #40 | Water Meter | Low Susceptibility | No | No |
| 79 | Police Station | Police Station | Low Susceptibility | No | Police Headquarters |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

Vulnerability Assessment

The purpose of the vulnerability assessment is to estimate the extent of potential damages from natural hazards of varying types and intensities. A vulnerability assessment and estimation of damages was performed for hurricanes, earthquakes, and flooding. The methodology used for hurricanes and earthquakes was the HAZUS-MH software. The methodology for flooding was developed specifically to address the issue in many of the communities where flooding was not solely related to location within a floodplain.

Introduction to HAZUS-MH

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

“HAZUS-MH is a nationally applicable standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing and evaluating mitigation plans and policies as well as emergency preparedness, response and recovery planning..

HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods and earthquakes on populations.”

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

Level 1 relies upon default data on building types, utilities, transportation, etc. from national databases as well as census data. While the databases include a wealth of information on the nine communities that are a part of this study, it does not capture all relevant information. In fact, the HAZUS training manual notes that the default data is “subject to a great deal of uncertainty.”

However, for the purposes of this plan, the analysis is useful. This plan is attempting to only generally indicate the possible extent of damages due to certain types of natural disasters and to allow for a comparison between different types of disasters. Therefore,

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

this analysis should be considered to be a starting point for understanding potential damages from the hazards. If interested, communities can build a more accurate database and further test disaster scenarios.

Estimated Damages from Hurricanes

According to the State Hazard Mitigation Plan, between 1858 and 2000, there were 15 hurricanes. 60% were Category 1, 33% were Category 2 and 7% were Category 3. For the purposes of this plan, Category 2 and a Category 4 storms were chosen to illustrate damages. The Category 4 storm was included in order to present a reasonable “worst case scenario” that would help planners and emergency personnel evaluate the impacts of storms that might be more likely in the future, as we enter into a period of more intense and frequent storms.

Table 6
Estimated Damages from Hurricanes

| | Category 2 | Category 4 ¹ |
|--|------------|-------------------------|
| Building Characteristics | | |
| Estimated total number of buildings | 8,153 | 8,153 |
| Estimated total building replacement value (Year 2002 \$) (Millions of Dollars) | \$3,150 | \$3,150 |
| Building Damages | | |
| # of buildings sustaining minor damage | 11 | 1,020 |
| # of buildings sustaining moderate damage | 1 | 191 |
| # of buildings sustaining severe damage | 0 | 11 |
| # of buildings destroyed | 0 | 2 |
| Population Needs | | |
| # of households displaced | 0 | 118 |
| # of people seeking public shelter | 0 | 25 |
| Debris | | |
| Building debris generated (tons) | 0 | 8,202.5 |
| Tree debris generated (tons) | 0 | 2,313.5 |
| # of truckloads to clear building debris | 0 | 328 |
| Value of Damages (Thousands of dollars) | | |
| Total property damage | \$.05 | \$40,292.74 |
| Total losses due to business interruption | \$2.01 | \$5,918.19 |
| ¹ No Category 4 or 5 hurricanes have been recorded in New England. However, a Category 4 hurricane was included to help the communities understand the impacts of a hurricane beyond what has historically occurred in New England. | | |

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Estimated Damages from Earthquakes

Methodology Used

In order to assess damages from earthquakes, the HAZUS-MH earthquake module was used. For more information, see the description of the HAZUS-MH software above. The HAZUS earthquake module allows users to define a number of different types of earthquakes and to input a number of different parameters. The module is more useful where there is a great deal of data available on earthquakes. In New England, defining the parameters of a potential earthquake is much more difficult because there is little historical data. The earthquake module does offer the user the opportunity to select a number of historical earthquakes that occurred in Massachusetts. For the purposes of this plan, two earthquakes were selected: a 1963 earthquake with a magnitude of 5.0 and an earthquake with a magnitude of 7.0.

**Table 7
Estimated Damages from Earthquakes**

| | Magnitude 5.0 | Magnitude 7.0 |
|--|--------------------------|--------------------------|
| Building Characteristics | | |
| Estimated total number of buildings | 8,153 | 8,153 |
| Estimated total building replacement value (Year 2002 \$)(Millions of dollars) | \$3,150 | \$3,150 |
| Building Damages | | |
| # of buildings sustaining slight damage | 232 | 1,842 |
| # of buildings sustaining moderate damage | 56 | 917 |
| # of buildings sustaining extensive damage | 7 | 261 |
| # of buildings completely damaged | 1 | 52 |
| Population Needs | | |
| # of households displaced | 15 | 615 |
| # of people seeking public shelter | 3 | 131 |
| Debris | | |
| Building debris generated (tons) | Not available | Not available |
| Value of Damages (Millions of dollars) | | |
| Total property damage | \$28.92 | \$195.9 |
| Total losses due to business interruption | \$1.37 | \$37.55 |

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Estimated Damages from Flooding

Methodology Used

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

Watertown is 4.12 square miles or 2,636.58 acres. Approximately 58.78 acres have been identified by local officials as areas of flooding. This amounts to 2.23 % of the land area in Watertown. The number of structures in each flood area was estimated by applying the percentage of the total land area to the number of structures (8,153) in Watertown; the same number of structures used by HAZUS for the hurricane and earthquake calculations. HAZUS uses a value of \$260,920.43 per structure for the building replacement value. This was used to calculate the total building replacement value in each of the flood areas. The calculations were done for a low estimate of 10% building damages and a high estimate of 50% as suggested in the FEMA September 2002 publication, "State and Local Mitigation Planning how-to guides". (Page 4-13). The range of estimates for flood damages is \$317,018.32 - \$17,336,857.97. These calculations are not based solely on location within the floodplain or a particular type of storm (i.e. 100 year flood).

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**Table 8
Estimated Damages from Flooding**

| ID | Flood Hazard Area | Approximate Area in Acres | % of Total Land Area in Watertown | # of Structures | Replacement Value | Low Estimate of Damages | High Estimate of Damages |
|-----------|---------------------------|----------------------------------|--|------------------------|--------------------------|--------------------------------|---------------------------------|
| 1 | Charles River | 42.968 | 1.63 | 132.89 | \$34,673,715.94 | \$3,467,371.59 | \$17,336,857.97 |
| 2 | Cunniff Elementary School | 3.939 | 0.149 | 12.15 | \$3,170,183.23 | \$317,018.32 | \$1,585,091.61 |
| 3 | Watertown High School | 9.324 | 0.354 | 28.86 | \$7,530,163.61 | \$753,016.36 | \$3,765,081.8 |
| 4 | Police Headquarters | 2.548 | 0.097 | 7.9 | \$2,061,271.4 | \$206,127.14 | \$1,030,635.7 |
| 5 | Rutland Street | 14.019 | .532 | 43.37 | \$11,316,119.05 | \$1,131,611.91 | \$5,658,059.53 |

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Future Development in Hazard Areas

The Town of Watertown has identified two parcels where development has been proposed, is underway, or is expected to occur in the future. Table 9 shows the relationship of these parcels to two of the mapped hazards. This information is provided so that planners can ensure that development proposals meet all flood plain zoning and that careful attention is paid to drainage issues.

| Table 9: Relationship of Potential Development to Hazard Areas | | |
|---|-----------------------|-------------------|
| Parcel | Landslide risk | Flood Zone |
| Hartz Mason | Low | 78.3418% in AE |
| Boston Scientific | Low | 55.4542% in AE |
| Repton Phase II | Low | No |
| Port Oil / Mount Auburn St | Low | No |
| Perkins School | Low | No |
| Perkins School | Low | No |
| Gore Property | Low | No |
| 140 Pleasant St | Low | No |
| Ionics | Low | No |
| Greenhouse | Low | No |

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V. HAZARDS AND EXISTING MITIGATION MEASURES

Existing Multi-Hazard Mitigation Measures

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

Communications Equipment – The Town has access to three Incident Command Units, mobile communications centers available to the town through the MA State Police, the MA Dept. of Fire Services, and MEMA.

Emergency Power Generators – Emergency generators are located at the Main Library, Police Department, Fire Department, Public Works Facility, and Watertown High School.

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

Regional Emergency Planning Committee (REPC) – Watertown participates in the Battle Road Regional Emergency Planning Committee.

Existing Flood Hazard Mitigation Measures

National Flood Insurance Program (NFIP) – Watertown participates in the NFIP with 74 policies in force as of the end of 2009. FEMA maintains a database on flood insurance policies and claims. This database can be found on the FEMA website at <http://www.fema.gov/business/nfip/statistics/pcstat.shtm>.

The following information is provided for the Town of Watertown:

| | |
|--|--------------|
| Flood insurance policies in force (as of December 31, 2009) | 74 |
| Coverage amount of flood insurance policies | \$18,295,000 |
| Premiums paid | \$23,807 |
| Total losses (all losses submitted regardless of the status) | 12 |
| Closed losses (Losses that have been paid) | 8 |
| Open losses (Losses that have not been paid in full) | 0 |
| CWOP losses (Losses that have been closed without payment) | 4 |
| Total payments (Total amount paid on losses) | \$410,892.94 |

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

Street sweeping – Every street gets swept at least four times a year with the Town completing on average 16 curb miles a week.

Catch basin cleaning – The town has approximately 3200 catch basins that are cleaned every year on average. This service is contracted out by the town.

Roadway treatments – The Town uses liquid calcium salt additive.

Drainage infrastructure maintenance - The town requires a maintenance agreement in perpetuity on private drainage facilities. To the extent possible, the Town requires all storm water to be handled on site rather than directed into the municipal storm drain system.

Zoning Regulations – Zoning is intended to protect the public health and safety through the regulation of land use. The Watertown Zoning Ordinance includes a Floodplain District (Section 5.06). The purposes of this district are to:

1. To provide that lands in the Town of Watertown subject to seasonal or periodic flooding as described hereinafter shall not be used for residence or other purposes in such manner as to endanger the health or safety of the occupants thereof.
2. To protect, preserve and maintain the water table and water recharge areas within the Town so as to preserve the present and potential water supplies for the public health and safety of the residents of the Town of Watertown.
3. To assure the continuation of the natural flow pattern of the water courses within the Town of Watertown in order to provide adequate and safe floodwater storage capacity to protect persons and property against the hazards of flood inundation.

The Floodplain District is an overlay district, defined by the 100-year floodplain as designated by FEMA. Within the District, by-right uses are limited to conservation, outdoor recreation, wildlife preservation, existing structures, and certain retail uses in the RD – Limited Redevelopment District which meet criteria established within the Floodplain District and have been issued a final Order of Conditions under the Massachusetts Wetlands Protection Act. An existing structure may be expanded and other uses, as allowed in the underlying zoning district, may be allowed by Special Permit, providing that it can be demonstrated that the proposed construction will not be detrimental to the public health, safety, or welfare, and the project meets the requirements of all applicable state and local regulations including those of the Massachusetts State Building Code pertaining to buildings within the floodplain.

Stormwater Ordinance – A storm water ordinance is currently under development and anticipated to be adopted sometime in winter 2010.

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Wetlands Ordinance - The Town of Watertown Wetlands Ordinance (Chapter XV) protects water resources, wetlands, and their adjoining land areas by controlling activities that might have a significant or cumulative impact on the recognized values of these resource areas, including their ability to serve as a flood control and storm damage prevention feature. Any activity that might fill or otherwise alter these resource areas requires a permit from the Watertown Conservation Commission. The adjoining land area under the protection of this by-law includes land within 150 feet of a pond or wetland and land within 200 feet of a river or stream as well as any land within a designated floodplain.

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.

Watertown Open Space and Recreation Plan (OSRP) - Watertown's OSRP identifies a number of open space parcels in identified hazard areas including floodplains and brush fire areas. For many of these parcels the plan recommends developing use and management plans, including lands along the Charles River and Whitney Hill. These management plans should include consideration of hazard issues such as flooding and brush fires.

Existing Wind Hazard Mitigation Measures

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

Tree-trimming program – The Town conducts its own tree maintenance and also uses its own equipment to trim and remove trees as needed and grind stumps.

Existing Winter Hazard Mitigation Measures

Snow disposal –The town conducts general snow removal operations with its own equipment. There is a park on grove street that is used a snow disposal site as necessary.

Existing Brush Fire Hazard Mitigation Measures

Outdoor Burning Prohibited – Outdoor burning is prohibited in Watertown.

Development Review – The Fire Department is a member of the site plan review committee.

Existing Geologic Hazard Mitigation Measures

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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

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

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 10- Watertown Existing Mitigation Measures | | | |
|---|------------------------------------|---|--|
| Type of Existing Mitigation Measures | Area Covered | Effectiveness/ Enforcement | Improvements/ Changes Needed |
| MULTIPLE HAZARDS | | | |
| Comprehensive Emergency Management Plan (CEMP) | Town-wide. | Emphasis is on emergency response. | None. |
| Communications Equipment | Town-wide. | Effective. | |
| Massachusetts State Building Code | Town-wide. | Most effective for new construction. | None. |
| Participation in the Regional Emergency Planning Committee (LEPC) | Town-wide. | A forum for cooperation on natural and manmade disasters. | None. |
| Emergency Power Generators | Town-wide. | Effective. | |
| FLOOD HAZARDS | | | |
| Participation in the National Flood Insurance Program (NFIP) | Areas identified on the FIRM maps. | There are 74 policies in force. | Encourage all eligible homeowners to obtain insurance. |
| Street sweeping | Town-wide. | Effective. | None. |
| Catch basin cleaning | Town-wide. | Effective. | None. |
| Roadway treatments | Town roads. | Effective. | None. |
| Drainage infrastructure maintenance | Town-wide. | Effective | |
| Zoning – Floodplain District | Town-wide. | Effective. | |
| Stormwater By-Law | Town-wide. | Underway | |
| Wetlands Protection Ordinance | Resource Areas | | None |
| Comprehensive Emergency Management Plan (CEMP) | Town-wide. | Emphasis is on emergency response. | Plan is up to date. |
| DCR dam safety regulations and permitting | State-wide. | Somewhat effective | Improvements needed to the statewide system for dam inspections. |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 10- Watertown Existing Mitigation Measures | | | |
|---|---------------------|--|---|
| Type of Existing Mitigation Measures | Area Covered | Effectiveness/ Enforcement | Improvements/ Changes Needed |
| Watertown OSRP | Town-wide | Somewhat effective | Include consideration of hazard mitigation in plan update and management plans. |
| WIND HAZARDS | | | |
| Comprehensive Emergency Management Plan (CEMP) | Town-wide. | Effective primarily for emergency response. | The CEMP is up to date. |
| The Massachusetts State Building Code | Town-wide. | Effective for most situations except severe storms | None. |
| Tree trimming program | Town-wide. | Effective. | |
| WINTER HAZARDS | | | |
| There are no specific measures beyond regular salting and sanding of the roads and local plowing. | | | |
| BRUSH FIRE HAZARDS | | | |
| Outdoor burning prohibited. | Town-wide. | Effective. | None. |
| Development Review | Town-wide. | Effective. | None. |
| GEOLOGIC HAZARDS | | | |
| The Massachusetts State Building Code | Town-wide. | Effective for most situations. | None. |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

VI. HAZARD MITIGATION GOALS AND OBJECTIVES

The Watertown Local Multiple Hazard Community Planning Team met on May 17, 2010. At that meeting, the team reviewed and discussed a draft set of goals and objectives for the Town of Watertown. The following eight goals were endorsed by the team for the Watertown Hazard Mitigation Plan:

1. Prevent and reduce the loss of life, injury, public health impacts and property damages resulting from all major natural hazards.
2. Identify and seek funding for measures to mitigate or eliminate each known significant flood hazard area.
3. Integrate hazard mitigation planning as an integral factor in all relevant municipal departments, committees and boards.
4. Prevent and reduce the damage to public infrastructure resulting from all hazards.
5. Encourage the business community, major institutions and non-profits to work with the Town to develop, review and implement the hazard mitigation plan.
6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation and solutions for hazards affecting multiple communities.
7. Ensure that future development meets federal, state and local standards for preventing and reducing the impacts of natural hazards.
8. Take maximum advantage of resources from FEMA and MEMA to educate Town staff and the public about hazard mitigation.

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VII. POTENTIAL MITIGATION MEASURES

What is hazard mitigation?

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

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

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

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

Process for Setting Priorities for Mitigation Measures

The decision on priorities was made at a meeting of the local committee. Priority setting was based on local knowledge of the hazard areas, cost information and an assessment of benefits.

MAPC staff attended the FEMA Benefit-Cost Analysis Training Course on October 24-25, 2007. Information from this training was shared with local officials in order to help them understand the role of a benefit/cost analysis in developing and evaluating potential mitigation projects.

Based on information gained from the Benefit-Cost Analysis trainings and a review of the STAPLEE criteria (a checklist for evaluating social, technical, administrative, political, legal, economic and environmental issues) MAPC asked the local committee to take into consideration factors such as the number of homes and businesses affected, whether or not road closures occurred and what impact closures had on delivery of emergency services and the local economy, anticipated project costs, whether the town had the technical and administrative capability to carry out the mitigation measures, whether any environmental constraints existed, and whether the town would be able to justify the costs relative to the anticipated benefits.

The listing of high, medium, and other potential mitigation measures is provided in the sections below and summarized in Table 11.

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High Priority Mitigation Measures

Flooding, Drainage Infrastructure and Dams

- A) Charles River: Watertown has already established good relationships with the operators of the dams upstream and downstream of the Town that contribute to operation of these dams to mitigate flooding along the river. That coordination, between the Charlestown Dam, the Waltham Dam, and the Mother Brook Dam in Dedham, is essential to addressing flooding during storms and Watertown will continue to work with these dam operators and advocate for dam improvements as necessary.
- B) Continue process of revising storm water regulations and management program.

Earthquakes

- C) Purchase mobile, long-running generators and/or install fixed, multi-fuel generators in designated emergency shelters.

Brush Fires

- D) Whitney Hill: Build a fire access road and create a brush fire prevention maintenance program.
- E) Acquire a brush truck for fire response in wooded areas.

Multi-Hazard

- F) Purchase hand-held GPS units and mobile radio communications equipment. The Town needs a communication system that will allow DPW and emergency management (police and fire) to communicate during an emergency event.

Multi-hazard: power outage

- G) Upgrade all generators as needed; provide alternative fuel sources and generator power source flexibility.
- H) Install fixed, multi-fuel generators at the Town Hall.

Measures to Ensure Compliance with NFIP

- I) Watertown has already updated its Flood Information Rate Maps (FIRM) maps information and town bylaw based on the latest data from FEMA. These maps will be kept up to date reflecting future changes to the FEMA recognized flood zones.

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Medium Priority Mitigation Measures

Flooding, Drainage Infrastructure and Dams

- J) Charles River: Create an application program for funding and technical assistance to flood zone property owners to develop perimeter protection and flood proofing strategies such as small levees, flood walls, and similar.
- K) Cunniff Elementary School: Upgrade pumping system and improve storm water drainage away from the building.
- L) Watertown High School: Upgrade pumping system and improve storm water drainage away from the building.
- M) Rutland Street: Create a program to support homeowners in the installation of pumps. Consider tying pumps into the public storm drain system.
- N) Dedicate more resources for more frequent maintenance of town-owned drainage facilities, such as more frequent removal of sediment.
- O) Begin to study the feasibility of creating a stormwater utility to help pay for drainage system maintenance and improvements.
- P) Develop a larger capacity for emergency flood preparation and emergency police details.

High Winds and Hurricanes

- Q) Incorporate additional contract labor to conduct ongoing tree maintenance program.

Earthquakes

- R) Investigate options to make all public municipal buildings earth-quake resistant.

Multi-Hazard

- S) Purchase a digital/hard copy map plotter to enable large map creation from town GIS files.

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Introduction to Potential Mitigation Measures (Table 11)

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

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

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

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

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

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

Army Corps of Engineers (ACOE) – The website for the North Atlantic district office is <http://www.nae.usace.army.mil/>. The ACOE provides assistance in a

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

number of types of projects including shoreline/streambank protection, flood damage reduction, flood plain management services and planning services.

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

United States Department of Agriculture – The USDA has programs by which communities can get grants for firefighting needs. See the link below for some example.

<http://www.rurdev.usda.gov/rd/newsroom/2002/cfg.html>

Abbreviations Used in Table 11

FEMA Mitigation Grants includes:

FMA = Flood Mitigation Assistance Program.

HMGP = Hazard Mitigation Grant Program.

PDM = Pre-Disaster Mitigation Program

ACOE = Army Corps of Engineers.

MHD = Massachusetts Highway Department.

EOT = Executive Office of Transportation.

DCR = Department of Conservation and Recreation

DHS/EOPS = Department of Homeland Security/Emergency Operations

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

USDA = United States Department of Agriculture

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 11 Watertown Potential Mitigation Measures | | | | | | |
|---|---|-----------------|--------------------------------------|-------------------|---|----------------------------------|
| Hazard Area | Mitigation Measure | Priority | Implementation Responsibility | Time Frame | Estimated Cost | Potential Funding Sources |
| High Priority | | | | | | |
| A) Charles River | Maintain coordination with operators of dams upstream and downstream of Watertown | High | DPW | On-going | NA | Watertown |
| B) Flooding, Drainage Infrastructure and Dams | Continue revising storm water program. | High | DPW | 2010- 2012 | | Watertown |
| C) Earthquakes | Purchase mobile, long-running generators and/or install fixed, multi-fuel generators in designated emergency shelters | High | Fire Department | 2010- 2015 | \$20,000 per mobile or \$50,000 per fixed generator | Watertown / FEMA |
| D) Brush Fire – Whitney Hill | Build fire access road and create brush fire prevention program. | High | Fire Department | 2010-2013 | TBD | Watertown / FEMA |
| E) Brush Fire | Brush truck. | High | Fire Department | 2012-2013 | TBD | Watertown / FEMA |
| F) Multi-hazard | Purchase hand-held GPS units and mobile radio communications equipment | High | Fire Department | 2010 -2013 | TBD | Watertown / FEMA |
| G) Multi-hazard: power outage | Upgrade all generators as needed. | High | Police/DPW/Fire | 2010 -2015 | \$50,000 per new fixed | Watertown / FEMA |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 11 Watertown Potential Mitigation Measures | | | | | | |
|---|---|-----------------|--------------------------------------|-------------------|-----------------------|----------------------------------|
| Hazard Area | Mitigation Measure | Priority | Implementation Responsibility | Time Frame | Estimated Cost | Potential Funding Sources |
| | | | | | generator. | |
| H) Multi-hazard: power outage | Install fixed, multi-fuel generators at Town Hall. | High | Fire/DPW | 2010-2015 | \$105,000 | Watertown / FEMA |
| Measures to Ensure Compliance with NFIP | | | | | | |
| I) FIRM mapping and bylaws | Maintain updated town Flood Information Rate Maps (FIRM) maps information and town bylaw. | High | DPW | 2010-2012 | TBD | Watertown |
| Medium Priority | | | | | | |
| J) Charles River | Program to fund and provide technical assistance for flood protection. | Medium | DPW | 2012-2015 | TBD | Watertown / FEMA |
| K) Cunniff Elementary School | Upgrade pumps and improve site drainage. | Medium | School Dept | 2012-2015 | TBD | Watertown / FEMA |
| L) Watertown High School | Upgrade pumps and improve site drainage. | Medium | School Dept | 2012-2015 | TBD | Watertown / FEMA |
| M) Rutland Street | Program to fund and assist homeowners with pumps. | Medium | DPW | 2012-2015 | TBD | Watertown / FEMA |
| N) Flooding, Drainage | Dedicate more resources for more frequent | Medium | DPW | 2010 – 2015 | TBD | Watertown |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

| Table 11 Watertown Potential Mitigation Measures | | | | | | |
|---|---|-----------------|--------------------------------------|-------------------|-----------------------|----------------------------------|
| Hazard Area | Mitigation Measure | Priority | Implementation Responsibility | Time Frame | Estimated Cost | Potential Funding Sources |
| Infrastructure and Dams | maintenance of town-owned drainage facilities, such as more frequent removal of sediment. | | | | | |
| O) Flooding, Drainage Infrastructure and Dams | Study feasibility of creating stormwater utility | Medium | DPW | 2010 – 2011 | \$5,000 | Watertown |
| P) Flooding, Drainage Infrastructure and Dams | Develop greater emergency flood preparation and emergency response capacity. | Medium | DPW/Police/Fire | 2010- 2015 | TBD | Watertown / FEMA |
| Q) High Winds and Hurricanes | Increase contract labor for tree maintenance program. | Medium | DPW | 2010 -2013 | TBD | Watertown |
| R) Earthquakes | Investigate options to make all public buildings earthquake resistant. | Medium | Fire Department | 2010-2015 | TBD | Watertown / FEMA |
| S) Multi-hazard | Purchase a digital/hard copy map plotter to enable large map creation from town GIS files | High | Town Administrator | 2010 – 2013 | \$5000 | Watertown / FEMA |

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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TOWN OF WATERTOWN HAZARD MITIGATION PLAN

VIII. REGIONAL AND INTER-COMMUNITY CONSIDERATIONS

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

Regional Partners

In many communities, mitigating natural hazards, particularly flooding, is more than a local issue. The drainage systems that serve these 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 Town of Watertown, the Department of Conservation and Recreation (DCR), the Massachusetts Water Resources Authority (MWRA), Massachusetts Highway Department (MHD) and the Massachusetts Bay Transportation Authority (MBTA). The planning, construction, operations and maintenance of these structures are integral to the flood hazard mitigation efforts of communities. These agencies must be considered the communities regional partners in hazard mitigation. These agencies also operate under the same constraints as communities do including budgetary and staffing constraints and numerous competing priorities. In the sections that follow, the plan includes recommendations for activities to be undertaken by these other agencies. Implementation of these recommendations will require that all parties work together to develop solutions.

Inter-Community Considerations

Groundwater Sourced Flooding

A number of communities in this part of the region experience a relatively high incidence of groundwater sourced flooding in basements including Arlington, Belmont, and Watertown. This flooding appears to be linked to high water tables created by clay layers in the soil. Areas that flood appear to be scattered across these communities and in each of the above towns, local staff indicated that they did not have an accurate way to predict exactly where or when basement flooding might occur. These communities might benefit from sharing the cost of investigating the causes of this flooding, mapping the most likely areas impacted, and developing awareness programs for property owners.

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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TOWN OF WATERTOWN HAZARD MITIGATION PLAN

IX. PLAN ADOPTION AND MAINTENANCE

Plan Adoption

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

Plan Maintenance

MAPC worked with the Watertown Hazard Mitigation Planning Team to prepare this plan. This group will continue to meet on an as-needed basis to function as the Local Hazard Mitigation Implementation Group, with one town official designated as the coordinator. Additional members could be added to the local implementation group from businesses, non-profits and institutions.

Implementation Schedule

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

This information will be used to prepare a report or addendum to the local hazard mitigation plan. The Hazard Mitigation Implementation Team will have primary responsibility for tracking progress and updating the plan.

Develop a Year Four Update – During the fourth year after initial plan adoption, the coordinator of the Hazard Mitigation Implementation Team will convene the team to begin to prepare for an update of the plan, which will be required by the end of year five in order to maintain approved plan status with FEMA. The team will use the information from the year four biannual review to identify the needs and priorities for the plan update.

Prepare and Adopt an Updated Local Hazard Mitigation Plan – FEMA’s approval of this plan is valid for five years, by which time an updated plan must be approved by FEMA in order to maintain the town’s approved plan status and its eligibility for FEMA mitigation grants. 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 local Hazard Mitigation Planning Team should begin the process by the end of Year 3. This will help the town avoid a lapse in its approved plan status and grant eligibility when the current plan expires.

At this point, the Hazard Mitigation Implementation Team may decide to undertake the update themselves, contract with the Metropolitan Area Planning Council to update the plan or to hire another consultant. However the Hazard Mitigation Implementation Team

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

decides to update the plan, the group will need to review the current FEMA hazard mitigation plan guidelines for any changes. The update of the Belmont Hazard Mitigation Plan will be forwarded to MEMA and DCR for review and to FEMA for approval.

Integration of the Plans with Other Planning Initiatives

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

- Fire / Emergency Management
- Police
- Public Works / Highway
- Engineering
- Planning and Community Development
- Conservation
- Parks and Recreation
- Health
- Building

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

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

X. LIST OF REFERENCES

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

Town of Watertown Zoning Ordinance

Town of Watertown Wetlands Ordinance

Town of Watertown Open Space and Recreation Plan, 2005 - 2010

Commonwealth of Massachusetts, MacConnell Land Use Statistics, 1999

Federal Emergency Management Agency, Flood Insurance Rate Maps for Watertown, MA, 2010

Metropolitan Area Planning Council, Geographic Information Systems Lab

Metropolitan Area Planning Council, Regional Plans and Data

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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TOWN OF WATERTOWN HAZARD MITIGATION PLAN

**APPENDIX A
MEETING AGENDAS**

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

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TOWN OF WATERTOWN HAZARD MITIGATION PLAN



Don Boyce
DIRECTOR



Richard Sullivan
COMMISSIONER



Marc D. Draisen
EXECUTIVE DIRECTOR

**GREATER BOSTON
PRE-DISASTER
MITIGATION PLAN**

**UPPER NORTH
SHORE
Regional Hazard
Mitigation Team**

- Danvers
- Essex
- Gloucester
- Hamilton
- Ipswich
- Manchester
- Middleton
- Rockport
- Wenham

**INNER CORE-WEST
Regional Hazard
Mitigation Team**

- Arlington
- Belmont
- Newton
- Waltham
- Watertown
- Wellesley

**SOUTH SHORE
Regional Hazard
Mitigation Team**

- Duxbury
- Norwell

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

Hazard Mitigation Community Planning Team Greater Boston / Inner Core-West

First Meeting

WEDNESDAY, APRIL 16, 2008, 10:00 AM

Waltham Government Center
119 School Street, Waltham
Meeting Room 5 (lower level)

AGENDA

- 10:00 WELCOME & INTRODUCTIONS *(Please sign contact sheet)*
- 10:10 OVERVIEW OF FEDERAL DISASTER MITIGATION ACT & PRE-DISASTER MITIGATION PLANNING
 - Presentation, Questions & Discussion
--Martin Pillsbury, Manager of Regional Planning, MAPC
- 10:30 GETTING STARTED: THE HAZARD MITIGATION PLAN FOR THE INNER CORE-WEST COMMUNITIES
 - Review of Scope of Work & Schedule
 - Questions & Discussion - Local Issues & Priorities
- 10:50 PREVIEW OF MAPPING AND DATABASES FOR THE PLAN
 - Examples from the North Shore & Metro Boston PDM Plans
--Alan Bishop, GIS Manager, MAPC
- 11:20 NEXT STEPS / MEETING SCHEDULE
- 11:30 ADJOURN

TOWN OF WATERTOWN HAZARD MITIGATION PLAN



Don Boyce
DIRECTOR



Richard Sullivan
COMMISSIONER



Marc D. Draisen
EXECUTIVE DIRECTOR

**GREATER BOSTON
PRE-DISASTER
MITIGATION PLAN**

**UPPER NORTH
SHORE
Regional Hazard
Mitigation Team**

Danvers
Essex
Gloucester
Hamilton
Ipswich
Manchester
Middleton
Rockport
Wenham

**INNER CORE-WEST
Regional Hazard
Mitigation Team**

Arlington
Belmont
Newton
Waltham
Watertown
Wellesley

**SOUTH SHORE
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Metropolitan Area Planning Council

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

Hazard Mitigation Community Planning Team Greater Boston / Inner Core-West

Second Meeting

MONDAY, DECEMBER 15, 2008, 10:00 AM

Waltham Government Center
119 School Street, Waltham
Public Meeting Room (lower level)

AGENDA

10:00 WELCOME, INTRODUCTIONS & OVERVIEW OF AGENDA

**10:05 REVIEW OF HAZARD MAPPING AND CRITICAL INFRASTRUCTURE
DATA COLLECTION**

- *Allan Bishop, GIS Manager, will present an overview of the draft Critical Facilities database and community hazard maps*

10:45 UPDATE ON LOCAL PLANS

- *Martin Pillsbury and Christine Wallace will review progress and next steps for developing the local PDM Plans for each community*

**11:00 SETTING GOALS AND OBJECTIVES FOR THE REGIONAL PDM
PLAN**

- *Martin Pillsbury will in review goals and objectives and ask the team to discuss priorities for the Inner Core - West communities (see attachment)*

11:20 NEXT STEPS / MEETING SCHEDULE

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

Meeting Agenda Local Multiple Hazard Community Planning Team Watertown, MA

May 17, 2010 10:00-11:30 AM
Fire Department Headquarters, 99 Main St

1. Welcome and Introductions
2. Project Overview (*James Freas, MAPC*)
3. Identification of Goals
4. Ortho Map Markup of Hazardous Areas/ Conversation:
 - What floods? How often? Any mitigation studies done? What mitigation measures have been done or planned for? High or low priority?
 - Other hazards: Brush fires, dams, earthquake, high winds? What areas? Dam studies available?
 - Map known future development areas? Type, size, status of permitting
5. Existing Mitigation Measures
6. Next Steps: Follow up with individuals as needed, continue information gathering, set local group Goals and Objectives meeting, and check information to date.

Project Overview - MAPC received a grant to prepare natural hazards *Pre-Disaster Mitigation Plan* for the communities of Arlington, Belmont, Newton, Waltham, Wellesley, and Watertown. MAPC is working with the six communities to develop a plan 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 in order to remain eligible for FEMA Disaster Mitigation Grants.

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

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

Meeting Agenda Local Multiple Hazard Community Planning Team Watertown, MA

June 7, 2010 10:00-11:30 AM
Fire Department Headquarters, 99 Main St

1. Welcome, Introductions
2. Introduce Watertown Hazard Mitigation Planning map series and digitized ortho photo showing Areas of Concern—check for accuracy and edit as needed
3. Review and edit Watertown Mitigation Matrix as needed- set priority projects
4. Introduce STAPLE/E project rating criteria
5. Set draft goals for Hazard Mitigation Plan
6. Next steps: 1) Finalize mitigation measures; 2) submit draft plan to Work Group for comment; 3) submit draft to MEMA, FEMA

Project Overview - MAPC received a grant to prepare natural hazards *Pre-Disaster Mitigation Plan* for the communities of Arlington, Belmont, Newton, Waltham, Wellesley, and Watertown. MAPC is working with the six communities to develop a plan 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 in order to remain eligible for FEMA Disaster Mitigation Grants.

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

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

APPENDIX B HAZARD MAPPING

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

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

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

Map 1: Population Density – This map uses the US Census block data for 2000 and shows population density as the number of people per acre in seven categories with 60 or more people per acre representing the highest density areas.

Map 2: Potential Development – This map shows potential future developments, and critical infrastructure sites. MAPC consulted with town staff to determine areas that were likely to be developed or redeveloped in the future.

Map 3: Flood Zones – The map of flood zones used the FEMA NFIP Flood Zones as its source. For more information, refer to the FEMA Map Service Center website <http://www.msc.fema.gov>. The definitions of the flood zones are described in detail on this site as well. The flood zone map for each community also shows critical infrastructure and municipally owned and protected open space.

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

The landslide information shows areas with either a low susceptibility or a moderate susceptibility to landslides based on mapping of geological formations. This mapping is

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

highly general in nature. For more information on how landslide susceptibility was mapped, refer to <http://pubs.usgs.gov/pp/p1183/pp1183.html>.

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

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

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

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

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

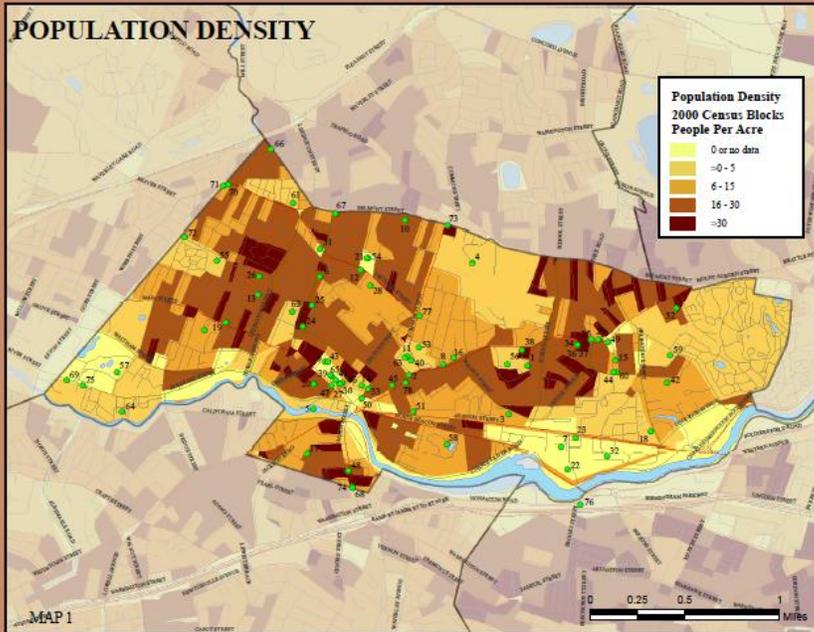
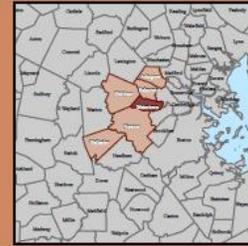


FEMA Pre-Disaster Mitigation Planning Grant

WATERTOWN, MA

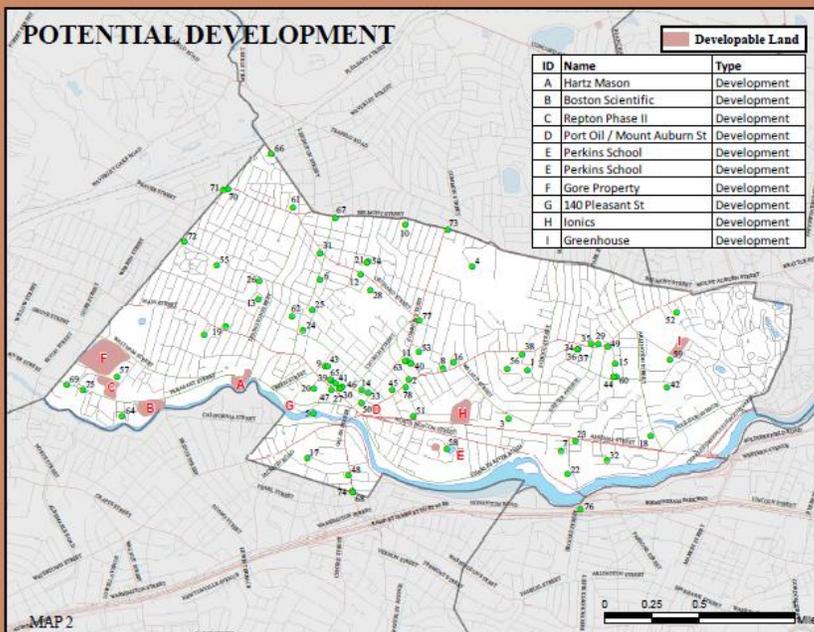
NATURAL HAZARDS MAP

Population Density and Potential Development



CRITICAL INFRASTRUCTURE SITES

| ID | Name | Type |
|----|----------------------------|-------------|
| A | Hartz Mason | Development |
| B | Boston Scientific | Development |
| C | Repton Phase II | Development |
| D | Port Oil / Mount Auburn St | Development |
| E | Perkins School | Development |
| F | Gore Property | Development |
| G | 140 Pleasant St | Development |
| H | Ionics | Development |
| I | Greenhouse | Development |
| J | ... | ... |
| K | ... | ... |
| L | ... | ... |
| M | ... | ... |
| N | ... | ... |
| O | ... | ... |
| P | ... | ... |
| Q | ... | ... |
| R | ... | ... |
| S | ... | ... |
| T | ... | ... |
| U | ... | ... |
| V | ... | ... |
| W | ... | ... |
| X | ... | ... |
| Y | ... | ... |
| Z | ... | ... |



Sites

- Critical Infrastructure Sites
- Repetitive Loss Sites

Water Bodies

Roads / Transportation

- Local
- Collector
- Arterial
- Interstate
- Trains

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis.

Produced by MAPAC Data Services
60 Temple Place, Boston, MA 02111 (617) 451-2770

Data Sources:
Metropolitan Area Planning Council (MAPC)
Massachusetts Geographic Information System (MassGIS)
Watertown, MA

Path:
C:\Data\Services\Projects\Current_Projects\FDM\FDM\Watertown

Date: June 2010

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

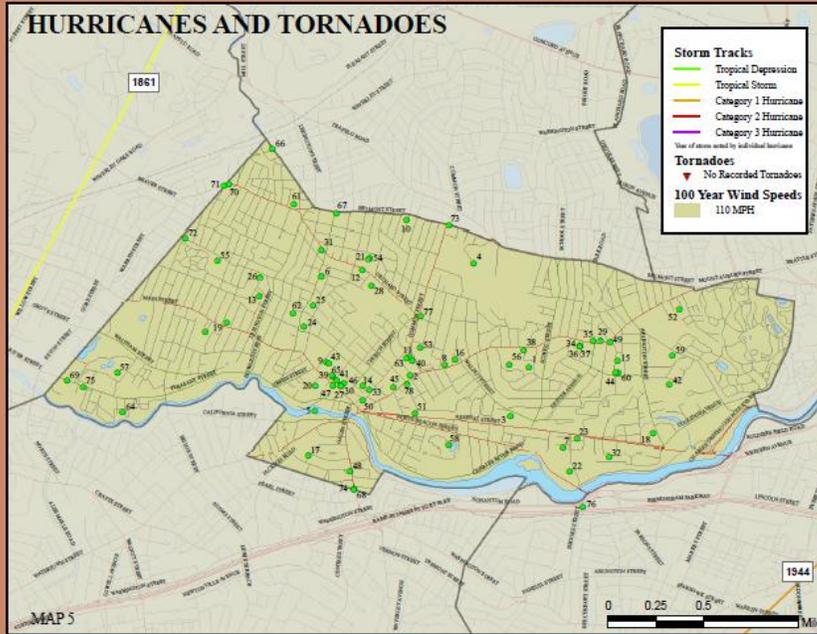
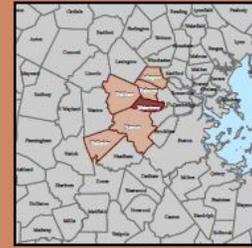


FEMA Pre-Disaster Mitigation Planning Grant

WATERTOWN, MA

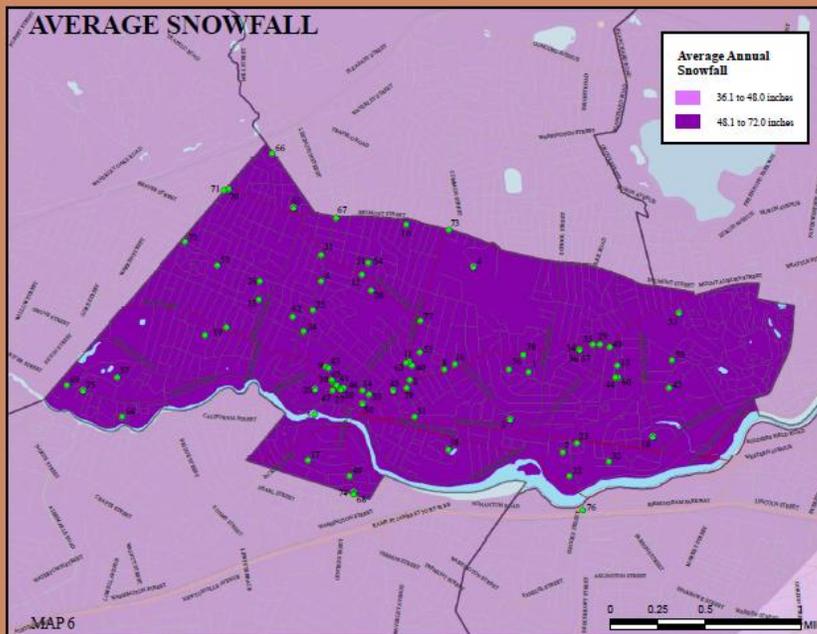
NATURAL HAZARDS MAP

Hurricanes / Tornadoes and Average Snowfall



CRITICAL INFRASTRUCTURE SITES

| ID | Name | Address | Phone |
|-----|-------------------|------------------|----------------|
| 1 | City of Watertown | 100 State Street | (617) 252-1000 |
| 2 | City of Watertown | 100 State Street | (617) 252-1000 |
| 3 | City of Watertown | 100 State Street | (617) 252-1000 |
| 4 | City of Watertown | 100 State Street | (617) 252-1000 |
| 5 | City of Watertown | 100 State Street | (617) 252-1000 |
| 6 | City of Watertown | 100 State Street | (617) 252-1000 |
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| 11 | City of Watertown | 100 State Street | (617) 252-1000 |
| 12 | City of Watertown | 100 State Street | (617) 252-1000 |
| 13 | City of Watertown | 100 State Street | (617) 252-1000 |
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| 19 | City of Watertown | 100 State Street | (617) 252-1000 |
| 20 | City of Watertown | 100 State Street | (617) 252-1000 |
| 21 | City of Watertown | 100 State Street | (617) 252-1000 |
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| 24 | City of Watertown | 100 State Street | (617) 252-1000 |
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| 28 | City of Watertown | 100 State Street | (617) 252-1000 |
| 29 | City of Watertown | 100 State Street | (617) 252-1000 |
| 30 | City of Watertown | 100 State Street | (617) 252-1000 |
| 31 | City of Watertown | 100 State Street | (617) 252-1000 |
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Sites

- Critical Infrastructure Sites
- Repetitive Loss Sites
- Water Bodies

Roads / Transportation

- Local
- Collector
- Arterial
- Interstate
- Trains

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis.

Produced by MAPC Data Services
40 Temple Place, Boston, MA 02111 (617) 451-2770

Data Sources:
Metropolitan Area Planning Council (MAPC)
Massachusetts Geographic Information System (MassGIS)
Watertown, MA

Path:
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Date: June 2010

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

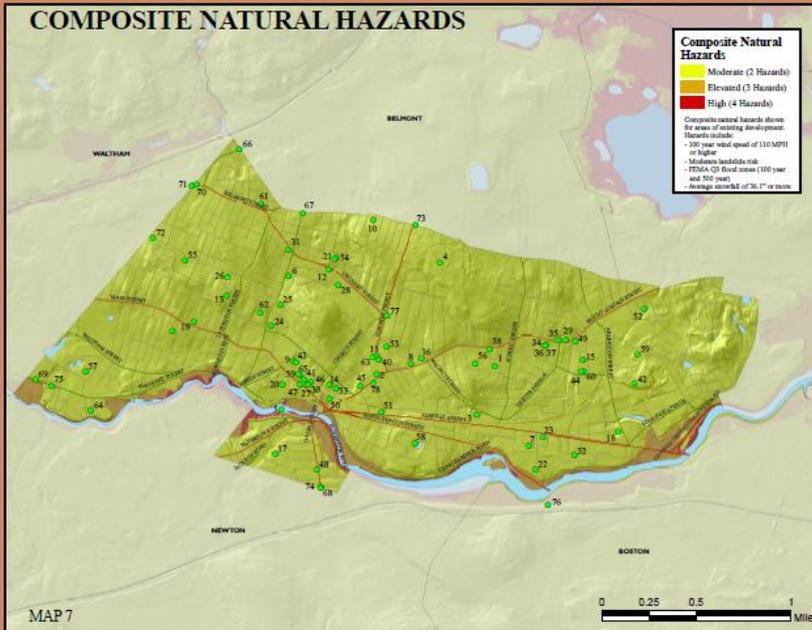
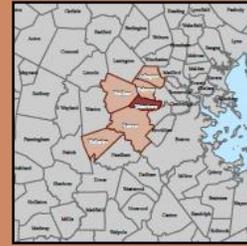


FEMA Pre-Disaster Mitigation Planning Grant

WATERTOWN, MA

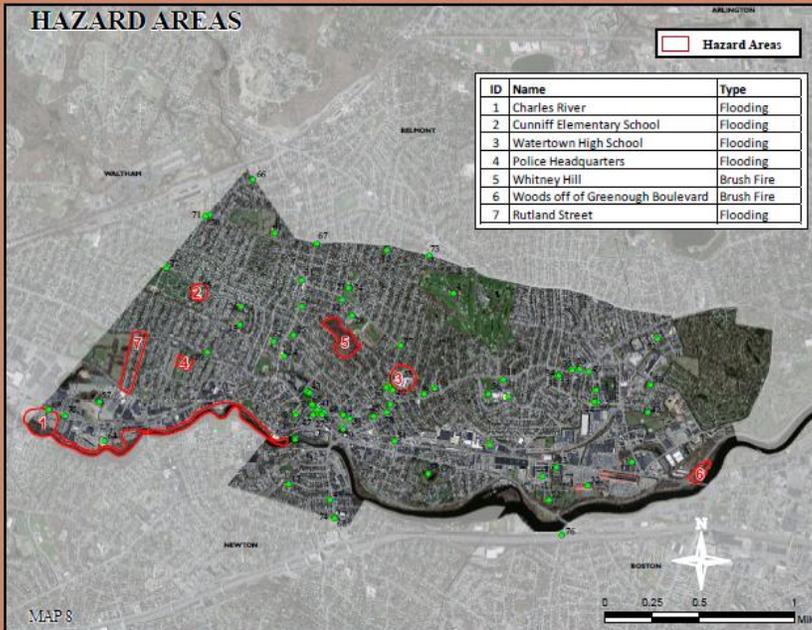
NATURAL HAZARDS MAP

Composite Natural Hazards and Hazard Areas



CRITICAL INFRASTRUCTURE SITES

| ID | Name | Type | Notes |
|-----|----------------------------------|------------|-------|
| 1 | Charles River | Flooding | |
| 2 | Cuniff Elementary School | Flooding | |
| 3 | Watertown High School | Flooding | |
| 4 | Police Headquarters | Flooding | |
| 5 | Whitney Hill | Brush Fire | |
| 6 | Woods off of Greenough Boulevard | Brush Fire | |
| 7 | Rutland Street | Flooding | |
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Sites

- Critical Infrastructure Sites
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Water Bodies

Roads / Transportation

- Local
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Produced by MAPAC Data Services
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Data Sources:
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 Watertown, MA

Path:
 K:\Data\GIS\Projects\Current_Projects\FM\COM\Watertown

Date: June 2010

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

**APPENDIX C
DOCUMENTATION OF PUBLIC MEETING**

TOWN OF WATERTOWN HAZARD MITIGATION PLAN



Watertown Town Council
Administration Building
149 Main Street
Watertown, MA 02472
Phone: 617-972-6470

ELECTED OFFICIALS:

Mark S. Sideris
Council President

Stephen P. Corbett
Vice President

John A. Donohue
Councilor At Large

Susan G. Falkoff
Councilor At Large

Anthony Palomba
Councilor At Large

Angeline B. Kounelis
District A Councilor

Cecilia Lenk
District B Councilor

Vincent J. Piccirilli, Jr.
District C Councilor

John J. Lawn, Jr.
District D Councilor

Town Council Meeting
Tuesday, July 13, 2010 – 6:30 PM*
Richard E. Mastrangelo Chamber
Administration Building

AGENDA

1. ROLL CALL
2. EXECUTIVE SESSION – 6:30 PM*
 - a) To discuss strategy with respect to collective bargaining
3. RECONVENE OPEN MEETING – 7:15 PM
4. PLEDGE OF ALLEGIANCE
5. ACCEPTANCE OF MINUTES: [June 22, 2010](#)
6. PUBLIC FORUM
7. REPORTS OF COMMITTEES:
 - a) Committee on Public Works [report](#) on the implementation of a community path, driveway permits and a recycling center – Susan G. Falkoff, Chair.
 - b) Committee on Rules and Ordinances report on Council Rules – Anthony Palomba, Chair.
 - c) Committee on Economic Development and Planning [report](#) and action on the [appointment](#) of Ms. Linda Barletta to the Planning Board – Stephen P. Corbett, Chair.
8. INFORMATIONAL PRESENTATIONS:
 - a) Informational Presentation on State and Local Affairs – Jonathan Hecht, State Representative.
 - b) [Informational Presentation](#) on the Town's efforts to date in the creation of a Hazard Mitigation Plan - James Freas, Regional Planner, Metropolitan Area Planning Council.
9. MOTIONS, ORDERS AND RESOLUTIONS:
 - a) Acceptance of Proclamation honoring [Dolores Grandinetti](#) upon her retirement – Stephen P. Corbett.
 - b) [First Reading](#) and referral to the Planning Board on a proposed Amendment to the Zoning Ordinance related to the Green Communities Act.

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

**APPENDIX D
DOCUMENTATION OF PLAN ADOPTION**

TOWN OF WATERTOWN HAZARD MITIGATION PLAN

DOCUMENTATION OF PLAN ADOPTION

[To be added to final plan after adoption by the town]