

The Town of Brimfield

Local Natural Hazards Mitigation Plan

Adopted by the Brimfield Board of Selectmen on January 31, 2011

Prepared by:

The Brimfield Natural Hazards Mitigation Planning Committee

and

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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 Brimfield 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 hazard mitigation plan before a disaster occurs can save the community money and 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 Brimfield included the following tasks:

- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure 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.
- Identifying deficiencies in the current strategies and establishing goals for updating, revising, or adopting new strategies.
- Adopting and implementing the final Local Natural Hazards Mitigation Plan.

The key product of this process is the development of an Action Plan with a Prioritized Implementation Schedule.

Public Committee Meetings

December 15, 2009, 1:00-3:00 pm: Working committee held at Town Offices.

January 13, 2010, 1:00-3:00 noon: Working committee meeting held at 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.

Public Meetings with the Board of Selectmen

In 2005 the Board of Selectmen agreed to begin the process of developing a Local Hazard Mitigation Plan. Because PVPC was facilitating development of 32 local annex plans and a regional Hazard Mitigation Plan, Brimfield's plan was not finalized until 2009.

On January 31, 2011: The Board of Selectmen adopted the Local Natural Hazard Mitigation Plan. Meeting held at Brimfield Town Offices.

Participation by Public & Entities in Surrounding Communities

From 2007 to 2009 the Pioneer Valley Planning Commission sent a series of press release to all area media outlets to inform private citizens that the planning process for Brimfield and other Pioneer Valley communities' Hazard Mitigation Plan had commenced and that all residents of Brimfield were invited to attend plan development sessions. This press release (see Appendix E) resulted in a series of news articles that enhanced awareness of Brimfield's Hazard Mitigation Planning Process.

In addition to media outreach, all public meetings were posted at the field Town Hall in compliance with the Commonwealth of Massachusetts' open meeting law. Hazard Mitigation planning was discussed at meetings of the Western Region Homeland Security Advisory Council (WRHSAC) from 2003 to the present. The WRHSAC comprises representatives of emergency management, public works, emergency response, police and fire, ambulance services, regional transit and municipal government. Representatives are charged with updating their peers and professional associations on information covered in all meetings. Thus surrounding communities have been aware of Brimfield's hazard mitigation planning efforts.

On October 26, 2009 the Pioneer Valley Planning Commission sent a press release (see Appendix E) to all area media outlets to inform the public that a draft of Brimfield's Hazard Mitigation Plan had had been placed on PVPC's website and hard copies were available at PVPC's offices and Brimfield Town Hall and that all residents, businesses and other concerned parties of Brimfield and adjacent communities were encouraged to comment on the plan. The plans were made available in this manner for 30 days.

Citizens from adjacent municipalities were also encouraged to comment on Brimfield's plan.

2: LOCAL PROFILE

Community Setting

Brimfield is a small, rural town located in the southeastern corner of Hampden County in western Massachusetts. Comprised of five villages – Brimfield Center, East and West Brimfield, Fentonville, and Dingley Dell – it has managed to remain a rural, residential community of approximately 3,400 residents.

Brimfield is located approximately midway between Worcester and Springfield. Route 20 bisects the town (east to west), and crosses Route 19 (north to south) at the Town Center. Most residential development is clustered around the Town Center and around the town's major water bodies, Sherman Pond and Little Alum Pond. Commercial development is limited and is located primarily in the Town Center and along Route 20. Bordering communities are Monson, Wales, Holland, Sturbridge, Warren, and Palmer.

Brimfield is characterized by lakes, streams, and gentle, rolling landscapes. Steerage Rock, located on the ridge of Mount Waddaquaddock, was an important landmark during colonial times on the Bay Path Trail, which connected Boston with towns along the Connecticut River Valley. Brimfield is divided north to south by the borders of two major watersheds. The Chicopee River Watershed drains a large area of land in the western section of the town. The Quinebaug River Watershed, which encompasses the majority of Brimfield's land area, drains the central and eastern sections of the town. The total land area of Brimfield is approximately 22,588 acres. The majority of its land is undeveloped (82%) and consists mainly of large contiguous areas of native forestland.

Brimfield was the third town to be settled in Hampden County and was originally founded as a plantation, adjoining Springfield in 1701. In 1731 it was established as an independent town, covering an area which today is made up of Monson, Wales, and Holland. Though predominantly a farming community, industry during the colonial period included the manufacturing of pottery, bricks, and wool clothing. Throughout the 19th century, manufacturing activity increased, as grist mills, saw mills, and even a distillery were introduced into the community. During the early 1900's the agricultural operations declined and the town began evolving into a residential community. Since 1980, the population has increased by approximately 44%.

Today, Brimfield is host to the largest antique show and flea market in all of New England. Nationally renowned, this market is held three times a year on expansive grounds along Route 20. The Brimfield Antique and Collectable Show regularly attracts several thousand antique dealers and tens of thousands of buyers from around the world. There is no doubt that this tri-annual event has shaped the identity of the town.

Infrastructure

Brimfield's history and geography have been major factors in the development of the Town's infrastructure. As a primarily rural town, nestled among the hills and streams of

the area, local land use patterns have not required significant transportation networks or other public infrastructure.

Roads and Highways

The major artery running through town is Route 20, which was the main highway connecting Boston and Western Massachusetts prior to the construction of the Massachusetts Turnpike. While Route 20 runs East-West through the town, State Route 19 runs North-South, with the two main roads crossing at the Brimfield town center.

The Massachusetts Turnpike (I-90) crosses both northern corners of the town. Exits are in Sturbridge, 7 miles to the east, and Palmer, 8 miles to the west. Auto travel to Worcester and Springfield takes approximately 30 minutes, to Hartford one hour, and to Boston 90 minutes.

Rail

The CSX rail line runs through the northeastern corner of Brimfield's town limits. It is a well-used line, accommodating over thirty trains per day, both freight and passenger rail. It makes no stop in Brimfield.

Water and Sewer Service

The Town of Brimfield does not provide municipal water service to residents. Residential and commercial development is supplied through private deep well systems. There are currently no plans to establish a municipal water supply system in the town.

The Town of Brimfield does not provide municipal sewer service to residential and commercial development. Sewerage disposal and treatment is provided by private septic systems. There are currently no plans to establish a public sewer system and treatment facility in Brimfield.

Natural Resources

Brimfield's scenic rural landscape is often cited by residents as one of the main reasons they chose to live in the town. Due to limited development, the natural beauty of the town's landscape has remained unspoiled for centuries. A mixture of river valleys and wooded hills create the town's unique landscape character. Large parcels of open space lands, both public and privately owned, have maintained the town's rural character. Working farms and pastureland are scattered throughout the land and reflect Brimfield's history as an agricultural community.

Water Resources

Brimfield's plentiful water resources include numerous rivers and streams, several water bodies, and wetlands. The abundance of water resources is also reflected in the reliable availability of groundwater for private and public wells and also in the number of former water-driven mills. The Town's three major water bodies are Sherman Pond, Little Alum Pond, and the Brimfield Reservoir.

Brimfield possesses two major rivers and numerous streams and brooks. The Quaboag, one of the principal rivers of Massachusetts, forms the boundary between Brimfield and Palmer. A narrow valley bounds this stretch of the river on the Brimfield side which rises steeply to provide scenic views to the houses which increasingly line the road running just under the hillside. The Quinebaug River cuts through the southeast corner of Brimfield. The river was dammed in 1960 to create the East Brimfield Reservoir, a flood control project of the U.S. Army Corps of Engineers. Brimfield's major streams and brooks include: Mill Stream, Tufts Brook, Turkey Brook, Penny Brook, Bottle Brook, West Brook, East Brook, Mill Brook, Wales Brook, Mountain Brook, Treats Brook.

Brimfield also contains several large wetlands and numerous smaller wetlands scattered throughout the town.

Forests

Native woodlands are the principle vegetation type in Brimfield. Woodlands cover 17,803 acres of Brimfield, approximately 80 percent of the Town's land area. Types of woodlands in Brimfield include hardwood forests, coniferous forests, and mixed woods. Brimfield's woodlands provide habitat for numerous wildlife species and a form of sustainable economic development through timber harvesting.

Development

Several factors have played, and will continue to play, an important role in the development of Brimfield. 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 Quinebaug and Quaboag Rivers, their tributaries and floodplains; and the feasibility of private wells and independent septic. 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.

In its current zoning, Brimfield has four base zoning districts and one overlay districts. The base districts define the allowed uses and dimensional requirements in all parts of the town, while the overlay districts provide for additional restrictions in certain areas. The base districts include (1) Agricultural-Residential; (2) Business; (3) Industrial; and (4) Multiple-Dwelling District for Elderly.

In addition, the Town utilizes a Floodplain overlay district. This district is designated for areas within the 100-year floodplain. It includes strict regulations about what type of development is permitted and other relevant restrictions.

The Zoning Bylaw also establishes a Site Plan Approval procedure for most business, industrial, and commercial buildings within the Town. Site Plan Review allows the Planning Board the ability to review the development proposal to ensure that the basic safety and welfare of the people of Brimfield are protected.

Current Development Trends

Today, this small community is home to approximately 3,400 residents. The majority of Brimfield's 22,588 acres is undeveloped land, totaling nearly 18,569 acres. Residential land totaling 1,601 acres and agricultural land totaling 1,586 acres account for the majority of the remaining Town area.

Currently, development in Brimfield is somewhat encouraged by existing zoning to seek areas where the environmental conditions support such development. Although the town's existing zoning limits development in areas preserved for conservation, or in flood hazard areas, it does permit medium to high-density suburban development throughout much of its current open land. Another, perhaps more significant constraint dictating development in Brimfield is the feasibility of an on-site private well and septic treatment. Brimfield will continue to depend on individual wells and independent septic systems for the foreseeable future.

3: HAZARD IDENTIFICATION & ANALYSIS

Profiling the Natural Hazards

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

Each of these hazards was assessed by the Committee for location of occurrence, extent, previous occurrences, and probability of future events. (See Appendix C for sources, methodology.) This resulted in a ranking of hazard, by risk, see Table 3.1. More detailed descriptions of each of the points of analysis are included in the Identification and Vulnerability Assessment (below).

Table 3.1: Hazard Profiling and Risk Index Worksheet

Type of Hazard	Location	Extent	Previous Occurrences	Probability of Future Events	Hazard Risk Index Rating
Flooding (100-year)	Large	Limited	Yes	Low	2
Flooding (localized)	Medium	Minor	Yes(extensive)	Very High	1
Severe Snow/Ice Storms	Large	Limited	Yes	Very High	1
Hurricanes/Severe Wind	Large	Minor	Yes (minimal)	Very Low	4
Tornado/Microburst	Small	Catastrophic	No	Very Low	4
Wildfire/Brushfire	Small	Minor	Yes (minimal)	Very High	3
Earthquake	Large	Catastrophic	No	Very Low	4
Dam Failure	Small	Minor	No	Very Low	5
Drought	Small	Minor	No	Very Low	5
Man-Made Hazard: Hazardous Materials	Large	Limited	No	Very Low	3

Natural Hazard Identification and Vulnerability Assessment

The following is a description of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Brimfield. The *Past and Potential Hazards/Critical Facilities Map* (Appendix D) reflects the contents of this analysis.

Vulnerability Assessment Methodology

In order to determine estimated losses due to natural hazards in Brimfield, each hazard area was analyzed with results shown below. The data below was calculated using FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses*, August 2001.

Total value of all structures in Brimfield (2006): \$406,673,450

Median value of a home in Brimfield (2007): \$192,450

Average household size: 2.4 persons

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 damage calculations are rough estimate and likely reflect worst-case scenarios. Computing more detailed damage assessment based on assessor's records is a labor-intensive task and beyond the scope of this project.

Flooding

The average annual precipitation for Brimfield and surrounding areas in northwestern Massachusetts is 46 inches. There are three major types of storms that bring precipitation to Brimfield. 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. In addition to damage of buildings directly in the floodplain, development can result in a loss of natural flood storage capacity and can increase the water levels in water bodies. Flood levels may then increase, causing damage to structures not normally in the flood path.

The Floodplain Map for the Town of Brimfield 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 Brimfield, the main concentration of floodplain is within the southeastern corner of town – around the East Brimfield Reservoir and Pork Barrel and Green Ponds, following the Quinebaug River. An arm of this floodplain also stretches northeasterly toward the town center, following along Mill Brook. The other major floodplain area is around the

Quaboag River on the western border of town. Other smaller 100-year floodplains exist, including the area along East Brook, Sherman Brook, and Sherman Pond, as well as along Wales Brook, and along Hollow Brook.

Most of the floodways in Brimfield are narrow, fewer than 400 feet wide, because the town's hilly topography and rocky terrain do not permit the formation of broad floodplains. However, the major floodplain area around the Quinebaug River, especially near Pork Barrel Pond and Green Pond in the southeastern corner of town, is much wider.

The major floods recorded in Western Massachusetts during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. Brimfield has experienced many flooding events over the last decade. Generally, these small floods have had minor impacts, temporarily impacting roads and residents' yards.

As described above, flooding can happen on a range of scales. For the purposes of this analysis, the hazard has been broken into two separate types – **Flooding (100-year)** and **Flooding (localized)**. Risk and vulnerability assessment for these separate types of flooding are analyzed below.

Flooding (100-year base flood): Medium-High Risk

There are approximately 1,678 acres of land within the FEMA mapped 100-year floodplain and 715 acres of land within the 500-year floodplain within the Town of Brimfield. According to the Community Information System (CIS) of FEMA, there were 23 structures (all residential) located within the Special Flood Hazard Area (SFHA) in Brimfield as of July 1999, the most current records in the CIS for the Town of Brimfield. Therefore, a vulnerability assessment for a 100-year flood equals approximately \$4,426,350 million of damage, with approximately 57 people impacted.

At this time the Town of Brimfield has no repetitive loss properties as defined by FEMA's NFIP.

Location

Washington Road, Dunhamtown Palmer Road, Kings Bridge Road, East Hill Road, Cubles Drive, Five Bridge Road, Brookfield Road, and Old Palmer Road

- Roads are located within the 100 year flood area
- Roads would need construction and resurfacing if this area were to flood.
- 15 residential structures on Washington Road, 13 residential structures on Dunhamtown Palmer Road, 1 residential structure on Kings Bridge Road, 56 residential structures on East Hill Road, 30 residential structures on Cubles Drive,

26 residential structures on Five Bridge Road, 33 residential structures on Brookfield Road, 27 residential structures on Old Palmer Road and 1 commercial structure that have been affected or could be affected by a flood incident;

- Vulnerability assessment: Estimated 200 residential structures, * average assessed value of \$192,450 (assuming 100% damage to 100% of the structures) = \$38,490,000;
- Cost for repairing or replacing any power lines, telephone lines, and contents of structures are not included.

Extent

If Brimfield experiences a 100 year flood, the consequences could be catastrophic for property owners with homes located in the 100 year flood plain area. An estimated 200 residential structures could be affected with a 100% replacement cost over \$38 million.

Previous Occurrences

Searching the National Climactic Data Center, the FEMA declared disasters website, and local knowledge and records, yields no details of previous 100 year flood occurrences. The August 1955 flood caused some damage.

Probability of Future Events

The chance of a major flood in the 100-year flood plain is by definition 1% in any given year.

Flooding (localized)

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, Brimfield often experiences minor flooding at isolated locations due to drainage problems, or problem 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 incidents that could be affected in the future by heavy rain and runoff. Additionally, the vast majority of culverts throughout town tend to be impacted by beavers, so localized flooding can potentially occur at any culvert crossing.

To determine the vulnerability of the Town to localized flood events, the property within identified areas was visually analyzed using aerial photography (Pictometry), which allowed structures to be identified and tallied. Specific vulnerability assessments were estimated for sites which have been susceptible to localized flooding in the past, and are described below.

Location

Dunhamtown Palmer Road, Cubles Drive, Brookfield Road, Hastings Lane, East Hill Road, and Hall Road.

Extent

Minor local flooding in the spring—no significant property damage or threat to persons.

Previous Occurrences

Almost every year there is minor local flooding in the spring time. The August 1955 flood is the worst flood Brimfield has experienced in current residence's memory. The flood of August 18-23, 1955, was caused by Hurricanes Connie and Diane, which occurred days apart; the result was loss of life and extensive property damage from North Carolina to Massachusetts (Bogart, 1960, p. 12-16, 28-29). Hurricane Connie ended what had been an extended dry spell. During August 11-16, total rainfall ranged from 2 to 9 inches. This storm was followed by rainfall of from 2 to 19 inches from Hurricane Diane during August 17-20.

Probability of Future Events

Based on local knowledge and experience, there is a high probability of minor local flooding every spring and a small possibility of serious flooding.

Severe Snow/Ice Storm

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 also 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.

Location

Severe winter weather occurs regionally and therefore would impact the entire town.

Any severe winter weather incident can cause critical snow and ice hazards at several points along roads in the northern portion of Town. This is due to significant grade and a dangerous turns, causing driving difficulties and impairing visibility.

Extent

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.

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 factor in the area affected by the snowstorm, the snow, and the number of people living in the path of the storm. The NESIS score 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

Brimfield'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. In addition, during heavy snow years, accumulations can reach several feet deep. Brimfield's historic road network often creates some steep grades, dangerous intersections, or narrow throughways, sometimes making plowing difficult and causing snow and ice hazards.

- Brimfield 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 Brimfield 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.
- According to the on March 7, 2001 Brimfield and environs experienced a severe snow event including high winds, sleet and snow

Probability of Future Events

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

Hurricanes/Severe Wind

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 the atmosphere warms. Climate change research indicates that storms like hurricanes will become more intense and more frequent in the future. Severe wind can also occur in the absence of a hurricane, especially impacting mountain tops.

Location

All of Brimfield 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

Brimfield's location in Western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience some high wind events. During hurricanes or severe wind events, the Town has experienced small blocks of downed timber and uprooting of trees onto structures.

- Estimated wind damage: 5% of the structures with 10% damage, \$2,033,367;
- Estimated flood damage: 10% of the structures with 20% damage, \$8,133,469;
- Vulnerability assessment for a hurricane event (both wind and flood damages): \$10,166,836;
- Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included.

Previous Occurrences

In Massachusetts, sixteen hurricanes have had landfall since 1851, two of which impacted Western Massachusetts. These include Hurricane Carol in 1954 and Hurricane Gloria in 1985. Hurricanes are usually ranked category 1-5, using the Saffir-Simpson Scale, with category 5 hurricanes being the most severe. Both Hurricane Carol and Gloria were category 1-2 storms, meaning winds ranged from 74-110 mph with the potential for some roofing or window damage to buildings, damage to unanchored mobile homes, trees, or poor construction, and/or some minor flooding.

- 1938 hurricane was a major event - wind damage and flooding statewide.
- Power and phone lines - disruptions of services.
- Flooding/washing of evacuation routes.

Table 3.2 Major Non-Winter Storms to Affect Brimfield Area		
Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
Great Hurricane of 1938	1938	Unclear, 3 or 4
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 Brimfield (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 Brimfield in any given year is approximately 10 percent.

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. Microbursts and tornadoes are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of climate change from global warming.

Location

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

Extent

Because tornadoes and microbursts rarely occur in this part of the country, assessing damages is difficult. Furthermore, buildings have not been built to Zone 2, Design Wind Speed Codes. The entire Town of Brimfield is vulnerable.

- Tornadoes/microburst hazard estimates 20% damage to 10% of structures in Town;
- Vulnerability assessment estimates \$8,133,469 in damages;
- Estimated cost does not include building contents, land values or damages to utilities.

Previous Occurrences

No known tornados have touched down in Brimfield, but there have been several high-wind storms and hail events. In Western Massachusetts, the majority of sighted tornadoes have occurred in a swath directly over Brimfield, known as "tornado alley."

Fifteen incidents of tornado activity (all F2¹ or less) occurred in Hampden County between 1959 and 2005.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of tornadoes in Brimfield.

Wildfires/Brushfire

According to FEMA, there are three different classes of wildland fires: surface fires, ground fires and crown fires. 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 lightening. Crown fires move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions. While wildfires or brushfires have not been a significant problem in Brimfield, 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.

Hampden County has approximately 273,000 acres of forested land, which accounts for 67% of total land area. Forest fires are therefore a potentially significant issue. In Brimfield, approximately 78% of the town's total land area is in forest, or about 17,803 acres, and is therefore at risk of fire.

Location

Approximately 80% of Brimfield is forested so the entire town is at risk of wildfires.

Extent

The Brimfield Fire Department reports that it has records of only small brushfires covering less than a few acres at the most. All of the fires were permitted burns that got out of control.

However, moderate risk exists for potential wildfire incidents due to the extensive forest cover. Forested and agricultural areas with high fuel content have more potential to burn. In addition, it is often very difficult to access some of the locations to extinguish the brushfire.

Previous Occurrences

¹ F2 refers to the commonly used Fujita Tornado Damage Scale which ranks tornados F0-F5 depending on estimated wind speeds and damages, with F5 the most severe.

Illegal brushfires are somewhat common in Brimfield, but the vast majority are small and quickly contained. According to the Brimfield Fire Department, there are approximately 12 unauthorized burns (or brushfires) per year, on average. As a point of comparison, approximately 1,000 burn permits are issued annually.

There is no record, authenticated or anecdotal, of wildfires in Brimfield.

Probability of Future Events

Based upon the past events, it is reasonable to say there is a low frequency of wildfires in Brimfield.

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. 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. 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.

Location

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

Table 3.3: New England Earthquakes (1924-2002)² magnitude 4.2 or higher		
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

² Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm

Table 3.4: New England States Record of Earthquakes ²		
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
Total Earthquakes in New England (1568-1989)		1,239

Extent

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.

- Moderate potential for damage in commercial corridor of Brimfield;
- Structures are mostly wood frame construction, so loss estimates predict 20% of town assessed value, not including costs for repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures;
- Vulnerability assessment estimates approximately \$81,334,690.

Previous Occurrences

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.

Tables 3.3 & 3.4 contain information regarding most of the earthquakes, including all of affecting New England, the significant ones. None have been noted to cause any damage in Brimfield or the surrounding area.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of major earthquakes in Brimfield (there have been no earthquakes over 4.2 on the Richter scale in nearly 100 years) while the possibility of a less severe earthquake or tropical storm affecting Brimfield in any given year is slightly less than 1 percent but these are unlikely to cause any significant damage.

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. 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. Most earthen dam failures occur when floodwaters above overtop and erode the material components of the dam.

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 four 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.
- Non-jurisdictional: The storage capacity of the impoundment and height of dam are such that they need not be regulated.

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.

Location

According to DCR and MEMA sources, as well as local knowledge, there are currently nine (9) dams³ in Brimfield. The follow table identifies the dams within the town as well as whether they are classified as low, significant, significant, non-jurisdictional or high hazard.

Dam name/ date built	ID	Owner	Purpose	Condition/last inspected	Hazard Risk
Wheeler Pond Dam (Mill Lane Road Dam)	MA00077	Town of Brimfield	Recreation	Fair/ 2009	Significant
Dean Pond Dam	MA00078	Commonwealth of MA/ DCR	Recreation	Fair/ 5-6-06	Significant
W. D. Cheney Dam	MA00076	Cheney Family Limited Partnership	Recreation	Unknown / Unknown	Low
Woodman Pond Dam	MA00529	Commonwealth of MA/ DCR	Recreation	Fair/ 5-22-06	Low
Dearth Hill Road Dam	MA02528	Commonwealth of MA/ DCR	Recreation	Fair/ 9-18-06	Low

³ It is difficult to track down accurate records of dams, as ownership and exact location is not clear. Furthermore, many very old dams listed in DCR records are not in existence anymore, according to local knowledge. This list is compiled from a combination of sources, and then verified by the Committee.

Little Alum Pond Dam	MA02713	Town of Brimfield	Unknown	Never inspected b/c the dam is too small to warrant inspection	Non-jurisdictional
Butler Dam	MA02716	Commonwealth of MA/ DCR	Unknown	Brach 9-18-06	Non-jurisdictional
Boys Club Dam	MA02712	Boys Club of Brimfield	Recreation	Breach/ Unknown	Non-jurisdictional
No name recorded	MA02714	Thomas & Sarah Scrivner	Unknown	Breach/ not regulated	Non-jurisdictional

Extent

The two dams assessed as “significant hazards” are in fair condition and are being monitored by the community.

If the Wheeler Dam failed, an estimated 29 residential structures and 7 commercial structures would be in jeopardy. Routes affected include: Palmer Road/Main Street, Wales Road, Haynes Hill Road, and Mill Road.

The Dean Pond dam is located away from structures and is not anticipated to cause damage to residences or commercial structures if it failed.

Previous Occurrences

The Wheeler Dam let go in the 1955 flood.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency of dam failure in Brimfield.

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.

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.

Location

A drought would affect all of Brimfield.

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.

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. Even so, there have been several years of drought-like conditions in Western Massachusetts: 1940-1952, 1980-1983, and 1995-2001. Furthermore, 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. Additionally, even minor droughts will increase the risk of wildfire, especially in areas of high recreational use.

Previous Occurrences

In Massachusetts, six major droughts have occurred statewide since 1930. 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.

Brimfield has had limited experience with severe drought conditions. In 1930, drought conditions caused urban areas to permit withdrawals at lower water levels, including from the Quaboag River in West Brimfield. The town doesn't anticipate any severe water shortages. However, because there is no (town-wide) public water supply, there is a risk of individual private wells drying up. There is some history of residents' wells drying up, mostly due to increased development nearby. Additionally, even minor droughts will increase the risk of wildfire, especially in areas of high recreational use.

Probability of Future Occurrences

Based upon the past events, it is reasonable to say that there is a low frequency of drought in Brimfield.

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 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. According to TRI, there are no industries currently releasing hazardous materials within Brimfield's town limits.

Brimfield relies on Springfield's HazMat team for responding to incidents involving hazardous materials through a mutual aid agreement. There is no history of any major

accidents involving some sort of oil or chemical spill, but transportation of chemicals and bio-hazardous materials by vehicle transport on Main Street is a concern. Small areas of hazardous materials storage increase the potential for future incidents.

Location

Two Tier II Hazardous Materials storage facilities are located in Brimfield and are included on the Past & Potential Hazards/Critical Facilities Map (Appendix D).

However, 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.

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, but given the relative lack of hazardous chemicals present in Brimfield the extent is likely to be limited.

Previous Occurrences

Available data dating from 1998-2003 shows zero releases of hazardous materials.

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low likelihood of hazardous chemical releases in Brimfield.

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 Brimfield has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Brimfield'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 Brimfield.
- 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 and evacuation routes potentially affected by hazard areas are identified in Table 4-1, following this list. The Past and Potential Hazards/Critical Facilities Map (Appendix D) 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
 - Primary: Brimfield Fire Dept.- 34 A Wales Rd. (Rt. 19)
 - Secondary: Congregational Church, 20 Main Street—working to establish an agreement with the Tantasqua Regional High School

- 2) Fire Station
Brimfield Volunteer Fire Department – 34A Wales Rd. (Rt. 19)
- 3) Police Station
Brimfield Police Department – 34A Wales Rd. (Rt 19)
- 4) Highway Department – 34 B Wales Rd
- 5) Emergency Fuel Stations
Highway Department – 34 B Wales Rd
- 6) Emergency Electrical Power Facility
Generators at school, Police/Fire and Highway Department. Several portable generators are also available-Highway Department, and all Fire trucks have portable generators on board
- 7) Emergency Shelters
Primary: Brimfield Elementary- 22 Wales Rd
Town Hall Annex - 23 Main St.
St. Christopher's Roman Catholic Church- 20 East Main St.
Congregational Church- 20 Main St
Hitchcock Free Academy- 2 Brookfield Rd. (Rt. 20)
- 8) Water Sources
Dean Pond, Woodman Pond, Dearth Hill Pond, Mill Pond, Lake Sherman Pond, Little Alum Pond, East Brimfield Reservoir
- 9) Transfer Station
Share with Wales (located in Wales)
- 10) Helicopter Landing Sites
Elementary School parking lot, N42 06.9 W 072 11.9
Open Field (Dunhamtown Palmer Road) N42 08.5 W072 16.2
Chenney's Orchard N42 09.2 W072 08.2
Linda's House N42 04.6 W072 11.7
Cemetary Roadway N42 06.3 W072 07.4
(Permitted anywhere feasible.)
- 11) Communications
Dearth Hill Rd, Champeau Road, Devils Lane and Route 20 town radio tower on steerage rock
- 12) Primary Evacuation Routes
Route 20 (Palmer Road, Main Street, Sturbridge Road)
Route 19 (Warren Road, Wales Road)
Local roads that are used in evacuation: Apple Road, Brookfield Road, Dunhamtown Palmer Road, East Brimfield Road, Holland Road, Monson Road,

Dunhamtown Brimfield Road, Little Alum Road, St Clair Road, Dearth Hill Road, Cubles Drive

Note- Route 90 passes through Brimfield but there is no access to it within Brimfield but the Town has two access gates for emergency use

13) Bridges/Culverts Located on Evacuation Routes

Bridges

<u>Evacuation Route</u>	<u>Crosses</u>	<u>Owner</u>	<u>Year Built</u>	<u>Year Rebuilt</u>
Route 20 (Sturbridge Road)	Mill Brook	Mass Highway	1955	NA
Route 19 (Wales Road)	Mill Brook	Mass Highway	1951	NA
Route 20 (Palmer Road)	Elbow Brook	Mass Highway	1938	NA

Culverts

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 Brimfield.

- 1) Problem Culverts
See attached list

Category 3 – Facilities/Populations to Protect

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

- 1) Elderly Housing/Assisted Living
Meadowbrook Acres Retirement Village- Lower Palmer Road/ Rte 20
- 2) Public Buildings/Areas
Public Library Main Street
Post Office- 1 Main Street
Senior Center -20 Main Street
- 3) Schools
Brimfield Elementary- 22 Wales Rd
- 4) Churches
St. Christopher's Roman Catholic Church- 20 East Main Street
Congregational Church- 20 Main Street
Bethany Charismatic Catholic Church- Dunhamtown Palmer Road
Friendship Baptist- 9 East Brimfield Holland Road
Kingdom Hall Jehovah's Witnesses, Old Palmer Road

- 5) Historic Buildings/Sites
See list attached
- 6) Apartment Complexes
Meadowbrook Acres Retirement Village, Lower Palmer Road/Rte 20
Colonial Park-Main Street
- 7) Employment Centers
Accellent Inc.- 68 Mill Lane
Brimfield Elementary School- 22 Wales Rd

Category 4 – Potential Resources

Contains facilities that provide potential resources for services or supplies.

- 1) Food/Water
Village Food Mart – Somers Road
Big Y Supermarket – 525 Main Street, East Longmeadow
Cumberland Farm, Main Street
- 2) Hospitals/Medical Supplies
Brimfield Ambulance Service- 34 Wales Road
No pharmacies
- 3) Gas
Sunoco/Drake Petroleum- Routes 19 And 20
Cumberland Farms- 3 Main St
County Line Hardware Exxon- 341 Sturbridge Rd.
- 4) Building Materials Suppliers
County Line Hardware– Sturbridge Road
- 5) Heavy & Small Equipment Suppliers
Town volunteers
- 6) Gravel Pits
Kibbe’s Gravel – Somers Road

Table 4.1: Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding (100-year)	Roads in 100 year flood plain		Dunhamtown Palmer Road, Cubles Drive, and Old Palmer Road
Flooding (localized)	Some roads in 100 year flood plain	none	Dunhamtown Palmer Road, Cubles Drive.
Severe Snow/Ice Storm	Whole town	Potentially all, but not likely	Route 20 (Palmer Road, Main Street, Sturbridge Road) Route 19 (Warren Road, Wales Road) Local roads that are used in evacuation: Apple Road, Brookfield Road, Dunhamtown Palmer Road, East Brimfield Road, Holland Road, Monson Road, Dunhamtown Brimfield Road, Little Alum Road, St Clair Road, Dearth Hill Road, Cubles Drive
Hurricane/Severe Wind		Potentially all, but not likely	Route 20 (Palmer Road, Main Street, Sturbridge Road)

			Route 19 (Warren Road, Wales Road) Local roads that are used in evacuation: Apple Road, Brookfield Road, Dunhamtown Palmer Road, East Brimfield Road, Holland Road, Monson Road, Dunhamtown Brimfield Road, Little Alum Road, St Clair Road, Dearth Hill Road, Cubles Drive
Wildfire/Brushfire	80% of the Town is forested, so the whole town is vulnerable, but the Town has never experienced a wildfire	Potentially all, but not likely	All—as above
Earthquake		Potentially all, but not likely	All—as above
Dam Failure	Residences along Palmer Road/Main Street, Wales Road, Haynes Hill Road, and Mill Road.		Palmer Road/Main Street, Wales Road.
Drought	n/a	n/a	n/a
Hazardous Materials	Routes 20 and 19		Routes 20 and 19

5: MITIGATION STRATEGIES

One of the steps of this Natural Hazard Mitigation Plan is to evaluate all of the town's existing policies and practices related to natural hazards and identify potential gaps in protection. Once these gaps in protection are identified, future mitigation strategies can be crafted and recommended. This is done by evaluating existing and future measures in comparison to the Town's goal statement for natural hazard mitigation.

Goal Statement

To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to natural disasters. 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.

For the extent of this analysis, the Committee reviewed the following Town documents:

- Zoning Bylaw
- Subdivision Regulations
- Brimfield Community Development Plan - Open Space and Recreation Element
- CEM Plan
- Other relevant Bylaws as identified (Fire Department Burn Permit Procedures, Building Code, etc.)

This section of the plan serves to identify current mitigation strategies and recommend future mitigation strategies. This is done both generally, and by hazard type.

General Mitigation Measures

Several of the recommended mitigation measures have multiple benefits because, if implemented, they will mitigate or prevent damages from more than one type of natural hazard. There are also some general mitigation measures that do not fall specifically under one hazard type, but could be put into place for facilitation of better natural hazard protection generally.

Brimfield's Comprehensive Emergency Management Plan (CEM Plan) is a general mitigation tool. Although the CEM Plan is focused on the procedural response to an emergency, it also includes detailed steps for preparedness, in addition to inventorying and organizing information.

Other recommendations for future general mitigation measures are included here:

- Continue municipal efforts to examine current notification system including feasibility of new siren warning system, internet radio system, or Reverse 911. Develop a preliminary project proposal and cost estimate.

Flooding

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town’s water bodies and waterways.

Current Mitigation Measures

The Town currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the Town’s zoning by-law, subdivision regulations, as well as a proposed stormwater management by-law. Relevant goals are included in the adopted Open Space and Recreation Plan. Infrastructure like dams and culverts are in place to manage the flow of water. These current mitigation strategies are outlined in the following table.

Existing Strategy		Description	Effectiveness	Potential Changes
Flood Control Structures		Seven dams.	effective.	
Culvert Replacement		Priority list of necessary culvert replacements and other construction projects to effectively manage flooding.	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 and wetlands are protected by strict regulations. Agriculture-Residential uses allowed by Board of Appeals.	Effective for preventing incompatible development within the flood prone areas.	
	Special Permit/Site Plan Approval	Proposed uses must meet requirements for protection of wetlands, floodplain, slopes, vegetation, erosion and sedimentation, etc.	Effective for preventing incompatible development.	
	Open Space Communities	Allows for clustering of development in order to protect open space.	Very effective, if used appropriately.	

Subdivision Regulations	Procedural Requirements	Preliminary and definitive plans must include proposed drainage layout.	Somewhat effective at protecting water bodies and other features.	
	Design Standards	Protection of Natural Features	Somewhat effective at protecting water bodies and other natural features	
		Clearing for Roads; Tree Planting Specifications	Effective at protecting tree cover.	
		Storm Drainage	Somewhat effective at preventing flooding.	
Brimfield Community Development Plan – Open Space and Recreation 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.	Effective in identifying sensitive resource areas, including floodplains. Encourages forest, farmland protection, help conserve the town's flood storage capacity.	Work to implement relevant action items in OSRP.	
National Flood Insurance Program Participation	As of 2006, there were 15 homeowners with flood insurance policies.	Somewhat effective, provided that the town remains enrolled in the National Flood Insurance Program.	The town has evaluated whether to become a part of FEMA's Community Rating System and determined it is not cost effective at this time.	

Future Mitigation Measures

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Seek funding to replace top priorities on culvert replacement list.
- Implement the goals and strategies of the Brimfield Open Space and Recreation Element of the Community Development Plan that deal with protection of floodplain, forests, and farmland.

Severe Snow/Ice Storm

Winter storms can be especially challenging for emergency management personnel. 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. Even though the storm has usually been forecast, there is no certain way for predicting its length, size or severity. Therefore, mitigation strategies must focus on preparedness prior to a severe snow/ice storm.

Current Mitigation Measures

The Town’s current mitigation tools and strategies focus on preparedness, with many regulations and standards established based on safety during storm events. These current mitigation strategies are outlined in the following table.

Note: 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 5-1 in the previous section can also be considered as mitigation measures for severe snow/ice storms.

Table 5-2: Existing Severe Snow/Ice Storm Hazard Mitigation Measures

Existing Strategy		Description	Effectiveness	Potential Changes
Zoning By-Laws	Use Regulations	Utilities must be placed underground.	Effective for preventing power loss.	Work with National Grid to facilitate underground utilities as allowed.
Subdivision Regulations	Design Specifications	Standards include street grade regulations (6% - 12% maximum); and intersection grade regulations.	Effective.	
	Utility Trenches	Electric and telephone lines shall be placed underground, where applicable	Effective for preventing power loss.	
State Building Code		The Town of Brimfield has adopted the Massachusetts State Building Code.	Effective.	
Backup Electric Power		The shelter has backup power, and several mobile generators	Very effective in case of power loss.	
Tree Management		List of dangerous trees created annually for National Grid.	Very effective, preventative collaboration.	

Future Mitigation Measures

Several potential changes to the Town’s current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Work with National Grid Electric Company to facilitate the underground placement of new utility lines in general and existing utility lines in locations where repetitive outages occur (as applicable).
- Participate in the creation of a Regional Debris Management Plan.

What is a Regional Debris Management Plan?

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.

Hurricanes/Severe Wind

Of all the natural disasters that could potentially impact Brimfield, 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). Even with significant warning, hurricanes can do significant damage – both due to flooding and severe wind.

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 5-1 can also be considered hurricane mitigation measures.

The high winds that oftentimes accompany hurricanes can also damage buildings and infrastructure. The Town is satisfied with the regulations in place to help minimize the extent of wind damages.

The Town's current mitigation strategies to deal with severe wind are equally applicable to wind events such as tornadoes and microbursts. Therefore, the analysis of severe wind strategies is coupled with this hazard.

Tornadoes/Microbursts

The location and extent of potential damaging impacts of a tornado are completely unpredictable. Most damage from tornadoes or microbursts comes from high winds that can fell trees and electrical wires, generate hurtling debris and, possibly, hail. 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. In addition, current land development regulations can also help prevent wind damages.

The following table outlines the Town’s existing mitigation strategies that help prevent wind damages, whether from hurricanes, tornadoes, microbursts, or any other event.

**Table 5-3: Existing Severe Wind Hazard Mitigation Measures
(Including Hurricane, Tornado, Microburst Hazards)**

Existing Strategy		Description	Effectiveness	Potential Changes
Zoning By-law	Use Regulations	Utilities must be placed underground.	Effective for preventing power loss.	Work with National Grid to facilitate underground utilities as allowed.
	Trailers	Restricts the usage of mobile homes or trailers as permanent living quarters.	Somewhat effective for preventing damage to susceptible structures.	
State Building Code		The Town has adopted the MA State Building Code.	Effective.	
Tree Management		List of dangerous trees created annually for National Grid.	Very effective, preventative collaboration.	

Future Mitigation Measures

Several potential changes to the Town’s current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Work with National Grid Electric Company to facilitate the underground placement of new utility lines in general and existing utility lines in locations where repetitive outages occur (as applicable).
- Participate in the creation of a Regional Debris Management Plan.

Wildfire/Brushfire

Although somewhat common, the vast majority of brushfires in Brimfield are small and quickly contained. However, as with any illegal fire or brushfire, there is always the risk that a small brushfire could grow into a larger, more dangerous wildfire, especially if conditions are right. Therefore, it is important to take steps to prevent wildfires and brushfires from turning into natural disasters.

Current Mitigation Measures

The following table identifies what the Town is currently doing to manage brushfires and makes some suggested potential changes and recommendations for decreasing the Town’s likelihood of being heavily impacted by a wildfire or brushfire.

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

Existing Strategy	Description	Effectiveness	Potential Changes
Zoning Bylaw: Site Plan Approval	Requires location and description of proposed water supply; Fire Department approval.	Effective.	
Subdivision Regulations: Preliminary/Definitive Plan	Fire Department reviews plan for response	Effective.	
Burn Permits	Residents must obtain burn permits, and personnel provide information on safe burn practices.	Somewhat effective.	Consider increasing enforcement of burning regulations, perhaps invoke penalties for offenders.
Public Education/ Outreach	The Fire Department has an ongoing educational program in the schools.	Effective.	

Future Mitigation Measures

Several potential changes to the Town’s current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Consider increasing education and enforcement of burn permits; including pre-season review of regulations in public outreach campaign and/or invoking penalties for offenders.

Earthquake

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.

Current Mitigation Measures

The Town’s most relevant existing mitigation measures are described in the following table.

Table 5-5: Existing Earthquake Hazard Mitigation Measures

Existing Strategy	Description	Effectiveness	Potential Changes
State Building Code	The Town of Brimfield has adopted the State Building Code.	Effective for new buildings only.	Evaluate older structures categorized as critical facilities to determine if they are earthquake resistant.
Debris Management Plan	A debris management plan could be developed.	Effective.	Consider participation in the creation of a Regional Debris Management Plan.

Future Mitigation Measures

Potential changes to the Town’s current strategies have been identified in the above table, and these are compiled below:

- Evaluate critical facilities to determine if they are earthquake resistant.
- Participate in the creation of a Regional Debris Management Plan.

Dam Failure

Dam failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. In addition, dam failure most often coincides with flooding, so its impacts can be multiplied, as the additional water has no where to flow.

Current Mitigation Measures

The only mitigation measures currently in place are the state regulations governing the construction, inspection, and maintenance of dams. This is managed through the Office of Dam Safety at the Department of Conservation and Recreation.

Table 5-6: Existing Dam Failure Hazard Mitigation Measures

Existing Strategy	Description	Effectiveness	Potential Changes
New Dam Construction Permits	State law requires a permit for the construction of any dam.	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).	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 for dams for which municipality is responsible.

Future Mitigation Measures

Recent changes in legislation have shifted some of the responsibility of dam safety onto dam owners. The Town recognizes the need to adjust to this change. Several potential changes to the Town’s current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Identify sources of funding for dam safety inspections for dams for which municipality is responsible.

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.

Current Mitigation Measures

Brimfield 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.

Table 5-7: Existing Drought Hazard Mitigation Measures

Existing Strategy	Description	Effectiveness	Potential Changes
Zoning Bylaw: Site Plan Approval	Requires adequate measures to prevent surface and ground water pollution, or changes.	Effective for protection water supply.	
Brimfield Open Space and Recreation Plan	Makes recommendations for protecting Brimfield’s water quality and supply.	Somewhat effective for raising awareness about protecting water quality, supply, and conservation.	Implement plan goals.

Future Mitigation Measures

Potential changes to the Town’s current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- In regards to the Brimfield Open Space and Recreation Plan, implement the goals and strategies dealing with protection of waterbodies.

Hazardous Materials

Hazardous materials are in existence throughout Town, and are constantly being moved on Brimfield’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 Brimfield has some regulations currently in place to mitigate the impacts of a hazardous materials disaster.

In addition, Brimfield is participating with 8 surrounding communities and the Quaboag Regional Emergency Management Committee (REPC) to look into hazardous materials transported through their communities.

Table 5-8: Existing Hazardous Materials Hazard Mitigation Measures

Existing Strategy	Description	Effectiveness	Potential Changes
Enforce DEP and other regulations governing hazardous materials		Somewhat effective	Consider revising Floodplain District bylaw to limit storage of hazardous materials/wastes (as defined by DEP).
Participate in sub-regional effort to identify issues pertaining to hazardous materials transport through town.	Quaboag REPC is launching a project.	Anticipated to be effective.	

Future Mitigation Measures

Potential changes to the Town’s current strategies have been identified in the above table, and these are compiled below:

- Consider revising Floodplain District bylaw to limit storage of hazardous materials/wastes (as defined by DEP).

6: PRIORITIZED IMPLEMENTATION SCHEDULE

Summary of Critical Evaluation

The Brimfield Hazard Mitigation Planning Committee reviewed each of the recommendation future mitigation measures identified, and used the following factors to prioritize mitigation projects:

- Ability to reduce loss of life
- 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 Brimfield 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.

Table 6.1: Prioritized Implementation Schedule – Action Plan

Priority	Mitigation Action	Responsible Department/Board	Proposed Completion Date	Funding Source/ Estimated Cost	Incorporation into Existing Plans
1	Seek funding to replace top priorities on culvert replacement list.	Highway Department, Emergency Management, SelectBoard	2015	HMGP	Capital Improvement Planning
2	Work to implement relevant action items in OSRP.	Conservation Commission, Planning Board, Select Board	2015	MA open space funds	OSRP
8	Work with National Grid Electric Company to facilitate the underground placement of new utility lines in general and existing utility lines in locations where repetitive outages occur (as applicable).	Select Board	ongoing	WMECO	
3	Participate in the creation of a Regional Debris Management Plan.	Highway Department, Emergency Management, SelectBoard	2015	Homeland Security	W. MA Regional Homeland Security plan
4	Consider increasing enforcement of burning regulations, perhaps invoke penalties for offenders.	Fire Department	ongoing	Local staff and volunteer time	
7	Evaluate critical facilities to determine if they are earthquake resistant.	Building Inspector, Emergency Management, SelectBoard	2016	unk	
5	Identify sources of funding for dam safety inspections for dams for which municipality is responsible.	Highway Department, Emergency Management, SelectBoard	2016	MEMA DCR	OSRP
6	Consider revising Floodplain District bylaw to limit storage of hazardous materials/wastes (as defined by DEP).	Conservation Commission, Planning Board, Select Board	2016	MA DLTA	OSRP

7: PLAN ADOPTION & IMPLEMENTATION

Plan Adoption

Upon completion, copies of the Draft Local Hazards Mitigation Plan for the Town of Brimfield were distributed to the town boards for their review and comment. A public meeting was held by the Brimfield Board of Selectmen to present the draft copy of the Brimfield 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 Board of Selectmen 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 Brimfield Local Natural Hazards Mitigation Plan will begin following its formal adoption by the Brimfield Board of Selectmen 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 Brimfield Natural Hazards Planning Committee will oversee the implementation of the plan.

Plan Monitoring and Evaluation

The measure of success of the Brimfield 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 Brimfield 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, will be responsible for seeing that the actions are implemented and will report on their progress at the annual plan review meetings. They will integrate recommendations in this plan into existing and future plans as appropriate.

Outreach to the public, surrounding communities, agencies, businesses, academia, non-profits, or other interested parties outside of the town of Brimfield 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 2014. The meetings of the committee will be organized and

facilitated by the Emergency Management Director or the Brimfield Board of Selectmen. The approved Brimfield Hazard Mitigation plan will be available for public review at the Town Hall and the public library as well as at the PVPC offices for ongoing public review and comment.

CERTIFICATE OF ADOPTION**BRIMFIELD, MASSACHUSETTS****Board of Selectmen****A RESOLUTION ADOPTING THE BRIMFIELD****HAZARDS MITIGATION PLAN**

WHEREAS, the Town of Brimfield established a Committee to prepare the Brimfield Hazard Mitigation Plan; and

WHEREAS, several public planning meetings were held between December, 2009 and March, 2010 regarding the development and review of the Brimfield Hazard Mitigation Plan; and

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

WHEREAS, a duly-noticed meeting of the Board of Selectmen, to which the public were invited, was held on 1-31, 2011 to formally approve and adopt the Brimfield Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Brimfield Board of Selectmen adopts the Brimfield Hazard Mitigation Plan.

ADOPTED AND SIGNED this JANUARY 31, 2011 (date).


Chair,
Brimfield, Board of Selectmen

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
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
National Oceanic and Atmospheric Administration: National Weather Service; Tauton, MA.....	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) Internet Resources

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://ftpwww.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
The Tornado Project Online	http://www.tornado-project.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.iaaa.iix.com/ndcmap.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 – 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
HMGP	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
BOH	Board of Health
LEPC	Local Emergency Planning Committee
EMD	Emergency Management Director
Con Com	Conservation Commission
EOC	Emergency Operations Center
CEM Plan	Comprehensive Emergency Management Plan
WMECO	Western Massachusetts Electric Company
HAZMAT	Hazardous Materials

Appendix C – Natural Hazard Profiling Methodology⁴

In order to adeptly profile each of the hazards, 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, Location of Occurrence, Extent of Impacts, Previous Occurrences, Probability of Future Occurrence, 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 as Table 3.1 (Section 3, page 7).

Location of Occurrence

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

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

Extent of Impacts

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

Extent of Impacts	Magnitude of Multiple Impacts
Catastrophic	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.
Critical	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.
Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.

⁴ Source: information adapted from Town of Holden Beach, NC Community-Based Hazard Mitigation Plan, July 15, 2003, and Hyde County, NC Multi-Hazard Mitigation Plan, Sept 2002; and the Massachusetts Emergency Management Agency (MEMA).

Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.
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Previous Occurrences

Whether or not previous hazard events had occurred is also included, with detailed descriptions of specific previous occurrences within the hazard identification and vulnerability assessments, if necessary.

Probability of Future Occurrence

The likelihood of a future event for each natural hazard was classified according to the following scale:

Table C.3: Frequency of Occurrence and Annual Probability of Given Natural Hazard	
Frequency of Occurrence	Probability of Future Event
Very High	70-100% probability in the next year
High	40-70% probability in the next year
Moderate	10-40% probability in the next year
Low	1-10% probability in the next year
Very Low	Less than 1% probability in the next year

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.

The Hazard Ratings are labeled as follows:

- 1 – High Risk
- 2 – Medium-High Risk
- 3 – Medium Risk
- 4 – Medium Low Risk
- 5 – Low Risk

Appendix D – Past & Potential Hazards/Critical Facilities Map

Appendix E – Documentation of the Planning Process

**Brimfield Hazard Mitigation Planning Committee
Meeting #1 December 15 , 2009 1-3 pm
Brimfield Town Offices
AGENDA**

1) Introduction & Purpose of Committee

2) What is Hazard Mitigation Planning?

3) Begin Review of Draft Plan

4) Identify Critical Facilities (to be shown on Base map)

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

and Evacuation Routes Potentially Affected By Hazard Areas

5. Hazards Analysis Methodology

- Identify Past Hazard Occurrences, Location and Damage Assessments
- Hazard Identification and Analysis Worksheet

6. Analyze Development Trends

Review local zoning districts. Identify planned and proposed subdivisions and other common developments. Is planned development at risk by natural hazards? Are there mitigation measures that can be taken to prevent loss of life, property damage, and disruption of governmental services and general business activities.

7. Review Vulnerability Assessment Methodology and Potential Loss Estimates

8. Schedule and Agenda for next meeting

TOWN CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23, A-C

**Brimfield Hazard Mitigation Planning Committee
Meeting #2, January 13, 2010 1-3 pm
Brimfield Town Offices
AGENDA**

1. Finalize Critical Facilities and Evacuation Routes Potentially Affected By Hazard Areas
2. Review Vulnerability Assessment Methodology and Potential Loss Estimates
3. Establish Mitigation Goals and Objectives
4. Finalize Revised Map of Critical Facilities
5. Final Review of plan
6. Affirm Action Plan of Hazard Mitigation Strategies

TOWN CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23, A-C

Appendix F – Public Outreach

PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE

December 14, 2007

Pre-Disaster Mitigation Plans Under Development

The Pioneer Valley Planning Commission is beginning the process of drafting pre-disaster mitigation plans for the Communities of Amherst, Belchertown, **Brimfield**, Chicopee, Cummington, Goshen, Granby, Huntington, Palmer, Southampton, Springfield, Brimfield, West Springfield, Westhampton, Williamsburg, and Worthington.

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.

Individuals interested in their community's Hazard Mitigation plan can contact PVPC to request information on their community's plan development. In 2006-2007, PVPC facilitated development of plans for 16 communities in Hampshire and Hampden counties. Following completion of this second round of 16 hazard mitigation plans, PVPC will be developing a regional Hazard Mitigation plan. 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. For additional information, please contact Catherine Miller at (413) 781-6045 or cmiller@pvpc.org.

PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE

June 30, 2008

Pre-Disaster Mitigation Plans Public Comment Period

The Pioneer Valley Planning Commission, in conjunction with local Hazard Mitigation Planning Committees, has produced drafts of Pre-disaster Mitigation Plans for the communities of Cummington, Palmer, Southampton, Brimfield and Westhampton. Residents, business owners and other concerned parties of the named municipalities as well as of adjacent communities are encouraged to comment on each and all of the plans. The plans are currently able to be viewed on the Pioneer Valley Planning Commission website (under Projects and Plans) and the websites of the municipalities, where possible. Paper copies of the plans may be obtained at the Pioneer Valley Planning Commission offices at 26 Central Street, West Springfield or at the individual City/Town Halls. The plans will be available for the next 30 days.

Over the upcoming months pre-disaster mitigation plans will be developed for Amherst, Belchertown, **Brimfield**, Chicopee, Goshen, Granby, Huntington, Springfield, West Springfield, Williamsburg, and Worthington and will also be available for public comment as they are developed.

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.

In 2006-2007, PVPC facilitated development of plans for 16 communities in Hampshire and Hampden counties. Following completion of this second round of 16 hazard mitigation plans, PVPC will be developing a regional Hazard Mitigation plan. Communities with approved plans are 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. For additional information, please contact Catherine Miller at (413) 781-6045 or cmiller@pvpc.org.



PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE
February 5, 2009

Pre-Disaster Mitigation Plans Public Comment Period

The Pioneer Valley Planning Commission, in conjunction with local hazard mitigation planning committees, has produced drafts of pre-disaster mitigation plans for the communities of Huntington, Worthington, Granby, and Goshen. Residents, business owners, and other concerned parties of these municipalities and adjacent communities are encouraged to comment on these plans, which are currently available for viewing on PVPC's website at www.pvpc.org (under Projects and Plans) and the websites of the municipalities, where possible. Paper copies of the plans may be obtained at the Pioneer Valley Planning Commission offices at 26 Central Street, West Springfield or at the individual city and town halls. The plans will be available for the next 30 days.

Starting this month pre-disaster mitigation plans will be developed for Amherst, Belchertown, **Brimfield**, Chicopee, Springfield, West Springfield, and Williamsburg, and will also be available for public comment as they are developed.

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.

PVPC has previously facilitated development of plans for 21 communities in the Hampshire and Hampden county areas. Following completion of all 32 local hazard mitigation plans, PVPC will be developing a regional hazard mitigation plan. Communities with approved plans are 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. For additional information, please contact PVPC's Catherine Miller at (413) 781-6045 or cmiller@pvpc.org.

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MEDIA RELEASE

CONTACT: Catherine Ratté, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE

October 26, 2009

Pre-Disaster Mitigation Plans Public Comment Period

The Pioneer Valley Planning Commission, in conjunction with local hazard mitigation planning committees, has produced drafts of pre-disaster mitigation plans for the communities of Amherst, Belchertown, Brimfield, Chicopee, Springfield, West Springfield, and Williamsburg. Residents, business owners, and other concerned parties of these municipalities and adjacent communities are encouraged to comment on these plans, which are currently available for viewing on PVPC's website at www.pvpc.org (under Projects and Plans). Paper copies of the plans may be obtained at the Pioneer Valley Planning Commission offices at 60 Congress Street, Springfield. The plans will be available for the next 30 days.

In addition, PVPC has produced a draft regional Hazard Mitigation plan for the Pioneer Valley, a copy of which is also available for public review and comment at www.pvpc.org.

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.

PVPC has previously facilitated development of plans for 25 communities in the Hampshire and Hampden county areas. Communities with approved plans are 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. For additional information, please contact PVPC's Catherine Ratté at (413) 781-6045 or cratte@pvpc.org.