

THE TOWN OF AGAWAM

**LOCAL NATURAL HAZARDS MITIGATION
PLAN**



Adopted by the Mayor of Agawam on _____

**Prepared by:
The Agawam Natural Hazards Mitigation Planning Committee**

and

The Pioneer Valley Planning Commission

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1 - INTRODUCTION

Hazard Mitigation

The Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA) define Hazard Mitigation as any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc. Mitigation efforts undertaken by communities will help to minimize damages to buildings and infrastructure, such as water supplies, sewers, and utility transmission lines, as well as natural, cultural and historic resources.

Planning efforts, like the one undertaken by the Town of Agawam and the Pioneer Valley Planning Commission, make mitigation a proactive process. Pre-disaster planning emphasizes actions that can be taken before a natural disaster occurs. Future property damage and loss of life can be reduced or prevented by a mitigation program that addresses the unique geography, demography, economy, and land use of a community within the context of each of the specific potential natural hazards that may threaten a community.

Preparing a Local Natural Hazards Mitigation Plan before a disaster occurs can save the community money and will facilitate post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in the Plan. FEMA requires that a community adopt a pre-disaster mitigation plan as a condition for mitigation funding. For example, the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation Program are programs with this requirement.

Planning Process

The natural hazard mitigation planning process for the Town of Agawam included the following tasks:

- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure (i.e., critical facilities, public buildings, roads, homes, businesses, etc.) at the highest risk for being damaged by the identified natural hazards, particularly flooding.
- Identifying and assessing the policies, programs, and regulations a community is currently implementing to protect against future disaster damages. Examples of such strategies include:
 - Preventing or limiting development in natural hazard areas like floodplains;

- Incorporating recommendations in existing planning documents including Stormwater Management Plans, Master Plans, Open Space and Recreation Plans, and Emergency/Evacuation Plans that address the impacts of natural hazards; and
 - Requiring or encouraging the use of specific structural requirements for new buildings such as buried utilities, flood-proofed structures, and lightning grounding systems.
- Identifying deficiencies in the current strategies and establish goals for updating, revising or adopting new strategies.
 - Adopting and implementing the final Local Natural Hazards Mitigation Plan.

During the planning process, the Town's Local Natural Hazard Planning Committee (see acknowledgement page for specific information), headed by Chet Nicora, Agawam Emergency Management Director/ Assessor, identified Action Plan items and specific time frames. The actions were selected from a list of local strategies which were compiled by the regional LEPC during several brainstorming sessions (see Regional Natural Hazard Mitigation Plan Risk Assessment Matrix – Section 3: Risk Assessment) and others identified by the Town during their review of existing programs, policies, and regulations. From this list, specific Action Items were prioritized by the Town's Local Natural Hazards Planning Committee based on the following criteria:

- Select Action Items which have the ability to significantly mitigate the negative impact of natural hazards on people and property;
- Select Action items which the Town has the ability to implement given the financial and staff resources available;
- Select Action Items which will have the greatest influence on achieving Local Goals & Objectives;
- Select a diverse set of Action Items which will address different Natural Hazards that present a high or moderate risk to the region; and
- Select Action items which will address those mitigation measures identified as deficient or in need of attention to ensure that the Town is in the best possible position to address natural hazards which impact property and residents.

For example, updating or adopting a local floodplain bylaw would be a relatively low cost action item, which could have a significant impact on mitigating hazards caused by flooding. If adopted by the Town, this bylaw would discourage development in floodplain areas and prevent harm to people and damage to property. Another action item was to review and maintain shelters for victims of natural hazards within the Town and to conduct outreach to residents so that they are aware of the availability of those shelters.

First, however, the Town must identify what services are available at the different shelters (e.g. food preparation, potable water, back-up electrical power, heat, showers, etc.) and whether the location of different shelters will be impacted by different hazards (i.e. whether flooding will make the shelter inaccessible to some residents). This action item, review and maintain shelters, also addressed a number of different natural hazards and would help ensure that suitable shelters are available for different types of natural hazards. The action items selected were all considered

to have a low to moderate cost to implement. In some cases grant funding would be sought for implementation given the limited resources available in the Town.

The local action items represent a multi-faceted approach to addressing natural hazards in the Town and will be undertaken as resources become available and will be integrated into ongoing planning activities. As part of the review and adoption process, the Committee approved the action items that were in keeping with the goals and criteria established by the Town and assigned appropriate bodies within the Town to implement them within a five-year framework.

Public Committee Meetings

December 19, 2006, 9:00 -10:30 a.m.: Public informational and working meeting, held at Agawam DPW Conference Room.

January 30, 2007, 9:00 -10:30 a.m.: Working committee meeting held at Agawam DPW Conference Room.

February 27, 2007, 9:00 – 10:30 a.m.: Working committee meeting held at Agawam DPW Conference Room

March 27, 2007, 9:00 – 10:00 a.m.: Working committee meeting held at Agawam DPW Conference Room

April 24, 2007, 9:00 – 10:30 a.m.: Working committee meeting held at Agawam DPW Conference Room

February 7, 2008, 10:00- 11:00 a.m.: Working committee meeting held at Agawam DPW Conference Room

Copies of the meeting agendas can be found in Appendix B.

Public Meetings with the Board of Selectmen

Date: The Mayor adopted the Local Hazard Mitigation Plan. Hearing held at Agawam Town Offices.

A mailing was made to each committee member, prior to each meeting that contained information from the previous meeting, an agenda sheet, and information to be covered.

Participation by Public & Entities in Surrounding Communities

In the initial stages of the planning process for this mitigation plan, the Pioneer Valley Planning Commission conducted a series of outreach efforts to make the public aware of the regional mitigation process. In October of 2005, the Planning Commission notified all Select Boards and Chief Elected Officials that their community could participate in the region's mitigation planning process. Again, on April 4, 2006, the Planning Commission mailed a notice of planning activities to all Chief Elected Officials and Select Board in the Pioneer Valley. Both mailings explained the purpose of mitigation planning and invited communities to participate in either Round I or Round II of the region's mitigation planning process.

On September 13, 2007 the Pioneer Valley Planning Commission sent a press release to all area media outlets to inform the general public that drafts of the region's Hazard Mitigation plans

were complete and available for public comment and review on the Commission's website (www.pvpc.org). This press release (Appendix F) resulted in a series of news articles (Appendix F) that further enhanced awareness of the Hazard Mitigation Planning Process. The Town of Northampton was a key component of this outreach effort, as many of the officials quoted were from this community.

On November 20th, 2007 the Pioneer Valley Planning Commission Presented the planning process that led to the creation of the Agawam *Local Natural Hazards Mitigation Plan*. The Western Regional Homeland Security Council is the planning entity responsible for orchestrating the homeland security planning activities of Berkshire, Franklin, Hampden and Hampshire Counties. Collectively, this body is responsible for 101 communities.

Additionally, the Hampshire Regional Emergency Planning Committee was presented with the findings of this plan during its November 15, 2007 meeting. Prior to this briefing, the HREPC was provided with updates of the Hazard Mitigation Planning Process on April 20, 2007 and again on December 21, 2006.

Also, on September 23, 2007 the Republican Newspaper, based in Springfield, ran an article about the Pre-Disaster Mitigation Plans which included a solicitation of comments on the plans from the public. A copy of the article is included in Appendix B.

2 – LOCAL PROFILE

Community Setting

Agawam is the southernmost community in Massachusetts on the west bank of the Connecticut River. Located in the southwestern portion of the state, Agawam is within a short distance from many major New England Metropolitan areas, including Hartford which is only 25 miles to the south. Agawam is only minutes away from downtown Springfield, and is included in the Springfield-Holyoke-Chicopee Metro Region.

In 1631, two members of the Agawam tribe traveled to the Mass Bay colony from the Pioneer Valley. They sought members to settle in their valley in order to have the English protect the Agawam tribe from aggressors. William Pynchon, desirous of expanding his fur trade, explored the area and decided to settle on the western shores of the Connecticut River. This became the site of the first colonial settlement in the Pioneer Valley Region.

Agawam thrived as a farming community through the 1800s. The first cotton mill in western Massachusetts was built in 1810 on what is now Riverside Park. Agawam also had many lucrative crops, such as wool and tobacco. The present Agawam Regional Industrial Park was formerly land belonging to the Cuba-Connecticut Tobacco Company, one of the largest shade-grown tobacco farms in the East.

Agawam was established as a town in 1855, but remained primarily a farming community until as late as the 1950s, when the construction of highways facilitated suburban growth. Since this time, Agawam has witnessed a dramatic shift in land use patterns with over a 70% decrease in agricultural land. Since 1960, Agawam's population increased by 79%. The majority of the town's developed land is in residential use. Agawam's recent decade of new home construction has coincided with the Town's effort to protect its historic open spaces and rural character.

Today, Agawam is both a residential community for those who commute to Springfield and neighboring Connecticut, as well as a commercial and industrial center itself. State Route 57, the Town's primary highway, was recently expanded and provides direct access to the Agawam Regional Industrial Park. This facility provides further opportunities for commercial and industrial expansion.

The largest amusement park in New England, Six Flags New England, is located in Agawam. It attracts visitors from throughout the Northeast. Its carousel is a National Register of Historic Places landmark.

Infrastructure

Agawam's location, centralized in the region and a border community along the Connecticut state line, has played a major role in facilitating the expansion of its infrastructure. Several

major thoroughfares criss-cross through the town, and development patterns have followed these corridors. In addition, the town's physical characteristics and topography couple with its location to define its boundaries and guide its development.

Roads and Highways

Agawam is served and accessible by a variety of roads that range from high volume expressways to quiet, residential streets. It is at the hub of major north-south and east-west transportation corridors. The main thoroughfare through town is Route 57, which travels east-west, through the center of Agawam. Other key roads, including State Routes 187 (Westfield Street), 75 (Suffield Street), 159 (Main Street), and 147 (Memorial Ave) spur off of Route 57 and connect Agawam to points north and south. The major regional transportation corridors of U.S. Route 5 and Interstate 91 run just along the eastern border of town, crossing the Connecticut River in Agawam's northeastern corner.

Rail

There is no passenger or freight rail service in Agawam.

Public Transportation

Bus service to the community is provided by the Pioneer Valley Transit Authority to many locations throughout the Pioneer Valley, usually via the Springfield Bus Terminal. In addition, limited bus service is provided to the Agawam Regional Industrial Park, the Pheasant Hill Apartments, and the Heritage Nursing Home.

Water and Sewer

Agawam purchases 99% of its water from the Springfield Regional Supply System. The remainder of the water used in the community comes from private wells. The water that comes from Springfield is treated before consumption and there are no limitations by contract on how much Agawam can use. During the 1970s, Agawam used state and federal dollars to expand its aging sewer system enough so that as of 2004, 88% of the Town was sewered. The sewage is pumped to a treatment plant that is owned by the Town of Springfield on Bondi's Island where it is managed. Agawam pays for their share of the maintenance and operating costs based on the volume and strength of the sewage that comes from the community.

Schools

Public schools serving Agawam include the Early Childhood Center, Benjamin J. Phelps School, Clifford M. Granger School, James Clark School, Robinson Park School, Agawam Middle School, Agawam Junior High School, and Agawam High School.

Natural Resources

The following in the Natural Resources section include excerpts from the Agawam Open Space and Recreation Plan (2001).

Agawam's physical boundaries consist of three impressive features. The Connecticut River to the east provides the community with five miles of river frontage on New England's largest river. To the north, the Westfield River forms an eight mile boundary, most of which is located adjacent to Robinson State Park, Agawam's largest park. Because Agawam is located at the confluence of these two rivers, much of the eastern portion of the community is the floodplain of the two. The landscape then gently slopes to the west where the Provin Mountain range is physically prominent. Provin Mountain's summit at 640 feet is the highest point in Agawam, and provides spectacular view of Springfield, the Connecticut River, and the picturesque valleys and farmland surrounding. To the south, Agawam is bordered by state line with Connecticut. Agawam's physical boundaries play a role in the community's self image and make Agawam very parochial.

Water Resources

Agawam has approximately 532 acres of open fresh water, most of which is contained in the Westfield and Connecticut Rivers. The Connecticut River runs along the eastern boundary of Agawam for five miles. The section of the Westfield River that runs along the northern boundary of Agawam is approximately eight miles long, and runs from the Westfield town line to its confluence with the Connecticut River at Pynchon Point. Both of these water bodies have witnessed dramatic water quality improvement in recent years, and are considered generally safe for fishing and swimming. However, currents and boat traffic in the Connecticut and water depths in the Westfield make swimming impractical in most locations.

Several small ponds, all over three acres, but totaling less than 50 acres all together, are found in Town. These include: Silver Lake, Mawaga Pond, Leonard Pond, Robinson Park Pond, Springfield Turnverein Lake, Hathaway Pond, and the Lake in the Meadows. Other smaller bodies of surface water exist as well, and are primarily used for spray and irrigation and private recreation. In addition, many small streams also wind through town, including: Three Mile Brook, Tarkill Brook, Still Brook, Philo Brook, Miller Brook, Worthington Brook, and Adams Brook. Finally, a number of smaller unnamed intermittent streams, wetlands, and vernal pools exist as well.

Forests and Vegetation

Vegetative cover serves a variety of beneficial functions. It protects water from sedimentation by stabilizing soils. It serves as a buffer against noise and between different land uses. It provides food and habitat for different types of wildlife. It extracts carbon dioxide from the air and gives off oxygen. It heightens the aesthetic quality of our surroundings, and it provides opportunities of recreation.

Agawam’s rapid suburbanization over the past few decades has resulted in an appreciable loss of agricultural vegetation as those lands most suitable for agricultural use are also the most desirable for development. During this period, however, pockets of natural vegetation in the Town’s wetlands and hilly areas have been less severely impacted. Currently, approximately 2,143 acres (14%) of Agawam is cropland or pasture, and 5,093 acres (33%) of Agawam is forested.

Development in Agawam

Development Patterns

Several factors have played, and will continue to play, an important role in the development of Agawam. These include: the existing development pattern and availability of land for future development; the present road network; physical factors such as steep slopes, poor soil conditions, land set aside for conservation, the Westfield and Connecticut Rivers, their tributaries and floodplains; and the availability of utilities such as public water and sanitary sewers. These factors have an impact, both individually and cumulatively, on where and how development occurs.

Zoning and other land use regulations constitute a town’s “blueprint” for its future. Land use patterns over time will continue to look more and more like the town’s zoning map until the town is finally “built out”—that is, there is no more developable land left. Therefore, in looking forward over time, it is critical that the town focus not on the current use and physical build-out today, but on the potential future uses and build-out that are allowed under the town’s zoning map and zoning bylaws. Zoning is the primary land use tool that the town may use to manage development and direct growth to suitable and desired areas while also protecting critical resources and ensuring that development is in keeping with the town’s character.

Agawam has 11 zoning districts. The districts define the allowed uses and dimensional requirements in all parts of the town. These districts are described below.

Residence A-1 Districts: Single family residences

Residence A-2 Districts: Single-, 2- & 4-family residences

Residence A-3 Districts: Apartments, garden-type apartments, & condominiums

Residence A-4 Districts: Elderly housing

Residence A-5 Districts: Age-restricted housing

Residence B Districts: Single- & 2-family residences

Agriculture Districts: Single family residences, agriculture & administrative offices

Business A Districts: Retail uses, all residential and agricultural uses

Business B Districts: Mixed commercial, including light industrial

Industrial District A: Industrial, mixed commercial & agricultural

Industrial District B: Industrial, mixed commercial & agricultural

Current Development Trends

Agawam’s landscape is relatively flat, but rising along the western border and bordered by two major rivers. Ten percent of Agawam’s land is permanently protected and about 1,607 acres temporarily protected under the state’s Chapter 61A Program. The land is approximately 33%

forestland most of which is fragmented except along the western border on Provin Mountain and in along the Westfield River in Robinson State Park. Most parts of Agawam are widely developed with the most concentrated development in north Agawam. The least developed area is on Provin Mountain undeveloped primarily because of steep slopes. Also parts of Feeding Hills and some areas along North and South Westfield Roads are not heavily developed due a lack of sewer lines and soil inappropriate for septic systems.

Today, this community is home to approximately 28,144 residents in 11,260 households with 73.6% of the homes being owner occupied. The average commute time for Agawam residents is 21 minutes (one way). Development has been relatively steady in Agawam in this decade with average of about 50 building permits issued per year. This is a decrease in development rate since the 1990s. There is no particular part of Agawam where the town is working to promote development.

Development in Hazard Areas

Hazards identified in this plan are regional risks and, as such, all new development falls into the hazard area. The exception to this is flooding. According to the Community Information System (CIS) of FEMA, there were 370 1-4 family structures and 15 “other” structures located within the Special Flood Hazard Area (SFHA) in Agawam as of June 20, 2005, the most current records in the CIS for the Town of Agawam.

National Flood Insurance Program (NFIP)

Agawam is a participating member of the National Flood Insurance Program. Flood Insurance Rate Maps, all bearing the effective date of February 1, 1978, are used for flood insurance purposes and are on file with the Agawam Planning Board. As of 2005, there were 299 policies in effect in Agawam for a total of \$43,682,300 worth of insurance (based on the median home value in Agawam). There are currently no “Repetitive Loss Properties” insured under the NFIP within the Town of Agawam.

3 – HAZARD IDENTIFICATION & ANALYSIS

Natural Hazard Identification

Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to identify the natural hazards which are most likely to have an impact on the Town of Agawam.

Floods

The average annual precipitation for Agawam and surrounding areas in northwestern Massachusetts is 46 inches. There are three major types of storms that bring precipitation to Agawam. Continental storms that originate from the west continually move across the region. These storms are typically low-pressure systems that may be slow-moving frontal systems or more intense, fast-moving storms. Precipitation from coastal storms, also known as nor'easters, that travel into New England from the south constitute the second major storm type. In the late summer or early fall, the most severe type of these coastal storms, hurricanes, may reach Massachusetts and result in significant amounts of rainfall. The third type of storm is the result of local convective action. Thunderstorms that form on warm, humid summer days can cause locally significant rainfall.

Floods can be classified as either *flash floods*, which are the product of heavy, localized precipitation in a short time period over a given location or *general floods*, which are caused by precipitation over a longer time period in a particular river basin. There are several local factors that determine the severity of a flooding event, including: stream and river basin topography, precipitation and weather patterns, recent soil moisture conditions, amount of impervious surface area, and the degree of vegetative clearing. Furthermore, flooding can be influenced by larger, global climate events. Global warming and climate change have the potential to shift current rainfall and storm patterns. Increased precipitation is a realistic result of global warming, and could potentially increase the frequency and intensity of flooding in the region. Currently, floods occur and are one of the most frequent and costly natural hazards in the United States.

Flash flooding events typically occur within minutes or hours after a period of heavy precipitation, after a dam or levee failure, or from a sudden release of water from an ice jam. Most often, flash flooding is the result of a slow-moving thunderstorm or the heavy rains from a hurricane. In rural areas, flash flooding often occurs when small streams spill over their banks. However, in urbanized areas, flash flooding is often the result of clogged storm drains (leaves and other debris) and the higher amount of impervious surface area (roadways, parking lots, roof tops).

In contrast, *general flooding* events may last for several days. Excessive precipitation within a watershed of a stream or river can result in flooding particularly when development in the floodplain has obstructed the natural flow of the water and/or decreased the natural ability of the groundcover to absorb and retain surface water runoff (e.g., the loss of wetlands and the higher amounts of impervious surface area in urban areas).

A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large “sponges” to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into fertile, productive farmland like that found in the Connecticut River valley. In the past, floodplain areas were also often seen as prime locations for development. Industries were located on the banks of rivers for access to hydropower. Residential and commercial development occurred in floodplains because of their scenic qualities and proximity to the water. Although periodic flooding of a floodplain area is a natural occurrence, past and current development and alteration of these areas will result in flooding that is a costly and frequent hazard.

The major floods recorded in Western Massachusetts during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. Flooding along the Westfield River and Connecticut River has historically been a problem in Agawam. Over the years floods have destroyed several structures along the Connecticut River. Since most of the land along the Westfield River is protected and undeveloped, flooding has less potential to damage structures and is, therefore, less of a concern there.

Severe Snowstorms/Ice Storms

Severe winter storms can pose a significant risk to property and human life because the rain, freezing rain, ice, snow, cold temperatures and wind associated with these storms can disrupt utility service, phone service and make roadways extremely hazardous. Severe winter storms can be deceptive killers. The types of deaths that can occur as a result of a severe winter storm include: traffic accidents on icy or snow-covered roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to cold temperatures. Infrastructure and other property are also at risk from severe winter storms and the associated flooding that can occur following heavy snow melt. Power and telephone lines, trees, and telecommunications structures can be damaged by ice, wind, snow, and falling trees and tree limbs. Icy road conditions or roads blocked by fallen trees may make it difficult to respond promptly to medical emergencies or fires. Prolonged, extremely cold temperatures can also cause inadequately insulated potable water lines and fire sprinkler pipes to rupture and disrupt the delivery of drinking water and cause extensive property damage.

New England generally experiences at least one or two severe winter storms each year with varying degrees of severity. Research on climate change indicates that there is great potential for stronger, more frequent storms as the global temperature increases. Severe winter storms typically occur during January and February; however, they can occur from late September through late April.

Hurricanes

Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour, and large amounts of precipitation. Hurricanes generally occur between June and November and can result in flooding and wind damage to structures and above-ground utilities. Global warming will increase the threat of hurricanes as oceans and atmosphere warms. Climate change research indicates that storms like hurricanes will become more intense and more

frequent in the future. In Massachusetts, major hurricanes occurred in 1904, 1938, 1954, 1955, 1960 and 1976.

Tornadoes / Microbursts

Tornadoes are swirling columns of air that typically form in the spring and summer during severe thunderstorm events. In a relatively short period of time and with little or no advance warning, a tornado can attain rotational wind speeds in excess of 250 miles per hour and can cause severe devastation along a path that ranges from a few dozen yards to over a mile in width. The path of a tornado may be hard to predict because they can stall or change direction abruptly. Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester, including towns in Hampden County.

Of additional concern are microbursts, which often do tornado-like damage and can be mistaken for tornadoes. In contrast to the upward rush of air in a tornado, air blasts rapidly downward from thunderstorms to create microbursts.¹

Microbursts and tornadoes are not uncommon in the region, and they are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of climate change from global warming. In the last fifty years, three known tornados have touched down in Agawam, and there have been several high-wind storms and hail events. In Western Massachusetts, the majority of sighted tornadoes have occurred in a swath just east of Agawam, known as "tornado alley."

Wildland Fires/Brushfires

According to FEMA, there are three different classes of wildland fires: *surface fires*, *ground fires* and *crown fires*.² The most common type of wildland fire is a surface fire that burns slowly along the floor of a forest, killing or damaging trees. A ground fire burns on or below the forest floor and is usually started by lightning. Crown fires move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions. While wildland fires have not been a significant problem in Agawam, there is always a possibility that changing land use patterns and weather conditions will increase a community's vulnerability. For example, drought conditions can make forests and other open, vegetated areas more vulnerable to ignition. Once the fire starts, it will burn hotter and be harder to extinguish. Soils and root systems starved for moisture are also vulnerable to fire. Residential growth in rural, forested areas increases the total area that is vulnerable to fire and places homes and neighborhoods closer to areas where wildfires are more likely to occur. Global climate changes may also influence precipitation patterns, making the region more susceptible to drought and therefore, wildfires.

There were 22 brushfires reported in Agawam in 2006. As a point of comparison, the Fire Department issued 814 burn permits to Agawam residents during that same year.

¹ <http://www.fema.gov/regions/vii/2003/03r7n06a.shtm>

² FEMA, "Fact Sheet: Wildland Fires," September 1993.

Earthquakes

An earthquake is a sudden, rapid shaking of the ground that is caused by the breaking and shifting of rock beneath the Earth's surface. Earthquakes can occur suddenly, without warning, at any time of the year. New England experiences an average of 30 to 40 earthquakes each year although most are not noticed by people.³ Ground shaking from earthquakes can rupture gas mains and disrupt other utility service, damage buildings, bridges and roads, and trigger other hazardous events such as avalanches, flash floods (dam failure) and fires. Un-reinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated, unstable soil, and mobile homes not tied to their foundations are at risk during an earthquake.⁴

Table 3-1
New England Earthquakes with a Magnitude of 4.2 or more 1924 - 2002

Location	Date	Magnitude
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7
Middlebury, VT	April 10, 1962	4.2
Near NH Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	Jan. 19, 1982	4.5
Plattsburg, NY	April 20, 2002	5.1

Source: Northeast States Emergency Consortium Web site:
www.nesec.org/hazards/earthquakes.cfm

³ Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm.

⁴ Federal Emergency Management Agency Web site:
www.fema.gov/hazards/earthquakes/quake.shtm.

**Table 3-2
New England States Record of Historic Earthquakes**

State	Years of Record	Number Of Earthquakes
Connecticut	1568 - 1989	137
Maine	1766 - 1989	391
Massachusetts	1627 - 1989	316
New Hampshire	1728 - 1989	270
Rhode Island	1766 - 1989	32
Vermont	1843 - 1989	69
New York	1737 - 1985	24
<i>Total Number of Earthquakes within the New England states between 1568 and 1989 = 1,239.</i>		

Source: Northeast States Emergency Consortium Web site:
www.nesec.org/hazards/earthquakes.cfm

Massachusetts introduced earthquake design requirements into their building code in 1975. However, these specifications apply only to new buildings or to extensively modified existing buildings. Buildings, bridges, water supply lines, electrical power lines and facilities built before 1975 may not have been designed to withstand the forces of an earthquake. The seismic standards have also been upgraded with the 1997 revision of the State Building Code.

Dam Failure

Although dams and their associated impoundments provide many benefits to a community, such as water supply, recreation, hydroelectric power generation, and flood control, they also pose a potential risk to lives and property. Dam failure is not a common occurrence but dams do represent a potentially disastrous hazard. When a dam fails, the potential energy of the stored water behind the dam is released. Most earthen dam failures occur when floodwaters above overtop and erode the material components of the dam. Often dam breaches lead to catastrophic consequences as the water ultimately rushes in a torrent downstream flooding an area engineers refer to as an “inundation area.” The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Many dams in Massachusetts were built in the 19th century without the benefit of modern engineering design and construction oversight. Dams can fail because of structural problems due to age and/or lack of proper maintenance. Dam failure can also be the result of structural damage caused by an earthquake or flooding brought on by severe storm events.

The Massachusetts Department of Conservation and Recreation (MA DCR) was the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the

implementing regulations 302 CMR 10.00). Until 2002, DCR was also responsible for conducting dam inspections but then state law was changed to place the responsibility and cost for inspections on the owners of the dams. This means that individual dam owners are now responsible for conducting inspections.

The state has three hazard classifications for dams:

- *High Hazard:* Dams located where failure or improper operation will likely cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads.
- *Significant Hazard:* Dams located where failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads or cause interruption of use or service of relatively important facilities.
- *Low Hazard:* Dams located where failure or improper operation may cause minimal property damage to others. Loss of life is not expected.

The inspection schedule for dams is as follows:

- Low Hazard dams – 10 years
- Significant Hazard dams – 5 years
- High Hazard dams – 2 years

The time intervals represent the maximum time between inspections. More frequent inspections may be performed at the discretion of the state. Dams and reservoirs licensed and subject to inspection by the Federal Energy Regulatory Commission (FERC) are excluded from the provisions of the state regulations provided that all FERC-approved periodic inspection reports are provided to the DCR. All other dams are subject to the regulations unless exempted in writing by DCR.

The Massachusetts Emergency Management Agency (MEMA) identifies twelve (12) dams in Agawam. The follow table identifies the dams within the town as well as whether they are classified as low, significant, or high hazard

Table 3-3: Agawam Dams, Classified by Hazard Risk

Dam	Hazard Risk
Provin Mountain Reservoir	High
Silver Lake Dam	Significant
Strathmore Paper Company Dam	Significant
Gogulski Dam	Significant
Rising Dam (Leonard)	Significant
Didonato Dam	Significant
Robinson Pond Dam	Significant
Provost Dam	Low

West Springfield Fish & Game Club Dam	Low
Nine Lot Dam	Low
Mawaga Dam	Low
Zerra Dam	Low

Source: Massachusetts Emergency Management Agency (MEMA)

It is also important to consider and plan for the potential critical failure of dams upstream on Provo Mountain and Cobble Mountain. Located in the towns of Blandford and Granville, Cobble Mountain Reservoir is owned by the Town of Springfield, and is the main water supply for the town of Agawam. A breach in the dam on Cobble Mountain Reservoir, and the breakage of the water main lines in Agawam would have a catastrophic effect on the towns of Agawam, Longmeadow, East Longmeadow, and Ludlow.

Drought

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector.⁶

In Massachusetts, six major droughts have occurred statewide since 1930⁵. They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels.

Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

When evaluating the region’s risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought.⁶ However, global warming and climate change may have an effect on drought risk in the region. With the projected temperature increases, some scientists think that the global hydrological cycle will also intensify. This would cause, among other effects, the potential for more severe, longer-lasting droughts.

Man-Made Hazards – Hazardous Materials

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. These chemicals come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazardous materials in various

⁵ US Geological Survey Water-Supply Paper 2375. “National Water Summary 1989 – Floods and Droughts: Massachusetts.” Prepared by S. William Wandle, Jr., US Geological Survey.

⁶ National Drought Mitigation Center – <http://drought.unl.edu>

forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes and businesses routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

The Toxics Release Inventory (TRI), a publicly available EPA database that contains information on specific toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities.⁷ According to TRI, there are six industries currently releasing hazardous materials within Agawam's town limits. According to Town Officials, there are 13 Tier II reporting companies in Agawam. Furthermore, according to the MA Department of Environmental Affairs, there are twenty-six (26) Chapter 21E sites listed in Agawam that have not been issued a Release Action Outcome. Of these 26 sites, 22 are commercial or industrial sites.

Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States--from major industrial plants to local dry cleaning establishments or gardening supply stores. These hazardous materials are transported regularly over our highways and by rail and if released can spread quickly to any community. Incidents can occur at any time without warning. Human error is the probable cause of most transportation incidents and associated consequences involving the release of hazardous materials.

Natural Hazard Analysis Methodology

In order to review the likelihood of a specific hazard occurring, to identify the location of occurrence, and to assess the impacts of the hazard event, a *Hazard Identification and Analysis Matrix* was prepared to organize the information that was gathered for this project. The matrix is organized into the following sections: Type of Hazard, Frequency of Occurrence, Severity of Impacts and Hazard Index. The Hazard Index was completed to rank the hazards according to the frequency of occurrence and the amount of potential damage likely to occur. The Hazard Index forms the basis for concentrating the future mitigation efforts outlined in this plan. A description of each of the matrix categories is provided below. The completed Matrix is shown on Table 3-7.

Type of Hazard

The natural hazards identified for Agawam include floods, severe snowstorms/ice storms, hurricanes, tornadoes, wildfires/brushfires, dam failure and earthquakes. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage. A more detailed description of each type of hazard is included in the earlier section of this chapter.

Frequency of Occurrence

The frequency or likelihood of occurrence for each natural hazard was classified according to the following scale:

⁷ 2004 Toxic Releases Inventory (TRI) Data Files for Massachusetts. www.epa.gov/tri/

Table 3-4
Frequency of Occurrence and Annual Probability of Given Natural Hazard

Frequency of Occurrence	Annual Probability
<i>Very High</i>	70-100% probability in the next year
<i>High</i>	40-70% probability in the next year
<i>Moderate</i>	10-40% probability in the next year
<i>Low</i>	1-10% probability in the next year
<i>Very Low</i>	Less than 1% probability in the next year

Source: information adapted from Hyde County, North Carolina Multi-Hazard Mitigation Plan, September 2002.

Location of Occurrence

The classifications are based on the area of the Town of Agawam that would potentially be affected by the hazard. The following scale was used:

Table 3-5
Location of Occurrence and Percentage of Town Impacted of Given Natural Hazard

Location of Occurrence	Percentage of Town Impacted
<i>Large</i>	More than 50% of the town affected
<i>Medium</i>	10 to 50% of the town affected
<i>Small</i>	Less than 10% of the town affected

Source: information adapted from Hyde County, North Carolina Multi-Hazard Mitigation Plan, September 2002.

Severity of Impacts

The severity of direct impacts an affected area could potentially suffer were classified according to the following scale:

Table 3-6
Severity of Impacts and Magnitude of Multiple Impacts of Given Natural Hazard

Severity of Impacts	Magnitude of Multiple Impacts
<i>Catastrophic</i>	Multiple deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
<i>Critical</i>	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.
<i>Limited</i>	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.
<i>Minor</i>	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

Source: information adapted from Hyde County, North Carolina Multi-Hazard Mitigation Plan, September 2002.

Hazard Index

The hazard index ratings were determined after assessing the frequency, location and impact classifications for each hazard. The hazard index ratings are based on a scale of 1 (highest risk) through 5 (lowest risk). The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable however; many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability.

**Table 3-7
Hazard Identification and Analysis Worksheet for Agawam**

TYPE OF HAZARD	FREQUENCY OF OCCURRENCE	LOCATION OF OCCURRENCE	IMPACT	HAZARD RISK INDEX RATING
Flooding	Moderate	Medium	Critical	2
Severe Snow/Ice Storms	High	Large	Critical	1
Hurricanes / Severe Wind	Low	Large	Critical	2
Tornadoes/Microbursts	High	Small	Limited	3
Wildfire/Brushfire	Very Low	Small	Minor	5
Earthquakes	Very Low	Large	Catastrophic	4
Dam Failures	Low	Medium	Critical	2
Drought	Moderate	Large	Minor	4
Man-Made Hazards: Hazardous Materials	High	Small	Minor-Limited	4

Source: information adapted from Town of Holden Beach North Carolina Community-Based Hazard Mitigation Plan, July 15, 2003 and the Massachusetts Emergency Management Agency (MEMA).

Vulnerability Assessment

The following is a list of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Agawam. The Past and Potential Hazards Map at the end of this Plan reflects the contents of this list.

In order to determine estimated losses due to natural and man made hazards in Agawam, each hazard area was analyzed with results shown below. Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. The value of all structures in the Town of Agawam, including exempt structures such as schools and churches, is \$2,896,851,574 as of FY2006. The median value of a home in Agawam during FY2006 is \$199,000, according to the Warren Group⁸. The data below was calculated using FEMA's HAZUS-MH, as well as "Understanding Your Risks: Identifying Hazards and Estimating Losses," August 2001. In addition, the Committee completed the Vulnerability Assessment Worksheets which provided more data to estimate the potential losses.

Past and Potential Hazards

Flooding (100-year floodplain): Medium-High Risk

Historically, the majority of flooding in Agawam has been localized flooding affecting particular neighborhoods either in one of the identified flood plains or areas containing small ponds or wetlands that can overflow in when the town has heavy rainfall. The one major flood event on record was the flood of March 1936. Direct accounts of the extent of the flooding in Agawam do not seem to exist, however there is extensive documentation of the flooding in neighboring Springfield and therefore flooding Agawam can be extrapolated from that information.

An unusually cold and snowy winter, followed by a spell of warm and rainy weather, turned the normal spring rising of the Connecticut River into an unprecedented natural catastrophe. The flood inundated Hadley, Hatfield, Northampton, Holyoke, and Springfield, as well as smaller towns (Agawam was one of these) and villages along its course. In Massachusetts alone, the Great Flood killed ten people and left 50,000 homeless. It was an unmatched natural catastrophe for the Bay State, causing over \$200,000,000 in damage in 1936 dollars.

A preliminary vulnerability assessment was prepared to evaluate the potential impact that flooding could have on the portions of Agawam located within the 100-year floodplain. Flooding was chosen for this evaluation because it is a natural hazard likely to impact the community and the location of the impact can be determined by mapping of areas inundated during severe flooding events. Flooding can be caused by severe storms, such as hurricanes, nor'easters, and microbursts, as well as ice dams and snow melt. To determine the vulnerability of the town, the property within the floodplain with the highest likelihood of damage was

⁸ *The Warren Group*. 2006. Accessed 10/6/06.

identified and preliminary damage assessments were then generated for classes of residential properties. The damage estimates presented in the following table are rough estimates and likely reflect a worst-case scenario.

Extent

There are approximately 1022 acres of land within the FEMA mapped 100-year floodplain and 262 acres of land within the 500-year floodplain within the Town of Agawam. According to the Community Information System (CIS) of FEMA, there were 370 1-4 family structures and 15 “other” structures located within the Special Flood Hazard Area (SFHA) in Agawam as of June 20, 2005, the most current records in the CIS for the Town of Agawam. Utilizing the Town’s median home value of \$199,000, a preliminary damage assessment was generated. For the estimated number of people living in the floodplain, an average household size of 2.43⁹ people was used.

A total of 385 structures are located within the SFHA in Agawam, totaling approximately \$76,999,615 of damage, and 936 people impacted. The damage estimate is a rough estimate and likely reflects a worst-case scenario. Computing more detailed damage assessments based on assessor’s records is a labor-intensive task and beyond the scope of this project.

River Road Neighborhood

Encompassing 37 streets and approximately 370 residential homes, the neighborhoods that run northwest of River Road are within the 100 year and 500 year floodplain. A preliminary assessment of 100% damage to 100% of the structures could run \$73, 630,000 of damage. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- This area is within a FEMA mapped 100-year and 500-year flood zone
- Flooding has occurred in this area in recent years.
- Potential for damage / repair to River Road
- Potential for closure of main evacuation route.

Previous Occurrences

Records show flooding has occurred here in 1983, 1955, and 1936 with the two earlier events associated with extensive, regional floods.

Probability of Future Events

The risk of flooding in a 100-year floodplain is 1% in any given year, but according to the data, the risk is closer to 3%.

Flooding: (Localized) Medium-High Risk

There is moderate potential for annual flood incidents in Agawam due to the topography and inadequate culverts. Most of the flood hazard areas listed here were identified due to known past occurrence in the respective area. There are many areas with no record of previous flood

⁹ Figure courtesy of 2000 U.S. Census.

incidents that could be affected in the future by heavy rain and runoff from surrounding slopes.

Location

Lower Suffield Street (Route 75)

Localized flooding, has occurred in the past on lower Suffield Street at the crossing with Westfield Brook. Approximately three (3) residential structures could be affected by a flood incident here. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$597,000. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- This area is not within a FEMA mapped 100-year flood zone.
- Flooding has occurred in this area in recent years due to inadequate culvert capacity.
- Potential for damage / repair to Route 75
- Potential for closure of main evacuation route.

Upper Suffield Street (Route 75)

Portions of upper Suffield Street have also experienced localized flooding in the past. There are no structures in the area where the flooding occurs.

- This area is not within a FEMA mapped 100-year flood zone.
- Flooding has occurred in this area in recent years due to inadequate culverts capacity exacerbated by beaver activity.
- Potential for damage / repair to Route 75
- Potential for closure of main evacuation route

North Street

The town has experience some minor flooding on this road due to culvert problems over White Brook. Approximately four (4) residential structures could be affected by a flood incident here. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$796,000. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- This area is not within a FEMA mapped 100-year flood zone.
- No past record of major flooding in this area.

Leonard Pond

A 75-year storm in the 1980s caused significant damage to residential homes along Kathy Terrace. Approximately 15 residential structures could be affected by a flood incident here. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$2,985,000. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- This area is not within a FEMA mapped 100-year flood zone.
- Flooding occurred in this area in the 1980s.

Provin Mountain Reservoir

Agawam obtains its water from the Springfield Water and Sewer Commission but operates its own system for the distribution of water within the community. This system is the Provin Mountain Reservoir, which holds 60 million gallons of water. Any damage to the water tanks at Provin Mountain would have a catastrophic effect for the community. Major flooding would

occur along the western portion of town, and damage or destroy many residential homes and critical facilities. There are no estimates on the number of homes that could be affected if the reservoir tanks were breached.

- This area is not within a FEMA mapped 100-year flood zone.
- No past record of flooding in this area.

Extent

See information in Location section

Previous Occurrences

See information in Location section

Probability of Future Events

Based upon previous data, it is difficult to predict the chance of minor or severe flooding occurring in any year in Agawam.

Severe Snowstorms/Ice Storms: High Risk

Three types of winter events are heavy snow, ice storms, and extreme cold which cause concern. Occasionally heavy snow years will collapse buildings. Ice storms have disrupted power and communication services. Timberland has been severely damaged. Extreme cold affects the elderly.

Location

The entire town of Agawam is susceptible to severe winter storms.

Snow Drift Areas

The following areas have been identified as areas where large snow drifts form during winter storm events:

- South Westfield Street
- Pine Street
- Agawam High School
- Poplar Street
- Mill Street
- Springfield Street

Extent

The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information are combined in an equation that calculates a NESIS score which varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories. The largest NESIS values result from storms producing heavy snowfall over large areas that include major metropolitan centers.

Previous Occurrences

Agawam's recent history has not recorded any loss of life due to the extreme winter weather, but there are usually several incidents of property damage or personal injury each winter. These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

- Agawam has been subject to 22 winter storms categorized as major to extreme according to the NESIS scale since 1960. Additional historically significant winter storms to affect Agawam include the Great Snow of 1717 and the Blizzard of 1888
- Moderate risk town wide due to snow, ice and extreme cold.
- Elderly are affected by extreme weather.

Probability of Future Events

Based on the NESIS scale, Agawam is at risk of a major to extreme winter storm in any given year is slightly less than 50 percent.

Hurricanes/Severe Winds: Medium-High Risk

Location

All of Agawam is at risk from hurricanes with ridgetops more susceptible to wind damage and the flood-prone portions of town to flooding from the heavy rains.

Extent

Agawam's location in southwestern Massachusetts reduces the risk of extremely high winds that are associated with hurricanes. The Town has experienced small blocks of downed timber and uprooting of trees onto structures. Hurricanes can and do create flooding. Estimated wind damage 5% of the structures with 10% damage \$14,484,258. Wind damage to buildings from these storms is largely independent of development patterns in Agawam. This is due to Agawam's relative lack of large hills, where wind events would tend to cause greater damage. Additionally, there is relatively little existing development on the hills and little likely future development due to existing usage and/or steep slopes. Estimated flood damage 10% of the structures with 20% damage \$57,937,031. Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included.

Previous Occurrences

- Connecticut River corridor at risk.
- 1938 hurricane was a major event - wind damage and flooding statewide.
- Power and phone lines - disruptions of services.

- Flooding/washing of evacuation routes.

Table 3-8 Other Major Non-Winter Storms to Affect Agawam Area

Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
Great Atlantic Hurricane	1944	1
Carol	1954	3
Edna	1954	1
Diane	1955	Tropical Storm
Donna	1960	Unclear, 1 or 2
Groundhog Day Gale	1976	Not Applicable
Gloria	1985	1
Bob	1991	2
Floyd	1999	Tropical Storm

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of major hurricanes in Agawam (once every fifty years is less than a one percent chance of any such storm occurring in a given year) while the possibility of a less severe hurricane or tropical storm affecting Agawam in any given year is approximately 10 percent.

Tornadoes/Microbursts: Medium Risk

Location

The hazard area for tornadoes in Agawam varies according to the intensity and size of the tornado. There have not been enough tornadoes in Agawam to accurately predict sections of town that are more likely to experience a tornado.

Extent

Risk of tornadoes is considered to be medium in Hampden County. Tornadoes rarely occur in this part of the country; therefore, assessing damages is difficult. River corridors and hill tops are most prone to damage from these events, but as described in Hurricanes/ Severe Winds section, above, there are few hills in Agawam and little development on them. On the other hand, the areas along some of the Westfield and all of the Connecticut Rivers are vulnerable, densely developed and have sustained damage in the past. Buildings have not been built to Zone 2, Design Wind Speed Codes. Microbursts are more common. Estimated damages to 10% of structures with 20% damages \$57,937,031. Estimated cost does not include building contents, land values or damages to utilities.

Previous Occurrences

- 16 incidents of tornado activity (F2 or less) occurred in Hampden Co. from 1956 to 1992.
- On 10/3/1979, a tornado that reached category 4 (max. wind speeds 207-260 mph) tornado 4.1 miles away from the Agawam town center killed 3 people and injured 500 people and caused between \$50,000,000 and \$500,000,000 in damages. The tornado was likely less than category 4 when it reached Agawam.

- A microburst occurred along River Road in 2006 which caused damage to trees and homes along the road.

Probability of Future Events

Given the low number of previous recorded occurrences the probability of future events is considered to be medium to low.

Wildfires/Brush Fires: Low Risk

As timber harvesting is reduced, wood roads close, debris builds up on the ground, potential for wildfire increases town-wide. Entire town has minimal forest fire protection.

Location

The following areas have been identified as potential wildfire areas in Agawam:

Robinson State Park: Due to the amount of timber within the park, this 800-acre area with five miles of frontage along the Westfield River has the potential to burn, especially during a drought season. Brush fires within the park are common. There is no history of wildfires occurring in this area.

Extent

Wildfire is unlikely to affect large areas of Agawam as most forest areas are fragmented. Areas on or near Provin Mountain and Robinson State Park are most at risk.

Previous Occurrences

Agawam has averaged 19 brushfires per year since 2003. No damage to structures or people was associated with these brushfires. There is no record, recorded or anecdotal of wildfires in Agawam.

Probability of Future Events

Based upon the available of data, there is a low frequency of wildfires in Agawam.

Earthquakes: Medium-Low Risk

Location

In the event of an earthquake, all of Agawam would be affected with some portions more impacted than others, depending on the magnitude of the earthquake and the underlying population density.

Extent

There is moderate potential for serious damage along Connecticut River shoreline. Structures are mostly of wood frame construction estimated loss 20% of town assessed structural valuation \$579,370,315. Costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures are not included.

Nineteen earthquakes, intensity V (Modified Mercalli scale) or greater, have centered in Massachusetts since it was colonized by Europeans. A shock in 1755 reached intensity VIII at Boston and was felt across the State. In addition, Massachusetts was affected by some of the more severe Canadian shocks plus the earthquake of 1929 that centered on Grand Banks of Newfoundland.

Strong earthquakes in the St. Lawrence Valley in 1638, 1661, 1663, and 1732 were felt in Massachusetts. The 1638 and 1663 shocks damaged chimneys at Plymouth, Salem, and Lynn. On June 11, 1643, Newbury, Massachusetts, was strongly shaken. Again in 1727 (November 9) an earthquake described as "tremendous" in one report and "violent" in another caused much damage at Newbury. The shock was felt from the Keenebec River to the Delaware River and from ships at sea to the extreme western settlements. Several strong aftershocks were reported from the area through February 1728.

A complete list of earthquakes affecting New England can be found in Table 3-2.

Previous Occurrences

None of the recorded earthquakes have been noted to cause any damage Agawam or the surrounding area.

- No known incidents of earthquake damage in Agawam
- Low risk to town

Probability of Future Events

Based upon the availability of data, there is a low frequency of earthquakes in Agawam with a between a 1% and 2% chance of an earthquake occurring in any given year.

Dam Failure: 5—Low Risk

Location

Agawam has 12 dams on public and private land. Refer to the Hazard Mitigation Map (Appendix E) for their locations and Table 3-3 on page 15-16.

Extent

Dams in Massachusetts are assessed according to their risk to life and property. Dams with a *Low Hazard* rating may cause minimal property damage with no expected loss of life; *Significant Hazard* dams may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads or cause interruption of use or service of relatively important facilities; *High Hazard* dams will most probably cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads. The hazard ratings of the dams can be found on pages 15-16. A series of dams including the Didonato, Zerra, Provost, West Springfield Fish & Game Club, and Silver Lake (listed from upstream to down) are located in series and a failure at any upstream dam would be likely to cause the failure of downstream dams enlarging the extent of damage from any individual dam.

Previous Occurrences

There has been one recorded dam failure in Agawam in 1955. There are no records indicating the damage associated with the failure. The dam was not rebuilt.

Probability of Future Events

As Agawam's high hazard dams age, and if maintenance is deferred, the likelihood of a dam bursting will increase, but, currently the frequency of dam failures is very low with a less than one percent chance of a dam bursting in any given year.

Drought: Medium-Low Risk

Location

A drought would impact all of Agawam.

Extent

The severity of a drought would determine the scale of the event and would vary among town residents depending on whether the residents' water supply is derived from a private well or the public water system.

Previous Occurrences

In Massachusetts, six major droughts have occurred statewide since 1930¹⁰. They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. Agawam has had limited experience with severe drought conditions. Drought will increase the risk of wildfire, especially in areas of high recreational use and as more timberland is set aside as non-harvested timberland, the potential for the risk of wildfire will increase.

Probability of Future Events

In Agawam, as in the rest of the state, drought occurs at a medium frequency, with a range of a 1% or a 10% chance of drought occurring in a single given year. However, due to the water richness of Western Massachusetts Agawam is unlikely to be adversely affected by anything other than a major, extended drought.

Man-Made Hazards - Hazardous Materials: Medium-Low Risk

Agawam relies on the support of Police and Emergency Management Office for responding to incidents involving hazardous materials. Public transportation of chemicals and bio-hazardous materials by vehicle transport on Route 57 are a concern. Also, several areas of hazardous materials storage, especially Tier II reporting companies, increase the potential for future incidents.

¹⁰ US Geological Survey Water-Supply Paper 2375. "National Water Summary 1989 – Floods and Droughts: Massachusetts." Prepared by S. William Wandle, Jr., US Geological Survey.

Location

There are thirteen (13) sites in the Town of Agawam identified by the U.S. EPA as Tier II Hazardous Material sites.

These sites are:

- Town of Agawam, 1000 Suffield Street and 1347 Main Street
- Bay State Gas, 200 Springfield Street, Agawam
- Berkshire Power, LLC: 36 Moylan Lane
- EBTEC: 120 Shoemaker Lane
- Springfield Water and Sewer Waste Water Treatment: 188 M Street (Rt. 5)
- Springfield Water and Sewer Commission: 1121 North West Street, Feeding Hills
- Fisher Scientific: 325 Bowles Road
- Hampden Fence Supply, Inc.: 80 Industrial Lane
- H.P. Hood: 233 Main Street
- Northeast Utilities System: Moylan Lane
- Rocky's Hardware: 10 Springfield Street
- Suddekor, LLC: 240 Bowles Road
- Tennessee Gas Pipeline: 1615 Suffield Street

Extent

The extent of hazardous chemical release is not predictable as it is dependent on the location including whether it is from a stationary or moving source, amount and type of chemical released, and weather conditions at the time of the release.

Previous Occurrences

Available data dating to 1997 shows an average of slightly more than 2 releases of hazardous materials (total) from these sites per year and there has been no property damage or loss of life associated with these releases.

Probability of Future Events

Given available data there are likely to be 1-2 releases of hazardous chemicals each year however the likelihood of a catastrophic release is very low.

(Critical Facilities and Hazards Map Located In Back of Plan)

4 – CRITICAL FACILITIES

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort.
- Maintains an existing level of protection from hazards for the community.
- Would create a secondary disaster if a hazard were to impact it.

Critical Facilities within Hazard Areas

Hazards identified in this plan are regional risks and, as such, all critical facilities fall into the hazard area. The exception to this is flooding. There are several critical facilities that fall within the 100-year floodplain as shown in the table at the end of this section.

The Critical Facilities List for the Town of Agawam has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Agawam's Hazard Mitigation Committee has broken up this list of facilities into four categories. The first category contains facilities needed for Emergency Response in the event of a disaster. The second category contains Non-Emergency Response Facilities that have been identified by the Committee as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Agawam. The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster. The fourth category contains Potential Resources, which can provide services or supplies in the event of a disaster. The Critical Facilities Map at the end of this Plan identifies these facilities.

Category 1 – Emergency Response Services

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

- 1. Emergency Operations Center**
Emergency Management Office – 1000 Suffield Street
- 2. Fire Station**
Agawam Fire Department Headquarters – 800 Main Street
Fire Station #2 – 1200 Springfield Street
- 3. Police Station**
Agawam Police Department – 681 Springfield Street
- 4. Highway Garage**
Department of Public Works Headquarters– 1000 Suffield Street

5. **Water Department**
Department of Public Works Headquarters– 1000 Suffield Street
6. **Emergency Fuel Stations**
Department of Public Works Headquarters– 1000 Suffield Street
7. **Emergency Electrical Power Facility**
Department of Public Works Headquarters– 1000 Suffield Street
8. **Emergency Shelters**
Agawam High School – 760 Cooper Street
Agawam Junior High School – 1305 Springfield Street
Agawam Middle School – 68 Main Street
9. **Dry Hydrants - Fire Ponds - Water Sources**
None
10. **Transfer Station**
None
11. **Utilities**
Electrical Substations – Silver Street, Moylan Drive, Springfield Street
12. **Helicopter Landing Sites**
Tennessee Gas – 1615 Suffield Street
Industrial Lane – 80 Industrial Lane
13. **Communications**
None
14. **Primary Evacuation Routes**
Route 57
Southwick Street (Route 57)
Route 75 (Suffield Street)
Route 187 (Pine Street, South Westfield Street, North Westfield Street)
Route 147 (Springfield Street)
Route 159 (Main Street)
Route 5
15. **Bridges Located on Evacuation Routes**
Agawam Bridge – Springfield, Suffield and Main Streets
Julia Buxton Bridge – Route 5 North
Stratmore Bridge – Bridge and River Streets

Category 2 – Non Emergency Response Facilities

The town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Agawam.

1. Water Supply

Cobble Mountain Reservoir (Towns of Blandford and Granville)
 Provin Mountain Storage Reservoir
 Water Transmission Lines (3) from Provin Mountain (60", 42", 54/48")
 Water Pump Stations: Halladay Drive, Hamilton Circle

2. Sewer Infrastructure (Pump Stations)

Water Treatment Plant – 188 M. Street
 983 River Road
 380 River Road
 Hendon Drive
 Losito Lane
 233 Main Street (rear HP Hood Inc.)
 North Street
 895 N. Westfield Street
 100 Pleasant Valley Road
 Riverview Ave.
 School Street
 South Street
 Valley Street

3. Problem Culverts

Suffield Street
 Leonard Pond
 North Street

Category 3 – Facilities/Populations to Protect

The third category contains people and facilities that need to be protected in event of a disaster.

1. Special Needs Population

None

2. Elderly Housing/Assisted Living

Danahy School House – 51 Maple Street
 Meadowbrook Manor – 66 Meadowbrook Manor
 Colonial Haven – Colonial Haven Drive
 County Estates Partnership – 1200 Suffield Street
 Quail Run Estates – 50 Cardinal Drive

Pheasant Hill Estates – S. West Street
Country View Apartments – N. Westfield Street
Atrium – 153 Cardinal Drive

3. Recreation Areas

Six Flags New England – 1623 Main Street
Crestview Country Club – 281 Shoemaker Lane
St. Anne Country Club – 781 Shoemaker Lane
Agawam Municipal Golf Course – 128 Southwick Street
Oak Ridge Golf Club – 850 S. Westfield Street
Perry Lane Park – 107 Perry Lane
Robinson State Park – 428 North Street

4. Schools

Department of Special Education - 760 Cooper Street
Early Childhood Center - 108 Perry Lane
Benjamin J. Phelps School - 689 Main Street
Clifford M. Granger School - 31 South Westfield Street
James Clark School - 65 Oxford Street
Robinson Park School - 65 Begley Street
Agawam Middle School - 68 Main Street
Agawam Junior High School - 1305 Springfield Street
Agawam High School - 760 Cooper Street
Bambi Nursery School – 22 Vernon Street
Pam’s Place Child Care Center – 605 Springfield Street
Kid’s Place Pre-School – 901 Springfield Street
Westfield Head Start – 733 Main Street
Smart Start Pre-School (F.H. Congregational Church) – 21 N. Westfield Street

5. Churches

St. John’s Church – 823 Main Street
All Saints Parish – 74 Bridge Street
Bethany Assembly of God – 580 Main Street
Agawam Congregational Church – 745 Main Street
First Baptist Church – 760 Main Street
Greater Springfield Korean Church – 22 Hunt Street
Faith Bible Church – 370 Shoemaker Lane
Agawam Church of the Bible – 335 Walnut Street Ext.
Agawam United Methodist Church – 459 Mill Street
Lighthouse Christian Center – 522 Springfield Street
Kingdom Hall – N. Westfield Street
Valley Community Church – 152 South Westfield Street

6. Historic Buildings/Sites

Agawam Center Historic District (24-196 Elm St.; 551-1008 Main St.)
Capt. Charles Leonard House – 663 Main Street
Puchase-Ferre House – 1289 Main Street

Thomas and Esther Smith House – 251 North West Street

7. Apartment Complexes (over 8 units)

Coach Light Apartments – Beldon Court (88)
 Elizabeth Manor – 238 Maple Street (40)
 Gramacy Park Apartments – 156 Suffield Street (32)
 Hale Haven Apartments – 21 River Road (12)
 Hallmark Apartments – 24 Dwight Street (38)
 Hillside Apartments – 49 North Street (8)
 Lamplighter Apartments – 23-42 Amherst Avenue (87)
 Lantern Court Apartments – 438 Springfield Street (16)
 Maple Garden Apartments (Sutton Place) – 191 Maple Street (96)
 Meadow House Apartments – 408-410 Meadow Street (36)
 Mill House Apartments – 643 Suffield Street (32)
 Pheasant Hill Village – Pheasant Hill Drive (200)
 Rivervista Apartments – 122 Main Street (32)
 Riviera Apartments – Riviera Drive (120)
 Royal Lane Apartments – 415 Springfield Street (10)
 Shibley Court Apartments – 33 Norman Terrace (119)
 Spindrift Apartments – 110-118 Main Street (20)
 Stockade Apartments – 619 Springfield Street (10)
 Town Crier Apartments – 873 Springfield Street (28)
 Village Apartments – 65-67 Bridge Street (20)
 Country Manor (Village Arms Apartments) – 59-63 South Westfield Street (60)
 Walnut Hill Apartments – 21 Dwight Street (22)
 William Pynchon Apartments – 336 Meadow Street (10)
 William Pynchon Apartments – 338 Meadow Street (50)
 William Pynchon Apartments – 350 Meadow Street (10)

8. Condominium Developments (over 8 units)

Beekman Place Estates – 430 Main Street
 Castle Hills – 133 Silver Lane
 Corey Colonial – 60 Corey Street
 Heritage – 418 Meadow Street
 Longbrook Estates – 1485 Suffield Street
 Mansion Woods – 562 Suffield Street
 Norfield Common – 420 Main Street
 Overlook – Autumn Street
 Plantation – School Street
 Regency – 391 Meadow Street
 Sheri Lane – Sheri Lane

9. Employment Centers

Six Flags New England (seasonal) – 1623 Main Street
 Country Estates of Agawam – 1200 Suffield Street
 HP Hood Inc. – 233 Main Street

Genesis Health Care – 462 Main Street
Heritage Hall East – 464 Main Street
Heritage Hall North – 55 Cooper Street
Heritage Hall South – 100 Harvey Johnson Drive
Heritage Hall West – 61 Cooper Street
Olympic Manufacturing Group – 153 Bowles Road
Simmons Co. – 320 Bowles Road

10. Camps

Perry Lane Summer Camp

11. Mobile Home Parks

72-74 Springfield Street

Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding (100-year Flood)	100-year floodplain along Connecticut River, Westfield River	370 residential homes; 15 other structures	River Road
Flooding	Lower Suffield Street / Westfield Brook crossing	3 residential homes	Route 75
	Upper Suffield Street	None	Route 75
	North Street / White Brook Crossing	4 residential homes	North Street
	Leonard Pond	15 residential structures	West Street
	Provin Mountain Reservoir	Several residential structures	Route 187
Wildfires/Brushfires	Robinson State Park	DCR buildings	None
Hazardous Materials	Town of Agawam: 1000 Suffield Street & 1347 Main Street	Department of Public Works	Route 75
	Bay State Gas: 200 Springfield Street	4 homes	None
	Berkshire Power, LLC: 36 Moylan Lane	None	None
	EBTEC: 120 Shoemaker Lane	3 commercial buildings	None
	Springfield Water & Sewer Waste Water Treatment :188 M Street	None	None

Hazardous Materials (con't)	Springfield Water & Sewer Commission: 1121 North West Street	None	None
	Fisher Scientific: 325 Bowles Road	None	None
	Hampden Fence Supply, Inc: 80 Industrial Lane	None	None
	H.P. Hood: 233 Main Street	None	None
	Northeast Utilities System: Moylan Lane	Transformers, switch yard	None
	Rocky's Hardware: 10 Springfield Street	Shopping center, motel	Route 147
	Suddekor, LLC: 240 Bowles Road	None	None
	Tennessee Gas Pipeline: 1615 Suffield Street	Approx. 100 residential homes	All routes

(Critical Facilities and Hazards Map Located In Back of Plan)

5 – CURRENT MITIGATION STRATEGIES

Flooding

The Floodplain Map for the Town of Agawam shows the 100-year and 500-year flood zones identified by FEMA flood maps. The 100-year flood zone is the area that will be covered by water as a result of a flood that has a one percent chance of occurring in any given year. Likewise, the 500-year flood has a 0.2 percent chance of occurring in any given year. In Agawam, there are several floodplain areas – primarily along the Connecticut River in the eastern side of town, and the Westfield River on the northern side of town. Additional floodplains run along the Three Mile Brook, winding through the town center. In addition, there are some smaller floodplains mapped in low-lying areas throughout Agawam, like Still Brook.

The major floods recorded in Western Massachusetts during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. Flooding along the Connecticut River has historically been a problem in Agawam. Residential development lies within the current Connecticut River floodplain. Over the years floods have destroyed several structures along the river. Now that much of the land along the river is protected and undeveloped, flooding has less potential to damage structures and is, therefore, less of a concern for the town.

One of the goals of this Natural Hazards Mitigation Plan is to evaluate all of the town's existing policies and practices related to natural hazards and identify potential gaps in protection.

Management Plans

The Comprehensive Emergency Management (CEM) Plan for Agawam lists the following generic mitigation measures for flood planning:

1. Identify areas in the community that are flood prone and define methods to minimize the risk. Review National Flood Insurance Maps.
2. Disseminate emergency public information and instructions concerning flood preparedness and safety.
3. Community leaders should ensure that Agawam is enrolled in the National Flood Insurance Program.
4. Strict adherence should be paid to land use and building codes, (e.g. Wetlands Protection Act), and new construction should not be built in flood prone areas.
5. Ensure that flood control works are in good operating condition at all times.
6. Natural water storage areas should be preserved.
7. Maintain plans for managing all flood emergency response activities including addressing potentially hazardous dams.

The Comprehensive Emergency Management (CEM) Plan for Agawam also lists the following generic preparedness and response measures for floods:

1. Place EOC personnel on standby during stage of flood ‘watch’ and monitor NWS/New England River Forecast Center reports.
2. Ensure that public warning systems are working properly and broadcast any information that is needed at this time.
3. Review mutual aid agreements.
4. Monitor levels of local bodies of water.
5. Arrange for all evacuation and sheltering procedures to be ready for activation when needed.
6. Carry out, or assist in carrying out needed flood-proofing measures such as sand bag placement, etc.
7. Regulate operation of flood control works such as floodgates.
8. Notify all Emergency Management related groups that will assist with flood response activities to be ready in case flood ‘warning’.
9. Broadcast warning/notification of flood emergency.
10. Coordinate traffic control and proceed with evacuation of affected populations as appropriate.
11. Open and staff shelters and reception centers.
12. Undertake, or continue to carry out, flood proofing measures.
13. Dispatch search and rescue teams.
14. Dispatch emergency medical teams.

Evacuation Options

Route 57

Southwick Street (Route 57)

Route 75 (Suffield Street)

Route 187 (Pine Street, South Westfield Street, North Westfield Street)

Route 147 (Springfield Street)

Route 159 (Main Street)

Route 5

Flood Control Structures

FEMA has identified twelve dams within the Town of Agawam.

Land Use Regulations that Mitigate Impacts from Flooding

The Town of Agawam has adopted several land use regulations that serve to limit or regulate development in floodplains, to manage stormwater runoff, and to protect groundwater and wetland resources, the latter of which often provide important flood storage capacity. These regulations are summarized below and their effectiveness evaluated in Table 4-1.

Zoning Ordinance

The Town of Agawam has established a Zoning Ordinance designed in part to “promote the health, safety, convenience, morals and welfare, of its inhabitants; to lessen congestion in the streets, to secure safety from fire, panic and other danger, to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population, to facilitate the adequate provision of transportation, water, sewerage, schools, parks and other public requirements and to increase the amenities of the town.” The Zoning Ordinance includes several provisions that mitigate the potential for flooding, including:

ARTICLE XII: Floodplain Zone

Section 180-67. Purpose.

The Floodplain Zone and the regulations herein have been established for the following purposes: to protect and preserve the watercourses and their adjoining floodplain; to reduce the hazards of floods upon the public health, safety and general welfare; to protect floodplain occupants from a flood that is or may be caused by their own land use and that is or may be undertaken without full realization of the dangers therein; to protect the public from the a burden of extraordinary financial expenditures for flood control and relief, and to protect the capatown of the floodplain to absorb, transmit and store runoff to assure retention of sufficient floodway area to convey flows which can reasonably be expected to occur.

Section 180-68. Maps; use of other base flood elevation data.

A. All land delineated on the map consisting of two (2) pages entitled "Flood Insurance Rate Map, Town of Agawam, Massachusetts, Hampden County, Effective February 1, 1978," as Zone A-11, Zone A-16, Zone A, Zone A-2 and Zone B shall be included in the Floodplain Zone. This map is part of the Flood Insurance Study made for the Town of Agawam by the United States Department of Housing and Urban Development, Federal Insurance Administration. These Flood Insurance and Flood Boundary and Floodway Maps and any revision thereto are hereby adopted by reference and declared to be a part of this chapter [2]. In general terms the Floodplain Zone is that land adjacent to the Westfield River, Connecticut River and its tributaries and Still Brook which lie at or below the elevation of the base flood (one-hundred-year flood) as determined in the Flood Insurance Study. The Floodplain Zone shall be considered to be superimposed over other zones shown on the Zoning Map, as a recognition of the special hazards which exist in such areas.

B. In Zone A areas where base flood elevation data is not provided by the Flood Insurance Study, other available data from federal, state or other sources shall be utilized as a basis of determining the base flood level for purposes of enforcing the provisions of this Article.

Section 180-69. Permitted uses.

In those portions of the town so designated in Section 180-68, the following uses of land shall be permitted, provided that all necessary state or federal permits are obtained:

- A. Conservation of water, plants and wildlife.
- B. Legally permitted outdoor recreation not requiring development or landscape alteration in conflict with the purpose of this zone.
- C. Grazing, forestry and other farms or agriculture consistent with the purposes of the zone.
- D. Dwellings lawfully existing prior to the adoption of these provisions: however no building permits for substantial improvements or extensions shall be granted unless a special permit is granted by the Board of Appeals.
- E. Proper operation and maintenance of dams and other water control devices.
- F. Construction and maintenance of highways, streets, sidewalks, sewers, water mains, storm drains, utilities and related facilities by governmental agencies, provided that the water and sewer systems and utilities be designed and constructed to minimize flood damage and to minimize or eliminate infiltration of floodwater into the systems and discharges from the systems into floodwaters.
- G. The following uses by special permit as provided by Section 180-71, if determined to be consistent with the purpose of this zone, said determination to be made by the Board of Appeals following application for a special permit by the landowner or owner
 - (1) Developed recreation facilities, except buildings.
 - (2) Utility lines and facilities.
 - (3) Dams and other water control facilities. If in an authorized plan by a public agency or if built to create ponds for recreational or agricultural use.
 - (4) Minor buildings incidental to permitted flood control, recreation, agricultural, etc. uses, and not exceeding two hundred (200) square feet in ground coverage, if constructed so as to not obstruct natural hydrological features, and provided that the requirements of Subsection G(5) relative to the elevation of the base flood are met.
 - (5) In the floodway fringe. The numbered A zones, Zone A, and Zone B, that portion of the Floodplain Zone outside the floodway, the development of structures for residential use only if the lowest floor (including the basement) is elevated to or above the level of the base flood (one-hundred-year flood) and the development of structures for nonresidential use only if the lowest floor (including the basement) is elevated to be above the level of the base flood (one-hundred-year flood) or together with the attending utility and sanitary facilities, is floodproofed to or above the level of the base flood (one-hundred-year flood), provided that a special permit is issued by the Board of Appeals. The term "floodproofed" shall mean watertight with walls substantially impermeable to the passage of water and with structural components

having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

Section 180-70. Prohibited uses.

A. In those portions of the town so specified in Section 180-68 as "floodplain: the following uses of land shall be prohibited:

- (1) The bulk storage of buoyant, flammable, explosive or toxic materials.
- (2) The addition, removal or transfer of such quantities of material, including trees, shrubs, and ground cover that would reduce the water storage capacity at the floodplain, obstruct the flow of floodwaters in a floodway or otherwise adversely affect the natural hydrology of the area to the extent that the base flood elevation would be raised cumulatively more than one (1) foot.
- (3) The digging or drilling of a well intended as a source of domestic water.
- (4) The installation of septic tank or leaching fields or on-site waste disposal systems.
- (5) The placement or location of a mobile home or the creation of mobile home parks or subdivision.

B. In land within the floodway the following uses of land shall be prohibited, in addition to those listed above:

- (1) Any development within the portions of the town so specified as "floodway" on the Flood Boundary and Floodway Map.
- (2) Erection, construction or other creation or installation of any building, dam or other structure.
- (3) Any use or structure which would result in any increase in flood levels during the base flood discharge.

Section 180-71. Special permit.

A. If any land in the floodplain as defined in Section 180-68 is found by the Board of Appeals not in fact to be at or below the level of the base flood (one-hundred-year flood), not to be unsuitable because of drainage conditions, or if the proposed action is not inconsistent with the purpose of this Article, the Board of Appeals may grant, after a public hearing with due notice, a special permit for the use or development of such land and for the construction and erection of a building or structure for any purpose permitted in the underlying district, subject to the reasonable conditions and safeguards. Any action by the Board of Appeals shall not be construed to affect insurance determination or rates.

B. The application for a special permit shall include a plan prepared and certified by a professional engineer or land surveyor registered in the Commonwealth of Massachusetts. This plan will show all proposed and existing buildings, structures, roads, ways, drainage facilities and landscape features, including wetlands, trees and the like, and other engineering and hydrological data the Board finds necessary. The plan will show all existing and proposed finished ground contours at one-foot intervals.

C. The application for a special permit shall also include an environmental impact statement prepared by an environmentally qualified registered professional engineer. This statement will describe the impact upon the physical environment of the proposed use.

D. The Board of Appeals may waive the requirements of Subsection C if it determines that the probable impact upon the physical environment of the proposed use is to be minimal and that an environmental impact statement is not necessary to its consideration of the application.

E. The applicant shall provide the Board with an original and seven (7) copies of the request and of any plan and/or environmental impact statement required under Subsections B and C above. The Board of Appeals shall within seven (7) days forward one (1) copy of each to the inspector of Buildings, Planning Board, Board of Health and Conservation Commission. These agencies may file written recommendations with the Board of Appeals within thirty (30) days of receipt of notification. The Board of Appeals shall not grant approval of an application for a special permit until these recommendations have been received or until expiration of said thirty-day period.

F. In passing upon such request, the Board of Appeals shall consider all technical evaluations, all relevant factors, standards specified in other sections of this Article and:

- (1) The danger that materials may be swept onto other lands to the injury of others.
- (2) The danger to life and property due to flooding or erosion damage.
- (3) The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
- (4) The importance of the services provided by the proposed facilities to the community.
- (5) The necessity to the facility of a waterfront location. where applicable.
- (6) The availability of alternative locations, not subject to flooding or erosion damage, for the proposed use.
- (7) The compatibility of the proposed use with existing and anticipated development.
- (8) The relationship of the proposed use to the Comprehensive Plan and Floodplain Management Program for that area.
- (9) The safety of access to the property in times of flood for ordinary and emergency vehicles.
- (10) The expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site.
- (11) The cost of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems and streets and bridges.

G. The Board of Appeals may issue a permit under this section if it finds that the proposed use of the premises will not endanger the health and safety of the occupants of land within the floodplain or the public, or it may issue a permit with such conditions as it deems necessary to protect the health and safety of the occupants and the public or provide proper flood control or protection, or it may deny the application. The burden of showing that the proposed development will not endanger health and safety and that it

will be an appropriate use of the land shall rest upon the developer, who shall provide such additional engineering and hydrological data as the Board of Appeals deems necessary. The Board shall, as a condition of approval, require that effective notice be given to prospective purchasers or existing landowners by signs, notation on plans and permits or otherwise, of past flooding of said premises, and the steps undertaken by the petitioner or his successor in title to alleviate the effects of the same.

H. Without limiting the generality of the foregoing, the Board shall ensure that

(1) New construction or substantial improvements of residential structures within the Floodplain Zone will have the lowest floor (including the basement) elevated to or above the level of the one-hundred-year flood.

(2) New construction or substantial improvements of nonresidential structures intended for human occupancy or employment, excluding open-walled shelters for temporary use by outdoor recreationalists, within the Floodplain Zone will have the lowest floor (including the basement) elevated to or above the level of the one-hundred-year flood or, together with attendant utility and sanitary facilities, be floodproofed, as defined in Section 180-69, up to the level of the one-hundred-year flood. Where floodproofing is utilized for a particular structure, the Board shall require certification from a registered engineer or architect of the floodproofing and of the elevation to which the structure is floodproofed.

(3) No use or structure shall be located in the designated floodway which would result in any increase in flood levels during the base flood discharge.

(4) No fill or encroachment within the designated floodway shall be permitted that would impair its ability to carry and discharge the waters resulting from the one-hundred-year flood, except where the effect on flood heights is fully offset by stream improvements.

(5) All other necessary permits for the proposed development, as defined in Section 180-2, have been received from those federal, state or local governmental agencies from which price approval is required.

(6) Adjacent communities and the Massachusetts Department of Environmental Quality Engineering, Division of Water Resources, are notified prior to any alteration or relocation of a watercourse, and that evidence of such notification is submitted to the Federal Insurance Administration, and that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained.

(7) New construction (including prefabricated buildings) and substantial improvements be anchored to prevent flotation and lateral movement, and be constructed with flood-resistant materials and methods.

(8) New or replacement water supply systems and/or sanitary sewerage systems to be located in the Floodplain Zone shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

ARTICLE I: General Procedures

Section 180.30: Site Plans

C. Procedure.

(3) All site plans shall be prepared... to show with reasonable accuracy the following information, in addition to that required in Section 180-4:

(f) Drainage. The plan must be submitted to the Department of Public Works for input prior to Planning Board review.

(m) The location of any wetlands, streams, drainage swales and areas subject to flooding.

Subdivision of Land

In addition to the Zoning Ordinance, Agawam's Subdivision of Land Ordinance contains several provisions that mitigate the potential for, and impact of, flooding, including:

ARTICLE VII: Floodplains

Section 159-37. Rules and regulations.

The Planning Board herewith stipulates rules and regulations for the subdivision and/or development of land which lies within the floodplain as described in the Town Ordinance.

Section 159-38. Authority, priority of regulations.

Authority for these regulations is derived from the commitment of the Town of Agawam to the Federal Insurance Administrator under the Federal Flood Insurance Act. These rules and regulations shall take priority over any conflicting regulations of the Planning Board.

A. The finished grade of land at all sides of any major building shall be set at a minimum grade above flood level as determined by the Planning Board from historic flood data.

B. The total area may not be removed from the floodplain or graded in such a way as to cause additional hazard to the remainder of the floodplain areas. No more than one-third (1/3) of the total area may be regraded or filled.

C. More than one (1) exit from the total area shall be provided for emergency evacuations by clearing and suitable grading and related work, and no obstructions to vehicular passage shall be allowed within the exit route. This exit may not require paving or other surfacing. The developer shall so note any deeds concerning obstructions to passage.

D. Utilities. Town sewer systems shall be constructed to the specifications of the Department of Public Works and Board of Health to ensure safety from flooding. All water lines, gas and electric lines shall be constructed with suitable area master shutoff valves. All aboveground utility control boxes shall be constructed to avoid flood damage and to elevations as determined by the Planning Board. Electric and telephone lines shall be underground and all access to underground utilities shall be constructed to the specifications of the Department of Public Works. Any drainage pipes opening into the floodway (river or stream) shall be constructed to the specifications of the Department of Public Works to prevent flooding of the system.

E. All plans reviewed by this Board which lie in the floodplain shall be stamped or legally noted so that landowners and future occupants shall be aware of their responsibilities. The notation shall be endorsed on Form A, Subdivision Control Not Required, as well as Form B, Subdivision Control, preliminary and definitive plans.

ARTICLE IV: Design Standards

Section 159-10. Easements.

B. Where a subdivision is traversed by a watercourse, drainageway, channel or stream, a stormwater easement or drainage right-of-way thirty (30) feet in width shall be provided. In addition to providing for construction, maintenance and access, said easements shall contain flowage rights. In the event that a stream is of a seasonal nature or the exact course cannot be determined, then total flowage rights across the land in question shall be provided.

Section 159-12. Drainage.

A. A system of drains shall be installed to collect stormwater from the proposed streets and lots and to transmit the water to a point where it may be discharged in a natural watercourse or stream. The drains shall be designed to have a minimum velotown at design flow of three (3) feet per second and a maximum velotown of ten (10) feet per second. The sizing of storm drains and culverts shall be as specified in the Report on Storm Drainage for the Town of Agawam by Tighe & Bond, 1972, and/or as approved by the Town Engineer.

B. In general, surface water from the lots shall not be deposited directly into the ways. The area within the setback line may be graded to drain toward the street line. All other surface water from individual lots shall be handled insofar as possible within the lots themselves. Developers shall provide for lot surface drainage by a system separate from drainage of the street, by the use of swales, culverts, retention ponds, yard drains and piping, riprapped outlets at the water body, etc., in a manner which shall protect the natural water table unless the lowering of the water table is necessary for the health of the occupants. Strict attention shall be paid to the relationship of leaching fields to surrounding grading. Surface water systems shall not connect into the road drainage system except by permission of the Board, in which case such condition shall be noted on the approved plan. The total design of the system shall also meet with the approval of the Town Engineer.

C. Where, in the opinion of the Town Engineer and/or Planning Board, the discharge of stormwater from a subdivision will alter the character of a watercourse to overflow its banks (confines), then the applicant will be required to submit drainage and flowage easements along said watercourse to a point where it is determined by the Town Engineer and/or Planning Board that the effect of the stormwater drainage discharge will have a negligible effect on the watercourse. The easements and flowage rights shall be of such width to cover the extent of the suspected flooding. These easements and flowage rights

will be required both within and outside of the boundaries of the proposed subdivision. The total design of the system shall also meet with the approval of the Town Engineer.

D. All subdivisions shall be constructed in conformance with the “Town Storm Drainage Ordinance.” Detention ponds will be utilized as required and each detention pond will be fenced except as otherwise required by the Department of Public Works. Construction standards shall comply with Department of Public Works Standards. No dry wells or leaching fields for the underground disposal of stormwater will be allowed. No stormwater holding ponds without positive surface outlets shall be allowed.

ARTICLE V: Construction Standards and Required Improvements

Section 159-27. Clearing and grading.

To prevent wind and water erosion, the following measures must be employed on all sites:

- A. Regions of the site must be developed in separate increments so that the disturbed area is kept to a minimum. At no time is the entire area to be disturbed.
- B. Natural vegetation shall be retained and protected whenever possible.
- C. All disturbed area shall be stabilized with a temporary vegetative cover if to be left exposed for greater than one (1) month, with the exception of roadways which are to be treated with appropriate measures at the end of each workday.
- D. All stockpiled soils shall be stabilized with temporary vegetative cover.

River and Stream Protection

The Town of Agawam follows the standards established by the Wetlands Protection Act, which protects water bodies and wetlands through the town Conservation Commission. The Town also has instituted its Floodplain District, a zone district that restricts development and use of lands within the floodplain.

Agawam Community Development Plan

In 2004, the Town of Agawam completed its Community Development Plan. The intent of the document is not to address hazard mitigation or flood control in a direct or comprehensive way; however, the Open Space and Recreation Element of the plan inventories the natural features and environments in the town, many of which, such as wetlands, groundwater recharge areas, farms, rivers, streams, and brooks, contain floodplain, dam failure inundation or localized flooding areas.

The plan highlights the importance of balancing future development with the preservation of the community’s natural and scenic resources. The preservation of open space and farmland will provide flood storage capatown, which reduces the amount of impervious surfaces in an area, as well as other benefits not directly related to natural hazard mitigation.

In addition, Agawam’s 2006 Open Space and Recreation Plan also listed some specific goals. Because preserving and protecting open space plays a key role in providing flood capatown, some of these goals and objectives are still relevant today, in terms of flood protection.

Section 8 – Goals and Objectives

Specific Goal: Preserve valuable natural resources, habitat systems, and farmland.

Objectives:

- a. Provide incentives to landowners to manage and/or develop in an environmentally sensitive manner.
- b. Educate the community about land management techniques.
- c. Purchase land or development rights (or long leases).
- d. Actively pursue farmland preservation.

National Flood Insurance Program

The Town of Agawam participates in the National Flood Insurance Program. As of 2003, there were 249 policies in effect in Agawam for a total of \$34,972,000 worth of insurance. The town is not a member of the Community Rating System, which entitles policyholders to a discount on flood insurance premiums. The CRS ranking is based on the steps that a town has taken to control flood losses.

The Community Rating System reduces flood insurance premiums to reflect what a community does above and beyond the National Flood Insurance Program's (NFIP) minimum standards for floodplain regulation. The objective of the CRS is to reward communities for what they are doing, as well as to provide an incentive for new flood protection activities. To participate in the CRS, a community must fill out an application and submit documentation that shows what it is doing and that its activities deserve at least 500 points. More information including instructions and applications is available at <http://training.fema.gov/EMIWeb/CRS/m3s1main.htm>

Table 5-1: Existing Flood Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Flood Control Structures	Twelve dams.	Flood inundation zones below dams	Very effective for preventing flooding downstream.	Ensure dam owners realize their responsibility to inspect the dams.
Culvert Replacement	Priority list of necessary culvert replacements and other construction projects to effectively manage flooding	Entire Town	Very effective for managing flood control needs.	Seek funding from HMGP for top-priority projects.
Zoning By-Laws				
Floodplain District	Areas delineated as part of the 100-year floodplain are protected by strict use regulations	100-year flood plain, area around river	Very effective for preventing incompatible development within the floodplain.	None
General Bylaws				
Stormwater and Erosion Control	Requires, through a permit process, that new development activities protect the existing hydrological cycle by preserving pre-development stormwater flows in post development		Very effective for controlling the amount of run-off and pollutants from stormwater	None
Subdivision Regulations				
Floodplain District	Specific subdivision regulations for floodplain district (see above).	100-year flood plain	Very effective for managing any construction or development within the floodplain.	None
Design Standards	Easement requirements for subdivisions, require protection of watercourses, even intermittent streams.	All subdivisions	Effective at mitigating impacts of development on watershed.	None

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
	Strict drainage requirements for subdivisions.	All subdivisions	Effective at mitigating impacts of stormwater.	None
Construction Standards and Required Improvements	Clearing and grading requirements for subdivisions.	All subdivisions	Effective at protecting natural features of the site and thereby preserving flood storage capatown.	None
River and Stream Protection	Required enforcement of standards established by Wetlands Protection Act.	Entire town.	Somewhat effective at protecting water bodies and wetlands.	None.
Agawam Community Development Plan – Open Space Element	Inventories natural features and promotes natural resource preservation in the town, including areas in the floodplain; such as wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks.	Entire town.	Effective in identifying sensitive resource areas, including floodplains. Encourages forestland and farmland protection, which will help conserve the town’s flood storage capatown.	Work to implement goals in Community Development Plan.
Participation in the National Flood Insurance Program	As of 2003, there were 249 homeowners with flood insurance policies. The town currently participates in the National Flood Insurance Program.	Areas identified by the FEMA maps.	Somewhat effective, provided that the town remains enrolled in the National Flood Insurance Program.	The town should evaluate whether to become a part of FEMA’s Community Rating System

Severe Snowstorms/Ice Storms

Winter storms can be especially challenging for emergency management personnel even though the storm has usually been forecast. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected.¹¹

Management Plans

The CEM Plan for Agawam lists the following generic mitigation measures for severe winter storms:

1. Develop and disseminate emergency public information concerning winter storms, especially material which instructs individuals and families how to stock their homes, prepare their vehicles, and take care of themselves during a severe winter storm.
2. As it is almost guaranteed that winter storms will occur annually in Massachusetts, local government bodies should give special consideration to budgeting fiscal resources with snow management in mind.
3. Maintain plans for managing all winter storm emergency response activities.

To the extent that some of the damages from a winter storm can be caused by flooding, all of the flood protection mitigation measures described in Table 4-1 can also be considered as mitigation measures for severe snowstorms/ice storms.

The CEM Plan for Agawam lists the following generic preparedness and response measures for severe winter storms:

1. Ensure that warning/notification, and communications systems are in readiness.
2. Ensure that appropriate equipment and supplies, (especially snow removal equipment), are in place and in good working order.
3. Review mutual aid agreements.
4. Designate suitable shelters throughout the community and make their locations known to the public.
5. Implement public information procedures during storm 'warning' stage.
6. Prepare for possible evacuation and sheltering of some populations impacted by the storm (especially the elderly and special needs).

¹¹ Comprehensive Emergency Management Plan for the Town of Agawam, August 1999.

7. Broadcast storm warning/notification information and instructions.
8. Conduct evacuation, reception and sheltering activities.
9. If appropriate, activate media center. Refer to Resource Manual for media center information.
10. Dispatch search and rescue teams.
11. Dispatch emergency medical teams.
12. Take measures to guard against further danger from power failure, downed trees and utility lines, ice, traffic problems, etc.
13. Close roads, and/or limit access to certain areas if appropriate.
14. Provide assistance to homebound populations needing heat, food, and other necessities.
15. Provide rescue and sheltering for stranded/lost individuals.

Restrictions on Development

There are no restrictions on development that are directly related to severe winter storms. However, the Town of Agawam's Zoning Ordinance regulates some roadway standards, which, although not specified as weather hazard mitigation, can serve to minimize accident potential from severe winter storms:

ARTICLE 1: General Provisions

Section 180-8. Supplementary regulations

F. Vision clearance. On any corner lot vision clearance shall be provided in the following manner:

- (1) On a corner lot in any Business A and Business B District the side line shall be a minimum of ten (10) feet from the side street and the parking of vehicles in this side area is prohibited.
- (2) A triangular area free from obstruction shall be provided in which nothing shall be erected or maintained between a point two and one-half (2 1/2) feet above the street grade and a point eight (8) feet above the street grade and measuring at least ten (10) feet back from the point of intersection on each of such streets.

ARTICLE IV: Design Standards

Section 159-8. Streets.

D. Intersections. The intersection of places and lanes with other streets shall have a property line radius of fifteen (15) feet and a curblin radius of twenty-five (25) feet. The intersections of all other streets shall have a property line radius of twenty-five (25) feet and a curb radius of thirty-five (35) feet. The Planning Board reserves the right to

increase these radii wherever it may deem necessary for public safety. Maximum grade allowed within one hundred (100) feet of an intersection, measured from the outer gutter line, is two and five-tenths percent (2.5%). [Amended 3-21-1991]

Other Mitigation Measures

Severe snowstorms or ice storms can often result in a small or widespread loss of electrical service. The shelters at the Middle School and Junior High are both served by a large pad-mounted generator that will provide electric power in the event of primary power failure.

State Building Code

For new or recently built structures, the primary protection against snow-related damage is construction according to the State Building Code, which addresses designing buildings to withstand snowloads. The Town of Agawam currently employs a staff of five to manage building inspections and to ensure that construction meets state standards.

Table 5-2: Existing Severe Snowstorms/Ice Storms Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
General Provisions	Standards include visibility requirements for corner lots.	Entire town.	Effective.	None.
Design Standards	Standards include visibility requirements for intersections.	All Subdivisions	Effective.	None.
Required Improvements	Utilities, including power lines, must be placed underground.	All Subdivisions	Effective for preventing power loss	Recommended addition to subdivision regulations – to prevent power outages.
Backup Electric Power	Shelters must have backup power, two mobile generators	Shelters; entire town	Very effective in case of power loss	Confirm that all shelters have back-up power generators.
State Building Code	The Town of Agawam has adopted the Massachusetts State Building Code.	Entire town.	Effective.	None.
Tree Management	List of dangerous trees created annually for WMECO. Continued cooperation with WMECO to get tree lines above power lines.	Entire town.	Very effective, preventative collaboration.	None.
Debris Management Plan	A debris management plan could be developed for the region	Entire town.	Effective	Consider participation in the creation of a Regional Debris Management Plan.

Hurricanes/Severe Thunderstorms

Of all the natural disasters that could potentially impact Agawam, hurricanes provide the most lead warning time because of the relative ease in predicting the storm's track and potential landfall. MEMA assumes "standby status" when a hurricane's location is 35 degrees North Latitude (Cape Hatteras) and "alert status" when the storm reaches 40 degrees north Latitude (Long Island).¹² The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Therefore, all of the flood protection mitigation measures described in Table 4-1 can also be considered hurricane mitigation measures. High winds that oftentimes accompany hurricanes can also damage buildings and infrastructure.

Town of Agawam's land development standards and State Building Code regulations, as listed below, are equally applicable to wind events such as hurricanes and tornadoes.

Management Plans

The CEM Plan for Agawam includes the following generic mitigation measures for hurricane planning and response:

1. Develop and disseminate emergency public information and instructions concerning hurricane preparedness and safety.
2. Community leaders should ensure that Agawam is enrolled in the National Flood Insurance Program.
3. Develop and enforce local building codes to enhance structural resistance to high winds and flooding. Build new construction in areas that are not vulnerable to direct hurricane effects.
4. Maintain plans for managing all hurricane emergency response activities.

The CEM Plan for Agawam includes the following generic preparedness and response measures for hurricanes:

1. Ensure that warning/notification systems and equipment is ready for use at the 'hurricane warning' stage.
2. Review mutual aid agreements.
3. Designate suitable wind and flood resistant shelters in the community and make their locations known to the public.

¹² Comprehensive Emergency Management Plan for the Town of Agawam, August 1999.

4. Prepare for coordination of evacuation from potentially impacted areas including alternate transportation systems and locations of special needs facilities.
5. Activate warning/notification systems to inform public of protective measures to be taken including evacuation where appropriate.
6. Conduct evacuation of affected populations.
7. Open and staff shelters and reception centers.
8. Dispatch search and rescue teams.
9. Dispatch emergency medical teams.
10. Activate mutual aid activities.
11. Take measures to guard against further danger from downed trees and utility lines, debris, etc.

Evacuation Options

Route 57

Southwick Street (Route 57)

Route 75 (Suffield Street)

Route 187 (Pine Street, South Westfield Street, North Westfield Street)

Route 147 (Springfield Street)

Route 159 (Main Street)

Route 5

Land Development Standards

There are no restrictions on development that are directly related to hurricanes. However, the Town of Agawam's Land Development Ordinance does have some provisions that are wind-related, specifically, zoning bylaws related to wireless communications facilities and mobile home parks.

ARTICLE XIV: Personal Wireless Service Facilities and Towers

Section 180-90. Purposes.

The purposes of this article are to:

F. Locate towers so that they do not have negative impacts, such as, but not limited to, visual blight, attractive nuisance, noise and falling objects, on the general safety, welfare and quality of life of the community.

Section 180-97. General Requirements

K. In order to ensure public safety, the minimum distance from the base of s telecommunications tower to (i) any property line and/or street, and (ii) all buildings on the subject property occupied on a regular basis, shall be a minimum of (a) 260 feet; or (b) one and one-half (1 1/2) times the height of the facility/mount, including any antennas

or appurtenances, whichever is greater. Such minimum distance to all publicly owned parks and playgrounds shall be at least 375 feet. As used herein, "publicly owned parks" shall not include any golf courses.

ARTICLE XII: Floodplain Zone

Section 180-70. Prohibited uses.

A. In those portions of the town so specified in Section 180-68 as "floodplain": the following uses of land shall be prohibited:

(5) The placement or location of a mobile home or the creation of mobile home parks or subdivision.

State Building Code

For new or recently built structures, the primary protection against wind-related damage is construction that adheres to the State Building Code, which, when followed, results in buildings that withstand high winds. The Town of Agawam currently employs a staff of five to manage the building inspections and to ensure that construction meets state standards.

Tornadoes/Microbursts

Worcester County and areas just to its west, including portions of Hampden County, have been dubbed the "tornado alley" of the state because the majority of significant tornadoes in Massachusetts's weather history have occurred in that region.¹³ According to the *Institute for Business and Home Safety*, the wind speeds in most tornadoes are at or below design speeds that are used in current building codes.¹⁴ Like earthquakes, the location and extent of potential damaging impacts of a tornado are completely unpredictable. Most damage from tornadoes comes from high winds that can fell trees and electrical wires, generate hurtling debris and, possibly, hail.

Management Plans

The CEM Plan for Agawam includes the following generic mitigation measures for tornado planning and response:

1. Develop and disseminate emergency public information and instructions concerning tornado safety, especially guidance regarding in-home protection and evacuation procedures, and locations of public shelters.
2. Strict adherence should be paid to building code regulations for all new construction.
3. Maintain plans for managing tornado response activities. Refer to the non-institutionalized, special needs and transportation resources listed in the Resource Manual.

¹³ Comprehensive Emergency Management Plan for the Town of Agawam, August 1999.

¹⁴ www.ibhs.org.

The CEM Plan for Agawam includes the following generic preparedness and response measures for tornadoes:

1. Designate appropriate shelter space in the community that could potentially withstand tornado impact.
2. Periodically test and exercise tornado response plans.
3. Put Emergency Management on standby at tornado ‘watch’ stage.
4. At tornado ‘warning’ stage, broadcast public warning/notification safety instructions and status reports.
5. Conduct evacuation, reception, and sheltering services to victims.
6. Dispatch search and rescue teams.
7. Dispatch emergency medical teams.
8. Activate mutual aid agreements.
9. Take measures to guard against further injury from such dangers as ruptured gas lines, downed trees and utility lines, debris, etc.
10. Acquire needed emergency food, water, fuel, and medical supplies.
11. Take measures relating to the identification and disposition of remains of the deceased.

Evacuation Plans

Route 57

Southwick Street (Route 57)

Route 75 (Suffield Street)

Route 187 (Pine Street, South Westfield Street, North Westfield Street)

Route 147 (Springfield Street)

Route 159 (Main Street)

Route 5

Table 5-3: Existing Hurricane and Tornado Hazard Mitigation Measures (Wind-Related)

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Wireless Communication District	Restrictions on height, and other features of wireless communication towers	District area	Somewhat effective for preventing damage to nearby property	None.
Floodplain District	Mobile homes/RVs are not permitted within the floodplain district.	Floodplain district.	Somewhat effective for preventing damage to susceptible structures (mobile homes).	None.
Utilities	Electric, cable, communications and gas utility lines are to be placed underground.	New subdivisions	Somewhat effective for ensuring that utility service is uninterrupted by severe storms in new areas of residential development	Work with utility companies to underground new utility lines in general and existing utility lines in locations where repetitive outages occur.
State Building Code	The Town of Agawam has adopted the Massachusetts State Building Code.	Entire town.	Effective.	None.
Debris Management Plan	A regional debris management plan could be developed. ¹⁵	Entire town.	Effective.	Consider participation in the creation of a Regional Debris Management Plan.
Shelters	There are 3 shelters identified.	Entire town.	Somewhat effective.	None.

15 Natural disasters can precipitate a variety of debris, including trees, construction and demolition materials and personal property. After a natural disaster, potential threats to the health, safety and welfare of impacted citizens can be minimized through the implementation of a debris management plan. Such a plan can be critical to recovery efforts after a disaster, including facilitating the receipt of FEMA funds for debris clearance, removal and disposal. Additional information is available at <http://www.fema.gov/rrr/pa/dmgbroch.shtm>.

Wildfires/Brushfires

Hampden County has approximately 273,000 acres of forested land, which accounts for 67 percent of total land area. Forest fires are therefore a potentially significant issue. In Agawam, approximately 33 percent of the town's total land area is in forest, or about 5,093 acres, and is therefore at risk of fire. In 2006, there were 22 brush fires reported in Agawam.

Management Plans

The Agawam CEM Plan does not include any specific information on wildfires.

Land Development Standards

There are currently no restrictions on development that are based on the need to mitigate the hazards of wildfires/brushfires.

Regulatory Measures

Burn Permits: Burn permits for the Town of Agawam are issued from the Agawam Fire Department. Approximately 814 permits were issued in 2006. Residents can obtain a burn permit during the burning season from January 15 through May 1, dependant on fire conditions. Applicant can obtain a burn permit over the phone. There is no cost for the permit.

Public Education/Outreach: The Fire Department has an educator on staff who is designated a SAFE officer. She visits each of the schools at least once a year. In addition, the Department distributes brochures on fire safety.

Table 5-4: Existing Wildfire/Brushfire Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Burn Permits	Residents are permitted to obtain burn permits over the phone. State police personnel provide information on safe burn practices.	Entire town.	Effective.	None.
Public Education/ Outreach	The Fire Department has an ongoing educational program in the schools.	Entire town.	Effective.	None.

Earthquakes

Although there are five mapped seismological faults in Massachusetts, there is no discernable pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard to plan for. Most buildings and structures in the state were constructed without specific earthquake resistant design features.

In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the Town's recovery from an earthquake.

Management Plans

The Agawam CEM Plan lists the following generic mitigation measures for earthquakes:

1. Community leaders in cooperation with Emergency Management Personnel should obtain local geological information and identify and assess structures and land areas that are especially vulnerable to earthquake impact and define methods to minimize the risk.
2. Strict adherence should be paid to land use and earthquake resistant building codes for all new construction.
3. Periodic evaluation, repair, and/or improvement should be made to older public structures.
4. Emergency earthquake public information and instructions should be developed and disseminated.
5. Earthquake drills should be held in schools, businesses, special care facilities, and other public gathering places.

The Agawam CEM Plan lists the following generic preparedness and response measures for earthquakes:

1. Earthquake response plans should be maintained and ready for immediate use.
2. All equipment, supplies and facilities that would be needed for management of an earthquake occurrence should be maintained for readiness.
3. Emergency Management personnel should receive periodic training in earthquake response.
4. If the designated Emergency Operations Center (EOC) is in a building that would probably not withstand earthquake impact, another building should be chosen for an earthquake EOC.
5. Mass Care shelters for earthquake victims should be pre-designated in structures that would be most likely to withstand earthquake impact.
6. EOC will be activated and response will immediately be engaged to address any and all earthquake effects listed.

7. Emergency warning/notification information and instructions will be broadcast to the public.
8. Search and rescue teams will be dispatched.
9. Emergency medical teams will be dispatched.
10. Firefighters will address fires/explosions, and HAZMAT incidents.
11. Law enforcement personnel will coordinate evacuation and traffic control.
12. Reception centers and shelters will be opened and staffed.
13. Animal control measures will be taken.
14. Law enforcement personnel will protect critical facilities and conduct surveillance against criminal activities.
15. Immediate life-threatening hazards will be addressed such as broken gas lines, downed utility wires, and fire control resources.
16. Emergency food, water, and fuel will be acquired.
17. Activate mutual aid.
18. Measures will be taken relating to identification and disposition of remains of deceased by the Chief Medical Examiner.

Evacuation Options

Route 57
Southwick Street (Route 57)
Route 75 (Suffield Street)
Route 187 (Pine Street, South Westfield Street, North Westfield Street)
Route 147 (Springfield Street)
Route 159 (Main Street)
Route 5

State Building Code

State and local building inspectors are guided by regulations put forth in the Massachusetts State Building Code. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975 and included specific earthquake resistant design standards. These seismic requirements for new construction have been revised and updated over the years and are part of the current, 6th Edition of the Massachusetts State Building Code. Given that most structures in Massachusetts were built before 1975, many buildings and structures do not have specific earthquake resistant design features. According to the 2000 U.S. Census, approximately 55% of the housing in Agawam was built before 1970. In addition, built areas underlain by artificial fill, sandy or clay soils are particularly vulnerable to damage during an earthquake.

Restrictions on Development

There are no seismic-related restrictions on development.

Table 5-5: Existing Earthquake Hazard Mitigation Measures

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
State Building Code	The Town of Agawam has adopted the State Building Code.	Entire town but applies to new construction only.	Effective for new buildings only.	Evaluate older structures to be used as shelters to determine if they are earthquake resistant.
Debris Management Plan	A regional debris management plan could be developed.	Entire town.	Effective.	Consider participation in the creation of a Regional Debris Management Plan.
Shelters	Three shelters have been identified for victims of earthquakes in Agawam.	Entire town.	Effective.	None.

Dam Failures

The only mitigation measures in place for dams are the state regulations that control their construction and inspection.

Management Plans and Regulatory Measures

The Agawam CEM Plan states that there are three categories of dam failure or overspill and that action should be taken according to hazard rating:

Type 1: Slowly Developing Condition

1. Activate EOC
2. Activate all communication networks
 - Establish communications with Command Position on a 24-hour basis.
3. Release public information
4. Notify:
 - MEMA Region Headquarters
 - American Red Cross
 - Downstream communities
5. Review Plans for evacuation and sheltering
 - a. Evacuation
 - routes
 - notification
 - b. Shelter
 - availability and capatown
 - food, supplies, and equipment
 - shelter owners and managers
 - other communities (if out of town sheltering is required)
6. Require “Stand By” status of designated emergency response forces.

Type 2: Rapidly Developing Condition

1. Establish a 24-hour communications from dam site to EOC.
2. Assemble, brief and assign specific responsibilities to emergency response forces.
3. Release public information.
4. Obtain and prepare required vehicles/equipment for movement.
5. Prepare to issue warning.

Type 3: Practically Instantaneous Failure

1. Issue warning
2. Commence immediate evacuation.
3. Commit required resources to support evacuation.
4. Activate shelters or coordinate activation of shelters located outside the community.
5. Notify:
 - MEMA Region Headquarters
 - Red Cross
6. Initiate other measures as required to protect lives and property.

The Agawam CEM Plan contains the following generic mitigation measures for dam failure:

1. Develop and conduct public education programs concerning dam hazards.
2. Maintain up-to-date plans to deal with threat and actual occurrence of dam over-spill or failure.
3. Emergency Management and other local government agencies should familiarize themselves with technical data and other information pertinent to the dams, which impact Agawam. This should include determining the probable extent and seriousness of the effect to downstream areas.
4. Dams should be inspected periodically and monitored regularly.
5. Repairs should be attended to promptly.
6. As much as is possible burdens on faulty dams should be lessened through stream re-channeling.
7. Identify dam owners.
8. Determine minimum notification time for down stream areas.

The Agawam CEM Plan contains the following generic preparedness and response measures for dam failure:

1. Pre-place adequate warning/notification systems in areas potentially vulnerable to dam failure impact.
2. Pre-place procedures for monitoring dam site conditions at first sign of any irregularity that could precipitate dam failure.
3. Identify special needs populations, evacuations routes, and shelters for dam failure response.
4. Have sandbags, sand, and other items to reinforce dam structure or flood proof flood prone areas.
5. Disseminate warning/notification of imminent or occurring dam failure.
6. Coordinate evacuation and sheltering of affected populations.
7. Dispatch search and rescue teams.
8. Coordinate evacuation and sheltering of affected populations.
9. Activate mutual aid if needed.
10. Acquire additional needed supplies not already in place, such as earth moving machinery.
11. Establish incident command post as close to affected area as safely possible.
12. Provide security for evacuated public and private property.

Evacuation Options

Route 57

Southwick Street (Route 57)

Route 75 (Suffield Street)

Route 187 (Pine Street, South Westfield Street, North Westfield Street)

Route 147 (Springfield Street)

Route 159 (Main Street)

Route 5

Permits Required for New Dam Construction

Massachusetts State Law (M.G.L. Chapter 253 Section 45) regulates the construction of new dams. A permit must be obtained from the Department of Conservation and Recreation (DCR) before construction can begin. One of the permit requirements is that all local approvals or permits must be obtained.

Dam Inspections

The DCR requires that dams rated as Low Hazards are inspected every ten (10) years, dams that are rated as Medium/Significant Hazards are inspected every five (5) years, and dams that are rated as High Hazards are inspected every two (2) years. This is the responsibility of the dam owner.

Restrictions on Development

There is no mention made regarding the construction of new dams in the Town of Agawam zoning or subdivision regulations, although alterations of watercourses must be reported.

There are no town restrictions on dam locations. The DCR issues permits for new dams and does have the authority to deny a permit if it is determined that the design and/or location of the dam is not acceptable.

Table 5-6: Existing Dam Failure Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
New Dam Construction Permits	State law requires a permit for the construction of any dam.	Entire town.	Effective. Ensures dams are adequately designed.	None.
Dam Inspections	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Entire town.	Low. The responsibility for this is now on dam owners, who may not have sufficient funding to comply.	Identify sources of funding for dam safety inspections. Incorporate dam safety into development review process.
Evacuation Plans	Comprehensive evacuation plans would ensure the safety of the citizens in the event of dam failure.	Inundation areas in town.	None.	None.

Drought

Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and drought. And unlike other places, drought can most likely be effectively mitigated in regions like the Pioneer Valley if measures are put into place. Agawam has several water protection regulations in place, as evidenced in the section on flooding. Additional regulations and mitigation options, specific to drought mitigation, are included here.

Management Plans

The Agawam CEM Plan contains the following generic mitigation measures for drought:

1. Seeks to balance demand on water supply through land use, zoning and other tools.
2. Encourages water conservation and water control measures to ease demand on water supply.
3. Improves efficiency and capatown of the water supply system, including leak detection and repair.

The Agawam CEM Plan contains the following generic preparedness and response measures for drought:

1. Identify potential emergency water sources, such as purchase from adjoining communities if available.
2. Keep abreast of drought forecasts issued by the State Drought Task Force.
3. Encourages businesses and other bulk users to develop water conservation and shortage plans.
4. Implement water use controls as needed.
5. Coordinate requests for potable water in emergency situations.

Land Development Regulations

Agawam's Zoning Ordinance has several sections governing flood and stormwater management, proper drainage, and water resources protection. The regulations protecting these features of the landscape can also be seen as preventing drought, as they promote the natural processes of infiltration and groundwater recharge. (See language in Flood section, above.) In addition, the Subdivision Rules deal with some details regarding water supply, including several requirements for approval of subdivision plan, for example:

ARTICLE III: Plan Submission and Approval Procedure

Section 159-7. Definitive plan.

D. Preparation of definitive plan... The definitive plan shall contain the following information:

(11) The proposed layout of storm drainage, public water supply and public sewage disposal systems. If wells and/or septic tanks and leach fields are intended to be utilized, these shall be shown by general indication of location with spot elevations on the finished grading sheet. The Board of Health reserves the right to make final determination concerning location and specifications of private water and sewage systems.

Agawam Community Development Plan

Water is not a main focus of the Open Space Element of the Agawam Community Development Plan, although it recognizes the important role that water resources play in the character and open space of the town. Therefore, no major recommendations are made regarding protecting or preserving the town's water supply. However, the plan does a good job of inventorying all the water resources in town.

Other Mitigation Measures

None.

Table 5-7: Existing Drought Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Plan Submission and Approval Procedure	Water supply wells for subdivision require percolation test and approval.	All subdivisions	Effective to managing sufficient water supply to new development.	None.
Agawam Community Development Plan	Inventory of water resources in town.	Entire town.	Somewhat effective for raising awareness about protecting water quality, but not water supply/conservation.	None.

Man-Made Hazards/Hazardous Materials

Hazardous materials are in existence throughout Town, and are constantly being moved on Agawam's roads and highways. However, there is no way to anticipate where and when a hazardous materials spill or explosion could take place. Therefore, it makes is somewhat difficult to determine mitigation strategies, but Agawam has some regulations currently in place to mitigate the impacts of a hazardous materials disaster.

Management Plans

A Model Hazardous Materials Response Plan is provided in the Agawam CEM Plan framework for community and/or LEPC use under the Specific Hazards Annexes section. Complete plans may be attached to the CEM or referenced as a separate document. The CEM Plan may also support regional emergency planning committees.

Land Development Regulations

Agawam's Land Development Ordinance does not address hazard materials management in the Zoning Ordinance.

Agawam Community Development Plan

The Community Development Plan identifies several potential hazardous waste sites in Agawam – including landfills. But because most of town is served by a public water supply, there is little risk of hazardous wastes contamination. The plan notes that the greatest risk is of someone mishandling hazardous chemicals, but makes no recommendations regarding this.

Other Mitigation Measures

None.

Table 5-8: Existing Man-Made Hazard/Hazardous Materials Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Agawam Community Development Plan	Identifies potential hazardous sites in town.	Entire town.	Effective at bringing to light the risk of hazardous waste contamination.	None.
Industrial Zoning	Restrictions are provided to the types of uses that are allowed in the industrial zone	Industrial zoning district	Keep hazardous materials in a restricted area.	None.

6 – FUTURE MITIGATION STRATEGIES

Goal Statements and Action Items

As part of the natural hazards mitigation planning process that will be undertaken by the Agawam Natural Hazards Planning Committee, existing gaps in protection and possible deficiencies will be identified and discussed. The committee will then develop general Goal Statements and Action Items that, when implemented, will help to reduce risks and future damages from natural hazards. The Goal Statements, Action Items, town department(s) responsible for implementation, and the proposed timeframe for implementation for each category of natural hazard are described below.

Several of the Action Items have multiple benefits because, if implemented, these Action Items will mitigate or prevent damages from more than one type of natural hazards. For example, updating the Subdivision Regulations to require new utility lines be placed underground will prevent property damage and loss of service in the event of high winds (tornado or hurricane) or severe snow and ice storms.

General Mitigation Action Items

Goal Statement: To provide adequate shelter, water, food and basic first aid to displaced residents in the event of a natural disaster and to provide adequate notification and information regarding evacuation procedures, etc., to residents in the event of a natural disaster.

Action Item: Collect, periodically update, and disseminate information on which local radio stations provide emergency information, what to include in a ‘home survival kit,’ how to prepare homes and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster.

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: Ongoing

Rationale: Increased likelihood of town residents being prepared in the event of a disaster.

Action Item: Identify and rectify all data limitations in this plan.

Responsible Department/Board: Emergency Management Director,
Planning Department

Proposed Completion Date: 2009

Rationale: Will enable better assessment of hazard risks, leading to more effective hazard mitigation strategies.

Flooding

Overall, the Town of Agawam's existing land use regulations regulate development, reduce or eliminate localized flooding events and control the quantity and quality of stormwater runoff. Long-range planning documents such as the town's Community Development Plan also address flood prevention and mitigation either directly or indirectly in the goals and objectives listed in these documents.

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to flooding

- Action Item:** Identify, prioritize and replace undersized culverts throughout Town.
Responsible Department/Board: Department of Public Works, Conservation Commission
Proposed Completion Date: 2010
Rationale: Improved water flow will decrease water level increases in flood-prone areas during storms and lessen the likelihood of flooding
- Action Item:** Implement goals established in the Open Space section of Agawam's EO418 Community Development Plan.
Responsible Department/Board: Planning Board, Conservation Commission
Proposed Completion Date: 2010
Rationale: Will decrease flood damage by keeping development out of flood-prone areas and protecting flood storage capacity.
- Action Item:** Become part of FEMA's Community Rating System
Responsible Department/Board: Mayor, Town Council
Proposed Completion Date: 2009
Rationale: By reducing insurance rates it will increase participation in NFIP.
- Action Item:** Acquisition of large pumps and piping to be used for flood control in case of a flooding emergency
Responsible Department/Board: Department of Public Works
Proposed Completion Date: 2010
Rationale: Improved water flow will decrease water level increases in flood-prone areas during storms and lessen the likelihood of flooding.
- Action Item:** Conduct an annual sandbag inventory and purchase more if needed to ensure adequate supply
Responsible Department/Board: Department of Public Works
Proposed Completion Date: Ongoing
Rationale: To ensure adequate supply of sandbags for potential floods.

Severe Snow Storms/Ice Storms

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to severe snow and ice storms.

Action Item: Develop and implement a plan for providing access to water, information, shelter, and food stores to people in remote locations in town in the event of a severe winter storm.

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: 2009

Rationale: Provide basic services and survival necessities for town residents unable to reach existing shelters during a disaster.

Action Item: Develop and implement plan to transport emergency personnel (such as doctors) to areas of town as needed during severe winter storms.

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: 2009

Rationale: Provide increased emergency services for town residents during a disaster.

Hurricanes and Tornadoes

The Action Items listed above, under flooding, address the flooding that can result from a hurricane.

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to high winds associated with hurricanes and tornadoes.

Action Item: Work with utility companies to identify where it is feasible to underground new utility lines and existing utility lines, especially in locations where repetitive outages occur.

Responsible Department/Board: Planning Board, Town Council

Proposed Completion Date: 2009

Rationale: Provide increased emergency services for town residents and allow more residents to stay in their own homes during a disaster, decreasing strain on existing shelters.

Action Item: Evaluate the EOCs to determine if they are resistant to potential winds effects from hurricanes, tornadoes and microbursts and make necessary upgrades if they are found to be deficient.

Responsible Department/Board: Building Inspector, Emergency Management Director

Proposed Completion Date: 2010

Rationale: EOCs will be better able to withstand disasters and provide adequate shelter for town residents during a disaster.

Wildfires/Brushfires

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to wildfires/brushfires.

Action Items: Develop and distribute an educational pamphlet on fire safety and prevention to all town residents.

Responsible Department/Board: Fire Department

Proposed Completion Date: Ongoing

Rationale: Will decrease likelihood of allowed, open burning of spreading and becoming a wildfire.

Earthquakes

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to earthquakes.

Action Item: Evaluate shelters to determine if they are earthquake resistant and make necessary upgrades if needed.

Responsible Department/Board: Building Inspector, Emergency Management Director

Proposed Completion Date: Ongoing

Rationale: Shelters will be better able to withstand disasters and provide adequate shelter for town residents during a disaster.

Action Item: Install back-up generators at shelters without them to ensure all identified shelters have sufficient back-up utility service in the event of primary power failure.

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: 2008

Rationale: Shelters will be better able to withstand disasters and provide adequate shelter for city residents during a disaster.

Dam Failure

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to dam failures.

Action Item: Create schedule of required dam inspections, send letters of notification to private dam owners at both one year and six months prior to required inspection dates, determine if inspections have been completed, require copies of inspection reports be provided to the town, and initiate appropriate legal actions if inspections are not completed as required.

Responsible Department/Board: Emergency Management Director, Department of Public Works – Engineering Department

Proposed Completion Date: 2008

Rationale: Will lessen the likelihood of dam failures.

Action Item: Map areas in town that would be impacted in case of a dam failure.

Responsible Department/Board: Public Works, Engineering

Proposed Completion Date: 2010

Rationale: Mitigation actions could be targeted to most vulnerable areas.

Drought

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to drought.

Action Item: Adopt a water conservation bylaw

Responsible Department/Board: Conservation Commission

Proposed Completion Date: Ongoing

Rationale: Will result in greater water reserves to enable community to better weather drought.

Man-Made Hazard / Hazardous Materials

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to man-made hazard / hazardous materials.

Action Item: Establish an Action Plan that addresses chlorine releases at EPA Tier II locations

Responsible Department/Board: Fire Department, Emergency Management Director

Proposed Completion Date: Ongoing

Rationale: Decrease chance of accidental release of hazardous materials.

Prioritized Implementation Schedule

Summary of Critical Evaluation

The Agawam Hazard Mitigation Planning Committee reviewed each of the actions identified above, as well as existing mitigation strategies using the following factors to prioritize mitigation projects:

- Ability to reduce disaster damage
- Social acceptability
- Ability to complete or be combined w/other actions
- Technical feasibility / potential success
- Impact on the environment
- Administrative workability
- Ability to meet regulations
- Political acceptability
- Ability to save or protect historic structures
- Legal implementation
- Ability to meet other community objectives
- Economic impact
- The duration of its implementation period
- Environmental compatibility

Project Prioritization

The Agawam Hazard Mitigation Planning Committee created the following prioritized schedule for implementation of prioritized items. The table lists items in order of priority.

Note: As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

**PRIORITIZED IMPLEMENTATION SCHEDULE
(ACTION PLAN)**

IMPLEMENTATION STRATEGY FOR PRIORITY MITIGATION ACTIONS

The Agawam Hazard Mitigation Planning Committee created the following prioritized schedule for implementation:

ACTION NUMBER	MITIGATION ACTION	RESPONSIBLE DEPARTMENT/BOARD	PROPOSED COMPLETION DATE	HAZARD ACTION INTENDED TO MITIGATE	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST
1	Evaluate shelters to determine if they are earthquake resistant and make necessary upgrades if needed.	Building Inspector, EMD	Ongoing	Earthquake	Town Staff	N/A
2	Identify and rectify all data limitations in this plan.	EMD, Planning Department	2008	All	Town Staff	N/A
3	Establish an Action Plan that addresses chlorine releases at EPA Tier II locations	Fire Department, EMD	Ongoing	Hazardous materials	Town Staff / Volunteers	N/A
4	Develop and distribute an educational pamphlet on fire safety and prevention.	Fire Department	Ongoing	Wildfires/brushfires	Town Staff	To be determined
5	Adopt a Water Conservation bylaw	Conservation Commission	Ongoing	Drought	Smart Growth Technical Assistance Grant Program	\$5,000
6	Identify, prioritize and replace undersized culverts throughout Town.	DPW, Conservation Commission	2010	Flooding, Hurricanes	HMGP	\$200,000
7	Install back-up generators at shelters without them to ensure all identified shelters have sufficient back-up utility service.	EMD	2008	All, except Drought	Town Staff	N/A
8	Conduct an annual sandbag inventory to ensure adequate supply	DPW	2008	Flood, Hurricane	Town Staff	N/A
9	Create schedule of required dam inspections, send letters of notification to private dam owners at both one year and six months prior to required inspection dates, determine if inspections have been completed, require copies of inspection reports be provided to the town, and initiate appropriate legal actions if inspections are not completed as required.	EMD, DPW-Engineering	2008	Dam failure	Town Staff	N/A

ACTION NUMBER	MITIGATION ACTION	RESPONSIBLE DEPARTMENT/BOARD	PROPOSED COMPLETION DATE	HAZARD ACTION INTENDED TO MITIGATE	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST
10	Develop and implement plan to transport emergency personnel to areas of town as needed during severe winter storms.	EMD	2009	Severe winter storms	Town Staff	N/A
11	Develop a plan for providing access to water, information, shelter, and food stores to people in remote locations in town in the event of a severe winter storm.	EMD	2009	Severe winter storms	Town Staff	N/A
12	Work with utility companies to identify where it's feasible underground new utility lines and existing utility lines in locations where repetitive outages occur	Mayor, Town Council, Planning Board	2009	Flood, Hurricane, Tornado, Severe, winter storms, Dam failure	Town Staff	N/A
13	Become a part of FEMA's Community Rating System	Mayor, Town Council	2009	Flooding, Hurricane	Town Staff / Volunteers	N/A
14	Acquisition of local or regional large pumps and piping to be used for flood control in case of a flooding emergency	Department of Public Works	2010	Flood, Hurricane, Dam failure	To be determined	To be determined
15	Map areas in town to determine which critical facilities would be impacted in case of dam failure	Department of Public Works – Engineering	2010	Dam Failure	Town Staff	N/A
16	Implement goals established in the Open Space section of Agawam's EO418 Community Development Plan	Planning Board, Conservation Commission	2010	Flood, Hurricane	Town Staff	N/A
17	Evaluate the EOCs to determine if they are resistant to potential winds effects from hurricanes, tornadoes and microbursts and make necessary upgrades if they are found to be deficient.	Building Inspector, EMD	2010	Hurricane, Tornado	Town Staff	N/A

7 – PLAN ADOPTION & IMPLEMENTATION

Plan Adoption

Upon completion, copies of the Draft Local Hazards Mitigation Plan for the Town of Agawam were distributed to the town boards for their review and comment. A public meeting was held by the Agawam Town Council to present the draft copy of the Agawam Local Natural Hazards Mitigation Plan to town officials and residents and to request comments from this committee and the general public. The Natural Hazards Mitigation Plan was formally approved by the Town Council and Mayor and forwarded to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for their approval.

Plan Implementation

The implementation of the Agawam Local Natural Hazards Mitigation Plan will begin following its formal adoption by the Agawam Town Council and approval by MEMA and FEMA. Specific town departments and boards will be responsible for ensuring the development of policies, bylaw revisions, and programs as described in Sections 5 and 6 of this plan. The Agawam Natural Hazards Planning Committee will oversee the implementation of the plan.

Plan Monitoring and Evaluation

The measure of success of the Agawam Local Natural Hazards Mitigation Plan will be the number of identified mitigation strategies implemented. In order for the town to become more disaster resilient and better equipped to respond to natural disasters, there must be a coordinated effort between elected officials, appointed bodies, town employees, regional and state agencies involved in disaster mitigation, and the general public.

The Agawam Natural Hazards Planning Committee will meet on an annual basis or as needed (i.e., following a natural disaster) to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm for strategies to remove obstacles to implementation. Those parties noted in Section 6 of the plan, all of whom have a representative on the Agawam Natural Hazards Planning Committee, will be responsible for seeing that the actions are implemented and will report on their progress at the annual plan review meetings.

Outreach to the public, surrounding communities, agencies, businesses, academia, non-profits, or other interested parties outside of the town of Agawam will be done in advance of each annual meeting in order to solicit their participation in assessment of the plan. Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. At a minimum, the committee will review and update the plan every five years, beginning in the fall of 2011. The meetings of the

committee will be organized and facilitated by the Emergency Management Director or the Agawam Select Board.

Incorporation of Plan Requirements into other Planning Mechanisms/Documents

At times when the town of Agawam is considering creation of or changes to local planning documents or procedures including, but not limited to comprehensive plans, capital improvement plans, zoning and building codes site reviews and permitting processes the information and recommendations contained in this plan will be reviewed by the people and committees involved in those processes and, when appropriate, will incorporate those recommendations into the new planning procedures.

CERTIFICATE OF ADOPTION
TOWN OF AGAWAM, MASSACHUSETTS
MAYOR RICHARD A. COHEN
A RESOLUTION ADOPTING THE
AGAWAM HAZARD MITIGATION PLAN

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

WHEREAS, several public planning meetings were held between December 2006 and February 2008 regarding the development and review of the Agawam Hazard Mitigation Plan; and

WHEREAS, the Agawam Hazard Mitigation Plan contains several potential future projects to mitigate hazard damage in the Town of Agawam; and

WHEREAS, a duly-noticed public hearing was held by the Agawam Town Council on _____, 2008 to formally approve and adopt the Agawam Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Mayor of Agawam adopts the Agawam Hazard Mitigation Plan.

ADOPTED AND SIGNED this _____, 2008.

Susan R. Dawson
Mayor

ATTEST

8 – APPENDICES

Appendix A: Technical Resources

1) Agencies

Massachusetts Emergency Management Agency (MEMA).....	508/820-2000
Hazard Mitigation Section	617/626-1356
Federal Emergency Management Agency (FEMA)	617/223-4175
MA Regional Planning Commissions:	
Berkshire Regional Planning Commission (BRPC).....	413/442-1521
Cape Cod Commission (CCC).....	508/362-3828
Central Massachusetts Regional Planning Commission (CMRPC).....	508/693-3453
Franklin Regional Council of Governments (FRCOG).....	413/774-3167
Martha’s Vineyard Commission (MVC).....	508/693-3453
Merrimack Valley Planning Commission (MVPC).....	978/374-0519
Metropolitan Area Planning Council (MAPC).....	617/451-2770
Montachusett Regional Planning Commission (MRPC).....	978/345-7376
Nantucket Planning and Economic Development Commission (NP&EDC).....	508/228-7236
Northern Middlesex Council of Governments (NMCOG).....	978/454-8021
Old Colony Planning Council (OCPC).....	508/583-1833
Pioneer Valley Planning Commission (PVPC).....	413/781-6045
Southeastern Regional Planning and Economic Development District (SRPEDD).....	508/823-1803
MA Board of Building Regulations & Standards (BBRS).....	617/227-1754
MA Coastal Zone Management (CZM).....	617/626-1200
DCR Water Supply Protection.....	617/626-1379
DCR Waterways.....	617/626-1371
DCR Office of Dam Safety.....	508/792-7716
DFW Riverways.....	617/626-1540
DFP Wetlands and Waterways.....	617/292-5500
MA Dept. of Housing & Community Development.....	617/573-1100
Woods Hole Oceanographic Institute.....	508/457-2180
UMass-Amherst Cooperative Extension.....	413/545-4800
National Fire Protection Association (NFPA).....	617/770-3000
New England Disaster Recovery Information X-Change (NEDRIX – an association of private companies & industries involved in disaster recovery planning).....	781/485-0279
MA Board of Library Commissioners.....	617/725-1860
MA Highway Dept, District 2.....	413/582-0599
MA Division of Marine Fisheries.....	617/626-1520
MA Division of Capital & Asset Management (DCAM).....	617/727-4050
University of Massachusetts/Amherst.....	413/545-0111
Natural Resources Conservation Services (NRCS).....	413/253-4350
MA Historical Commission.....	617/727-8470
U.S. Army Corps of Engineers.....	978/318-8502
Northeast States Emergency Consortium, Inc. (NESEC).....	781/224-9876
US Department of Commerce: National Oceanic and Atmospheric Administration: National Weather Service; Tauton, Massachusetts	508/824-5116
US Department of the Interior: US Fish and Wildlife Service	413/253-8200
US Geological Survey	508/490-5000

2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP)	Massachusetts Emergency Management Agency
406 Public Assistance and Hazard Mitigation	Massachusetts Emergency Management Agency
Community Development Block Grant (CDBG).....	DHCD, also refer to RPC
Dam Safety Program.....	MA Division of Conservation and Recreation
Disaster Preparedness Improvement Grant (DPIG)	Massachusetts Emergency Management Agency
Emergency Generators Program by NESEC [‡]	Massachusetts Emergency Management Agency
Emergency Watershed Protection (EWP) Program.....	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP)	Massachusetts Emergency Management Agency
Flood Plain Management Services (FPMS).....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP).....	Massachusetts Emergency Management Agency
Mutual Aid for Public Works.....	Western Massachusetts Regional Homeland Security Advisory Council
National Flood Insurance Program (NFIP) [†]	Massachusetts Emergency Management Agency
Power of Prevention Grant by NESEC [‡]	Massachusetts Emergency Management Agency
Roadway Repair & Maintenance Program(s).....	Massachusetts Highway Department
Section 14 Emergency Stream Bank Erosion & Shoreline Protection	US Army Corps of Engineers
Section 103 Beach Erosion.....	US Army Corps of Engineers
Section 205 Flood Damage Reduction.....	US Army Corps of Engineers
Section 208 Snagging and Clearing	US Army Corps of Engineers
Shoreline Protection Program.....	MA Department of Conservation and Recreation
Various Forest and Lands Program(s).....	MA Department of Environmental Protection
Wetlands Programs	MA Department of Environmental Protection

[‡] NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NESEC for more information.

[†] Note regarding National Flood Insurance Program (NFIP) and Community Rating System (CRS): The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community’s floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. MEMA can provide additional information regarding participation in the NFIP-CRS Program.

3) Websites

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/litbase/hazards/	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	http://wxp.eas.purdue.edu/hurricane	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	http://nemaweb.org	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	http://www.gsfc.nasa.gov/ndrd/disaster/	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	http://ltpwww.gsfc.nasa.gov/ndrd/main/html	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	http://www.statelocal.gov/	General information through the federal-state partnership.
National Weather Service	http://nws.noaa.gov/	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	http://h20.usgs.gov/public/realtime.html	Provisional hydrological data
Dartmouth Flood Observatory	http://www.dartmouth.edu/artsci/geog/floods/	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	http://www.fema.gov/fema/csb.html	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	http://www.met.fsu.edu/explores/tropical.html	Tracking and NWS warnings for Atlantic Hurricanes and other links
National Lightning Safety Institute	http://lightningsafety.com/	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	http://www.ghcc.msfc.nasa.gov/otd.html	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	http://www.wep.es.llnl.gov/wwwep/ghp.html	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	http://www.tornadoproject.com/	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	http://www.nssl.uoknor.edu/	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	http://www.iaa.iix.com/ndemap.html	A multi-disaster risk map.
Earth Satellite Corporation	http://www.earthsat.com/	Flood risk maps searchable by state.
USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.

Appendix B: Documentation of Planning Process

**Agawam Hazard Mitigation Planning Committee
Meeting #1**

AGENDA

DATE: Tuesday, December 19, 2006

TIME: 9:00 AM

Agawam DPW Conference Room

1) Introduction

2) Purpose of Committee

- Why selected to serve on Committee
- What we are doing and why

3) What is Hazard Mitigation Planning?

- Presentation on Hazard Mitigation
- Explain/set milestones (5 committee meetings)

4) Step 1: Organize Hazard Mitigation Team

- Establish a chairperson/point of contact

5) Identify Hazards (past and potential) on Base Map

- What are the hazards?
- What is at risk from those hazards?

6) Develop Base Map with Critical Facilities

- Identify Critical Facilities on Base Map. The following list contains items that should be clearly identified on the map, as they apply to your community:

- | | |
|--------------------------------|---------------------------------------|
| - Emergency Operations Center | - Nursing Homes |
| - Emergency Fuel Facilities | - Elderly Housing |
| - Town/Town Hall | - Day-Care Facilities |
| - Police Station | - Correctional Facilities |
| - Fire Station | - Other Congregate Care Facilities |
| - Public Works Garages | - Shelters |
| - Water Treatment Facilities | - Special Needs Populations |
| - Sewage Treatment Plants | - Hazardous Materials Facilities |
| - Water Tower/Supply Pumps | - Access Roads to Critical Facilities |
| - Power Plants | - Evacuation Routes |
| - Electrical Power Substations | - Unique or Historic Resources |
| - Schools | - Commercial Economic Impact Areas |
| - Major Highways and Roadways | - Socio-Economic Impact Areas |
| - Bridges | - Areas with Second Language Needs |
| - Dams | - Hospitals |

7) Questions & Answer Period / Set Goals for Next Meeting

Agawam Hazard Mitigation Planning Committee

Meeting #2

AGENDA

Tuesday, January 30, 2007

9:00 a.m.

Agawam DPW Conference Room

1) Hazards Analysis Methodology

- Past and Potential Hazards
 - ☞ Hazard Identification and Analysis Worksheet
- Critical Facilities
 - ☞ Is this information correct?

2) Information needed for PDM Plan

- Review list of questions

3) Analyze Development Trends

- Looking at Community Change
- Map out Development Patterns

4) Question and Answer Period

5) Set Goals for and Schedule Next Meeting

**Agawam Hazard Mitigation Planning Committee
Meeting #3**

AGENDA

February 27, 2007

9:00 a.m.

Agawam DPW Conference Room

1) Hazards Analysis Methodology

- Past and Potential Hazards (pgs.18-22 of draft plan)

2) Critical Facilities / Evacuation Routes Chart

- pgs.28-29 of draft plan

3) Identify what's in place & Identify gaps in the current protection

- Chapter 5 of Draft Plan (Current Mitigation Strategies)
- Review of Draft Existing Protection Measures
- Identify gaps in existing protection

4) Question and Answer Period

5) Set Goals for and Schedule Next Meeting

**Agawam Hazard Mitigation Planning Committee
Meeting #4**

AGENDA

March 27, 2007

9:00 a.m.

Agawam DPW Conference Room

- 1) Review of Draft Goal Statements**
- 2) Brainstorm Mitigation Actions**
 - What actions can be taken?
 - Evaluating Action Feasibility
- 3) Prioritize List of Mitigation Actions in Order of Importance**
 - Fill out the Evaluation Chart for each action.
- 4) Question and Answer Period**

**Agawam Hazard Mitigation Planning Committee
Meeting #5**

AGENDA

April 24, 2007

9:00 a.m.

Agawam DPW Conference Room

- 1) Prioritize List of Mitigation Actions in Order of Importance**
 - Fill out the Evaluation Chart for each action.
- 2) Establish a Minimum Acceptable Level for Actions**
- 3) Review / edits of final plan**
- 4) Question and Answer Period**

**Agawam Hazard Mitigation Team
Meeting #6**

AGENDA

2/7/08

10:00 a.m.

Agawam DPW Conference Room

- 1) Introduction**
- 2) Review FEMA comments on Draft Plan and discuss proposed changes to Plan**
- 3) Discuss Next Steps for the Agawam *Hazard Mitigation Plan* including FEMA Review and Adoption by the Board of Selectmen/Town Council.**
- 4) Question and Answer Period**

(Documentation of Public Notices)

PRESS RELEASE

CONTACT: Andrew Smith, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE

September 12, 2007

Public Input Sought on Pre-Disaster Mitigation Plans

The Pioneer Valley Planning Commission has completed final working drafts of pre-disaster mitigation plans for thirteen communities in the region: Agawam, Chester, Chesterfield, Easthampton, Hadley, Hampden, Hatfield, Holland, Holyoke, Ludlow, Monson, Northampton, and South Hadley.

This planning effort is being undertaken to help communities assess the risks they face from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

The draft plans are posted for public review and comment on PVPC's website at www.pvpc.org. Please submit comments to PVPC's Andrew Smith at (413) 781-6045 or asmith@pvpc.org no later than November 30, 2007. Communities with approved plans will be eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

These pre-disaster mitigation plans are being developed with assistance from the Pioneer Valley Planning Commission with funding provided by the Massachusetts Emergency Management Agency.

The Republican.

'Predisaster plans' readied for grants

Sunday, September 23, 2007

By **NANCY H. GONTER**
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It's the public's turn to weigh in on plans prepared by local communities to keep the damage from natural disasters to a minimum. Sixteen "predisaster mitigation plans," developed by the Pioneer Valley Planning Commission working with local officials from each community, are part of an effort to secure grant money from the Massachusetts Emergency Management Agency, said Catherine M. Miller, principal planner with the commission.

"This comes from an effort by the Federal Emergency Management Agency that while we are aware you can't prevent natural disasters from happening, you can prevent the long term consequences," Miller said.

The plans, which average more than 100 pages each, can be viewed on the agency's Web site at www.pvpc.org Plans for Agawam, Chester, Chesterfield, Easthampton, Hadley, Hampden, Hatfield, Holland, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southwick, Ware and Wilbraham are available, she said.

"This is largely an education exercise so people know local government is looking into these things and thinking about what the consequences of natural disasters would be. It's reassuring to know local governments are looking at this kind of thing especially after all the awareness following (hurricane) Katrina," Miller said.

Comments may be made by calling Andrew Smith at the Commission at (413) 781-6045 or by e-mailing him at asmith@pvpc.org by Nov. 30.

The plans were developed with a state grant of \$224,962 which was supplemented by local communities for total cost of just under \$300,000, she said.

Each plan looks at the risks communities may face from natural disasters such as flooding, tornadoes, drought and earthquakes, and what can be done to prevent damage to property and loss of life. They also prioritize projects for funding for mitigation efforts, Miller said. An example of a mitigation project is Greenfield's purchase of the Wedgewood Gardens mobile home park which was badly flooded by the Green River in 2005 and had previously been flooded, although that was not part of this program, Miller said.

The commission is working with 32 communities in this area and a second round of 16 more communities will soon be started. They are Amherst, Belchertown, Brimfield, Chicopee, Cummington, Goshen, Granby, Huntington, Palmer, Southampton, Springfield, Westfield, West Springfield, Westhampton, Williamsburg and Worthington.

After that, a plan for the entire region will be prepared, Miller said.

Northampton Deputy Fire Chief Dana Cheverette, a member of the local committee that worked with the commission on the town's plan, said going through the process of preparing the plan was helpful.

"You identify the flood plans and you identify the area where you need to put your resources. In 1988 when the Oxbow area flooded, a lot of people got isolated. Now we know where the people could get isolated," Cheverette said.

Sunday's news briefs

Posted by The Republican Newsroom September 30, 2007 12:04PM

Predisaster plan drafts

The Pioneer Valley Planning Commission has completed final working drafts of predisaster mitigation plans for 13 communities in the region. The draft plans are posted for public review and comment on the commission's Web site at www.pvpc.org. The deadline for comments is Nov. 30.

This planning effort is being undertaken to help communities assess the risks they face from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. Communities with approved plans will be eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

Affected are Agawam, Chester, Chesterfield, Easthampton, Hadley, Hampden, Hatfield, Holland, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southwick, Ware and Wilbraham are available, she said.

Appendix C

List of Acronyms

FEMA	Federal Emergency Management Agency
MEMA	Massachusetts Emergency Management Agency
PVPC	Pioneer Valley Planning Commission
EPA	Environmental Protection Agency
DEP	Massachusetts' Department of Environmental Protection
NWS	National Weather Service
HMGF	Hazard Mitigation Grant Program
FMA	Flood Mitigation Assistance Program
SFHA	Special Flood Hazard Area
CIS	Community Information System
DCR	Massachusetts Department of Conservation and Recreation
FERC	Federal Energy Regulatory Commission
TRI	Toxics Release Inventory
FIRM	Flood Insurance Rate Map
NFIP	National Flood Insurance Program
CRS	Community Rating System
BOS	Board of Selectmen
DPW	Department of Public Works
LEPC	Local Emergency Planning Committee
EMD	Emergency Management Director
Con Com	Conservation Commission
Ag Com	Agricultural Commission
EOC	Emergency Operations Center
CEM Plan	Comprehensive Emergency Management Plan
EMA	Emergency Management Agency
RACES	Radio Amateur Civil Emergency Service
WMECO	Western Massachusetts Electric Company
HAZMAT	Hazardous Materials

Past and Potential Hazards/Critical Facilities Map