

The City of Springfield

Local Natural Hazards Mitigation Plan



Adopted by the Springfield City Council - TBD 2022

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

ACKNOWLEDGEMENTS

Springfield Mayor Domenic J. Sarno extends his special thanks to the Springfield Natural Hazards Mitigation Planning Committee as follows:

Bernard Calvi, Springfield Fire Department Commissioner

Lindsay Hackett, Deputy Chief Administrative Financial Officer

Melanie Acobe, Budget Director

Chris Cignoli, Department of Public Works (DPW) Director

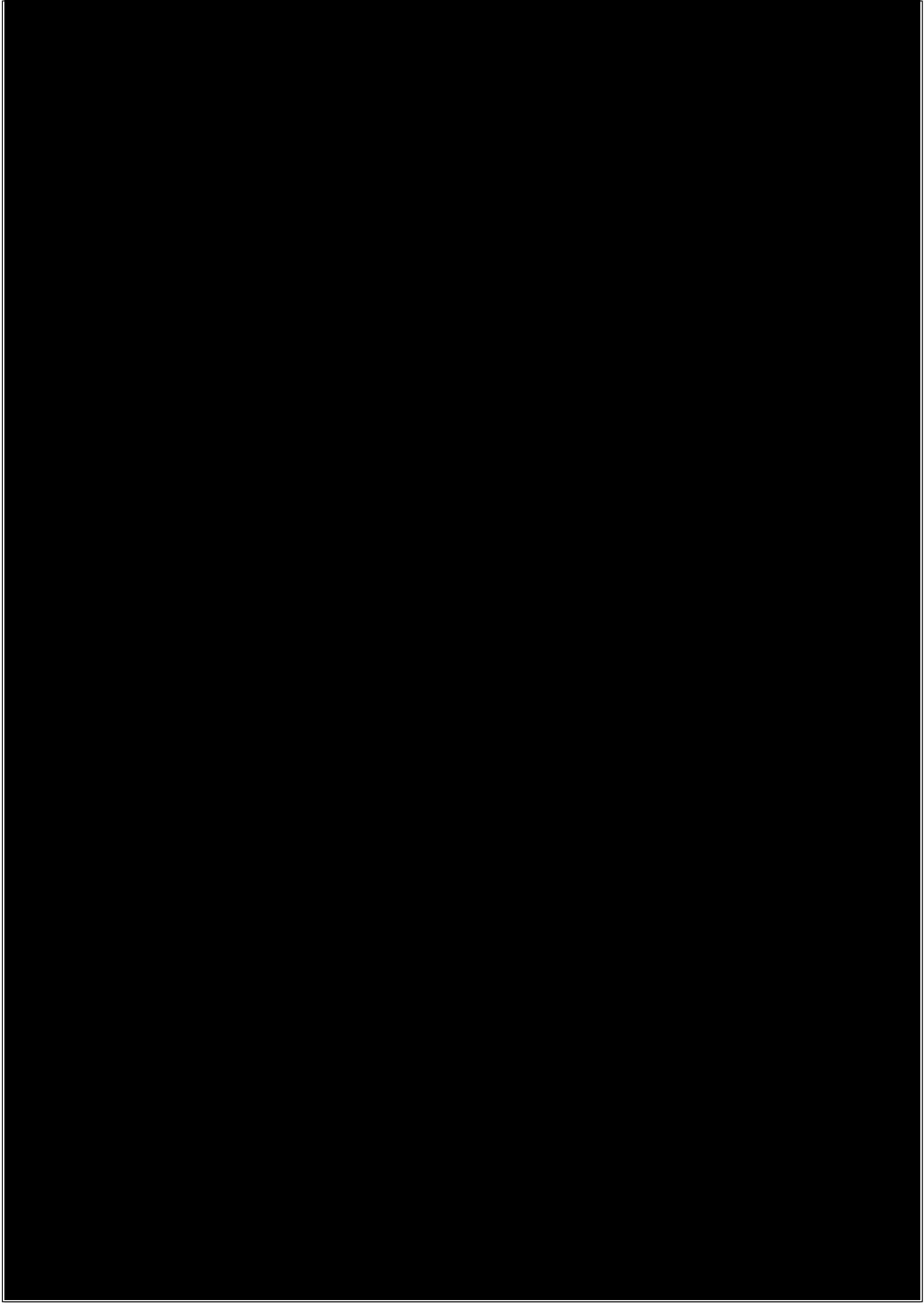
Patrick Sullivan, Executive Director of Parks, Buildings & Recreation Management

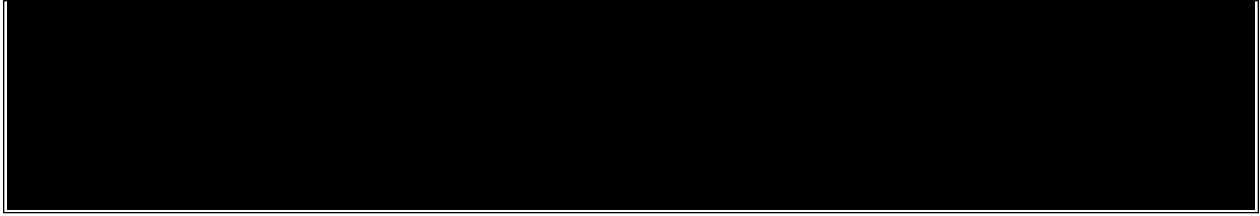
Elyssa Parrish, Budget Analyst

Ciara Hanlon, Senior Budget Analyst

Springfield Mayor Domenic J. Sarno offers thanks to the Massachusetts Emergency Management Agency (MEMA) for developing the Commonwealth of Massachusetts Natural Hazards Mitigation Plan (www.state.ma.us/dem/programs/mitigate/index.htm) which served as a model for this plan.

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INTRODUCTION

Hazard Mitigation

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

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

Preparation of a local natural hazard mitigation plan before a disaster occurs can save the community money and facilitate post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in the plan. FEMA requires that a community adopt a pre-disaster mitigation plan as a condition for mitigation funding. For example, the Building Resilient Infrastructure and Communities (BRIC) Program, the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation Program (PDM) are programs with this requirement.

Planning Committee

To facilitate the development of all action plans and implementation schedules, an ad-hoc working committee met regularly. The group consisted of Fire Commissioner Bernard Calvi, Department of Public Works Director Chris Cignoli, Former Director of Emergency Preparedness Robert Hassett, Former Budget Director Melanie Acobe and Former Administration & Finance Budget Analyst Elyssa Parrish.

Planning Process

The natural hazard mitigation planning process for the City of Springfield included the following tasks:

- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding.
- Identifying and assessing the policies, programs, and regulations the community is currently implementing to protect against future disaster damages.

- Identifying deficiencies in the current capabilities and establishing goals for updating, revising or adopting new strategies.
- Adopting and implementing the final Local Natural Hazards Mitigation Plan.

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

An important part of the planning process was reviewing and incorporating relevant plans, studies, report and technical information of current capabilities and areas of opportunity for future mitigation measures. The Natural Hazards Mitigation Planning Committee reviewed and incorporated, when possible, the following:

- Massachusetts State Hazard Mitigation Plan
- City of Springfield Capital Improvement Plan (CIP)
- City of Springfield Hazard Mitigation Plan 2015
- Open Space and Recovery Action Plan
- Comprehensive Emergency Management Plan (CEM Plan)
- Zoning Ordinances
- Subdivision Regulations
- National Flood Insurance Program
- Building/Housing Codes
- Flood Insurance Study for Hampden County
- Springfield Community Development Plan
- Springfield Landslide Hazards
- USACE Flood Damage Reduction Segment/System Inspection Report

Other resources used in the development of the Natural Hazards Mitigation Plan are documented as footnotes throughout this document.

Public Committee Meetings

June 29, 2021, 10:00 am: Working committee meeting held at Springfield City Hall, Conference Room 310. Kickoff Meeting for the Hazard Mitigation Plan, reassessed hazard severity levels facing the City of Springfield, discussed timetable for the Hazard Mitigation Plan completion.

July 26, 2021, 1:00 pm: Working committee meeting held via Zoom. Updated tables in Hazard Mitigation Plan, specifically effectiveness, potential improvements and expansions, and critically affected facilities.

September 14, 2021, 1:00 pm: Working committee meeting held via Zoom. The meeting was attended by planning committee members, and agenda items included updating the City's action plan and a prioritization of action items. (Appendix F), as well as specific parts of the 2016 plan, i.e. wildfires/brushfires, landslides and dam repair in Springfield.

The plan was posted on the City website and committee members made hard copies available at the all Springfield City Libraries for all residents, businesses and other concerned parties. The plans were made available in this manner for 21 days. Springfield residents and citizens from adjacent municipalities, such as East Longmeadow, Chicopee and West Springfield, were encouraged to comment on Springfield’s plan. In addition to posting the draft plan on the City’s website, the committee complied with open-meeting laws by posting the meeting on the City’s public calendar and by posting a notice on the public bulletin board providing the date, time, location, and agenda of the meeting. During the 21 days the plan was posted, we received one comment on behalf of the Advocacy and Community Engagement Coordinator of the Springfield Preservation Trust. The purpose of the comment was to inform us that the Mill River Dam project and Forest Park projects may be protected by their eligibility to be listed on the National Register of Historic Places. This was taken into consideration in the development of this plan by verifying this information and dispersing the findings to the individuals associated with the Capital Improvement Plan.

Public Meetings

Public and Neighboring Jurisdiction Involvement in the Planning Process

In order to update the plan, internal planning sessions were held with key departments to discuss roles, responsibilities and project prioritization. Below is a sample of those meeting occurrences:

Table 1.1: City Internal Planning Sessions		
Departments	Topic	Date & Time
SFD, A&F, DPW, Parks	Hazard Mitigation Plan Review	June 29, 2021, 10:00 AM
SFD, A&F, DPW	Hazard Mitigation Plan Review	July 26, 2021, 1:00 PM
Hazard Mitigation Planning Committee	Prioritized Action Plan	September 14, 2021 1:00 PM

Additionally, the Western Region Homeland Security Advisory Council (WRHSAC) and the Regional Emergency Planning Committees of Western Massachusetts were kept informed of the Hazard Mitigation planning process underway in Western Massachusetts since 2005. The WRHSAC includes representatives of all emergency disciplines who are charged with bringing the information they learn at the meetings back to their colleagues. In this way, emergency response professionals, fire fighters, police officers, EMT’s, municipal officials, dispatchers, and transit officials from all of Western Massachusetts have been educated about hazard mitigation planning in the region and have been specifically encouraged to review and comment on neighboring jurisdictions plans.

Plan Implementation & Monitoring

The implementation of the Springfield Local Natural Hazards Mitigation Plan began following its formal adoption by the Springfield Mayor and approval by MEMA and FEMA. Specific City departments and boards have been responsible for ensuring the development of policies, ordinance revisions, and programs, since its formal adoption in 2015. Our Springfield Natural Hazards Planning Committee will continue to oversee the implementation of the plan upon its updated adoption in 2021.

The Springfield Local Natural Hazards Mitigation Plan has been incredibly successful. Since 2015, many projects have been started and completed to establish more disaster resilience for the City of Springfield. Once the Hazard Mitigation Plan was developed in 2015, Springfield became eligible for grant funds that helped the community become better equipped to respond to natural disasters. For example, using awarded Hazard Mitigation Grant Program (HMGP) Funds, we were able to begin projects on Tiffany St., and South Branch Parkway to minimize roadway flooding. Building disaster resilience has been a coordinated effort between elected officials, appointed bodies, city employees, along with regional and state agencies involved in disaster mitigation, and the general public.

The Springfield Natural Hazards Planning Committee has met annually or as needed (i.e., following a natural disaster) to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm for strategies to remove obstacles to implementation. Responsible parties with a representative on the Springfield Natural Hazards Planning Committee, are tasked with seeing that the actions are implemented and will continue to report on their progress at the annual plan review meetings. Outreach to the public, surrounding communities, agencies, businesses, academia, non-profits, or other interested parties outside the City of Springfield has been done in advance of each annual meeting to solicit their participation in assessment of the plan. Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different City departments and/or revise the goals and objectives contained in the plan. At a minimum, the committee will continue reviewing and updating the plan every five years.

To gain continual public input, the Hazard Mitigation Plan will be a topic open for discussion at regularly held City Open Space Committee meetings.

Various departments have been able to collaborate on a multitude of projects with the funds received from the Hazard Mitigation Grant Program (HMGP). The HMGP funds have been instrumental in accomplishing major projects in Springfield that improve our position against potential environmental and manmade disasters.

Some of the projects that the Department of Public Works has accomplished with these funds have been to improve the structural integrity of Connecticut River dikes, and to improve drainage capacities of roadways throughout the city by repairing drainage culverts. The Department of Parks, Buildings & Recreation Management has been able to make citywide dam improvements, and construct much needed bridge upgrades to city owned bridges, ensuring vehicular and pedestrian safety. Prior to receiving funding through the HMGP, this project had been deferred fifteen years, due to budgetary constraints.

To help build a resilient community for city officials and constituents, the City of Springfield has begun working on several projects to help increase disaster resilience. Across several departments, actions have been implemented since the initial Hazard Mitigation Plan was adopted in 2015. Since 2015, we have used the grant funds we were eligible for to improve the structural integrity of Connecticut River Dikes, remove debris from Watershops' pond to repair the dam, as well providing Watershops' pond with upgrades to restore hydropower. The Department of Public Works (DPW) has also been able to upgrade the flood prevention system,

repair a box culvert on South Branch Parkway and dredge steams near Tiffany Street to control road flooding.

Plan Incorporation & Review

The Springfield Natural Hazards Planning Committee includes in their regular business a periodic review of the plan, and assesses the need for any updates. The committee is proactive and mindful regarding any strategic opportunities to include defined hazard mitigation measures in other planning initiatives taken on by the City. For example, after the June 1, 2011 tornado hit the City, hazard mitigation measures were incorporated in the City's standing long-term recovery plan and capital improvement plan. This will serve as a model by which hazard mitigation should be prioritized, city-wide.

The City monitors this plan using a combination of annual meetings of the Natural Hazards Planning Committee and follow up on specific projects by responsible City staff. When needed, site visits and additional follow up with stakeholders occur for actions outlined in the mitigation strategy.

A scheduled annual review of the plan by the Natural Hazards Planning Committee will continue being conducted at a regular meeting. At that time, the Natural Hazards Planning Committee will review the hazard mitigation measures that have been implemented to that date, and determine whether these measures have positively affected the overall hazard and/or reduced vulnerability. This review may include follow-up site visits to appropriate locations where mitigation measures have been implemented. Mitigation measures that have not been implemented will be reviewed to determine if they still will minimize natural hazards, or if they are no longer a viable option. Additionally, the Natural Hazards Planning Committee team will determine any new options to include in future updates of the plan.

LOCAL PROFILE

Community Setting

The City of Springfield is the largest City in the Pioneer Valley Region. It is the third largest community in the Commonwealth of Massachusetts. Together with the Cities of Holyoke and Chicopee, and their neighboring communities, Springfield comprises the fourth largest metropolitan area in New England.

A largely developed and urbanized City comprised of 33 square miles (approximately 21,147 acres), Springfield is located on the eastern bank of the Connecticut River in Western Massachusetts, just north of the Connecticut state line.

Settled in 1636, Springfield has several historic and distinct neighborhoods in addition to a newly revitalized Central Business District. These neighborhoods earned the City its nickname of the “City of Homes.” Springfield is also known as the “City of Firsts” paying homage to its history as the birthplace of the first gasoline-powered automobile and motorcycle, and the game of basketball.

Springfield is home to eight of the region’s twenty largest employers, including Baystate Medical Center, Mass Mutual Life Insurance, Eastman, and Smith & Wesson. Major visited attractions include MGM Springfield, Springfield Symphony Hall, City Stage, MassMutual Center, Springfield Amory National Historic Site, The Basketball Hall of Fame, Forest Park, and the Springfield Library and Museums Association – all of which are located in a historic downtown campus setting. Springfield is also home to four colleges and four hospitals.

MGM Springfield has committed to further developing the downtown metropolitan area of Springfield, providing 3,000 jobs to residents of Springfield and neighboring communities. MGM Springfield is contributing funds to revitalize Court Square, a historic location of Springfield by renovating Court Square Hotel property at 13-31 Elm Street. The property is expected to include 74 apartments, and retail/restaurant space on the first two floors.

Infrastructure

Springfield’s infrastructure reflects its dense, urban roots coupled with its location along the Connecticut River.

Roads and Highways

Springfield is located just south of the intersection of two of New England’s most significant interstate highways – Interstate 91, traveling north-south from Canada to the Connecticut shoreline, and Interstate 90 (the Massachusetts Turnpike), traveling east-west from Boston, MA to Seattle, WA. While Interstate 91 actually passes through the City, between the river and downtown Springfield, access to Interstate 90 from the City is provided by a bypass route, Interstate 291. Other key routes include Route 20, Route 83, and Route 21, in addition to several major thoroughfares.

Rail and Transit

The region's interstate bus and Amtrak train stations are located in downtown Springfield. The City is also the hub of the regional bus service provided by the Pioneer Valley Transit Authority. In 2020, the city completed an \$80,000,000 renovation at Union Station which is now the intermodal hub for the Pioneer Valley.

Public Water and Sewer Service

Springfield's public water and sewer service is managed through the Springfield Water and Sewer Commission.

The Commission's source of supply is the Little River in Western Massachusetts with raw water storage at its Borden Brook and Cobble Mountain Reservoirs. All water is filtered at the West Parish Filtration Plant in Westfield, and then stored in tanks at Provin Mountain, before flowing through 580 miles of distribution system piping to the Commission's customers in Springfield and Ludlow. All water flows by gravity from the reservoirs to the Commission's service area. In addition, the Commission owns and maintains four drinking water pumping stations to increase pressure in certain portions of the service area.

The Springfield Regional Wastewater Treatment Facility (SRWTF) is the largest of 171 activated sludge facilities in New England and second in size in the region only to Boston's primary treatment plant. Located in Agawam, Massachusetts, the SRWTF presently treats the domestic and industrial wastes from eight communities, including Springfield.

The Commission serves a total population of approximately 250,000. The Commission services approximately 43,500 water and 550 fire accounts throughout the water distribution system in Springfield and Ludlow. The Commission services approximately 36,400 accounts in the Springfield sewer system.

Natural Resources

Even as a regional center that is mostly built-out, Springfield is continually shaped by several of its natural resources and amenities.

Water Resources

The most significant of Springfield's natural resources is the Connecticut River flowing along its western border.

There are 28 lakes and ponds in Springfield. These are: Bass Pond, Mill Pond, Breckwood Pond, Island Pond, Porter Lake, Watershops Pond, Loon Pond, Five Mile Pond, Long Pond, Mona Lake, Dimmock Pond, Quarry Pond, Van Horn Upper Reservoir, Van Horn Lower Reservoir, Carp Pond, Swan Pond, Barney Pond, Fountain Lake, Porter Lake, Duck Pond, Lower Duck Pond, Aquatic Gardens(5), Venture Pond, and Lake Lorraine.

There are several tributaries to the Chicopee and Connecticut Rivers. These are: Abbe Brook, North Branch Mill River, South Branch Mill River, and Schneelock Brook.

Additionally, Springfield contains about 115 acres of wetlands, and several miles of inner riparian zone habitat.

These water resources all provide important wildlife habitat, flood storage capacity, and recreation outlets, and in some cases they are water supply sources as well.

Forests and Fields

Almost 20% of the total acreage of Springfield remains forested, approximately 4,100 acres. The predominant forest habitat in Springfield is the northern hardwoods hemlock. Species vary with the topography but consist primarily of hemlock, beech, sugar maple, and yellow birch.

There are also a few hundred (approximately 383) acres of cropland, pastureland, and open land in Springfield, providing additional vegetation types and habitat opportunities.

It is worthwhile to note that the majority of these forested and open lands are within Springfield's public parks.

Development

Springfield's growth was initiated first by farmers, then by industry and commercial development, and more recently by commercial and residential redevelopment. But the City's topography, soils, and physiography (lakes, rivers, wetlands and watershed areas), shape and constrain these land use patterns.

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

The Springfield Zoning Ordinance was updated in August 2013, and establishes twenty base zones and six overlay zones:

- Seven residential districts: Residence A-1, Residence A, Residence B, Residence B-1, Residence C, Residence C-1 (Residential Project Districts), Residence C-2 (High-Rise Apartment Districts)
- One residence-office district: Office A (Residence-Office)
- Two commercial districts: Commercial P (Parking Lot), Commercial A (Neighborhood)
- Five business districts: Business A (General), Business B (Service), Business B-1 (Corporate Campus), Business C (CBD), Business D (Regional Shopping)
- Three industrial districts: Mixed Use Industrial, Industrial Park, Industrial A
- One open space district: Park and Open Space
- One riverfront district: Connecticut Riverfront
- Six overlay districts: West Columbus Urban Renewal District, Neighborhood Commercial District, Floodplain District, Smart Growth Overlay District, and Casino District.

Although all appropriate zoning is relevant to protecting the health and safety of the City residents, two of Springfield's districts are specifically relevant to natural hazard mitigation:

- Floodplain District - The floodplain overlay applies to those areas within the boundary of the one-hundred-year flood that are considered hazardous according to FEMA. It limits some uses in order to prevent potential flood damage.
- Connecticut Riverfront District - The purpose of this district is to protect and preserve the river from potentially damaging pollution or environmental degradation by regulating certain uses along its banks. The regulations state specific prohibited and restricted uses, regulates drainage, details site plan requirements and special permit procedures.

The Zoning Ordinance also establishes a Site Plan/Special Permit Approval procedure for specific uses and structures within Springfield. This review allows the Special Permit Granting Authority the ability to review development to ensure that the basic safety and welfare of the people of Springfield are protected, and includes several specific evaluation criteria that are relevant to natural hazards.

Current Development Trends

Today, the vast majority of Springfield's 17 square miles is residential land, totaling close to 10,729 acres. Undeveloped land is the second most prolific land use, totaling close to 4,510 acres. Land used for commercial and industrial uses constitutes a relatively large 1,718 acres, and 1,523 acres, respectively. There is also a significant amount of land characterized as urban open/public land at 1,593 acres, and there are 694 acres of outdoor recreational land. Agricultural land constitutes a relatively small 112 acres, as to be expected in an urbanized area.

Springfield's zoning laws and land use regulations reflect the needs of a mature community that is, for the most part, completely built out. The City encourages uses in commercial, residential and industrial locations, and promotes residential density in the downtown. Development is regulated by the City Planning Board and occurs where public infrastructure already exists. Development status and plans are tracked by the City Planning Board. Approvals in future development are made with an effort to decrease vulnerability.

Whenever federal funding is used on projects, environmental review is triggered through the Department of Technical Assistance and Compliance. The work of the Department of Technical Assistance and Compliance, along with the Department of Disaster Recovery and Business Continuity is made in an effort to make Springfield more resilient in the face of severe weather events.

TABLE 2.1: SUMMARY OF SPRINGFIELD DEVELOPMENT AND DEVELOPMENT PLANS					
Name	Status	Year	Housing Units	Commercial Square Feet	Project Type
Worthington Street Redevelopment	Projected	2027	45	33,000	Mixed Use
Kitteridge Building	Projected	2028	50	25,000	Mixed Use
New Courthouse Development	Projected	2030	100	290,000	Mixed Use

Springfield Courthouse Redevelopment	Projected	2030	50	60,000	Mixed Use
Brightwood Elementary School	Planning	2021		150,500	Commercial
AIC Campus Improvements	Planning	2021	32	13,753	Mixed Use
New Court Terrace/Rainville	Planning	2022	92		Residential
11-21 Stockbridge Street	Planning	2023		5,000	Commercial
195 State Street/First Resource	Planning	2024	35		Residential
113-115 State Street	Planning	2025	35	45,000	Mixed Use
1139-1155 Main Street	Planning	2025	60	55,000	Mixed Use
Residences at the Vault	Planning	2025	52		Residential
Gemini Site Redevelopment	Planning	2025	33		Residential
Eastfield Mall Redevelopment	Planning	2025	276	500,000	Mixed Use
Focus Springfield TV	Planning	2026		47,500	Commercial
Baystate Place Apartments	Construction	2023	346		Residential
31 Elm Street Court Square Project	Construction	2023	74		Residential
New Parking Garage	Construction	2024		25,000	Commercial
Silverbrick Lofts	Completed	2015	282		Residential
Springfield Union Station	Completed	2017		62,000	Commercial
Riverfront Park Renovations	Completed	2018			Public
Holiday Inn Express	Completed	2018		30,000	Commercial
MGM Springfield	Completed	2018	54	694,157	Mixed Use
CRRC North America	Completed	2018		220,000	Commercial
Springfield Conservatory of the Arts School	Completed	2019		776,000	Commercial
Overland Lofts	Completed	2020	60	6,000	Mixed Use
City Hall Rehabilitation	Completed	2020			Public
165 Liberty Street Redevelopment	Completed	2020		20,000	Commercial
Wahlburgers	Completed	2021		4,500	Commercial
Jackalope	Completed	2022		3,100	Commercial
Del Ray Taqueria & Bar	Completed	2022		3,400	Commercial
Shaking Crab Restaurant	Completed	2022		7,500	Commercial
Redevelopment of Former Marriot	Completed	2022		265 rooms	Commercial
Burger King	Completed	2022		4,500	Commercial
Duc-Pac Corp	Completed	2022		75,000	Commercial

Development in Hazard Areas

Hazards identified in this plan are regional risks and, as such, all new development falls into the hazard area. The exception to this is flooding. According to the Community Information System (CIS) of FEMA, there were 87 insured residential structures located within the Special Flood Hazard Area (SFHA) in Springfield as of 2015, the most current records in the CIS for the City

of Springfield. It should be noted that Grochmal Avenue has several mobile homes located in the 100-year floodplain, and that the 500-year floodplain includes downtown parcels between Bliss Street and Leete Street.

Future Development

The City of Springfield is largely developed, with most of the identified potential future land uses expected to be redevelopment. As new development and redevelopment occurs it is subject to the latest building code requirements and zoning regulations pertaining to wind, earthquakes, and flooding. With the exception of flooding, natural hazard risk rates do not vary across Springfield, and any potential development in flood zones must adhere to local ordinances designed to mitigate risk. Overall, future potential development would not significantly increase the Town's vulnerability, as long as existing regulations are adhered to.

HAZARD IDENTIFICATION & ANALYSIS

Natural Hazard Profiling Methodology¹

In order to adeptly profile each of the hazards, a Hazard Identification and Analysis Matrix was prepared to organize the information that was gathered for this project.

The matrix is organized into the following sections: Type of Hazard, Location of Occurrence, Impact, Previous Occurrences, Probability of Future Occurrence, and Hazard Index. The Hazard Index was completed to rank the hazards according to the frequency of occurrence and the amount of potential damage likely to occur. The Hazard Index forms the basis for concentrating the future mitigation efforts outlined in this plan. A description of each of the matrix categories is provided below.

Location of Occurrence

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

Table 3.1: Location of Occurrence, Percentage of City Affected of Given Natural Hazard	
Location of Occurrence	Percentage of City Affected
Large	More than 50% of the City affected
Medium	10 to 50% of the City affected
Small	Less than 10% of the City affected

Impact

¹ Source: information adapted from Town of Holden Beach, NC Community-Based Hazard Mitigation Plan, July 15, 2003, and Hyde County, NC Multi-Hazard Mitigation Plan, Sept 2002; and the Massachusetts Emergency Management Agency (MEMA).

The impact an affected area could potentially suffer were classified according to the following scale:

Table 3.2: Impact, Magnitude of Multiple Impacts of Given Natural Hazard	
Impact	Magnitude of Multiple Impacts
Catastrophic	Multiple deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
Critical	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1
Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.
Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

Previous Occurrences

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

Probability of Future Occurrence

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

Table 3.3: Probability of Future Events of Given Natural Hazard	
Probability of Future Event	Annual Likelihood of Event
Very High	70-100% probability in the next year
High	40-70% probability in the next year
Moderate	10-40% probability in the next year
Low	1-10% probability in the next year
Very Low	Less than 1% probability in the next year

Hazard Index

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

The Hazard Ratings are labeled as follows:

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

Profiling the Natural Hazards

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

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

Table 3.4: Hazard Profiling and Risk Index Worksheet					
Type of Hazard	Location	Impact	Previous Occurrences	Probability of Future Events	Hazard Risk Index Rating
Flooding (100-year)	Medium Large	Minor	Yes	Low	3
Flooding (localized)	Medium	Limited	Yes	Medium-High	2
Hurricanes/Severe Wind	Large	Minor	Yes	Low	3
Severe Snow/Ice Storms	Large	Limited	Yes	Very High	3
Wildfire/Brushfire	Small	Minor	Yes	High	3
Man-Made Hazard: Hazardous Materials	Large	Limited	No	Very Low	2
Dam Failure	Small	Limited	No	Very Low	3
Table 3.4: Hazard Profiling and Risk Index Worksheet					
Type of Hazard	Location	Impact	Previous Occurrences	Probability of Future Events	Hazard Risk Index Rating
Landslide	Small	Limited	Yes	Low	4

Tornado/Microburst	Small	Catastrophic	No	Very Low	4
Earthquake	Large	Catastrophic	No	Very Low	4
Drought	Small	Minor	No	Very Low	5
Extreme Temperature	Large	Minor	Yes	High	5
Tsunami*	N/A	N/A	No	N/A	N/A
Coastal Flooding*	N/A	N/A	No	N/A	N/A

*The City of Springfield is not a coastal community, and as such, would harbor no threats of impact.

Natural Hazard Identification and Vulnerability Assessment

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

Vulnerability Assessment Methodology

In order to determine estimated losses due to natural hazards in Springfield, each hazard area was analyzed with results shown below. The data below was calculated using FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses*, August 2021.

Total Value of all Structures in Springfield (2022): \$9,996,905,540.00

Total Number of Housing Units (2019): 62,042

Median Value of a Home in Springfield (2015-2019): \$156,200

Average Household Size (2015-2019): 2.64 persons

Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. The damage calculations are rough estimate and likely reflect worst-case scenarios. Computing more detailed damage assessments based on assessor's records is a labor-intensive task and beyond the scope of this project.

Springfield. Continental storms, which originate from the west and continually move across the region. These storms are typically low-pressure systems that may be slow-moving frontal systems or more intense, fast-moving storms. Precipitation from coastal storms, also known as nor'easters, that travel into New England from the south constitute the second major storm type. In the late summer or early fall, the most severe type of these coastal storms, hurricanes, may reach Massachusetts and result in significant amounts of rainfall. The third type of storm is the

result of local convective action. Thunderstorms that form on warm, humid summer days can cause locally significant rainfall.

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

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

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

A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large “sponges” to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into fertile, productive farmland like that found in the Connecticut River valley. In the past, floodplain areas were also often seen as prime locations for development. Industries were located on the banks of rivers for access to hydropower. Residential and commercial development occurred in floodplains because of their scenic qualities and proximity to the water. Although periodic flooding of a floodplain area is a natural occurrence, past and current development and alteration of these areas will result in flooding that is a costly and frequent hazard. In addition to damage of buildings directly in the floodplain, development can result in a loss of natural flood storage capacity and can increase the water levels in water bodies. Flood levels may then increase, causing damage to structures not normally in the flood path.

The Floodplain Map for the City of Springfield shows the 100-year and 500-year flood zones identified by FEMA flood maps. The 100-year flood zone is the area that will be covered by water as a result of a flood that has a one percent chance of occurring in any given year. Likewise, the 500-year flood has a 0.2 percent chance of occurring in any given year. In Springfield, there are several floodplain areas – primarily along the Connecticut River, North

Branch Mill River, South Branch Mill River, Mill Pond and Abbe Brook. There are some smaller 500-year floodplains mapped as well, along Grochmal Street, Avocado Street and Fisk Avenue.

The major floods recorded in Western Massachusetts during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. Springfield has experienced many flooding events over the last decade. Generally, these small floods have had minor impacts, temporarily affecting roads and residents' yards. However, Citywide flooding on October 8, 2005 caused an apartment building's roof to collapse, the most recent Citywide flooding, on October 15, 2005, blocked sections of Interstate-91, and on July 11, 2006,² another large storm caused property damage in Springfield and several municipalities around the state.

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

Flooding (100-year base flood): Medium Risk

There are approximately 474 acres of land within the FEMA mapped 100-year floodplain and 674 acres of land within the 500-year floodplain within the City of Springfield. According to the Community Information System (CIS) of FEMA, there were 88 insured residential structures located within the Special Flood Hazard Area (SFHA) in Springfield as of August 2013, the most current records in the CIS for the City of Springfield.

Specific vulnerability assessments were estimated for sites within the SFHA which have been susceptible to 100-year floods in the past, they are described below (At this time the City of Springfield has no repetitive loss properties as defined by FEMA's NFIP).

Location

Connecticut and Mill Rivers Flooding

The rising of the Connecticut and Mill Rivers would cause wide spread damage to the low lying areas. This would also cause a significant threat to the safety and health of the City's citizens. The Connecticut River borders the City on western most edge, from Chicopee to the South End Bridge. The Mill River begins at Water Shops Pond and flows southwest to the Connecticut River. These areas are protected by levees that make up the City's Flood Protection System ("FPS"). The FPS was constructed by the United States Army Corps of Engineers ("USACE") between 1937 and 1941 in response to the flood of 1936. The FPS is made up of three levee structures which the USACE inspects and reports on annually. Springfield's current accreditation status for each of its three FPS structures that run the entire length of the City's Connecticut River borders and the Mill River conduit is minimally acceptable.

The City of Springfield's Flood Protection System (FPS) consists of 11,164 ft. of concrete flood wall and 3,895 ft. of earthen embankment. It also consists of five (5) pumping stations which are

² Information on 2005 and 2006, was accessed on National Climatic Data Center website (www.ncdc.noaa.gov/oa/ncdc.html) on December 10, 2007.

under the jurisdiction of the Springfield Water and Sewer Commission (SWSC). The FPS is on the western most portion of the City, along the Connecticut River, and protects the City beginning at the Chicopee line and continues southerly to the South End Bridge. The other portion of the FPS is the Mill River Conduit. This structure consists of 1600 ft. of concrete flood walls.

The Flood Map shows the areas that would be affected should the system fail during a flooding situation (Appendix D). The system is designed to withstand the “500 Year” flood. As mentioned, Springfield’s current accreditation status is “minimally acceptable,” should the system be deemed “unacceptable” and fall from accredited status due to a poor report by the USACE, the home and business owners in the areas shown on the map would have to obtain flood insurance.

By mandate, quarterly inspection reports are provided to the USACE. The DPW utilizes these reports as a basis for needed repairs. Repairs of a magnitude beyond the resources of the DPW are outsourced. In 2021, the FPS’s Operation and Maintenance (O&M) manual was updated by outside consultants. The O&M is used as a guide by the Department for proper operation and maintenance of the system. The DPW will continue maintenance and monitoring of the FPS.

Extent

There are approximately 474 acres of land within the FEMA mapped 100-year floodplain and 674 acres of land within the 500-year floodplain within the City of Springfield. In the North End of the City, Baystate Medical Center medical facilities along Wason Avenue, Birnie Avenue and Main Street would be affected. In the South End, the Downtown Business District would suffer millions in damage; properties in this area include the Basketball Hall of Fame, MGM Springfield, and numerous restaurants and large businesses like the Balise Car Dealerships. In addition, the damage to the small business owners would be insurmountable.

The National Weather Service maintains water level gages on the Connecticut River to monitor flooding. The NWS has various flooding classifications based on water level. These classifications and their definitions are:

Action Stage is the stage which, when reached by a rising stream, represents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity. The type of action taken varies for each gauge location. Gauge data should be closely monitored by any affected people if the stage is above action stage.

Minor Flooding is defined to have minimal or no property damage, but possibly some public threat. A Flood Advisory product is issued to advise the public of flood events that are expected not to exceed the minor flood category. Examples of conditions that would be considered minor flooding include:

- water over banks and in yards
- no building flooded, but some water may be under buildings built on stilts (elevated)
- personal property in low lying areas needs to be moved or it will get wet
- water overtopping roads, but not very deep or fast flowing

- water in campgrounds or on bike paths
- inconvenience or nuisance flooding
- small part of the airstrip flooded, and aircraft can still land
- one or two homes in the lowest parts of town may be cut off or get a little water in the crawl spaces or homes themselves if they are not elevated

Moderate Flooding is defined to have some inundation of structures and roads near the stream. Some evacuations of people and/or transfer of property to higher elevations may be necessary. A Flood Warning is issued if moderate flooding is expected during the event. Examples of conditions that would be considered moderate flooding include:

- several buildings flooded with minor or moderate damage
- various types of infrastructure rendered temporarily useless (i.e. fuel tanks cannot be reached due to high water, roads flooded that have no alternates, generator station flooded)
- elders and those living in the lowest parts of the village are evacuated to higher ground
- access to the airstrip is cut off or requires a boat
- water over the road is deep enough to make driving unsafe
- gravel roads likely eroded due to current moving over them
- widespread flooding, but not deep enough to float ice chunks through town
- water deep enough to make life difficult, normal life is disrupted and some hardship is endured
- airstrip closed
- travel is most likely restricted to boats

Major Flooding is defined to have extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations are necessary. A Flood Warning is issued if major flooding is expected during the event. Examples of conditions that would be considered major flooding include:

- many buildings flooded, some with substantial damage or destruction
- infrastructure destroyed or rendered useless for an extended period of time
- multiple homes are flooded or moved off foundations
- everyone in threatened area is asked to evacuate
- National Guard units assist in evacuation efforts
- erosion problems are extreme
- the airstrip, fuel tanks, and the generator station are likely flooded
- loss of transportation access, communication, power and/or fuel spills are likely
- fuel tanks may float and spill and possibly float downstream
- ice chunks floating through town that could cause structural damage
- high damage estimates and high degree of danger to residents

These flood categories are shown in feet in the table below. The NWS data for the Connecticut River water levels at the gauge in Springfield for historic crests and the top five highest most recently measured crests, shown below, indicates that the river has reached major flood state twice since measurements began, a minimum of moderate flood stage five times, and a minimum of flood stage six times.

Flood Categories (in feet)

Major Flood Stage:	24
Moderate Flood Stage:	22
Flood Stage:	20
Action Stage:	18

Historic Crests for the Connecticut River at the Springfield Gauge		
Feet	Flood Category	Date
28.60 ft	Major Flood	03/20/1936
25.75 ft	Major Flood	09/23/1938
22.65 ft	Moderate Flood	06/01/1984
22.45 ft	Moderate Flood	11/06/1927
21.10 ft	Flood	08/19/1955

NOAA Advanced Hydrologic Prediction Service

Impact

According to the Community Information System (CIS) of FEMA, there were 88 insured residential structures located within the Special Flood Hazard Area (SFHA) in Springfield. Therefore, a vulnerability assessment for a 100-year flood equals approximately \$22.9 million of damage to residential structures, with approximately 180 people impacted.

Previous Occurrences

Since the last Springfield HMP update, the NOAA Storm Events Database has reported 16 flooding events in the Springfield area. These are shown in Table 3.5 below:

Table 3.5 Flood Events in Springfield 2015 – 2022

COUNTY	LOCATION	DATE	TIME	EVENT TYPE
HAMPDEN CO.	FEEDING HILLS	7/12/2017	1600	Flood
HAMPDEN CO.	BRIGHTWOOD	7/12/2017	1629	Flood
HAMPDEN CO.	EAST SPRINGFIELD	7/18/2017	1918	Flood
HAMPDEN CO.	ARMORY	10/24/2017	2159	Flood
HAMPDEN CO.	BRIGHTWOOD	6/28/2018	1455	Flood
HAMPDEN CO.	ARMORY	8/18/2018	1259	Flood
HAMPDEN CO.	BRIGHTWOOD	8/18/2018	1309	Flood
HAMPDEN CO.	SPRINGFIELD	8/18/2018	1311	Flood
HAMPDEN CO.	ARMORY	8/18/2018	1325	Flood
HAMPDEN CO.	BRIGHTWOOD	8/18/2018	1348	Flood
HAMPDEN CO.	ARMORY	8/18/2018	1401	Flood
HAMPDEN CO.	BRIGHTWOOD	9/26/2018	2125	Flood
HAMPDEN CO.	BRIGHTWOOD	7/6/2019	1603	Flood
HAMPDEN CO.	FOREST PARK	7/6/2019	1651	Flood
HAMPDEN CO.	ARMORY	7/6/2020	2002	Flood
HAMPDEN CO.	ARMORY	8/23/2020	1945	Flood

NOAA Storm Events Database, 2022

The DPW owned / controlled storm drainage systems, in general, have held up very well to the storm events that have occurred during the calendar year 2021. Where damage has occurred along City controlled systems was mostly at storm water outlet locations. These locations have been identified and are part of the Hazard Mitigation Plan and Capital Improvement Plan.

Probability of Future Events

1-10% probability in the next year

Vulnerability

Based on the above assessment the City of Springfield faces a Hazard Risk Index Rating of “3 – Medium” from 100-year flooding.

Flooding (localized) – Medium/High Risk

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, Springfield often experiences minor flooding at isolated locations due to drainage problems, or problem culverts.

There are a total of 27 problem culverts or other localized flooding areas are all over the City, and have been mapped on the Past and Potential Hazards/Critical Facilities Map (Appendix C). Most of the flood hazard areas listed here were identified due to past occurrences in the respective area. There are many areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff. Additionally, the vast majority of culverts throughout the City tend to be impacted by beavers, so localized flooding can potentially occur at any culvert crossing.

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

Location

Island Pond Flooding

Island Pond receives storm water runoff from four (4) storm drainage areas and pond levels rise according to the size and frequency of the rain events. There is no outlet for the pond therefore the pond elevation continues to raise causing flooding to backyards and eventually residential cellars of the homes that abut the pond. Currently there is a pump in one of the inlet manholes that turns on at preset elevations and slowly pumps the pond into an adjacent sanitary sewer. This system pumps relatively clean storm runoff into the sanitary system and there is an unnecessary cost associated with the treatment of this water. During heavy rain events the system is unable to manage the flows and flooding occurs. In addition, there are pump breakdowns and inlet blockages that contribute to the problem.

Abbe Brook Flooding

Abbe Brook has several problem areas that require mitigation. Several outlets have severe erosion which has undermined the headwalls and storm drains causing large areas of embankment to collapse and the siltation has decreased downstream capacities.

Drainage Culvert Reclamation

The City has several miles of drainage ditches in need of enhanced capacity, most notably along Roosevelt Ave from Alton Street to Wilbraham Rd. parallel to Industry Ave. and cross-country from Peekskill Ave to Greenleaf Community Center. During heavy rain events Roosevelt Ave. floods under State Street. Also, there are concerns of flooding and property damage due to decreased capacity. Culvert restoration is also necessary for Tiffany Street, Dickinson Street and South Branch Parkway locations. Both of these projects are under design at this time. South Branch Parkway has a 20' +/- deep manhole and pipe system that has failed causing sinkholes to occur. Project reconstruction has been approved by MEMA / FEMA under the HGMP program. The project will include complete replacement of the manhole structure and associated piping. On Tiffany Street, due to roadway drainage overflow, culvert side slopes have severely deteriorated. This project has also been approved by MEMA / FEMA under the HMGP program. The project is currently under design and will result in additional streambank stabilization.

Probability of Future Events

There is a moderate probability, or 10-40%, of localized flooding occurring in the next year.

Vulnerability

Based on the above analysis, the City of Springfield faces a Hazard Risk Index Rating of “2 – Medium-High” from localized flooding.

TABLE 3.5 FLOOD HAZARD MITIGATION ASSESSMENT				
Capability		Description	Effectiveness	Potential Improvements/
Flood Control Structures		Twelve dams	Somewhat effective.	Improve or remove high-risk dams.
		Connecticut River Dikes	Very effective for managing floodwaters	Maintenance of dikes to maintain structural integrity.
Culvert Replacement		Island Pond storm water pump station project	Very effective for managing flood control needs.	Prevent localized flooding from high volume storm events
		South Branch Parkway Drainage improvement project	Very effective	
		Tiffany Street Entry Dingle Brook culvert and Stream channel repairs and improvements	Very effective	
Zoning Ordinances	Floodplain District	Overlay district to protect areas delineated as part of the 100-year floodplain and special permit requirements.	Moderately effective for preventing hazardous chemical facilities from entering the floodplain; allows some uses by right and requires a special permit for	Create a table of uses that clarifies which uses are allowed by-right, special permit or not at all; then modify table of uses to prohibit high-risk uses and future construction.
	Special Permit	Applied to those uses that the City of Springfield wants to control, should a proposed project not conform to the needs of a neighborhood.	Somewhat effective for preventing incompatible development.	Consider creating more performance-based evaluations, environmental standards.
	Connecticut Riverfront District	Accommodates and controls development along the riverfront; promotes tourism, recreation.	Somewhat effective at preventing development along the riverfront.	Include setbacks from waterways and prevent construction in identified floodplains.

Sub divi sion Reg ulati ons	Preliminary and Definitive Plan	Proposed storm drainage, sewer, water supply, and major site features (including natural features) must be included.	Somewhat effective for preventing incompatible development.	None.
	Design Standards	Environmental Analysis – includes impact analysis of recharge and infiltration.	Effective for protecting natural processes like flood	None.
		Development Impact Statement – describes natural features, drainage systems	Effective for encouraging compatible development.	None.
		Storm Drainage – determines impact of development to downstream. Storm Drainage analysis will utilize increased storm intensities due to	Effective for mitigating impacts of development to downstream.	None.
		Site Preservation – significant natural and cultural sites must be noted and preserved when applicable.	Effective for protecting important natural features.	None.
		Excavation and Grading – regulates how earth removal must be conducted.	Effective for minimizing earth removal and preventing	None.
Springfi eld Co mm unit y Dev elop men t Plan		The CD Plan identifies key goals and actions to promote natural resource preservation in the City, including areas in the floodplain; such as wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks.	Effective at identifying key policy actions necessary to preserve open space.	Work to implement relevant goals and policies in Plan.
Nati onal Flo od Insu ranc e Pro gra m Part icip atio n		As of 2021, there were 87 homeowners with flood insurance policies.	Somewhat effective, provided that the City remains enrolled in the National Flood Insurance Program.	None.

Hurricanes/Severe Wind – Medium Risk

Hurricanes are the most severe type of storms known as tropical cyclones, which are low pressure systems causing thunderstorm-like activity and rotate counterclockwise. According to the National Oceanic and Atmospheric Administration (NOAA):

“A tropical cyclone that has winds of 38 mph (33 kt) or less is called a tropical depression. When the tropical cyclones winds reach 39-73 mph (34-63 kt), it is called a tropical storm. When the winds exceed 74 mph (64 kt), the storm is considered to be a hurricane.”

Hurricanes generally occur between June and November and can result in flooding and wind damage to structures and above-ground utilities. Severe wind can also occur in the absence of a hurricane, especially impacting mountain tops. Climate change will increase the threat of hurricanes and severe wind as oceans and the atmosphere warms. Climate change research indicates that storms like hurricanes will become more intense and more frequent in the future.

Location

All of Springfield is at risk from hurricanes with ridge tops more susceptible to wind damage and the flood-prone portions of town to flooding from the heavy rains. Springfield’s location in Western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience some high wind events. During hurricanes or severe wind events, the City has experienced small blocks of downed timber and uprooting of trees onto structures.

Extent

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricanes are classified according to the Saffir-Simpson hurricane wind scale, as shown below in Table 3.6. Hurricane wind intensity is rated on a scale of 1 to 5, with 5 being the most intense. For each category of wind intensity, the degree and type of damage is described.

Hurricanes are classified according to the Saffir-Simpson hurricane wind scale as follows:

Table 3.6: Saffir-Simpson Hurricane Wind Scale		
Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (Major)	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (Major)	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (Major)	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: NOAA - National Weather Service (<https://www.nhc.noaa.gov/aboutsshws.php>)

Impact

Using a total a value of all structures in City of \$10.1B (Springfield Assessors, 2023), wind damage of 5 percent with 10 percent of structures damaged would result in an estimated \$50.6M of damage. Estimated flood damage to 10 percent of the structures with 20 percent damage to each structure would result in \$202.4M of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Previous Occurrences

In Massachusetts, 17 hurricanes have had landfall since 1851, three of which impacted Western Massachusetts. These include Hurricane Carol in 1954 and Hurricane Gloria in 1985. Hurricanes are usually ranked category 1-5, using the Saffir-Simpson Scale, with category 5 hurricanes being the most severe. Both Hurricane Carol and Gloria were category 1-2 storms, meaning winds ranged from 74-110 mph with the potential for some roofing or window damage to buildings, damage to unanchored mobile homes, trees, or poor construction, and/or some minor flooding.

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

Table 3.7: Major Non-Winter Storms to Affect Springfield Area

Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
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Great Hurricane of 1938	1938	Unclear, 3 or 4
Great Atlantic Hurricane	1944	1
Carol	1954	3
Edna	1954	1
Diane	1955	Tropical Storm
Donna	1960	Unclear, 1 or 2
Groundhog Day Gale	1976	Not Applicable
Gloria	1985	1
Bob	1991	2
Floyd	1999	Tropical Storm
Allison	2001	Tropical Storm
Irene	2011	Tropical Storm
Henri	2021	Tropical Storm

Probability of Future Events

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

Vulnerability

Based on the above analysis, Springfield faces a Hazard Risk Index Rating of "3 - Medium" from hurricanes and severe wind.

The entire City would be vulnerable to the impact of a hurricane. Additionally, high winds could impact the City's communication and energy infrastructure and older buildings.

TABLE 3.8 EXISTING SEVERE WIND HAZARD MITIGATION MEASURES

Existing Strategy		Description	Effectiveness	Potential Changes
Zoning Ordinance	Mobile Homes/Trailers	Mobile homes are permitted with some additional regulations; trailers are only allowed as temporary living quarters.	Not effective for preventing damage to susceptible structures	Restricting location of mobile homes in high-hazard area and establish a buy-back program for high-risk mobile homes.

	Wireless Communications Structures and Facilities	Structures are required to be as minimally invasive as possible to the environment, have height restrictions, and must have be setback 200 % of the structure's height; 100% allowed for "stealth design towers".	Very effective for preventing damage in the case of a severe storm.	Done.
Subdivision Regs.	Design Standards	Utilities must be placed underground	Effective for preventing power loss.	Done.
State Building Code		The City has adopted the MA State Building Code.	Effective.	Done
Tree Management		List of dangerous trees created annually for Eversource.	Very effective, preventative collaboration.	Done

Severe Snow/Ice Storm – Medium Risk

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

Location

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

Extent

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

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

NESIS scores factor in the area affected by the snowstorm, the snow, and the number of people living in the path of the storm. The NESIS score varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories. The largest NESIS values result from storms producing heavy snowfall over large areas that include major metropolitan centers. Table 3.9 describes the NESIS scale and categories.

In the past, heavy snowfall events (such as the blizzards of 1978, 1993, and 2011) can lead to more than 20 inches of snow falling on Springfield. This results in damage to utility lines and reduces mobility along high-traffic roadways. Winter storms with severe ice can extensively damage above-ground utility lines. As snow and ice accumulates, falling limbs can lead to damages to infrastructure and buildings. In addition, during heavy snow years, accumulations can reach several feet deep. Springfield's historic road network often creates some steep grades,

dangerous intersections, or narrow throughways, sometimes making plowing difficult and causing snow and ice hazards.

Table 3.9: Northeast Snowfall Impact Scale Categories		
Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

Source: <http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

Impact

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all residential property in city, (\$8.7B Springfield Assessor, 2023) is used. An estimated 20 percent of damage would occur to 10 percent of structures, resulting in a total of \$173.5M worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Previous Occurrences

Springfield's recent history has not recorded any loss of life due to the extreme winter weather, but there are usually several incidents of property damage or personal injury each winter. In addition, during heavy snow years, accumulations can reach several feet deep. Springfield's historic road network often creates some steep grades, dangerous intersections, or narrow throughways, sometimes making plowing difficult and causing snow and ice hazards.

On October 31, 2011, the City of Springfield was hit with a freak snowstorm that crippled the City, leaving many residents without power for seven days, and the City with a cost of \$30 million to clean-up.

- Springfield has been subject to 23 winter storms categorized as major to extreme according to the NESIS scale since 1960. Additional historically significant winter storms to affect Springfield include the Great Snow of 1717 and the Blizzard of 1888
- Moderate risk citywide due to snow, ice and extreme cold.
- Elderly are affected by extreme weather.

Probability of Future Events

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

Vulnerability

Based on the above assessment, Springfield faces a Hazard Risk Index Rating of "3 - Medium" from severe snowstorms and ice storms.

The entire City is vulnerable to the impacts of severe snow and ice. The City's energy and communication infrastructure could be vulnerable to heavy snow or ice, which has been known to cause power outages across the region. Ice and snow buildup on roadways, as well as decreased visibility in a snow event, can make winter travel difficult and dangerous for City residents.

TABLE 3.10: SEVERE SNOW/ICE STORM HAZARD MITIGATION ASSESSMENT				
Capability		Description	Effectiveness	Potential Improvements/ Expansion
Zoning Ordinance	Wireless Communication Structures and Facilities	Structures are required to be as minimally invasive as possible to the environment, have height restrictions, and must be setback 200 % of the structure’s height; 100% allowed for “stealth design towers”.	Very effective for preventing damage in the case of a severe storm.	None.
Subdivision Regulations	Design Standards	Utilities must be placed underground at time of construction	Effective for preventing power loss.	None.
		Street grade regulations (maximum 10%)	Effective.	None.
State Building Code		The City of Springfield has adopted the Massachusetts State Building Code.	Effective	Effective.
Backup Electric Power		Identified shelters have backup power, three mobile generators	Effective	Very effective in case of power loss.
Tree Management		List of dangerous trees created annually for Eversource	Effective	Very effective, preventative collaboration.

Wildfires/Brushfire – Medium Risk

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

Location

No particular section of Springfield is more susceptible to wildfire because all of the forested areas are relatively isolated from each other. The largest contiguous area of woodland in Springfield is Forest Park in the southeast corner of the City. Hampden County has approximately 273,000 acres of forested land, which accounts for 67% of total land area. Forest fires are therefore a potentially significant issue.

Extent

In Springfield, approximately 19% of the City's total land area is in forest, or about 4,114 acres, and is therefore at risk of fire.

Wildfires can cause widespread damage to the areas that they affect. They can spread very rapidly, depending on local wind speeds and be very difficult to get under control. Fires can last for several hours up to several days.

Wildfires and Brushfires are classified according to the "Wildfire Burn Severity Classification" which identifies fire characteristics and potential damage caused:

Table 3.11: WILDFIRE BURN SEVERITY CLASSIFICATION			
	General Statements	Indicators	Interpretations
Low Fire Severity (Type III)	Primarily occur on rangeland	Duff and debris are partly burned	Root crowns and surface roots will resprout quickly (within one year)
	No sediment delivery	Soil is a normal color	Infiltration and erosion potential are not significantly changed
	Natural recovery likely	Hydrophobicity is low to absent	
		Standing trees may have some brown needles	

Medium Fire Severity (Type II)	Primarily occur on steep, lightly timbered slopes with grass	Duff is consumed	Root crowns will usually resprout
	Some sediment delivery	Burned needles are still evident	Roots and rhizomes below one inch will resprout
		Ash is generally dark colored	Most perennial grasses will resprout
		Hydrophobicity is low to medium on surface soil up to one inch deep	Vegetative recovery is one to five years
		Soil is brown to reddish-brown and up to two inches of soil is darkened from burning (below ash)	Soil erosion potential will increase due to the lack of ground cover and moderate hydrophobicity
		Roots are viable below one inch	
		Shrub stumps and small fuels are charred, but present	
		Standing trees are blackened but not charcoal	
High Fire Severity (Type I)	Primarily occurs in unprotected drainages on steep, timbered, north or east slopes with dense forest canopy	Duff consumed	Soil productivity is significantly reduced
		Uniformly gray or white ash (in severe cases ash is thin and white or light)	Some roots and rhizomes will resprout, but only those deep in soil
	Sediment delivery likely Natural recovery limited	No shrub stumps or small fuels remain	Vegetative recovery is five to ten years
		Hydrophobicity medium to high - up to two inches deep	Soil erosion potential can be significantly increased
		Two to four inches of soil is darkened (soil color often reddish orange)	
		Roots burned two to four inches	
		Soil physically affected (crusting, crystallization, agglomeration)	
		Standing trees charcoal up to one inch deep	

Source: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/programs/planning/ewpp/?cid=nrcs144p2_056249

Impact

In Springfield, approximately 19% of the City's total land area is in forest, or about 4,114 acres, and is therefore at risk of fire. Up to 4 structures could be impacted by a wildfire in one of the

City's agricultural areas. Assuming 100% damage to 100% of the structures, not including costs repairing or replacing any power lines, telephone lines, and contents of structures, a vulnerability assessment estimates approximately \$1.2M in damages for a wildfire.

Previous Occurrences

Illegal brushfires are somewhat common in Springfield. The fires that occur are small and quickly contained. According to the Springfield Fire Department, there were approximately 337 unauthorized burns (or brushfires) in 2020. However, high risk exists for potential wildfire incidents, especially near some of the City's forested, agricultural, and recreational lands. Forested and agricultural areas with high fuel content have more potential to burn. In addition, it is often very difficult to access some of the locations to extinguish the brushfire. In the past five years, the City has experienced several severe weather events that have increased the deadfall in the forested areas of the City.

The following table provides fire data for the City of Springfield from 2016 – 2020 from the Massachusetts Fire Incidence Reporting System. Brush fires would be included under "Other Fires."

Table 3.12: Fire Incidences in Springfield 2016-2020

Springfield					Population: 153,060			
	Total Fires	Structure Fires	Vehicle Fires	Other Fires	Total Arsons	Structure Arsons	Vehicle Arsons	Other Arsons
2016	782	371	87	324	24	11	7	6
2017	503	314	76	113	20	8	7	5
2018	483	296	72	115	42	20	5	17
2019	499	267	91	141	47	17	14	16
2020	640	283	80	277	63	31	11	21

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a moderate probability, 10-40% in the upcoming year, of wildfires in Springfield.

Vulnerability

Based on the above assessment, Springfield faces a Hazard Risk Index Rating of "3 - Medium" from wildfire and brushfires.

TABLE 3.13: WILDFIRE/BRUSHFIRE HAZARD MITIGATION ASSESSMENT			
Capability	Description	Effectiveness	Potential Improvements/ Expansion

Zoning Ordinance	Wireless Communications Structures and Facilities	Fire Chief is involved in final review of site plan for structure.	Effective	None
Subdivision Regulations	General	Fire Chief may be consulted on any subdivision approval.	Effective	None
	Design Standards	Fire protection is included in the required Development Impact Statement and as a part of the rules regulating water supply to the	Effective	None
Public Education/ Outreach		The Fire Department has an ongoing educational program in the schools.	Effective	None

Man-Made Hazards – Hazardous Materials – High Risk

Hazardous materials are chemical substances, which, if released or misused, can pose a threat to the environment or health. These substances come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes and businesses routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

The Toxics Release Inventory (TRI) is a publicly available EPA database that contains information on specific toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities.

Due to the development patterns of the City—residential growth radiated outwards from employment centers as the City grew—a large portion of the City's neighborhoods have evolved in and around industrial centers. This makes the risk from chemical releases significantly greater, due to the immediate impact this can have on large populations.

Springfield relies on the Massachusetts Department of Fire Services District 4 HazMat Team when responding to incidents involving hazardous materials, through a mutual aid agreement.

Location

According to TRI, there are 30 industries currently releasing hazardous materials within Springfield's City limits. In addition, there are 110 sites in the City considered Tier II Hazardous Materials storage facilities, 12 of which are also included in TRI. All 128 sites are included on the Past & Potential Hazards/Critical Facilities Map (Appendix C). Finally, there are over 69 Tier II facilities reporting in Springfield, and 23 of those are listed as facilities that manage extremely hazardous substances.

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

Extent

The extent of hazardous chemical release is not predictable as it is dependent on the location including whether it is from a stationary or moving source, amount and type of chemical released, and weather conditions at the time of the release, but given the range of chemicals present in Springfield the extent could range from limited to critical.

Impact

Due to the nature of the unpredictability of the extent of a chemical release, the impact is difficult to quantify.

Previous Occurrences

The City of Springfield has had a high level of chemical spills and toxic events for the past several decades. Springfield's history as an industrial City has resulted in a high concentration of businesses and abandoned sites that contain hazardous chemicals. In addition to this, the ribbon of railways and roadways that weave across the City carries industrial freight that oftentimes contains hazardous chemicals. The rail network is a major connecting route between Boston and Chicago, and between Quebec and New York City. Only one major petroleum pipeline serves the region and Springfield which is the sole provider of products to both distributors and military customers. Finally, there are over 63 Tier II facilities reporting in Springfield, and 23 of those are listed as facilities that manage extremely hazardous substances.

The convergence of several factors has led to a series of accidents in Springfield. In 1984, a release of fuming nitric acid forced the evacuation of 10,000 people from their homes and businesses in a period of 12 hours. In 1986, two releases of fuming nitric acid caused the evacuation of 5,000 people for a period of eight hours *plus* the evacuation of 1,000 more people which led to the shutdown of all interstate and rail lines for the same amount of time. In 1988, a chlorine release from a warehouse forced the evacuation of more than 50,000 people for three days. In 1991, an accident with a truck carrying nuclear fuel rods on Interstate 91 caused the closure of the highway and the City's central business district for 14 hours. In 1993, a truck leaked hydrochloric acid in several portions of the City as it drove until emergency personnel stopped it. In 2002, a leak of 5,000 pounds of anhydrous ammonia placed the City at risk for 24 hours. In addition, the City has three major interstates that are within the City limits, along with and East-West freight rail that passes through the City. This critical transportation infrastructure carries a variety of Hazardous Materials through the City on a daily basis.

Probability of Future Events

On average, there is one event per week in Springfield, but most of these events are related to small-scale releases of petroleum and the likelihood of a catastrophic release is very low.

Vulnerability

Based on the above assessment, Springfield faces a Hazard Risk Index Rating of "2 – Medium-High Risk" from Hazardous Materials.

Dam Failure – Medium Risk

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

Many dams in Massachusetts were built in the 19th century without the benefit of modern engineering design and construction oversight. Dams can fail because of structural problems due to age and/or lack of proper maintenance. Dam failure can also be the result of structural damage caused by an earthquake or flooding brought on by severe storm events. Most earthen dam failures occur when floodwaters rise above, overtop, and then erode the material components of the dam.

Location

According to DCR sources, as well as local knowledge, there are currently eleven (11) dams³ in Springfield. The following table identifies the dams within the City as well as whether they are classified as low, significant, or high hazard.

Table 3.14: Dams in Springfield					
Dam Name/ Date Built	ID	Owner	Purpose	Condition/ Last Inspected	Hazard Risk
Watershops Pond Dam	MA00569	City of Springfield	Recreation	Fair/ 08-20-19	High
Van Horn Park Lower Dam	MA00571	City of Springfield	Recreation	Rebuilt/ 2019-2021	High
Breckwood Pond	MA00570	City of Springfield	Recreation	Poor/04-09-2021	Significant
Forest Park Middle Pond Dam	MA02358	City of Springfield	Recreation	Poor/03-28-18	Significant
Forest Park Upper Pond Dam	MA00568	City of Springfield	Recreation	Poor/ 07-06-21	Significant
Plastic Park Dam	MA00573	USPS	Recreation	Breached/N/A	Low
Putnam’s Puddle Dam	MA00572	City of Springfield	Recreation	Unsafe, Partially Breached/ 03-25-18	Low

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

Baystate Plumbing & Heating Pond Dam	MA02007	City of Springfield	Non-functional power	City has indicated to Office of Dam Safety that this dam is not owned by the City; however, DPW is pursuing dam removal as a part of the flood	Significant
Mill Pond Dam	MA00575	City of Springfield	Recreation	Fair/ 07-09-20	Low
Van Horn Park Upper Dam	MA00574	City of Springfield	Recreation	Poor/ 03-30-21	Low
Forest Park Lower Pond Dam	MA02357	City of Springfield	Recreation	N/A	Non-jurisdictional

Extent

The Massachusetts Department of Conservation and Recreation (MA DCR) was the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). Until 2002, DCR was also responsible for conducting dam inspections but then state law was changed to place the responsibility and cost for inspections on the owners of the dams. This means that individual dam owners are now responsible for conducting inspections.

The state has three hazard classifications for dams:

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

The inspection schedule for dams is as follows:

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

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

There are several small dams along the City's streams and rivers, but a thorough review of the dam inundation zones for these properties (conducted for the City's CEM Plan) indicated that there was little risk of damage to life and property from these structures. While these structures pose little risk, the Quabbin Reservoir Dams and the Cobble Mountain Dam pose a significant risk to the City.

The Quabbin Reservoir's Primary Dam is 170 feet high and holds back 412 billion gallons of water. This structure is located to the east along the Belchertown and Ware town boundaries. A breach of this dam would take 8 hours for the maximum damage to the City to be realized, during which the water levels of the Connecticut and Chicopee Rivers would crest 60 feet above their normal peaks; backwash into the North Branch and Mill Rivers would also result in severe local flooding. For a 48-hour period, the City would be divided into four isolated sections and once the flood waters receded, the impact and scope of the devastation would be catastrophic. The Massachusetts Water Resources Authority owns these dams and is responsible for maintenance and inspections.

The Cobble Mountain Reservoir Dam is located to the west in the Town of Russell. The failure of this dam would result in significant flooding of the Connecticut River. The Connecticut's water levels would rise 43 feet above normal levels in eight hours, and significant portions of the City would be under water. This dam is owned by the Springfield Water and Sewer Commission which is responsible for maintaining it.

Essential Power, LLC owns a dam in Indian Orchard at the Indian Orchard power substation along the Chicopee River. Failure of this would cause damage to a mobile home park located on Grochmal Avenue and to the Eastman (formerly Solutia) industrial complex. The mobile home park's location gives residents less than 30 minutes to evacuate their homes safely.

Impact

The Quabbin Reservoir's Primary Dam is 170 feet high and holds back 412 billion gallons of water. This structure is located to the east along the Belchertown and Ware town boundaries. A breach of this dam would take 8 hours for the maximum damage to the City to be realized, during which the water levels of the Connecticut and Chicopee Rivers would crest 60 feet above their normal peaks; backwash into the North Branch and Mill Rivers would also result in severe local flooding. For a 48-hour period, the City would be divided into four isolated sections and once the flood waters receded, the impact and scope of the devastation would be catastrophic. The Massachusetts Water Resources Authority owns these dams and is responsible for maintenance and inspections.

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Essential Power, LLC owns a dam in Indian Orchard at the Indian Orchard power substation along the Chicopee River. Failure of this would cause damage to a mobile home park located on Grochmal Avenue and to the Eastman (formerly Solutia) industrial complex. The mobile home park's location gives residents less than 30 minutes to evacuate their homes safely.

Previous Occurrences

There have been two dam failures in Springfield's recent history. The first was "Putnam's Puddle" in August 1991, and was a result of Hurricane Gloria. An earthen dam, it self-breached as a result of the storm, and even though it was listed as a high-hazard dam, the impact, luckily, was minimal. The contents of the "Puddle" washed into Breckwood Pond. The Breckwood Pond Dam held and effluent proceeded to Watershops Pond and down the North Branch of the Mill River into the Connecticut River.

In the winter of 2006 the Plastics Park Dam, a high hazard dam, began to fail at its spillway. Its foot flooded as a result of downstream animal (beaver) activity. Beavers had blocked a culvert under a railroad spur along Worcester Street. Two large pumps on flatbed trailers were brought in to keep the lagoon from flooding onto Worcester Street. Solutia, in anticipation of the failure of the plastics Park Dam, partially breached the dam and stabilized the shoulders of the spillway. The beavers were relocated. CSX, Inc. repaired and upgraded the conduit under the railway spur to accommodate additional flow. In August 2011, during Hurricane Irene, the remaining structure of the Plastics Park Dam self-breached with little or no consequence.

Probability of Future Events

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

Vulnerability

Based on this analysis, Springfield has a Hazard Risk Index Rating of "3 - Medium" from dam failure.

Landslides – Medium/Low Risk

According to the United States Geological Survey (USGS), landslide is a general term used to describe the downslope movement of soil, rock, and organic materials under the effects of gravity and also the landform that results from such movement. There are various different classifications of landslides that are associated with specific mechanics of slope failure and the properties and characteristic of failure types.

A major cause of landslides in Springfield is escarpment saturation. An escarpment is a steep slope or long cliff that exists today due to the action of glaciers thousands of years ago. The escarpments generally occur at the margins of stream or glacial outwash terraces or are geological gullies in soft, water-deposited soil strata. Because of the environmental conditions present during their formation, escarpments are closely associated with freshwater wetlands and streams.

Location

According to the “Soil Survey of Hampden County, Massachusetts” U.S. Department of Agriculture, a significant percentage of the land within the City of Springfield is composed of terrace escarpments (see Appendix E: Terrace Escarpments and Steep Slopes). Although the USDA Soil Survey has mapped significant portions of Springfield as Terrace Escarpments, many of the terrace-associated landforms within the City have been so altered or obscured by urban works and structures that identification of specific soils on a survey level is impossible, yet the landforms still bear the characteristics of the steep, often-unstable terrace slopes. To assist in identifying these areas, a slope analysis of the topography within the City of Springfield was applied to the 2005 Digital Elevation Model (DEM) obtained from the Commonwealth of Massachusetts, Office of Geographic Information (MassGIS). These areas are also identified on Appendix E.

Extent

Due to their unconsolidated nature, steep slopes, and the presence of sands and gravels overlying silts and clays, terrace escarpments and associated landforms can easily become unstable, especially where historical development activities have occurred on or near these landforms. These soils can slowly or suddenly erode and/or slip, causing gullies, landslides, and even massive loss of soil. This is a natural process for these soils, which may be initiated or increased by human activities. Increased storm water runoff, concentrated storm water flows, and increased overburden weight can all act to promote excessive slope erosion or occasional large-scale slope failures, with resultant damages to infrastructure and the built environment, and attendant threats to human health and safety. Not only has soil erosion and slope failure on terrace escarpments resulted in damages to personal property and public infrastructure, these sometimes unpredictable phenomena have also severely impacted the City of Springfield's wetland resources, disrupting wildlife habitat and contributing to reductions in water quality.

Impact

Using a total a value of all property abutting the Connecticut River of \$948.9M (Springfield Assessors, 2023), landslide damage of 20 percent with 10 percent of structures damaged would result in an estimated \$19.0M of damage.

Previous Occurrences

The United States Geologic Survey (USGS) Landslide Inventory lists the occurrence of 12 landslides in Massachusetts since 2008. The confidence level ranges from possible landslide to high confidence in the extent or nature of the landslide. The closest recorded landslide to Springfield was in Holyoke in September 2008.⁴

In the past twenty-five years, the following locations in Springfield have experienced landslide occurrences:

- Crest Street
- Dickinson Street
- Old Colony Road
- Magawiska Road
- South Branch Parkway
- Tiffany Street
- Trafton Road

All of these locations are on the perimeter of Forest Park which is a region identified to have a high volume of terrace escarpments.

Probability of Future Events

Based on the State's Hazard Mitigation Plan, Springfield has a high susceptibility to landslides but low incidence.

Vulnerability

Based on this analysis, Springfield has a Hazard Risk Index Rating of "4 – Medium-Low" from Landslides.

⁴ <https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d>

Tornadoes/Microbursts – Medium/Low Risk

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

Of additional concern are microbursts, which often do tornado-like damage and can be mistaken for tornadoes. In contrast to the upward rush of air in a tornado, air blasts rapidly downward from thunderstorms to create microbursts. Microbursts and tornadoes are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of rising temperatures resulting from climate change.

Location

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

Extent

The impact of a tornado is identified according to the Enhanced Fujita scale, which classifies tornadoes based on wind speeds and a various collection of observed damage.⁵

TABLE 3.15: ENHANCED FUJITA SCALE						
FUJITA SCALE			DERIVED EF SCALE		OPERATIONAL EF SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	EF Number	3 Second Gust (mph)	EF Number	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Source: <http://www.spc.noaa.gov/efscale/ef-scale.html>

⁵ According to NOAA, “The Enhanced F-scale still is a set of wind estimates (not measurements) based on damage. Its uses three-second gusts estimated at the point of damage based on a judgment of 8 levels of damage to the 28 indicators listed below. These estimates vary with height and exposure. **Important:** The 3 second gust is not the same wind as in standard surface observations. Standard measurements are taken by weather stations in open exposures, using a directly measured, “one minute mile” speed.”

Table 3.16: Enhanced Fujita Scale Levels and Descriptions of Damage			
EF-Scale Number	Intensity Phrase	3-Second Gust (MPH)	Type of Damage Done
EF0	Gale	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
EF1	Moderate	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
EF2	Significant	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	Severe	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	Devastating	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester, including towns and cities in Hampden County.

Of additional concern are microbursts, which often do tornado-like damage and can be mistaken for tornadoes. In contrast to the upward rush of air in a tornado, air blasts rapidly downward from thunderstorms to create microbursts. Microbursts and tornadoes are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of rising temperatures resulting from climate change.

Location

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

Extent

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

Impact

To approximate the potential impact to property that could be affected by this hazard, the total value of all residential property in city, \$8.7B (Springfield Assessor, 2023) is used. An estimated 20 percent of damage would occur to 10 percent of structures, resulting in a total of \$173.5M

worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Previous Occurrences

Springfield’s location in Hampden County places it within the vicinity of the part of Massachusetts that experiences tornadoes more frequently than other portions of the State. Four tornadoes with an F1 or higher ranking have been recorded in Springfield since 1950, but only one, in 2011, caused any known damage. In Western Massachusetts, the majority of sighted tornadoes have occurred in a swath east of Springfield, known as “tornado alley.” Nineteen incidents of tornado activity occurred in Hampden County between 1956 and 2020 (three of these incidents part of the 2011 tornado, which touched down in multiple locations). These are listed in Table 3.16 below.

On June 1, 2011, an EF3 tornado⁶ touched down in Springfield, damaging six miles of the City and destroying thousands of structures, schools and infrastructure that resulted in a five-day State of Emergency. The immediate aftermath brought a level of collaboration from public safety, health, engineering, as well as area nonprofits and businesses, which was unprecedented. For example, the Springfield Fire Department received 15,070 emergency calls and responded to 15,953 emergencies. Fire personnel responded to emergencies from residents on the street or outside their homes that were unable to call due to downed phone and power lines). For several weeks following the tornado the City’s Office of Emergency Preparedness facilitated meetings between the City’s leadership, local utility companies, the Pioneer Valley Red Cross, the Salvation Army and other critical businesses as needed.

After the critical response that followed for weeks/months afterward, the City of Springfield, working with DevelopSpringfield, the Springfield Redevelopment Authority, neighborhood councils, private businesses, concerned residents and others, used this catastrophic event as a catalyst to create the “Rebuild Springfield Master Plan”. While the Rebuild Springfield initiative was created in response to the June 1st tornado, the scope of the initiative is far greater than rebuilding, and includes tools that will serve to rethink Springfield’s future forever. Further, the Rebuild Springfield Plan incorporated previous plans, reports, and studies from a variety of organizations and stakeholders – to include City plans and documents, neighborhood plans, ULI reports, and many other studies.

Table 3.17: Tornado Events in Hampden County 1956-2020						
County	Date	Event	Scale	Deaths	Injuries	Property Damage
Hampden	6/1/1956	Tornado	F1	0	0	250000
Hampden	6/1/1956	Tornado	F1	0	0	25000

⁶ Beginning 1 February 2007, the National Weather Service began utilizing a tornado classification system referred to the “EF”, or Enhanced Fujita, scale. Events noted in this plan occurring prior to 2007 are referred to on the original “F”, or original Fujita, scale.

Hampden	6/1/1956	Tornado	F1	0	0	25000
Hampden	9/12/1956	Tornado	F1	0	0	250
Hampden	6/26/1958	Tornado	F1	0	0	250
Hampden	7/21/1963	Tornado	F0	0	0	2500
Hampden	8/11/1966	Tornado	F2	0	0	250000
Hampden	7/19/1968	Tornado	F0	0	0	250
Hampden	10/3/1970	Tornado	F1	0	0	0
Hampden	8/9/1972	Tornado	F1	0	0	2500
Hampden	9/14/1972	Tornado	F1	0	0	2500
Hampden	7/24/1975	Tornado	F2	0	0	25000
Hampden	6/29/1977	Tornado	F1	0	0	0
Hampden	8/10/1979	Tornado	F1	0	1	25000
Hampden	6/24/1992	Tornado	F0	0	0	0
Hampden	6/1/2011	Tornado	EF3	3	200	2.28E+08
Hampden	6/1/2011	Tornado	EF1	0	0	0
Hampden	6/1/2011	Tornado	EF1	0	0	0
Hampden	8/2/2020	Tornado	EF0	0	0	45000

Probability of Future Events

Based upon the past events, it is reasonable to say that there is a low frequency and probability of tornadoes in Springfield, with one tornado occurring approximately every 15 years.

Vulnerability

Based on this analysis, Springfield has a Hazard Risk Index Rating of "4 – Medium-low" from Tornadoes and Microbursts.

Earthquakes – Medium/Low Risk

An earthquake is a sudden, rapid shaking of the ground that is caused by the breaking and shifting of rock beneath the Earth's surface. Ground shaking from earthquakes can rupture gas mains and disrupt other utility service, damage buildings, bridges and roads, and trigger other hazardous events such as avalanches, flash floods (dam failure) and fires. Un-reinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated, unstable

soil, and mobile homes not tied to their foundations are at risk during an earthquake. Earthquakes can occur suddenly, without warning, at any time of the year. New England experiences an average of 30 to 40 earthquakes each year although most are not noticed by people.

Location

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

Extent

Earthquakes are measured according to their magnitude and intensity on separate scales. Magnitude is measured by the moment magnitude (Mw) scale⁷, and the numerical Richter Scale, while intensity measurements are typically done according to Modified Mercalli scale.

According to the US Geological Survey “On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3.”

Because of its calculus, the Richter Scale is useful when gauging earthquake intensity in specific locations but because earthquakes “flow” and permeate over great distances, scales like the Moment-Magnitude are more broadly applicable.

TABLE 3.18: Orders of Magnitude on the Richter Scale	
Magnitude	Effects
1 to 3.5	Generally not felt, but recorded
3.5 to 5.4	Often felt, but rarely causes damage
Under 6.0	At most, slight damage to strong buildings
6.1 to 6.9	Destructive over 100km where people live
7.0 to 7.9	Major earthquake causing serious damage
8.0 or greater	Great earthquake causing damage over an area hundreds of kilometers across

Source: <http://mms.nps.gov/yell/ofvec/exhibits/eruption/earthquakes/quake2.htm>

The intensity of an earthquake is measured using the Modified Mercalli Scale. This scale quantifies the effects of an earthquake on the Earth’s surface, humans, objects of nature, and man-made structures on a scale of I through XII, with I denoting a weak earthquake and XII denoting an earthquake that causes almost complete destruction.

⁷ According to the USGS, “the moment magnitude (Mw) scale, based on the concept of seismic moment, is uniformly applicable to all sizes of earthquakes but is more difficult to compute than the other types. All magnitude scales should yield approximately the same value for any given earthquake.”

Source: USGS Earthquake Glossary – Magnitude: <http://earthquake.usgs.gov/learn/glossary/?term=magnitude>

Table 3.19: Modified Mercalli Intensity Scale for and Effects			
Scale	Intensity	Description Of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly Strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Source: <http://earthquake.usgs.gov/learn/topics/mercalli.php>

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

- Because many of the buildings were built before 1975 (an estimated 78% of 62, 706), there is potential for serious damage throughout Springfield;
- Structures are mostly wood frame construction, so loss estimates predict 20% of City assessed value, not including costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures;

- Vulnerability assessment estimates approximately \$1,628,821,008.

Previous Occurrences

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

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

Tables 3.3 & 3.4 show the location, magnitude and total number of earthquakes that have affected the New England area. According to the Northeast States Emergency Consortium (NESEC), only 1 magnitude 4 or higher earthquake has occurred in New England since 2010, a 4.6 magnitude earthquake centered at Hollis Center Maine, on October 16, 2012. None of these earthquakes have been noted to cause any damage in Springfield or the surrounding area.

Table 3.20: New England Earthquakes (1924-2020) magnitude 3.6 or higher		
Location	Date	Magnitude
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7
Middlebury, VT	April 10, 1962	4.2
Near NH Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	Jan. 19, 1982	4.5
Plattsburg, NY	April 20, 2002	5.1
Bar Harbor, NH	October 2, 2006	3.7
Hollis Center, ME	October 16, 2012	4.7
Bliss Corner, MA	November 8, 2020	3.6

Table 3.21: New England States Record of Earthquakes

State	Years of Record	Number of Earthquakes
Connecticut	1678 – 2016	115
Maine	1766 – 1989	454
Massachusetts	1668 – 2016	408
New Hampshire	1638 – 2016	320
Rhode Island	1766 – 2016	34
Vermont	1843 – 2016	50
New York	1737 – 2016	551
Total Earthquakes in New England (1568-1989)		1381

Impact

Because many of the buildings were built before 1975 (an estimated 78% of 62,706), there is potential for serious damage throughout Springfield. Structures are mostly wood frame construction, so loss estimates predict 20% of City assessed value, not including costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures. A vulnerability assessment estimates approximately \$1.6B.

Probability of Future Events

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

Vulnerability

Based on this analysis, Springfield has a Hazard Risk Index Rating of "4 – Medium-Low" from Earthquakes.

Older buildings are particularly vulnerable to earthquakes because their construction pre-dates building codes that included strong seismic consideration. A loss of historic buildings could represent a loss of Springfield's history and culture and a loss of the critical facilities in City could impede the City's ability to operate. Some of the City's identified evacuation routes contain bridges, which may not be able to function if a strong earthquake were to hit.

Table 3.22: Earthquake Hazard Mitigation Assessment			
Capability	Description	Effectiveness	Potential Improvements/ Expansion

Zoning Ordinance	Wireless Communications Structures and Facilities	Structures are required to be as minimally invasive as possible to the environment, have height restrictions, and must be setback 1.25 times the structure's height.	Very effective for preventing damage in the case of an earthquake.	None.
State Building Code		The City of Springfield has adopted the State Building Code.	Effective for new buildings only.	Evaluate older structures categorized as critical facilities to determine if they are earthquake/disaster resistant.

Drought – Low Risk

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

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

Location

A drought would affect all of Springfield.

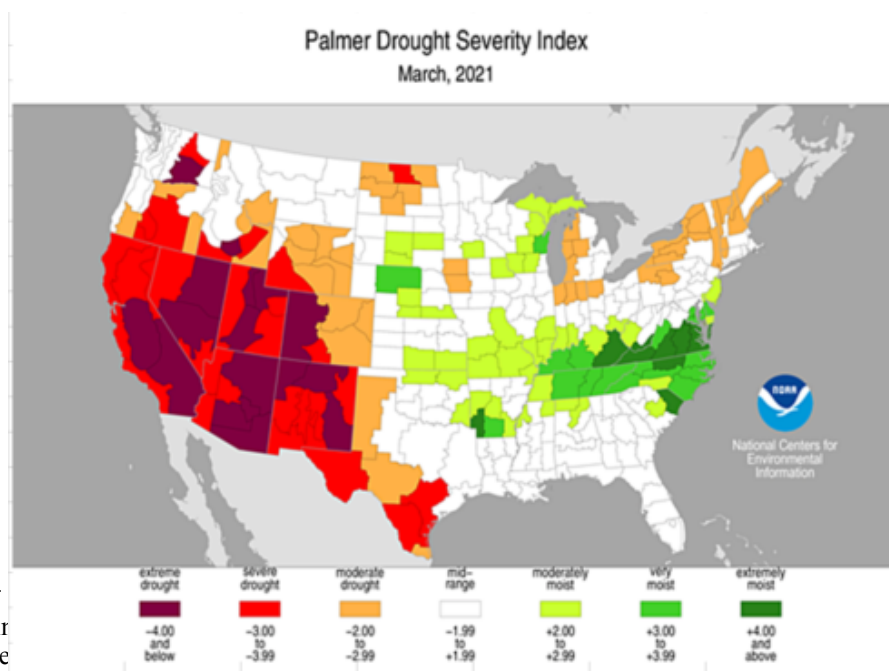
Extent

When evaluating the region's risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought. Even so, there have been several years of drought-like conditions in Western Massachusetts: 1940-1952, 1980-1983, 1995-2001, 2013-2014, 2016-2017, 2020 and 2022. Furthermore, climate change is increasing the frequency and length of droughts. Changes in precipitation patterns will result in longer periods of dry days in the summer and fall, as well as increased rainfall events that result in increased runoff and reduced infiltration of rainwater and replenishment of groundwater.

Additionally, even minor droughts will increase the risk of wildfire, especially in areas of high recreational use.

The severity of a drought would determine the scale of the event and would vary among town residents depending on whether the residents' water supply is derived from a private well or the public water system. Zone II wellhead protection areas for public water supplies are defined as an area of an aquifer that "contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at safe yield, with no recharge from precipitation)."⁸ If these conditions extended beyond the thresholds that determine supply capacity the damage from a drought could be widespread due to depleted groundwater supplies. The U.S. Drought Monitor also records information on historical drought occurrence. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as shown below.

Figure 3.1: Palmer Drought Severity Index



⁸ <https://www.mass.gov/info-details/water-supply-protection-wells>

Impact

Due to the water richness of Western Massachusetts, Springfield is unlikely to be adversely affected by anything other than a major, extended drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard.

Previous Occurrences

In Massachusetts, six major droughts have occurred statewide since 1930. They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped into urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought in Massachusetts since 2000, based on the US Drought Monitor:

Table 3.23: Annual Drought Classification Status in Massachusetts	
Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of state
2002	D2 conditions in 99% of state
2003	No drought
2004	D0 conditions in 44% of state
2005	D1 conditions in 7% of state
2006	D0 conditions in 98% of state
2007	D1 conditions in 71% of state
2008	D0 conditions in 57% of state
2009	D0 conditions in 44% of state
2010	D1 conditions in 27% of state
2011	D0 conditions in 0.01% of state
2012	D2 conditions in 51% of state
2013	D1 conditions in 60%, D0 in 99.9% of state
2014	D1 conditions in 26%, D0 in 99.99% of state
2015	D1 conditions in 72%, D0 in 100 % of state
2016	D3 conditions in 52%, D2 in 90%, D1 in 98%, D0 in 100% of state

2017	D3 conditions in 9%, D2 in 69%, D1 in 98%, D0 in 99% of state
2018	D1 conditions in 36%, D0 in 85% of state
2019	D0 in 85% of state
2020	D3 conditions in 37%, D2 in 83%, D1 in 96%, D0 in 100% of state

Source: US Drought Monitor

Springfield has had limited experience with severe drought conditions. The City has not experienced a threat to its water supply, and doesn't anticipate any severe water shortages throughout the City.

Probability of Future Occurrences

Springfield's water supply system was designed to accommodate a much larger population, so there is little historical evidence of water shortages in Springfield. The City's two reservoirs, Cobble Mountain and Borden Brook, have a combined daily DEP permitted daily safe yield of 79.1 million gallons per day and the average daily withdrawal is roughly 36 million gallons per day. There have been no documented water shortages and the City's Comprehensive Emergency Management Plan identifies the loss of water as a low risk for Springfield.

Vulnerability

Based on the above assessment, Springfield has a Hazard Risk Index of "5 - Low" from drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard.

Extreme Temperatures – Low Risk

As per the Massachusetts Hazard Mitigation Plan, there is no universal definition for extreme temperatures, and extreme temperatures can be defined as those that are far outside the normal ranges. Extreme heat, for this climatic region, is usually defined as a period of three or more consecutive days above 90°F, but more generally a prolonged period of excessively hot weather, which may be accompanied by high humidity. Extreme cold, again, is relative to the normal climatic lows in a region. Temperatures that drop decidedly below normal and wind speeds that increase can cause harmful wind-chill factors.

Extreme temperature is a very dangerous state that can lead to medical emergencies in both extreme cold and extreme heat. The National Weather Service (NWS) has multiple alerts that are issued when the proper criteria are expected. Extreme heat is the leading cause of weather-related fatalities in the United States. The City of Springfield will typically have 5-10 days a year with temperatures in the 90's with the possibility of having a day where the temperature reaches above 100°F. Extreme cold can last for several days in the Springfield area. Extreme cold can bring health emergencies to the various populations such as the homeless, infirmed, elderly and children. The average temperatures for Massachusetts are:

- Winter (Dec-Feb) Average = 27.83°F
- Summer (Jun-Aug) Average = 71.33°F

Location

Extreme temperatures occur regionally; therefore, the hazard would impact the entire city.

Extent

Extreme heat, according to the Center for Disease Control (CDC), is when the temperature is substantially hotter and or more humid than average. CDC describes extreme cold as when temperatures drop below normal and can be very dangerous if it is windy.

The City of Springfield experiences extreme temperatures at least once or twice a year. Research shows that extreme temperatures are becoming more frequent due to climate change.

Extreme Heat

The National Weather Service uses the heat index scale to measure extremely hot temperatures. The scale takes into consideration the air temperature and the humidity. With this information they are able to determine the risk to humans. The National Weather Service (NWS) uses this chart to determine if they need to releases a Heat Advisory (100-104 degrees F for 2 or more hours) or an Excessive Heat Warning (105+ degrees F for 2 or more hours).

Table 3.24: Heat Index Chart

		Temperature (°F)															
Relative Humidity (%)		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
	55	81	84	86	89	93	97	101	106	112	117	124	130	137			
	60	82	84	88	91	95	100	105	110	116	123	129	137				
	65	82	85	89	93	98	103	108	114	121	128	136					
	70	83	86	90	95	100	105	112	119	126	134						
	75	84	88	92	97	103	109	116	124	132							
	80	84	89	94	100	106	113	121	129								
	85	85	90	96	102	110	117	126	135								
	90	86	91	98	105	113	122	131									
	95	86	93	100	108	117	127										
	100	87	95	103	112	121	132										
Category		Heat Index					Health Hazards										
Extreme Danger		130 °F – Higher					Heat Stroke or Sunstroke is likely with continued exposure.										
Danger		105 °F – 129 °F					Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.										
Extreme Caution		90 °F – 105 °F					Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.										
Caution		80 °F – 90 °F					Fatigue possible with prolonged exposure and/or physical activity.										

Source: NWS, Heat Index, 2018

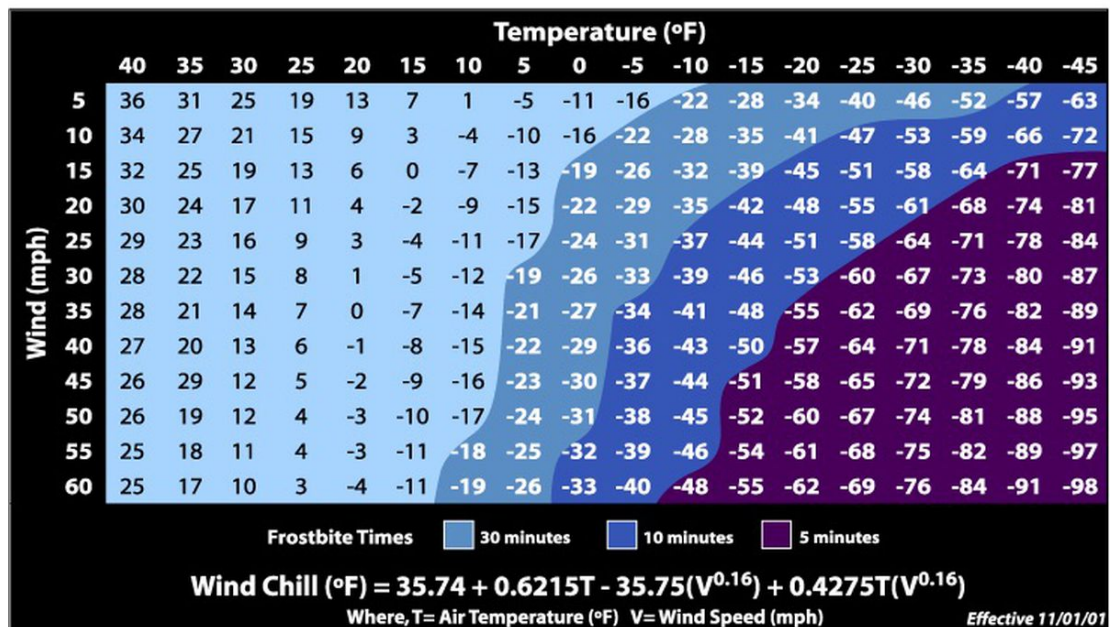
Extreme Cold

There is no exact definition for extreme cold according to the NWS they do calculate the intensity of cold temperature via the wind chill. The wind chill is determined by using the Wind Chill Index which takes into consideration what the temperature feels like outside for people and the rate in which the rate of heat is loss from exposed skin due to the wind and temperature. The NWS will use the chart to then determine if a wind chill warning needs to be issued based on whether the sustained wind and if it is -25 degrees F or below for 3 hours or more.

Table 3.25: Wind Chill Temperature Index



Wind Chill Chart



Source: NWS, 2018

Impact

The impact of extreme heat or cold in Springfield is considered to be "critical," with multiple injuries and significant property damage (due to Springfield's large stock of neglected/abandoned and old buildings.) Structures and infrastructure are not as risk of damage caused by extreme temperatures.

Previous Occurrences

The City of Springfield has experienced both extreme cold and heat conditions. The following chart shows the record temperature for heat and cold along with the mean within the 5 years of 2015-2020. All data was gathered from the NWS NOWData resource.

Table 3.26 Average Temperatures (2015-2020)

Table 3.27 below shows the maximum monthly temperatures for the Springfield area, taken at Barnes Airport in Westfield, from 2010-2022. The highest temperature recorded during that period of time was 103 degrees in July 2010. All of those years show a high temperature over 90 degrees during the month of July, and all but one year show a high temperature of 90 degrees or greater for the month of August.

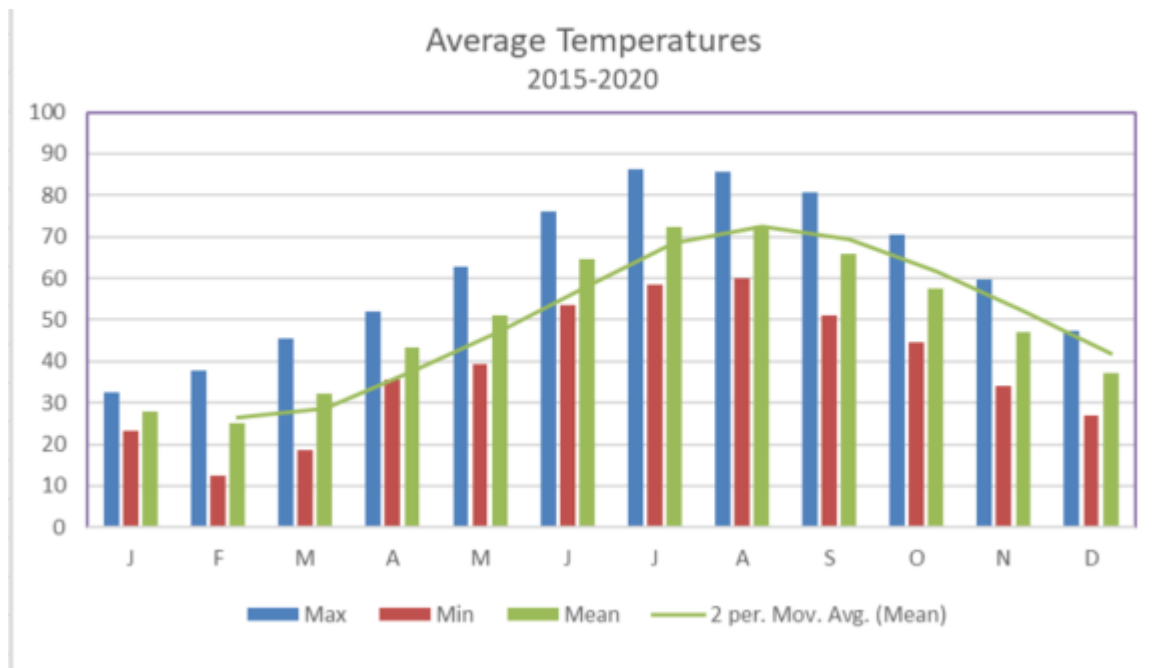


Table 3.27: Monthly Maximum Temperatures 2010-2022

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2010	56 0	46 0	72 0	91 0	98 0	92 0	103 0	96 0	97 0	78 0	67 0	59 0	103
2011	49 0	63 0	69 0	85 0	91 0	94 0	102 0	91 0	85 0	85 3	70 1	61 0	102
2012	69 0	61 1	83 0	93 0	93 0	98 0	100 0	96 0	87 0	79 0	66 0	57 0	100
2013	60 0	50 0	59 0	78 0	96 0	94 0	99 0	88 0	95 0	80 0	70 0	64 0	99
2014	56 0	52 0	57 0	77 0	89 0	91 0	93 0	90 0	93 0	78 0	67 0	55 0	93
2015	43 0	40 0	53 0	79 0	92 0	89 0	94 0	93 0	96 0	74 0	76 0	69 0	96
2016	57 0	63 0	80 0	83 0	92 0	89 0	98 0	96 0	91 0	85 0	70 0	56 1	98
2017	55 0	72 0	62 0	89 0	95 0	96 0	92 0	91 0	92 0	81 0	74 0	58 0	96
2018	58 1	79 0	59 0	73 0	91 0	95 0	98 0	96 0	96 0	85 0	66 0	63 0	98
2019	55 0	62 0	70 0	77 0	87 0	91 0	99 0	94 0	92 0	82 0	71 0	53 0	99
2020	70 0	62 0	74 0	66 0	84 0	94 0	98 0	94 0	85 0	79 0	78 0	62 0	98
2021	45 0	48 0	77 2	78 0	93 0	99 0	92 0	96 0	87 0	79 0	69 0	62 0	99
2022	51 0	66 0	75 0	76 0	93 0	94 0	96 0	97 0	86 0	78 0	76 0	M 12	M
Mean	56	59	68	80	92	94	97	94	91	80	71	60	98
Max	70 2020	79 2018	83 2012	93 2012	98 2010	99 2021	103 2010	97 2022	97 2010	85 2018	78 2020	69 2015	103 2010
Min	43 2015	40 2015	53 2015	66 2020	84 2020	89 2016	92 2021	88 2013	85 2020	74 2015	66 2018	53 2019	93 2014

Source: NWS NOWData

Probability of Future Events

The probability of future extreme heat and extreme cold is considered to be “very high”, 70-100% chance of occurring in the next year. Multiple studies have shown that extreme temperatures are occurring more frequently due to climate change.

Vulnerability

Based on the above assessment, Springfield has a Hazard Risk Index Rating of "5 - Low" from extreme temperatures.

CRITICAL FACILITIES

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

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

Critical Facilities within Hazard Areas

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

The Critical Facilities List for the City of Springfield has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Springfield's Hazard Mitigation Committee has broken up this list of facilities into four categories:

1. The first category contains facilities needed for Emergency Response in the event of a disaster.
2. The second category contains Non-Emergency Response Facilities that have been identified by the Committee as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Springfield.
3. The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster.
4. The fourth category contains Potential Resources, which can provide services or supplies in the event of a disaster.

The critical facilities and evacuation routes potentially affected by hazard areas are identified in Table 4-1, following this list, The Past and Potential Hazards/Critical Facilities Map (Appendix C) identifies these facilities.

Category 1 – Emergency Response Services

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

1) Emergency Operations Center

Primary: Raymond Sullivan Public Safety Complex - 1212 Carew Street

Secondary: Storm Operation Center- 70 Tapley Street

2) Fire Stations

Fire Chief's Office - 605 Worthington St

Fire Dept.-Arson Squad - 1212 Carew St

Fire Dept.-Public Relations – 605 Worthington St

Fire Inspections & Permits – 605 Worthington St

Springfield Fire Dispatch – 1535 Roosevelt Ave

Station 2 – 1265 Parker Street

Station 3 – 382 White Street

Station 4 – 1212 Carew Street

Station 5 – 15 Odessa Street

Station 6 – 16 Massreco Street

Station 7 – 2729 Main Street

Station 8 – 33 Eastern Avenue

3) Police Station

75 Dwight Street

50 East Street

299 Page Boulevard

130 Pearl Street

4) Highway Department

70 Tapley Street

5) Water

Bondi's Island in Agawam

6) Emergency Fuel Stations

Department of Public Works – 70 Tapley Street, Springfield

7) Emergency Shelters

Central High School

Commerce High School

Kiley Jr. High School

Van Sickle Middle School

Elias Brookings Elementary School

8) Water Sources

Numerous locations in Springfield, any available.

9) Transfer Station/Waste Management

State Recycling Center – Birnie Ave

Bondi's Island in Agawam

10) Helicopter Landing Sites

Massachusetts State Police Springfield Barracks – Armory Street

Mercy Medical Center – Stafford Street
Baystate Medical Center – Chestnut Street
MassMutual Insurance Company – State Street
Van Horn Park- Armory Street

11) Communications

1500 Main Street
22 Birnie Avenue
101 West Street
1212 Carew Street
440 Tiffany Street
99 Arnold Avenue
224 Hancock Street
556-562 Saint James Avenue
1414 State Street
2025 Roosevelt Avenue
101 West Street
230 Verge Street
Bound By Main Street, Vernon Street, East Cumberland Street & Pynchon

12) Primary Evacuation Routes

Main Street – Indian Orchard
Main Street – Downtown Springfield
Plainfield Street
Route 141 (Worcester Street)
Route 21
Route 143
Route 291
Route 5
Route 83

13) Bridges/Culverts Located on Evacuation Routes

20 Park Avenue – Connecticut River
Allen Street – Mill River
Allen Street – Raceway
Belmont Avenue – Mill River

Flint Street – Mill River
Fox Road – Mill River
Hancock Street – Mill River
Interstate 91 – Water Mill River
Mill Street-Mill River
NBR Parkway – Mill River
Roosevelt Avenue – Watershops Pond
Sunrise Terrace – Mill River

Category 2 – Non-Emergency Response Facilities

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

1) Problem Culverts

Abbe Brook
Acorn Street drainage ditch and culvert
Dickinson Street – towards Porter Lake Drive
North Brook culvert
Poor Brook drainage ditch
Roy Street drainage ditch and culvert
Senator Street drainage ditch and culvert
Worcester Street near Bircham Road
Several drainage areas around Forest Park into the Porter Lake system

Category 3 – Facilities/Populations to Protect

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

1) Special Needs Population/ Elderly Housing/Assisted Living

2-90 Barney Street 4-102 Trafton Street
603 Berkshire Ave. - 45
63-67 Florida Street Not In Use
Bay State Place - 414 Chestnut Street
Baystate Ambulatory Care Center 3300 Main Street (**Emergency Power**)
Baystate Med Ctr. - 759 Chestnut Street
Baystate Med Ctr. (South Campus) - 140 High Street (**Emergency Power**)
Beech Manor Rest Home 38 Warner St (**Emergency Power**)
Blue Spruce Rest Home 175 Bowdoin Street

Carpe Diem Apts. - 1228 Carew Street
 Central Apartments - 347-367 Central Street
 Chateau Apts. 5 Temple Street
 Chestnut Park 115-185 Dwight Street
 Christopher Ct Apts. 1118-1122 Street Ames Av
 City Wide Assocs. - 11 Acushnet Ave.
 Forest Park Manor 472 Dickinson St
 Gentile Apartments - 85 Williams Street
 Hampden House Rest 190 Kendall Street
 Harrigan Apartments - 107 Belmont Street
 Highland House - 250 Oak Grove Av.
 Hobby Club Housing - 307 Chestnut Street
 Hogan Apts. 138- St James Av
 Hunter Place Apts. - 69 Andrew Street
 Independence House 1475 Roosevelt Av
 Indian Orchard Manor - 1-57 Milton Ct.
 Johnny Appleseed - 500 Hancock Street
 Kathryn Jones Apts. - 35-49 Pendleton Av
 Kendall Commons - 200 Kendall Street
 Keystone Woods (Under Construction) 942 Grayson Dr. -
 Linden Towers - 310 Stafford Street
 Maple Hill Rest Home - 156 Mill Street **(Emergency Power)**
 Marbetton-Wendall Apts. - 549 Main Street
 Mercy Hospital 271 Carew Street **(Emergency Power & Self-Contained Ventilation)**
 Morgan Apartments 3151 Morgan Street-
 Morris Street Sch Apts. - 45 Dewey Street
 Myrtle Street Sch Apts. 64 Myrtle Street I.O.
 Park View Specialty Hospital - 1400 State Street **(Emergency Power)**
 Pine Manor Nursing H 1190 Liberty Street
 Primus Mason Manor - 74 Walnut Street **(Emergency Power)**
 Providence. Care Center of Springfield - 370 Pine Street
 Reed's Landing - 807 Wilbraham Rd.
 Riverview Towers - 134 Sanderson St

Shriners Hospital - 516 Carew Street **(Emergency Power)**

Spruce Manor (Vacant) - 388 Central Street **(Emergency Power)**

Street James Manor - 744 Street James Av.

Tri-Towers - 35 Saab Court

Wingate Health Care Ctr. - 215 Bicentennial Highway **(Emergency Power)**

Wingate Health Care Ctr. - 22 Ridgewood Place **(Emergency Power)**

2) Day Care Centers / Group Homes / Community Centers

Academy Head Start - 1190 Liberty St

Acorn Learning- 62 Noel St

Acres Pre-School & Kindergarten - 850 Parker St

Anne McTier House - 20-6 Wilbraham Av

Armory Sq. Day Care -1 Armory Sq.-STCC

Association for Community Living - 1 Carando Dr.

Bergin Head Start - 15 Girard Av.

Boland Head Start - 426 Armory St

Brighter Future Child Care - 83 Main Street Indian Orchard

Brooks Children's House - 99 Revere St

Camp Angelina - 1252 S. Branch Pkwy.

Carew Street Head Start - 65 Carew St

Center for Human Development- 127 Orange St

Center for Mental Health - 503 State St (operates under Center for Human Development)

Champion Child Care - 30 Bowdoin St

Child Care Service

Children & Family Center of New north Citizens' Council - 2455 Main St

Children's Center at Mason Wright- 74 Walnut St

Children's Creative Center - 170 Edendale Street

Children's Creative Ctr. - 29 Logan Street

Children's Corner - 177 1/2 Hancock St

Children's Corner Day Care - 240 Walnut St

Children's House - 24 Chapin Terrace

Children's House -720 Wilbraham Rd.

Children's Study Home - 44 Sherman St

Clarendon Family Day Care - 774 State Street

Clinton Nursing School & Kindergarten 1590 Sumner Ave.
 Community Care -40 Sierra Vista Rd
 Community Care Center - 69 Sunrise (residence program)
 Community Enterprises - 57 Pineywood Av.
 Community Enterprises Main Office - 1985 Main Street
 Ctr. for Human Dev. - 25 27 Bonnyview St
 Dunbar Community Center -33 Oak Street
 Early Child Ctr. - 15 Catharine St
 Early Childhood Center of Greater Springfield 15 Catharine St
 Early Childhood Center - 143 Eastern Ave.
 Eastern Avenue Head Start - 162 Eastern Ave.
 El Instituto De La Familia Community Care - 549 Chestnut St
 ETHOS Alcohol Treatment 56 Temple St
 Exper w/Travel - 85-87 White St
 Forest Park Head Start - Alderman St
 Foster Memorial Nursing Home - 36 Puritan Rd.
 Gandara Mental Health Center - 2155 Main St
 Gandara Mental Health Ctr. (old - W W Johnson Life Ctr.)- 736 State St
 Gandara Recovery House - 33 Arch St
 Gerena Head Start - 200 Birnie Ave
 Giggle Garden's Child Care- 469 Tiffany Street
 Giggle Gardens - 1400 State St
 Grey House Center- 22 Sheldon St
 Hampden County Program - 54 Manhattan St
 Hampden City Assn. for Comm Living- 1230 Plumtree Rd.
 HCS Headstart - 33 Wilbraham Av.
 Hilltop Services -210-212 Centre Street
 Hilltop Services -55 Blanding St
 Horizons House 764 Alden St
 I O Citizen's Council - 117 Main Street I.O.
 Intensive Residential Prog - 80 Glenvale St
 Jacqueline's Children's house - 403 Orange Street
 Jewish Comm. Ctr 1160 Dickinson St

Jolly Juniors Child Care Center - 50 Massachusetts Av
Key Program - 156 Arnold Ave.
Key Program - 576 State Street
Key Program - 786 Wilbraham Rd.
Key Program -20 Parkwood Street
Kid Stop at Brunton -1801 Parker St
Kid Stop at Glickman - 120 Ashland St
Kid Stop at Sumner - 45 Sumner Av. -
Kid Stop at Zanetti - 59 Howard St
Kiddie Kollege - 797 State Street
Kim center Adult Day Care- 604 Cottage St
Kinder Care Learning -201 Cooley Street
Laragione Rehab Center - 163 Westminister St
Laragione Rehab Center - 166 Westminister St
Laragione Rehab Center - 186 Street James Ave
Laragione Rehab Center - 187 Westminister St
Laragione Rehab Center - 204 Street James Ave
Laragione Rehab Center (main) - 179 Street James Ave
Li'l Branches - 94 Anniversary St
Liberty Extended Day Program - 5 Nursery St
Loaves and Fishes Soup Kitchen - 287 State Street
Make Way for Ducklgs - 761 Sumner Ave.
Marathon House - 5 Madison Ave. -
Mason Sq Community Center - 756 State Street
Mason Square Head Start - 30 Madison Ave.
Mayflower Senior Ctr - 80 Arvilla St
Mental Health Assn - 15 Pratt St
Mental Health Assn. - 52 Avon Place -
Mental Health Assn. -110 Lloyd Ave.
Mental Health Assoc. - 65 Price St
Michele's Kids Care -700 Parker St
Mini and Winnie Day Care - 17 John St
Montessori-Pioneer Valley - 1524 Parker St

Moxon Early Childhood Center- 20 LaFrance Street I O
Muhammad's Learning Center. - 187 Main Street I.O.
Multi-Cultural Services - 27 Brittany Rd.
Multi-Cultural Services - 294-296 Oak St I O
My Sister's House- 89 Belmont Ave.
New Beginnings Child Care - 721 State Street
New North Citizen's Council Daycare2383 Main St
North End Com Center - 2383 Main St
Open Pantry - 95 Jefferson Ave.
Open Pantry Shelter - 68 70 Calhoun St
Opportunity House - 59 Street James Av
Opportunity House- 61 Street James Ave
Orchard Children's Corner - 459 Main Street I.O.
Potter's House- 92 Clifton Ave
Prospect House 103 Prospect St
Robins Playful Panda- 34 Westminster Street
Salvation Army - 170 Pearl St
Salvation Army - 285 Liberty Street
Sch Dept. Pre-School Program - 455 Island Pond Rd
Small Wonders Child Care - 58 Marlborough Street
South End Com Ctr - 29 Howard Street
Springfield Day Nursery155 Chestnut St
Springfield Golden Age Club - 45 East Court Street
Springfield Rescue Mission - 19 Bliss St
Springfield Boys Club - 481 Carew Street
Springfield Day Nursery - 255 King St
Springfield Day Nursery- 55 State St -
Springfield Day Nursery- 52 Sumner Ave.
Springfield Girls Club PEP - 100 Acorn St
St Lukes Rest/Women - 85 Spring St
Sullivan Head Start- 160 Nursery St
Sunshine Nursery and Daycare1- 50 Quincy Street
The Kid's Place - 594 Cottage Street

Three Rivers Program - Ridgewood Terrace
Trinity Nursery School - 361 Sumner Ave.
Worthington House 769 Worthington St
Y.M.C.A. - 275 Chestnut St

3) Public Buildings/Areas

(Armory Street – I-291 Circle)
16 Acres Fire Sta - 1265 Parker Street
16 Acres Public Lib - 1187 Parker Street
American Convention Svc - 50 Turnbull St
American Red Cross - 506 Cottage Street
AMR Amb. Svc. - 595 Cottage Street
Amtrak Train Stat. - 66 Lyman Street
Ar Reserve Armory - 50 East Street
Armory Museum - 1 Armory Sq.
AT&T Telephone - 351 Bridge Street
Barrows Park Pool - Walnut & Oak Sts
Bask Hall of Fame - 1000 W. Columbus Av
Baystate Gas Co. - 2025 Roosevelt Ave.
Blunt Park Pool - Blunt Park Rd.
Boston Concessions Group - 1277 Main St
Brightwood Library - 359 Plainfield Street
Bus Sta/Peter Pan - 1776 Main Street
Camp Star-Park Dept Physically Handicapped Camp - 1385 Berkshire Ave.
City Hall - 36 Court Street
Civic Center - 1277 Main Street
Conn Valley Mus - 194 State Street
Cyr Arena - Forest Park
DPW Tapley St Facility - 70 Tapley Street
E. Spfld. F.S. - 933 Page Blvd.
E. Spfld. Pub Lib - 21 Osborne Terr.
Federal Bldg. - 1550 Main Street
Fire Alarm Center - 1535 Roosevelt Ave
Fire HQ - 605 Worthington Street(EMERGENCY POWER)

Forest Park Pool - Forest Park
 Forest Park Pub Lib - 380 Belmont Ave.
 Franconia Golf Course (Seasonal) 619 Dwight Rd.
 Greenleaf Ctr - 1189 Parker Street
 GWV Smith Art Mus - 222 State Street
 Hampden County Sheriff Day Reporting Ctr. - 311 State Street..
 Hampden Cty Ct House - 50 State Street
 I.O. Fire Station - 15 Odessa Street
 I.O. Pub Library - 44 Oak Street, I.O.
 Liberty Pub Lib. - 773 Liberty Street
 Ma Dept. Youth Serv. - 280 Tinkham Rd.
 Mason Sq. F.S. 33 Eastern Ave. (EMERGENCY POWER)
 Mason Square Lib. - 765 State Street
 Mass Mutual Ctr. - 1277 Main St
 Massreco Fire Station - 16 Massreco Street
 Medcare Amb Svc - 345 Page Blvd.
 Museum of Fine Art - 49 Chestnut Street
 Museum of Science - 236 State Street
 Nat Guard Arm - 1505 Roosevelt Ave
 North End Fire Sta - 2729 Main Street (EMERGENCY POWER)
 Old Water Dept. Yard - 71 Colton Street
 (operates PVRTA, PVRTA located at 2808 Main Street)
 Park Dept. Admin - Forest Park Park Rangers
 Pine Point Pub Lib - 204 Boston Rd.
 Police HQ - 130 Pearl Street (EMERGENCY POWER)
 Purchasing Dept. - 233 Allen Street
 Quadrangle Complex City Library - 220 State Street
 R Sullivan Public Safety - 1212 Carew Street
 Reg of Motor Veh – 1250 Street James Ave.
 School Dept. - 195 State Street
 School Time Transportation, Inc. - 99 Arnold Av.
 Smead Skating Rink - 1780 Roosevelt Ave
 Spfld. Area Transit Co., Inc. (SATCO) 2840 Main Street

State Office Bldg. - 436 Dwight Street
State Police - 600 Liberty Street
Sumner Ave. F.S. - 1043 Sumner Ave
U.S. Bulk Mail Ctr. - 190 Fiberloid Ave
U.S. Post Office - 1149 Main St
U.S. Post Office - 1500 Main St
U.S. Post Office - 1883 Main St
U.S. Post Office - 19 Oak St
U.S. Post Office - 190 Fiberloid St
U.S. Post Office - 3065 Main St
U.S. Post Office - 393 Belmont Ave
U.S. Post Office - 914 State St
US Sprint - 400 Taylor Street
US Water (Bondi Island Plant) - In City of Agawam
Veterans Golf Course - 1059 S. Branch Pkwy
Eversource - 300 Cadwell Dr.
Western Mass Kidney Center 2000 Main Street
WMass Corr Alcoh Ctr. - 26 Howard Street
Zoo in Forest Park - 1 Pecousic St

4) Schools

Academy at Kiley – 180 Cooley Street
Academy Hill School - 1190 Liberty Street
Alfred G Zanetti Elementary School – 474 Armory Street
Alfred Glickman Elementary School - 120 Ashland Ave
Alice Beal Elementary School - 285 Tiffany St
Arthur Talmadge Elementary School - 1395 Allen St
Baystate Academy Charter School – 2001 Roosevelt Ave.
Brightwood-Lincoln Elementary School - 255 Plainfield St
Chestnut Accelerated Middle School - 355 Plainfield St
Curtis Blake Day School - 979 Dickinson St
Daniel Brunton Elementary School - 1801 Parker St
Deberry-Swan Elementary School – 670 Union Street
Edward Boland Elementary School - 426 Armory St

Elias Brookings Middle School – 433 Walnut Street
Forest Park Middle School - 46 Oakland St
Frank H Freedman Elementary School - 90 Cherokee Dr.
Frederick Harris Elementary School - 58 Hartford Ter.
Gates Expeditionary Learning School - 1170 Carew St
German Gerena Community School - 200 Birnie Ave
Glenwood Elementary School - 50 Morison Ter.
High School Of Commerce - 415 State St
Hiram Dorman Elementary School - 20 Lydia St
Horace Mann New Leadership Cs - 180 Ashland Ave
Indian Orchard Elementary – 95 Milton Street
John Duggan Middle School - 1015 Wilbraham Rd
John F Kennedy Middle School - 1385 Berkshire Ave
Kathleen Thornton School - 44 Sherman St
Kensington Avenue Elementary School - 31 Kensington Ave
Liberty Elementary School - 962 Carew St
Liberty Preparatory Academy – 37 Alderman Street
M Marcus Kiley Middle School - 180 Cooley St
Margaret C Ells Elementary School - 319 Cortland St
Martin Luther King Chart School - 649 State St
Mary A Dryden Veterans Memorial School - 190 Surrey Rd
Mary Lynch Elementary School - 315 N Branch Pkwy
Mary O Pottenger Elementary School - 1435 Carew St
Mary Walsh Elementary School - 50 Empress Ct,
Mill Pond School - 91 Old Acre Rd
Milton Bradley Elementary School - 22 Mulberry St
Pioneer Valley Christian School - 965 Plumtree Rd
Pioneer Valley Montessori School - 1524 Parker St
Rebecca Johnson Elementary School - 55 Catherine St
Robert M Hughes Charter School - 90 School St
Roger L Putnam Vocational Tech High School - 1300 State St
Sabis International Charter School - 160 Joan St
Safe - Berkshire St Campus - 90 Berkshire St

Safe - Eastern Avenue Campus - 118 Alden Street
Safe - Recovery School - 334 Franklin Street
Safe - Wilbraham Ave Campus - 140 Wilbraham Ave
Saint Michael's Academy - 153 Eddywood St
Samuel Bowles Elementary School - 24 Bowles Park
Springfield Central High School - 1840 Roosevelt Ave
Springfield High School Science & Tech - 1250 State Street
Springfield Honors Academy - 415 State Street
The Springfield Renaissance School – 1170 Carew Street
Sumner Avenue Elementary School - 45 Sumner Ave
Thomas Balliet Elementary School - 52 Rosewell Street
Thomas Balliet Middle School – 111 Seymour Ave
Van Sickle Middle School – 1170 Carew Street
Veritas Preparatory School – 370 Pine Street
Warner Elementary School – 493 Parker Street
Washington Elementary School – 141 Washington Street
White Street Elementary School – 300 White Street
Several private daycares throughout the City – see Past & Potential Hazards/Critical Facilities Map

5) Religious Buildings

Churches

Acres Congregation-Jehovah - 1680 Wilbraham Rd
Alden Baptist Church - 649 State St
All Nations Church of God - 67 Kenyon St
Alpha & Omega Ministry - 2755 Main St
Apostolic Church - 34 Catharine St
Bethel African Methodist - 27 Pendleton Ave
Bethesda Ev Lutheran Church - 455 Island Pond Rd
Blessed Hope Advent Christian - 1516 Sumner Ave
Blessed Sacrament - 445 Plainfield St
Canaan Baptist Church-Christ - 42 Hobart St
Canaan Baptist Church-Christ - 1430 Carew St
Celestial Praise Church of God - 321 Wilbraham Rd

Christ Church Cathedral - 35 Chestnut St
Christ Presbyterian Church - 1597 Allen St
Christadelphian Chapel - 710 White St
Christian Embassy Church - 30 Bowdoin St
Christian Hill Baptist Church - 54 Bowdoin St
Christian Hope Ministry - 1657 Main St
Christian Life Ctr. - 1590 Sumner Ave
Church in the Acres Baptist - 1383 Wilbraham Rd
Church Of God - 135 Hancock St
Church Of Jesus Christ of LDS - 376 Maple St
Church of the Nazarene - 961 Wilbraham Rd
Citylights Ministry - 4 Garfield St
Daniel's New Bethel Church - 1321 Dwight St
Diocese of Springfield - 65 Elliot St
Diocese-Western Mass-Episcopal - 37 Chestnut St
Dr. Elouise Franklin Church Inc. - 104 Hancock St
East Church Congregational - 455 Island Pond Rd
Ebenezer Missionary Baptist - 44 Dearborn St
Faith United Church - 52 Sumner Ave
Family Church - 245 Bay St
First Korean Church-Nazarene - 212 Cottage St
First Park Memorial Baptist - 1 Garfield St
First Spiritualist Church - 33 Bliss St
Foster Memorial Church - 1234 Parker St
Freedom House of God Church - 563 Union St
Friendship Baptist Church - 68 Church St
Fuentes De Salvacion - 803 Liberty St
Gardner Memorial Ame Zion - 90 Carew St
Gethsemane Chr of Jesus Christ - 47 Harvey St
Glorious Gospel Church - 627 State St
Grace Baptist Church - 60 Bowles Park
Grace Church Of Christ - 336 Springfield St
Harvest Fellowship Church - 761 Sumner Ave

Heritage Baptist Church - 640 Plumtree Rd
Holiness Church of God Seventh - 398 Hancock St
Holy Cross Catholic Church - 221 Plumtree Rd
Holy Name Rectory - 323 Dickinson St
Holy Temple Church of God - 145 Bay St
Holy Trinity Church of God - 57 Bay St
House of Prayer Apostolic - 116 Walnut St
Iglesia Bautista Hispana - 18 Salem St
Iglesia Bautista Sinai - 134 Abbe Ave
Iglesia Cristina Senda Antiqua - 372 Walnut St
Iglesia De Dios Elsiloe Inc. - 17 Morgan St
Iglesia De Dios Pentecostal - 72 Orchard St
Iglesia Fe Victoriosa Inc. - 700 Berkshire Ave
Iglesia Pentecostal Fente De - 6 Talcott St
Iglesia Vision Misionera Voz - 744 Main St
J C Williams Community Ctr. - 116 Florence St
Jehovah's Witnesses - 131 Clifton Ave
Jehovah's Witnesses - 21 Sanderson St
Jehovah's Witnesses - 187 Stuart St
Latino Ministry Movement Juan - 254 Bridge St
Librerria Christiana Fuente De - 346 Orange St
Macedonia Church-God In - 201 King St
Martin Luther King Jr. Church - 14 Concord Ter.
Mary Mother of Hope Church - 840 Page Blvd
Mass Holy Assembly Church-All - 43 Homer St
Morning Star Church - 88 Lawton St
Mt Calvary Baptist Church - 17 John St
Mt Calvery Baptist Church - 981 Wilbraham Rd
Mt Zion Baptist Church - 368 Bay St
New Creation Discipleship - 893 Boston Rd
New England District Lutheran - 400 Wilbraham Rd
New Generation Christian Chr - 605 Liberty St
New Hope Pentecostal - 364 Central St

New Jerusalem Chr-God & Christ - 209 Quincy St
Oasis Ministries Intl Church - 121 Chestnut St
Old First Church - 50 Elm St
Our Lady of Rosary Parish Hall - 334 Franklin St
Our Lady of the Rosary Parish - 334 Franklin St
Our Lady-The Sacred Heart - 417 Boston Rd
Pentecostal Bethel Church - 8 Cass St
Pentecostal Church of God - 74 Oak St
Pentecostal Church of God - 25 Terrence St
Potter's House Pentecostal Chr - 761 Sumner Ave
Power International - 1655 Main St # 302
Praise & Glory Church - 145 State St
Progressive Community Baptist - 599 State St
Revival Time Evangelistic Ctr. - 132 Florence St
Sacred Heart Church - 395 Chestnut St
Salvation Army - 170 Pearl St
Seventh Day Adventist Church - 1118 Sumner Ave
Shepherd's Gate Christian - 336 Springfield St
Shiloh Church - 91 Jasper St
Shiloh Freewill Baptist Church - 26 Burr St
Shiloh Seventh Day Adventist - 797 State St
Solid Rock Community Baptist - 821 Liberty St
South Congregational Church - 45 Maple St
Spanish Christian Church - 565 Chestnut St
Spanish Christian Church Ed - 549 Chestnut St
Spring Of Hope Church of God - 35 Alden St
Springfield Hispanic Seventh - 124 Putnam Cir
Springfield Presbyterian Chr - 18 Spencer St
Springfield Wesleyan Church - 82 White St
St Barnabas & All Saints Chr - 41 Oakland St
St Catherine of Siena Parish - 1023 Parker St
St Francis of Assisi Chapel - 254 Bridge St
St George Greek Orthodox Chr - 22 Saint George Rd

St John's Congregational Chr - 643 Union St
St Joseph Parish - Po Box 70666
St Luke's Episcopal Church - 961 Saint James Ave
St Mark Armenian Church - 2427 Wilbraham Rd
St Mark's Cme Church - 64 Dresden St
St Michaels Catholic Cathedral - 260 State St
St Patrick's Church - 1900 Allen St
St Paul's RC Church - 235 Dwight Rd
St Peter & St Paul Russian Chr - 118 Carew St
St Peter's Episcopal Church - 45 Buckingham St
St Rachel's Holiness Church - 171 Eastern Ave
Strait to Heaven Church - 2 Orange St
Temple Of Praise - 433 Eastern Ave
Third Baptist Church - 149 Walnut St
Trinity Lutheran Church - 400 Wilbraham Rd
Trinity United Methodist Chr - 361 Sumner Ave
True Vine Church - 140 Andrew St
Union Church - 91 Jasper St
United House of Prayer - 331 Wilbraham Rd
Unity in Christ Deliverance - 45 Dearborn St
Wachogue Congregational Church - 80 Arvilla St
Wesley United Methodist Church - 741 State Street
Whole Truth Temple - 8 Norfolk Street
Word of Life Church - 282 White Street
Zion Community Baptist Church - 1140 Roosevelt Ave

Synagogues

Beth El Temple - 979 Dickinson Street
Kesser Israel Synagogue - 19 Oakland Street
Kodimoh Synagogue - 124 Sumner Ave
Sinai Temple-Reform - 1100 Dickinson Street

Mosques

Al Baqi Islamic Ctr. - 495 Union Street

6) Historic Buildings/Sites

Apremont Triangle Historic District - Jct. Pearl, Hillman, Bridge, and Chestnut
 Bangs Block - 1119 Main Street
 Baystate Corset Block - 395-405 Dwight Street and 99 Taylor Street
 Belle and Franklin Streets Historic District - 77--103 Belle Street and 240--298 Franklin Street
 Bicycle Club Building - 264-270 Worthington Street
 Burbach Block - 1113-1115 Main Street
 Carlton House Block - 9-13 Hampden Street
 Chapin National Bank Building - 1675-1677 Main Street
 Colonial Block - 1139-55 Main Street
 Court Square Historic District - Bounded by Main, State, Broadway, Pynchon St's., and City Hall Pl.
 Cutler and Porter Block - Also known as 109 Lyman Street
 Downtown Springfield Railroad District - Roughly bounded by Lyman, Main, Murray, and Spring St's.
 Driscoll's Block - 211-13 Worthington Street
 Edisonia Theater Block - 1156--1176 Main Street
 Ethel Apartment House - 70 Patton St
 First Church of Christ, Congregational - 50 Elm Street
 Fitzgerald's Stearns Square Block - 300-308 Bridge Street
 Forest Park Heights Historic District -Off MA 21
 French Congregational Church - 33-37 Bliss Street
 Fuller Block - 1531-1545 Main Street
 Guenther & Handel's Block - 7--9 Stockbridge Street
 Gunn and Hubbard Blocks - 463-477 State Street
 Hampden County Courthouse - Elm Street
 Hampden Savings Bank - 665 Main Street
 Haynes Hotel Waters Building - 1386-1402 Main Street
 Henking Hotel and Cafe - 15-21 Lyman Street

7) Employment Centers

American International College - 1000 State Street
 Springfield College - 263 Alden Street
 Western New England College - 1215 Wilbraham Rd
 Baystate Health - 280 Chestnut Street

Baystate Medical Ctr. - 759 Chestnut Street

Baystate Medical Ctr. Specialty - 140 High Street

Hartford Hospital - 80 Seymour Ave

Mercy Medical Ctr. - 271 Carew Street

Park View Rehab & Nursing Ctr. - 1400 State Street

Shriner's Hospital - 516 Carew Street

Weldon Rehabilitation Hospital - 233 Carew Street

Table 4.1: Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas			
Hazard Type	Hazard Area	Critical Facilities	Evacuation Routes
Flooding	Connecticut River Flooding	Baystate Medical Center campus and associated	Main Street, Springfield Street, Chestnut Street,
		Springfield Housing Authority residences in the Brightwood Section of	Worcester Street (Route 141), Cadwell Street, Bircham Street
		Grochmal Avenue Wastewater Treatment	Worcester Street (Route 141), Cadwell Street,
	Chicopee River Flooding	Grochmal Mobil Home Park	Worcester Street (Route 141), Cadwell Street,
		MA Fire Training Center	Worcester Street (Route 141), Cadwell Street, Bircham Street, Main Street (IO), Berkshire
		Eastman	Main Street (Indian Orchard), Oak Street, Myrtle Street, Parker
		Water Street Section of Indian Orchard	Mill Street, Locust Street, Main Street,
Hurricane/Severe Wind	Citywide Impact	All critical facilities affected	Evacuation Routes will be main City Arterials such as: Main Street, East and West Columbus Ave, Sumner Ave, Parker St, Boston Road, Carew Street, Berkshire Ave.,
Severe Snow/Ice Storm	Citywide Impact	All critical facilities affected	Evacuation Routes will be main City Arterials such as: Main Street, East and West Columbus Ave, Sumner Ave, Parker St, Boston Road, Carew Street, Berkshire Ave.,
Table 4.1: Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas			
Hazard Type	Hazard Area	Critical Facilities	Evacuation Routes
Wildfire/Brushfire	Limited Impact	Baystate Medical Center – Main Campus	Main Street, Springfield Street, Chestnut Street,
		Buckeye Pipeline Terminal	Albany Street, Armory Street, Street James
		FL Roberts Terminal (Buckeye Pipeline)	Albany Street, Armory Street, Street James

		Sprague Oil Terminal (Buckeye Pipeline)	Albany Street, Armory Street, Street James Avenue, Route 291, Tinkham Road
		Department of Youth Services Secure	Tinkham Road
		Mercy Hospital	Carew Street, Stafford Street, Armory Street, Stoney Hill Road
		Big Y Center	Roosevelt Ave., Cottage Street, Route 291, Industry Ave., Memorial Avenue
		Department of Youth Services Secure	Tinkham Road, Wilbraham Road, Stoney Hill Road
		Forest Park	Sumner Ave, Dickenson Street, Route 5, Route 91 Eastman Street
Hazardous Materials	Buckeye Oil Terminal	CSX Rail Line	Albany Street, Armory Street, Street James Avenue, Route 291, Tinkham Road
		Eastman Kodak	Worcester Street (Route 141), Cadwell Street, Bircham Street, Main Street (IO), Berkshire Street
		Astro Chemicals	Roosevelt Ave., Cottage Street, Route 291, Industry Ave., Memorial Avenue
		Richco	Roosevelt Ave., Cottage Street, Route 291, Industry Ave., Memorial Avenue

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

Hazard Type	Hazard Area	Critical Facilities	Evacuation Routes
Hazardous Materials		Smith & Wesson	Roosevelt Ave., Cottage Street, Route 291, Industry Ave., Memorial Avenue
Dam Failure	Upper Van Horn Dam	Baystate Medical Center campus and associated clinics on Main Street	Main Street, Springfield Street, Chestnut Street, Armory Street, Chapin Street
		Baystate Medical Center Main Street campus	Springfield Street Chapin Terrace
		Springfield Housing Authority residences in the Brightwood Section of Springfield	Plainfield Street, West Street, Wason Street, Main Street, Route 291, Berkshire Street
		Grochmal Avenue Wastewater Treatment Facility	Worcester Street (Route 141), Cadwell Street, Bircham Street

	Indian Orchard Dam	Grochmal Mobil Home Park	Worcester Street (Route 141), Cadwell Street, Birch Street
		Eastman	Worcester Street (Route 141), Cadwell Street, Birch Street
		Water Street section of Indian Orchard	Main Street (Indian Orchard), Oak Street, Myrtle Street, Parker Street, Boston Ave
Landslide	Forest Park Neighborhood	Utility Failure	Interstate 91
Earthquake	Citywide Impact – especially pre-1975 construction	All critical facilities affected	Main Street – Indian Orchard Evacuation Routes Will be main City Arterials such as: Main Street, East and West Columbus Ave, Sumner Ave, Parker St, Boston Road, Carew Street, Birch Street, Boston Ave
Table 4.1: Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas			
Hazard Type	Hazard Area	Critical Facilities	Evacuation Routes
Drought	Citywide Impact	No critical facilities affected	No evacuations required
Extreme Temperature	Citywide Impact	No critical facilities affected	No evacuations required

(Past & Potential Hazards/Critical Facilities Map Located In Appendix C)

MITIGATION CAPABILITIES/STRATEGIES

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

Goal Statement

To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to natural disasters;
To provide adequate shelter, water, food and basic first aid to displaced residents in the event of a natural disaster and to provide adequate notification and information regarding evacuation procedures, etc., to residents in the event of a

For the purposes of this analysis, the Committee reviewed the following City documents:

- Zoning Ordinances
- Subdivision Rules and Regulations
- Springfield Open Space and Recreation Plan
- City of Springfield Capital Improvement Plan (CIP)
- USACE Flood Damage Reduction Segment/System Inspection Report
- Other relevant Guidelines as identified (Fire Department Burn Permit Procedures, Building Code, etc.)
- Comprehensive Emergency Management (CEM) Plan

What's the CEM Plan?

An important existing general preparedness and response tool is Springfield's Comprehensive Emergency Management Plan (CEM Plan). Although the CEM Plan is focused on the procedural response to an emergency, it organizes information, includes supply and

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

General Mitigation

Several of the recommended mitigation measures have multiple benefits because, if implemented, they will mitigate or prevent damages from more than one type of natural hazard.

These do not fall under one hazard type, but could be put into place for facilitation of better natural hazard protection generally.

Existing Mitigation Capabilities

These general hazard-related capabilities are already in place and currently being used for tools for emergency preparedness. The Hazard Mitigation Planning Committee recognizes that these are also important recommendations for the City, and has included them here:

- Springfield has an active Local Emergency Planning Committee.
- The Springfield Department of Health & Human Services in cooperation with the Pioneer Valley Chapter of the American Red Cross and the Salvation Army has established a system to inventory supplies at existing shelters and developed a needs list and storage requirements.
- The Springfield Office of Emergency Preparedness is examining its current notification system, including the feasibility of a new siren warning system. The City has been using a reverse 911 system (Blackboard) for about five years.
- The Office of Emergency Preparedness and the Department of Health & Human Services hosts a web site and provides community instruction to disseminate information on emergency information, what to include in a “home survival kit”, how to prepare homes and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster.
- The Department of Information Technology has continued to upgrade infrastructure and technology systems to best protect the City’s data and operations management in the event of a natural disaster.

Table 5.1 General Hazard Mitigation Assessment

Capability	Description	Effectiveness	Potential Improvements/ Expansion
Meetings of the Local Emergency Planning Committee	Consists of representatives from government, industry, utilities, public safety and the greater business community. This committee meets six (6) times a year.	Very effective.	Once approved, the City's HM committee will meet with the Local Emergency Planning Committee to review CIP and other plans when funding becomes available for potential projects to apply for FEMA grant funding
Emergency Notification System in place by way of reverse 911	The City uses reverse 911 in the event of storm, major crimes, hazardous material and terrorist notifications.	Very effective.	None.

Table 5.1 General Hazard Mitigation Assessment

Capability	Description	Effectiveness	Potential Improvements/ Expansion
The Office of Emergency Preparedness and the Department of Health & Human Services hosts a web site and provides community instruction to disseminate information on emergency information	Information includes “home survival kit”, how to prepare homes for extreme weather, and evacuation routes	Very effective.	New educational documents for City residents for high/medium risk hazards
Fiber Mesh Network	The City has been working towards connecting public facilities within a fiber network for continued communication/operations during a disaster	Very effective.	Finish high speed ring from City Hall Main Datacenter to Tapley Street Alternate Datacenter via Office of Emergency Preparedness.
Data Center failover automation and analysis software	Software would create scripts and automate failing from City Hall to Tapley Datacenter and vice versa	Effective.	Automation software for virtual infrastructure.

Back up Datacenter	The City has established an alternate data center within City limits for continued operations if City Hall is somehow compromised	Effective.	Backup storage solution for long range deployment (>45 miles).
Emergency Communication Redundancy	Pearl Street is a backup for Roosevelt with a complete redundancy call answer point and communications center	Very effective.	Potential relocation with enhancements in the future

Future Mitigation Measures

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

- Continued review of the City's comprehensive plans when Hazard Mitigation grant opportunities arise.
- Research and implementation for new programs that will increase effectiveness for emergency communications between City officials/Public Safety and residents during a disaster.
- Public education and outreach for planning during a disaster.
- Continued improvements to the City's IT programming and infrastructure to allow continued communication and operations during a disaster.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Flooding

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

Existing Mitigation Capabilities⁹

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

Table 5.2 Flood Hazard Mitigation Assessment				
Capability		Description	Effectiveness	Potential Improvements/ Expansion
Flood Control Structures		Twelve dams	Somewhat effective.	Improve or remove high-risk dams.
		Connecticut River Dikes	Very effective for managing	Maintenance of dikes to maintain structural
Culvert Replacement		Island Pond storm water pump station project Abbe Brook bank stabilization project Drainage Culvert Reclamation Project – Alton Street, Wilbraham Rd., Industry Ave., Roosevelt Ave., Peekskill Ave. Tiffany St. Project	Very effective for managing flood control needs.	Prevent localized flooding from high volume storm events
Zoning	Floodplain District	Overlay district to protect areas delineated as part of the 100-year floodplain and special permit requirements.	Moderately effective for preventing hazardous chemical facilities from entering the floodplain; allows some uses by right and requires a special permit for most hazardous	Create a table of uses that clarifies which uses are allowed by-right, special permit or not at all; then modify table of uses to prohibit high-risk uses and future construction.

⁹ City of Springfield current NFIP activity data retrieved from the NFIP BureauNet: <http://bsa.nfipstat.fema.gov/reports/1011.htm#MAT>

ng Ordin ances	Special Permit	Applied to those uses that the City of Springfield wants to control, should a proposed project not conform to the needs of	Somewhat effective for preventing incompatible development.	Consider creating more performance-based evaluations, environmental standards.
	Connecticut Riverfront District	Accommodates and controls development along the riverfront; promotes tourism, recreation.	Somewhat effective at preventing development along the riverfront.	Include setbacks from waterways and prevent construction in identified floodplains.
Subdi visio n Regu lation s	Preliminary and Definitive Plan	Proposed storm drainage, sewer, water supply, and major site features (including natural features) must	Somewhat effective for preventing incompatible development.	None.
	Design Standards	Environmental Analysis – includes impact analysis of	Effective for protecting natural processes like flood	None.
		Development Impact Statement – describes natural features, drainage systems	Effective for encouraging compatible development.	None.
		Storm Drainage – determines impact of development to downstream.	Effective for mitigating impacts of development to downstream.	None.
		Site Preservation – significant natural and cultural sites must be noted and preserved when applicable.	Effective for protecting important natural features.	None.
		Excavation and Grading – regulates how earth removal must be conducted.	Effective for minimizing earth removal and preventing	None.
	Springfield Community Development Plan	The CD Plan identifies key goals and actions to promote natural resource preservation in the City, including areas in the floodplain; such as wetlands, groundwater recharge areas, farms and open space, rivers, streams	Effective at identifying key policy actions necessary to preserve open space.	Work to implement relevant goals and policies in Plan.
	National Flood Insurance Program Participation	As of 2022, there were 75 homeowners with flood insurance policies.	Somewhat effective, provided that the City remains enrolled in the National Flood	Increase the number of homeowners with Flood Insurance to provide coverage to all properties on CIS list

Springfield, MA - Current NFIP Policy Statistics (11/30/2022)	
Policies in Force:	75
Insurance in Force:	\$35,674,000
Written Premium in Force:	\$61,975
What is the NFIP's Community Rating System?	
The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS), a	

The City has capabilities in place to ensure compliance with NFIP requirements. Several years ago, FEMA completed an updated Flood Insurance Study for Hampden County. Following a rigorous review of the newly identified flood zones and elevations by Planning and DPW department employees, the City of Springfield City Council formally adopted the updated mapping effective July 16th, 2013. The updated digital floodplain boundaries have been added to the City's GIS mapping system and are available to the public via the City website mapping application.

All new projects proposing land alteration, including but not limited to grading and construction, within flood zones A and AE (the "100-year storm flood zone") are reviewed and approved by the Springfield planning department, DPW and Conservation Commission. Projects are permitted by the Commission when the applicant can prove compliance with local, state and federal regulations related to flood plain alteration. Although uncommon, when unpermitted work occurs within regulated flood zone areas, enforcement actions are performed by the Conservation Commission and the Department of Public Works.

Future Mitigation Measures

Many mitigation measures for the City's flooding hazards are area specific. Several potential changes to the City's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

- Connecticut and Mill Rivers Flooding: Repair and upgrade deficiencies as indicated by the USACE and quarterly inspection report, bringing accreditation status from minimally acceptable to acceptable.
- Island Pond Flooding: Install a storm water pump station and new storm drain that redirects storm water up Surrey Road and discharges to a conservation area in the Water shops Pond drainage basin.
- Abbe Brook Flooding: Bank stabilization, outlet reconstruction and channel restoration projects are all necessary to restore capacity to the bank.

- Drainage Culvert Reclamation: Clean and reestablished design capacities throughout the system.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Hurricanes/Severe Wind (Including Tornado/Microburst Hazards)

Of all the natural disasters that could potentially affect Springfield, hurricanes provide the most lead warning time because of the relative ease in predicting the storm's track and potential landfall. MEMA assumes "standby status" when a hurricane's location is 35 degrees North Latitude (Cape Hatteras) and "alert status" when the storm reaches 40 degrees North Latitude (Long Island). Even with significant warning, hurricanes can do significant damage – both due to flooding and severe wind.

The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Therefore, all of the flood protection mitigation measures described in Table 5-1 can also be considered hurricane mitigation measures.

The high winds that oftentimes accompany hurricanes can also damage buildings and infrastructure. But regulations can be put into place to help minimize the extent of wind damages.

Existing Mitigation Capabilities

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

Table 5.3 Existing Severe Wind Hazard Mitigation Measures (Including Hurricane, Tornado, Microburst Hazards)				
Capability		Description	Effectiveness	Potential Changes/ Improvements
Zoning Ordinance	Mobile Homes/ Trailers	Mobile homes are permitted with some additional regulations; trailers are only allowed as temporary living quarters.	Not effective for preventing damage to susceptible structures	Restricting location of mobile homes in high-hazard area and establish a buy-back program for high-risk mobile homes.
	Wireless Communications Structures and Facilities	Structures are required to be as minimally invasive as possible to the environment, have height restrictions, and must be setback 200% of the structure's height; 100% allowed for "stealth design towers".	Very effective for preventing damage in the case of a severe storm.	Done.
Subdivide. Regs	Design Standards	Utilities must be placed underground	Effective for preventing power loss.	Done.
State Building Code		The City has adopted the MA State Building Code.	Effective.	Done.

Tree Management	List of dangerous trees created annually for Eversource.	Very effective, preventative collaboration.	Done.
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Future Mitigation Measures

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

- Restricting location of mobile homes in high-hazard area and establish a buy-back program for high-risk mobile homes.
- Introduce tree management program to reduce power outages from storms producing high winds.
- Disaster resistance evaluation of critical City-owned facilities.
- Work with Eversource to facilitate the underground placement of new utility lines in general and existing utility lines in locations where repetitive outages occur (as applicable).
- Participate in the creation of a Regional Debris Management Plan.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Severe Snow/Ice Storm

Winter storms can be especially challenging for emergency management personnel. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected. Even though the storm has usually been forecast, there is no certain way for predicting its length, size or severity. Therefore, mitigation measure must focus on preparedness prior to a severe snow/ice storm.

Existing Mitigation Capabilities

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

Note: For damages from a winter storm that can be caused by flooding, all of the flood protection mitigation measures described in Table 5.2 in the previous section can also be considered as mitigation measures for severe snow/ice storms.

Table 5.4 Severe Snow/Ice Storm Hazard Mitigation Assessment				
Capability		Description	Effectiveness	Potential Improvements/ Expansion
Zoning Ordinance	Wireless Communications Structures and Facilities	Structures are required to be as minimally invasive as possible to the environment, have height restrictions, and must be setback 200 % of the structure’s height; 100% allowed for “stealth design towers”.	Very effective for preventing damage in the case of a severe storm.	None.
Subdivision Regulations	Design Standards	Utilities must be placed underground at time of construction	Effective for preventing power loss.	None.
		Street grade regulations (maximum 10%)	Effective.	None.
State Building Code		The City of Springfield has adopted the Massachusetts State Building Code.	Effective.	None.
Backup Electric Power		Identified shelters have backup power, three mobile generators	Very effective in case of power loss.	None.
Tree Management		List of dangerous trees created annually for Eversource.	Very effective, preventative collaboration.	Reduce power outages resulting from wind, snow and ice storms.

Future Mitigation Measures

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

- Work with Eversource to facilitate the underground placement of new utility lines in general and existing utility lines in locations where repetitive outages occur (as applicable).
- Determine if existing generators at shelters are effective, replace if not effective.
- Increase enforcement of restrictions prohibiting residents from plowing snow into the road.
- Participate in the creation of a Regional Debris Management Plan.

What is a Regional Debris Management Plan?

Natural disasters can precipitate a variety of debris, including trees, construction and demolition materials and personal property. After a natural disaster, potential threats to the health, safety and welfare of impacted citizens can be minimized through the implementation of a debris management plan. Such a plan can be critical to recovery efforts after a disaster, including facilitating the receipt of FEMA funds for debris clearance, removal and disposal.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Wildfire/Brushfire

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

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

Table 5.5: Wildfire/Brushfire Hazard Mitigation Assessment				
Capability		Description	Effectiveness	Potential Improvements/Expansion
Zoning Ordinance	Wireless Communications Structures and Facilities	Fire Chief is involved in final review of site plan for structure.	Effective.	None.
Subdivision Regulations	General	Fire Chief may be consulted on any subdivision approval.	Effective.	None.
	Design Standards	Fire protection is included in the required Development Impact Statement and as a part of the rules regulating water supply to the	Effective.	None.
Public Education/ Outreach		The Fire Department has an ongoing educational program in the schools.	Effective.	None.

Future Mitigation Measures

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

- Increase public education to recognize the dangers of fire, including the fire hazards that smoking-related materials pose.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding/staff to facilitate these projects.

Hazardous Materials

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

Table 5.6: Hazardous Materials Hazard Mitigation Assessment

Capability	Description	Effectiveness	Potential Improvements/ Expansion
Zoning Ordinance	All hazardous materials usage or storage must be registered with the Fire Chief.	Effective.	None.

Future Mitigation Measures

Potential changes to the City's current capabilities have been identified in the above table, and are compiled below:

- Update definitions to be consistent with State definitions.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure staff to complete this project.

Dam Failure

Dam failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. In addition, dam failure most often coincides with flooding, so its impacts can be multiplied, as the additional water has nowhere to flow.

Existing Mitigation Capabilities

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

Table 5.7: Dam Failure Hazard Mitigation Assessment			
Capability	Description	Effectiveness	Potential Improvements/Expansion
New Dam Construction Permits	State law requires a permit for the construction of any dam.	Effective. Ensures dams are adequately designed.	None.
Dam Inspections	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Low. The responsibility for this is now on dam owners, who may not have sufficient funding to comply.	Remove or improve dam impoundments that have been identified as non-essential high-hazard dams.

Future Mitigation Measures

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

- Develop and implement plan to remove unnecessary high and significant hazard dams. Plastics Park Dam and the Baystate Plumbing & Heating Pond Dam have already been identified as candidates
- Improve or remove dams that have been identified as non-essential high-hazard dams.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Landslide

Landslides are infrequent occurrences and an incidence would have limited impact. Throughout the years, Springfield has placed simple mitigation efforts in affected areas that have minimized the damaging impacts of landslides.

Existing Mitigation Capabilities

In an effort to mitigate future landslide occurrences, the City of Springfield has invested in two key ground erosion controls through the installation of various dropped manhole systems and gabion walls around the affected regions. These have proven to be very effective.

Table 5.8: Landslide Hazard Mitigation Assessment				
Capability		Description	Effectiveness	Potential Improvements/ Expansion
Zoning Ordinance	Planning Board Site Plan Review Criteria	The Planning Board may impose conditions designed to ensure that the proposed use, development or structure will avoid significant detrimental environmental impacts, including storm water runoff, erosion or sedimentation.	Effective.	None.
Dropped Manhole Systems		In the past 25 years, the City has installed multiple dropped manhole systems in an effort to control storm water runoff that would otherwise cause further erosion to terrace escarpments.	Very Effective.	Upgrade existing manholes to a dropped system.
Gabion Walls		Gabion walls have been installed for earth retention, erosion control and flood control.	Very Effective.	Installation of more gabion walls.

Future Mitigation Measures

In order to continue mitigating potential landslide occurrences, the City could invest in upgrading existing manholes to a dropped system and installing more gabion walls. This will ensure that erosion occurs in a controlled manner and not cause landslide to the City's current terrace escarpments.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Earthquake

Although there are five mapped seismological faults in Massachusetts, there is no discernible pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard to plan for.

Most buildings and structures in the state were constructed without specific earthquake resistant design features. In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the City's recovery from an earthquake.

Existing Mitigation Capabilities

The City's most relevant existing mitigation measures are described in the following table.

Table 5.9: Earthquake Hazard Mitigation Assessment				
Capability		Description	Effectiveness	Potential Improvements/ Expansion
Zoning Ordinance	Wireless Communications Structures and Facilities	Structures are required to be as minimally invasive as possible to the environment, have height restrictions, and must be setback 1.25	Very effective for preventing damage in the case of an earthquake.	None.
State Building Code		The City of Springfield has adopted the State Building Code.	Effective for new buildings only.	Evaluate older structures categorized as critical facilities to determine if they are earthquake/disaster resistant.

Future Mitigation Measures

Potential changes to the City's current capabilities have been identified in the above table and are compiled below:

- Evaluate older structures categorized as critical facilities to determine if they are earthquake/disaster resistant.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for this project.

Drought

Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and drought. And unlike other places, drought can most likely be effectively mitigated in regions like the Pioneer Valley if measures are put into place.

Existing Mitigation Capabilities

While Springfield has limited drought risk—there are no City wells or recreation areas—several water protection regulations are in place, as evidenced by the section on flooding. Additional regulations and mitigation options, specific to drought mitigation, are included here.

Table 5.9: Drought Hazard Mitigation Assessment				
Capability		Description	Effectiveness	Potential Improvements/ Expansion
Sub divi sion Reg ulat ions	Preliminary and Definitive Plan	Proposed storm drainage, sewer, water supply, and major site features (including natural features) must be included.	Effective for ensuring adequate water supply and preventing drainage problems.	None.
	Design Standards	Environmental Analysis – includes impact analysis of recharge and infiltration.	Effective for protecting natural processes like flood mitigation.	None.
		Site Preservation – significant natural and cultural sites must be noted and preserved when applicable.	Effective for protecting important natural features including bodies of water.	None.
		Excavation and Grading – regulates how earth removal must be conducted.	Effective for minimizing earth removal and preventing sedimentation.	None.
Springfield Community Development Plan		Makes several relevant recommendations regarding preventing drought, protecting water supply and quality.	Potentially effective step, if taken.	Implement recommendations.

Future Mitigation Measures

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

- Implement recommendations from the Springfield Community Development Plan, dealing protection of water supply and quality.
- Create Water Conservation Guidelines, as education to City residents.

Resource Gaps

In order to make continued progress on mitigation measures, the City would need to secure funding for these projects.

Extreme Temperature

The City of Springfield experiences extreme temperatures at least once or twice a year. Research shows that extreme temperatures are becoming more frequent due to climate change. The impact of extreme temperatures is citywide.

Existing Mitigation Capabilities

To mitigate extreme heat, the Springfield Department of Health and Human Services (SDHHS) opens up cooling sites to the general public from 11 am to 8 pm when there is a heat warning. To mitigate extreme cold, the SDHHS also has a Cold Weather Emergency Response Plan that is activated at the Health Commissioner's discretion.

Table 5.10: Extreme Temperatures Hazard Mitigation Assessment			
Capability	Description	Effectiveness	Potential Improvements/ Expansion
Cooling Centers	Several Citywide sites with air conditioning are made available to the public to prevent heat stress in residents.	Very Effective.	None.
Cold Weather Emergency Response Plan	Plan increases awareness of cold weather precautions for the general public and implements a comprehensive response plan to provide temporary overnight shelter to homeless and inadequately housed individuals.	Very Effective.	None.

Future Mitigation Measures

The City of Springfield will continue to implement its current mitigation strategies through the implementation of the Cold Weather Emergency Response Plan and the opening of cooling centers.

Resource Gaps

No additional funding is necessary.

PRIORITIZED IMPLEMENTATION SCHEDULE

Summary of Critical Evaluation

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

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

Project Prioritization

The Springfield Hazard Mitigation Planning Committee created the following schedule for implementation of prioritized items. These projects are prioritized using the criteria detailed in earlier sections of this plan, and that used in the City's Capital Improvement Plan. The FY22-26 Capital Improvement Plan states that: "limited resources exist for competing projects."

"This requires that each project's full impact on the City's budget be considered in rating and evaluating projects. Projects that are self-funded or have a large proportion of external funding will receive higher ratings than those that do not, as these projects have less impact on the funding portion of our capital budget."

Employing this rationale in conjunction with the hazard criteria detailed in previous sections, should result in improved prioritization of mitigation projects because of their eligibility for external funding.

The capital project prioritization criteria and ratings are derived from the following processes and criteria. A more detailed explanation may be found in Appendix H.

Capital projects are categorized into one of seven categories:

- Building
- Infrastructure

- Equipment
- Equipment (Other)
- Land/Parks/Fields
- Technology
- Salary

Each project is further classified into one of five different types of projects:

- New
- Reconstruction/Replacement
- Demolition
- Major Repair/Renovation
- Repair

The City's Capital Improvement Committee is responsible for identifying and prioritizing the City's needs and coordinating them with the operating budget. The Capital Improvement Committee reviews each submission. After appropriate review and consideration, the committee establishes project priorities given quantitative measures of need and justification as established by the rating department and reviewed by the committee.

1. Criteria	Weight: 5
2. Impact on Service to Public	Weight: 3
3. Promotes Economic Development	Weight: 3
4. Legal Obligations and Compliance	Weight: 3
5. Urgency of Maintenance Needs	Weight: 2
6. Prior Phases	Weight: 2
7. Resiliency	Weight: 1
8. Perception	Weight: 1

Each criterion above receives a different weight. Each project is assigned to one of four priority levels based on the overall weighted score. These scores were considered by the Planning Committee when ranking the following list of projects:

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

Table 6.1 Implementation Schedule- Action Plan

Priority	Mitigation Action	Responsible Department/ Board	Proposed Timeframe in Months	Specific Actions	Funding Source	Incorporation into Existing Plan
1	Improve structural integrity of Connecticut River Dikes	DPW	6 Design/ 24 Construction	Enhance capability for dike structures.	HMGP/FMA	USACE Report Quarterly DPW Inspection
2	Baystate Plumbing & Heating Pond Dam Removal	DPW/Parks	8 Design / 14 Construction	Demolish and remove existing dam.	BRIC	USACE Report Quarterly DPW Inspection
3	Citywide dam improvements	DPW/ Parks	8-12 Design/ 14 Construction	Survey and make necessary enhancements.	FMA/HMGP/ MA "Seawall"	CIP
4	Tiffany Road Flood Control	Emergency Management, DPW	6 Design / 12 Construction	Dredge streams to return to original path, and fortify banks	HMGP	CIP
5	Fps (Sps) Curtain Drains All Sections	DPW	6 Design/ 12 Construction	Locate, clean, televise and enhance capability of the curtain drains as required by the USACE.	FMA	CIP USACE Report Quarterly DPW Inspection
6	Citywide Fire Debris Removal	Emergency Preparedness, Fire Department, Parks Department	4 Implementation	Remove slash and all tree debris	BRIC	Open Space Plan
7	Prevent further construction in identified floodplains in the Connecticut Riverfront District	Planning Department	12 Implementation	Update ordinance, get City Council approval	City Bond	No
8	Once approved, the City's HM committee will review CIP and other plans when funding becomes available for potential projects	Natural Hazards Mitigation Committee	4 Implementation	Watch for funding opportunities, review City plans annually	City Bond	
9	Education for reporting illegal dumping in stormwater drains, etc.	Natural Hazards Mitigation Committee, DPW	4 Implementation	Utilize existing City websites and social media	General Fund	No

10	Island Pond Road Flood Control	Emergency Preparedness, Department of Public Works, Parks Department	4 Design / 8 Construction	Repair outlet and fortify flood control culverts	HMGP/FMA	Open Space/ CIP
11	Repair Culvert Outlets Citywide	Emergency Preparedness, Department of Public Works, Parks Department	12 Design / 24 Construction	Rebuild outlets, and install erosion protection systems	HMGP	Open Space/ CIP
12	Abbey Brook Flooding Avoidance	Emergency Preparedness, Department of Public Works, Parks Department	6 Design / 12 Construction	Redesign drain system and stabilize slopes to mitigate varved clay and protect adjacent wetlands	HMGP	No
13	New educational documents for City residents for high/ medium risk hazards	Natural Hazards Mitigation Committee	6 Implementation	Create informational webpage	General Fund	No
14	Citywide - Pond Dredging	Parks Department	12-24 Implementation	Remove sediment build up to maintain water bodies city wide. Maintain sediment retention basins including maintenance or	FMA/CPA	CIP
15	Stormwater Outfall Improvements	DPW	36 Implementation	Stormwater outfalls identified as poor or failed are to be rehabilitated to functioning status. Includes infrastructure repair or replacement in environmentally sensitive areas.	BRIC	CIP
16	Police Operations Redundancy at 50 East Street	Department of Information Technology/Police Department	5 - 8 Implementation	Data/Operations redundancy at second Police facility for servers, records and communications systems for continued operations	HMGP	No
17	Magawisca Road Reconstruction	Emergency Preparedness, Department of Public Works, Parks Department	6 Design / 12 Construction	Redesign drain system and stabilize slopes to mitigate varved clay and protect adjacent wetlands	BRIC	Open Space/ CIP
18	Duck Pond / Aquatic Gardens Outlet Reconstruction	Emergency Management, Park Department	6 Design / 14 Construction	Redesign drain system and stabilize slopes to mitigate varved clay and protect adjacent wetlands	BRIC	Open Space/ CIP
19	Drainage culvert reclamation project	DPW	6 Design / 14 Construction	Improve drainage along city roadways.	BRIC/ General Fund	No
20	Create table of uses for Floodplain District - right, special permit, and	Planning Department	12 Implementation	Review ordinance, make Table of Uses available to public	Pay-Go Capital Account	No
21	Create performance based evaluation and environmental standards for Special	Planning Department	12 Implementation	Update ordinance, get City Council approval	General Fund	No

22	Restrict location for mobile homes within Zoning Ordinance	Planning Department	12 Implementation	Update ordinance, get City Council approval	General Fund/FMA	No
23	Update definitions within Zoning Ordinance to be consistent with State	Planning Department	12 Implementation	Update ordinance, get City Council approval	FMA	No
24	Upgrades to City Owned Bridges	DPW/ Parks/ Department of Capital Asset Construction	12-24 Implementation	The repair of city owned bridges is necessary to maintain their structural integrity and to insure vehicular and pedestrian safety. The city needs to establish a maintenance schedule to insure the bridges' structural integrity and vehicular and pedestrian safety. A recent update from Mass DOT has confirmed our bridge assessment. In response to	BRIC/MassDot	CIP
25	Update Tree Replacement Program	Parks Department	12-24 Implementation	Continue tree replacement for city streets and public parks in accordance with the tree master plan, asset inventory and upgrades to	BRIC/CDBG/ General Fund	CIP
26	Wireless Backhaul Project	Department of Information Technology	6 Implementation	Wireless backhaul to assist in building alternate paths aside from the fiber to provide resilience in the event of a fiber cut. With mission critical police and fire radio traffic as well as city telecommunications riding over the existing infrastructure, this has become a focus while we build out the existing	HMGP	CIP
27	Automation software for virtual infrastructure.	Department of Information Technology	1 Implementation	Datacenter failover automation and analysis software that would create scripts and automate failing from City Hall to Backup Datacenter and	HMGP	CIP
28	Backup data storage solution for long range deployment	Department of Information Technology	5 - 8 Implementation	Backup storage solution for long range deployment (>45 miles).	HMGP	CIP
29	Increase the number of homeowners with Flood Insurance to provide coverage to all properties on CIS	Planning Department	20-48 Implementation	Public outreach/education	PDM	No

PLAN ADOPTION & IMPLEMENTATION

Plan Adoption

Upon finalization, copies of the Draft Local Hazards Mitigation Plan for the City of Springfield were distributed to the City boards for their review and comment. A public meeting was held by the Springfield Mayor to present the draft copy of the Springfield Local Natural Hazards Mitigation Plan to City officials and residents and to request comments from this committee and the general public. The Natural Hazards Mitigation Plan was then formally submitted to the Massachusetts Emergency Management Agency (MEMA), and with their approval submitted to the Federal Emergency Management Agency (FEMA).

FEMA issued an official “approval pending adoption,” and the Mayor signed off on the final version of the plan. The Mayor’s signature constituted formal plan adoption.

Plan Implementation

The implementation of the Springfield Local Natural Hazards Mitigation Plan began following its formal adoption by the Springfield Mayor and approval by MEMA and FEMA. Specific City departments and boards are responsible for ensuring the development of policies, ordinance revisions, and programs. The Springfield Natural Hazards Planning Committee oversees the implementation of the plan, and consists of representatives from the following City offices:

Office of Emergency Preparedness

Mayor’s Office

Police Department

Health & Human Services

Fire Department

Office of Management & Budget

Planning & Economic Development

Law Department

Parks & Facilities

Department of Public Works

The representatives collaborated with City offices to incorporate the 2016 Hazard Mitigation Plan into other planning mechanisms, such as the FY17-22 Capital Improvement Plans, FY21 Master Development Plan, and FY21 Northeast Downtown Master Plan. Moving forward, the 2022 Hazard Mitigation Plan will be incorporated into updated versions of the plans above, as well as the upcoming updated Open Space & Recreation Plan.

Plan Monitoring and Evaluation

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

To monitor this plan there will be a Natural Hazards Planning Committee that will meet on an annual basis—or as needed (i.e., following a natural disaster)—to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm strategies to remove obstacles to implementation. Responsible parties will have a representative on the Springfield Natural Hazards Planning Committee, and will be responsible for seeing that the actions are implemented and progress reported on at the annual plan review meetings.

Continued Public Involvement

Outreach to the public, surrounding communities, agencies, businesses, academia, non-profits, or other interested parties outside of the City of Springfield will be done in advance of each annual meeting in order to solicit their participation in assessment of the plan. Community members will be invited to attend the City's Open-Space committee meeting through regular meeting postings, and will be encouraged to submit feedback and comments regarding the plan and proposed mitigation measures. Open-Space Committee meetings are held in accordance with the open meeting laws of the Commonwealth and the City.

Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different City departments and/or revise the goals and objectives contained in the plan. At a minimum, the committee will review and update the plan every five years. The meetings of the committee will be organized and facilitated by the Emergency Management Director or the Mayor of Springfield.

Evaluation

Evaluation of the hazard mitigation plan in its entirety will be done on a 5-year basis in accordance to the Disaster Mitigation Act of 2000 or after any significant natural hazard disaster. Any new problems that arise will be reviewed by the hazard mitigation team and incorporated in to the hazard mitigation plan. The plan will be updated with possible new mitigation measures and plans of action as determined from the evaluation. This allows for updates to be made as the City grows and changes.

Through the use of a reassessment, evaluation of the plan will include a review of the goals and actions and whether each still addresses current and expected conditions to determine if these measures have impacted the overall hazard and/or reduced vulnerability. The frequency of, and magnitude of the identified hazards will be reviewed.

Local fiscal issues, administrative challenges, or major regulation changes will also be discussed during this evaluation process, as well as local development and land use changes.

Update

The Office of Emergency Preparedness will oversee the Natural Hazards Planning Committee's involvement in the review and updating process. As noted in the Monitoring and Evaluation Sections, at least once a year the committee will convene to review the new information and make recommendations for ongoing changes or updates.

The official update process will commence approximately 18 months prior to this plan's expiration date. The committee will be responsible for conducting this review and update. The update will be in conformance with federal requirements and will evaluate effectiveness of

whether previously approved plan's method and schedule for monitoring, evaluating, and updating the plan worked, and what elements or processes, if any, need to be changed or modified to provide a more successful outcome in future plans.

**CERTIFICATE OF ADOPTION
CITY OF SPRINGFIELD, MASSACHUSETTS
CITY COUNCIL
A ORDER ADOPTING THE CITY OF SPRINGFIELD
LOCAL NATURAL HAZARDS MITIGATION PLAN**

WHEREAS, the City of Springfield recognizes the threat that natural hazards pose to people and property within the local community; and

WHEREAS, the City of Springfield established a Committee to prepare the Local Natural Hazards Mitigation Plan in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, several public planning meetings were held during 2021 regarding the update and review of the Local Natural Hazards Mitigation Plan; and

WHEREAS, the Local Natural Hazards Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Springfield from the impacts of future hazards and disasters; and

WHEREAS, a duly-noticed public hearing was held by the Springfield City Council on _____, 2021 to formally approve and adopt the Springfield Local Natural Hazards Mitigation Plan.

NOW, THEREFORE BE IT ORDERED that the Springfield City Council adopts the Local Natural Hazards Mitigation Plan.

ADOPTED AND SIGNED this _____, 2021.

Domenic J. Sarno, Mayor
City of Springfield

ATTEST:

APPENDICES

Appendix A – Technical Resources (in the event of an emergency)

1) Agencies

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

Northeast States Emergency Consortium, Inc. (NESEC).....	781/224-9876
National Oceanic and Atmospheric Administration: National Weather Service; Taunton, MA.....	508/824-5116
US Department of the Interior: US Fish and Wildlife Service	413/253-8200
US Geological Survey	508/490-5000

2) Mitigation Funding Resources

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

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

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

3) Internet Resources

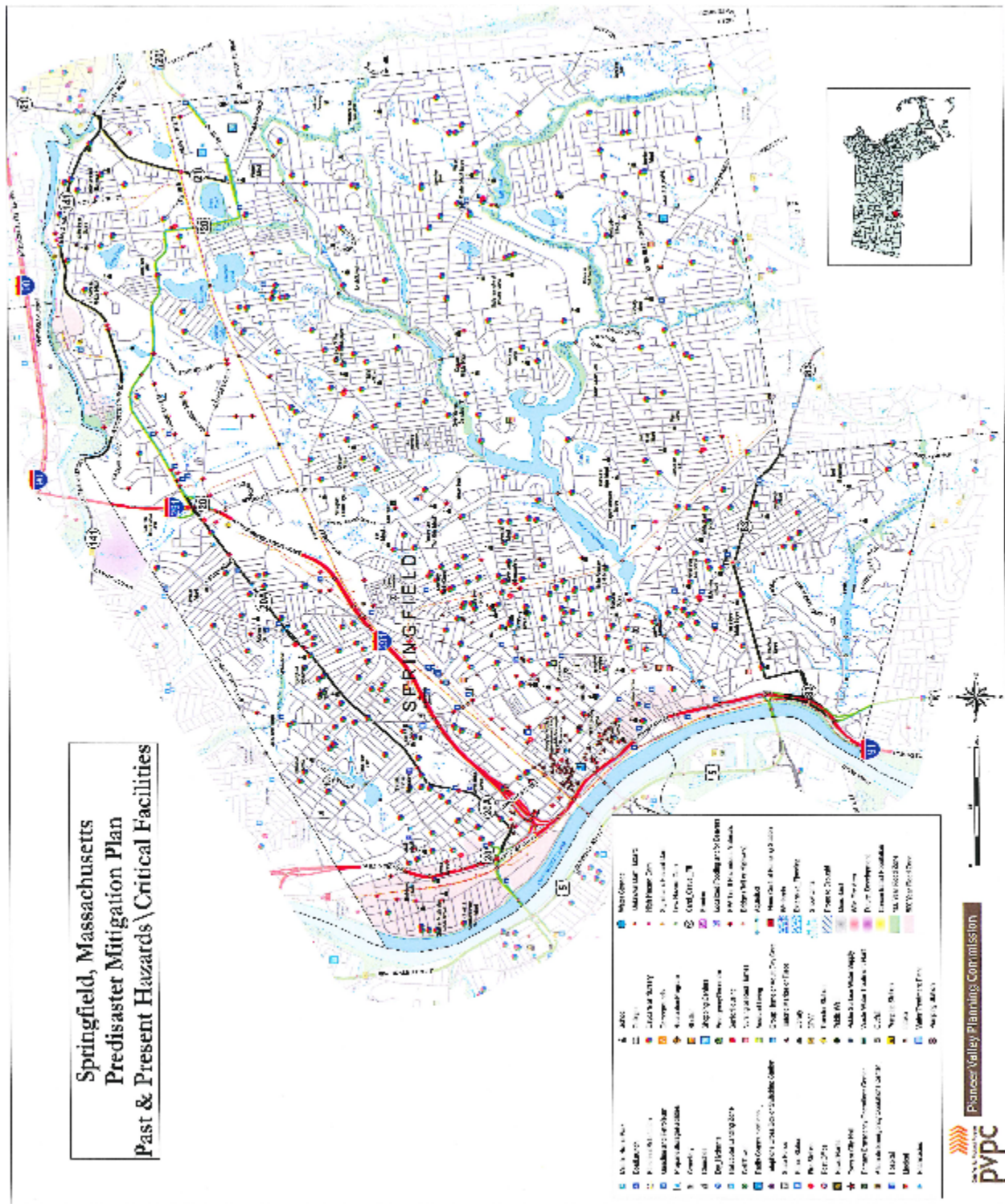
Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	http://www.colorado.edu/litbase/hazards/	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	http://wxp.eas.purdue.edu/hurricane	Hurricane track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

USDA Forest Service Web	http://www.fs.fed.us/land	Information on forest fires and land management.
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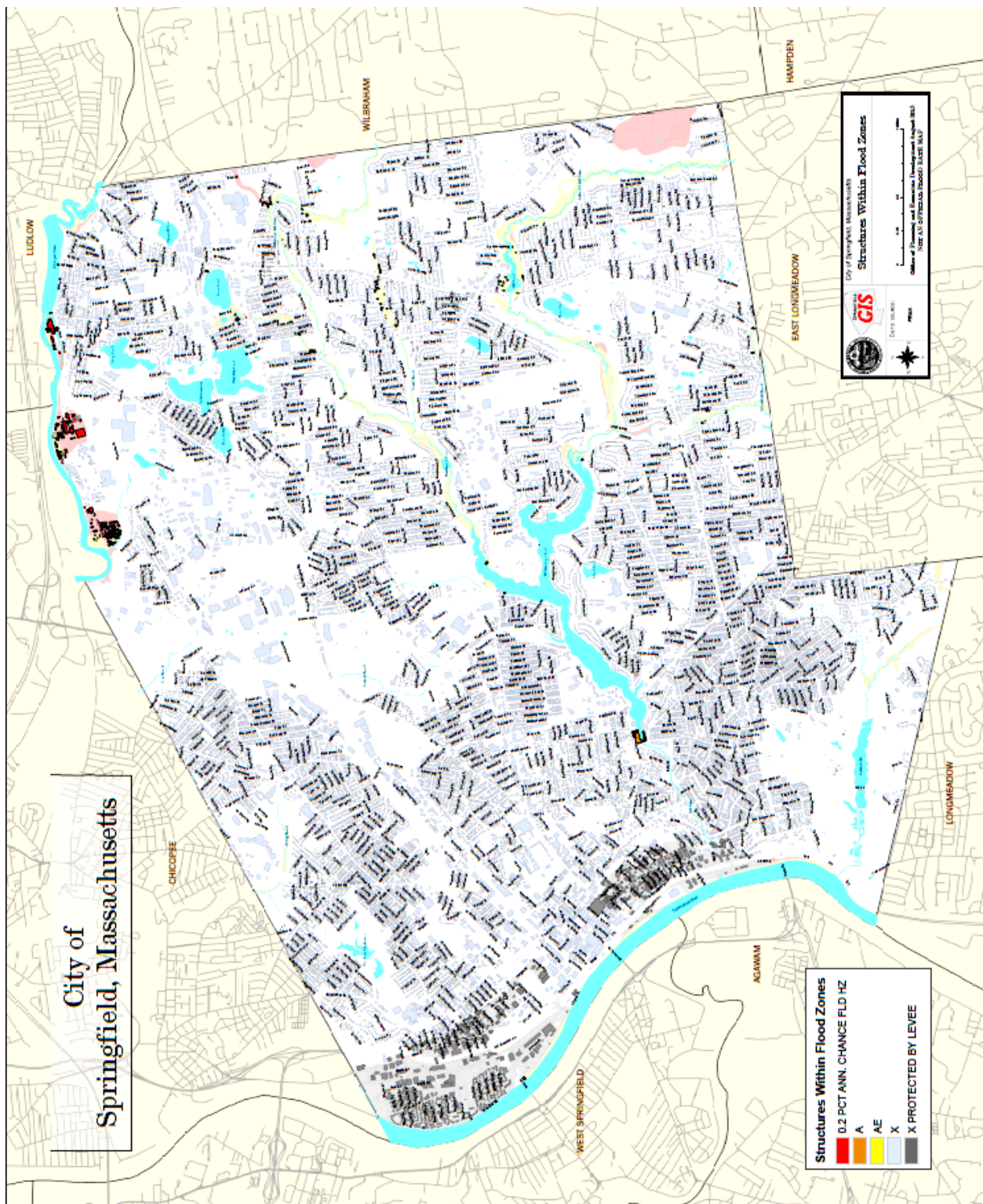
Appendix B – List of Acronyms

FEMA	Federal Emergency Management Agency
MEMA	Massachusetts Emergency Management Agency
PVPC	Pioneer Valley Planning Commission
EPA	Environmental Protection Agency
DEP	Massachusetts' Department of Environmental Protection
NWS	National Weather Service
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure & Communities
FMA	Flood Mitigation Assistance Program
SFHA	Special Flood Hazard Area
CIS	Community Information System
DCR	Massachusetts Department of Conservation and Recreation
FERC	Federal Energy Regulatory Commission
TRI	Toxics Release Inventory
FIRM	Flood Insurance Rate Map
NFIP	National Flood Insurance Program
CRS	Community Rating System
BOH	Board of Health
LEPC	Local Emergency Planning Committee
EMD	Emergency Management Director
Con Com	Conservation Commission
EOC	Emergency Operations Center
CEM Plan	Comprehensive Emergency Management Plan
HAZMAT	Hazardous Materials

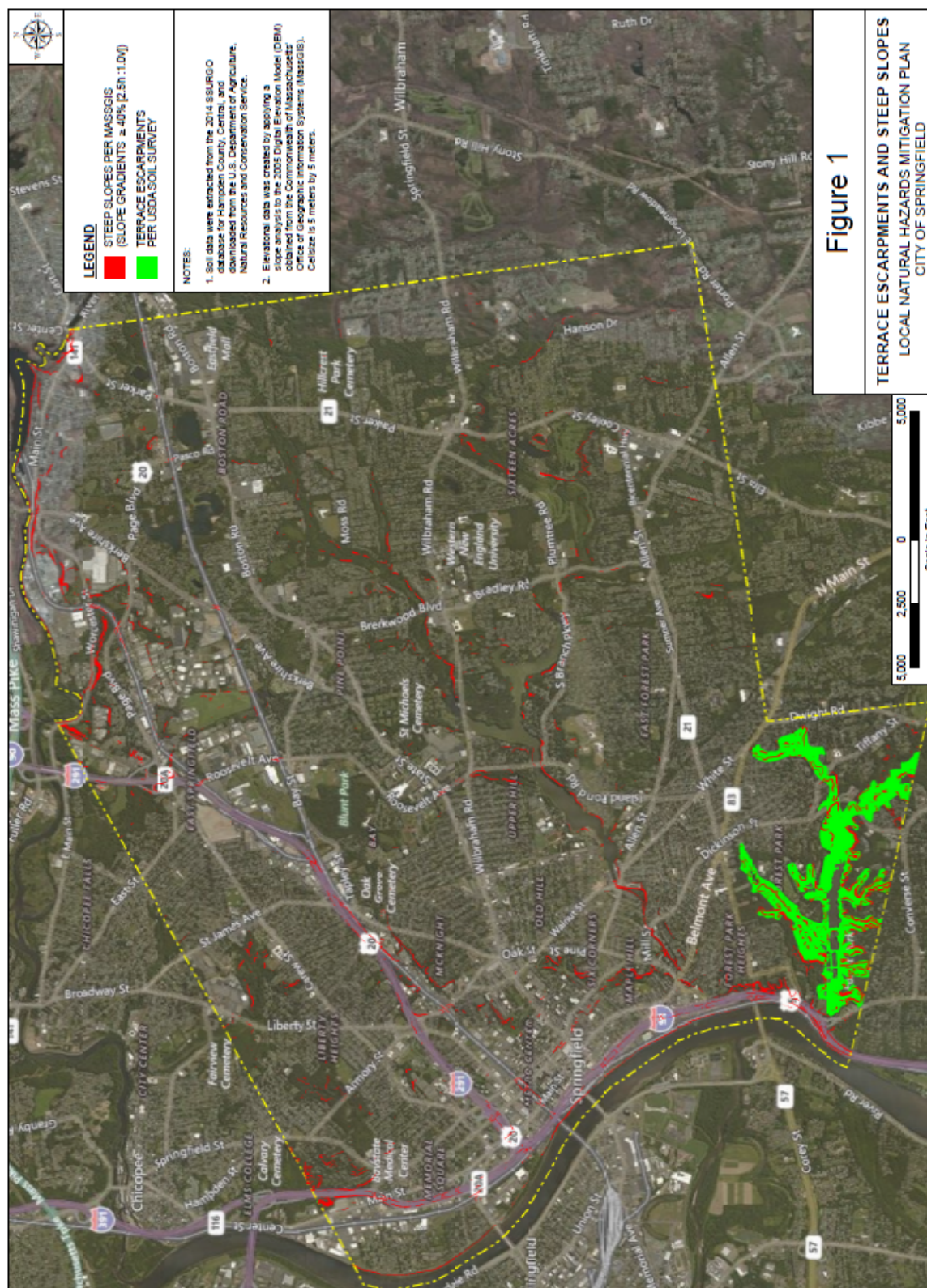
Appendix C – Past & Potential Hazards/Critical Facilities Map



Appendix D – Structures Within Flood Zones Map



Appendix E – Terrace Escarpments and Steep Slopes



Appendix F – Documentation of the Planning Process

Springfield Hazard Mitigation Planning Committee

Meeting #1 June 29, 2021 at 10 a.m.

Springfield City Hall Conference 310, 36 Court St.

AGENDA

- Review purpose of hazard mitigation plan
- Renewal process (Exp. 10/28/2021)
- Hazard Identification and Analysis Matrix
- Critical Facilities and Evacuation Routes
- Existing Mitigation Capabilities
- Action Plan
- Next Steps

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

****Note: The public is encouraged to attend****

Springfield Hazard Mitigation Planning Committee

Meeting #2, July 26, 2021, 1 p.m.

Zoom

AGENDA

- Section Addressing Climate Change
 - Only received responses from 2 people – please respond
- Critical Facilities List
- Review Tables from HMP 2015 Document
 - Table 5-0 General Hazard Mitigation Assessment
 - Table 5-1 Flood Hazard Mitigation Assessment
 - Table 3-5 Dams in Springfield
 - Table 5-6 Dam Failure Hazard Mitigation Assessment
 - Table 5-4 Wildfire/Brushfire Hazard Mitigation Assessment
 - Wildfire Burn Severity Classification
 - Table 5-9 Earthquake Hazard Mitigation Assessment
 - Table 5-3 Existing Severe Wind Hazard Mitigation Measures
 - Table 3.2 Major Non-Winter Storms to affect Springfield Area
 - Table 5-2 Severe Snow/Ice Storm Hazard Mitigation Assessment
 - Table 6.1 Implementation Schedule Action Plan

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

Springfield Hazard Mitigation Planning Committee

Meeting #3, September 14, 2021, 1:00 p.m.

Zoom

AGENDA

- Update Action Plan
- Pat Sullivan
 - Island Pond Flooding (description of problem and work being done)
 - Mill River Conduit
 - Dams in Springfield Table
 - Tree Management program for heavy winds
- Chris Cignoli
 - Destruction of Sewage manholes
 - Summer 2021 heavy rainfall, negative impact?
 - # of pumping stations in Springfield
 - Mill River Conduit
 - Operation & Maintenance Manual Updates
 - Flood damage to residential structures
 - Landslide Occurrences
 - Magawiska Rd.
 - Old Colony Rd.
 - Converse St.
 - Trafton Rd.
 - Dickinson St.
- BJ Calvi
 - Brushfires 2020
 - Specific Wildfire events
 - # of companies emitting hazardous materials in Springfield
 - Tier 2 facilities reporting?
 - Man Made hazard accidents since 2002.

CITY CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23 A-C
Appendix G – Public Outreach

PRESS RELEASE

CONTACT: Elyssa Parrish, Budget Analyst, Office of Administration & Finance (413) 784-4890

FOR IMMEDIATE RELEASE

Pre-Disaster Mitigation Plans Under Development

The Springfield Office of Emergency Preparedness is beginning the process of drafting pre-disaster mitigation plans for the City of Springfield.

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

Individuals interested in their community's Hazard Mitigation plan can contact Office of Administration & Finance (413-784-4890 or eparrish@springfieldcityhall.com) to request information on their community's plan development. When Springfield's plan is approved it will be eligible for Building Resilient Infrastructure & Communities (BRIC) grant program funding from the Massachusetts Emergency Management Agency.

PRESS RELEASE

CONTACT: Elyssa Parrish, Budget Analyst, Office of Administration & Finance (413) 784-4890

FOR IMMEDIATE RELEASE

Pre-Disaster Mitigation Plans Public Comment Period

The City of Springfield Office of Emergency Preparedness, in conjunction with representatives from the City's Police, Fire, Health, Public Works and Planning Departments, has produced a final draft of its Hazard Mitigation Plan. The plan is currently available for public review and comment on the City of Springfield's website (http://www3.springfield-ma.gov/cos/dept_emergency.0.html). Paper copies of the plans may be obtained at the Mayor's Office, The plans will be available for the next two (2) weeks.

This planning effort is being undertaken to help the City assess the risks it faces from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards. Communities with approved plans are eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

PRESS RELEASE

CONTACT: Ciara Hanlon, Budget Analyst, Office of Administration & Finance (413) 784-4819

FOR IMMEDIATE RELEASE

Public Comment Period for City of Springfield's Hazard Mitigation Plan Is Open Until 7/15/22

Springfield, MA – The City of Springfield is pleased to announce the opportunity for public comment on the Hazard Mitigation Plan (HMP) Update. The public comment period will be open July 1, 2022 through July 15, 2022.

Please email all comments to Ciara Hanlon at chanlon@springfieldcityhall.com with subject heading “HMP Public Comment” by the deadline. Comments received after the deadline will not be accepted.

This draft HMP, originally published in 2016, identifies the hazards that potentially impact the City, assesses the vulnerability to the hazards and identifies specific actions that can be taken to reduce the risk from the hazards. The Federal Disaster Mitigation Act of 2000 (DMA 2000) outlines a process which cities, counties, and special districts can follow to develop a HMP.

Please check out Massachusetts's Local Hazard Mitigation Planning page for more details.

The draft HMP can be found on the City's Emergency Preparedness website and copies are also available at all library branches throughout the City.

Appendix H – Capital and Hazard Mitigation Project Prioritization

Capital Improvement Process

Departments submit capital requests to the Finance Department electronically along with necessary supporting documentation (See Implementation Schedule for a summary of requested projects). Requests are captured in a database maintained by the Finance Department and are reviewed by the Capital Improvement Committee. This process is required by City ordinance and is consistent with best practices regarding capital investment.

Database Requirements

All capital requests are submitted in electronic format and include the following information:

- Project Category
- Project Type
- Department Priority
- Estimated Project Cost
- Proposed Funding Sources
- Project Description
- Project Urgency
- Project Benefits
- Fiscal Impact
- Legal Obligations
- Public Service Impact
- Completed Prior Phases

Categories

Capital projects are categorized into one of seven categories:

- Building – This includes acquisition, replacement, renovation, and addition to, construction or long-term lease of a building or a major component thereof.
- Infrastructure – This category includes roadwork, sidewalks, traffic signals, drainage systems and other improvements of a lasting nature that are not building structures.
- Equipment (Vehicular) – This includes equipment capable of self-propulsion from one location to another.
- Equipment (Other) – This includes all other equipment that meets the definition of a capital project item but is not capable of self-propulsion.
- Land/Parks/Fields - This category includes the acquisition, replacement, renovation, addition to, construction or long-term lease of parks and playing fields. If the acquisition of land is associated with the acquisition of a building or an infrastructure project, the project would be categorized in those respective categories.
- Technology – This category includes all purchases that meet the definition of a capital item in the area of technology such as computers, digital copiers, printers, telephone systems and software programs.
- Salary – This category includes salary for staff associated with a specific project and helps to determine what, if any, operating costs are included in the project plan.

Types

Each project is further classified into one of five different types of projects:

- New – The purchase, acquisition or construction of new capital, as distinct from the purchase of new capital items to replace existing capital.
- Reconstruction/Replacement – The substantial reconstruction or replacement of a capital asset, such as a street, building or a piece of capital equipment. This may entail the demolition of an existing asset or the abandonment of an asset and the construction or acquisition of a new asset to replace it.
- Demolition – This includes commercial and residential building demolition.

- Major Repair/Renovation – Large-scale renovations and repairs to capital assets, such as building system replacements, equipment overhauls and other items intended to extend the useful life of an existing capital asset.
- Repair – Smaller scale capital repairs that extend the useful life of a capital asset.

Capital Improvement Committee

The Capital Improvement Committee is responsible for identifying and prioritizing the City's needs and coordinating them with the operating budget. The Committee is comprised of the Chief Administrative and Finance Officer, the Director of Finance, the Director of Public Works, the Director of Parks, Buildings and Recreation, the Director of the City's Capital Asset Construction Department and the Director of Economic Development and Planning for the City and a representative of the City Council. Any member who has an interest in any item before the committee must recuse him or herself from deliberations on that item. For the FY22 planning process the Committee members included:

- Chief Administrative and Financial Officer – Timothy J Plante
- Deputy Chief Administrative and Financial Officer – Lindsay Hackett
- Budget Director – Melanie Acobe
- Director of Department of Public Works – Christopher Cignoli
- Director of Parks, Building/Recreation – Patrick Sullivan
- Director of Capital Asset and Construction – Peter Garvey
- Chief Development Officer – Timothy Sheehan
- City Council Representative – Timothy Allen
- Deputy Director of Economic Development – Brian Connors
- Capital Improvement Analyst – Erin Hand

The Capital Improvement Committee reviews each submission. After appropriate review and consideration, the committee establishes project priorities given quantitative measures of need and justification as established by the rating department and reviewed by the committee.

Criteria

Each project is ranked on six criteria:

- Overall fiscal impact - Will the project bring in additional revenue or will it cost additional money to operate? Are their funding sources other than the general fund for this project?
- Legal obligations – Does the project improve compliance with federal law, state law, or local ordinance?

- Impacts on service to the public - Will residents receive better service if the project is conducted? Will it address a public health, safety, accreditation or maintenance need?
- Urgency of maintenance needs - Is the asset currently broken and in need of immediate replacement?
- Prior phases - If the project is a multiyear project, have prior phases been previously conducted?
- Department priority – What priority does the department place on the projects based on the departmental mission, goals and objectives.

Each criterion above receives a different weight. Each project is assigned to one of four priority levels based on the overall weighted score.

The capital plan is intended to be a fluid document that will be subject to change each year as priorities change and additional information becomes available. All final requests approved by the Capital Improvement Committee will be submitted for final review and approval to the Mayor and the City Council.

Rating Criteria

CRITERIA 1 – OVERALL FISCAL IMPACT

Weight: 5

Rationale: Limited resources exist for competing projects. This requires that each project's full impact on the City's budget be considered in rating and evaluating projects. Projects that are self-funded or have a large proportion of external funding will receive higher ratings than those that do not, as these projects have less impact on the funding portion of our capital budget.

Considerations: Ratings for this factor will consider these major points:

- A. Capital cost of the project relative to all other project requests.
- B. Impact of the project on City operating costs and personnel levels.
- C. Whether the project requires City appropriation or is funded from agency, grant funds, matching funds or generated revenue.
- D. Impact on the City's tax revenue or fee revenue.
- E. Will external funding be lost should the project be delayed?

Illustrative Ratings:

- 5 - Project requires less than 10% City funding.
- 4 - Project requires less than 30% City funding.
- 3 - Project requires less than 50% City funding.
- 2 - Project requires more than 50% City funding, decreases operating costs.
- 1 - Project requires more than 50% City funding, operating costs remain the same.

0 - Project requires more than 50% City funding, increases operating costs

Note: Projects which do not impact either revenues or operating costs will receive the score of a project that is more favorable in the category (for revenue, the score will be the “increasing revenue” score and for costs, the “decreasing costs” score). This score will then be reduced by 0.5 to reflect the lack of actual increase in revenue or decrease in costs.

CRITERIA 2 – IMPACT ON SERVICE TO THE PUBLIC **Weight: 3**

Rationale: Consideration will be given to capital projects that address health, safety, accreditation or maintenance issues as well as those that improve the services provided by a department. Service is broadly defined, as are the City’s objectives in meeting the health, safety or accreditation needs of our residents and/or improved operations of an existing department.

Considerations: Ratings for this factor will consider these major points:

- A. Whether the project focuses on a service that is currently a “high priority” public need.
- B. Whether the project has immediate impact on service, health, safety, accreditation or maintenance needs.
- C. Whether the service is already being provided by existing agencies.

Illustrative Ratings:

- 5 – Project would address an immediate public health or safety need.
- 4 – Project would improve service and addresses a public health or safety need.
- 3 – Project would improve service to meet current desired goals.
- 2 – Project would address deficiencies or problems with existing services; would establish new service.
- 1 - Project would maintain existing standard of service.
- 0 – Project not related to maintaining an existing standard of service.

CRITERIA 3 – PROMOTES ECONOMIC DEVELOPMENT **Weight: 3**

Rationale: Some projects offer a regional, citywide, or neighborhood benefit, enticing home buyers and business owners by making the City an attractive place to live or work. Criteria 3 assesses projects based on the impact to the City’s economic development efforts

Considerations: Ratings for this factor will consider these major points:

- A. Whether the project enhances the City’s economic vitality by stimulating the local economy, increasing revenue, improving government effectiveness, or reducing operating costs.

Illustrative Ratings:

- 5 – Significant regional benefit.
- 4 – Citywide improvement.

- 3 – Benefits large portion of City.
- 2 – Benefits one neighborhood.
- 1 – Assists in the elimination of slum and blight.
- 0 – No impact.

CRITERIA 4 - LEGAL OBLIGATIONS AND COMPLIANCE

Weight: 3

Rationale: Some projects are essentially mandatory due to court orders, federal mandates, or state laws that require their completion. These projects should receive higher consideration than those which are considered discretionary. Criteria 2 evaluates both the severity of the mandate and the degree of adherence to state and federal laws.

Considerations: Ratings for this factor will consider these major points:

- A. Whether the City is under direct court order to complete this project.
- B. Whether the project is needed to meet requirements of federal or state legislation.

Illustrative Ratings:

- 5 – City or Department is currently under court order to take action.
- 4 – Project is necessary to meet existing state and federal requirements.
- 3 – Legislation is under discussion that would require the project in the future.
- 2 – There is no legal or court order or other requirement to conduct the project.
- 1 – Project requires change in state or law to proceed.
- 0 – Project requires change in federal or law to proceed.

CRITERIA 5 – URGENCY OF MAINTENANCE NEEDS

Weight: 2

Rationale: The City's most immediate goal in both capital and operating finance is to maintain current service levels for our citizens, businesses and visitors. Capital projects that are essential to maintain services, protect investments, or restore service that have been interrupted due to failure of capital assets will receive the highest rating in this criterion.

Considerations: Ratings for this factor will consider these major points:

- A. Whether a service is currently interrupted.
- B. Whether the project as requested will result in full restoration of an interrupted service.
- C. Whether the project is the most cost-effective method of providing or maintaining a service.
- D. Where a service is not currently interrupted, the likelihood that it will be in the next five years if the project is not funded.
- E. Whether costs of the project will increase (beyond inflation) if the project is delayed.
- F. Whether the agency has prepared a comprehensive maintenance/rehabilitation/ replacement schedule and the project is due under that schedule.

Illustrative Ratings:

5 – Service is currently interrupted and the project will restore service in the most cost-effective manner possible.

4 – Service is likely to be disrupted in a five-year horizon if the project is not funded.

3 – The project is necessary to maintain an orderly schedule for maintenance and replacement.

2 – The cost of the project will increase in future (beyond inflation) if it is delayed at this time.

1 – There is a minor risk that costs will rise or service will be interrupted if the project is not funded.

0 – There is no financial or service risk in delaying or not funding the project.

CRITERIA 6 – PRIOR PHASES

Weight: 2

Rationale: Some projects are developed in phases due to their complexity or size. In such cases, the need has already been established by a prior commitment of funding. Therefore, continuation of the project will be given higher consideration.

Considerations: Ratings for this factor will consider these major points:

A. Whether the project has received prior funds.

B. Whether the project requires additional funding to be operational.

Illustrative Ratings:

5 – All but the final phase has been fully funded.

4 – Multiple phases have been fully funded.

3 – Multiple phases have been partially funded.

2 – The first phase has been fully funded.

1 – The first phase has been partially funded.

0 – No prior phases have been funded or partially funded.

CRITERIA 7 – RESILIENCY

Weight: 1

Rationale: Some projects are developed in an effort to mediate unseen risks or disasters the City could face. These projects take a proactive approach to alleviating chronic stresses to the City to assist with resilience efforts after a disaster.

Considerations: Ratings for this factor will consider these major points:

A. Whether the project addresses stresses that weaken the fabric of a city on a daily or cyclical basis, examples include: High unemployment, Overtaxed or inefficient public transportation system, Endemic violence, Chronic food and water shortages.

B. Whether the project addresses response to a vulnerable population after a disaster. A vulnerable population is a group or community whose circumstances present barriers to obtaining or understanding information or accessing resources. Typically, lower-income persons are considered vulnerable populations since they are less able to recover from the effects of disasters.

Illustrative Ratings:

- 5 – Relieves chronic stressors to the City.
- 4 – Resolves response to vulnerable population after shock.
- 3 – Improves chronic stressors to the City.
- 2 – Improves response to vulnerable population after shock.
- 1 – Enhances natural resources.
- 0 – No impact.

CRITERIA 8 – PERCEPTION

Weight: 1

Rationale: This criterion refers to project assessment of the extent of public support or interest group advocacy and/or opposition

Considerations: Ratings for this factor will consider these major points:

- A. Whether the project has been identified by a plan, Government official or public organization.
- B. The public's perception of the project, positive or negative.

Illustrative Ratings:

- 5 – Identified in comprehensive plan, project plan or other study.
- 4 – Specific project request from the City Council.
- 3 – Project request from neighborhood organization of another group.
- 2 – Public perception of need known to City department.
- 1 – Knowledge of public perception of need unknown.
- 0 – Public opposition.

Appendix I – 2017/2022 Priorities Comparison

Table 6.2 - 2017 Priority Schedule Status Updates

2017 Priorities	Current Status	Specific Actions	Updates Since 2017	2017 Priority	2022 Priority
Improve structural integrity of Connecticut River Dikes	Planning Design / Construction	Enhance capability for dike structures.	The City of Springfield's Flood Control System is divided into three major segments. Beginning in 2018 and completed in 2022, the City invested over \$4 million in the upgrade of the City's Flood Control System that included new surface drainage system, new toe drain systems, structural repairs to floodwalls, and upgrades to other structural components. The City inspects the Flood Control System 3-4 each year in concert with the USACOE. Due to the nature of	1	1
Improve existing infrastructure to Watershops Pond to restore hydropower, avoiding flood damage and providing hydropower to emergency shelter at Elias	Complete	Continue to monitor infrastructure and hydropower	Project Completed Summer 2022	2	NA
Forest Park Main Greeting Road Repair	Complete	Continue to monitor to ensure embankments are secure	Main Greeting Road was repaired in 2018.	3	NA
Lower Van Horn Dam Restoration	Complete	Continue to monitor to ensure embankments are secure	Completed September 2019	4	NA
Watershops Pond Debris Removal and	Complete	Continue monitoring debris levels	Debris Removal Completed as part of the Watershops Dam Repair - Spring 2022.	5	NA
Baystate Plumbing & Heating Pond Dam Restoration	Planning Design / Construction	Demolish and remove existing dam.	The removal of the dam is not a mandatory items as per the USACOE, however, it removal will better expedite flow within the Mill River. The removal has been delayed due to the significant impact to abutting properties and the cost associated with the	6	2

Citywide dam improvements	Planning Design / Construction	Survey and make necessary enhancements	The Department continues to monitor and submit required state reporting to the office of Dam Safety. The department received a grant for the upper Van Horn Dam to prepare designs to restore and rebuild. The designs will be completed in the fall 2023. PBRM continues to research grants to compete the additional dams across the city. The City recently completed upgrades to the Water Shops Dam. Fall 2022. All critical Dams have been brought to current	7	3
Flood Prevention System (Fps) upgrades	Complete	Continue monitoring upgrades to ensure they are working effectively	The City of Springfield's Flood Control System is divided into three major segments. Beginning in 2018 and completed in 2022, the City invested over \$4 million in the upgrade of the City's Flood Control System that included new surface drainage system, new toe drain systems, structural repairs to floodwalls, and upgrades to other structural components. The City inspects the Flood Control System 3-4 each year in concert with the USACOE. Due to the nature of	8	NA
Tiffany Road Flood Control	Planning Design / Construction	Dredge streams to return to original path, and fortify	The City of Springfield has been awarded a grant by FEMA for the repairs to the downstream area of the Tiffany Street Culvert. The project is currently in design and is scheduled for construction for	9	4
Fps (Sps) Curtain Drains All Sections	Planning Design / Construction	Locate, clean, televise and enhance capability of the curtain drains as required by the usage.	The curtain drain / toe drain system for the Mill River Section and the Connecticut River Section have been 100% replaced and upgraded as part of the recent construction work begun in 2018, and completed in 2022. The replacement of the toe drain system for the Connecticut River north section is currently being coordinated with	10	5
Mill River Conduit Upgrades Wing Walls-Locust Street	Complete	Continue monitoring for any upgrades as necessary	The Mill River Conduit and Wing Wall Repairs were completed as part of the construction started in 2018 and completed in 2022. Repair and Upgrade information has been provided to the USACOE	11	NA

Mill River Channel Improvement-Rifle Street	Planning Design / Construction	Maintains integrity of city's flood control system as well as keeps the city in compliance with FEMA. Failure to stay in compliance will result in a decertified flood control system which will result in fines.	The Mill River Channel Repairs were completed as part of the construction started in 2018 and completed in 2022. Repair and Upgrade information has been provided to the USACOE	12	NA
Citywide Fire Debris Removal	Ongoing	Remove slash and all tree debris	The DPW has been involved with the removal of tree debris as part of projects located in debris areas, such as drainage improvements, outlet repairs, etc. Also tree debris in and around Watershops Pond was removed as part of the Dam replacement project in 2022.	13	6
Prevent further construction in identified floodplains in the Connecticut Riverfront District	Ongoing	Update ordinance, get City Council approval	Construction within floodplains is currently restricted based upon requirements of FEMA and the USACOE and does not necessarily need an ordinance update.	14	7
Once approved, the City's HM committee will review CIP and other plans when funding becomes available for potential projects to be completed	Implementation	Watch for funding opportunities, review City plans annually	Since 2017, the City has initiated design and or completed construction on the following HM projects: Tiffany Street Flood Improvements, St. Lawrence Ave. drainage improvements, South Branch Parkway drainage / flood improvements, Laurel Street Drainage Improvements, Timothy Circle Improvements, Flood Control System Improvements, Watershops Pond Dam Replacement, Bradley Road Bridge Replacement	15	8
Education for reporting illegal dumping in stormwater drains, other bodies of water	Ongoing	Create informational webpage	The City regularly reports on illegal dumping on their main website. The City is in progress of creating a specific webpage dedicated to illegal dumping information.	16	9
Watershops Pond Debris Removal	Complete	Continue monitoring Watershops Pond debris levels	Debris Removal Completed as part of the Watershops Dam Repair - Spring 2022.	17	NA

South Branch Parkway Box Culvert Repair	Planning Design / Construction	Resize box culvert to withstand 100-year storm and	Repairs to the South Branch Parkway drainage and culvert system were completed in 2022 under a grant from FEMA / MEMA	18	NA
Island Pond Road Flood Control	Planning Design / Construction	Repair outlet and fortify flood control	The City is working on applying for funding for this project.	19	10
Repair Culvert Outlets Citywide	Planning Design / Construction	Rebuild outlets, and install erosion protection systems	The DPW has repaired a number of inlets / outlets throughout the City along with erosion control improvements including: Tiffany Street, South Branch Parkway, Laurel Street, West Canton Circle, and various locations along Mill River North Section. Inlet / Outlet improvements will	20	11
Abbey Brook Flooding Avoidance	Planning Design / Construction	Redesign drain system and stabilize slopes to mitigate varved clay and protect	Minor Slope Stabilization and channel stabilization was completed in 2019. Additional improvements / upgrades are also being planned	21	12
Disaster resistance evaluation of critical City-owned facilities	Planning Design	Conduct Seismic surveys	The department has written grants to replace the two oldest School buildings Brightwood and Homer Street School. MSBA funded the replacement of these 1895 buildings. The Brightwood school reopened in 2021 and the Homer Street School will open Fall 2023. The department continues to seek grant funding to conduct	22	NA
New educational documents for City residents for high/ medium risk hazards	Implementation	Create informational webpage	Emergency Preparedness website on the Fire Departmental page is currently up to date with information regarding storms, hurricanes, earthquakes, and associated high wind, tornado, and flooding risks. This website will continue to be updated with additional hazards and educational	23	13
Citywide - Pond Dredging	Implementation	Remove sediment build up to maintain water bodies city wide. Maintain sediment retention basins including maintenance or replacement	At this time there have been no state or federal grant resources available to dredge our lakes and ponds. It is a multi-million dollar project and requires extensive permitting. We continue to research grants that would provide the resources to accomplish this work across our city.	24	14

Stormwater Outfall Improvements	Implementation	Stormwater outfalls identified as poor or failed are to be rehabilitated to functioning status. Includes infrastructure repair or replacement in	The DPW has repaired a number of inlets / outlets throughout the City along with erosion control improvements including: Tiffany Street, South Branch Parkway, Laurel Street, West Canton Circle, and various locations along Mill River North Section. Inlet / Outlet improvements will continue as funds are available.	25	15
Fiber Mesh Connectivity	Complete	Finish high speed ring from City Hall Main Datacenter to Tapley Street Alternate Datacenter via Office of Emergency	Design of an upgrade Citywide Fiber Network to support all City owned / maintained facilities in currently underway with installation and activation scheduled for 2023	26	NA
Police Operations Redundancy at 50 East Street	Implementation	Data/ Operations redundancy at second Police facility for servers, records and communications systems for continued operations during a	The building was constructed and certified for occupation April 2, 2018. Much work has been completed on the Data/Operations side of the project, but there was a delay due to COVID-19.	27	16
Magawisca Road Reconstruction	Planning Design / Construction	Redesign drain system and stabilize slopes to mitigate varved clay and protect	The Department monitors this area on a monthly basis and continues to research grant opportunities to improve the slopes. To date no grants have been available for this purpose.	28	17
Duck Pond / Aquatic Gardens Outlet Reconstruction	Planning Design / Construction	Redesign drain system and stabilize slopes to mitigate varved clay and protect	The Department has completed a study on the Duck Pond and Pecousic Brook water resource area. We are researching grants to address the \$1.5 million required to restore this area of Forest Park.	29	18
Drainage culvert reclamation project	Planning Design / Construction	Improve drainage along city roadways.	As part of roadway reconstruction and paving project, the DPW has systematically been upgrading catch basins, and in-road drainage systems to better convey flows to	30	19

Create table of uses for Floodplain District - right, special permit, and not at all	Implementation	Review ordinance, make Table of Uses available to public	Uses / developments within any floodplain are regulated by a combination of FEMA, DEP, the USACOE and the City's Conservation Commission. Ordinance update is not required	31	20
Create performance based evaluation and environmental standards for Special Zoning Permits	Implementation	Update ordinance, get City Council approval	Springfield's Zoning Ordinance (as amended to December 29, 2019) has provisions regarding development within flood plains. These include additional requirements for the applicant of a Special Zoning Permit to demonstrate compliance with flood plain restrictions and flood hazard mitigation. The City of Springfield will need funding to contract with experts for the development of a performance based evaluation and review of the environmental	32	21
Introduce tree management program to reduce power outages from wind, snow and ice storms	Implementation	Develop program	A complete street tree inventory was completed in 2020. Industry standard Hazard Tree Assessments were completed for all street trees by certified arborists. This has allowed us to prioritize high risk hazard tree mitigation. The Forestry Division has removed over 2,800	33	NA
Restrict location for mobile homes within Zoning Ordinance, implement a buy-back	Implementation	Update ordinance, get City Council approval	Springfield's Zoning Ordinance (as amended to December 29, 2019) has restrictions regarding Mobile Home locations. The City of Springfield will need additional funding to contract with the experts to develop a buy-back program and implement said program.	34	22
Implement relevant recommendations from Springfield Community Development Plan for open	Complete	Watch for funding opportunities, review City plans annually	Springfield's Open Space Seven Year Action Plan was implemented in multiple steps from FY15 - FY21.	35	NA
Update definitions within Zoning Ordinance to be consistent with State definitions	Implementation	Update ordinance, get City Council approval	Springfield's Zoning Ordinance (as amended to December 29, 2019) has restrictions regarding Hazardous Materials storage which defines Hazardous Materials using references to Massachusetts State Building Code 'use groups'. The City continues to explore the benefits of including the full definitions within their own Zoning Ordinance, but has found that at this time referencing the Massachusetts	36	23

Increase the number of homeowners with Flood Insurance to provide coverage to all	Ongoing	Continue outreach for new and current homeowners periodically	The City has increased the dollar amount of Insurance in Force. The City continues to provide outreach to new homeowners and current homeowners to increase the total coverage.	37	32
Upgrades to City Owned Bridges	Ongoing	The repair of city owned bridges is necessary to maintain their structural integrity and to insure vehicular and pedestrian safety. Maintenance of the city owned bridges has been deferred for approximately 15 years due to budgetary constraints. The city needs to establish a maintenance schedule to insure the bridges' structural integrity and vehicular and pedestrian safety. A recent update from mass dot has confirmed our bridge	Bridges within the City of Springfield, both City owned and State owned are inspected by MassDOT every 2 years. Currently there are two City owned bridges under design for improvement based upon data from the inspection reports; Bradley Road Bridge and West Street Bridge. As inspection reports are received, if additional inspections and / or repairs are required work is initiated. Also, the DPW is working with MassDOT on the improvements / replacement of the following bridges in Springfield; St James Ave over 291, St. James Ave., over railroad; Armory Street Bridges over rail lines, Tapley Street over 291; Liberty St. / Armory St. over 291	38	24
Update Street Tree Inventory And Tree Replacement Program	Ongoing	Continue tree replacement for city streets and public parks in accordance with the tree master plan, asset inventory and upgrades to the city's tree	A complete street tree inventory was completed in 2020. The tree planting program continues with improvements to the municipal tree nursery completed in 2020 including a propagation greenhouse. We have also planted nearly 2,000 trees with the Greening the Gateway Cities Grant since 2017. Tree planting efforts are always on-going and the Forestry Division is constantly looking to identify new sources of funding.	39	25

Camerota Property (Five Mile Pond) Purchase	Complete	Acquisition of approximately 11 acres of open space located on northern shoreline of five mile pond to preserve the watershed. Once acquired, additional restoration or natural woodland is needed to preserve the watershed,	The city continues to monitor grant opportunities that would match the acquisition of this property. We would anticipate the acquisition could be completed within the next five years.	40	NA
Wireless Backhaul Project	Implementation	Wireless backhaul to assist in building alternate paths aside from the fiber to provide resilience in	This project will begin pending completion of the fiber deployment which is currently underway.	41	26
Automation software for virtual infrastructure.	Implementation	Datacenter failover automation and analysis software that would create scripts and automate failing from City Hall to Backup Datacenter	City is investigating the possibility of implementing through alternative avenues at this time.	42	27
Backup data storage solution for long range deployment (>45 miles).	Implementation	Backup storage solution for long range deployment (>45 miles)	This project is on hold while the SAN lease is being worked on and will be re-evaluated depending on the lease developments.	43	28
Plastics Park Dam	Complete	Remove Dam	Project was completed.	44	NA