

HAZARD MITIGATION PLAN UPDATE ANNEX FOR THE TOWN OF LISBON

Southeastern Connecticut Council of Governments Multi-Jurisdictional Hazard Mitigation Plan

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Prepared for:

TOWN OF LISBON
1 Newent Road
Lisbon, Connecticut 06351
(860) 376-3400
www.lisbonct.com

Prepared by:

MILONE & MACBROOM, INC.
99 Realty Drive
Cheshire, Connecticut 06410
(203) 271-1773
www.miloneandmacbroom.com

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This HMP annex update could not have been completed without the time and dedication of the following individuals at the local level:

Thomas Sparkman
1 Newent Road
Lisbon, CT 06351
(860) 374-3400
tsparkman@lisbonct.com

First Selectman, Local Coordinator

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1.0 INTRODUCTION

1.1 Purpose of Annex

The purpose of this HMP annex is to provide an update to the hazard risk assessment and capability assessment provided in the previous HMP, and to evaluate potential hazard mitigation measures and prioritize hazard mitigation projects specific to mitigating the effects of hazards to Lisbon. Background information and the regional effects of pertinent hazards are discussed in the main body of the Southeastern Connecticut Council of Governments (SCCOG) Multi-Jurisdictional Hazard Mitigation Plan. Thus, this annex is designed to supplement the information presented in the Multi-Jurisdictional HMP with more specific detail for Lisbon and is not to be considered a standalone document.

The primary goal of this hazard mitigation plan annex is to identify particular vulnerability to hazards and potential mitigation measures for such hazards in order to *reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources*. This includes the reduction of public and private damage costs. Limiting losses of and damage to life and property will also reduce the social, emotional, and economic disruption associated with a natural disaster.

1.2 Setting

Lisbon is a rural community in the north-central region of New London County that was settled as early as 1698 and incorporated in 1786. The community has since grown to a population of 4,069 as of the 2000 census. Additional growth over the next decade brought the total population of the town to 4,338 as of the 2010 census. The town is approximately 16.7 square miles in area and includes the village of Newent which is the Town Center. The Town is bordered by Norwich and Sprague to the west, Canterbury to the north, Griswold to the east, and Preston to the south.

Several major transportation corridors traverse the town. Major roads include Interstate 395, Route 12, Route 138, and Route 169. Rail lines that travel through the town include two tracks belonging to the Providence/Worcester line: One runs along the Quinebaug River from Norwich into Jewett City, and the other enters from Versailles (Sprague), travels just south of Newent, and then turns northeast to follow the Quinebaug River into Canterbury. The rail lines allow residents and goods to travel between communities throughout southeastern Connecticut and the eastern seaboard.

Major waterways include the Quinebaug River (which drains from Canterbury and forms the boundary of Lisbon with Griswold to the east and Preston to the south) and the Shetucket River (which drains from Sprague and forms the boundary of Lisbon and Norwich). The Quinebaug River reaches its confluence with the Shetucket River in southwestern Lisbon. Shipping is not conducted on these rivers due to the presence of dams downstream in Norwich.

1.3 Plan Development

The 2005 HMP and its annexes were developed through a series of meetings and the completion of written questionnaires, personal interviews, and workshops as described in the Multi-Jurisdictional HMP update. Since that time, the HMP has been available in local governmental offices and available to emergency personnel. Residents were encouraged to contact the First

Selectman with any concerns regarding emergency response or potential projects related to natural hazard damage.

Based on the existing plan, existing information, and hazards that have occurred since 2005, SCCOG determined that the following data collection program would be sufficient to collect data to update the Multi-Jurisdictional plan and each annex.

- ❑ The SCCOG issued a press release on November 20, 2011 announcing a public information meeting on the multi-jurisdictional HMP update. This press release was published in the *Norwich Bulletin and The Day*. This notice was also posted on the SCCOG website and the *Patch* (a popular internet newspaper). The public information meeting was held on December 13, 2011 at the SCCOG office.
- ❑ A data collection meeting was held with the on January 19, 2012 to discuss the scope and process for updating the plan and to collect information. The First Selectman represented the local planning team. The meeting focused on reviewing each section of the existing hazard mitigation plan and annex, critical facilities, and various types of hazards that have affected the town and that should be addressed in the update.
- ❑ The draft that is sent for State review will be posted on the Town website (<http://www.lisbonct.com/>) as well as the SCCOG website (<http://www.seccog.org>) for public review and comment. In addition, a hard copy will be made available in the SCCOG office in Norwich. A press release will announce the availability of the HMP for review. This will provide residents, business owners, and other stakeholders throughout the SCCOG region the opportunity to review and comment on a relatively complete draft with all annexes. Comments received from the public will be incorporated into the final draft where applicable following State and Federal comments.

The adoption of this HMP update by the Town of Lisbon will be coordinated by SCCOG and the First Selectman. The HMP update must be adopted within one year of conditional approval by FEMA, or the Town will need to update the HMP and resubmit it to FEMA for review. The adoption resolution is located in Appendix A of this annex.

1.4 **Progress Monitoring**

Following adoption, the First Selectman will continue to administer this HMP under the authority of the Board of Selectmen and will be the local coordinator of the HMP. The First Selectman will coordinate with responsible departments as listed in Table 11-1 and ensure that the recommendations of this HMP are considered or enacted. Refer to Section 1.8 of the Multi-Jurisdictional HMP for a description of how the local coordinator will perform progress monitoring. The majority of recommendations in this annex can be accomplished within or with only a slight increase in the operating budgets of the various departments. Projects that require capital improvements or additional funding will need to be approved by the Board of Selectmen.

The HMP will be on file with the First Selectman and at the Building Department to assist in guiding growth decisions. See Section 2.5 for recommendations related to integrating the findings of this HMP into other Town planning documents. The Town will encourage residents to contact the First Selectman with concerns related to natural hazards or emergency response via

the Town's website. Such announcements will also state that the HMP is available for public review at the Town Hall as well as available on the Town's and the SCCOG's website.

The Town of Lisbon will review the status of plan recommendations each year. The First Selectman will be in charge of overseeing recommended projects and coordinating an annual meeting with applicable departments (those listed in Table 11-1) and other interested departments. Refer to Section 1.8 of the Multi-Jurisdictional HMP for a list of matters to be discussed at the annual meeting, including a review of each recommendation and progress achieved to date, or reasons for why the recommendation has not been enacted. The First Selectman will keep a written record of meeting minutes and the status of the recommendations. These records of progress monitoring will form the basis for the next HMP update.

The Town of Lisbon understands that the multi-jurisdictional HMP and this annex will be effective for five years from the date of FEMA approval of the first SCCOG jurisdiction regardless of the date of adoption by the Town. The First Selectman will coordinate with SCCOG for the next HMP update which is expected to occur in 2016-2017.

2.0 COMMUNITY PROFILE

2.1 Physical Setting

The Town of Lisbon is located in the north-central section of the SCCOG. Elevations range from approximately 30 feet near the confluence of the Quinebaug and Shetucket Rivers to just over 380 feet in north-central Lisbon. Commercial development is concentrated along Route 12 with other commercial areas located sporadically throughout the town with other areas being predominantly rural.

Geology is important to the occurrence and relative effects of natural hazards such as earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in lands underlying Lisbon. Lisbon contains two bedrock types. The majority of Lisbon is underlain by the Tatnic Hill Formation, while a narrow band parallel to the town's eastern boundary is underlain by the Quinebaug Formation. Each of these formations consists primarily of gneiss and schist which are relatively hard metamorphic rocks. Two inactive faults lie beneath Lisbon. One fault is located in the southern portion of the town and is oriented northwest-southeast, while the second fault is located at the boundary between the two bedrock formations and is defined as a thrust fault that is likely Devonian or Ordovician in origin.

The Town's surficial geologic formations include glacial till and stratified drift. Refer to the Multi-Jurisdictional HMP for a generalized view of surficial materials. The majority of the Town is underlain by glacial till. Till contains an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. Areas adjacent to the Quinebaug River, the Shetucket River, Blissville Brook, and Old Stone Mill Brook have fairly extensive areas underlain by sand, sand and gravel or floodplain alluvium. The amount of stratified drift present is important as areas of stratified materials are generally coincident with floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present day streams and rivers. However, the smaller glacial till watercourses can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes and the likelihood of soil subsidence in areas of fill.

2.2 Land Use and Development Trends

According to the 2004 *Plan of Conservation and Development*, Lisbon was a rural community for most of its history. After World War II, the proliferation of the automobile and regional growth spurred Lisbon to become a bedroom community as the population of Lisbon doubled between 1950 and 1970. While the pace of growth slowed over the next two decades, the completion of Interstate 395 facilitated the creation of major commercial and industrial developments in the town such as a regional waste-to-energy facility and a regional commercial center.

Lisbon continues to be a relatively undeveloped residential community. The town center is located in the area referred to as Newent near the intersection of Routes 138 and 169. Several important buildings including the Town Hall, fire station and senior center are located in this area. Lisbon is also known for its historical sites such as the Bishop House Museum, Anshei Israel Synagogue, and the first railroad tunnel in America. Lisbon Meadows Park is near the town center with recreational fields for soccer and baseball and many hiking trails. According to the *Plan of Conservation and Development*, the Town's long term goal is to acquire 15% of all land area in Lisbon for open space.

The majority of housing units in Lisbon are single family homes (83%). Currently, approximately 37% of the area of Lisbon is developed or committed to a specific use such as municipal open space. The 2004 Plan identified more than 6,600 acres of land in Lisbon that is currently vacant or that may be capable of supporting additional development in the future. After accounting for zoning and development constraints such as steep slopes, wetlands, and floodplains, the 2004 Plan estimated that an additional 3,000 housing units could be constructed in the future, yielding approximately 8,000 additional residents. Such an increase would require a noticeable increase in municipal services particularly with regard to emergency services.

Local employment in Lisbon is approximately 800 non-agricultural jobs. These include construction and manufacturing, retail and wholesale, and service occupations. The most focused commercial area is located along Route 12 near Jewett City, but small commercial areas are also interspersed throughout the town.

Since the last HMP was written in 2005, development has been relatively slow due to the recent economic downturn. Approximately five to eight new subdivisions have been constructed over the past five years, with four additional subdivisions in the planning stages. A few single family homes have also been built. The net gain in housing units between 2005 and 2010 was 40. The most densely developed areas include the Kimball Road area near Canterbury and the area surrounding Blissville Pond which includes densely developed homes and a trailer park.

Commercial and industrial development has also been slow over the past five years. A new shopping center was completed on Route 12 in the last decade, and two new commercial developments are in the planning stages. No new industry has been developed in the past five years.

2.3 Drainage Basins and Hydrology

All land in the town eventually drains to the Shetucket River, although approximately half of the town first drains to the Quinebaug River. The northwestern corner of Lisbon drains to the Little River in Sprague via Old Stone Mill Brook. The Little River is a major tributary of the Shetucket River. The northern section of Lisbon drains via an unnamed stream to Cory Brook in Canterbury. Cory Brook is a tributary of the Quinebaug River. Other notable bodies of water found throughout Lisbon include Aspinook Pond (a major impoundment of the Quinebaug River), Taftville Pond (an impoundment of the Shetucket River), the lower reach of the Little River in western Lisbon near Versailles, Lisbon Brook in the southeastern portion of town, and Blissville Brook, and Blissville Pond in the southwestern portion of Lisbon.

The headwater streams of the Shetucket River are heavily flood controlled such that widespread flooding is no longer an issue along this watercourse. Three significant dams are located on Shetucket River in Norwich at Occum, Taftville, and Greenville, but they do not offer any flood abatement capacities. The eastern edge of the Taftville dam is located in Lisbon, while the Occum dam is located just upstream of Lisbon.

Similar to the Shetucket River, the upper reaches of the Quinebaug River are also heavily flood controlled such that flooding along this watercourse is also not an issue in Lisbon. Aspinook Pond is formed by a significant dam utilized for hydropower that spans from Lisbon into Jewett City.

2.4 Governmental Structure

Lisbon is governed by a Town Meeting and Board of Selectmen form of government. The authority of Town officials is granted by Connecticut General Statutes. The Town Meeting is the legislative body of the Town and the Board of Selectmen is responsible for the administration of Town policies. The First Selectman is the chief elected official and is responsible for the day-to-day administration of the Town. The First Selectman serves as Highway Superintendent overseeing the building and maintenance of all roads including plowing and sanding in the winter. In addition to the First Selectman, the Building Department, Public Works, and the Volunteer Fire Department also have an active role in hazard mitigation.

The Town of Lisbon has several commissions that can take an active role in hazard mitigation, including the Conservation Commission, the Planning and Zoning Commission, and the Zoning Board of Appeals. Departments and commissions common to all municipalities in SCCOG and were described in Section 2.8 of the Multi-Jurisdictional HMP. More specific information for the departments and commissions of the Town of Lisbon is noted below:

- ❑ The Building Official reviews plans for new development and significant redevelopment and inspects the work to ensure it meets current building codes. The Town of Lisbon utilizes the Connecticut Building Code.
- ❑ The Conservation Commission is the Inland Wetlands Regulatory Agency for the Town of Lisbon and reviews plans for compliance with said regulations and maintains the Town's inland wetlands map.
- ❑ The Planning & Zoning Commission reviews land use applications, zoning regulation amendments, planning and development projects, and grant opportunities to ensure that development and growth in the town is consistent with existing land use, environmental policy, and the objectives of the *Plan of Conservation and Development*. They are assisted by the Zoning Enforcement Officer. SCCOG provides town planning services.
- ❑ The Public Works Department consists of a Road Foreman and several staff overseen by the First Selectman. They provide services including safe, efficient and well-maintained infrastructure of roads, bridges, snow removal and deicing on roads; tree and tree limb removal in rights-of-way; and maintain and upgrade storm drainage systems to prevent flooding caused by rainfall.
- ❑ The Lisbon Volunteer Fire Department provides fire suppression, fire prevention, rescue, emergency medical services, and hazardous materials response services to the town. Patients are transported to Backus Hospital in Norwich.
- ❑ The Zoning Board of Appeals reviews projects that were denied by the Planning & Zoning Commission or were cited by the Zoning Enforcement Officer, as well as those that require variances.

The roles of Town departments have not changed since the time of the previous HMP. Thus, the Town of Lisbon remains technically, financially, and legally capable of implementing mitigation projects for natural hazards to the extent that funding is available.

2.5 Review of Existing Plans and Regulations

The Town has several Plans and regulations that suggest or create policies related to hazard mitigation. These policies and regulations are outlined in the Emergency Operations Plan, *Plan of Conservation and Development*, Zoning Regulations, Subdivision Regulations, and Inland Wetland Regulations. The Zoning and Subdivision Regulations were both recently updated to incorporate new NFIP requirements.

Emergency Operations Plan

The Town has an Emergency Operations Plan (EOP) that is updated and certified by the First Selectman annually. This document provides general procedures to be instituted by the First Selectman and/or designee and the Fire Department in case of an emergency. The Town has a volunteer Emergency Management Director who is only activated during emergencies. Emergencies can include but are not limited to natural hazard events such as hurricanes and nor'easters. The EOP is directly related to providing emergency services prior to, during, and following a natural hazard event.

Plan of Conservation and Development (2004)

The *Plan of Conservation and Development* was adopted in 2004 with contributions from local boards and commissions, citizens, and citizen groups. The Plan did not specifically consider the potential impacts of natural hazards, but did outline areas that could not be built upon due to natural features that restrict development. The purpose of the plan is to balance growth with maintaining the quality of life that citizens within the Town embrace. The current plan notes that future development will seek to strengthen the Newent area, with residential development occurring on large lot sizes outside of this village area. The *Plan of Conservation and Development* further suggested a number of recommendations related to natural hazard mitigation of which many have been enacted such as the open space program.

Zoning Regulations

The Zoning Regulations of the Town of Lisbon were last updated in July 2011. The recent updates include updated NFIP regulations associated with the recent release of the FIS and DFIRM for New London County in July 2011 and include a variety of preventative regulations pertinent to mitigating flooding hazards. These regulations are applied during the permitting process for new construction and during substantial improvement of existing structures. The regulations meet the minimum requirements required under the NFIP.

In addition to the Special Flood Hazard Area Regulations (Section 10.15), the Zoning Regulations contain several other entries applicable to hazard mitigation. For example, flat roofs are not allowed in business village districts for certain commercial facilities. The buildable areas of any lot excludes wetlands, watercourses, water bodies, the 1% annual chance floodplain, wetland buffer areas (50 foot minimum), detention areas, slopes in excess of 20%, rock or ledge outcrops, easements, rights-of-ways, and other setback areas, reducing the potential development density. Certain types of development, such as commercial and industrial areas, must locate utilities underground. Mobile home upgrades must have sloped shingled roofs and meet all

Connecticut Building Codes for mobile homes, providing an additional level of protection for these vulnerable structures.

Subdivision Regulations

The Subdivision Regulations of the Town of Lisbon were last updated in July 2011. Several of the design standards are pertinent to hazard mitigation, including encouraging the creation of through streets, avoidance of steep grades for new roads, and that new facilities are designed to minimize flood damage. New developments are also required to set aside open space and to place utilities underground.

Inland Wetland and Watercourses Regulations

The Inland Wetlands and Watercourses Regulations in the Town of Lisbon were last amended on April 1, 2012. The regulations require a permit for certain regulated activities which take place within 100 feet of a wetland or watercourse or that may impact a wetland or watercourse. These regulations build on the preventative flood mitigation provided by the Zoning and Subdivision regulations by preventing fill and sedimentation that could lead to increased flood stages.

2.6 Critical Facilities, Sheltering Capacity, and Evacuation

The Town of Lisbon considers several facilities to be critical to ensure that emergencies are addressed while day-to-day management of the Town continues. Critical facilities are presented on figures throughout this annex and summarized in Table 2-1. No critical facilities are located within the 1% annual chance floodplain. These facilities are described in more detail below.

**TABLE 2-1
Critical Facilities**

| Facility | Address or Location | Emergency Power? | Shelter? | In 1% Annual Chance Floodplain? |
|----------------------------------|---------------------|------------------|----------|---------------------------------|
| Lisbon Central Elementary School | 15 Newent Rd | ✓ | ✓ | |
| Public Works Garage | 1 Newent Rd | | | |
| Town Hall | 1 Newent Rd | | | |
| Volunteer Fire Department* | 7 Newent Rd | ✓ | | |

*Emergency Operations Center

Public Works Garage

The Town Public Works garage and Resident State Trooper’s office are both located in a single building behind Lisbon Central School. It is used for vehicle and equipment storage and the facility also houses the Town’s salt and sand supply. The POCD notes that the central location of this facility is important but that space constraints and shared access with Lisbon Central School make clear the need to relocate some or all of these important municipal functions.

Town Hall

The Lisbon Town Hall houses records, plans, and other documents important for administering the Town. It does not have emergency backup power.

Lisbon Volunteer Fire Department

The Lisbon Fire Department provides fire suppression, rescue, and emergency medical services. The Fire Department operates out of a station in Newent this is part of the municipal complex. This building also includes the Town's Emergency Operations Center and has a generator for emergency power. The Fire Department utilizes Blissville Pond to fill and empty the fire trucks of water.

The POCD notes that the fire station is beginning to experience space shortages for the purposes of training programs and records management. Additionally, although adequate for the equipment and supplies currently in use, additional or larger new equipment as the community grows will require expansion or relocation of the fire station.

Shelters

Lisbon Central Elementary School is the Town's shelter and can hold approximately 150 people. The school has a generator and the shelter is American Red Cross certified. The Town does not have a secondary or backup shelter. If additional space was needed, the Town would send people to a regional American Red Cross Shelter.

Communications

The Town's communication capability is considered adequate for most circumstances. Emergency communications are good except during long power outages. The Town relies on radios, cellular phones and email for much of its communications. The Town is also part of the CT Alerts "Everbridge" Reverse 9-1-1 system for emergency notification of residents. Typically, Town personnel post notifications on bulletin boards and on the Town website prior to major storms and also utilize local media (newspapers, television, and radio) to pass information during and after storms. Residents can also contact the First Selectman directly with comments related to natural hazards or emergency response, or can use a contact tool on the Town's website.

Communication was difficult during the power outages following Hurricane Irene and Winter Storm Alfred due to downed trees and power outages at the nearby cellular towers. Town personnel made personal contact with residents by going door-to-door during the outage to pass along necessary information.

Health Care and Senior Living Facilities

The Town does not have any convalescent or nursing homes, senior homes, or complexes. The Town has one doctor's office and one physical therapy center, but no walk-in medical facilities. None of these facilities are considered by the Town to be critical facilities.

Evacuation Routes

Lisbon does not have a published evacuation map; residents utilize State roads or local roads to exit the town. The highest capacity egress routes from Lisbon include Interstate 395 into Norwich or Griswold, Route 138 into Griswold or Sprague, Route 169 into Norwich or Canterbury, and Route 12 into Norwich or Griswold.

Additional Groups

Lisbon has one in-home day care but no commercial day-care centers. These are not considered to be critical facilities.

In addition to Town departments, the American Red Cross and the Salvation Army provide services related to mitigation and emergency management. The American Red Cross and the Salvation Army help provide shelter and vital services during disasters and participate in public education activities.

2.7 Status of 2005 Plan Recommendations

The previous HMP included several general recommendations related to mitigating natural hazards. The recommendations and a summary of actions taken over the past several years towards those actions are listed below. Where progress was indicated, the progress was paid for out of the Town's operating budget.

- ❑ Develop a Flood Audit Program – Structures have not been directly impacted by flooding in recent memory so this is not a significant issue for the Town. Flooding is limited to poor drainage or nuisance flooding such as homes near hillsides that require basement pumpouts. The Town is aware of these areas and a formal program is not proposed. *This recommendation will not be pursued further.*
- ❑ Evaluate the Risk Exposure of the Mobile Home Park near Blissville Pond – This HMP update considers the risk of the mobile home parks in Lisbon to natural hazards. These areas were a concern during the March 2010 storms but they did not flood. Mobile homes are at an elevated risk of wind damage due to their less-resilient construction as compared with single family homes. *This recommendation is evaluated in this plan update and does not need to be carried forward.*
- ❑ Evaluate the Hazard Resistant Nature of Critical Facilities – This is ongoing as part of the Town's annual EOP update. No critical facilities are believed to be more or less susceptible to natural hazards. *This recommendation remains valid but has been subsumed into the EOP update.*
- ❑ Comprehensive Evaluation of Emergency Communication Capabilities Throughout the Town – This is ongoing along with the annual EOP update. The Town has communication capability with surrounding communities. *This recommendation remains valid.*
- ❑ Review of Transportation Facilities to Identify Critical Risks – This is ongoing annually as part of the Emergency Operations Plan update. The Town had access issues during Hurricane Irene

due to the many downed trees and power lines. *This recommendation remains valid but has been subsumed into the EOP update.*

- ❑ Identify Appropriate Improvements to Traffic Infrastructure and Emergency Response Training and Equipment – This is ongoing as part of Fire Department training and the annual EOP update. *This recommendation remains valid but has been subsumed into the EOP update.*
- ❑ Implement a Reverse 9-1-1 System to Automatically Call Telephones Throughout Town, Relaying Important Information During an Emergency – The Town is part of the statewide CT Alerts “Everbridge” System. *This recommendation has been completed and the Town will continue to encourage residents to participate.*
- ❑ Distribute or Post Public Information Regarding Hazards in the Town – Notifications are posted on bulletin boards at town buildings and on the Town website. Local media is utilized to pass information during storms, including newspaper, television, and radio. Town employees made personal contact with residents during the recent power outages by going door-to-door. *This recommendation remains valid and there are additional opportunities such as providing brochures at the Town Hall and posting of preparedness information on the Town’s webpage.*
- ❑ Evaluate Emergency Shelters, Update Supplies, and Check Communication Equipment – This is done at least quarterly or following any use of the facilities. *This recommendation remains valid.*
- ❑ Maintain Emergency Personnel Training as Well as Maintaining and Updating Emergency Equipment and Response Protocols – Training is performed regularly, with equipment upgrades occurring to the extent the budget will allow. *This recommendation remains valid.*
- ❑ Evaluate and Consider Burying Power Lines Underground and Away from Possible Tree Damage – This is only considered for new projects. Utilities in certain areas are required to be located underground per the Zoning Regulations. There are no plans to move existing utilities underground. *This recommendation remains valid for future developments and should be placed into an ordinance for new development or substantial redevelopment regardless of zoning.*
- ❑ Complete an Earthquake Survey of all Critical Facilities and Infrastructures –A formal survey is not proposed due to the infrequent nature of this hazard. *This recommendation will not be pursued further.*
- ❑ Complete Catch Basin and Culvert Surveys to Identify Structures in Need of Maintenance or Replacement – Inspections are performed annually each spring by Public Works. Public Works also inspects catch basins in floodprone areas for blockages prior to major storms. *This recommendation remains valid.*
- ❑ Complete a Survey of Fire Hydrants to Assess Vulnerabilities and Capabilities for Fire Protection – Fire protection capabilities are reviewed at least annually with the EOP update. Fire flow pressures are very good where hydrants are provided by public water companies, and dry hydrants are placed throughout the town. The Town believes that its fire protection level is adequate. *This recommendation remains valid.*

3.0 INLAND FLOODING

3.1 Setting / Historic Record

Flooding is the primary hazard that impacts the town each year as documented in the previous HMP. While riverine flooding is a concern, nuisance flooding and poor drainage have historically been the primary flooding issues at several locations in the town. Flooding is typically caused by heavy rainstorms, but can also be caused by relatively light rains falling on frozen ground. Flooding of roadways is more common than damage to structures. Nuisance flooding (basement flooding) is the most common type of flooding in Lisbon.

The March 2010 storms produced the most widespread flooding in Lisbon since the last HMP, causing some roadway flooding and a significant amount of nuisance flooding as noted below. Structures were not directly affected by overbank flooding, including those located in the 1% annual chance floodplain.

- ❑ Drainage systems on Bundy Hill Road, Ames Road, Ice House Road, and Lower Blissville Road that pass Blissville Brook are considered by the Town to be undersized. These roads all overtopped during the March 2010 floods.
- ❑ Homes in the Pleasant View Cove area adjacent to Aspinook Pond came close to flooding but did not flood.
- ❑ While the Town does not have records of the exact number of residents who needed their basements pumped out by the Fire Department's mobile equipment, the Town recalls that the number of homes affected exceeded any other storm in recent memory. Many homes that were affected had never needed pumpouts previously.

The October 2005 floods caused less flooding than the March 2010 storms. Many of the same areas were affected, including Bundy Hill Road and Ames Road.

3.2 Existing Programs, Policies, and Regulations

The Town attempts to mitigate inland flood damage and flood hazards by utilizing a wide range of measures including restricting activities in floodprone areas, replacing bridges and culverts, promoting flood insurance, acquiring floodprone structures, maintaining drainage systems, through education and outreach, and by utilizing warning systems. Many mitigation measures are common to all hazards and therefore were listed in Section 2.6. Additional mitigation measures have been put in place by the State and Federal government upstream of Lisbon that helps to reduce flooding downstream, including several protection projects.

Flood Control Structural Projects

As noted in Section 3.4.4 of the Multi-Jurisdictional HMP, several significant flood control projects have been constructed by the USACE upstream of Lisbon on the Shetucket and Quinebaug Rivers. These flood protection projects were completed in the 1950's and 1960's and greatly reduce the incidence and severity of flooding in Lisbon.

Bridge Replacements, Drainage, and Maintenance

The Department of Public Works cleans and inspects catch basins and culverts at least annually or more often if problems are noted. When flooding occurs, the Public Works department or the Fire Department would handle the complaints depending on the location. For example, Public Works would inspect bridges and culverts and erect barricades to close roads, while the Fire Department responds to calls requesting help for flooded basements. The Town uses a message system on its webpage and fields phone calls related to drainage complaints. Drainage complaints are directed to the First Selectman.

Regulations, Codes, and Ordinances

The Town of Lisbon has planning and zoning tools in place that incorporate floodplain management. The Town has recently updated its flood protection regulations in both its Zoning and Subdivision Regulations in June 2011 as noted in Section 2.5. The Town utilizes the 1% annual chance floodplain as defined by FEMA to regulate floodplain and floodway activities and requires 100 percent compensatory storage for any encroachment in the floodplain. The Town also requires new construction or substantial renovations to be located at an elevation greater than the base flood elevation.

The Town's Subdivision Regulations require that adequate drainage be provided to reduce exposure to flood hazards and that buildings and utilities be located to minimize the effects of flood damage. Regulations covering development in or within 100 feet of inland wetland or watercourse areas were last updated in 2012 and are enforced by the Town's Conservation Commission. The Town has also adopted a map prepared by the Conservation Commission which regulates building in wetland areas.

Acquisitions, Elevations, and Property Protection

The Town of Lisbon has not performed acquisitions or elevations of floodprone property. Property protection has focused instead on preventive measures and maintaining and upgrading drainage systems.

Flood Watches and Warnings

The First Selectman and the Fire Department access weather reports through the National Weather Service and local media. Residents can also sign up for the Statewide Reverse 9-1-1 to receive warnings when storms are imminent. The Town can telephone warnings into potentially affected areas using this system.

3.3 Vulnerabilities and Risk Assessment

This section discusses specific areas at risk to inland flooding within the Town. Inland flooding due to nuisance flooding or poor drainage is most common type of flooding experienced by the Town, although roadway inundation also occurs during more severe events.

3.3.1 Vulnerability Analysis of Areas along Watercourses

Major inland watercourses and water bodies in Lisbon have the 1% annual chance floodplain defined by FEMA. The Shetucket River, the Quinebaug River, and Blissville Brook are mapped as Zone AE, indicating that flood elevations are available. The headwaters of Blissville Brook are mapped as Zone A. These watercourses do not typically present flooding hazards to residents, buildings, or roadways, although it is understood that an extreme event could cause structures and roadways to flood. Refer to Figure 3-1 for the location of the 1% annual chance floodplains within Lisbon. In addition, ice jams have not previously been an issue along the rivers in Lisbon.

Lisbon has several major transportation routes including Routes 12, 138, and 169. The DFIRM mapping suggests that Route 12 near the Shetucket River, Route 138 (Town House Road) just west of Newent, and the crossings of Blissville Brook on Route 169 could be affected by extreme flooding. In addition to these major roads, several minor roads in the Town could also be impacted by an extreme flooding event, including Paper Mill Road from Versailles Pond (Little River) on the border with Sprague; and Mell Road, Ames Road, Schoolhouse Road, Bundy Hill Road, Ice House Road, and Lower Blissville Road along Blissville Brook. As noted in the previous HMP, a section of Phillips Road near the Quinebaug River has also flooded in the past. While floodplains are mapped adjacent to the two railroad lines, these structures are elevated and not considered to be at risk of overtopping.

3.3.2 Vulnerability Analysis of Private Properties

As noted in Table 3-4 of the Multi-Jurisdictional HMP, a total of 49 structures in Lisbon appear to be located in the 1% annual chance floodplain. A total of 23 are located near the Quinebaug River, 18 are located nearby the Shetucket River, and eight are located along Blissville Brook and its tributaries. The majority of these structures are residential but some commercial structures are also located in the floodplain.

Town personnel indicate that structures do not typically get flooded by overbank flooding. Recall that significant flood control structures have been created upstream of Lisbon to mitigate flooding along the Quinebaug and Shetucket rivers. Repetitive flood insurance claims have not been filed at any properties in Lisbon over the past twenty-five years. Nuisance (basement) flooding is an issue particularly during major rainstorms, but the structures affected usually do not lie within the 1% annual chance floodplain.

The Lisbon Mobile Home Park is located on the eastern edge of Blissville Pond. Several mobile homes are located on periphery of the 1% annual chance floodplain associated with Blissville Pond. While the trailer park has not flooded over the past several years, the previous HMP notes that this park has been evacuated due to flooding in the past.

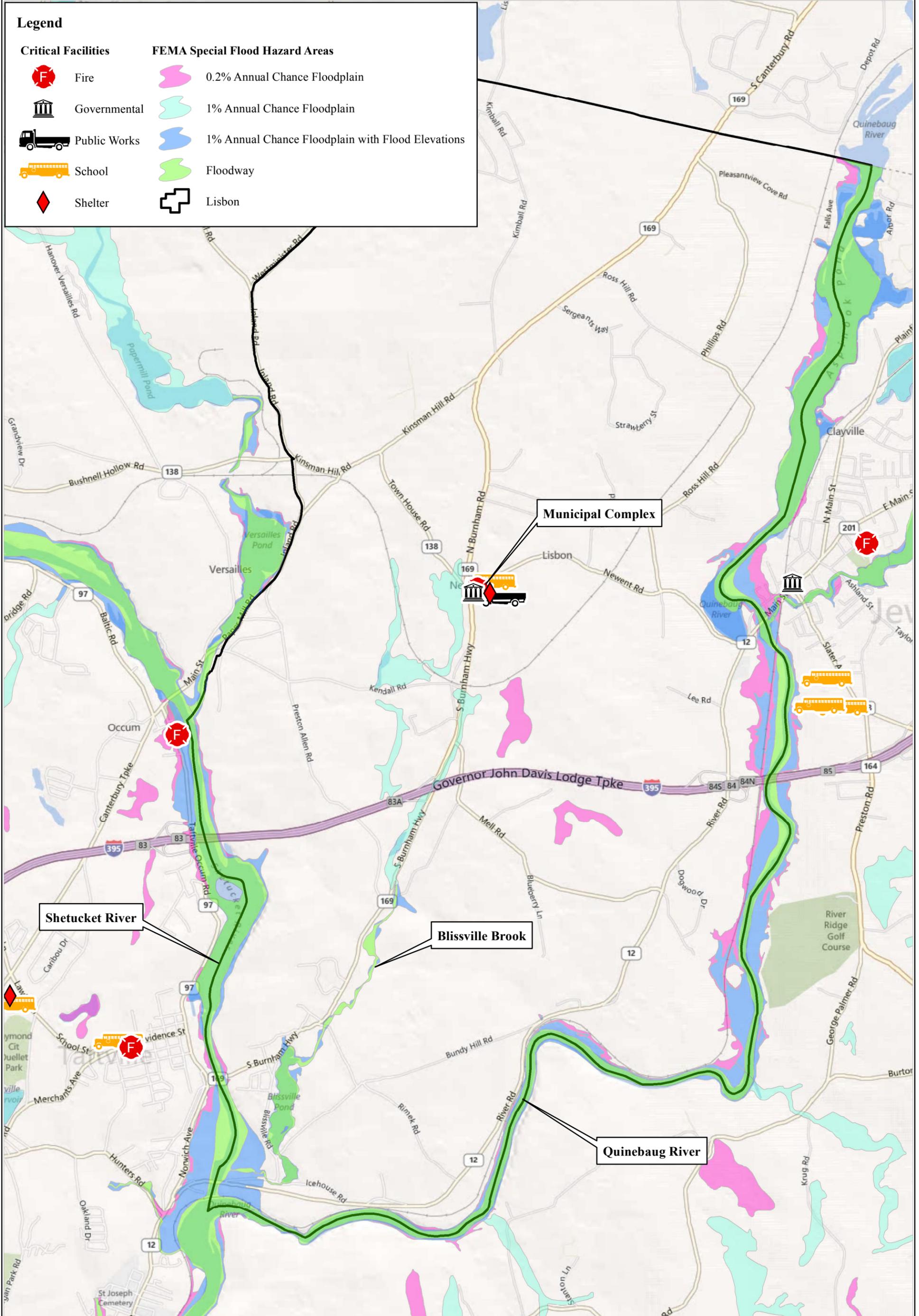
Legend

Critical Facilities

-  Fire
-  Governmental
-  Public Works
-  School
-  Shelter

FEMA Special Flood Hazard Areas

-  0.2% Annual Chance Floodplain
-  1% Annual Chance Floodplain
-  1% Annual Chance Floodplain with Flood Elevations
-  Floodway
-  Lisbon



SOURCE(S):
Microsoft Virtual Earth, FEMA, Town of Lisbon

Figure 3-1: FEMA Special Flood Hazard Areas

Location:
Lisbon, CT



**SCCOG HMP Update
Town of Lisbon Annex**

Map By: scottb
MMI#: 3570-05
MXD: H:\3570-05\GIS\Maps\Lisbon\Figure3-1.mxd
1st Version: 6/30/2012
Revision: 6/28/2012
Scale: 1 in = 2,500 ft

Engineering,
Landscape Architecture
and Environmental Science
MILONE & MACBROOM
99 Realty Drive Cheshire, CT 06410
(203) 271-1773 Fax: (203) 272-9733
www.miloneandmacbroom.com

3.3.3 Vulnerability Analysis of Critical Facilities

As noted in Section 2.6, no critical facilities in Lisbon are located within the 1% annual chance floodplain. However, given the relatively limited development in Lisbon the closure of roadways and major transportation routes due to flooding is a concern for emergency personnel. For example, flooding along Blissville Brook and Blissville Pond could potentially overtop several roads, resulting in detours through local roads that would lengthen the time for emergency response.

3.4 Potential Mitigation Measures, Strategies, and Alternatives

Potential mitigation measures for reducing or eliminating the impact of inland flooding fall into the categories of prevention, property protection, emergency services, public education and awareness, natural resource protection, and structural projects. General potential mitigation measures that can be taken to reduce the effects of inland flooding were discussed in Section 3.7 and in Section 11.2.2 of the Multi-Jurisdictional HMP. General recommendations pertinent to all natural hazards that could affect the town are listed in Section 11 of this annex, as are specific measures pertinent to reducing inland flooding in the Town of Lisbon.

4.0 COASTAL FLOODING & STORM SURGE

4.1 Setting / Historic Record

The Town of Lisbon is not located along the coastline or along any tidally-influenced river. It is also not located in a potential hurricane surge zone. No coastal flooding or storm surge has affected the town since the last HMP. Therefore, the town is considered to be immune to the direct effects of coastal flooding and storm surge.

4.2 Existing Programs, Policies, and Regulations

The Town does not have any regulations in affect to restrict development due to coastal flooding hazards.

The Town understands that in an extreme case its shelter spaces may need to be utilized by non-Lisbon residents if a regional evacuation occurred due to a coastal flooding event as managed through its mutual aid agreements with SCCOG. The Town is prepared for this potential circumstance.

4.3 Vulnerabilities and Risk Assessment

No areas of the town are vulnerable to coastal flooding or storm surge.

4.4 Potential Mitigation Measures, Strategies, and Alternatives

No mitigation measures for reducing the impact of coastal flooding or storm surge in the town are necessary or are proposed.

5.0 HURRICANES AND TROPICAL STORMS

5.1 Setting / Historic Record

Several types of hazards may be associated with tropical storms and hurricanes including heavy or tornado winds, heavy rains, and flooding. Flooding hazards are discussed in Section 3 of this annex. Wind hazards are widespread and can affect any part of the town. However, some buildings in the town are more susceptible to wind damage than others.

The last major hurricane or tropical storm wind event to affect the town was associated with Hurricane Irene in August 2011. Trees fell throughout the town and the region causing power outages that lasted up to seven days in Lisbon.

5.2 Existing Programs, Policies, and Mitigation Measures

Wind loading requirements for new buildings are addressed through the Connecticut Building Code which is utilized by the Town. Effective December 31, 2005, the design wind speed for the Town of Lisbon is 110 miles per hour. Town personnel note that recently constructed buildings all meet the Connecticut Building Code standard wind loading, but that to their knowledge no buildings (including critical facilities) have been constructed to exceed wind loading requirements. New commercial developments and subdivisions are required to place utilities underground in order to mitigate storm-related damages.

Parts of trees (limbs) or entire tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. Utility lines are located underground in only a few areas of the town. Lisbon has a tree warden who can post notification and schedule tree removal. The Public Works staff also monitors trees as part of their normal rounds, performs informal inspections for the tree warden, and has a small budget for minor tree maintenance. The Town hires outside contractors for larger jobs and those near power lines. CL&P, the local electric utility, provides tree maintenance near its power lines. Algonquin Gas also performs trimming near their utilities. AT&T and Comcast (telephone and cable) may also perform some trimming.

Warning is one of the best ways to prevent damage from hurricanes and tropical storms, as these storms often are tracked well in advance of reaching Connecticut. The Town can access National Weather Service forecasts via the internet as well as listen to local media outlets (television, radio) to receive information about the relative strength of the approaching storm. This information allows the Town to activate its EOP and encourage residents to take protective or evacuation measures if appropriate.

Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas. Residents can sign up to receive warnings from the statewide CT “Everbridge” Reverse 9-1-1 system to receive critical information. Although hurricanes that have impacted Lisbon have historically passed in a day's time, additional regional shelters could be outfitted following a storm with the assistance of the American Red Cross on an as-needed basis for long-term evacuees.

5.3 Vulnerabilities and Risk Assessment

The entire Town is vulnerable to hurricane and tropical storm wind damage and from any tornadoes (Section 6) accompanying the storm, as well as inland flooding (Section 3). Of particular concern are the blockage of roads and the damage to the electrical power supply from falling trees and tree limbs. The Town had extensive outages in some areas because of tree damage to utility lines following Hurricane Irene in 2011.

Direct wind damage to newer buildings from hurricane or tropical storm-level winds is rare in the Town since the new buildings were constructed to meet or exceed current building codes. Many buildings in the Town are historic and many were built prior to the 1970s and do not meet current building codes. Older buildings in the Town (particularly within Newent) and the two mobile home parks (located east of Blissville Pond and on Tunnel Hill Road) are particularly susceptible to roof and window damage from high wind events. This risk to structures will be reduced with time as these buildings are remodeled or replaced with buildings that meet current codes.

The strength of a large hurricane could cause a moderate economic impact to the town. The potential economic effect of wind damage to SCCOG was evaluated in the Multi-Jurisdictional HMP. A separate analysis was not performed specifically for Lisbon.

5.4 Potential Mitigation Measures, Strategies, and Alternatives

Potential mitigation measures for reducing or eliminating the impact of wind damage fall into the categories of prevention, property protection, emergency services, public education and awareness, natural resource protection, and structural projects. General potential mitigation measures that can be taken to reduce the effects of wind damage from hurricanes and tropical storms were discussed in Section 5.7 and in Section 11.2.3 of the Multi-Jurisdictional HMP. General recommendations pertinent to all hazards that could affect the town are listed in Section 11 of this annex, as are specific measures pertinent to reducing wind damage to the Town of Lisbon.

6.0 SUMMER STORMS AND TORNADOES

6.1 Setting / Historic Record

Similar to hurricanes and winter storms, wind damage associated with summer storms and tornadoes has the potential to affect any area of the town. Furthermore, because these types of storms and the hazards that result (flash flooding, wind, hail, and lightning) might have limited geographic extent, it is possible for a summer storm to harm one area within the town without harming another. Such storms occur in the town each year, although hail and direct lightning strikes to the town are rarer. For example, the NCDC reported that penny-sized hail was reported in Lisbon on June 26, 2009, but no other occurrences were reported. No tornadoes have occurred in the town since the last HMP.

6.2 Existing Programs, Policies, and Mitigation Measures

Warning is the most viable and therefore the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively. The Town can access National Weather Service forecasts via the internet as well as listen to local media outlets (television, radio) to receive information about the relative strength of the approaching storm. This information allows the Town to activate its EOP and encourage residents to take protective measures if appropriate.

Aside from warnings, several other methods of mitigation for wind damage are employed by the Town as explained in Section 5.2 within the context of hurricanes and tropical storms. In addition, the Connecticut Building Code includes guidelines for the proper grounding of buildings and electrical boxes to protect against lightning damage.

6.3 Vulnerabilities and Risk Assessment

Summer storms are expected to occur each year and are expected to at times produce heavy winds, heavy rainfall, lightning, and hail. All areas of the town are equally likely to experience the effects of summer storms. The density of damage is expected to be greater near the more densely populated area of the town, and mobile home parks and campgrounds are more vulnerable to summer storm damage.

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Experience has generally shown that wind in excess of 50 miles per hour (mph) will cause significant tree damage during the summer season as the effects of wind on trees is exacerbated when the trees are in full leaf. The damage to buildings and overhead utilities due to downed trees has historically been the biggest problem associated with wind storms. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions. Fortunately, most fires are quickly extinguished due to the town's strong fire response.

Lightning and hail are generally associated with severe thunderstorms and can produce damaging effects. All areas of the town are equally susceptible to damage from lightning and hail, although lightning damage is typically mitigated by warnings and proper grounding of buildings and equipment. Hail is primarily mitigated by warning, although vehicles and watercraft can often

not be secured prior to the relatively sudden onset of a hailstorm. Lightning and hail are considered likely events each year, but typically cause limited damage in the town. Older buildings and mobile homes are most susceptible to lightning and hail damage since many were constructed prior to current building codes.

Although tornadoes pose a threat to all areas of Connecticut, their occurrence is least frequent in New London County as compared with the rest of the State. Thus, while the possibility of a tornado striking the town exists, it is considered to be an event with a very low probability of occurrence.

6.4 Potential Mitigation Measures, Strategies, and Alternatives

General potential mitigation measures that can be taken to reduce the effects of wind damage were discussed in Section 5.7 and in Section 11.2.3 of the Multi-Jurisdictional HMP. No additional recommendations are available specific to reducing damage from summer storms and tornadoes. Refer to Section 11 of this annex for recommendations related to wind damage and general recommendations related to emergency services.

7.0 WINTER STORMS AND NOR'EASTERS

7.1 Setting / Historic Record

Similar to hurricanes and summer storms, winter storms have the potential to affect any area of the town. However, unlike summer storms, winter storms and the hazards that result (wind, snow, and ice) have more widespread geographic extent. In general, winter storms are considered highly likely to occur each year (major storms are less frequent), and the hazards that result (nor'easter winds, snow, and blizzard conditions) can potentially have a significant effect over a large area of the town.

Winter storms and nor'easters have affected the town since the last HMP, as reported to the NCDC and reported by Town officials. However, only the winter storms of 2010-2011 and Winter Storm Alfred had a significant effect on the town. The winter of 2010-2011 produced significant snowfall in Lisbon. The Town checked all flat-roofed buildings and while the school was a concern, it was not cleared and did not experience any damage. Many residents also cleared their own roofs or hired contractors. Several mobile homes experienced roof damage related to snow loading.

Winter Storm Alfred in late October 2011 caused minor to moderate tree damage, with power outages lasting up to three days.

7.2 Existing Programs, Policies, and Mitigation Measures

Existing programs applicable to winter storm winds are the same as those discussed in Sections 5.2 and 6.2. Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks; tree trimming and maintenance to protect power lines, roads, and structures; and other associated snow removal and response preparations.

As it is almost guaranteed that winter storms will occur annually in Connecticut, it is important to locally budget fiscal resources toward snow management. Snow is the most common natural hazard requiring additional overtime effort from Town staff, as parking lots and roadways need constant maintenance during storms. The Public Works Department oversees snow removal in the Town and stores salt and sand at the Public Works Garage. The Town has established plowing routes that prioritize access to and from critical facilities. The Connecticut Department of Transportation (DOT) plows State roads. Since the nearest Connecticut DOT facility is located nearby in Occum (Norwich), plowing is generally timely.

The Connecticut Building Code specifies that a pressure of 30 pounds per square foot be used as the base "ground snow load" for computing snow loading for roofs. The Town monitors the roofs of municipal buildings when snow loads accumulate and shovel if necessary, and many residents and businesses also shovel or plow their roofs.

7.3 Vulnerabilities and Risk Assessment

Severe winter storms can produce an array of hazardous weather conditions, including heavy snow, blizzards, freezing rain and ice pellets, flooding, heavy winds, and extreme cold. Further "flood" damage could be caused by flooding from frozen water pipes. Often, tree limbs on roadways are not suited to withstand high wind and snow or ice loads.

This section focuses on those effects commonly associated with winter storms, including those from blizzards, ice storms, heavy snow, freezing rain, and extreme cold. Warning and education can prevent most injuries from winter storms. Most deaths from winter storms are indirectly related to the storm, such as from traffic accidents on icy roads and hypothermia from prolonged exposure to cold. Damage to trees and tree limbs and the resultant downing of utility cables are a common effect of these types of events. Secondary effects can include loss of power and heat.

The majority of buildings in Lisbon were constructed within the past several decades and therefore not particularly susceptible to damage from heavy snow. While some Town buildings could be susceptible to heavy snow loads, they will be cleared quickly if safety is a concern. For example, Lisbon Central Elementary School has a flat roof which makes it more susceptible to snow load damage.

Icing is not a significant issue in the Town. In general, there are few steep slopes such that extra sanding and salting of the roadways in necessary locations alleviates any trouble spots. In addition, there are no issues with ice jams on any of the streams in the town. However, a few private roads in town are problematic for emergency response during the winter. For example, Pleasant View Cove Road is a nearly two-mile long unimproved road that includes a private railroad crossing. The road is very hilly and relatively narrow, making the road essentially one lane during winters with significant snow accumulation.

7.4 Potential Mitigation Measures, Strategies, and Alternatives

Potential mitigation measures for flooding caused by nor'easters include those appropriate for flooding that were discussed in Section 3.7 of the Multi-Jurisdictional HMP and Section 11 of this annex. General potential mitigation measures that can be taken to reduce the effects of wind damage were discussed in Section 5.7 and in Section 11.2.3 of the Multi-Jurisdictional HMP and Section 11 of this annex. However, winter storm mitigation measures must also address blizzards, snow, and ice hazards. These were discussed in Section 7.7 and Section 11.2.4 of the Multi-Jurisdictional HMP and Section 11 of this annex.

8.0 EARTHQUAKES

8.1 Setting / Historic Record

An earthquake is a sudden rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse; disrupt gas, electric, and telephone lines; and often cause landslides, flash floods, fires, avalanches, and tsunamis. Earthquakes can occur at any time and often without warning. Detailed descriptions of earthquakes, scales, and effects can be found in Section 8 of the Multi-Jurisdictional HMP.

Despite the low probability of an earthquake occurrence, earthquake damage presents a potentially catastrophic hazard to the town. However, it is very unlikely that the town would be at the epicenter of such a damaging earthquake. No major earthquakes have affected the town since the last HMP.

8.2 Existing Programs, Policies, and Mitigation Measures

The Connecticut Building Codes include design criteria for buildings specific to each region as adopted by Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in Lisbon. The Town has adopted these codes for new construction, and they are enforced by the Building Inspector.

Due to the infrequent nature of damaging earthquakes, Town land use policies do not directly address earthquake hazards. However, the potential for an earthquake and emergency response procedures is addressed in the Town's EOP.

8.3 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. As noted in Section 2.1, areas along the Shetucket River, Quinebaug River, Blissville Brook, and Old Stone Mill Brook are underlain by stratified drift. These areas are potentially more at risk for earthquake damage than the areas of the town underlain by glacial till. The best mitigation for future development in areas of sandy material is the application of the most stringent standards in the Connecticut Building Code, exceeding the building code requirements, or, if the Town deems necessary, the possible prohibition of new construction. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till.

Two bedrock faults are located within Lisbon. Unlike seismic activity in California, earthquakes in Connecticut are not associated with specific known active faults. However, bedrock in Connecticut and New England in general is typically formed from relatively hard metamorphic rock that is highly capable of transmitting seismic energy over great distances. For example, the relatively strong earthquake that occurred recently in Virginia was felt in Connecticut because the energy was transmitted over a great distance through such hard bedrock.

The built environment in the town primarily includes some more recent construction that is seismically designed. However, most buildings were built before the 1990's and therefore are not built to current building codes. In addition, there are two mobile home parks and at least one campground with recreational buildings or shelters that may not be seismically designed. Thus, it is believed that most buildings would be at least moderately damaged by a significant earthquake.

Those town residents who live or work in older, non-reinforced masonry buildings are at the highest risk for experiencing earthquake damage.

Areas of steep slopes can collapse during an earthquake, creating landslides. Lisbon has many areas of steep slopes and bluffs although the majority of these features occur in undeveloped areas. Thus, landslides are not a concern in the town.

Seismic activity can also break utility lines such as water mains, gas mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this HMP, dam failure has been addressed separately in Section 10.0. As noted previously, most utility infrastructure in the town is located above ground. A quick and coordinated response with Connecticut Light & Power will be necessary to inspect damaged utilities following an earthquake, to isolate damaged areas, and to bring backup systems online. This is covered in the Town's and Connecticut Light & Power's EOPs.

A *HAZUS-MH* analysis of the potential economic and societal impacts to the SCCOG region from earthquake damage is detailed in the Multi-Jurisdictional HMP. The analysis addresses a range of potential impacts from any earthquake scenario, estimated damage to buildings by building type, potential damage to utilities and infrastructure, predicted sheltering requirements, estimated casualties, and total estimated losses and direct economic impact that may result from various earthquake scenarios.

8.4 Potential Mitigation Measures, Strategies, and Alternatives

Due to the low probability of occurrence, potential mitigation measures related to earthquake damage primarily include adherence to building codes and emergency response services. Both of these are mitigation measures common to all hazards as noted in Section 11 of this annex. The Multi-Jurisdictional HMP also includes additional recommendations for mitigating the effects of earthquakes that are also listed in Section 11.

9.0 WILDFIRES

9.1 Setting / Historic Record

Wildfires are considered to be highly destructive, uncontrollable fires. The most common causes of wildfires are arson, lightning strikes, and fires started from downed trees hitting electrical lines. Thus, wildfires have the potential to occur anywhere and at any time in both undeveloped and lightly developed areas of Lisbon. Structural fires in higher density areas of the town are not directly addressed herein.

Lisbon typically experiences a handful of brush fires each spring and autumn. The largest fires burn two to five acres at maximum. No major fires could be recalled in recent history.

9.2 Existing Programs, Policies, and Mitigation Measures

Monitoring of potential fire conditions is an important part of mitigation. The Connecticut DEEP Forestry Division uses the rainfall data recorded by the Automated Flood Warning system to compile forest fire probability forecasts. This allows the DEEP to monitor drier areas to be prepared for forest fire conditions. The Town can access this information over the internet. The Town also receives “Red Flag” warnings via local media outlets.

Existing mitigation for wildland fire control is typically focused on building codes, public education, Fire Department training, and maintaining an adequate supply of equipment. The Town’s EOP recommends a 30-50 foot cleared radius be maintained around homes and buildings to prevent wildfires.

The Lisbon Volunteer Fire Company has a strong mutual aid relationship with its neighbors to fight wildfires. The Town has an off-road vehicle and a gator to access distant fires, and goes to the fires as quickly as possible. Fire protection water is obtained through seven dry hydrants located throughout Lisbon. Areas along Route 169 and Route 12 have water service provided by Norwich Public Utilities or the Jewett City Water Company, respectively. These agencies test fire flows and inform the fire department of the pressure available.

In areas located far from available hydrants, the fire department drafts water from the various streams, ponds, and rivers in the town, and rely on pump trucks to carry water to distant areas. Blissville Pond is a primary source of fire protection water for such purposes. The amount of fire protection afforded by the existing hydrants and nearby water bodies is considered to be adequate for the development level of Lisbon. The Fire Department will continue to evaluate the level of risk and the need for additional hydrants as development continues in the future.

9.3 Vulnerabilities and Risk Assessment

As Lisbon is largely forested, wildfires can occur almost anywhere due to the undeveloped nature of the town. Pleasant View Cove Road is a particular area of concern for emergency personnel since it is a long private road and no dry hydrants are located nearby. Firefighters draft water from Aspinook Pond to provide firefighting water in this area. Other undeveloped areas that are not nearby public water service, dry hydrants, or water bodies are considered to be moderate risk due to the need to transport fire fighting water, and the fact that off-road equipment must be utilized to fight fires. The remaining areas of the town that are located nearby water sources are

considered to be a low-risk area for wildfires. Refer to Figure 9-1 in the Multi-Jurisdictional HMP for a general depiction of wildfire risk areas within Lisbon.

A particular concern for the Fire Department is that several of the dry hydrants need maintenance. The dry hydrants have been in place for many years and as such vegetation is impeding the intakes and reducing the volume of flow available.

9.4 Potential Mitigation Measures, Strategies, and Alternatives

The Town of Lisbon is a low- to moderate-risk area for wildfires. Potential mitigation measures for wildfires include a combination of prevention, education, and emergency planning measures as presented in Section 11.

10.0 DAM FAILURE

10.1 Setting / Historic Record

Dam failures can be triggered suddenly with little or no warning and often in connection with natural disasters such as floods and earthquakes. Dam failures can occur during flooding when the dam breaks under the additional force of floodwaters. In addition, a dam failure can cause a chain reaction where the sudden release of floodwaters causes the next dam downstream to fail. While flooding from a dam failure generally has a limited geographic extent, the effects are potentially catastrophic depending on the downstream population. A dam failure affecting Lisbon is considered a possible event each year with potentially critical effects. No dam failures affected the town since the time of the last HMP.

10.2 Existing Programs, Policies, and Mitigation Measures

The Connecticut DEEP administers the Dam Safety Section and designates a classification to each state-registered dam based on its potential hazard as detailed in the regional plan. As noted in the Multi-Jurisdictional HMP, Lisbon is home to one Class B (significant hazard) dam, and six additional Class B or Class C dams are located upstream of Lisbon whose failure could potentially lead to flooding within the town. These dams are listed on Table 10-1.

TABLE 10-1
High and Significant Hazard Dams Within and Upstream of the Town of Lisbon

| Dam | Hazard Class | Location | Owner | River System |
|-----------------------------------|--------------|----------------------|----------------------|--------------------------------|
| Aspinook Pond Dam | B | Jewett City / Lisbon | Private (Commercial) | Quinebaug River |
| Lower Blissville Pond Dam | B | Lisbon | Town of Lisbon | Blissville Brook |
| Paper Mill Pond Dam | B | Sprague | Private (Commercial) | Little River / Shetucket River |
| Scotland Dam | C | Windham | Private (Commercial) | Shetucket River |
| Taftville Dam #4 (Taftville Pond) | C | Norwich / Lisbon | Private (Commercial) | Shetucket River |
| Tunnel Dam | B | Preston / Lisbon | Private (Commercial) | Quinebaug River |
| Versailles Pond Dam | B | Sprague | Private (Commercial) | Little River / Shetucket River |

Dams in the region whose failure could impact Lisbon are under the jurisdiction of the Connecticut DEEP. The dam safety statutes are codified in Section 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut State Agencies have been enacted, which govern the registration, classification, and inspection of dams. Dams must be registered by the owner with the DEEP according to Connecticut Public Act 83-38.

Owners of high and significant hazard dams are required to maintain EOPs for such dams. The Town of Lisbon owns two dams: the Blissville Pond dam (a low hazard dam) and the Lower

Blissville Pond Dam (a significant hazard dam). The Town inspects these dams annually and they are believed to be in good condition. No information was available in the Connecticut DEEP files regarding an EOP or dam failure inundation analysis being performed for the Lower Blissville Pond Dam.

10.3 **Vulnerabilities and Risk Assessment**

The potential impacts related to the failure of Class C and Class B dams within or upstream of Lisbon are described below. Where information was available, the descriptions below are based on information available at the Connecticut DEEP Dam Safety files.

- ❑ Scotland Dam – The Scotland Dam is a Class C dam located on the Shetucket River near the Windham, Scotland, and Franklin boundary that is privately owned and used for hydroelectric power generation. Failure of this dam would likely result in an inundation area similar to the 0.2% annual chance flood event for areas downstream along the Shetucket River from the dam to Occum Pond, with lesser impacts downstream in Lisbon. Flooding of the access road to the trash to energy plant would be expected, as would the flooding of structures in the Lower Blissville Road and River Road (Route 12) area near Norwich.
- ❑ Taftville Dam #4 – Taftville Dam #4 is a Class C dam located on the Shetucket River between Norwich and Lisbon and is privately owned. The dam impounds water for hydroelectric power generation. Failure of this dam would likely result in an inundation area similar to the 1% annual chance flood event for areas downstream along the Shetucket River from the dam to the Thames River. This would cause the inundation of several structures in Lisbon in the Lower Blissville Road and River Road (Route 12) area near Norwich.
- ❑ Aspinook Pond Dam – This privately-owned Class B dam impounds the Quinebaug River to provide hydroelectric power generation. Failure of this dam could cause a flood similar to the 1% annual chance flood downstream in Jewett City, Lisbon, and Griswold. Undeveloped areas of Preston could also be affected. As shown by the dam failure inundation analysis prepared by Louis Berger & Associates, Inc. in the late 1970's for the USACE, Newent Road (Route 138) could potentially flood, as could agricultural fields located along the Quinebaug River in Lisbon.
- ❑ Lower Blissville Pond Dam – This Class B dam is owned by the Town of Lisbon and located at the southwestern end of Lower Blissville Pond just upstream of Ice House Road. The dam is in good condition with major repairs occurring in 1988. While a formal dam failure inundation analysis is not believed to have been prepared for this dam, failure of this dam would likely overtop Ice House Road and Lower Blissville Road and cause flooding of structures along Lower Blissville Road in Lisbon. The Shetucket River would likely absorb the floodwaters without further damage to structures.
- ❑ Paper Mill Pond Dam – This Class B dam is privately owned and located in Sprague on the eastern end of Paper Mill Pond. The dam was created to impound the waters of the Little River for industrial purposes. According to a 1970's report by the USACE, failure of the Paper Mill Pond Dam would mostly cause flooding in Sprague upstream of the railroad, although the water level rise within Versailles Pond could also cause minor flooding along Paper Mill Road on the eastern edge of the pond in Lisbon.

- ❑ *Tunnel Dam* – This Class B dam that impounds the Quinebaug River is privately-owned and located between Preston and Sprague just upstream of the confluence with the Shetucket River. The dam was originally constructed to provide power for industrial purposes, but now is utilized for hydroelectric power generation. Failure of this dam would likely cause minor flooding along the Shetucket River downstream to Taftville Dam #4, with no structures being affected in Lisbon.
- ❑ *Versailles Pond Dam* – This privately-owned Class B dam that impounds the Little River was originally constructed for industrial purposes. Failure of this dam would cause significant impacts in Sprague, but only minor flooding along the Little River and Shetucket River in Lisbon with no structures being affected.

10.4 Potential Mitigation Measures, Strategies, and Alternatives

Lisbon is considered a low-risk area for dam failure since the majority of dams are well-maintained with active coordination with the Connecticut DEEP. Potential mitigation measures for dam failure include a combination of prevention, education, and emergency planning, as well as dam removal projects as discussed in Section 11.

11.0 RECOMMENDATIONS

11.1 Summary of Specific Recommendations

The Multi-Jurisdictional HMP provided several region-wide recommendations applicable to all hazards that are also pertinent to the Town of Lisbon. In addition, recommendations throughout the sections of this annex are also applicable as recommendations. These recommendations are listed below:

11.1.1 Recommendations Applicable to All Hazards

Regional Coordination

- Continue to promote inter-jurisdictional coordination efforts for emergency response.
- Continue to promote local and regional planning exercises that increase readiness to respond to disasters.
- Continue to evaluate communication capabilities and pursue upgrades to communication and ensure redundant layers of communication are in place within the Town and with other SCCOG communities, New London County, and the State of Connecticut.
- Continue to promote regional transportation planning through SCCOG to balance general transportation, shipping, and potential evacuation needs.
- Work with SCCOG to perform a regional study to identify the vulnerability of critical facilities that may be unable to withstand natural hazard damage. Emphasis should be placed on critical infrastructure, shelters and other sites to ensure structural integrity against various hazards and adequacy of backup supplies.

Local Emergency Response & Public Information

- Continue to review and update the Town EOP at least once annually.
- Continue to maintain emergency response training and equipment and upgrade equipment when possible.
- Encourage local officials to attend FEMA-sponsored training seminars at the Emergency Management Institute (EMI) in Emmitsburg, Maryland. All of these workshops are free of charge. Tuition, travel and lodging are provided by FEMA for the EMI training. Annual training sessions include emergency management, environmental reviews, the FEMA grant programs, the NFIP and CRS and others related to other hazards.
- Continue to evaluate emergency shelters, update supplies, and check communication equipment.
- Continue to promote dissemination of public information regarding natural hazard effects and mitigation measures into local governmental and community buildings. Specifically,

- ⇒ Obtain copies of the disaster planning guides and manuals from the "Are You Ready?" series (<http://www.ready.gov/are-you-ready-guide>).
- ⇒ Encourage residents to purchase NOAA weather radios with an alarm feature.
- ⇒ Post hazard preparedness information on the Town's website. Include links to established sources at the State of Connecticut and FEMA.
- ❑ Encourage residents to submit contact information to the CT Alerts Reverse 9-1-1 system on the CT Alerts website, and continue utilizing the system to telephone warnings into affected areas.

Prevention

- ❑ Develop a checklist for land development applicants that cross-references the specific regulations and codes related to disaster resilience.
- ❑ Integrate elements of this HMP into the *Plan of Conservation and Development* during the next update of that plan.
- ❑ Require the underground installation of utilities for all new development where possible.
- ❑ Continue reviewing building plans to ensure proper access for emergency vehicles.
- ❑ Continue to enforce the appropriate building code for new building projects.
- ❑ Encourage residents to install and maintain lightning rods on their buildings.

Natural Resource Protection & Open Space

- ❑ Continue to regulate development in protected and sensitive areas including steep slopes, wetlands, and floodplains.

11.1.2 Recommendations Applicable to Inland Flooding

Prevention

- ❑ Continue to regulate new development activities within SFHAs to the greatest extent possible within the local land use regulations.
- ❑ Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream.
- ❑ Conduct an annual inspection of floodprone areas that are accessible to Town officials. Determine if potential flood damage is stormwater facility related and make recommendations as appropriate.

Property Protection

- ❑ Incorporate information on the availability of flood insurance into all hazard-related public education workshops.
- ❑ Make available FEMA-provided flood insurance brochures at public accessible places such as the local government buildings. Encourage residents to purchase flood insurance if they are located within a FEMA SFHA.
- ❑ Provide technical assistance to owners of non-residential structures that suffer flood damage regarding floodproofing measures such as wet and dry floodproofing.
- ❑ Encourage residents to submit flood insurance claims following damage events.

Emergency Services

- ❑ Pursue mutual aid agreements with such organizations as the American Red Cross and the Boy Scouts of America to provide volunteer labor during flooding to assist with response activities.

Public Education and Awareness

- ❑ Visit schools (as is currently done under fire prevention) and educate children about the risks of floods (and other natural hazards) and how to prepare for them.
- ❑ Encourage builders, developers, and architects to become familiar with the NFIP land use and building standards by attending annual workshops.

Natural Resource Protection

- ❑ Pursue the acquisition of additional municipal open space in SFHAs.
- ❑ Continue to aggressively pursue wetlands protection through existing wetlands regulations. Incorporate performance standards into subdivision reviews to include additional protective measures such as conservation easement areas around wetlands and watercourses.

Structural Projects

- ❑ Utilize recently available extreme rainfall data to determine existing sizing of culverts. Encourage bridge replacements and culvert replacements in areas found to be undersized.
- ❑ Continue to perform catch basin and culvert surveys to perform maintenance and cleaning and to identify and prioritize structures in need of replacement.
- ❑ Upgrade culverts along Blissville Brook to reduce the chance that roads will overtop during severe storm events.

11.1.3 Recommendations Applicable to Wind Damage from Hurricanes, Tropical Storms, Summer Storms, Tornados, and Winter Storms

Property Protection

- ❑ Promote the use of functional shutters for older buildings in the town to guard against window breakage which can result in structural failure.
- ❑ The Building Department should make information on wind-resistant construction techniques (such as hurricane straps) available to all building permit applicants.

Emergency Services

- ❑ Identify a location or locations in the town for a brush disposal operation for dealing with debris after wind storms. Determine how these trees can be reused within the town (chips, firewood, composting) to reduce costs of exporting.
- ❑ Consider surveying all Town-owned buildings to determine their ability to withstand wind loading, particularly Lisbon Central Elementary School (shelter).
- ❑ Develop agreements, if necessary, with land owners and with companies to chop/chip in order to ensure that plans are in place prior to damage and cleanup needs (as is done for snow plow operations).

Public Education and Awareness

- ❑ Visit schools (as is currently done under fire prevention) and educate children about the risks of wind events (and other natural hazards) and how to prepare for them.

11.1.4 Recommendations Applicable to Other Damage from Winter Storms

- ❑ Consider conducting a study to identify municipal buildings, critical facilities, and commercial / industrial buildings that are vulnerable to roof damage or collapse due to heavy snow loads. This study could be included in the regional critical facility study described in Section 2.8.
- ❑ Consider drafting a written plan for inspecting and prioritizing the removal of snow from Town-owned structures.
- ❑ Continue making funding available to the Public Works Department each budget year for clearing snow from roads and parking lots.
- ❑ Provide information for generally protecting town residents during cold weather and for mitigating icing and insulating pipes at residences.
- ❑ Consider posting the snow plowing routes in local government buildings and on the Town's website such that residents and business owners may better understand their risks during winter travel.

- ❑ Continue to identify areas that are difficult to access during winter storm events and develop contingency plans for emergency personnel.

11.1.5 Recommendations Applicable to Earthquakes

- ❑ Ensure that Town departments have adequate backup supplies and facilities for continued functionality in case earthquake damage occurs to these buildings and critical facilities. This should be part of the regional critical facility study discussed in Section 2.8.
- ❑ Consider preventing residential development in areas prone to collapse such as below steep slopes or in areas prone to liquefaction.

11.1.6 Recommendations Applicable to Wildfires

- ❑ Continue to evaluate public water supply hydrants, dry hydrants and areas at risk of wildfire in the town.
- ❑ Extend fire protection to areas identified as being particularly at risk, such as the Pleasant View Cove Road area.
- ❑ Continue to support public outreach programs to increase awareness of forest fire danger, equipment usage, and protecting homes from wildfires. Educational materials should be made available at the Town Hall.
- ❑ Ensure that provisions of Town regulations regarding fire protection facilities and infrastructure are being enforced.
- ❑ Perform maintenance and repairs on the Town's dry hydrants such that fire flows from these sources are unimpeded.

11.1.7 Recommendations Applicable to Dam Failure

- ❑ Include structures in Lisbon that lie within dam failure inundation areas in the Reverse 9-1-1 contact database.
- ❑ Work with the Connecticut DEEP to ensure that the owners of high and significant hazard dams that could impact the town have a current EOP. The Town Hall should keep a copy of such plans.
- ❑ Provide assistance to owners of lesser-ranked dams regarding resources available for inspections and maintenance.
- ❑ Create an EOP for Lower Blissville Pond Dam and submit it to DEEP.

11.2 Prioritization of Specific Recommendations

As explained in Section 11.3 of the Multi-Jurisdictional HMP, the STAPLEE method was utilized in this annex to prioritize recommendations. Table 11-1 presents the STAPLEE matrix for the

Town of Lisbon. Each recommendation includes the department or commission responsible for implementing the recommendation, a proposed schedule, and whether or not the recommendation is new or originally from the previous HMP. Refer also to Section 2.7 for the list of previous plan recommendations and whether or not each recommendation was carried forward into this HMP.

TABLE 11-1: TOWN OF LISBON STAPLEE MATRIX FOR PRIORITIZING RECOMMENDATIONS

| Implementation of Current Recommendations | Existing or New Recommendation? | Responsible Department ¹ | Schedule | Cost ² | Potential Funding Source ³ | Weighted STAPLEE Criteria ⁴ | | | | | | | | | | | | | | Total STAPLEE Score |
|---|---------------------------------|-------------------------------------|-----------|-------------------|---------------------------------------|--|----------------|----------------|-----------|-------|---------------|---------------|------------------|--------|----------------|----------------|-----------|-------|---------------|---------------------|
| | | | | | | Benefits | | | | | | | Costs | | | | | | | |
| | | | | | | Social | Technical (x2) | Administrative | Political | Legal | Economic (x2) | Environmental | STAPLEE Subtotal | Social | Technical (x2) | Administrative | Political | Legal | Economic (x2) | |
| ALL HAZARDS | | | | | | | | | | | | | | | | | | | | |
| Regional Coordination | | | | | | | | | | | | | | | | | | | | |
| Continue to promote inter-jurisdictional coordination efforts for emergency response | New | FD | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | 0.0 | 9.0 | | |
| Continue to promote local and regional planning exercises that increase readiness to respond to disasters | New | BoS | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | 8.0 | | | | 0.0 | 8.0 | | |
| Continue to evaluate communication capabilities and pursue upgrades to communication and ensure redundant equipment is available | Existing | FS, FD | 2012-2017 | Low | OB, CI | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | -0.5 | -1.0 | 8.0 | |
| Continue to promote regional transportation planning through SCCOG | Existing | BoS | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | | 7.0 | | | | | 0.0 | 7.0 | |
| Work with the SCCOG to perform a regional study of the vulnerability of critical facilities to natural hazard damage | New | FS | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | -0.5 | | | -0.5 | -2.0 | 6.0 | |
| Local Emergency Response & Public Information | | | | | | | | | | | | | | | | | | | | |
| Continue to review and update the Town EOP at least once annually | Existing | BoS, FD | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | | 0.0 | 9.0 | |
| Continue to maintain emergency response training and equipment and upgrade equipment when possible | Existing | BoS, FD | 2012-2017 | Moderate | OB, CI | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | 8.0 | | | | -0.5 | -1.0 | 7.0 | |
| Encourage Town officials to attend FEMA-sponsored training seminars at EMI | New | FS | 2012-2017 | Minimal | OB | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 0.5 | 7.0 | | | | | 0.0 | 7.0 | |
| Continue to evaluate emergency shelters, update supplies, and check communication equipment | Existing | FS, FD | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Continue to promote dissemination of public information regarding natural hazard effects into Government buildings, with additions | Existing | FS, BI | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | | 0.0 | 9.0 | |
| Encourage residents to submit contact information to the CT Alerts Reverse 9-1-1 system and utilize it during emergencies | Existing | FS | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Prevention | | | | | | | | | | | | | | | | | | | | |
| Develop a checklist for land development applicants that cross-references the specific regulations and codes related to disaster resilience | New | ZEO | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | -0.5 | | | -0.5 | 7.5 | |
| Integrate elements of this HMP into the Plan of Conservation and Development during the next update | New | PZC, ZEO | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | -1 | -0.5 | | -1.5 | 7.5 | |
| Continue reviewing building plans to ensure proper access for emergency vehicles | New | FD | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Require the underground installation of utilities for all new development | Existing | PZC | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | | 7.0 | -0.5 | | -0.5 | | -1.0 | 6.0 | |
| Continue to enforce the appropriate building code for new building projects | New | BI | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Encourage residents to install and maintain lightning rods on their structures | New | BI, FD | 2012-2017 | Minimal | OB | 1 | 0.5 | 1 | 1 | 1 | 1 | 0.5 | 7.5 | | | | | 0.0 | 7.5 | |
| Natural Resource Protection & Open Space | | | | | | | | | | | | | | | | | | | | |
| Continue to regulate development in protected and sensitive areas including steep slopes, wetlands, and floodplains | New | PZC | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | | 0.0 | 9.0 | |
| FLOODING RECOMMENDATIONS | | | | | | | | | | | | | | | | | | | | |
| Prevention | | | | | | | | | | | | | | | | | | | | |
| Continue to regulate new development activities within SFHAs to the greatest extent possible within Town land use regulations | New | PZC | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | | 0.0 | 9.0 | |
| Require developers to demonstrate whether detention or retention of stormwater is the best option for reducing peak flows downstream | New | PZC | 2012-2017 | Minimal | OB | 0.5 | 1 | 1 | 1 | 1 | 1 | 0.5 | 8.0 | | | | | 0.0 | 8.0 | |
| Conduct an annual inspection of floodprone areas that are publically accessible. Recommend drainage improvements as appropriate. | New | DPW | 2012-2017 | Low | OB | 1 | 1 | 1 | 0.5 | 1 | 0.5 | 0.5 | 7.0 | | | | | 0.0 | 7.0 | |
| Property Protection | | | | | | | | | | | | | | | | | | | | |
| Incorporate information on the availability of flood insurance into all hazard-related public education workshops | New | ZEO | 2012-2017 | Low | OB | 1 | 1 | 0.5 | 0.5 | 1 | 1 | | 7.0 | -0.5 | | | | -0.5 | 6.5 | |
| Make available FEMA-provided flood insurance brochures and encourage residents to purchase insurance if they are in a SFHA | New | ZEO, FS | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Provide technical assistance to owners of non-residential structures regarding floodproofing techniques | New | BI | 2012-2017 | Low | OB | 1 | 0.5 | 0.5 | 1 | 1 | 1 | 0.5 | 7.0 | | | | | 0.0 | 7.0 | |
| Encourage residents to submit flood insurance claims following damage events | New | All | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Emergency Services | | | | | | | | | | | | | | | | | | | | |
| Pursue mutual aid agreements with non-profits to provide volunteer labor for response activities | New | FS | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | 0.0 | 8.0 | |
| Include structures within the 1% annual chance floodplain within the Reverse 9-1-1 contact database | New | FS | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | -0.5 | -0.5 | | | -1.0 | 7.0 | |

TABLE 11-1: TOWN OF LISBON STAPLEE MATRIX FOR PRIORITIZING RECOMMENDATIONS

| Implementation of Current Recommendations | Existing or New Recommendation? | Responsible Department ¹ | Schedule | Cost ² | Potential Funding Source ³ | Weighted STAPLEE Criteria ⁴ | | | | | | | | | | | | | | Total STAPLEE Score | | | | | | | | | | |
|---|---------------------------------|-------------------------------------|-----------|-------------------|---------------------------------------|--|----------------|----------------|-----------|-------|---------------|---------------|------------------|--------|----------------|----------------|-----------|-------|---------------|---------------------|---------------|------------------|--|--|-----|------|------|------|------|-----|
| | | | | | | Benefits | | | | | | | Costs | | | | | | | | | | | | | | | | | |
| | | | | | | Social | Technical (x2) | Administrative | Political | Legal | Economic (x2) | Environmental | STAPLEE Subtotal | Social | Technical (x2) | Administrative | Political | Legal | Economic (x2) | | Environmental | STAPLEE Subtotal | | | | | | | | |
| Public Education and Awareness | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Visit schools and educate children about the risks of flooding and how to prepare | New | FD | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 8.0 | | | | | | | | 0.0 | 8.0 | | | | |
| Encourage builders, developers, and architects to become familiar with NFIP land use and building standards at annual workshops | New | ZEO | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 8.0 | | | -0.5 | | | | | | | -0.5 | 7.5 | | |
| Natural Resource Protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Pursue the acquisition of additional open space in SFHAs | New | BoS | 2012-2017 | High | CI* | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | 9.0 | | | | | | | | | -1 | -2.0 | 7.0 | | |
| Continue to aggressively pursue wetlands protection and incorporate performance standards into subdivision reviews | New | PZC | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | 9.0 | | | -0.5 | | | | | | | -0.5 | -1.0 | 8.0 | |
| Structural Projects | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Utilize the recently available extreme rainfall data to determine existing culvert sizing and encourage upgrades where undersized | New | DPW | 2012-2017 | Moderate | CI | 0.5 | 1 | 1 | 0.5 | 1 | 1 | | | | | | 7.0 | | | | | | | | | -1 | -2.0 | 5.0 | | |
| Continue to perform catch basin and culvert surveys to prioritize upgrades and perform maintenance and cleaning | Existing | DPW | 2012-2017 | Moderate | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | 0.5 | | | | | 7.5 | | | | | | | | | | 0.0 | 7.5 | | |
| Upgrade culverts along Blissville Brook to reduce the chance that roads will overtop during severe storm events | New | DPW | 2017-2022 | High | CI | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | | | | | 8.5 | | | | | | | | | -0.5 | -2.5 | 6.0 | | |
| WIND DAMAGE RELATED TO HURRICANES, SUMMER STORMS, TORNADOES, AND WINTER STORMS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Property Protection | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Promote the use of functional shutters for older buildings | New | ZEO | 2012-2017 | Minimal | OB | 1 | 0.5 | 1 | 1 | 1 | 0.5 | | | | | | 6.0 | | | | | | | | | | 0.0 | 6.0 | | |
| Make information on wind-resistant construction techniques available to all building permit applicants | New | BI | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 8.0 | | | | | | | | | | 0.0 | 8.0 | | |
| Emergency Services | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Identify a location for a brush-disposal operation for dealing with debris following wind storms and determine potential reuse | New | DPW | 2012-2017 | Minimal | CI | 0.5 | 1 | 1 | 1 | 1 | 1 | | | | | | 7.5 | | | | | | | | | | 0.0 | 7.5 | | |
| Consider surveying all Town-owned buildings to determine their ability to withstand wind loading | New | BI | 2012-2017 | Low | OB | 1 | 0.5 | 1 | 0.5 | 1 | 0.5 | | | | | | 5.5 | | | | | | | | | | 0.0 | 5.5 | | |
| Develop agreements with landowners and companies to chop/chip to ensure backup plans are in place for debris removal | New | DPW, FS | 2012-2017 | Low | OB | 0.5 | 0.5 | 1 | 0.5 | 1 | 0.5 | | | | | | 5.0 | | | | | | | | | | 0.0 | 5.0 | | |
| Public Education and Awareness | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Visit schools and educate children about the risks of wind events and how to prepare for them | New | FD | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | | | | | | 7.0 | | | | | | | | | | 0.0 | 7.0 | | |
| WINTER STORMS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Consider conducting a study to identify buildings vulnerable to roof damage or collapse from heavy snow in the town | New | BI | 2012-2017 | Moderate | OB | 1 | 1 | 1 | 0.5 | 0.5 | 1 | | | | | | 7.0 | | | | | | | | | | -0.5 | -1 | -2.5 | 4.5 |
| Consider drafting a written plan for inspecting and prioritizing the removal of snow from Town-owned structures | New | BI, FS | 2012-2017 | Low | OB | 0.5 | 1 | 1 | 1 | 1 | 0.5 | | | | | | 6.5 | | | | | | | | | | 0.0 | 6.5 | | |
| Continue making funding available to the Public Works Department each year for clearing snow from roads and parking lots | New | BoS | 2012-2017 | High | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | | | | | | 7.0 | | | | | | | | | | 0.0 | 7.0 | | |
| Provide information for protecting Town residents during cold weather and for mitigating icing and insulating pipes at residences | New | BI | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 8.0 | | | | | | | | | | 0.0 | 8.0 | | |
| Consider posting the snow plowing routes in local government buildings and on the Town's website | New | FS | 2012-2017 | Minimal | OB | 1 | 0.5 | 0.5 | 0.5 | 1 | | | | | | | 4.0 | | | | | | | | | | -0.5 | -0.5 | -1.0 | 3.0 |
| Continue to identify areas that are difficult to access during winter storm events and develop contingency plans to access such areas | New | FD, DPW | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | 8.0 | | | | | | | | | | 0.0 | 8.0 | | |
| EARTHQUAKES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ensure that Town departments have adequate backup supplies and facilities for continued functionality following an earthquake | New | FS | 2012-2017 | Moderate | OB, CI | | 0.5 | 1 | 0.5 | 0.5 | | | | | | | 3.0 | | | | | | | | | | -0.5 | -1 | -2.0 | 1.0 |
| Consider preventing residential development in areas prone to collapse such as below steep slopes or areas prone to liquefaction | New | PZC | 2012-2017 | Minimal | OB | 0.5 | 1 | 1 | 0.5 | 0.5 | 1 | 0.5 | | | | | 7.0 | | | | | | | | | | -0.5 | -0.5 | 6.5 | |

TABLE 11-1: TOWN OF LISBON STAPLEE MATRIX FOR PRIORITIZING RECOMMENDATIONS

| Implementation of Current Recommendations | Existing or New Recommendation? | Responsible Department ¹ | Schedule | Cost ² | Potential Funding Source ³ | Weighted STAPLEE Criteria ⁴ | | | | | | | | | | | | | | Total STAPLEE Score | | | |
|---|---------------------------------|-------------------------------------|-----------|-------------------|---------------------------------------|--|----------------|----------------|-----------|-------|---------------|---------------|------------------|--------|----------------|----------------|-----------|-------|---------------|---------------------|---------------|------------------|------------|
| | | | | | | Benefits | | | | | | | Costs | | | | | | | | | | |
| | | | | | | Social | Technical (x2) | Administrative | Political | Legal | Economic (x2) | Environmental | STAPLEE Subtotal | Social | Technical (x2) | Administrative | Political | Legal | Economic (x2) | | Environmental | STAPLEE Subtotal | |
| WILDFIRES | | | | | | | | | | | | | | | | | | | | | | | |
| Continue to evaluate public water supply hydrants, dry hydrants, and areas at risk of wildfire in the town | Existing | FD | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 8.5 | | | | | | | 0.0 | 8.5 | | |
| Extend fire protection to future areas identified as being particularly at-risk, such as the Pleasant View Cove Road area | New | FD, FS | 2012-2017 | Low | CI | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | -0.5 | | | | | | -0.5 | -1.5 | 7.5 | |
| Continue to support public outreach programs to increase awareness of forest fire danger, equipment usage, and protecting homes | New | FD | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 0.5 | 1 | 8.0 | | | | | | | | 0.0 | 8.0 | |
| Ensure that provisions of Town regulations regarding fire protection facilities and infrastructure are being enforced | New | FS | 2012-2017 | Low | OB | 0.5 | 0.5 | 1 | 0.5 | 1 | 0.5 | | 5.0 | | | | | | | | 0.0 | 5.0 | |
| Perform maintenance and repairs on the Town's dry hydrants such that fire flows from these sources are unimpeded | New | DPW | 2012-2017 | Moderate | OB | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 9.0 | | | | | | | -0.5 | -0.5 | -1.5 | 7.5 |
| DAM FAILURE | | | | | | | | | | | | | | | | | | | | | | | |
| Include structures within the dam failure inundation areas in the Reverse 9-1-1 contact database | New | FS | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | -0.5 | | -0.5 | | | | | | -1.0 | 7.0 |
| Work with CT DEEP to ensure that the owners of high hazard dams have current EOPs and keep local copies | New | FS | 2012-2017 | Minimal | OB | 1 | 1 | 1 | 1 | 1 | 1 | | 8.0 | | | | | | | | | 0.0 | 8.0 |
| Provide assistance to the owners of lesser ranked dams regarding resources available for inspections and maintenance | New | FS | 2012-2017 | Minimal | OB | 0.5 | 0.5 | 0.5 | 0.5 | 1 | | 0.5 | 4.0 | | | | | | | | | 0.0 | 4.0 |
| Create an EOP for Lower Blissville Pond Dam and submit it to DEEP | New | DPW | 2012-2017 | Low | OB | 1 | 1 | 1 | 1 | 1 | 1 | 0.5 | 8.5 | -0.5 | | -0.5 | | | | | | -1.0 | 7.5 |

NOTES

- Departments:
 - BI = Building Inspector
 - BoS = Board of Selectmen
 - DPW = Department of Public Works
 - FD = Fire Department
 - FS = First Selectman
 - PZC = Planning & Zoning Commission
 - ZEO = Zoning Enforcement Officer
- Minimal = To be completed by staff or volunteers where costs are primarily printing, copying, or meetings; Low = Costs are less than \$10,000; Moderate = Costs are less than \$100,000; High = Costs are > than \$100,000.
- OB = Operating Budget; CI = Capital Improvement budget; a * indicates that grant funding is needed and will be pursued
- A beneficial or favorable rating = 1; an unfavorable rating = -1. Technical and Financial benefits and costs are double-weighted (i.e. their values are counted twice in each subtotal)

APPENDIX A
ADOPTION RESOLUTION

RESOLUTION

TOWN OF LISBON HAZARD MITIGATION PLAN UPDATE

WHEREAS, the Town of Lisbon has historically experienced severe damage from hazards and is continues to be vulnerable to the effects of flooding, thunderstorms, high wind, winter storms, wildfires, earthquakes, and dam failure, resulting in loss of property and life, economic hardship, and threats to public health and safety;

WHEREAS, the Southeastern Connecticut Council of Governments, of whom the Town of Lisbon is a member, has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its Hazard Mitigation Plan Update under the requirements of 44 CFR 201.6;

WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedures for the Town of Lisbon;

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific hazards that impact the Town of Lisbon, with the effect of protecting people and property from loss associated with those hazards;

WHEREAS, adoption of this Plan will make the Town of Lisbon eligible for funding to alleviate the impacts of future hazards;

NOW THEREFORE BE IT RESOLVED by the Board of Selectmen of the Town of Lisbon that:

1. The Plan is hereby adopted as an official plan of the Town of Lisbon;
2. The respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
3. Future revisions and Plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution.
4. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen by October 1 of each calendar year.

APPROVED by the Board of Selectmen this 26th day of November, 2012.



Thomas W. Sparkman
First Selectman

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