CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE
AUGUST 2024

City of Central Falls

580 Broad Street

Central Falls, RI 02863

City of Pawtucket

137 Roosevelt Avenue

Pawtucket, RI 02860

Cities of Pawtucket and Central Falls MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024

August 2024

Prepared by:

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in association with

PUNCHARD CONSULTING

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- Joseph Tougas, Captain, Police Department, Central Falls Police Department
- Jim Vandermillen, Planning Director, City of Central Falls
- Michael Wilcox, Project Engineer, City of Pawtucket

LOCAL ADOPTION RESOLUTIONS

City of Central Falls, Rhode Island

RESOLUTION OF THE CITY COUNCIL
APPROVED:
RESOLUTION APPROVING THE PAWTUCKET – CENTRAL FALLS
MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024

WHEREAS the City of Central Falls recognizes the threat that natural hazards pose to people and property within the City of Pawtucket; and

WHEREAS the City of Central Falls has prepared a multi-hazard mitigation plan, hereby known as CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Central Falls from the impacts of future hazards and disasters; and

WHEREAS adoption by the City of Central Falls City Council demonstrates its commitment to hazard mitigation and achieving the goals outlined in the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF CENTRAL FALLS HEREBY APPROVES THE CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 REPLACING THE 2018 VERSION IN ITS ENTIRETY PENDING APPROVAL FROM THE RHODE ISLAND EMERGENCY MANAGEMENT AGENCY AND THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

Section 1. In accordance with M.G.L. c. 40, the City of Central Falls City Council adopts the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024. While content related to the City of Central Falls may require revisions to meet the plan approval requirements, changes occurring after adoption will not require City of Central Falls to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

Section 2. A copy of this resolution shall be included in the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024.

Section 3. The CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 shall be forwarded to the Rhode Island Emergency Management Agency for their final review and approval following City Council adoption.

Introduced by Council President Robert A. Ferri

Date: _____

Robert Ferri	Sonja Grace
City Council President	City Clerk

City of Pawtucket, Rhode Island

RESOLUTION OF THE CITY COUNCIL
APPROVED:
RESOLUTION APPROVING THE PAWTUCKET – CENTRAL FALLS
MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024

Resolved,
WHEREAS the City of Pawtucket recognizes the threat that natural hazards pose to people and property within the City of Pawtucket; and

WHEREAS the City of Pawtucket has prepared a multi-hazard mitigation plan, hereby known as CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in the City of Pawtucket from the impacts of future hazards and disasters; and

WHEREAS adoption by the City of Pawtucket City Council demonstrates its commitment to hazard mitigation and achieving the goals outlined in the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF PAWTUCKET HEREBY APPROVES THE CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 REPLACING THE 2018 VERSION IN ITS ENTIRETY PENDING APPROVAL FROM THE RHODE ISLAND EMERGENCY MANAGEMENT AGENCY AND THE FEDERAL EMERGENCY MANAGEMENT AGENCY.

Section 1. In accordance with M.G.L. c. 40, the City of Pawtucket Select Board adopts the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024. While content related to the City of Pawtucket may require revisions to meet the plan approval requirements, changes occurring after adoption will not require City of Pawtucket to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

Section 2. A copy of this resolution shall be included in the CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024.

Section 3. The CITIES OF PAWTUCKET AND CENTRAL FALLS MULTI-JURISDICTION HAZARD MITIGATION PLAN UPDATE 2024 shall be forwarded to the Rhode Island Emergency Management Agency for their final review and approval following City Council adoption.

ADOPTED by Ordinance Committee Recommends Setting a Public Hearing on _____

_____Chair

READ AND PASSED ON A ROLL CALL VOTE: AYES____ NOES_____ DATE: _____

_____Clerk

APPROVED _____
_____Mayor

SECTION 1. INTRODUCTION

This section provides a general introduction to the Pawtucket/Central Falls Multi-Jurisdiction Hazard Mitigation Plan. It consists of the following subsections:

1.1. Background
1.2. Purpose
1.3. Scope and Authority
1.4. Plan Organization

1.1. BACKGROUND

Introduction to Hazard Mitigation

Natural hazards, such as floods, hurricanes, earthquakes, and wildfires, are a part of the world around us. Their occurrence is often natural and inevitable and there is little we can do to control their force and intensity.

The cities of Pawtucket and Central Falls are vulnerable to a wide range of hazards. These hazards threaten the life and safety of residents and visitors and have the potential to damage or destroy both public and private property and disrupt the local economy and overall quality of life. While the threat from hazard events may never be fully eliminated, there is much we can do to lessen their potential impact upon our communities. By minimizing the damaging impacts of natural hazards upon our built environment, we can prevent such events from resulting in disasters. The concept and practice of reducing risks to people and property from known hazards is generally referred to as *hazard mitigation*.

> ***Hazard Mitigation***
> *Any action taken to reduce or eliminate long-term risk to life and property from hazards.*

Hazard mitigation techniques include structural measures and non-structural measures. Structural measures include activities such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards, or in some cases, such as flood control, physically altering the natural course of the hazard itself. Non-structural measures include activities such as the adoption of sound land use or floodplain management policies and the creation of public awareness programs. It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community's vulnerability to hazards over time.

One of the most effective means that a community can use to implement a comprehensive approach to hazard mitigation is to develop, adopt, and update as needed, a local *hazard mitigation plan*. A mitigation plan establishes the broad local vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

Disaster Mitigation Act of 2000

To reduce the nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act by invoking new and revitalized approaches to mitigation planning. Section 322 of the Act emphasized the need for state and local government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local government applying for federal mitigation grant funds. Communities with an adopted and federally approved hazard mitigation plan thereby become pre-positioned and more apt to receive available mitigation funds before and after the next declared disaster.

This Multi-Jurisdiction Hazard Mitigation Plan Update 2024 for the Cities of Pawtucket and Central Falls was prepared using a process to ensure that it meets all applicable federal and state requirements. This includes conformance with FEMA's latest *Local Mitigation Planning Policy Guide* (Effective April 19, 2023) and *Local Mitigation Planning Handbook* (released May 2023).

To implement the new Stafford Act provisions, FEMA published requirements and procedures for local hazard mitigation plans in the Code of Federal Regulations (CFR) 44 CFR § 201.6(d)(3). These regulations specify minimum standards for developing, updating, and submitting local hazard mitigation plans for FEMA review and approval at least once every five years. These requirements are included throughout the plan in the green call-out boxes, like the one below.

> A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within 5 years in order to continue to be eligible for mitigation project grant funding.

Local mitigation plans must be updated at least once every five years to remain eligible for FEMA hazard mitigation project grants. A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval within five (5) years to continue to be eligible for mitigation project grants.

1.2. PURPOSE

The purpose of the Local Hazard Mitigation Plan is to provide the Cities of Pawtucket and Central Falls with a comprehensive examination of all natural hazards affecting the area, as well as a framework for informed decision-making regarding the selection of cost-effective mitigation actions. When implemented, these mitigation actions will reduce each City's risk and vulnerability to natural hazards.

This plan is the result of a collaborative effort between the Cities and the surrounding communities. Throughout the development of the plan, the Local Planning Team (LPT) consulted the public and key stakeholders for input regarding identified goals, mitigation actions, risk assessment, and mitigation implementation strategy. A sample of key stakeholders who participated, included the Narragansett Bay Commission, Groundwork Rhode Island, and the Blackstone Valley Tourism Council.

As established and affirmed during the first LPT meeting, the primary purpose of this Multi-Jurisdiction hazard mitigation plan is three-fold:

1. To help the Cities of Pawtucket and Central Falls become better prepared and more resilient to potential emergencies and disasters.
2. To identify and assess the community's natural hazard risks and determine how to best minimize and manage those risks over time.
3. To make the Cities of Pawtucket and Central Falls eligible and better positioned to receive federal grant funding for mitigation projects and other types of non-emergency disaster assistance.

Guiding Principles for Plan Development

The LPT adhered to the following guiding principles in the plan's development.[1]

- Plan and invest for the future.
- Collaborate and engage early.
- Integrate community planning.

> ***COMMUNITY RESILIENCE*** *is the ability of a community to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. Activities such as disaster preparedness (which includes prevention, protection, mitigation, response and recovery) and reducing community stressors (the underlying social, economic and environmental conditions that can weaken a community) are key steps to resilience.*[1]

Yellow call-out boxes like the one to the right, are definitions taken from the Federal Emergency Management Agency Local Policy Guide, April 2023. These are included throughout the plan for reference and explanation.

The LPT prioritized mitigating impacts of climate change, mitigating risk to vulnerable communities, and protecting the built environment both today and in the future.

The LPT identified the following list of hazards to profile. They are shown in alphabetical order.

1. Coastal Storm
2. Dam Failure
3. Earthquake
4. Extreme Temperatures
5. Fire
6. Flood
7. Infectious Disease
8. Sea Level Rise
9. Severe Weather
10. Severe Winter Storm

[1] Federal Emergency Management Agency. (April 19, 2022). Local Mitigation Planning Policy Guide, p.13.

Mitigation Strategy

C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))

The Cities of Pawtucket and Central Falls Multi-Jurisdiction Hazard Mitigation Plan Update 2024 is an effective means to incorporate hazard mitigation principles and practices into routine government activities and functions for the whole planning area. The plan recommends specific actions that are designed to protect people and community assets from losses to those hazards that pose the greatest risk. These mitigation actions go beyond simply recommending structural solutions to reduce existing vulnerability, such as retrofitting buildings or strengthening infrastructure. Local policies on community growth and development, incentives for natural resource protection, and public awareness and outreach activities are examples of other actions considered to reduce each city's future vulnerability to identified hazards. The plan is designed to be a living document, with implementation and evaluation procedures included to help achieve meaningful objectives and successful outcomes over time. This plan serves as an update to the 2018 Multi-Jurisdiction Hazard Mitigation Plan.

The hazard mitigation strategy is the culmination of work presented in the Planning Area Profile (Section 3), Risk Assessment (Appendix A), and Capability Assessment (Appendix B). It is also the result of multiple meetings and sustained public outreach. The LPT developed the goals shown below. The goals from the previous Multi-Jurisdiction Hazard Mitigation Plan were revised to develop this current list. Information about the goal development process is in Section 4: Mitigation Strategy. The goals are considered "broad policy-type statements"[2] that represent the long-term vision for mitigating risk to natural hazards in the planning area. Concepts added to the goals, that were not included in 2018, include climate change, capacity and integration, and education. No concepts were omitted from the previous list.

[2] Federal Emergency Management Agency. (2013). *Local Mitigation Planning Handbook,* p. 6.

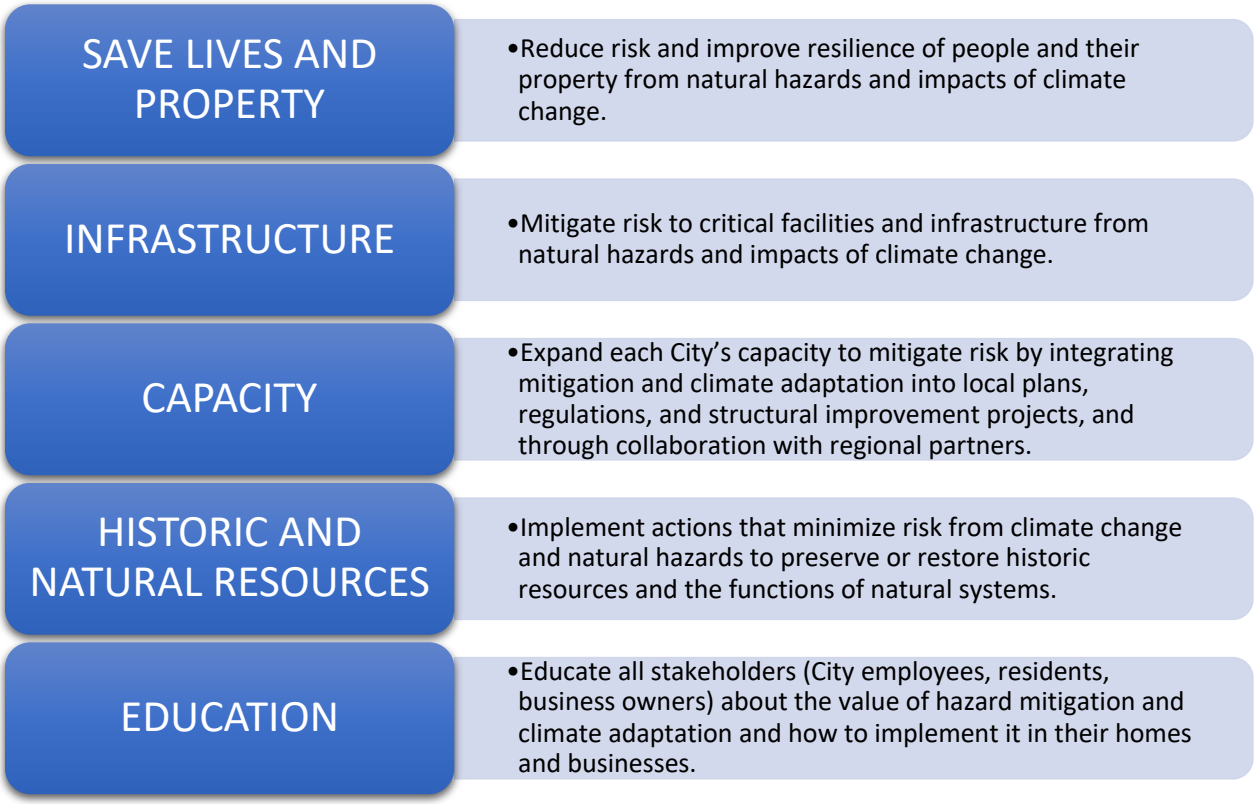


Figure 1. Mitigation Plan Goal Statements.

Land Use and Development

Changes in Development

E1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))

The cities of Pawtucket and Central Falls are largely built-out with more recent changes to the built environment occurring through ongoing or planned redevelopment projects. This includes some large investments in revitalizing Pawtucket's downtown core and riverfront areas, either already happening or in the pipeline, as well as some major infrastructure projects that will benefit both cities such as the new Pawtucket-Central Falls Transit Center, the Broad Street Regeneration Initiative, and the Narragansett Bay Commission's Combined Sewer Overflow project. There haven't been any major shifts in the demographics of either city since the previous plan was approved in 2018, but both cities did experience population increases. Some of the increases can be attributed to hundreds of new residential apartments that have been created in renovated mill and industrial buildings. However, it is important to note that many new residents moved to the cities during this period because the cost of housing has typically been lower than in other communities, yet many residents live in overcrowded apartments because housing costs are still more than they can afford on their own and the supply is not

sufficient. Total population for both cities is not expected to change significantly over the next several decades with projections indicating Central Falls will remain steady and Pawtucket may slightly decrease in the number of residents through 2040.[3]

> ***CHANGES IN DEVELOPMENT*** *means recent development (for example, construction completed since the last plan was approved), potential development (for example, development planned or under consideration by the jurisdiction), or conditions that may affect the risks and vulnerabilities of the jurisdictions (for example, climate change, declining populations or projected increases in population, or foreclosures) or shifts in the needs of underserved communities or gaps in social equity. This can also include changes in local policies, standards, codes, regulations, land use regulations and other conditions.*

While some of the ongoing or planned redevelopment efforts are occurring within or adjacent to areas that are prone to flood hazards, these threats are actively being addressed through resilient design standards that seek to reduce risk (for example by improving stormwater drainage, preserving/enhancing natural system features and functions, and protecting lives and property though strong codes and standards for new or improved construction). As further described in the Capability Assessment (Appendix B), new development or redevelopment projects in Pawtucket and Central Falls are planned and regulated through existing building codes, zoning regulations, site plan reviews, and other development standards which prevent or restrict land use and construction types that could lead to increased hazard vulnerability. All these efforts are helping Pawtucket and Central Falls to prevent changes in development from increasing future hazard vulnerability.

The following table summarizes key changes in development for each city since the previous plan was approved in 2018, noting whether they have occurred in hazard-prone areas along with any impacts to overall community vulnerability.

Key Changes in Development Since 2018

Central Falls		
Change in Development	*Hazard-Prone Area?*	*Impacts to Community Vulnerability*
Roosevelt Mills	Yes (flood)	A major project to redevelop the site of two former mill buildings along the Blackstone River on Roosevelt Avenue is in progress as of May 2024. One building is being converted to 106 residential apartments. The other building is being converted to a self-storage facility. Approximately 30% of the residential building's footprint and a narrow sliver of the storage building lie within the AE Flood Zone. An empty lot located between the two buildings occupies approximately 40% of the site. The empty lot will be regraded and will provide parking and stormwater infrastructure. A

[3] State of Rhode Island Division of Statewide Planning, City and Town Population Projections.

		stormwater management report was prepared in accordance with RIDEM standards and, along with the grading and drainage plan, was included in the plan review. A Remedial Action Work Plan has also been approved for the project and requires a combination of removal of contaminated soils and capping. An Environmental Land Use Restriction will be prepared and recorded to ensure that any future development on the site will not disturb the engineered caps on the site.
New Housing Developments	No	In addition to the Roosevelt Mills development, ten residential development projects with a total of more than 230 new housing units have been approved since 2022. The increase in residential density throughout the city that will result from these new developments, which are necessary to address the housing shortage, make the use of methods to combat the effects of climate change critically important. None of these projects are within a flood zone, but the plan review process for all projects includes a review of stormwater management plans to ensure that runoff is minimized and a review of site plans to maximize opportunities for increasing the tree canopy and incorporating vegetative landscaping and pervious surfaces into site plans.
Pine Street TOD North Streetscape and Parklet Project	No	This project will include the addition of green stormwater infrastructure that will capture run-off from storm events and introduce this water back into the ground water system, reducing the amount of stormwater from entering the combined sewer system.
Macomber Stadium (Soccer/Football/Baseball)	No	The city's main outdoor sports facility and home field for the City's high school football and soccer teams was forced to close because contaminants were present in the soil. Plans to remediate the field with RIDEM funds were coordinated with the Narragansett Bay Commission's need to reduce the volume of stormwater entering the CSO. The project created a new multi-sport artificial turf field and redirected stormwater from the field, the street, and the large roof of the adjacent manufacturing business to underground stormwater chambers. Seven biostrips were installed in sidewalks to capture additional stormwater, trees were planted to provide shade, and other landscaping and permeable pavers were installed to absorb stormwater on site. The new field opened in 2021.
Louis Yip Soccer Field	No	A former industrial site covered with buildings and impervious pavement was converted into a youth soccer

		field. Similar to the Macomber Stadium project, plans to remediate the site with RIDEM funds were coordinated with the Narragansett Bay Commission's need to reduce the volume of stormwater entering the CSO. The creation of the new soccer field project included brownfield remediation, the installation of stormwater chambers beneath the field, and four biostrips along nearby sidewalks. This project also included large bioswales beyond each end of the field to capture stormwater runoff from adjacent streets. The new field opened in 2021.
Pierce Park Remediation	No	The city's Little League field at Pierce Park, directly across the street from Macomber Stadium, was forced to close because contaminants were present in the soil. Plans to remediate the field with RIDEM funds were coordinated with the Narragansett Bay Commission's need to reduce the volume of stormwater entering the CSO. In addition to cleaning up the site and restoring the Little League field, the project included underground stormwater chambers and installation of a new basketball court with permeable asphalt. Several new trees were planted to provide shade, and other landscaping and permeable pavers were installed to absorb stormwater on site. The site re-opened in 2024.
Dexter Street Resilience Project	No	A brick-covered public plaza and a City-owned asphalt parking lot in need of significant repairs will use permeable paving materials and landscaping to reduce stormwater runoff onto Dexter Street. The project is expected to break ground in 2024.
The Central Falls Landing	Yes (flood)	The site of a former mill complex on the Blackstone River was redeveloped to improve public access to the river and bring new commercial activity to Broad Street. The project included environmental remediation, restoration of the remaining wooden mill building and construction of an addition, construction of a new commercial building, underground chambers to manage stormwater on site, and trees and landscaping to mitigate stormwater and heat effects. The redevelopment of the mill building, which is adjacent to the river, accounted for potential flooding by leaving the lower level unfinished and designing the addition to enable floodwater to flow into and out of the foundation.
New Central Falls High School	Yes (street flooding)	The stormwater infrastructure for the site of the new high school has been designed to resolve a chronic street

		flooding problem on Higginson Avenue that has been increasingly frequent and severe.
Offroad Segment of Blackstone Valley Bikeway	Yes (flood)	A ¼-mile off-road segment of the Blackstone Valley Bikeway was constructed along the Blackstone River. Construction included installation of new drainage pipes and repairs to an existing headwall between the bike path and the river to ensure proper flow of stormwater, and grading and installation of riprap along slope to minimize erosion from runoff. The bikeway opened in 2021.
OSRAM-Sylvania Redevelopment	(No)	Redevelopment of the former OSRAM-Sylvania lightbulb manufacturing complex, which had been vacant since 2014, began in 2022. Some buildings have been renovated for use as manufacturing and distribution facilities, while other structures were demolished to make room for parking/circulation and proposed multi-unit housing and ground floor commercial space. The redevelopment that has been planned to date includes onsite stormwater management. Future phases of development provide opportunities to include vegetative landscaping, solar panels and canopies, and energy-efficient building design.
River Island	Yes (flood)	River Island, surrounded by a mill spillway and the Blackstone River, includes recreation and outdoor education amenities that are accessible via a footbridge. The walking path and camp sites have been improved and a kayak launch, playground, and outdoor education facility have been added. Flooding from intense rainfall during storms in 2023 and 2024 washed out a portion of the walking path and vegetation and compromised the kayak launch. As of the summer of 2024, plans for further improvements have been prepared for wetlands permitting approval by RIDEM.
Narragansett Bay Commission (NBC) Combines Sewer Overflow (CSO) Tunnel Project	Yes (flood)	Excavation of underground tunnel completed in February 2024. Spearheaded by the Narragansett Bay Commission (NBC), the tunnel is designed to mitigate combined sewage overflow and stormwater drainage problems (Central Falls currently operates on an outdated system). It is expected to be fully functional in 2028 with capacity to store and divert nearly 60 million gallons of untreated wastewater during large storm events.
Pawtucket		
Change in Development	*Hazard-Prone Area?*	*Impacts to Community Vulnerability*
Tidewater Landing	Yes (flood)	This project will include a soccer stadium, parking, residential and commercial development, a pedestrian

		bridge across the river, and a stormwater park on the east side of the river. Although partially located in a tidal floodplain along the Seekonk River, this project includes flood-resilient design and improved stormwater management standards to help mitigate any increases in community vulnerability. This site was also a brownfields remediation site and has been remediated to the standards required from the RI Department of Environmental Management. The process of remediation included removal of contaminated soil and installation of a protective barrier with clean soil above the barrier d decreasing community vulnerability and exposure.
Pawtucket-Central Falls Transit Center	No	Completed in 2023. Although not located in a specific hazard-prone area, there is a lot of new and newly proposed development occurring in proximity to this new transit hub. The City's Transit-Oriented Development District will help promote stormwater management best practices, including the use of green infrastructure and other nature-based solutions, for future redevelopment projects that will likely be spurred by this new center. This along with the City's other development standards will help mitigate any increases in community vulnerability, and in some areas such as Pine Street and Barton Street these green infrastructure efforts are already decreasing the area's vulnerability to stormwater and extreme heat hazards.
Division Street Development	Yes (flood)	Division Street riverfront parcel(s) to be developed along the east bank with a mix of residential and commercial uses. There will be a stormwater "park" feature in the site to help control stormwater prior to it entering the ground water or adjacent Seekonk Rover. This is a similar development to Tidewater in terms of mixed uses (housing, parking garage, commercial/restaurant, etc.).
Festival Pier	Yes (flood)	Replacement of the accessory dock at the boat launch.
Stormwater / green infrastructure projects	No	Pine Street TOD North Streetscape and Parklet Project. This project will include the addition of green stormwater infrastructure that will capture run-off from storm events and introduce this water back into the ground water system, reducing the amount of stormwater from entering the combined sewer system. Daggett Avenue median is in the process of design and construction of GSI. USDA Forestry grant is funding multiple locations of GSI planter strips and hundreds of tree wells and new tree planting, to be implemented over next 5 years

Town Landing	Yes (flood)	The marina project was recently completed which included repairing and reinforcing the riverwall along the northern end of Town Landing. This wall was subjected to erosion and damage from previous floods. A revetment was installed in the river along the northerly side to divert excessive flow from the boat launch. The site is also a brownfields site and will be subject to soil remediation and capping of the site in the next phase of development.
Prospect Heights Sewer Reconstruction	No	Prospect Heights sewer reconstruction project (completed Spring 2024) impacted hundreds of families living at housing community by upgrading sewer connection and preventing back-ups into homes and DWO's into Narragansett Bay
Blackstone Bikeway Project	Yes (flood)	The City is currently working on a planned addition to the Blackstone River Bikeway in Pawtucket from Exchange Street, north of City Hall, to the Slater Mill historic site to the Town Landing and the Tidewater Development. The project will provide recreational benefits by expanding the public sidewalk area for cyclists and pedestrians, while promoting only passive use of existing flood-prone areas (no increase in community vulnerability).
Narragansett Bay Commission (NBC) Combined Sewer Overflow (CSO) Tunnel Project	Yes (flood)	Excavation of underground tunnel completed in February 2024. Spearheaded by the Narragansett Bay Commission (NBC), the tunnel is designed to mitigate combined sewage overflow and stormwater drainage problems (Pawtucket currently operates on an outdated system). It is expected to be fully functional in 2028 with capacity to store and divert nearly 60 million gallons of untreated wastewater during large storm events.

In addition to the above physical changes in the development of each city, there are other local conditions that may affect the risks and vulnerabilities of the planning area. For example, this includes the anticipated effects of climate change on nearly all identified natural hazards as detailed in the Hazard Analysis and Risk Assessment (Appendix A). Other conditions common to both Cities include aging and deteriorating stormwater drainage infrastructure, inadequate generator capacity for city-owned buildings, and increasing threats posed by severe weather events (especially extreme heat) on vulnerable segments of the population such as the elderly, disabled, and unhoused. Other local conditions identified as unique concerns for each city are listed below.

Central Falls

- Zoning changes were recently adopted by the City to allow for increases in residential density. From a health perspective, the community's existing population density makes all 1.3 square miles hazard prone due to the risk of spreading communicable disease (felt most acutely during the COVID-19 pandemic). Efforts to reduce residential density within individual housing units by

increasing the overall number of units and converting substandard housing that is overcrowded into safe, properly occupied units should continue.

Pawtucket

- The sewer system is aging and needs replacements. Current projects and projects described in Pawtucket's mitigation actions look to address aging infrastructure and the resultant effects.
- Impervious surfaces, especially in Conant Thread, where 86.2% is impervious. This compounds heat island effects and risks due to flooding. Increasing stormwater infrastructure and green areas will be important to reduce risks in this area.
    - Pine Street TOD North Streetscape and Parklet Project. This project will include the addition of green stormwater infrastructure that will capture run-off from storm events and introduce this water back into the ground water system, reducing the amount of stormwater from entering the combined sewer system.

Progress in Mitigation Efforts

E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement §201.6(d)(3))

Each City has proven their ability to mitigate risk independently and jointly. Together they have maintained this plan and worked to update it. Their joint efforts have proven an effective way to integrate mitigation concepts into other plans and policies. The following is a list of joint activities where the Cities integrated hazard mitigation concepts into other plans and projects:

- Municipal Resilience Program, Community Resilience Building Workshop, Summary of Findings October 2020
- Broad Street Regeneration Plan
- River Corridor Development Plan

The Cities share a joint Emergency Management Agency and a Chief Building Official. Priorities in each City have shifted to emphasize climate adaptation, nature-based solutions, and extreme heat and specifically the impacts of heat islands. The Pawtucket 20/20 Downtown Development Vision which includes waterfront development and Tidewater includes concepts to the 2018 Multi-Jurisdiction Hazard Mitigation Plan. Central Falls has a new zoning ordinance which permits greater density in development. Central Falls also developed a Climate Action Plan (2023) to target critical areas of concern for those disproportionately impacted by climate change. Hazard data and vulnerability information from the 2018 Multi-Jurisdiction Hazard Mitigation Plan was incorporated and updated to develop this plan. In addition, the mitigation actions identified in 2018 were reviewed and included, especially those related to stormwater management, green infrastructure, and emergency safety.
The status of each mitigation action from the 2018 Multi-Jurisdiction Hazard Mitigation Plan is included in Section 4 (Mitigation Strategy). The text in Section 4 includes a designation of Completed, Completed & To Be Continued, Partially Completed/In Progress, Delayed, or

Cancelled with a description. In addition, if the mitigation action has moved forward to this Plan's list of actions that is indicated.

1.3. AUTHORITY AND ASSURANCES

The Multi-Jurisdiction Hazard Mitigation Plan Update 2024 will be updated and maintained to continually address those natural hazards determined to be of primary concern to the Cities of Pawtucket and Central Falls as documented in through the hazard analysis and risk assessment (Appendix A). Other hazards that pose a low risk or are otherwise omitted from this plan will continue to be evaluated during future updates, but they may not be fully addressed until they are determined to be of primary concern to the Cities. The geographic scope (i.e., the "planning area") for the plan includes all areas within Pawtucket and Central Falls jurisdictional city limits.

This plan has been adopted by the City of Pawtucket and the City of Central Falls in accordance with the authority and police powers granted to local governments by the State of Rhode Island. A copy of the resolutions to adopt the plan is included before the Table of Contents. This plan was developed in accordance with current federal rules and regulations governing local hazard mitigation plans. The plan shall be monitored and updated on a routine basis to maintain compliance with the following legislation:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (Public Law 106-390) and by FEMA's Interim Final Rule published in the Federal Register on February 26, 2002, at 44 CFR Part 201.

The City of Pawtucket and the City of Central Falls will continue to comply with all applicable Federal laws and regulations during the periods for which they receive grant funding, in compliance with 44 CFR 201.6. The Cities will amend this plan whenever necessary to reflect changes in City, State or Federal laws and regulations, as required in 44 CFR 201.6. The list of laws and regulations the Cities with adhere to is below.

- Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended.
- National Flood Insurance Act of 1968, as amended.
- National Dam Safety Program Act (Pub. L. 92-367), as amended.
- 44 CFR Part 201 Mitigation Planning.
- 44 CFR, Part 60, Subpart A, including § 60.3 Flood plain management criteria for flood-prone areas.
- 44 CFR Part 77 Flood Mitigation Grants.
- 44 CFR Part 206 Subpart N. Hazard Mitigation Grant Program.

1.4. PLAN ORGANIZATION

This plan is organized into five (5) sections that make up the main body of the plan along with three (3) appendices as described below.

1. **Introduction**
   Section 1 serves as a general introduction to the plan document, including some brief background on hazard mitigation and hazard mitigation planning, as well as the purpose,

authority, scope, and organization of the plan document.

2. **Planning Process**
   Section 2 provides a summary of the process used to develop the plan, including how it was prepared and who was involved. It also describes the public engagement strategy used to involve the public and other community stakeholders, and it summarizes the review and incorporation of existing plans, studies, reports, and technical information.

3. **Planning Area Profile**
   Section 3 provides some background and a general overview of the entire planning area, including information specific to the Cities of Pawtucket and Central Falls such as their location and history; geography and climate; population, housing, and demographics; infrastructure and environment; employment and industry; and land use and development trends.

4. **Mitigation Strategy**
   Section 4 provides the blueprint for the Cities of Pawtucket and Central Falls to follow to become less vulnerable to the negative effects of the hazards identified and addressed in this plan. It is based on the consensus of the Local Planning Team and the findings and conclusions of the Hazard Analysis & Risk Assessment and Capability Assessment, in addition to the input and feedback generated through public engagement efforts. It includes the identification of an overall mission statement for the plan along with a series of mitigation goal statements designed to establish what the Cities wants to achieve with the plan. It also includes the identification, evaluation, and prioritization of specific mitigation actions that are intended to help each City achieve these mitigation goals over time.

5. **Plan Maintenance**
   Section 5 describes the formal plan maintenance process to ensure that the plan remains an active and relevant document that guides hazard mitigation actions over time. As conditions change, new information becomes available, or actions progress over the life of the plan, plan adjustments may be necessary to maintain its relevance. The plan maintenance section identifies procedures for monitoring, evaluating, and updating the plan; for implementing the plan through existing planning mechanisms; and for continued public involvement.

Appendices

Appendix A: Hazard Analysis and Risk Assessment

Appendix A provides an in-depth study of natural hazard risks for the planning area. It includes an overview of how the assessment was prepared along with detailed profiles for those hazards deemed to pose significant risk to the Cities of Pawtucket and Central Falls. It also includes a geospatial-based exposure and risk assessment for those hazards with geographically defined boundaries and culminates in a hazard risk ranking based on the findings and conclusions about the location, probability, potential impact, warning time, and duration of each hazard. Although included as an appendix, the Hazard

Analysis and Risk Assessment is a critical element to the plan that helped the Cities focus their mitigation planning efforts on those hazards of greatest concern and those community assets facing the greatest potential risk.

Appendix B: Capability Assessment

Appendix B describes the overall capability of the Cities of Pawtucket and Central Falls to implement hazard mitigation activities. The capability assessment also served as a critical part of the planning process, including the development of the mitigation strategy. Coupled with the Hazard Analysis and Risk Assessment (Appendix A), the Capability Assessment helped each City identify and target meaningful mitigation actions as well as plan implementation and maintenance procedures. It not only helped establish the goals for the Cities to pursue under this Plan, but also ensures that those goals and the mitigation actions that follow are realistically achievable given current local conditions and available resources.

Appendix C: Additional Documentation

Appendix C provides additional documentation of the plan development. This includes copies of meeting agendas, sign-in sheets, summary notes, and presentation slides for all Local Planning Team and Public Meetings. It also includes copies of meeting advertisements, notices, media articles, and other example documentation to demonstrate the efforts to promote public and stakeholder engagement in the planning process.

Appendix D: Mitigation Strategy Documentation

Appendix D includes multiple tables supporting each City's mitigation strategy. This includes the raw data for prioritizing each mitigation action. Additional tables sorting by types of mitigation actions, goal statements, hazards, lead position, and implementation schedule. Tables are based on the Mitigation Action Tracker, a spreadsheet, developed for each City.

1.5. PLAN ADOPTION

F2. For Multi-Jurisdiction plans, has the governing body of each jurisdiction officially adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))

Copies of the adoption resolutions are provided at the front of the plan. Each City intends to adopt the plan following "approved-pending-adoption" status from FEMA.

SECTION 2. PLANNING PROCESS

This section provides a summary of the process used to develop the plan, including how it was prepared and who was involved. It also describes the public engagement strategy used to involve the public and other community stakeholders. It consists of the following subsections:

2.1. Overview
2.2. Local Planning Team
2.3. Public and Stakeholder Engagement

2.1. OVERVIEW

The Cities of Pawtucket and Central Falls developed this Multi-Jurisdiction Hazard Mitigation Plan through the assistance of a federal planning grant awarded by the Rhode Island Emergency Management Agency (RIEMA). Grant funds were used to hire a consultant to work closely with the cities in the preparation of a plan that draws from each City's previous plan and that is in full compliance with current FEMA planning requirements per the following rules, regulations, and guidance:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (Public Law 106-390) and by FEMA's Interim Final Rule published in the Federal Register on February 26, 2002, at 44 CFR Part 201.
- Federal Emergency Management Agency Local Mitigation Planning Policy Guide, (Released April 19, 2022, Effective April 19, 2023).
- Element H: Additional State Requirements from the Local Mitigation Policy Guide.
- National Flood Insurance Act of 1968, as amended.
- National Dam Safety Program Act (Pub. L. 92-367), as amended.

A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))

A priority through the planning process was equity, which FEMA defines as the "consistent and systematic fair, just and impartial treatment for all individuals." This was a central theme throughout the planning process and effort was made to develop an inclusive planning process. The whole community (individuals, communities, private and nonprofit sectors, faith-based organizations, and all levels of government) were given an opportunity to participate.
The planning process for this updated hazard mitigation plan began in April 2023 and concluded in August 2024 (this does not include the months of plan review and adoption). Below is a graphical display of the plan development timeline. Jim Vandermillen, Planning Director, City of Central Falls, and Camerin Bennett, Assistant Planning Director, City of Pawtucket were the Co-Chairs of the Local Planning Team (LPT) and the primary points of contact for the consulting team. Together they facilitated all activities related to the development of the plan and engagement of the public. The Consulting Team met with the co-leaders on May 3, 2023, to kick-off the planning process. The figure below shows a timeline of the planning process.

Figure 2. Planning Process Timeline.

The City of Pawtucket participates in the NFIP Community Rating System (CRS) program. Participating in this program awards NFIP policy holders a reduction in flood insurance. Part of the Planning Process for this Multi-Jurisdiction Hazard Mitigation Plan Update included making sure to optimize the number of points the City can receive, more points translate into bigger insurance discounts for policy holders. The ten CRS Planning Steps and their adjacent Mitigation Planning Elements are shown in the table below. Each of these steps was completed.

Table 1. Comparison of the Planning Processes, Mitigation and CRS.

Mitigation Planning Elements	**CRS Planning Steps**
Planning Process	1- Organize to prepare the plan 2 - Involve the public 3 - Coordinate 10 - Implement, Evaluate, Revise
Hazard Identification and Risk Assessment	4 - Assess the hazard 5 - Assess the problem
Mitigation Strategy	6 - Set goals 7 - Review possible activities 8 - Draft an action plan
Plan Update	10 - Implement, evaluate, revise 5-year update
Plan Adoption	9 - Adopt the plan

2.2. LOCAL PLANNING TEAM

One of the earliest tasks completed in support of the planning process was the reformation of the Local Planning Team (LPT) to help guide and inform the plan throughout its development. The LPT was formed in 2018 for the development of the original plan and many members remain the same. Camerin Bennett, Assistant Planning Director, City of Pawtucket, and Jim Vandermillen, Planning Director, City of Central Falls were charged with the responsibility to oversee and serve as the primary points of contact for the planning process, the LPT was established to ensure proper representation from a variety of municipal staff, the public, and other community stakeholders. Throughout the process LPT members were asked to provide their input and expertise, including any information, ideas, or other resources that would contribute to the quality and effectiveness of the final plan.

The previous plan included a combination of two distinct but equal committees that comprised the LPT, the Steering Committee and the Stakeholder Committee. This was not deemed necessary by the Cities and the Local Planning Team now functions in the place of the previous committees. The LPT includes representatives from each City's planning departments and staff from other key City departments that implement activities or have expertise in topics relevant to mitigation planning. It also includes members of the public including but not limited to

residents and property owners, local business representatives, civic and volunteer leaders, non-profit organizations, staff from other governmental agencies, and other identified stakeholders with no formal attachment to City government. The LPT included representatives from five community sectors as shown in the list below. There is quite a bit of overlap between LPT member's responsibilities and community sectors, each member was listed once.

Emergency Management

- Captain, City of Central Falls Police Department
- Captain, City of Pawtucket Police Department
- Deputy Chief, City of Central Falls Fire Department
- Director, Pawtucket/Central Falls Emergency Management Agency
- Lieutenant, City of Pawtucket Fire Department
- Major, City of Central Falls Police Department
- Preparedness Officer, Pawtucket/Central Falls Emergency Management Agency

Economic Development

- Chief of Staff, City of Central Falls
- City Clerk Director, City of Central Falls
- Port Captain, Blackstone Valley Tourism Council

Land Use and Development

- Assistant Planning Director, City of Pawtucket
- Building Official, City of Pawtucket
- Code Enforcement Officer, City of Central Falls
- Engineer, City of Pawtucket
- GIS Coordinator, City of Pawtucket
- Planning Director, City of Pawtucket
- Planning Director, City of Central Falls
- Principal Environmental Engineer, Narragansett Bay Commission
- Principal Planner, City of Central Falls
- Project Engineer, City of Pawtucket
- Senior Planner, City of Pawtucket
- Urban Greening Projects Coordinator, Groundwork Rhode Island
- Zoning Director, City of Pawtucket

Health and Social Services

- Director of Constituent Services, City of Central Falls
- Program Officer, LISC Rhode Island, Pawtucket Central Falls Health Equity Zone
- Special Projects Coordinator, Groundwork Rhode Island

Infrastructure

- Assistant Chief Engineer, Pawtucket Water Supply Board
- Department of Public Works Director, City of Pawtucket

A complete listing of all LPT members in alphabetical order by last name is provided in Table 2.

Table 2. Local Planning Team Members.

First Name	Last Name	Title	Organization	Phone	Email
Nate	Bailey	Intern	City of Pawtucket	401-728-0500 x441	dprintern@pawtucketri.com
Jean	Barros	Code Enforcement Director	City of Central Falls	401-616-2410	jbarros@centralfallsri.us
Camerin	Bennett	Assistant Planning Director	City of Pawtucket	401-728-0500 x441	cbennett@pawtucketri.com
John	Carroll	Major, Police Department	Central Falls Police Department	401-616-2505	jcarroll@cfpd.centralfallsri.gov
Michael	Caruolo	Principal Environmental Engineer	Narragansett Bay Commission	401-461-8848	mcaruolo@narrabay.com
Chris	Crawley	DPW Director	City of Pawtucket	401-728-0500 x272	ccrawley@pawtucketri.com
Alberto	DeBurgo	City Clerk Director	City of Central Falls	401-616-2414	adeburgo@centralfallsri.us
David	Deloge	Director	Pawtucket/Central Falls Emergency Management Agency	401-729-5846 x103	ddeloge@pawtucketpolice.com
Ken	Dolan	Captain, Police Department	Pawtucket Police Department	401-727-9100x776	kdolan@pawtucketpolice.com
Sam	Dyman	Deputy Chief, Fire Department	Central Falls Fire Department	401-616-3602	sdyman@centralfallsri.us
Rob	Gianopoulos	Preparedness Officer	Pawtucket Central Falls Emergency Management	401-729-5846	Rgianopoulos@pawtucketpolice.com
Zuleyma	Gomez	Director of Constituent Services & Health	City of Central Falls	401-464-1148	Zgomez@centralfallsri.us
Jacqueline	Hall	Special Projects Coordinator	Groundwork Rhode Island	978- 512-9447	jhall@groundworkri.org
Eric	Hammerschlag	Engineer	City of Pawtucket	401-728-0500	ehammerschlag@pawtucketri.com
John	Hanley	Building Official	City of Pawtucket	401-728-0500 x247	jhanley@pawtucketri.com

First Name	Last Name	Title	Organization	Phone	Email
Russ	Houde	Assistant Chief Engineer	Pawtucket Water Supply Board	401-729-5004	rhoude@pwsb.org
Carl	Johnson	Zoning Director	City of Pawtucket	401-728-0500 x402	cjohnson@pawtucketri.com
Kevin	Keenan	Lieutenant	Pawtucket Fire Dept	401-639-2555	kkeenan@pawtucketfire.com
Kathryn	Kelly	Principal Environmental Engineer	Narragansett Bay Commission	401-461-8848	kkelly@narrabay.com
Robert	Kermes	Chief of Staff	City of Central Falls	401-727-7400	rkemes@centralfallsri.us
Lacey	Kohler	Urban Greening Projects Coordinator	Groundwork Rhode Island	401-305-7174	info@grondworkri.org
Jean	Martinez	Principal Planner	City of Central Falls	401-616-2482	jmartinez@centralfallsri.us
Liz	Moreira	Program Officer	LISC RI, Pawtucket Central Falls Heath Equity Zone	508-221-6352	emoreira@lisc.org
Emily	Morse	GIS Coordinator	City of Pawtucket	401-728-0500 x240	emorse@pawtucketri.com
Bianca	Policastro	Planning Director	City of Pawtucket	401-728-0500 x440	bpolicastro@pawtucketri.com
Matthew	Prendergast	Port Captain	Blackstone Valley Tourism Council	401-935-5009	m.prendergast509@gmail.com
Joseph	Tougas	Captain, Police Department	Central Falls Police Department	401-616-2511	jtougas@cfpd.centralfallsri.gov
Jim	Vandermillen	Planning Director	City of Central Falls	401-616-2425	jvandermillen@centralfallsri.us
Michael	Wilcox	Project Engineer	City of Pawtucket	401-728-0500 x447	mwilcox@pawtucketri.com

In addition to helping shape and guide the development of the plan, the LPT members were specifically invited and asked to provide support to the LPT through the following key roles and responsibilities:

- Attend 1 Kick-off Meeting
- Attend 3 LPT Meetings
- Attend 2 Public Meetings
- Support public outreach and engagement efforts
- Provide supporting data/information upon request
- Assist in the evaluation and prioritization of mitigation actions
- Review and comment on draft plan deliverables
- Approve final draft plan prior to submission to RIEMA and FEMA

A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))

The City of Central Falls Planning Director and the City of Pawtucket Planning Director regulate development in the cities.

Stakeholders were invited to participate in the planning process through the LPT, public meetings, and plan review. Appendix C includes the press releases and flyers used to announce meetings and opportunities for participation. The City of Central Falls Planning Director and the City of Pawtucket Assistant Planning Director with support from the LPT conducted outreach specifically to local and regional agencies involved in hazard mitigation, City boards, committees and departments that regulate development, neighboring communities, nonprofit organization representatives that serve socially vulnerable populations, and business and academic organizations.

The development of the plan required a series of meetings intended to facilitate discussion and capture information from the LPT, including responses to specific data requests, sharing suggestions for planning enhancements, or reviewing and commenting on interim draft content for the plan. More importantly the meetings prompted routine coordination and communication between City staff and other stakeholders throughout the drafting of the plan. As indicated above, the LPT convened for four key meetings throughout the planning process as briefly described below. Additional meetings were held to accomplish specific planning tasks, such as reviewing and updating information in support of the hazard analysis and risk assessment or the review of possible department-specific mitigation actions for inclusion in the plan. The LPT presentation slides are included in Appendix C.

The Kick-off Meeting took place on 5/3/2023 and included 18 people on Zoom. The focus of the meeting was to introduce the project to City leaders, explain their responsibilities, and discuss data collection and mitigation actions. The LPT agreed to add schools to their group for future meetings and to add representatives from socially vulnerable populations. The LPT did invite a representative from the Health Equity Zone to future meetings. They also discussed the active Housing Authority and Council on Aging/Senior Center as resources to utilize for representation and engagement.

The first LPT meeting took place on 6/28/2023 and included 16 people on Zoom. The focus of the first LPT meeting was to discuss stakeholder engagement, review possible mitigation goal statements, and to discuss in detail the risk assessment and capability assessment. Liz Moreira who represented the Health Equity Zone (HEZ) reported that the state has 15 zones, she directly covers three zip codes and approximately 90,000 residents. She mentioned the 40 partner organizations who she could use to leverage engagement and outreach toward future public meetings. While discussing the risk assessment the LPT brought up a question about sink holes since Central Falls had one in 2015 on Hunt Street which caused a watermain break. The LPT mentioned that Central Falls has seen an increase in development and a change to their Zoning Ordinance that encourages density. Pawtucket has seen development around the train station and for turning old mill buildings into housing. This redevelopment has raised the issue of heat islands and tree planting.

Several months passed between the first and second LPT meetings as City leaders gathered updates to the previous list of mitigation actions and capability assessment information. The second LPT took place on 11/16/2023 and included 18 people on Zoom. The focus of this meeting was reviewing a revised timeline, brainstorming outreach for the first public meeting, reviewing the finalized risk assessment and hazard rankings, and reviewing problem statements. Problem statements were developed to summarize risk assessment findings and assist the LPT with identifying mitigation actions. The LPT engaged in a discussion regarding the National Flood Insurance Policy's Community Rating System (CRS) and would it be of value to Central Falls. Pawtucket participates and they have approximately 90 policy holders. Central Falls has about half that number. It was decided that Central Falls does not have the capacity to participate in the program. For the public meeting it was decided to have the meeting in a hybrid fashion (Zoom and in-person) and to hold the meeting during a Pawtucket City Council Meeting.

Eighteen people attend LPT Meeting #3 on 5/1/2024. The focus of this meeting was on completing the draft plan and organizing public outreach for the 2nd public meeting and for plan review. The Co-Chairs agreed to invite City Council members from each City to attend the public meeting. Additional outreach possibilities mentioned included the Central Falls Mayor's Educational Policy Director, local schools, posts in local newspapers including the Times and the Valley Breeze, posts in the Mayor's Weekly Newsletter and posting flyers on websites and in community locations such as the Boys & Girls Club, the YMCA, and the Senior Center. For public review the LPT agreed to put hard copies in the Pawtucket City Hall and Public Library and the Central Falls Clerk's Office, Planning Department and Library. The City of Pawtucket offered to translate the flyer announcing the public meeting into Spanish. A member of the LPT inquired about translating the plan into Spanish and Jim Vandermillen agreed to talk with his colleagues about this possibility.

2.3. PUBLIC AND STAKEHOLDER ENGAGEMENT

A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))

The work plan included the development of a Public Engagement Strategy to generate public interest, solicit citizen input, and engage additional partners in the plan development process. The strategy identified specific opportunities and methods for citizens and targeted stakeholders to participate at various points in the planning process, including but not limited to hybrid meetings, an opportunity to review the draft plan and information on the web and on social media. Presentations from the public meetings are included in Appendix C.
The purpose of public outreach and stakeholder involvement was to:

- Generate public interest in mitigation planning
- Accommodate special populations identified in the planning area
- Solicit public input
- Engage local stakeholders
- Create opportunities for the public and local stakeholders to be actively involved in the mitigation planning process

COMMUNITY LIFELINES *are the most fundamental services in the community that, when stabilized, enable all other aspects of society.*

Representatives from all community lifelines were included in public engagement efforts. Community lifelines are a driving force behind FEMA's strategic goals for building a culture of preparedness and readying the nation for catastrophic disasters. The eight community lifelines can be a powerful tool for local governments when evaluating risk and developing mitigation actions. The LPT considered the eight community lifelines when conducting outreach through this planning process. The eight community lifelines and their respective components are shown in Figure 3.

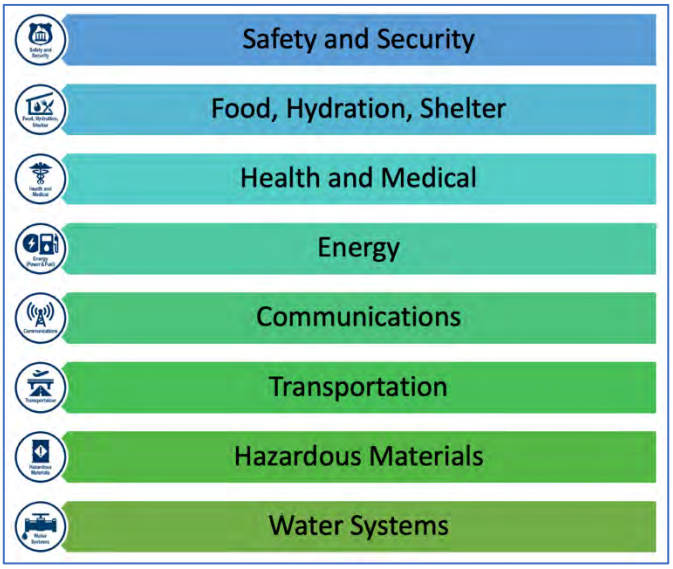


Figure 3. Community Lifelines.

To reach underserved communities and vulnerable populations flyers and press releases advertising each meeting were developed. The flyers were translated into Spanish to engage Spanish speaking residents. The Cities did not have the capacity to translate the flyers into Portuguese as well. Flyers were posted in many places including:

- YMCA
- Public Library and the Mobile Library
- Riverfront Lofts
- Exchange Street Café
- Boys and Girls Club
- Woodlawn Community Center
- Senior Center
- Harvest Kitchen
- Department of Public Works, City of Pawtucket
- Slater Park

- CVS on Armistice Street
- Pawtucket Visitor's Center
- Bravo Supermarket

Spanish and English versions of the flyer were emailed to the Health Equity Zone (HEZ) partner organizations and to people in the HEZ Housing Group. It was also sent to the Pawtucket Housing Authority and to the Blackstone Valley Tourism Council. Outreach through HEZ, the Housing Authority, the Senior Center, Harvest Kitchen, the YMCA and the Boys and Girls Club were efforts specifically made to engage vulnerable populations.

The first public meeting was held on January 24, 2024, in the Slaters Mill Building. This meeting was held in conjunction with a Pawtucket City Council Meeting. The Consulting Team gave a presentation to the City Council and then a more detailed presentation in a breakout room. Each meeting was a hybrid (both Zoom and in-person). The list of attendees is in Appendix C.

Figure 4. Flyer in Spanish for the 1st Public Meeting.

The City Council asked a question regarding the idea of paving near the river and if the Hazard Mitigation Plan would identify this is a positive or negative idea. They also asked about if sink holes would be included in the plan and if they are a human or natural cause.

Participants in the public meeting were primarily condominium owners of a property that experiences repetitive flooding. The Consulting Team encouraged the residents to purchase flood insurance, as the building is insured but individual units are not. There was some confusion regarding the possibility of mitigating risk to this privately owned property. The condominium residents mentioned that they have formed a Flood Committee that is exploring options and advocating for flood mitigation.

The second public meeting was held on May 30, 2024, in-person at the Rhode Island College Hub at 394 Dexter Street in Central Falls and on Zoom. This meeting was held during the day since the first meeting was held in the evening. The meeting was on Zoom and included people from each City including Councilwoman Tatiana Baena from Central Falls. The Councilwoman asked about flooding at the end of Brook Street behind where the new high school will be located. Flooding at this location had not been previously mentioned by the Public or the Local Planning Team. This proves the need for public engagement to capture high hazard areas, resident concerns, and potential mitigation actions.

Contributions from the LPT and public engagement impacted the plan in multiple ways. The table below indicates some of the contributions, others are included above and throughout the plan.

Table 3. Where Public Engagement Informed the Plan.

Area of the Plan Impacted	Contributions
Planning Area Profile	• The LPT updated the list of critical facilities, shown in Appendix A. They also contributed information regarding current land use practices.
Planning Process	• Participated in every aspect of the planning process and made recommendations regarding how to engage the public and key stakeholders.
Risk Assessment	• Described extent of hazard impacts based on previous events. • Offered first-hand insight and experiences of city residents. • Added the qualitative review to the risk analysis for determination of the hazard risk ranking.
Capability Assessment	• Contributed plans, bylaws, and reports for review. • Completed three Capability Assessment questionnaires including the National Flood Insurance survey and the Safe Growth survey.
Mitigation Strategy	• Identified and prioritized mitigation actions based on their concerns. • Focused on the concerns raised by community members.
Implementation Plan	• Committed to integrating this plan more thoroughly throughout City government and to posting the plan on the City's website.

2.4 REVIEW OF DRAFT PLAN

The Cities made the plan available for public review for two weeks in September 2024. A press release announcing the availability to review the plan was sent and the announcement was posted to each City's website in addition to all the outreach described above. Email invitations were also extended to the following list
Comments received

SECTION 3. PLANNING AREA PROFILE

This section provides some background and a general overview of the planning area. It consists of the following subsections:

3.1. Location and History

3.2. Geography and Climate

3.3. Population, Demographics, and Housing

3.4. Infrastructure and Environment

3.5. Employment and Industry

3.6. Land Use and Development Trends

3.1. LOCATION AND HISTORY

Pawtucket and Central Falls are in Providence County, Rhode Island, northeast of the City of Providence along the Blackstone River. Pawtucket is 8.7 square miles and the fourth most populous of the 39 cities and towns in the State of Rhode Island, while Central Falls is the seventeenth most populous, but at just 1.19 square miles it is the smallest municipality by land area. Pawtucket has 8,723 people per square mile, while Central Falls has 18,914 per square mile as of 2020, making it the most densely populated municipality in the state.[4]

Pawtucket was founded in 1671 at the falls of the Blackstone River. The area now known as Central Falls was a dense woodland at that time and evolved into a village, first in the Town of Smithfield and later in the Town of Lincoln. Following an unsuccessful proposal to merge the village with Pawtucket, Central Falls became an independent city in 1895.[4] The region grew along the Blackstone and other rivers as more mills were built and used this newly harnessed power source. Recognizing its significance, Congress established the John H. Chafee Blackstone River Valley National Heritage Corridor in 1986. On December 19, 2014, President Obama signed legislation that established the Blackstone River Valley National Historical Park, the 402nd park in the national park system.

Both Pawtucket and Central Falls are densely populated, historic mill cities situated along the Blackstone River and Interstate 95, just north of Providence, Rhode Island. Pawtucket is known as the birthplace of the American Industrial Revolution. In 1793, power from the Blackstone River was used to spin cotton into yarn at the Old Slater Mill, a historic site that is now part of

[4] https://www.centralfallsri.gov/community/page/history

the Blackstone River Valley National Historical Park. Pawtucket remains a manufacturing center today, with local companies producing jewelry, metal works, textiles, craft beer and spirits. Central Falls also emerged from the Blackstone Valley's industrial success, including a nearly two-decade period during the late 1790's when Central Falls was known as "Chocolateville" due to its reputation as a center of chocolate production.[5] The Chocolate Mill Overlook park along the bank of the Blackstone River marks the spot where the chocolate mill once stood, but the community still hosts many large historic mill buildings as well as homes with unique architectural detail where the owners of these mills once lived. Central Falls has always been a city of immigrants, and the diversity of its population is reflected along the city's two busy commercial corridors, Dexter and Broad Streets. After filing for bankruptcy in 2011 when it could not meet its obligations for pensions and health benefits, the City began to rebound by imposing a 4% property tax increase every year for five years and cutting back on the number of city employees.[6] Under new leadership, beginning with the city's first Latino mayor and now the first Latina mayor, and a wave of rejuvenated community spirit, Central Falls is enduring a dramatic comeback, capitalizing upon its historic manufacturing assets, diversity, and density. Pawtucket and Central Falls share some city resources and a common desire to transform abandoned mill buildings into vibrant live/work spaces. The transit hub and train station that the cities have worked on together for many years finally opened in January 2023. The Transit Oriented Development (TOD) district that surrounds the new transit hub extends into both cities has been a driver of growth and development.

Figure 5. Blackstone River in Pawtucket.

Pawtucket is managed by a mayor, elected every two years, and a City Council consisting of nine members, six of whom are elected from council districts and three from the City at large.[5] Central Falls is managed by a mayor who is elected to a four-year term, with a limit of two terms. The Council Members in Central Falls are elected and sit on a seven-member council with five ward representatives and two at-large representatives.

3.2. GEOGRAPHY AND CLIMATE

Pawtucket lies within three drainage basins, the Blackstone River, the Moshassuck River, and the Ten Mile River. The Blackstone River is the largest and most historically significant of the three rivers that run through Pawtucket. Entering the City from the north, the Blackstone courses generally southward, dividing Pawtucket into almost equal parts. At the Pawtucket Falls, the Blackstone falls into the tidal Seekonk River, a navigable extension of Narragansett

[5] https://rhodetour.org/items/show/32

Bay. The Blackstone has historic significance because the waterpower available at the falls was the primary reason for Pawtucket's early development. It was attractive for early manufacturing activity, and settlement continued to center around the river and the falls. Central Falls drains directly to the Blackstone River. Each city's geography puts it at risk of flooding.

The climate in Pawtucket and Central Falls "can be summarized as follows: (1) equitable distribution of precipitation among the four seasons; (2) large ranges of temperature both daily and annually; (3) great differences in the same season of different years; and (4) considerable diversity of the weather over short time periods."[6] According to the U.S. Climate Data temperatures range from an average low of 42.5F to an annual high temperature of 60.5F. July is the warmest month of the year with an average high of 83F and January is the coldest month of the year with an average high of 37F. Over 100 inches of rain is predicted annually over a span of 120 days.[7]

3.3. POPULATION, DEMOGRAPHICS, AND HOUSING

Pawtucket

According to the 2021 American Community Survey 5-Year Estimates, Pawtucket has a population of 75,612.[8] The 2020 Census revealed that for the first time in many decades, the population of Pawtucket has increased, likely the result of the hundreds of new residential apartments that have been created in the city from renovated mill and industrial buildings.

As of 2021, 55.8% of the population identified as White, 17.6% identified as Black or African American, 0.5% identified as American Indian and Alaska Native, 2.0% identified as Asian, 0.1.% identified as Native Hawaiian and Other Pacific Islander, and 25.5% identified as Hispanic or Latino. There are approximately 24.6% foreign-born persons in Pawtucket. The average household size is 2.52. Almost 82% of people over the age of 25 have a high-school degree or higher.[9] Based on the State of Rhode Island's Department of Environmental Management both Pawtucket and Central Falls are considered Environmental Justice Communities.[10]

The median household income as of 2021 was $56,427. Approximately 14.9% of the population lived below the poverty line in Pawtucket. Many of the homes in Pawtucket were built before World War II and most were concentrated around the mills in the center of the City. Much of Pawtucket's housing built during that era (1874-1920) consists of three-story wooden structures. Almost 50 percent of the city-wide housing stock is made up of these multifamily structures. After World War II, residential development shifted to lower density single-family units and a more suburban style. Through the 1950s, residential development expanded outside the urban core, and the city's outer neighborhoods were created. In the 1960s, a combination of federal housing policies affecting public housing authorities and private developers resulted in the construction of five high-rise apartments for senior citizens in and

[6] https://www.ncdc.noaa.gov/climatenormals/clim60/states/Clim_RI_01.pdf

[7] http://www.usclimatedata.com/climate/providence/rhode-island/united-states/usri0094

[8] https://www.census.gov/quickfacts/fact/table/pawtucketcityrhodeisland,centralfallscityrhodeisland/POP010210

[9] https://www.census.gov/quickfacts/fact/table/pawtucketcityrhodeisland,centralfallscityrhodeisland/POP010210

[10] https://dem.ri.gov/environmental-protection-bureau/initiatives/environmental-justice

around the downtown area. Although the emphasis remains on single-family homes, mill buildings were recently converted into residences. Because there is little undeveloped land in the city, it is anticipated that the majority of any new housing units will be part of redevelopment projects.[11]

Pawtucket has eight planning districts and 14 neighborhoods. District boundaries conform to census tract boundaries and where possible to neighborhoods as perceived by residents.

Pawtucket planning districts:

District 1/Fairlawn

1. District 2/Woodlawn
2. District 3/Oak Hill and West Riverview
3. District 4/Barton Street and Downtown
4. District 5/Pleasant View
5. District 6/East Riverview and Quality Hill and Beverage Hill/Plains
6. District 7/Darlington and Pinecrest
7. District 8/Slater Park and Countryside

Pawtucket neighborhoods:

1. Barton Street
2. Beverage Hill/Plains
3. Countryside
4. Darlington
5. Downtown
6. East Riverview
7. Fairlawn
8. Oak Hill
9. Pinecrest
10. Pleasant View
11. Quality Hill
12. Slater Park
13. West Riverview
14. Woodlawn

The Pawtucket School System consists of ten elementary schools, three junior high schools, and three senior high schools and the school administration building.[12] The list of schools is below:

[11] City of Pawtucket Comprehensive Plan, Adopted by the City Council, December 2016. p.26.

[12] Pawtucket Comprehensive Plan, p.103

- Elizabeth Baldwin Elementary
- M. Virginia Cunningham Elementary
- Flora S. Curtis Elementary
- Curvin McCabe Elementary
- Fallon Memorial Elementary
- Nathanael Greene Elementary
- Agnes E. Little Elementary
- Potter Burns Elementary
- Francis J. Varieur Elementary
- Henry J. Winters Elementary
- Pawtucket Learning Academy
- Lyman B. Goff Middles School
- Joseph Jenks Middle School
- Jacqueline Walsh School for the Arts
- Charles E. Shea Senior High
- Samuel Slater Middle School
- William E. Tolman Senior High

Figure 6. William E. Tolman High School.

Central Falls

According to the 2023 American Community Survey 5-Year Estimates, Central Falls has a population of 22,5483 [13] Central Falls has an average household size of 2.95, and a median household income of $43,092.[14] The percentage of the population with a high school diploma or higher level of education is 63.2%. Sixty-six percent of housing units in Central Falls were built prior to 1939. The majority are apartment buildings. Only 11.9% of housing units are detached homes. Poverty in Central Falls is significant with 24.4% of individuals falling below the poverty line. Central Falls serves as a source of affordable housing for the labor force in the Blackstone Valley area. Central Falls also falls within the State's Environmental Justice communities as can be seen in the figure from the State of Rhode Island's Department of Environmental Management below.[15]
As of 2023, 32.1% of the population identified as White, 8% identified as Black or African American, 0.6% identified as American Indian and Alaska Native, 0.2% identified as Asian, and

[13] https://www.census.gov/quickfacts/fact/table/pawtucketcityrhodeisland,centralfallscityrhodeisland/HSG495221#HSG495221
[14] https://www.census.gov/quickfacts/fact/table/pawtucketcityrhodeisland,centralfallscityrhodeisland/HSG495221#HSG495221
[15] https://dem.ri.gov/environmental-protection-bureau/initiatives/environmental-justice

69.1% identified as Hispanic or Latino. There are approximately 38.2% foreign-born persons in Pawtucket.[16]

Public schools in Central Falls include six schools within the Central Falls School District and two independent charter schools. As of 2022, 69.9% of students attending schools in the District spoke a language other than English at home, with 60% of students speaking Spanish at home.[17]

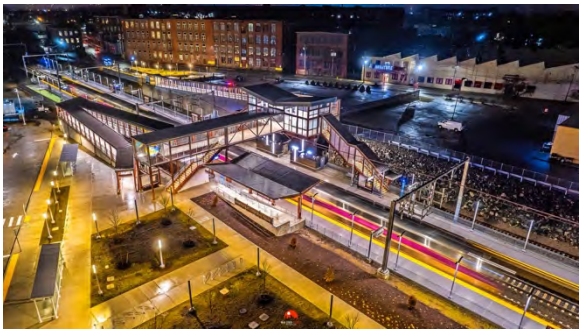
Schools in the Central Falls School District:

- Captain Hunt Preschool
- Ella Risk Elementary
- Veterans Memorial Elementary
- Raices Dual Language Academy
- Calcutt Middle School & Raices Upper
- Central Falls High School

Charter Schools:

- The Learning Community (K-8)
- Segue Institute for Learning (K-8, High School beginning in Fall 2024)
- Blackstone Valley Prep Junior High School (7-8)

3.4 INFRASTRUCTURE AND ENVIRONMENT



The cities rely on infrastructure before, during, and after a disaster. Infrastructure is important to identify and manage because of the services they provide daily. Mitigating risks related to natural hazards and climate change improves a city's resilience and economic vitality.

Figure 7. Pawtucket-Central Falls Transit Center.

Pawtucket

Pawtucket has minimal vacant land throughout the city. As the city developed, forestland was converted into farmland and then into house lots. The amount of land that can be classified as forestland or wooded is very small, less than 300 acres. Common tree types are oak, maple, and miscellaneous deciduous varieties.

The historic development of the city has resulted in ponds and marshes being filled and extensions of man-made fill into river and tidal areas. There is a series of freshwater wetlands totaling approximately 106 acres adjacent to the City's river systems. The largest extent of wetlands is on the Ten Mile River System and the Moshassuck River. Those wetland areas are used extensively by migrating waterfowl.

The Blackstone River ends at the falls under the Main Street Bridge and from that point, the Pawtucket/Seekonk River widens out as the northern most extension of Narragansett Bay. The

[16] https://www.census.gov/quickfacts/fact/table/pawtucketcityrhodeisland,centralfallscityrhodeisland/POP010210

[17] https://data.census.gov/profile/Central_Falls_School_District,_Rhode_Island?g=9700000US4400120

river shoreline is tidally affected as far north as the Pawtucket Falls at Main Street. The shoreline is largely confined to man-made retaining walls from the falls to the southern terminus of the former state pier on the eastern shore and to the vicinity of the Max Read Field on the western shore. The immediate upland areas that are not developed are characterized by steep embankments along most of the shore.

The Rhode Island Coastal Resources Management Council (CRMC) reviews construction and physical alterations that affect the coastal areas of Rhode Island. Although Pawtucket does not have an extensive shoreline, the same basic regulatory process is in effect for the city's coastal feature, the Pawtucket/Seekonk River. Certain major industrial activities as well as all proposed actions within 200 feet of the tidal area shoreline require review by the CRMC. Pawtucket worked with the communities of Providence, East Providence, and Cranston on the Metro Bay Special Area Management Plan (SAMP) to develop the Urban Coastal Greenways Policy, a guidance document which allows for these developed urban areas to be regulated differently from undeveloped rural areas.[18]

The city's transportation system is maintained through the Highway and Cemeteries and Traffic Engineering divisions of the Public Works Department. Through the City's Capital Improvement Program, the Department of Public Works budgets for items such as street and sidewalk improvements, traffic control improvements, bridge repairs, and road repaving. The City has also issued bonds as needed for larger improvement projects.

Approximately 1,000 acres of land area in the city is used for streets and highways. This represents 18% of the total city land area and is the second largest land use in the city. There are approximately 186 miles of local streets that are the responsibility of the City. The Department of Public Works maintains these streets by repairing the pavement, striping where necessary, maintaining the integrity of the road shoulder, and clearing vegetation along the roadside, plowing and sanding/salting in the winter and maintaining the drainage systems. If the road has a FHWA highway functional classification, the City's responsibility for repair and/or reconstruction of the roadway may be assisted through funding from the state aid system (see discussion of the Transportation Improvement Program (TIP) below).

There are a total of 43 bridge structures in the city. Of this total, 43 are associated with I-95.

The City of Pawtucket is serviced by Rhode Island Public Transit Authority (RIPTA) through a total of nine routes. While expansion of the RIPTA's overall system slowed between 2000 and 2010, ridership continued to increase as the agency implemented higher standards for service reliability. The State, through the Rhode Island Department of Transportation (RIDOT) and RIPTA, oversees I-95 as well as state highways and roadways through the city, and the public transportation system. There are also federal partners helping to build bikeway networks through funding and management, including the National Park Service (NPS) and Federal Highway Administration (FHWA). These federal agencies along with RIDOT and RIPTA are key partners in planning for the City's transportation needs.

Pawtucket has sewers in nearly 100% of the city. For those areas with existing onsite systems, the City's Ordinance (Chapter 335, Article II: Privies and Cesspools) requires maintenance and upkeep of systems. The existing sewer system is primarily a combined system collecting both

[18] Pawtucket Comprehensive Plan, p.73.

sewage and stormwater. All sewers within the Pawtucket sewer system discharge to the Narragansett Bay Commission (NBC) interceptor sewers that convey flows to the Bucklin Point wastewater treatment plant in East Providence.

The City owns and maintains approximately 200 miles of collector sewers that directly service residents. It also owns and maintains as a part of the collection system five wastewaters pumping facilities. These facilities provide for sewer service to lower lying areas, primarily along the Ten Mile River. Operation and maintenance of the local sewer system is provided through the City's Department of Public Works – Sewer, Sanitation, and Recycling Division.

Flows from Pawtucket's collector sewer system go into NBC's interceptor sewers. Considering the system's dual function as sewer and storm water collectors, wet weather flows increase dramatically beyond the existing pipe capacities. A series of combined sewer overflow (CSO) structures along the Blackstone and Seekonk Rivers provide relief by allowing direct overflow of the system into the river.

One of the major water pollution problems in the Narragansett Bay region is CSOs that periodically discharge into the Narragansett Bay. CSO systems collect both stormwater and wastewater into the same treatment facility. There are 20 CSO discharges in Pawtucket. During wet weather, the combined sanitary/stormwater flows can exceed the sewerage capacity. The excess is discharged at overflow points into the region's rivers.

The Pawtucket Water Supply Board (PWSB) draws over 2.0 million gallons daily from wells in the Valley Falls area of Cumberland. However, there is presently very little water being withdrawn from the groundwater resources within the City of Pawtucket. This is because of the presence of a citywide water system that uses mainly surface water reservoirs in the Town of Cumberland. This surface water system has been able to meet the water demands of three communities; Central Falls, Cumberland and Pawtucket, all served by the PWSB.

Having a groundwater supply within the borders of Pawtucket is fortunate, but it has been found that the groundwater is not suitable for drinking without further treatment because of the history and concentration of industrial and commercial uses in the City.

The PWSB system serves approximately 98,000 customers (2012), which includes in the entire cities of Pawtucket and Central Falls as well as the Valley Falls portion of Cumberland. The PWSB also has a wholesale contract with the Town of Cumberland. The service area is almost fully developed. Customers are predominately residences in medium to high density areas, but the PWSB also serves commercial, industrial, and institutional users.

The source of the PWSB water supply is the Abbott Run watershed, a sub-basin of the Blackstone Valley Drainage Basin. The watershed covers an area of about 27 square miles in the Town of Cumberland, Rhode Island, and the Towns of Wrentham, Franklin, Plainville, North Attleboro and Attleboro, Massachusetts.

The Diamond Hill Reservoir is the first and largest of the ponds and impoundments that make up the surface water supply. It was originally constructed in 1887. Over the years, it has been enlarged twice and currently has a storage capacity of 3.67 billion gallons of water. Downstream is the Arnold Mills Reservoir. It was constructed in 1927 and can store up to 1.163 billion gallons of water.

There are four other smaller ponds along the seven-mile length of Abbott Run. The PWSB owns two: Robin Hollow Pond and Happy Hollow Reservoir. The total available storage in these

ponds is about 142 million gallons. The other two ponds, Rawson Pond, and Howard Pond are privately owned. The total storage in these ponds is about 51 million gallons.

Central Falls

Central Falls has 28 miles of streets and highways. Three major thoroughfares carry most of the north-south traffic that connects Central Falls to the neighboring communities of Pawtucket, Cumberland, and Lincoln: Lonsdale Avenue, Broad Street and Dexter Street. Broad Street, Dexter Street, and the northern portion of Lonsdale Avenue, totaling approximately two miles, are owned and maintained by the State. The city developed in a manner that supported people to live and work within proximity of where they lived. Railroad tracks run through the eastern portion of the city, serving Amtrak and MBTA commuter rail and the Providence and Worcester Railroad freight line. Passengers can board MBTA commuter trains at the Pawtucket/Central Falls Transit Center that opened in 2023, just a few blocks south of the Central Fall-Pawtucket line and easily accessible by RIPTA bus service. T.F. Green International Airport in Warwick is just 14 miles south of Central Falls, while Logan International Airport in Boston is 47 miles away and easily accessible by Interstate 95. North Central State Airport is seven miles away in Smithfield, Rhode Island, Lincoln. The closest port is the Port of Providence located at the head of Narragansett Bay

Central Falls is served by three Rhode Island Public Transit Authority (RIPTA) bus routes along the Broad Street, Dexter Street, and Lonsdale Avenue corridors. Ridership on the routes through Central Falls is among the highest of all RIPTA routes, as transit is a convenient and viable transportation option for residents with limited financial means.

Massachusetts Bay Transit Authority (MBTA) commuter rail trains traverse Pawtucket and Central Falls and, as of 2023, residents can easily access this service at the Pawtucket/Central Falls Transit Center, which is also a hub for RIPTA bus service. The MBTA operation is focused on providing local service between Providence and Boston and includes service to TF Green Airport and Wickford to the south. Weekday passenger service provides 21 trips in each direction, while weekend service has 10 trips in each direction.

Amtrak operates both high speed and regional intercity passenger rail service along the Northeast Corridor through Pawtucket and Central Falls. The closest station is in Providence, which is directly accessible via MBTA commuter service at the Pawtucket/Central Falls Transit Center. Amtrak's operation is focused on providing intercity service between Boston, New York City, and Washington D.C. On a typical weekday, Amtrak operates 17 trains in each direction, for a total of 34 trains. Of these 34 trains, 16 are high speed and 18 are regional service trains.

Water service in Central Falls is provided by the Pawtucket Water Supply Board's system of reservoirs and ponds located in the Town of Cumberland. This water supply is dependent on the Abbott Run Groundwater Reservoir and the associated recharge areas. The system in Central Falls consists of 23 miles of water lines owned by the City. There are no privately-owned wells. Many miles of lines are over one hundred years old.

Central Falls has a City-owned combined sewer and storm water drainage system with 13 miles of sewers, 11 miles of sanitary sewers and 1 mile of storm drains. Wastewater in Central Falls is treated at the Narragansett Bay Commission's Bucklin Point facility in East Providence.

The Police Department in Pawtucket is headquartered in the City Hall complex on Roosevelt Avenue. All administrative functions and temporary lock-up facilities are located at this office. The Department's vehicular fleet operates from facilities on Armistice Boulevard, adjacent to the

Public Works Department Complex. The Central Falls Police and Fire Departments operate out of the City's Public Safety Complex on Illinois Street. The Pawtucket Fire Department maintains six active stations serving the City. The Departments maintain full firefighting capabilities for multistory building fires, which is critical for the several multi-story residential complexes for seniors in the cities.

First Responders

The Local Mitigation Planning Handbook (FEMA, 2013) explains that *"Critical facilities are structures and institutions necessary for a community's response to and recovery from emergencies. Critical facilities must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery. When identifying vulnerabilities, it is important to consider both the structural integrity and content value of critical facilities and the effects of interrupting their services to the community."*

In July 2015, Pawtucket and Central Falls signed a memorandum of understanding to establish a two-year cost-sharing pilot program that merged the emergency management services of the two cities. This was the starting point for other joint efforts, including the development of a joint Hazard Mitigation Plan in 2016 and in 2024. Following the pilot program, Central Falls has continued to share its Emergency Manager Director with Pawtucket.

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The Pawtucket Office of Emergency Management has signed memorandum of understanding (MOU) contracts with the Rhode Island Emergency Management Agency (RIEMA), American Red Cross, and First Student Bus Company; and has designated shelters in the city which include Jenks Junior High School, Baldwin Elementary School, Varieur Elementary School, Curvin McCabe Elementary School, and Nathaniel Greene Elementary School. These locations are designated as emergency shelters in case of a natural disaster but can be utilized as points of distribution as well.

The Director of Emergency Management also acts as the liaison for Emergency-911 (E-911). Those responsibilities include the review and update of the E-911 Master Street Guide annually or as often as requested, verification and confirmation of street ranges, check and correction of

incorrect addresses, verification and confirmation of new locations and addresses, and attendance at state and regional meetings and workshops as scheduled. The Director of Emergency Management also sits on the Urban Area Security Initiative Stakeholders group representing the City on grant funding which is made available to the City.

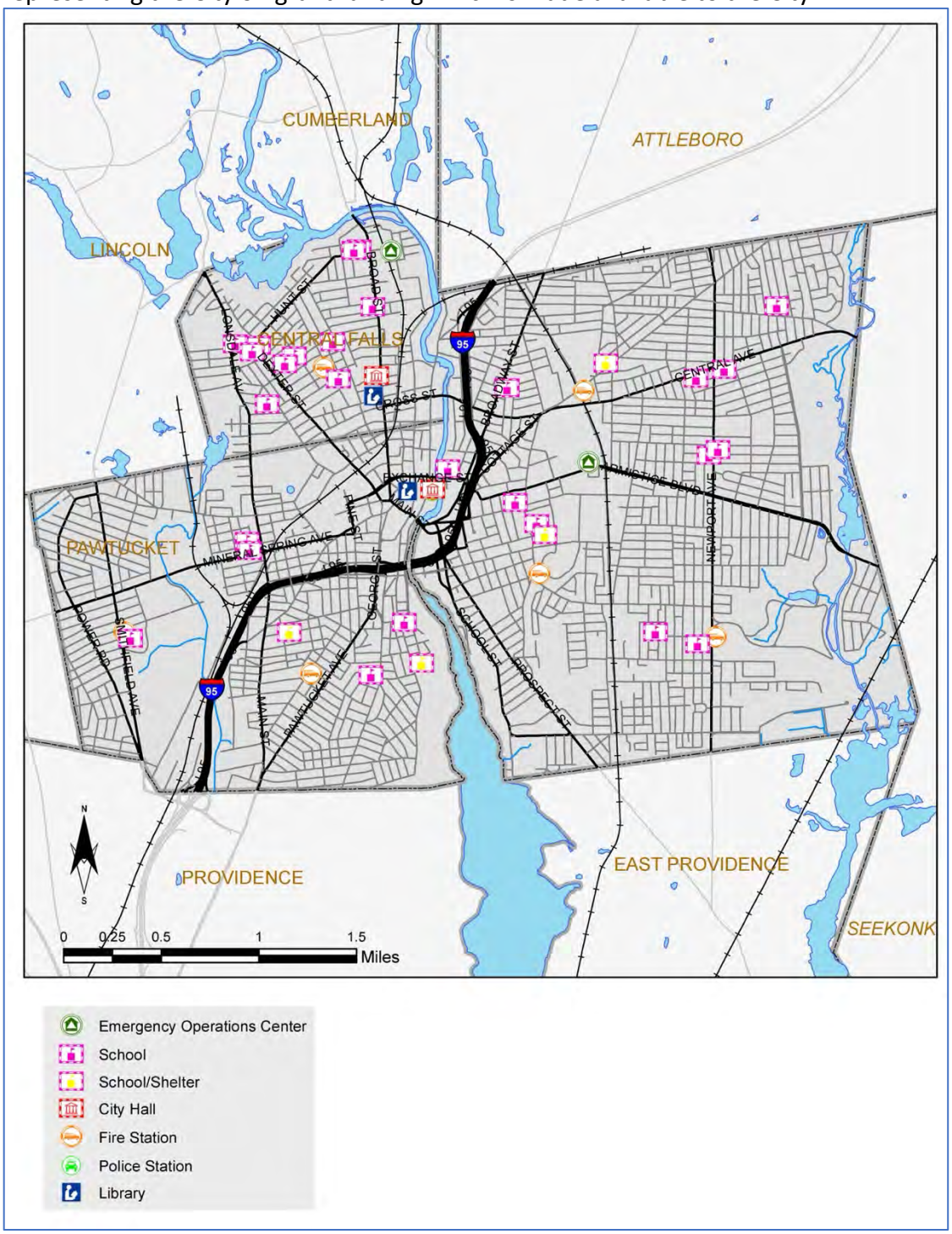


Figure 8. Critical Facilities in the Planning Area.

3.5. EMPLOYMENT AND INDUSTRY

Pawtucket

Most workers in Pawtucket are in the health care and social assistance field, followed by professional/scientific/management fields, retail trade and manufacturing[19] After the Administrative industry, Pawtucket has approximately the same number of health care and social assistance businesses as accommodation and food service. Pawtucket has many industrial buildings that are over fifty years old and in need of renovation to keep up with shipping and receiving demands. Unemployment in 2022 was 6.0% which is slightly over the State's average of 4.5%.[20]

The Hasbro, Inc. world headquarters is in Pawtucket and is the largest manufacturing employer. Other large employers fall in several manufacturing subsectors. Two of the largest employers were founded in the early 1900s and continue as large employers. Teknor Color Co. was founded in Pawtucket in 1924 and the Hasbro Co. in 1923. One of the City's other largest employers, Collette Travel, converted a large mill complex into their world headquarters.

Central Falls

Central Falls has 1,066 businesses. Most workers are in the miscellaneous manufacturing field followed by health care and social assistance.[21] Textile mills and textile products are nearly equal to the health care and administrative industries. Central Falls has many industrial buildings that are over fifty years old and in need of renovation to keep up with shipping and receiving demands. Unemployment in June 2024 was 5.4%, compared to the State's average of 4.4%.[21] According to the 2007 Comprehensive Plan, the City's four largest manufacturing employers at that time were Osram/Sylvania (which closed in 2015), Wardwell Braiding, Murdock Webbing and Fuller Packaging.

The City of Central Falls is committed to growing business and has several incentive programs including the Economic Expansion Incentive Program and a City staff position was created in 2022 to provide support to small businesses and residents entering the workforce.[23] The city has relied on property taxes as their primary source of revenue and the base has limited opportunities for growth since the city has little open space and its people have the lowest average income in the State.[24]

Pawtucket and Central Falls recently completed a Riverfront Corridor Market Analysis. This study describes the riverfront corridor:[22]

The Blackstone River ends in downtown Pawtucket where the Seekonk River begins as a long tidal estuary and continues flowing between Providence and East Providence to join the Providence River and into Providence Harbor.5 The Pawtucket-Central Falls Riverfront Corridor

[19] https://data.census.gov/table?q=unemployment&g=040XX00US44_060XX00US4400714140,4400754640

[20] https://data.census.gov/table?q=unemployment&g=040XX00US44_060XX00US4400714140,4400754640

[21] https://dlt.ri.gov/labor-market-information/data-center/unemployment-ratelabor-force-statistics-laus

[22] Pawtucket-Central Falls Riverfront Corridor Market Analysis, p.7.

contains the Roosevelt Avenue District along the west shore of the Blackstone River to Exchange Street, the Armory Arts District and Riverfront Commons District across the river on the eastern shore to I-95, and the Tidewater District south of I-95 along both sides of the Seekonk/Pawtucket River.6 The Riverfront Corridor Study Area, including the Blackstone River, is part of the John. H. Chafee Blackstone River Valley Heritage Corridor, and the Slater Mill Historic Site and Lorraine Mill area in Pawtucket will be key components of the planned John. H. Chafee Blackstone River Valley National Historical Park. A portion of the Riverfront Corridor Study Area includes the Armory Arts District abutting the Blackstone River, and the upper Tidewater District. The Study Area is within the Pawtucket Downtown National Historic District, and state-designated Growth Incentive Zone.

The Riverfront Corridor encompasses more than 200 acres of under-utilized waterfront characterized by vacant property, overgrown riverbanks, and a largely inaccessible river. Many properties are blighted, restrict visual and physical access to the river, some are contaminated or have other environmental issues. A few new owners of mill and commercial buildings have rehabilitated or renovated space for existing businesses, residential units, live-work studios, and a variety of commercial enterprises. Riverfront Corridor planning initiatives have identified several private and public property owners interested in making improvements, including redevelopment sites located at 417 Roosevelt Avenue in Central Falls, 100 Main Street, and 45 Division Street in Pawtucket.

Pawtucket and Central Falls are committed to working in tandem to develop employment and industry opportunities. Developing the Riverfront Corridor is one such example.

3.6. LAND USE AND DEVELOPMENT TRENDS

Both Pawtucket and Central Falls have small amounts of land that can be developed. For that reason, growth in each city relies on redevelopment, primarily of abandoned mills.

Pawtucket

The City focuses its revitalization policies on the downtown, along the riverfront, at the new commuter rail station, mill redevelopment and brownfield redevelopment. These efforts approach development through a comprehensive lens, evaluating the transportation, economic, open space, and housing needs of the neighborhood or project site and how it can link to the larger community.

Reflective of the City's land uses, a majority of Pawtucket is zoned for residential uses.[23] Pawtucket also has historic districts and flood hazard districts. The Flood Hazard District includes all special flood hazard areas: Zone A, A1-30, AE and Zone V, V1-30, VE on the City of Pawtucket Flood Rate Maps (FIRM) and the Flood Boundary and Floodway Maps, as amended. Activities with the flood hazard areas must comply with state and federal regulations and meet performance standards.

Pawtucket is located entirely within the state's designated Urban Services Boundary, an area served by existing public infrastructure (water, sewer, etc.) that supports development and growth. Pawtucket's Flood Land Use Map (FLUM) shows redevelopment and reinvestment in the City's historic economic center and along its riverfront needed economic activity to support

[23] Pawtucket Comprehensive Plan, p.12

the social and cultural vitality of the city, but in a way that is mindful of anticipated impacts by natural hazards and sea level rise.[24]
There are no permanently protected conservation areas in the city, and no properties have been identified within the city boundaries that are of interest for conservation purposes; however, the City will consider undeveloped land along its waterways for natural resource protection and preservation.

Central Falls

Converting old and abandoned mill buildings into live/work spaces is the primary way for Central Falls to develop. Central Falls has two main streets for commercial activity, Broad Street and Dexter Street. Broad Street businesses attract customers who are crossing the City between Pawtucket and Cumberland. While Dexter Street serves neighborhood shoppers. The other shopping area is Washington Street that has several small "mom and pop" stores.
South Central Falls Historic District covers approximately 9% of the total land area of the City, the District includes 395 buildings of which 377 contribute to its architectural and historic character. Two individually listed National Register properties – the Central Street School (1881) and the Samuel B. Conant House (1895) – are included in the District.[25] The Central Falls Historic Mill District has been included in the National Register of Historic Places since the mid 1970's. The Mill District includes:

- Stafford Mill Complex
- Pawtucket Thread Manufacturing Company
- Central Falls Woolen Mill
- Pawtucket Hair Cloth Mill
- Royal Weaving Mill

The cities of Pawtucket and Central Falls began examining the potential to restore access between Boston and Providence via commuter rail service in 2005. The cities believe that developing a commuter rail station would benefit the residents by increasing mobility and access to economic opportunity as well as benefit the cities overall by improving the environment and encouraging economic growth. With funding from RIDOT, Federal Transit Authority (FTA), and Federal Highway Administration (FHWA), the cities prepared a feasibility study to answer their initial questions about the viability of re-introducing commuter rail service in Pawtucket/Central Falls.

[24] Pawtucket Comprehensive Plan, p.21

[25] Central Falls Comprehensive Plan 2007, p.5-11.

National Register of Historic Properties/ Districts[26]

Conant Thread-Coats & Clark Mill Complex District.

Historic districts represent a group of buildings or sites that have been designated to be historically or architecturally significant. Pawtucket has 54 historic districts or properties and one National Historic Landmark. Central Falls has 13 historic places. Pawtucket and Central Falls share the Conant Thread-Coats & Clark Mill Complex District.

Pawtucket

- Blackstone Canal Historic District, Front Street Bridge (Lincoln) to Steeple and Promenade Streets (Providence, Pawtucket, and Lincoln) (5/6/71)
- Church Hill Industrial District, Main, Church, Bayley, Commerce, Hill and Pine Streets (8/12/82)
- Church Hill Industrial District (Boundary Increase), 60 Dexter Street, 125 Goff Avenue, 265 Pine Street (2/7/11)
- Conant Thread Company Mills, bounded by Pine, Conant, Carpenter, Coleman, Beecher Streets, and Lonsdale Avenue in Pawtucket; Lonsdale Avenue, Rand and Pine Streets in Central Falls (Pawtucket and Central Falls) (11/18/83) text | images Downtown Pawtucket Historic District, Broad, Grant, High, East, and Main Streets (4/5/07)
- Exchange Street Historic District, Exchange, Front and Fountain Streets (9/6/02)
- Old Slater Mill Historic Site National Historic Landmark District, Roosevelt Avenue (11/13/66) NHL
- Quality Hill Historic District, Cottage and Summit Streets, and side streets (4/13/84)
- Slater Park Historic District, between Armistice Boulevard and Newport Avenue (6/30/76)
- South Street Historic District, South Street (11/18/83)
- John F. Adams House, 11 Allen Avenue (11/18/83)
- Foster-Payne House, 25 Belmont Street (11/18/83)
- Leroy Theatre, 66 Broad Street (8/4/83) Fuller Tenement House, 339-341 Broadway (11/18/83)
- Fuller Tenement House, 343-345 Broadway (11/18/83)
- Fire Station #4, 474 Broadway (11/18/83)
- Charles Payne House, 25 Brown Street (11/18/83)
- Elisha O. Potter, 67 Cedar Street (11/18/83)
- Phillips Insulated Wire Company, 413 Central Avenue (3/19/04)
- Division Street Bridge, Division Street (11/18/83)
- Modern Diner, 364 East Avenue (10/19/78)
- West High School, 485 East Avenue (11/18/83)
- Frederick Scholze House, Scholze-Sayles House, 625 East Avenue (10/19/78)

[26] http://www.preservation.ri.gov/register/riproperties.php

- Louis Kotzow House, 641 East Avenue (11/18/83)
- Pawtucket Times Building, 23 Exchange Street (11/18/83)
- Pawtucket Lodge of Elks, 27 Exchange Street (11/18/83)
- Pawtucket Armory, 172 Exchange Street (11/18/83)
- First Ward Wardroom, 171 Fountain Street (11/18/83)
- Joseph Spaulding House, 30 Fruit Street (10/22/76)
- Pawtucket Post Office, 56 High Street (4/30/76)
- Nathaniel Montgomery House, 178 High Street (1/19/84)
- Lorenzo Crandall House, 221 High Street (11/17/78)
- Standard Paper Box Corporation, 110 Kenyon Avenue (2/24/15)
- Art's Auto Supply, 5-7 Lonsdale Avenue (12/15/78)
- Main Street Bridge, Main Street over the Blackstone River (11/18/83)
- Trinity Church, 50 Main Street (1/13/72)
- Gately Building, 335 Main Street (3/20/12)
- Hope Webbing Company Mill, 999–1005 Main Street (04/19/06)
- Collyer Monument, Mineral Spring Avenue, in Mineral Spring Park (11/18/83)
- Fifth Ward Wardroom, 47 Mulberry Street (11/18/83)
- E. A. Burnham House, 17 Nickerson Street (11/18/83)
- Liberty Arming the Patriot, Park Place (10/19/01)
- St. Paul's Episcopal Church, 50 Park Place (11/18/83)
- Church Hill Grammar School, 81 Park Place, (4/23/10)
- Gilbane's, 175-191 Pawtucket Avenue (11/18/83)
- St. Mary's Church Complex, between Pine and George Streets (11/18/83)
- Alfred L. Childs House/Childs-Brown House, 172 Pine Street (11/18/83)
- Riverside Cemetery, Pleasant Street (11/18/83)
- Conant Thread Company Mills, bounded by Pine, Conant, Carpenter, Coleman, Beecher Streets, and Lonsdale Avenue in Pawtucket, Lonsdale Avenue, Rand, and Pine Streets in Central Falls (Pawtucket and Central Falls) (11/18/83)
- Prospect Heights Housing Project, 560 Prospect Street (12/15/15)
- Bridge Mill Power Plant, 25 Roosevelt Avenue (11/18/83)
- Pawtucket City Hall, 137 Roosevelt Avenue (11/18/83)

Figure 9. Pawtucket Armory.

- Saint Jean Baptiste Church, 68 Slater Street (11/18/83)
- Deborah Cook Sayles Public Library, 13 Summer Street (12/6/75)
- Pawtucket Congregational Church, 40 Walcott Street (9/18/78)
- Pitcher-Goff House, 56 Walcott Street (6/24/76)
- James Mitchell House, 41 Waldo Street (11/18/83)

Central Falls

- Central Falls Mill Historic District, between Roosevelt Avenue and Blackstone River (4/6/79)
- South Central Falls Historic District, roughly bounded by Rand, Summit, Dexter and Broad Streets (1/31/91)
- Jenks Park and Cogswell Tower, adjoining 580 Broad Street to the north (9/22/72)
- Valley Falls Mill Complex, Broad Street and the Blackstone River (4/26/78)
- Valley Falls Mill Complex Office and Bathhouse (Amendment), 1359 & 1361 Broad Street (12/12/78)
- American Supply Company Building , 1420 Broad Street (4/24/17)
- Central Street School, 379 Central Street (8/6/79) Samuel B. Conant House, 104 Clay Street (4/6/79) Benjamin F. Greene House, 85 Cross Street (4/6/79) St. Matthew's Church, Dexter & West Hunt Street (4/6/79)
- Holy Trinity Church Complex, 134 Fuller Avenue (1/3/78)
- Central Falls Congregational Church, 376 High Street (7/12/76)
- David G. Fales House, 476 High Street (4/6/79)
- Conant Thread Company Mills, bounded by Pine, Conant, Carpenter, Coleman, Beecher Streets, and Lonsdale Avenue in Pawtucket; Lonsdale Avenue, Rand and Pine Streets in Central Falls (Pawtucket and Central Falls) (11/18/83)

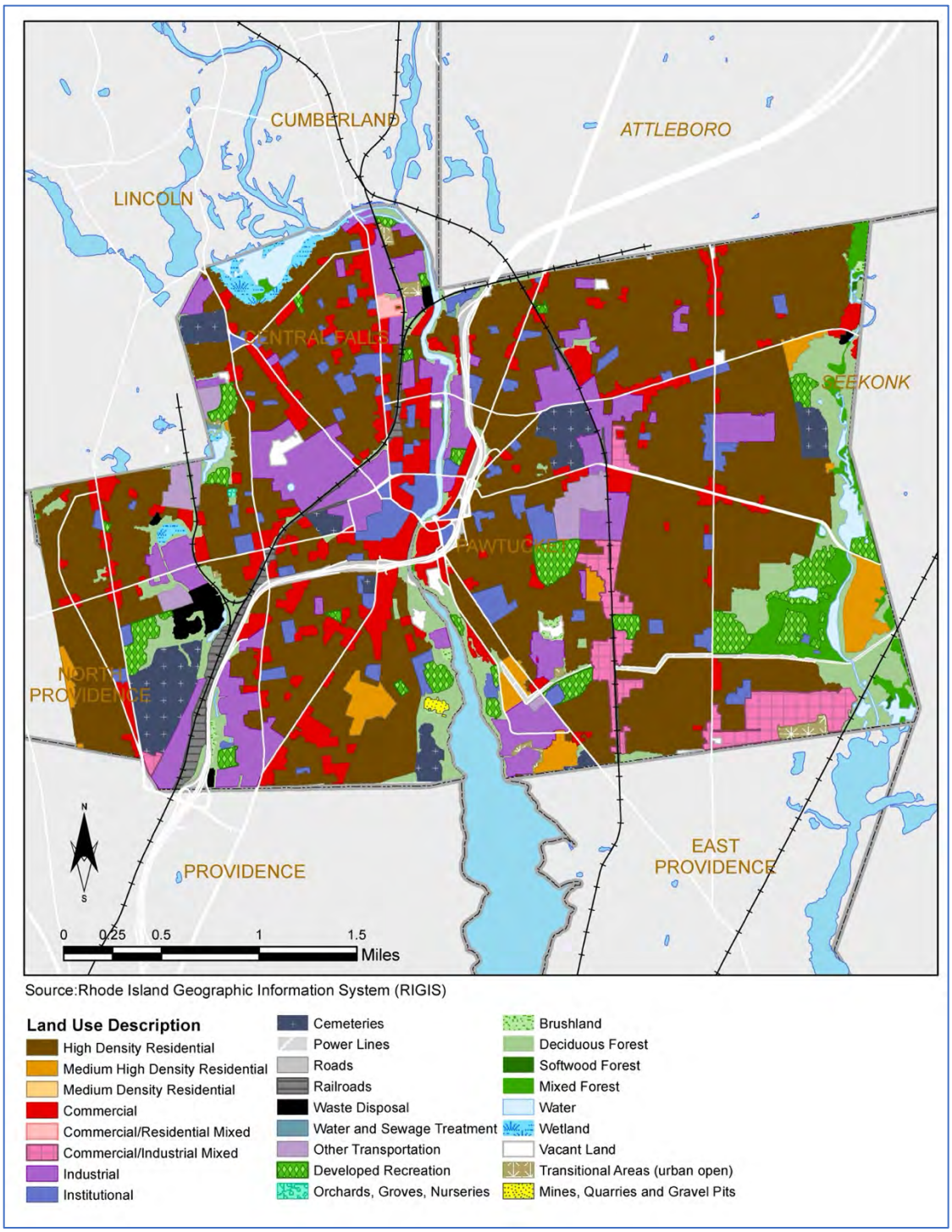


Figure 10. Land Use in the Planning Area.

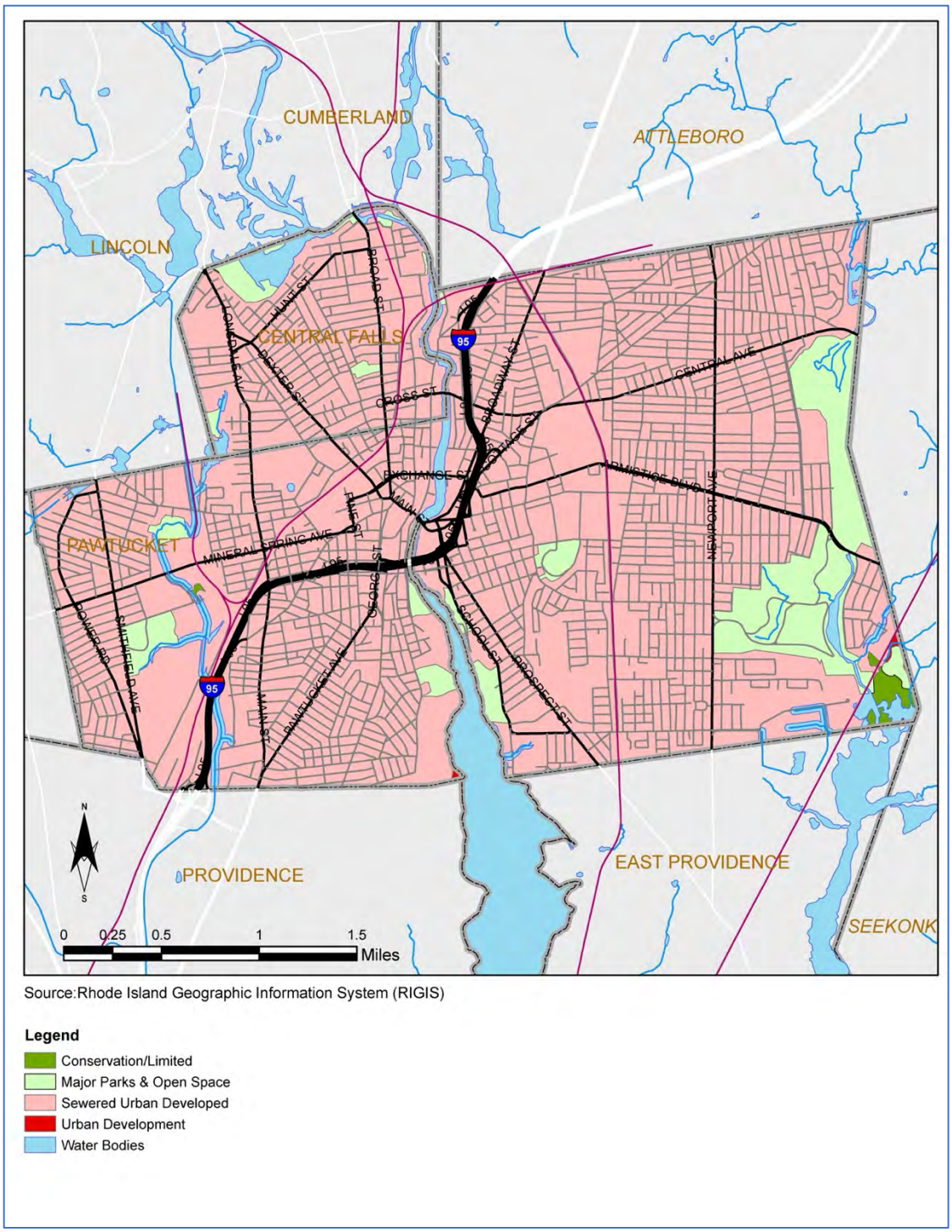


Figure 11. Future Land Use in the Planning Area.

SECTION 4. MITIGATION STRATEGY

The Mitigation Strategy section provides the blueprint for the Cities of Pawtucket and Central Falls to become less vulnerable to the negative effects of the hazards identified and addressed in this plan. It is based on the consensus of the Local Planning Team (LPT) and the findings and conclusions of the Hazard Analysis & Risk Assessment and Capability Assessment, in addition to the input and feedback generated through the public outreach stakeholder engagement efforts. The strategy is also based off past planning processes and the previously adopted hazard mitigation plan.
This section of the plan consists of the following subsections:

4.1. Overview

4.2. Mitigation Goals

4.3. Previous Mitigation Actions

4.4. Identification and Analysis of Possible Mitigation Activities

4.5. Selection and Prioritization of Mitigation Actions

4.6. Mitigation Action Plan (MAP)

4.1. OVERVIEW

The intent of the Mitigation Strategy is to provide the Cities of Pawtucket and Central Falls with a vision and overall goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of the mitigation techniques available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature.

- In being *comprehensive*, the development of the Mitigation Strategy included a thorough review of all hazards and identifies mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the Cities achieve compatible social, economic, and environmental goals.
- In being *strategic*, the development of the Mitigation Strategy ensures that all actions proposed for implementation are consistent with pre-identified and long-term planning goals.
- In being *functional*, each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy was to create an overall mission statement to be agreed upon by the LPT to represent the overall intended outcome of the plan. The final mission statement as adopted by the LPT is based off the mission statements of each City's previous hazard mitigation plan and is as follows:

Mission Statement

Preserve and enhance the quality of life, property, and resources by identifying areas at risk from natural hazards and climate change and implementing hazard mitigation strategies to protect the Lower Blackstone Valley's population, infrastructure, cultural, historic, and natural resources.

The next step included the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific mitigation actions. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance), as well as hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The third step included the review of previously adopted mitigation actions in addition to the identification, consideration, and analysis of new mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process to be sustained through the development and maintenance of this plan. Alternative mitigation measures will continue to be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as the plan is maintained over time.

The fourth and final step in designing the Mitigation Strategy is the selection and prioritization of mitigation actions to pursue during the 2024-2029 planning cycle. The Mitigation Action Plan (MAP) reflects the specific needs, concerns, and problems identified during the plan update process and represents a clear and functional plan for action. It is considered the most essential outcome of the mitigation planning process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for the Cities of Pawtucket and Central Falls to implement during this planning cycle. Many of these actions are also linked back to specific actions or activities as included in the previously adopted plan. Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources, and an estimated target date for completion. The MAP provides the departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for local decision makers who want to quickly review the recommendations and proposed actions of the Multi-Jurisdiction Hazard Mitigation Plan.

In preparing the Mitigation Action Plan, the LPT considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted mission statement and mitigation goals. Prioritization of the proposed mitigation actions was based on the factors outlined in subsection 4.4.

4.2. MITIGATION GOALS

C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))

> ***GOALS*** *are broad, long-term policy and vision statements that explain what is to be achieved by implementing the mitigation strategy.*

The Cities of Pawtucket and Central Falls developed four goal statements for this Multi-Jurisdiction Hazard Mitigation Plan. In developing these goals, careful consideration was given to the goals as identified for each City's previous hazard mitigation plan in addition to the wide range of strategies, goals, and actions from other community plans to ensure consistency and cross-integration. The goals are presented in Figure 12.

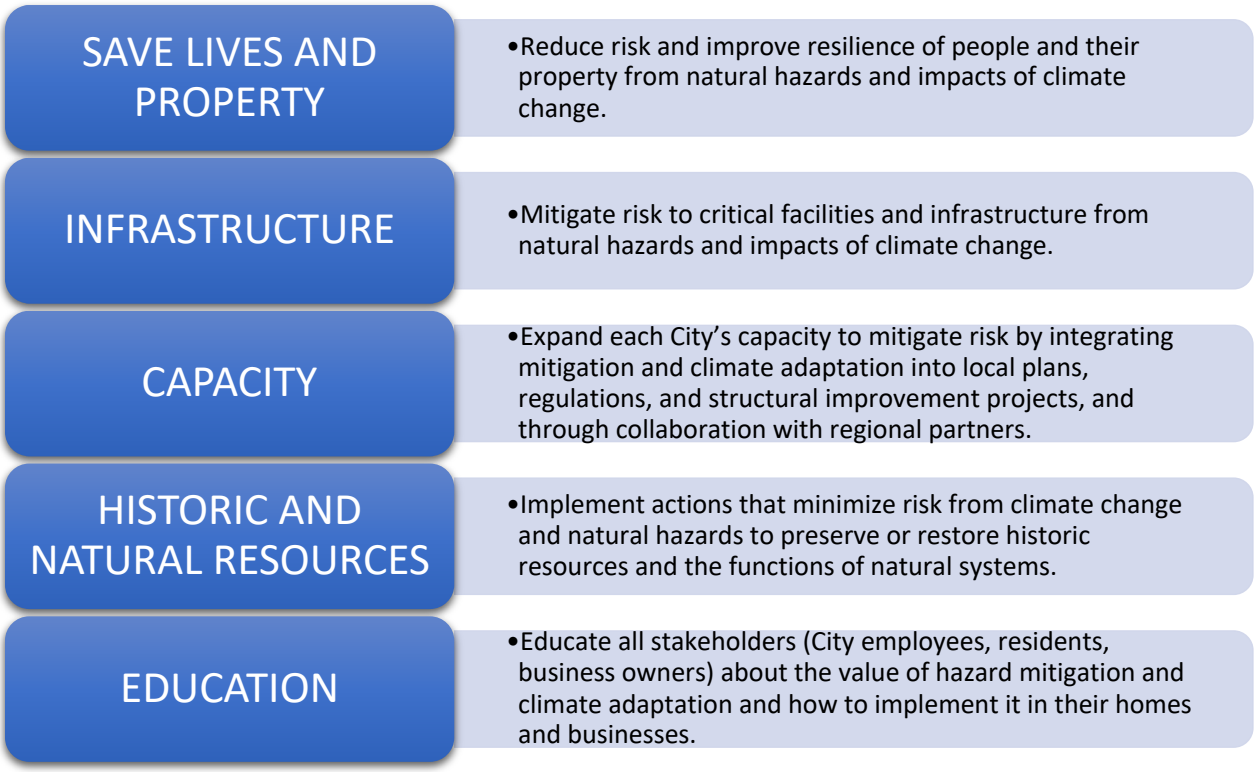


Figure 12. Mitigation Plan Goal Statements.

These mitigation goals were developed, discussed, and finalized by the LPT at their meetings. Each goal, purposefully broad in nature, serves to establish the parameters that were used to review and update existing mitigation actions and to aid in formulating new ones. The consistent implementation of mitigation actions over time will ensure that these mitigation goals are achieved.

4.3. PREVIOUS MITIGATION ACTIONS

E2-b. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement §201.6(d)(3))

The Cities of Pawtucket and Central Falls Multi-Jurisdiction Hazard Mitigation Plan (2018) included 45 mitigation actions for the City of Pawtucket and 16 for the City of Central Falls. For the purposes of this plan, all the actions were reviewed for their status and relevance. The following tables show the previous plan's actions and the status of each. In addition to their status, if an action was forwarded to this plan the final column indicates the title of the new action.

Table 4. City of Central Falls, Status of Mitigation Actions from Previous Plan.

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
1	Evaluate the properties along the Blackstone River and determine what actions will alleviate the flooding for affected streets.	Partially Completed/In Progress	There needs to be more extensive analysis of the remaining properties that haven't been converted to open space.	Yes	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
2	Reduce Urban Heat Island effect	Partially Completed/In Progress	Hundreds of trees have been planted in the city over the past 5 years, including street trees, on public properties, and on private property. This work is ongoing, particularly in partnership with Groundwork with findings from the USFS. No work has been done to promote green/cool roofs.	Yes	Reduce the urban heat island effect.
3	Improve Stormwater Management Planning	Partially Completed/In Progress	The City is actively seeking funds to perform a Facilities Plan that will inventory the existing stormwater and sanitary sewer infrastructure. As important as the Facilities Plan is, preparing a community-wide Stormwater Management Master Plan must not be overlooked. Stormwater analysis is a required element of plan review.	Yes	Prepare a Sewer/Stormwater Facilities Plan.
4	Adopt Polices to Reduce Stormwater Runoff	Partially Completed/In progress	Plan review procedures outlined in the Land Development and Subdivision Review Regulations include stormwater analysis, and the Zoning Ordinance includes maximum lot coverage. Emphasis needs to shift to enforcement.	Yes	Develop a plan to enforce stormwater regulations.
5	Improve Flood Risk Assessment	Partially Completed/In progress	City of Central Falls ordinance complies with revising and updating regulatory floodplain maps according to Sec. 10-243-Applicability. Boundaries may be defined	Yes	Annually review the City Floodplain Ordinance to ensure effectiveness and

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
			by the 100-year base flood elevations shown on the FIRM dated October 2, 2015.		consistency with regulations.
6	Manage Floodplain Beyond Minimum Requirements	Delayed	City of Central Falls ordinance complies with revising and updating regulatory floodplain maps according to Sec. 10-243-Applicability. Boundaries may be defined by the 100-year base flood elevations shown on the FIRM dated October 2, 2015.	Yes	Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.
7	Participate in the CRS	Cancelled	Possible participation in the CRS was discussed with FEMA during the April 2023 Community Assistance Contact meeting. With so few policies, a determination must be made as to whether there would be sufficient benefit.	No	
8	Map Community Risk	Delayed	The Planning Department has limited GIS capacity. An alternate solution to be investigated is coordinating with the City of Pawtucket.	Yes	Increase capacity to use GIS to meet hazard mitigation needs.
9	Integrate Mitigation into Local Planning	Partially Completed/In progress	The City adopted a Climate Action Plan in 2023. The City is actively seeking funds to update the Comprehensive Plan. This has been given a higher priority for the fiscal year beginning July 1, 2023.	Yes	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
10	Take necessary steps to mitigate the effects of the flooding along the Blackstone River.	Delayed	Flooding along the Blackston River continues and the City will seek funding to mitigate this risk. Delays have occurred due to a lack of funding.	Yes	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
11	Improve Stormwater Drainage System Capacity	Partially Completed/In progress	The City is actively seeking funds to perform a facilities plan that will inventory the existing stormwater and sanitary sewer infrastructure.	Yes	Prepare a Sewer/Stormwater Facilities Plan.
12	Conduct Regular Maintenance for Drainage Systems and	Partially Completed/In progress	Inspection of drainage systems is performed as required on an ongoing basis, and maintenance is performed in response to calls. New jet and vacuum	No	

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
	Flood Control Structures		equipment has been purchased (awaiting delivery as of October 2023), which will greatly increase DPW's ability to perform maintenance, regular maintenance will still be limited by availability of staff.		
13	Protect Critical Facilities and Equipment	Delayed	Current staff in the Clerk's Office is not aware of any actions that have been taken to address this issue since the 2018 Plan.	Yes	Protect Critical Facilities and Equipment.
14	Protect Existing Power Lines and Infrastructure	Completed	We continue to work with the utility company to trim and prune trees around power lines. We respond to resident concerns about power line and tree issues. We are also pro-actively conducting inspections of various electrical pole locations to insure the condition and safety of these electrical poles. Whenever we come across an area of concern we reach out to the utility company for assistance.	No	
15	Bury Power Lines	Cancelled	Current Planning Dept. staff is not aware of any discussions to address this issue since the 2018 Plan. There are no funds allocated in the budget.	No	
16	Educate Public about Multiple Hazards	Partially Completed/In progress	PCF EMA continually provides outreach and education on all hazards. Have been doing so since 2016. Everytime we are in the community at a function or special event we set up outreach stations providing most information in both English and Spanish.	Yes	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.

Table 5. City of Pawtucket, Status of Mitigation Actions from Previous Plan.

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
1	EMAP Accreditation	Cancelled	Lack of funding/staff & programs. In addition, other actions are a higher priority.	NO - explanation provided at left	
2	Increased CRS Rating	Completed + To Be Continued	Lack of funding/staff; efforts to increase services and preparedness actions is ongoing	YES - updated/revised description provided at right, if applicable	Increase CRS Rating.
3	Debris Management Plan	Completed	The City last updated the debris management plan in 2012. EMA is currently drafting updates to this existing plan to coincide with RIEMA state mandates that are anticipated to be completed in late 2017 - early 2018. This is a capability of the City.	NO - explanation provided at left	
4	Development of Parcel-Base GIS Database	Completed	GIS Coordinator hired in 2016 to expand and maintain GIS database	NO - explanation provided at left	
5	Building Code Compliance Enforcement	Completed	This continues as a capability of the City's.	NO - explanation provided at left	
6	Low-Impact Development	Partially Completed / In Progress	Ongoing, where applicable.	YES - updated/revised description provided at right, if applicable	Hire a Full-Time Resiliency Manager.
7	Recovery and Reconstruction Ordinance	Delayed	Lack of funding/staff & programs.	YES - updated/revised description provided at right, if applicable	Hire a Full-Time Resiliency Manager.

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
8	Publicly-Owned Dam Inspection, Classification, and Maintenance	Completed	RIDEM conducts damn inspections.	NO - explanation provided at left	
9	Develop Actionable Strategy to Address Repetitive Loss Properties	Completed	Part of CRS annual recertification.	NO - explanation provided at left	
10	Increase Green Infrastructure	Completed + To Be Continued	Received grant funding for urban forestry inventory, hiring of City arborist, GI install at 2-3 key sites, and increase urban canopy.	YES - updated/revised description provided at right, if applicable	Increase Green Infrastructure Throughout the City.
11	Relocate the City's Fuel Depots	Cancelled	Stormwater management is ongoing and a capability.	NO - explanation provided at left	
12	Privately-Owned Dam/Flood Control Devices Inspection, Classification, and Maintenance	Completed	There is one privately owned high-hazard dam with the ability to affect Pawtucket - the Hebronville dam in Attleboro. EMA receives updated DAM plans as available.	NO - explanation provided at left	
13	Public Housing Units	Completed	Fire safety devices annually inspected by Fire Department.	NO - explanation provided at left	
14	Ensuring the Safety of Elderly Housing and Public Housing	Completed	Fire safety devices annually inspected by Fire Department.	NO - explanation provided at left	
15	City Hall	Delayed	The City has investigated the structural stability of the towner and identified the cost to rehabilitate. There are improvements planned for some parts of the City Hall roof. A $5m bond referendum was approved by the City in 2016; delayed due to funding issues.	YES - updated/revised description provided at right, if applicable	Retrofit City Hall Tower.

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
16	Installation of Underground Overflow Tanks	Delayed	Not started due to lack of funding/staffing	YES - updated/revised description provided at right, if applicable	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
17	Localized Flooding of Roadways	Completed	Inventory of catch basin and sewer/water capacity is ongoing. The Department of Public Works maintains a priority list for roadway repairs to be completed through bond funding including identified flood prone areas. The City also continues to work with the Narragansett Bay Commission to plan for a significant combined sewer/water interceptor project slated for 2022-2025 and intended to improve stormwater capacity city-wide.	NO - explanation provided at left	
18	Bridge Inspection	Cancelled	RIDOT conducts all bridge inspections.	NO - explanation provided at left	
19	Emergency Procedure for Gas/Electrical Lines Running on Bridges	Partially Completed / In Progress	Existing bridges along the Blackstone River including Exchange Street, Main Street, Interstate 95, and Division Street have been repaired, including secured and repaired utility infrastructure. This work was largely supported through RIDOT and federal funding. Lower-lying bridges along the Moshassuck and Ten Mile rivers are now targeted for utility improvements and general repair.	NO - explanation provided at left	
20	Emergency Procedure for Water Lines Running on Bridges	Completed	Completed. PWSB has redundancies.	NO - explanation provided at left	
21	Elevate Low-Lying Bridges/Culverts	Partially Completed / In Progress	Existing bridges along the Blackstone River including Exchange Street, Main Street, Interstate 95, and Division Street have been repaired, including secured with fencing, structural improvements, and elevating culverts. This work	NO - explanation provided at left	

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
			was largely supported through RIDOT and federal funding. Lower-lying bridges along the Moshassuck and Ten Mile rivers are now targeted for security improvements and general repair.		
22	Industries in the Floodplain	Partially Completed / In Progress	Ongoing when applicable and considered a capability of the City.	NO - explanation provided at left	
23	Develop Retrofit (Dry/Wet Floodproof, Elevation) Program	Partially Completed / In Progress	The City adopted Flood Hazard District zoning regulations in 2013 with the goal to ensure public safety, minimize hazards to residents and property, and protect existing watercourses and wetlands. Additional requirements include compliance with state building code, coastal resources management, endangered species, freshwater wetlands, water quality, and sewage disposal requirements. All requested building permits within designated flood plains also require a minimum of 2 feet of freeboard above the 100-year base flood elevation. Enforcement is managed by the Pawtucket Building Official in coordination with state building code requirements.	NO - explanation provided at left	
24	Masonry Apartments and Mill Buildings	Completed + To Be Continued	Coordination between the Building Official and property owners of older mill buildings continue. The City has also provides various retrofit incentives including overlay mill reuse zoning, brownfields revolving loans, tax increment financing, and national historic designation.	NO - explanation provided at left	
25	School Vulnerability	Completed	Roofs and fire detection systems inspected annually. Shea and Tolman High School have building issues that need short term fixes as the city is constructing a unified high school and the schools will no longer be used.	NO - explanation provided at left	

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
26	Installation of Video Monitoring System - Monitor Capacity and Condition of Sewer Infrastructure	Delayed	Delayed due to lack of funding.	YES - updated/revised description provided at right, if applicable	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
27	Continue to Implement Infrastructure Replacement Plan	Partially Completed / In Progress	DPW maintains annual priorities for road, utility, public buildings, and other infrastructure repair. This is a capability of the City.	NO - explanation provided at left	
28	Installation of Seawall at Narragansett Electric's Substation	Completed	National Grid and Rhode Island Energy completed this work.	NO - explanation provided at left	
29	Backflow Prevention Valve Rebate Program	Delayed	Delayed due to lack of funding.	YES - updated/revised description provided at right, if applicable	Develop a Backflow Prevention Valve Rebate Program.
30	Acquire and Preserve Open Space along the Moshassuck River	Delayed	Delayed due to lack of funding.	YES - updated/revised description provided at right, if applicable	Acquire and Preserve Open Space along the Moshassuck River.
31	Preservation of Water Supply Reservoirs and their Watersheds	Partially Completed / In Progress	The PWSB continues its policy of working with the Town of Cumberland, the Cumberland Land Trust (CLT) and the Cumberland Open Space Commission (OSC) to acquire properties or development rights of properties in the Watershed with the prime intent of water quality protection. The PWSB continues to actively maintain and manage the land surrounding the Watershed. By owning the property, the PWSB can set forth storm water management plans to ensure that the Reservoir(s) are not negatively impacted by	NO - explanation provided at left	

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
			development. All construction within the Watershed is reviewed by the PWSB, and if warranted, comments are sent to the Town or RIDEM. The PWSB also worked with the Cumberland Zoning Committee to create a watershed overlay district. This watershed overlay district helps protect both Cumberland's and Pawtucket's watersheds by prohibiting certain types of commercial and industrial activities.		
32	Contain Hazardous Materials	Partially Completed / In Progress	All residential storage tanks are being removed. Pawtucket's hazardous materials officer witnesses all removals and issues permits for any commercial installations. A plan is provided by the installer for containment. All commercial tanks are double walled and must be able to contain 50% of their contents.	NO - explanation provided at left	
33	Open Space Acquisition	Partially Completed / In Progress	The City completed environmental remediation work along the Blackstone River on Front Street in 2015. Expanded Blackstone Valley Bike path infrastructure and Narragansett Bay Commission stormwater infrastructure improvements are proposed for the site. The City allocated Brownfield Revolving loan funds to the remediation and construction of a small public park on East Street along the Blackstone River. The City is actively working to relocate the Municipal Transfer Station out of the Moshassuck River floodplain and cap the decommissioned station site with clean soil. Targeted priority acquisition list has not been created.	YES - updated/revised description provided at right, if applicable	Acquire and Preserve Open Space along the Moshassuck River.

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
34	Volunteer Disaster Resistance Program	Completed + To be continued	EMA is working with the CERT team. Over the summer (2017), they disseminated preparedness information at various festivals and events.	NO - explanation provided at left	
35	Public Information, Outreach and Incentive Program	Completed + To be continued	Ongoing, when applicable.	YES - updated/revised description provided at right, if applicable	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
36	Information Brochure	Completed	EMA has information on various hazards affecting the City of Pawtucket that are directly distributed to residents.	NO - explanation provided at left	
37	Mass Care Facility Equipment	Partially Completed / In Progress	Mass Care Generator is a work in progress. Grant funding was obtained in October of 2017. Ongoing planning process with the School Department, solected contractor must be approved by the Pawtucket Purchasing Board. Electrical engineers must be hired to design project needs (Code Required) with installation of new generators expected in the summer of 2018. Anticipated that generators will be on line for the 2018 hurricane season.	YES - updated/revised description provided at right, if applicable	Install a Generator for New High School.
38	Volunteer Disaster Assistance Officer	Completed + To Be Continued	EMA has a granted funded preparedness officer position that has been filled since 2015.	NO - explanation provided at left	
39	Elderly and Special Needs Residents	Completed + To Be Continued	EMA and Pawtucket Housing Authority coordinating on safety seminars and evacuation drills.	NO - explanation provided at left	
40	Business Continuation	Completed + To Be Continued	The Police Department in coordination with the Chamber of Commerce maintains strategies to assist local businesses in flood prone areas to recover from the effects of a natural disaster including organizing collective cleanup and contact information. The	NO - explanation provided at left	

Action #	Action Title	Current Status	Current Status Description/Explanation	Keep for Updated Plan?	Updated Action Title/Description (if applicable)
			Pawtucket EMA completed and maintains the City's Continuity of Operations and Preparedness Plan (COOP).		
41	Coordinate Evacuation Plans with Neighboring Municipalities	Completed + To Be Continued	EMA continues to work with Central Falls and RIEMA on this effort. 2016-17 funding to update Pawtucket and Central Falls Emergency Management plans will be the first-multi-jurisdictional hazard mitigation plan in the state of Rhode Island.	NO - explanation provided at left	
42	Maintain Viable Evacuation Routes	Completed + To Be Continued	EMA continues to work with DPW and RIEMA on this effort.	NO - explanation provided at left	
43	GIS Integration Citywide	Completed + To be continued	GIS Coordinator hired in 2016 to expand and maintain GIS database, department access to relevant mapping information, and internet mapping site (MapGeo).	NO - explanation provided at left	
44	Publish Evacuation Routes	Completed	EMA continues to work with RIEMA on this effort.	NO - explanation provided at left	
45	Uninterrupted Municipal Water Supply	Partially Completed / In Progress	PWSB is coordinating with abutting water supply providers to discuss inter-connectedness.	NO - explanation provided at left	

4.4. IDENTIFICATION AND ANALYSIS OF POSSIBLE MITIGATION ACTIVITIES

C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))

***A MITIGATION ACTION** is a measure, project, plan or activity proposed to reduce current and future vulnerabilities described in the risk assessment.*

In formulating the *Mitigation Strategy*, a wide range of activities was considered to help achieve the established mitigation goals in addition to addressing specific hazard concerns. As described and more fully documented in Section 2 (Planning Process), these activities were reviewed and discussed during LPT meetings and were also sought through public and stakeholder engagement efforts. This systematic review of a wide range of activities was completed to ensure that all possible mitigation measures were explored.

In completing the review, a comprehensive range of specific mitigation actions were identified to reduce the effects of hazards as described in Appendix A (Hazard Analysis and Risk Assessment), with emphasis on addressing the vulnerability of new and existing buildings and infrastructure. This systematic review also included the consideration of numerous opportunities to expand and improve each City's municipal capabilities and resources to reduce risk as identified in Appendix B (Capability Assessment). The actions and opportunities explored by the LPT covered a variety of mitigation measures to be implemented in collaboration as well as independently, including preventive activities, property protection, natural resource protection, structural projects, public information activities, and emergency services.

The LPT also considered changes in land use and population, as well as 5 key assets when addressing problems identified in Appendix A (Hazard Analysis and Risk Assessment. These are:

1. People (including underserved communities and socially vulnerable populations)
2. Structures (including facilities, lifelines, and critical infrastructure)
3. Systems (including networks and capabilities)
4. Natural, historic, and cultural resources
5. Activities that have value to the community

In general, all activities considered by the LPT may be classified under one of the following four broad categories of mitigation techniques: local plans and regulations, structure and infrastructure projects, natural systems protection, and education and awareness programs. There is also a fifth common category of techniques which are described below as "Other Types of Actions." These techniques support hazard mitigation but typically fall into other phases of emergency management, such as preparedness or response. All five categories are briefly described with example types of actions below.

1. Local Plans and Regulations

Mitigation actions that fall under this category include government authorities, policies, or codes hat influence the way land and buildings are developed and built. Examples of these types of actions include:

- Floodplain regulations
- Coastal setbacks/erosion regulations
- Master plans
- Land use ordinances
- Subdivision regulations
- Development review
- Building codes and enforcement
- NFIP Community Rating System participation
- Capital improvement programs
- Open space preservation
- Stormwater management regulations

2. Structure and Infrastructure Projects

Mitigation actions that fall under this category involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards. Many of these types of actions are projects eligible for funding through the FEMA Hazard Mitigation Assistance (HMA) program. Examples of these types of actions include:

- Acquisitions and elevations of structures in flood prone areas
- Utility undergrounding
- Structural retrofits and upgrades
- Seawalls, floodwalls, and retaining walls
- Detention and retention structures
- Storm drain improvements, culverts, and channel modifications
- Safe rooms

3. Natural Systems Protection

Mitigation actions that fall under this category seek to use nature-based solutions to minimize damage and losses from hazards while providing the co-benefits that often come from preserving or restoring the functions of natural systems. Examples of these types of actions include:

- Dune and coastal barrier protection
- Sediment and erosion control
- Stream corridor restoration
- Forest management

- Conservation easements
- Wetland restoration and preservation
- Natural area and functions protection

4. Education and Awareness Programs

Mitigation actions that fall under this category inform and educate citizens, government officials, and property owners about natural hazards and potential ways to mitigate their risk. Although this type of mitigation reduces risk less directly than structural projects or certain regulatory policies, it is an important foundation. A greater understanding and awareness of hazards and risk among the public and key targeted stakeholders is more likely to lead to direct actions. Examples of these types of mitigation actions include:

- Radio or television spots
- Library collections and websites with hazard maps and information
- Real estate disclosure
- Technical assistance on hazard mitigation
- Presentations to school groups or neighborhood organizations
- Mailings to residents in hazard-prone areas
- Participation in national risk awareness or emergency preparedness programs such as FEMA's *High Water Mark* initiative, the National Weather Service's *StormReady program,* and the National Fire Protection Association's *Firewise USA* program

The LPT considered each of the hazard risks and problems identified in terms of the following CRS categories:

a. Preventive Activities
b. Floodplain Management Regulatory/Current & Future Conditions
c. Property Protection Activities
d. Natural Resource Protection Activities
e. Emergency Services Activities
f. Structural Projects
g. Public Information Activities

The LPT reviewed a comprehensive range of specific mitigation actions to reduce the effects of hazards as described in the risk assessment, with emphasis on addressing the vulnerability of new and existing buildings and infrastructure. This systematic review also included the consideration of numerous opportunities to expand and improve each City's municipal capabilities and resources to reduce risk as identified in the capability assessment. The actions and opportunities explored by the LPT covered a variety of mitigation measures to be implemented in collaboration as well as independently, including preventive activities, property protection, natural resource protection, structural projects, public information activities, and emergency services.
In reviewing all possible activities, the LPT generally considered preventive, property protection and public information activities among the top priorities for reducing future risks and

vulnerabilities to natural hazards. Although much of the planning area is already densely developed, both Cities have opportunities to build and improve community resilience through new planning and regulatory enforcement initiatives in combination with public education and outreach activities. Examples include creating a new structure for the ongoing implementation of climate adaptation and hazard mitigation projects, developing a long-term recovery plan to assist with post-disaster redevelopment, and integration resilience-themed content into existing City websites and social media activities. Additional actions to build upon and enhance these efforts were incorporated into the mitigation strategy following LPT discussion and the general consideration of the pros and cons of each activity.

The LPT also reviewed a range of structural projects and emergency service activities designed to help reduce the vulnerability of existing buildings and populations to potential hazard impacts. These actions included numerous stormwater management improvements across both cities, site-specific building and/or critical facility improvements, and a variety of flood mitigation solutions for known problem areas. Numerous activities related to protecting or restoring natural resources to support flood risk reduction and climate adaptation were also considered for incorporation into the plan as new actions for each City to pursue. Examples include increasing and maintaining green infrastructure and other nature-based solutions throughout both cities (to reduce flooding and the urban heat island effect), targeted stormwater drainage/storage improvements along the Blackstone River, and acquiring and preserving additional open space along the Moshassuck River.

Below is the list of actions for the City of Pawtucket with the corresponding CRS categories each action represents.

Table 6. City of Pawtucket Mitigation Actions with Corresponding CRS Categories.

CRS Category	Action #	Action Title
Emergency Services	3	Install a Generator for New High School.
	20	Debris Plan.
Natural Resource Protection	23	Oyster Beds in Seekonk River.
	26	Increase Green Infrastructure Throughout the City.
	27	Acquire and Preserve Open Space along the Moshassuck River.
Preventive	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	2	Increase CRS Rating.
	8	Climate Justice Plan.
	9	Tree inventory and planting.
	11	Heat Island Effect Survey.
	22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
	24	Create a Plan for Renewable Energy in Municipal Buildings.
Preventive / Emergency Services	4	Develop a Long-Term Recovery Plan.

CRS Category	Action #	Action Title
Property Protection	5	Prepare the New Centralized High School to Function as a Shelter.
	13	Develop a Backflow Prevention Valve Rebate Program.
	21	Retrofit City Hall Tower.
Public Information	6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
	7	Hire a Full-Time Resiliency Manager.
	10	Increase Telecommunication Capacity in the City.
Structural Projects	12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
	14	Mitigate Pleasant Street Flooding.
	15	Max Read Field Flood Mitigation Improvements.
	16	Address Stormwater Flooding at the Train Station.
	17	Address Flooding at Armistice Boulevard.
	18	Address Flooding at San Antonio Way.
	19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
	25	Evaluate and Upgrade the Five Pump Stations.

4.5. SELECTION AND PRIORITIZATION OF MITIGATION ACTIONS

All the above mitigation categories and actions, including their pros and cons and applicability for Pawtucket and Central Falls, were discussed by the LPT. The identification, evaluation, and selection of specific mitigation actions for each City's Mitigation Action Plan were carefully considered and discussed through multiple means including multiple LPT and open public meetings, and individual discussions with and feedback from municipal staff. They were also heavily based on the issues or problems identified through the findings and conclusions resulting from the Hazard Analysis and Risk Assessment (Appendix A) and Capability Assessment (Appendix B).

The LPT then had the job to create a cost-effective mitigation action plan that included projects to address the identified hazards, areas of risk and vulnerable assets. An online Mitigation Action Tracker was developed for the Cities to track the implementation of each mitigation action. The Mitigation Action Tracker was an online spreadsheet with separate cells showing each action's essential details. These column labels (essential details) listed in Table 7 to facilitate the City's ability to sort through the actions as well as to apply for grant funding.

Table 7. Essential Details for Mitigation Actions.

Essential Details	Detail Description
Action Title	Typically, a short description of the mitigation action.
Action Description	A detailed description of the action that includes the purpose or what natural hazard or problem may be mitigated by implementing the mitigation action.

Essential Details	Detail Description
Action Leader	A position in City government responsible for implementing the action.
Supporting Organizations	A possible list of supporting partners, these may be City departments, regional organizations, state agencies or adjacent communities.
Potential Funding Source(s)	A list of possible grant sources or the location in the City's budget for the funding necessary to implement the mitigation action.
Implementation Schedule	A timeline within 5 years (the life of the plan) that the City hopes to implement the action.
Estimated Cost	An estimated cost designated as high, medium, or low. The City considered these cost "buckets" because it is impossible to identify an exact cost for each mitigation action.
Hazard(s) Addressed	All the natural hazards that the action may mitigate are listed.

The priority order was chosen based on weighing costs versus benefits. It was imperative for each City to determine if the costs associated with an action were reasonable compared to the corresponding benefits. To do this, the LPT developed a prioritization table that included nine categories of criteria; these are detailed in the table below. Each category was assigned points with priority criteria given the highest points. The most points an action could earn was 24. This prioritization system is substantially more detailed than the one used in the previous mitigation plan. The LPT chose this system because it more thoroughly weighs benefits vs. costs.
Actions that scored 16 points or higher were ranked as High priority. Actions that scored between 13-15 points were considered Medium, and actions that scored under 12 points were considered low priority.

Table 8. Prioritization Criteria for Mitigation Actions.

	Criteria Category	Description	Detailed Ranking and Associated Points
1	Hazards Addressed	What level of hazards does the measure provide protection against?	High (Coastal Storms, Extreme Temperatures, Fire, Urban/Flash Flood, Severe Weather) = 3 Medium (Severe Winter Storm, Riverine Flood, Infectious Disease) = 2 Low (Dam Failure, Earthquake, Sea Level Rise, Coastal Flood) = 1
2	Approximate Cost	How much will the measure cost to implement?	Low (Under $25k) = 3 Medium ($25k - $250k) = 2 High over $250k) = 1
3	Internal Capacity	Does the measure require a significant commitment of staff capacity or resources for operation and maintenance?	Low Resource Commitment= 2 Medium Resource Commitment= 1 High Resource Commitment = 0
4	Implementation Timeline	How long will it take for the measure to convey its benefits from the start of implementation efforts?	1-2 Years= 3 3-4 Years= 2 5 or More Years= 1

	Criteria Category	Description	Detailed Ranking and Associated Points
5	Equity Focus	Does the measure provide support to Environmental Justice (EJ) and other Vulnerable Populations?	Direct Support = 3 Indirect Support = 2 No Support = 0
6	Protection of Lives	How effective is the measure in protecting lives and mitigating injuries resulting from the targeted hazard(s)?	Direct Support = 3 Moderate Indirect Support = 2 Minor Indirect Support = 1 None = 0
7	Protection of Critical Facilities or Infrastructure	Does the measure provide protection of critical facilities and infrastructure?	Yes = 3 No = 0
8	Natural Resource Protection	Does the measure provide protection of natural resources?	Yes = 2 No = 0
9	Alignment with Objectives	Does the measure align with the HMP objectives?	Yes =2 No =0

4.6. MITIGATION ACTION PLAN (MAP)

C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

This Mitigation Action Plan (MAP) lists all mitigation actions for the Cities of Pawtucket and Central Falls for implementation during the 2024-2029 planning cycle. Each City has their own list. The MAP has been designed to address the established goals of this plan (Section 4.2), and they are focused on those hazards and vulnerabilities presenting the highest potential threats to the planning area as determined through the Hazard Analysis and Risk Assessment (Appendix A). Mitigation actions are also based on each City's existing local capability as described in the Capability Assessment (Appendix B). The MAP will be maintained on a regular basis according to the plan maintenance procedures established in Section 5.
Below are the tables of mitigation actions for each City. The mitigation actions are listed in in order of priority with the action's essential details.

Table 9. City of Central Falls Mitigation Actions.

1	**Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.**	
High	**Action Description**	Hire a Sustainability Officer to manage implementation of the Central Falls Climate Action Plan. Create a Climate Action Task Force to ensure a range of community representation in driving implementation.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Mayor's Office, Department of Planning and Economic Development, Office of Health and Constituent Services
	Cost	Medium
	Potential Funding Sources	Planning Department Budget
	Hazards	Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood
	Implementation Schedule	2024-2025
2	**Integrate Mitigation into Local Planning.**	
High	**Action Description**	Incorporate risk assessment and hazard mitigation principles into the planning process when updating the City's Comprehensive Plan, specifically when preparing the Future Land Use Map and when meeting the State's requirement to include planning for natural hazards. Update the Zoning Ordinance and Zoning Map to reflect acceptable land uses that will mitigate risks by limiting exposure to potential hazards. Incorporate hazard risk assessment into the City's development and subdivision review process. Ensure natural hazards are considered in all land suitability analyses (LSA).
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development
	Cost	Low
	Potential Funding Sources	RI Housing Municipal Technical Assistance Program ($100,000 grant secured in 2024 for updates to Zoning Ordinance and Development Review Regulations); City's ARPA Funds (Comprehensive Plan Update)

	Hazards	Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2029
3	**Develop capacity to maintain green stormwater infrastructure.**	
High	**Action Description**	Develop a Green Stormwater Infrastructure Operations and Maintenance Program. Prepare a GSI O&M Manual to describe the ongoing operations and maintenance needs of each type of green infrastructure. Determine staffing and equipment needs and costs and whether to perform O&M tasks internally or through contracted services.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Department of Public Works
	Cost	Medium
	Potential Funding Sources	Rhode Island Infrastructure Bank: Municipal Resilience Program, State Revolving Fund
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2026
4	**Establish an ongoing Tree Risk Assessment and Mitigation Program.**	
High	**Action Description**	Perform an initial tree risk assessment and establish a routine to conduct periodic updates to the City's public tree inventory and conditions assessment. Identify areas that have the highest risk of personal injury and damage to infrastructure and properties. Use assessments to target initial and ongoing tree removal and selective pruning to mitigate risk.
	Lead Position	Tree Warden
	Supporting Agencies	Tree Advisory Board, Department of Public Works, Department of Planning and Economic Development
	Cost	Low
	Potential Funding Sources	Rhode Island Infrastructure Bank: Municipal Resilience Program, Department of Public Works Budget, Planning Department Budget
	Hazards	Coastal Storm, Severe Weather, Severe Winter Storm

	Implementation Schedule	2024-2025

5	**Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.**	
High	**Action Description**	Install stormwater infrastructure with sufficient capacity to redirect stormwater runoff and eliminate flooding adjacent to the City-owned athletic complex (site of the new high school) and nearby businesses on Higginson Avenue.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development, Department of Public Works, School District
	Cost	High
	Potential Funding Sources	FEMA/RIEMA: Building Resilient Infrastructure and Communities (BRIC), Hazard Mitigation Grant Program (HMGP); RIDEM: Ocean State Climate Adaptation and Resilience (OSCAR) Fund, Climate Resilience Fund
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2025
6	**Prepare a Sewer/Stormwater Facilities Plan.**	
Medium	**Action Description**	Conduct an inventory and conditions assessment of the City's wastewater, stormwater, and combined sewer infrastructure. Assess the record-keeping and operations in place for routine and emergency maintenance. Prepare a plan for infrastructure upgrades, including phasing, cost estimates, and potential funding sources. Prepare an Operations and Maintenance plan. Prepare a plan and identify funding sources for technology upgrades, including data collection and management, CMMS, and GIS, to improve ongoing operations.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Department of Public Works, Department of Planning and Economic Development
	Cost	High
	Potential Funding Sources	Rhode Island Infrastructure Bank: Clean Water State Revolving Fund
	Hazards	Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Coastal Flood

	Implementation Schedule	2024-2026
7	**Reduce the urban heat island effect.**	
Medium	**Action Description**	Prepare an Urban Forest Master Plan to guide the City's ongoing efforts to increase the tree canopy. Expand efforts to reduce the urban heat island effect by increasing utilization of additional proven methods. Identify funding to provide incentives for installation of green/solar roofs, use of cool roofing products, and installation of solar canopies over parking lots.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Tree Warden, Tree Advisory Board, Department of Planning and Economic Development, City's Fund Developer
	Cost	High
	Potential Funding Sources	Urban Forests for Rhode Island Technical Assistance Program (Participating in 2024), Rhode Island Office of Energy Resources, Rhode Island Infrastructure Bank: Municipal Resilience Program, Rhode Island Infrastructure Bank: Commercial Property Assessed Clean Energy (C-Pace), Rhode Island Infrastructure Bank: Efficient Buildings Fund (EBF)
	Hazards	Extreme Temperatures, Fire
	Implementation Schedule	2024-2026
8	**Provide a heating and cooling center at the El Centro Community Center.**	
Medium	**Action Description**	Include an emergency generator capable of heating and cooling the El Centro Community Center building scheduled to begin construction in 2025. Ensure that building is staffed and equipped to accommodate heating and cooling needs of residents when temperatures reach extreme levels.
	Lead Position	El Centro Program Manager
	Supporting Agencies	City's Office of Constituent Services and Health
	Cost	High
	Potential Funding Sources	FEMA/RIEMA: Building Resilient Infrastructure and Communities (BRIC) and Hazard Mitigation Grant Program (HMGP)
	Hazards	Extreme Temperatures

	Implementation Schedule	2024-2026

9	**Develop standing contracts for disaster cleanup response.**	
Medium	**Action Description**	Execute "pre-contracts" with multiple qualified contractors for disaster cleanup services (e.g., tree removal and pruning, debris removal, landscaping, etc.) prior to a weather event to minimize response times and costs. Prepare specifications and issue requests for proposals in accordance with FEMA guidance and the City's competitive procurement procedures.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Tree Warden, Department of Public Works, Purchasing Agent, Law Department
	Cost	Low
	Potential Funding Sources	Department of Public Works Budget, City Clerk's Office Budget, Law Department Budget
	Hazards	Coastal Storm, Severe Weather, Severe Winter Storm
	Implementation Schedule	2024-2025
10	**Develop a plan to enforce stormwater regulations.**	
Medium	**Action Description**	Revise plan review checklist to require documentation demonstrating that stormwater management regulations have been met. Establish a Technical Review Committee (TRC) that will include an engineer qualified to review stormwater requirements, calculations, and drainage plans. Revise plan review procedures to require TRC review. Ensure that approved stormwater plans are included in building permit application review.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development; Code Enforcement
	Cost	Low
	Potential Funding Sources	Rhode Island Housing: Municipal Technical Assistance Program ($100,000 grant secured in 2024 for updates to Zoning Ordinance and Development Review Regulations)
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2025

11	**Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.**	
Medium	**Action Description**	Update website and social media with current mitigation information.
	Lead Position	Preparedness Officer
	Supporting Agencies	Pawtucket/Central Falls Emergency Management Agency, Mayor's Office (Communications)
	Cost	Low
	Potential Funding Sources	Planning Department Budget
	Hazards	Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2029
12	**Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.**	
Medium	**Action Description**	Observations during and immediately following recent severe rainfall events suggest that flooding of residential properties and streets is caused by inflow of water from the river to catch basins when water levels rise above outfall. Inspect the drainage infrastructure to confirm proper functioning during normal conditions. Determine which actions (e.g. backflow preventers, increased storage capacity, new drainage, culverts, etc.) will reduce the water collection on the affected streets. Identify funding sources and perform the corrective action needed to upgrade the infrastructure on the flood affected streets.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Department of Public Works, Department of Planning and Economic Development
	Cost	High
	Potential Funding Sources	Rhode Island Infrastructure Bank: Municipal Resilience Program, State Revolving Fund; FEMA/RIEM Hazard Mitigation Grant Program, BRIC
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood

	Implementation Schedule	2024-2026

13	**Implement the Sewer/Stormwater Facilities Plan.**	
Medium	**Action Description**	Repair and replace the City's wastewater, stormwater, and combined sewer infrastructure as needed in accordance with the Facilities Plan. Implement the Operations and Maintenance Plan.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Department of Public Works
	Cost	High
	Potential Funding Sources	Rhode Island Infrastructure Bank: Clean Water State Revolving Fund
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2027
14	**Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.**	
Low	**Action Description**	Use nature-based solutions and other methods as needed to protect the unique natural habitat, walking trail, camp site, playground, and outdoor education facility from the increasingly destructive riverine flooding of the Blackstone River following severe rainfall events.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development, Department of Public Works, Purchasing Agent, Law Department, Groundwork RI, Tree Warden
	Cost	Medium
	Potential Funding Sources	Rhode Island Infrastructure Bank: Municipal Resilience Program; RIDEM: Ocean State Climate Adaptation and Resilience (OSCAR) Fund, Climate Resilience Fund; FEMA/RIEMA: Building Resilient Infrastructure and Communities (BRIC), Hazard Mitigation Grant Program (HMGP)
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2026

15	**Protect Critical Facilities and Equipment.**	
Low	**Action Description**	Installing lightning protection devices and methods, such as lightning rods and grounding, on communications infrastructure and other critical facilities; Installing and maintaining surge protection on critical electronic equipment.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Department of Public Works
	Cost	Medium
	Potential Funding Sources	Department of Public Works Capital Budget
	Hazards	Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2025-2029
16	**Increase green stormwater infrastructure throughout the City.**	
Low	**Action Description**	Conduct a Citywide assessment to identify locations for green stormwater infrastructure in the public right-of-way, publicly owned properties, and privately-owned properties. Prepare and adopt a community-wide stormwater management master plan (to be done in coordination with Action #7, Prepare a Sewer/Stormwater Facilities Plan). Revise Plan Review procedures to ensure that opportunities to include green stormwater infrastructure are considered in plans for proposed development projects.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development, Department of Public Works
	Cost	Medium
	Potential Funding Sources	Rhode Island Infrastructure Bank: Municipal Resilience Program, Narragansett Bay Commission
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2026

17	**Improve energy efficiency and increase use of renewable energy at City-owned properties.**	
Low	**Action Description**	Conduct an energy audit of all City-owned properties to assess energy use and identify waste and inefficiencies. Create plan to reduce waste. Identify locations where renewable energy infrastructure could be installed (e.g., rooftops, solar canopies, EV charging stations).
	Lead Position	Department of Public Works Director
	Supporting Agencies	Department of Public Works, Central Falls School District, Department of Planning and Economic Development
	Cost	Medium
	Potential Funding Sources	Rhode Island Office of Energy Resources, Rhode Island Infrastructure Bank: Municipal Resilience Program, Rhode Island Infrastructure Bank: Commercial Property Assessed Clean Energy (C-Pace), Rhode Island Infrastructure Bank: Efficient Buildings Fund (EBF)
	Hazards	Extreme Temperatures
	Implementation Schedule	2025-2029
18	**Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.**	
Low	**Action Description**	Conduct an annual review of the City Floodplain Ordinance, part of the Building Code Ordinance, to ensure consistency with floodplain regulations and mapping, and to ensure that regulations and ordinance meet current needs and expected conditions.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development, Code Enforcement
	Cost	Low
	Potential Funding Sources	Planning Department Budget
	Hazards	Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood
	Implementation Schedule	2025-2029

19	**Increase capacity to use GIS to meet hazard mitigation needs.**	
Low	**Action Description**	Increase the ability to incorporate GIS into hazard mitigation planning, analysis of incidents and potential risks, and implementation of hazard mitigation actions. Consider the costs and benefits of building staff capacity compared to hiring consulting services. Consult with the City of Pawtucket to consider the feasibility of including GIS-related tasks for hazard mitigation as a shared service, similar to the shared EMA Director and Building and Zoning Official.
	Lead Position	Planning & Economic Development Director
	Supporting Agencies	Department of Planning and Economic Development
	Cost	Medium
	Potential Funding Sources	Rhode Island Dept of Housing Municipal Fellows; Rhode Island Housing: Municipal Technical Assistance Program
	Hazards	Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2025-2028

Table 10. City of Pawtucket 2024 Mitigation Actions.

1	**Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.**	
High	**Action Description**	Hire a Sustainability Officer to manage implementation of the Central Falls Climate Action Plan. Create a Climate Action Task Force to ensure a range of community representation in driving implementation.
	Lead Position	Planning Director
	Supporting Agencies	Planning Department
	Cost	Medium
	Potential Funding Sources	Rhode Island Office of Energy Resources, EPA Environmental and Climate Justice Community Change Grant Program
	Hazards	Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood

	Implementation Schedule	2024-2025
2	**Increase CRS Rating.**	
High	**Action Description**	The City will continue to enhance its floodplain management capabilities and activities to achieve a higher class rating under FEMA's Community Rating System (CRS). While currently a Class 8 community, the City can achieve a higher class through the implementation of more credible activities, which would translate into higher premium discounts for NFIP policyholders throughout the community.
	Lead Position	Planning Director
	Supporting Agencies	Pawtucket/Central Falls Emergency Management Agency
	Cost	Low
	Potential Funding Sources	FEMA FMA
	Hazards	Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood.
	Implementation Schedule	2024-2028
3	**Install a Generator for New High School.**	
High	**Action Description**	Install backup generator during construction/development of new high school. There is currently no public building in Pawtucket that can act as an emergency shelter because none have generators.
	Lead Position	Pawtucket EMA Director
	Supporting Agencies	School Department, Planning Department
	Cost	Very High
	Potential Funding Sources	FEMA BRIC
	Hazards	Coastal Storm, Extreme Temperatures, Severe Weather, Severe Winter Storm, Earthquake, Coastal Flood
	Implementation Schedule	2027-2028

4	**Develop a Long-Term Recovery Plan.**	
High	**Action Description**	Development LTRP in order to prepare for the aftermath of potential hazards or extreme weather events. (former description: The City should continue to improve disaster resiliency. In the event of an emergency - once critical life and safety issues and vital public services have been reestablished, emphasis should be placed on the long-term recovery of the community, balancing the need to rebuild rapidly and return to normal against the objective of building back in a more resilient manner. Collaboration on a Regional Recovery and Reconstruction Ordinance could identify/facilitate resource and cost-sharing opportunities, as well as higher utilization of municipal services to those areas within the region most in need.)
	Lead Position	Pawtucket EMA Director
	Supporting Agencies	Planning Department, RIEMA
	Cost	Medium
	Potential Funding Sources	FEMA BRIC
	Hazards	Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood
	Implementation Schedule	2025-2026

5	**Prepare the New Centralized High School to Function as a Shelter.**	
High	**Action Description**	Centralized High School construction; Residents voted in 2022 to approve bond funding for the construction of a new unified high school with modern and innovative facilities for students. The new school could function as a shelter.
	Lead Position	School Superintendent
	Supporting Agencies	School Committee, Department of Public Works
	Cost	Very High
	Potential Funding Sources	City bond Fund, FEMA BRIC
	Hazards	Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood
	Implementation Schedule	2027-2028
6	**Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.**	
High	**Action Description**	Update website and social media with current mitigation information.
	Lead Position	Preparedness Officer
	Supporting Agencies	Pawtucket/Central Falls Emergency Management Agency
	Cost	Low
	Potential Funding Sources	Planning & DPW funding; RIFMA educational materials
	Hazards	Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2029

7	**Hire a Full-Time Resiliency Manager.**	
High	**Action Description**	Create new full-time position in the City to manage climate resiliency initiatives.
	Lead Position	DPW Director
	Supporting Agencies	Department of Public Works, Planning Department
	Cost	Medium
	Potential Funding Sources	USDA Forest Service Forestry Grant (SPTF)
	Hazards	Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2028
8	**Climate Justice Plan.**	
High	**Action Description**	Create a Climate Justice Plan for creating an equitable, low-carbon, and resilient future with a focus on Environmental Justice
	Lead Position	Planning Director
	Supporting Agencies	Department of Public Works
	Cost	Low
	Potential Funding Sources	FEMA BRIC grant, RIEMA technical assistance grant
	Hazards	All hazards
	Implementation Schedule	2024-2028

9	**Tree inventory and planting.**	
High	**Action Description**	Conduct a tree inventory in the City and identify areas to plant additional trees for adding to the canopy, reducing heat island, and implementing additional green infrastructure systems.
	Lead Position	DPW Director
	Supporting Agencies	Planning Department
	Cost	Medium
	Potential Funding Sources	USDA Forest Service Forestry Grant (SPTF)
	Hazards	Extreme Temperatures, Severe Weather, Riverine Flood
	Implementation Schedule	2024-2028
10	**Increase Telecommunication Capacity in the City.**	
Medium	**Action Description**	The City will work with telecommunication companies in the City to decrease areas without cell or internet service and provide reliable connectivity city-wide. This will allow vulnerable populations to access hazard mitigation resources.
	Lead Position	Commerce Director
	Supporting Agencies	
	Cost	Medium
	Potential Funding Sources	Commerce funding, private company incentives
	Hazards	Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood
	Implementation Schedule	2024-2028

11	**Heat Island Effect Survey.**	
Medium	**Action Description**	Perform study to survey heat island effects to determine areas that are most in need of additional tree canopy, reduction of pavement, etc.
	Lead Position	Planning Director
	Supporting Agencies	Department of Public Works
	Cost	Low
	Potential Funding Sources	FEMA BRIC grant, RIEMA technical assistance grant
	Hazards	Extreme Temperatures
	Implementation Schedule	2024-2028
12	**Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.**	
Medium	**Action Description**	Installation of underground overflow tanks in the areas subject to the most severe flooding. Because the City is so densely developed, in most areas there is no land to purchase to assist with the flood abatement by using retention ponds and the underground overflow tanks are the only feasible option.
	Lead Position	DPW Director
	Supporting Agencies	
	Cost	Medium
	Potential Funding Sources	RIDEM or EPA Stormwater/Resiliency Grant
	Hazards	Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood.
	Implementation Schedule	2025- 2028

13	**Develop a Backflow Prevention Valve Rebate Program.**	
Medium	**Action Description**	Reestablish the rebate program to encourage residents to install backflow prevention valves. The City has a very popular rebate program for private property owners to install backflow prevention valves. The source of rebate funding expired but many residents have continued to express interest in the program.
	Lead Position	DPW Director
	Supporting Agencies	
	Cost	Medium
	Potential Funding Sources	EPA Green Infrastructure Grant
	Hazards	Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Coastal Flood
	Implementation Schedule	2026-2028
14	**Mitigate Pleasant Street Flooding.**	
Medium	**Action Description**	Replace 24" sewer with larger line to prevent flooding and to maintain water quality.
	Lead Position	DPW Director/Project Lead/City Engineer
	Supporting Agencies	
	Cost	Very High
	Potential Funding Sources	EPA Green Infrastructure Grant, FEMA BRIC, RIEMA Flood Mitigation Assistance
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2027-2028

15	**Max Read Field Flood Mitigation Improvements.**	
Medium	**Action Description**	SSO needs to be installed due to capacity and short duration, extreme rainfall.
	Lead Position	DPW Director/City Engineer
	Supporting Agencies	
	Cost	Very High
	Potential Funding Sources	EPA Green Infrastructure Grant, FEMA BRIC, RIEMA Flood Mitigation Assistance
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2027-2028
16	**Address Stormwater Flooding at the Train Station.**	
Medium	**Action Description**	stormwater utility
	Lead Position	Planning Director
	Supporting Agencies	
	Cost	Very High
	Potential Funding Sources	EPA Green Infrastructure Grant, FEMA BRIC, RIEMA Flood Mitigation Assistance
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2027-2028

17	**Address Flooding at Armistice Boulevard.**	
Medium	**Action Description**	SSO needs to be installed due to capacity and short duration, extreme rainfall. Need to continue separate sewer and drain line down the remainder of Armistice BLVD (DOT did partial).
	Lead Position	DPW Director/City Engineer
	Supporting Agencies	We would have to continue separate sewer and drain line down the remainder of Armistice BLVD (DOT did partial)
	Cost	Very High
	Potential Funding Sources	EPA Green Infrastructure Grant, FEMA BRIC, RIEMA Flood Mitigation Assistance
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2027-2028
18	**Address Flooding at San Antonio Way.**	
Medium	**Action Description**	Flooding has occurred during high intensity, short duration storms. The City plans to identify methods and means, then implement, flooding mitigation measures.
	Lead Position	DPW Director/City Engineer
	Supporting Agencies	Rhode Island Infrastructure Bank: Municipal Resilience Building Program, RIDEM
	Cost	High
	Potential Funding Sources	EPA Green Infrastructure Grant, FEMA BRIC, RIEMA Flood Mitigation Assistance
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2027-2028

19	**Regrade and Prevent Flooding at Slater Park North Parking Lot.**	
Medium	**Action Description**	Grant to regrade parking lot and add bioretention area to prevent future flooding and assist in stormwater mitigation
	Lead Position	DPW Director/City Engineer
	Supporting Agencies	Rhode Island Infrastructure Bank: Municipal Resilience Building Program, RIDEM
	Cost	High
	Potential Funding Sources	Environmental Protection Agency: Green Infrastructure Grants
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2024-2025
20	**Debris Plan.**	
Medium	**Action Description**	Create a Debris Plan to remove and/or store debris city-wide in accordance with FEMA regulations.
	Lead Position	Pawtucket EMA Director
	Supporting Agencies	Department of Public Works, RIEMA
	Cost	Low
	Potential Funding Sources	FEMA BRIC grant
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Earthquake
	Implementation Schedule	2025-2028

21	**Retrofit City Hall Tower.**	
Low	**Action Description**	Retrofit tower at City Hall to mitigate high wind risk. The architecture of City Hall leaves the tower open to damage from high winds and major storm events.
	Lead Position	DPW Project Lead
	Supporting Agencies	National Historic Preservation
	Cost	Very High
	Potential Funding Sources	National Historic Grant
	Hazards	Coastal Storm, Severe Weather, Severe Winter Storm
	Implementation Schedule	2024-2025
22	**Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.**	
Low	**Action Description**	Identify funding opportunities or local regulations to facilitate camera monitoring of sewer line capacity. Many sewer lines in the City are over 150 years old. It is far too expensive to replace all lines and update the entire City (99% of the City is on the municipal system). It has also proven costly to wait and fix areas as they give out or break. It is far more cost effective to find the weakest areas of the system and repair/replace them before they fail. The City will also explore the ability to use flexible replacement plumbing or system components to mitigate risks of underground disturbance.
	Lead Position	DPW Director/City Engineer
	Supporting Agencies	Environmental Protection Agency
	Cost	Very High
	Potential Funding Sources	EPA Community Grants Program
	Hazards	Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Earthquake, Sea Level Rise, Coastal Flood.
	Implementation Schedule	2024-2028

23	**Oyster Beds in Seekonk River.**	
Low	**Action Description**	Support installation of oyster beds in the Seekonk River to help mitigate tidal flooding, river bank erosion, and storm surge effects. Will also be re-populating shellfish populations.
	Lead Position	Blackstone Valley Tourism Council
	Supporting Agencies	Planning Department
	Cost	Medium
	Potential Funding Sources	RIDEM Resiliency Grant
	Hazards	Coastal Storm, Severe Weather, Riverine Flood
	Implementation Schedule	2024-2028
24	**Create a Plan for Renewable Energy in Municipal Buildings.**	
Low	**Action Description**	Map out existing energy use in municipal buildings. Create plan to reduce energy use and increase renewable energy installations in the City on municipal buildings and parking lots to reduce impacts of climate change.
	Lead Position	Planning Director
	Supporting Agencies	Rhode Island Infrastructure Grant Program
	Cost	Low
	Potential Funding Sources	Rhode Island Infrastructure Bank: Municipal Resilience Building Program for existing use survey and plan, Rhode Island Commerce Renewable Energy Fund for project implementation
	Hazards	Coastal Storm, Extreme Temperatures, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level rise, Coastal Flood
	Implementation Schedule	2024-2028

25	**Evaluate and Upgrade the Five Pump Stations.**	
Low	**Action Description**	Evaluation and upgrades of 5 pump stations to mitigate risk of power outages and flooding which could lead to sewer backups.
	Lead Position	DPW Director/City Engineer
	Supporting Agencies	
	Cost	Very High
	Potential Funding Sources	Sewer Bond
	Hazards	Coastal Storm, Extreme Temperatures, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Earthquake, Sea Level Rise, Coastal Flood
	Implementation Schedule	2024-2026
26	**Increase Green Infrastructure Throughout the City.**	
Low	**Action Description**	The City shall identify and prioritize investments in nature-based solutions to mitigate natural hazards and a changing climate, including the use of green infrastructure (bioswales, rain gardens, permeable pavement, tree plantings, green/blue roofs, water squares, etc.) that reduce impervious surface coverage and provide multiple co-benefits for the community that go beyond risk reduction. These techniques should be applied to all future infrastructure improvements to help protect the City from the impacts of a changing climate including increased heavy downpours and flood events, as well as extreme heat.
	Lead Position	Department of Public Works Director
	Supporting Agencies	Planning Department
	Cost	High
	Potential Funding Sources	Environmental Protection Agency: Green Infrastructure Grants
	Hazards	Coastal Storm, Extreme Temperatures, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level rise, Coastal Flood
	Implementation Schedule	2024-2028

27	**Acquire and Preserve Open Space along the Moshassuck River.**	
Low	**Action Description**	To reduce future flood losses and preserve the natural and beneficial functions of adjacent floodplains, the City will seek to acquire and preserve additional open space for riparian areas along the Moshassuck River.
	Lead Position	Planning Director
	Supporting Agencies	Department of Public Works
	Cost	Very High
	Potential Funding Sources	NOAA grant, RIDEM Brownfields Remediation Grant
	Hazards	Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood
	Implementation Schedule	2024-2028

Additional tables are included in Appendix C. The breakdown of priority ranking points for each action is included in Appendix C. Readers of this plan must understand that the mitigation action list is aspirational, it does not mean that the LPT is confident that all actions may be implemented in the span of five years.

Action #	Action Title
1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
8	Provide a heating and cooling center at the El Centro Community Center.
11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.

Table 12 9 and 10 show the mitigation actions that specifically target vulnerable populations in each City. Tables 11 and 12 show actions that specifically target buildings and infrastructure each City. Each table lists the actions in order of priority.

Table 11. City of Central Falls Mitigation Actions that Target Vulnerable Populations.

Action #	Action Title
1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
8	Provide a heating and cooling center at the El Centro Community Center.
11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.

Table 12. City of Pawtucket Mitigation Actions that Target Vulnerable Populations.

Action #	Action Title
1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
3	Install a Generator for New High School.
5	Prepare the New Centralized High School to Function as a Shelter.
6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
8	Climate Justice Plan.
9	Tree inventory and planting.
10	Increase Telecommunication Capacity in the City.
11	Heat Island Effect Survey.

Table 13. City of Central Falls Mitigation Actions that Target Buildings and Infrastructure.

Action #	Action Title
5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.
7	Reduce the urban heat island effect.
8	Provide a heating and cooling center at the El Centro Community Center.
9	Develop standing contracts for disaster cleanup response.
12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
13	Implement the Sewer/Stormwater Facilities Plan.
15	Protect Critical Facilities and Equipment.
16	Increase green stormwater infrastructure throughout the City.

Table 14. City of Pawtucket Mitigation Actions that Target Buildings and Infrastructure.

Action #	Action Title
2	Increase CRS Rating.
3	Install a Generator for New High School.
10	Increase Telecommunication Capacity in the City.
12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
13	Develop a Backflow Prevention Valve Rebate Program.
14	Mitigate Pleasant Street Flooding.
15	Max Read Field Flood Mitigation Improvements.

Action #	Action Title
16	Address Stormwater Flooding at the Train Station.
17	Address Flooding at Armistice Boulevard.
18	Address Flooding at San Antonio Way.
19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
21	Retrofit City Hall Tower.
22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
24	Create a Plan for Renewable Energy in Municipal Buildings.
25	Evaluate and Upgrade the Five Pump Stations.

Possible Funding Sources

All the mitigation actions included in this plan have identified one or more potential funding sources. The LPT focused on projects eligible for Municipal Resilience Program (MRP) Grant funding and FEMA Hazard Mitigation Assistance funding. Below is a list of some of the federal and state funding mechanisms that may assist in implementing mitigation actions. There are additional Federal funding sources mentioned in FEMA's Mitigation Resource Guide.

Federal Emergency Management Agency (FEMA) Mitigation Grants

The Federal Emergency Management Agency (FEMA) makes grant funding available for a range of mitigation activities via several Hazard Mitigation Assistance (HMA) programs. These grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. They are not intended to fund repair, replacement, or deferred maintenance activities but are rather designed to assist in developing long-term, cost-effective improvements that will reduce risk to natural hazards.

- **Building Resilient Infrastructure and Communities (BRIC)**
  BRIC is a new FEMA hazard mitigation program designed to replace the agency's former HMA Pre-Disaster Mitigation (PDM) grant program, aiming to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. It is a result of recent amendments made to Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) by Section 1234 of the Disaster Recovery Reform Act of 2018 (DRRA). BRIC will support states, local communities, tribes, and territories as they undertake hazard mitigation projects reducing the risks they face from natural hazards. The BRIC program's guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.
- **Hazard Mitigation Grant Program (HMGP)**
  The HMGP is authorized under Section 404 of the Stafford Act. The HMGP provides grants to states, tribes, and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the

immediate recovery from a disaster. A key purpose of the HMGP is to ensure that any opportunities to take critical mitigation measures to protect life and property from future disasters are not lost during the recovery and reconstruction process following a disaster. HMGP is typically available only in the months after a federal disaster declaration, as funding amounts are determined based on a percentage of the funds spent on FEMA's Public and Individual Assistance programs.

- **Flood Mitigation Assistance (FMA) Program**
  The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the NFIP. FEMA provides FMA funds to assist states and communities with implementing measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the NFIP. The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities. One limitation of the FMA program is that it is generally used to provide mitigation for structures that are insured or located in Special Flood Hazard Areas (SFHAs) as mapped by FEMA. Federal funding for this nationally competitive grant program is generally an annual allocation (subject to Congressional appropriation) and eligibility is linked to a community's good standing in the NFIP.

State Funding Programs[27]

The Rhode Island Investment Bank's Municipal Resilience Program provides direct support to cities and towns to complete a municipal-driven workshop process that brings together climate change information and local knowledge to identify top hazards, current challenges, and community strengths. This process identifies priority projects and strategies to improve the municipality's resilience to all natural and climate-related hazards. Upon successful completion of a Municipal Resilience Program workshop, municipalities are designated as Resilient Rhody Municipalities and can apply for Municipal Resilience Program Action Grants for projects identified through the workshop process. The projects must improve climate resilience and result in design, engineering, and/or construction actions. Types of projects that can receive grant funding include:

- Dam retrofits or removal
- Road elevation
- Floodproofing or elevation of pump stations, berms, and levies
- Culvert resizing
- Green stormwater infrastructure
- Solar and battery back-up power
- Energy efficiency
- Watershed restoration
- Urban tree planting

[27] 2024 RI Hazard Mitigation Plan, page 339.

- Coastal and riparian resilience

Municipalities will be required to match grants with a 25% local project cost share. The Grants are not available for research-related activities.

The **RI READY** program is a statewide industrial site readiness initiative designed to prepare sites to achieve pre-permitted status. This program provides access to an array of services designed to create an inventory of pre-permitted properties ready for industrial development throughout the State. State investment is recaptured to the extent possible to make the initiative self-sustaining and extend the life of available funds. The RI READY program leverages the Quonset Development Corporation, a quasi-state agency which partners with both Rhode Island Commerce and municipalities and/or private parties to spur development activity throughout the state. Site-readiness awards are made in two categories, site-specific improvements, and municipal assistance. Site-specific improvements include site planning and pre-development activities and project improvements. Projects intended to catalyze growth in advanced industry clusters, regardless of project size, are prioritized. Municipal Assistance awards are for developing projects that will lead to further growth and support the municipality's development goals.

The Department of Environmental Management administers the **Climate Resilience Fund** to implement climate resilience projects for climate-driven challenges facing Rhode Island communities, both inland and coastal. Grants provide funding for projects that support restoring and improving the climate resilience of vulnerable coastal habitats, river and stream floodplains, and related habitat and are available to both local governments and non-profits. Grant recipients will be required to match grants with a 25% local project cost share.

The Department of Environmental Management **Wastewater Treatment Facility Resilience Fund** provides funding to municipalities and/or quasi-state entities to protect government-owned wastewater collection systems and treatment facilities against the effects of climate change and flooding. Wastewater Treatment Facility Resilience Fund projects harden, relocate, repair, or replace, and/or provide redundancy infrastructure at these wastewater treatment facilities. Approximately $5,000,000 has been awarded.

The Department of Environmental Management Each Division of Forest Environment manages the **Volunteer Fire Assistance Grant Program**. The program is funded through the US Department of Agriculture, Forest Service. The objective of the program is to improve the capacity and capability of fire departments in rural areas and rural communities (a population of 10,000 or less) to prevent and suppress wildfires. Applicants can request from $1,000 - $2,500 in grant funds, with a 50/50 match requirement.

The Office of Housing and Community Development administers the **State Community Development Block Grant** program, intended to develop viable communities by providing decent housing, expanding economic opportunities, and creating suitable living environments. The Office of Housing and Community Development manages the program for 33 Rhode Island municipalities, with the cities of Cranston, East Providence, Pawtucket, Providence, Warwick, and Woonsocket operating their own programs. Grant funding supports housing, economic development, facilities/improvements, services, and planning projects, with a priority placed on housing, economic development, and neighborhood revitalization. By regulation, the State may

only distribute funds to units of general local government. These communities may, however, distribute funds to non-profit and other entities to undertake eligible activities.
Rhode Island Historical Preservation and Heritage Commission manages the **State Historic Preservation Grant Program**. Projects under this program fund capital preservation for renovation projects at public historic sites, museums, and cultural art centers located in historic structures in the State of Rhode Island. The State Preservation Grants Program is a matching grant program that promotes careful planning for the restoration, rehabilitation, and preservation of a variety of historic resources around the state. Through its matching requirements, the program stimulates broader support and participation in historic preservation projects statewide.

SECTION 5. PLAN MAINTENANCE

The Plan Maintenance section outlines how the plan will be implemented, monitored, evaluated, and enhanced over time. This section also discusses how the public will continue to be involved in the hazard mitigation planning process. It consists of the following three subsections:

5.1. Continued Public Involvement

5.2. Monitoring, Evaluation, and Enhancement

5.3. Plan Implementation and Integration

5.1. CONTINUED PUBLIC INVOLVEMENT

D1. Is there discussion of how each community will continue public participation in the plan maintenance process? (Requirement 44 CFR § 201.6(c)(4)(iii))

Public participation is an integral component of the mitigation planning process and will continue to be essential as this plan evolves and is updated over time.
The most appropriate and meaningful opportunity for the public to be involved in the maintenance and implementation of the Multi-Jurisdiction Hazard Mitigation Plan is during the five-year plan review process. Public engagement in the plan review and update process will be solicited through multiple means and as similarly done for the 2024 plan update process (this includes formal public meetings in addition to other potential engagement activities). While the five-year plan review process represents the greatest opportunity for such involvement, other efforts to involve the public in the maintenance, evaluation, and enhancement process will continue to be made as necessary. These efforts may include but are not limited to the following:

- The City of Pawtucket and the City of Central Falls will invite the public to attend the Local Planning Team (LPT) meetings held in March and October each year.
- Advertising meetings of the LPT in the local newspaper, public bulletin boards, social media outlets, Cable Access TV, and/or City office buildings.
- Designating willing citizens and private sector representatives as official members of the LPT.
- Working with children through existing school programs and other appropriate means to engage children, parents, and other adults.
- Utilizing local media to update the public of any maintenance and/or periodic review activities taking place.
- Utilizing City websites to advertise any maintenance and/or periodic review activities taking place.
- Maintaining copies of the plan in city halls, libraries, and/or other appropriate venues.
- Posting annual progress reports on the plan to City websites.

5.2. MONITORING, EVALUATION, AND ENHANCEMENT

D2. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)? (Requirement 44 CFR § 201.6(c)(4)(i))

***MONITORING** means tracking the implementation of the plan over time.*

***EVALUATING** means assessing the effectiveness of the plan at achieving its stated purpose and goals.*

Monitoring, evaluating, and enhancing the Multi-Jurisdiction Hazard Mitigation Plan are important steps in maintaining an effective document. Periodic revisions and updates of the plan may be required to ensure that the goals of the plan are kept current, considering potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the plan is in full compliance with applicable federal, state, and local regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to the Mitigation Action Plan included in Section 4. As such, the Cities of Pawtucket and Central Falls adopt the following specific procedures to support routine plan maintenance and updates:

- The agency with the overall responsibility for monitoring the implementation and effectiveness of the plan is the City of Pawtucket's Department of Planning and Redevelopment in coordination with the combined Emergency Management Agency. To assist in this process, Department staff will routinely update the status of each mitigation action by using the Microsoft Excel-based ***Mitigation Action Tracker*** developed as part of this plan in coordination with other staff from both cities, and specifically those representatives from agencies identified as the lead department for mitigation actions. The Mitigation Action Tracker will help facilitate the routine submission, review, and discussion of status updates on each action on a regular and recurring basis (twice per year at a minimum, but more frequently as needed).
- The LPT will be the primary advisory body for plan implementation and will reconvene twice per year for a **plan review in March and October**. The LPT will also reconvene following any disaster events warranting a re-examination of the mitigation actions being implemented or proposed as new activities (further described under *Post-Disaster Plan Review and Update*). This will ensure that the plan is continuously updated to reflect changing conditions and needs within the planning area, and to discuss mitigation goal progress. These plan review meetings should take place in March and October of each year so that sufficient time is available for both cities to assess the status of any mitigation actions relevant to the upcoming year and in advance of local budget processes, so that any locally funded projects or activities may be considered. The City of Pawtucket will extend an invitation to the Rhode Island Emergency Management Agency (RIEMA), thirty days prior to each meeting. The public will also be invited to each meeting. The membership on the LPT may change from year to year but it will consistently include the following representatives from each City:
    - Mayor or Town Administrator
    - Emergency Manager

- Director of DPW
- Fire Chief
- Planning Department
- Finance Department
- Floodplain Manager

Following each semi-annual meeting, copies of the minutes will be sent to RIEMA within thirty days, outlining the progress on mitigation goals along with any other pertinent information for their awareness.

- Within 2 months following the annual plan review meeting, an **annual progress report** on the plan will be developed and presented to the Planning Commission and City Council of both cities to report on the status and advancement of actions identified in the plan and to provide information on any updates to relevant legislative requirements. The report may also highlight any proposed additions, amendments, or improvements required for the plan to increase its overall effectiveness. The preparation of the annual progress report should also be coordinated in tandem with annual reporting requirements of the Community Rating System (CRS) as appropriate for the City of Pawtucket.

As part of this monitoring, evaluation and enhancement process, staff from both cities will continue to attend any relevant meetings and/or training workshops sponsored by RIEMA or others as appropriate to keep up to date with any changing guidance or requirements for hazard mitigation plans.

Five-Year Plan Review and Update

> ***UPDATING*** *means reviewing and revising the plan at least once every five years.*

At a minimum, the plan will undergo a comprehensive review, update, and re-adoption every five years as required by federal regulations and per the current planning guidance from RIEMA and FEMA. This review and update process will be overseen by the LPT to determine whether there have been any significant changes in the planning area that may, in turn, necessitate changes to plan content. This includes changes in local hazard risks, mitigation capabilities, or in the types of mitigation actions being implemented. New development in identified hazard areas, an increased exposure to hazards, the increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect changes in the content of the current plan.

The plan review provides City staff and other identified stakeholders with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented. The City of Pawtucket's Department of Planning and Redevelopment will be responsible for reconvening the LPT and conducting the five-year plan review. This includes inquiring with RIEMA on the availability of funding support to assist with the update process at least one year in advance of the process getting underway.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness of the plan and potential improvements:

- Do the current mitigation goals and actions address current and expected conditions?
- Has the nature or magnitude of hazard risks changed?
- Are current resources adequate to implement the plan?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are there any issues that have limited the current implementation schedule?
- Are there implementation problems, such as technical, political, legal, or coordination issues with other agencies?

The National Dam Safety Program Act has authorized FEMA to provide High Hazard Potential Dams (HHPD) Rehabilitation Grant Program assistance for the rehabilitation of dams that do not meet minimum safety standards and pose substantial risk to life and property.[28] Towns and Cities interested in accessing the HHPD grant must have an approved local hazard mitigation plan and meet criteria outlined in Element G: High Hazard Potential Dams. Element G is optional for local governments. While this Plan update did not address Element G requirements, the Cities of Pawtucket and Central Falls will consider adding Element G during the next Plan update. Meeting the requirements of Element G include answering the following questions:

- Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?
- Did the plan address HHPDs in the risk assessment?
- Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?
- Did the plan include actions that address HHPDs, and prioritize mitigation actions to reduce vulnerabilities from HHPDs?

Following the five-year review, any revisions or updates will be summarized and implemented according to the reporting procedures outlined below. Upon completion of the review and update process, the updated plan will be submitted to RIEMA and FEMA for review and approval as required per current plan update requirements.

Reporting Procedures

The results of the five-year plan review will be summarized by the LPT in the relevant sections of the updated plan in accordance with the latest planning guidance from RIEMA and FEMA. This includes the following: a comprehensive description of the plan update process including an evaluation of plan effectiveness (Section 2); any updates to the planning area profile (Section 3); any notable revisions or updates to the hazard analysis and risk assessment (Appendix A) or capability assessment (Appendix B); updated mitigation goals and consideration of mitigation action alternatives, along with status updates on previously adopted mitigation action plans and the identification of newly proposed mitigation actions (Section 4); and revisions or updates to plan maintenance procedures (Section 5).

[28] Local Mitigation Planning Policy Guide, FEMA, Effective April 19, 2023, p.32.

As noted above, the Mitigation Action Tracker will also help both cities assess report on their previously adopted mitigation actions, and when necessary, adjust actions to address current conditions or realities. One of the most important steps in updating the plan will be to revisit, revise, and/or reaffirm the Mitigation Strategy section, particularly considering experiences and insights gained from the implementation of the current plan. The Mitigation Action Tracker will help the LPT to address questions such as those listed below to provide information updated information on the current status of each mitigation action included in the plan.

- If the action was completed, did it have the intended results? Did it achieve the goals outlined in the plan? What factors contributed to success?
- If the action was not completed, what were the barriers to implementation? For instance, was there a lack of political support, funding, staff availability, or another obstacle? Should the action be included in the mitigation strategy for the updated plan?

Post-Disaster Plan Review and Update

Following a state or federal disaster declaration, the LPT will reconvene, and the plan will be revised as necessary to reflect lessons learned or to address specific circumstances arising from the event. In some circumstances it may be necessary for the LPT to convene following localized emergencies and disasters to determine if changes in the plan are warranted. The City of Pawtucket's Director of Planning and the Emergency Management Director will determine on a case-by-case basis which events necessitate convening a meeting to consider modifying the plan, including but not limited to the identification and prioritization of existing mitigation actions. It will be the responsibility of the City of Pawtucket's Department of Planning and Redevelopment to reconvene the LPT and ensure that the appropriate stakeholders are invited to participate in the plan revision and update process.

5.3. PLAN INTEGRATION

D3. Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement 44 CFR § 201.6(c)(4)(ii))

The Cities of Pawtucket and Central Falls are responsible for implementing specific mitigation actions as identified in the Mitigation Action Plan in Section 4 (Mitigation Strategy). While the overall responsibility for plan implementation remains with the City of Pawtucket's Department of Planning and Redevelopment and the joint Emergency Management Agency, each proposed action has been assigned to a specific City department with overall responsibility and accountability for carrying the action out. In addition, a proposed implementation schedule has been assigned to each mitigation action to help drive progress toward completion and to assess whether actions are being implemented in a timely fashion.

Plan implementation will be accomplished by adhering to the schedules identified for each action. In some cases, the completion of an action may be contingent on access to outside funding or other resources, and when applicable, potential funding sources have also been identified. The City of Pawtucket's Department of Planning and Redevelopment and the Emergency Management Agency, in coordination with representatives from applicable lead departments from both cities, will monitor funding opportunities that could be leveraged to implement some of the costlier actions. It will be the responsibility of each lead department to determine additional implementation measures beyond those listed within the Mitigation Action Plan. This includes integrating mitigation actions into other local planning documents, processes, or mechanisms as deemed appropriate and most effective.

For the Cities of Pawtucket and Central Falls to succeed in reducing hazard risks over the long term, the information, ideas, conclusions, and strategic recommendations of this hazard mitigation plan should be integrated throughout their municipal government operations. Effective integration means to include mitigation principles, vulnerability information, and mitigation actions into other existing community planning mechanisms to leverage activities that have co-benefits, reduce risk, and increase resilience. Many other local plans and processes will present opportunities to address hazard mitigation in a way that can support multiple community objectives, so an important part of maintaining and implementing this hazard mitigation plan will be to identify and capitalize on these opportunities to leverage activities that have co-benefits (including but not limited to risk reduction).

> ***INTEGRATE*** *means to include hazard mitigation principles, vulnerability information and mitigation actions into other existing community planning to leverage activities that have co-benefits, reduce risk and increase resilience.*

> ***PLANNING MECHANISMS*** *refers to the governance structures used to manage local land use development and community decision-making, such as budgets, comprehensive plans, capital improvement plans, economic development strategies, climate action plans or other long-range plans.*

The LPT will remain tasked with ensuring that the goals and strategies of new and updated local planning documents are consistent with the goals and actions of the Multi-Jurisdiction hazard mitigation plan and will not contribute to increased hazard vulnerability in the planning area. Opportunities to integrate the requirements of this plan into other local planning mechanisms shall continue to be identified through future meetings of the LPT and through the five-year review process described in this section. Other planning mechanisms include but are not limited to local regulations and existing code enforcement procedures (i.e., zoning bylaws, site plan review, etc.), internal municipal policies, special projects or initiatives, and other routine government or community decision-making activities such as capital improvement planning and each City's annual budget process.

The specific local planning mechanisms where hazard mitigation information/actions may best be integrated include the following as identified and further described in Chapter 5 (Capability Assessment).

Pawtucket:

- Comprehensive Plan
- Zoning Ordinance
- Land Development and Subdivision Regulations
- Capital Improvement Program Ordinance
- Stormwater Management Plan
- Emergency Operations Plan (joint plan with Central Falls)

Central Falls:

- Comprehensive Community Plan
- Climate Action Plan
- Code of Ordinances Chapter 10 (Building and Regulations)
- Zoning Ordinance
- Land Development and Subdivision Review Regulations
- Capital Improvement Plans
- Emergency Operations Plan (joint plan with Pawtucket)

Emphasis for identifying these integration opportunities will be placed on those governance structures used to manage local land use and community development in both the pre-disaster and post-disaster environment. Also, as it relates to implementing specific mitigation actions identified in this plan, it will be the responsibility of each assigned lead department to determine additional measures that can support action completion or enhancement. This includes integrating mitigation actions from this plan into other local planning documents, processes, or mechanisms as deemed appropriate and most effective.

Lastly, while it is recognized that there are many benefits to integrating components of this hazard mitigation plan into other local planning mechanisms, the development and maintenance of this stand-alone plan is still considered by the LPT to be the most effective and appropriate method to identify, prioritize, and implement local hazard mitigation actions. In moving forward, both Cities will consider the incorporation of other plan documents into this plan, such as any future iterations of the joint Municipal Resilience Program (MRP) recommendations, the Central Falls Climate Action Plan, or related climate adaptation planning efforts.

APPENDIX A. HAZARD ANALYSIS AND RISK ASSESSMENT

The Hazard Analysis and Risk Assessment provides an in-depth study of natural hazard risks for Pawtucket and Central Falls. It is presented in the following distinct sections:

A.1 Overview
A.2 Hazard Identification
A.3 Hazard Profiles
A.4 Vulnerability Assessment
A.5 Summary Findings and Conclusions

B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR §201.6(c)(s)(i))

B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does the summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR §201.6(c)(s)(ii))

A.1. OVERVIEW

The purpose of the Hazard Analysis and Risk Assessment is to identify, analyze, and assess the overall risk of the planning area to natural hazards. It helps determine the potential impacts of hazards to the people, economy, and built and natural environments of the two cities as well as specific vulnerabilities or problem areas. It is a critical element that serves as the foundation to the entire mitigation planning process, which is focused on identifying and prioritizing actions to reduce risk to hazards. In addition to informing the Mitigation Strategy included in this plan, the Hazard Analysis and Risk Assessment can also be used to establish local emergency preparedness and response priorities, for land use and community development planning, and for decision making by elected officials, city staff, businesses, and organizations in the community.

The Hazard Analysis and Risk Assessment completed for the cities of Pawtucket and Central Falls builds on available historical data and information on past hazard occurrences, and projections for anticipated future occurrences. It includes hazard-by-hazard profiles for those hazards deemed to pose significant risk, a geospatial-based exposure and risk assessment for those hazards with geographically defined boundaries, and culminates in a hazard risk ranking based on the findings and conclusions about the location, probability, potential impact, warning time, and duration of each hazard. The process is designed to assist each City seek the most appropriate mitigation actions to pursue and implement—focusing efforts on those hazards of greatest concern and those assets facing the greatest risk.

Specific information on the methods and data sources used to complete the Hazard Analysis and Risk Assessment are incorporated throughout this section and will be refined as necessary through future updates to this plan.

Key Updates for 2023

For the 2023 plan update process, emphasis for updating the risk assessment was placed on the following key changes and/or content improvements:

- Incorporating the findings from the 2020 Community Resilience Building Workshop, a community-driven process to assess current hazard and climate change impacts for both Pawtucket and Central Falls.
- Updating the **Previous Occurrences** section for each hazard profile with any notable hazard events that occurred since the previous plan was adopted in 2018.
- Updating the **Probability of Future Events** section for each hazard profile to reflect the anticipated effects of future conditions, including climate change, on the frequency, location, and severity of identified hazards. The stand-alone section on *Natural Hazards and the Anticipated Effects of a Changing Climate* has also been updated based on new data and findings from the latest National Climate Assessment and climate change information provided by the State of Rhode Island.
- Updating the analysis and classification levels assigned to each hazard for the **Priority Risk Index (**PRI) and final **Hazard Rankings** based on updated data, technical information, and input provided by the Local Planning Team.
- Adding a **Vulnerability Summary** that summarizes the key hazard challenges or concerns for the planning area, including specific "problem statements" designed to help with the identification, evaluation, and prioritization of new/revised mitigation actions.

Additional revisions and/or data updates to other elements of the risk assessment were made as determined necessary (for example, changes in hazard locations or vulnerabilities based on local stakeholder input, new data sources or technical information on hazards, etc.). Much of the content from the 2018 plan has been carried forward, reflecting little to no required changes. This includes general descriptions of each hazard and other narrative information provided in the hazard profiles that required no updates or revisions.

One of the more notable updates to this assessment is the addition of ***Infectious Disease*** as a newly identified hazard, which is thoroughly described in its own hazard profile and priority classifications/rankings as consistent with the other hazards included in this risk assessment. Also of note, the Local Planning Team affirmed the determination made for the 2018 plan that Drought, Landslides, and Sinkholes are not of significant concern to the Cities to be included in the Risk Assessment and Mitigation Strategy for this plan. The rationale for all these determinations is provided in the following Hazard Identification section.

A.2. HAZARD IDENTIFICATION

This section provides a summary of the initial hazard identification and screening process. The first step in completing a comprehensive risk assessment for mitigation planning purposes is the identification of all natural hazards that can affect the people, economy, and built and natural environments in the planning area. The primary purpose of this step is to ensure that all potential natural hazard threats are considered for inclusion in the plan and to determine which are significant enough to carry forward for more detailed hazard analysis and risk assessment tasks.

Pawtucket and Central Falls are vulnerable to a wide range of natural hazards that threaten life and property which can be defined or categorized in a variety of ways. The hazard identification process completed for this plan began with a review of the previous plan and capturing early input from the Local Planning Team at their first plan update meeting in June 2023. This was followed by an extensive evaluation and classification of all potential hazards based on a review of the (then current) State of Rhode Island Hazard Identification and Risk Assessment (HIRA)[29], past major disaster and emergency declarations for Providence County, historical and anecdotal data on previous hazard events, and the hazard mitigation plans for neighboring jurisdictions. Readily available information from other official and reputable data sources was also evaluated to supplement information provided through these primary sources.

Table 15 identifies the 13 definitive types (or groupings) of natural hazards considered for this plan, listed in alphabetical order, and summarizes the rationale for why each was or was not recommended for further study in the risk assessment. While descriptive profiles and vulnerability assessments are to be completed only for the 10 hazards identified as posing significant risk for the planning area, the Local Planning Team shall not be precluded from considering mitigation actions for others if deemed appropriate. It should also be noted that hazards not currently identified for inclusion in the risk assessment may be further studied and/or included during the plan maintenance process as required.

Table 15. Hazard Identification and Screening Summary

Natural Hazard	Significant Risk for Planning Area?	Rationale for Inclusion or Exclusion from Risk Assessment
Coastal Storm (includes hurricanes, tropical storms, and nor'easters)	Yes	• Identified in previous/existing plans, and affirmed as a priority concern by the Local Planning Team • Identified as a top hazard of concern through the 2020 Community Resilience Building Workshop for both Cities • Frequency and severity of previous occurrences in planning area, including multiple major disaster and emergency declarations. • Review of NOAA historical records – 32 hurricanes or tropical storms have come within 75 miles of planning area since 1858. • High probability of future events, with potential to cause severe, extensive loss, damage, and disruption to the entire planning area
Dam Failure	Yes	• Identified in previous/existing plans, and affirmed as a hazard of concern by the Local Planning Team • Several high hazard dams are located within and upstream of the planning area

[29] State of Rhode Island State Hazard Mitigation Plan Update. 2019. Section 3.

Natural Hazard	Significant Risk for Planning Area?	Rationale for Inclusion or Exclusion from Risk Assessment
		• Existing studies suggest that hundreds of homes in planning area are potentially at risk to inundation from dam failures
Drought	No	• Not identified as a hazard of concern by the Local Planning Team • Low frequency of previous occurrences, especially for severe to extreme drought • Potential vulnerability to any physical, social, economic, or environmental impacts in the planning area caused by drought is considered low, primarily due to vast water supplies and storage. • Per representatives from the Pawtucket Water Supply Board, water demands in the planning area are currently *decreasing* due to population/demographic shifts. • Limited ability and need to implement additional drought mitigation activities beyond existing plans and procedures for emergency water conservation, and the ongoing drought monitoring and management efforts of the Rhode Island Water Resources Board and the Pawtucket Water Supply Board. • Identified in the State HIRA as posing a low jurisdictional vulnerability for Providence County.
Earthquake	Yes	• Identified in previous/existing plans – but as low risk • Previous occurrences – moderately damaging earthquakes strike somewhere in the region every few decades • Potential for significant future ground shaking events • Vulnerability older structures (especially unreinforced masonry buildings) and large commercial/industrial structures (old mills, etc.) constructed before modern building codes and/or on fill • Potential local impacts caused by ground liquefaction in low-lying areas near water bodies
Extreme Temperatures	Yes	• Identified as a top hazard of concern through the 2020 Community Resilience Building Workshop for both Cities • History of previous occurrences (both heat and cold)

Natural Hazard	Significant Risk for Planning Area?	Rationale for Inclusion or Exclusion from Risk Assessment
		• Potential for increased frequency, duration and severity of extreme heat events due to climate change • Potential life/safety impacts to vulnerable populations in the planning area that could be disproportionately affected
Fire (includes urban fire and wildfire)	Yes	• Urban fire identified in previous/existing plans, and affirmed as a priority concern by the Local Planning Team • Previous occurrences in planning area that have resulted in property damage and destruction • Density of structures and old mill buildings in the planning area exacerbate urban fire hazards (in addition to the presence of chemicals and other accelerants) • Wildland Urban Interface (WUI) areas identified in southeastern Pawtucket
Flood (includes riverine, coastal, flash, and urban flooding)	Yes	• Identified in existing plans, and affirmed as a priority concern by the Local Planning Team • Identified as a top hazard of concern through the 2020 Community Resilience Building Workshop for both Cities • Review of existing FEMA Flood Insurance Rate Maps and USACE Hurricane Surge Inundation Areas • Previous occurrences in planning area, including major disaster and emergency declarations but also more frequent, damaging events at a smaller scale • High probability of future events, with potential to cause severe damage and disruption in many locations across the planning area
Infectious Disease	Yes	• Identified as a hazard of concern by the Local Planning Team. Since 2020, significant impacts from COVID-19 have raised much greater concern with epidemics, pandemics, and related public health risks. • Vector-borne and other infectious diseases are a current threat for the planning area and may be exacerbated in the future by climate change. • Identified in the State HIRA as posing a moderate jurisdictional vulnerability for Providence County
Landslide	No	• Not identified as a hazard of concern in existing plans or by the local planning team

Natural Hazard	Significant Risk for Planning Area?	Rationale for Inclusion or Exclusion from Risk Assessment
		• No record of significant previous occurrences in planning area • Low probability of future occurrences based on existing landslide hazard mapping (USGS) • Not addressed in State HIRA for similar reasons
Sea Level Rise	Yes – but to be included as part of Flood hazard	• Identified in previous/existing plans (for Pawtucket) • Sea level rise projections and planning guidance from the State's Coastal Resource Management Council • Review of State HIRA, STORMTOOLS, and Climate Central's Risk Finder for sea level rise and coastal flood risk • Sea level rise will increase potential coastal/tidal flood risks for Pawtucket
Severe Weather (includes severe thunderstorms, high winds, tornadoes, hail, and lightning)	Yes	• Identified in existing plans, and affirmed as a priority concern by the Local Planning Team • Frequency and severity of previous occurrences in planning area • High probability of future events, with potential to cause extensive damage and disruption to the entire planning area
Severe Winter Storm (includes snow, blizzards, and ice storms)	Yes	• Identified in existing plans, and affirmed as a hazard of concern by the Local Planning Team • Frequency and severity of previous occurrences in planning area, including multiple major disaster and emergency declarations • High probability of future events, with potential to cause extensive damage and disruption to the entire planning area
Soil Hazards (includes sinkholes, subsidence, and expansion or collapse)	No	• Not identified as a hazard of concern in existing plans or by the Local Planning Team • No record of significant previous occurrences in planning area (only one known, non-naturally occurring event in Pawtucket caused by a water main break) • Low probability of future occurrences • Not addressed in State HIRA for similar reasons

While they may be identified or categorized in slightly different ways, the natural hazards identified in Table 15 are consistent with all the natural hazards identified for the State of Rhode Island in its current (2024) State Hazard Mitigation Plan. Some of the hazards are categorized differently and many are interrelated (for example, hurricanes may cause flooding,

or drought conditions may increase the likelihood of wildfires), but for hazard identification purposes these individual hazards are distinguished separately. More information on the interrelationship between hazards, potential secondary hazards resulting from a hazard event, and opportunities to mitigate multiple hazard-related risks through common mitigation techniques are addressed in subsequent sections of this plan.

A.3. HAZARD PROFILES

This section provides descriptive information on each of the nine (9) hazards identified as posing significant risk for Pawtucket and Central Falls, including the following key sub-sections:

- **General Description** – Provides brief descriptions of the hazard, its characteristics, and potential effects.
- **Location** – Provides information on the geographic areas within the planning area that are susceptible to occurrences of the hazard.
- **Severity/Extent** – Provides information on the potential strength or magnitude of the hazard.
- **Previous Occurrences** – Provides information on the history of previous hazard events in the planning area, including their impacts on people and property.
- **Probability of Future Occurrences** – Describes the likelihood of future hazard occurrences in the planning area. This includes a summary of any anticipated effects that climate change may have on the frequency, duration and intensity of future hazard events. A summary of these effects in the Northeast region and specifically Rhode Island is provided below.

This section concludes with an overall summary of the key findings on the characteristics of each hazard and their potential impacts to the planning area. This information was used to measure relative risk each hazard poses to Pawtucket and Central Falls and helped the Local Planning Team in ranking and generally prioritizing the hazards for purposes of mitigation strategy development.

NATURAL HAZARDS AND THE ANTICIPATED EFFECTS OF A CHANGING CLIMATE

One of the most important factors in assessing natural hazard risk is the consideration of climate change and its potential effects on future events. Traditionally, hazard risk assessments have relied heavily on historical data and information along with the assumption of stationarity—that natural systems will not change with time—in predicting future climate and hazard conditions. However, the best available science now tells us that hazard risk will change and, in many cases, will accelerate rapidly. Risk assessments must therefore embrace the reality of non-stationarity and address the how climate change may affect natural hazards. As mentioned above, this has been done for all applicable hazards throughout this assessment and is specifically summarized in the discussion on the *probability of future hazard occurrences*. A more general overview of the anticipated effects of climate change for the Northeast and specifically Rhode Island is provided below.

The impacts of climate change are already being felt in communities across the country. More frequent and intense extreme weather and climate-related hazard events, as well as changes in average climate conditions, are expected to continue to threaten human lives and damage property, ecosystems, and social systems that provide essential benefits to communities.

These impacts are increasing many existing risks and exacerbating or creating new vulnerabilities associated with natural hazards throughout the Northeast. Flooding, warming temperatures, sea level rise, and precipitation variability are all growing challenges for the region. Some the key relevant findings from the latest National Climate Assessment for the Northeast region include the following[30]:

- The Northeast continues to be confronted with extreme weather, most notably **extreme precipitation—**which has caused problematic flooding across the region—and **heatwaves**. In response, climate adaptation and mitigation efforts, including nature-based solutions, have increased across the region, with a focus on emissions reductions, carbon sequestration, and resilience building.
- Extreme heat, storms, flooding, and other climate-related hazards are causing **disproportionate impacts** among certain communities in the Northeast, notably including racial and ethnic minorities, people of lower socioeconomic status, and older adults. These communities tend to have less access to healthcare, social services, and financial resources and to face higher burdens related to environmental pollution and preexisting health conditions. Social equity objectives are prominent in many local-level adaptation initiatives, but the amount of progress toward equitable outcomes remains uneven.
- In recent years, there have been substantial advances in the magnitude and scope of climate action across all jurisdictional scales. Almost every state in the region has conducted or updated a climate impact assessment, developed a comprehensive climate action plan, and enacted climate-related laws since 2018. Innovative approaches to transparent, inclusive, and equitable processes around climate action are being embraced by Tribes, municipalities, and states. Although ambitious emissions reduction targets have been put forward, meeting these goals is expected to be challenging.
- Options for financing mitigation and adaptation efforts have expanded in recent years, providing households, communities, and businesses with more options for responding to climate change. Flood insurance allows individuals and communities to recover following extreme flooding events, but many at-risk homeowners lack adequate coverage. Although the public sector remains the primary source of funding for adaptation, private capital has started to invest in a variety of mitigation and adaptation projects, including services for monitoring climate risks and community-based catastrophe insurance.

For Rhode Island, the impacts of climate change upon built and natural environments are wide-ranging, discernible, and documented, and, in many cases growing in severity. According to the State's primary portal for climate change information[31], Rhode Island will experience warmer air and water temperatures, more extreme weather events such as droughts, intense precipitation, severe storms, and flooding, increasing rates of sea level rise, shorter winters and longer summers, and less snowfall and ice coverage. Climate change has the potential to pose

[30] United States Global Change Research Program. *Fifth National Climate Assessment.* 2023. Chapter 21: Northeast.

[31] State of Rhode Island. *Climate Change in Rhode Island*. Website: https://climatechange.ri.gov/; NOAA, State Climate Summary for Rhode Island (2022): https://statesummaries.ncics.org/chapter/ri/

significant risks for Rhode Island's water, wastewater, surface transportation, and energy infrastructures and utilities, our natural environment, and human health, welfare, and economic well-being. While more details on the anticipated effects of climate change on natural hazards are addressed in the individual hazard profiles provided in this assessment, some of the key observed and projected changes for Rhode Island include the following[32]:

OBSERVED CHANGES:

- Rhode Island's precipitation rates are climbing an inch almost every 10 years. 2018 was the third wettest year on record for RI (measured at TF Green Airport). In 2018, Rhode Island saw a record number of days with over an inch of rain.
- The long-term warming trend continued in 2019 with the Earth having its second warmest year on record. The remarkable global warmth of 2019 means the last 5 years rank as the top 5 hottest. This makes the 2010s the hottest decade on record.
- The water in Narragansett Bay is getting warmer. The surface temperature of the Bay has increased 2.5-2.9°F (from 1960-2010). Wintertime water temperatures are warming the most rapidly.
- Sea levels have risen more than 10 inches in Rhode Island since 1930 (at the Newport tide gauge). Sea level rise is accelerating both in Rhode Island and globally.

PROJECTED CHANGES:

- Under a higher emissions pathway, historically unprecedented warming is projected by the end of the 21st century. Increased intensity of heat waves is also projected, but a decreased intensity of cold waves.
- Continued increases in frequency and intensity of extreme precipitation events are projected.
- Sea level is projected to increase by at least 9 feet by 2100, with a substantial increase in the frequency of nuisance tidal flooding.

With the rising awareness of these climate change impacts, building climate resilience in Rhode Island has become a major focus of all levels of government as well as private business and residents. The key focus of climate resilience efforts is to address the vulnerabilities that communities face with regard to the consequences of climate change. Currently, climate resilience efforts encompass social, economic, technological, and political strategies that are being implemented on multiple scales. From local community action to global treaties, building climate resilience is becoming a priority in Rhode Island.

SUMMARY OF MAJOR DISASTER AND EMERGENCY DECLARATIONS

Prior to getting into hazard-specific profiles, it is important to note and document past major disaster and emergency declarations that have included Providence County. Major disaster and

[32] Ibid.

emergency declarations are issued by the President of the United States at a county level when an event has been determined to be beyond the capabilities and resources of state and local governments to respond and recover. A major disaster declaration is issued when a disaster or catastrophic event requires broader authority and resources to help states and local communities, as well as families and individuals, recover from the damage caused by the event. An emergency declaration is issued to protect property and public health and safety and to lessen or avert the imminent threat of a major disaster or catastrophe.
Since 1953, when presidential declarations first became issued, Providence County has been included in 12 major disaster declarations and 12 emergency declarations as listed in **Table 16**.

Table 16. Major Disaster and Emergency Declarations for Providence County, Since 1953

Declaration Date	Incident Type	Declaration Type	Description
5/12/2022	Snowstorm	Major Disaster	Severe Winter Storm & Snowstorm
8/21/2021	Hurricane	Emergency	Hurricane Henri
3/30/2020	Biological	Major Disaster	COVID-19 Pandemic
3/13/2020	Biological	Emergency	COVID-19
4/3/2015	Severe Storm(s)	Major Disaster	Severe Winter Storm & Snowstorm
3/22/2013	Severe Storm(s)	Major Disaster	Severe Winter Storm & Snowstorm
10/29/2012	Hurricane	Emergency	Hurricane Sandy
9/3/2011	Hurricane	Major Disaster	Tropical Storm Irene
8/27/2011	Hurricane	Emergency	Hurricane Irene
3/30/2010	Severe Storm(s)	Emergency	Severe Storms & Flooding
3/29/2010	Severe Storm(s)	Major Disaster	Severe Storms & Flooding
9/19/2005	Hurricane	Emergency	Hurricane Katrina Evacuation
2/17/2005	Snow	Emergency	Record Snow
3/27/2003	Snow	Emergency	Snow
11/19/1996	Other	Emergency	Major Water Main Break
1/24/1996	Snow	Major Disaster	Blizzard of 96 (Severe Snow Storm)
3/16/1993	Snow	Emergency	Blizzards, High Winds & Record Snowfall
9/16/1992	Toxic Substances	Emergency	Water Contamination
8/26/1991	Hurricane	Major Disaster	Hurricane Bob
10/15/1985	Hurricane	Major Disaster	Hurricane Gloria
2/16/1978	Snow	Major Disaster	Snow & Ice
2/7/1978	Snow	Emergency	Blizzard & Snowstorms
8/20/1955	Hurricane	Major Disaster	Hurricane & Flood
9/2/1954	Hurricane	Major Disaster	Hurricanes

Source: FEMA

Many additional emergencies and disasters have occurred that were not severe enough to require federal disaster relief through a presidential declaration. These include state declarations of disaster emergency as declared by the governor by executive order or proclamation if he or she finds a disaster has occurred, or the threat thereof, is imminent. The state of disaster emergency shall continue until the governor finds that the threat or danger has passed, or the disaster has been dealt with to the extent that emergency conditions no longer

exist and terminates the state of disaster emergency by executive order or proclamation. No state of disaster emergency may continue for longer than 30 days unless renewed by the governor.

Since the last plan update, the planning area has been included in eight state declarations of disaster emergency as follows:[33]

- Executive Order 24-03 (2/12/2024) – Winter Storm, Heavy Snow (statewide)
- Executive Order 24-01 (1/10/2024) – High Winds, Extreme Rainfall (statewide)
- Executive Order 23-10 (12/20/2023) – High Winds and Severe Rainfall (statewide)
- Executive Order 22-10 (01/29/2022) – Winter Storm Consisting of High Winds, Heavy Snow, and Blizzard Conditions (statewide)
- Executive Order 21-109 (10/12/2021) – New COVID-19 variants (extended)
- Executive Order 22-10 (8/20/2021) – Hurricane Henri
- Executive Order 22-10 (08/19/2021) – New COVID-19 variants (extended)
- Executive Order 22-10 (3/9/2020) – COVID-19 (extended)

Summary of Weather Events Since 2018

As can be seen above, most major disaster and emergency events have been declared for Providence County due to extreme weather conditions. Notable exceptions include the recent COVID-19 pandemic, a 1996 major water main break in Cranston, and a 1992 water contamination event that affected both Pawtucket and Central Falls.

Historically, coastal storms and other severe weather events have caused the most hazard-related impacts in the planning area. **Table 17** summarizes the number of storms and other significant weather phenomena recorded for Providence County since the last plan update process (2018), according to NOAA's Storm Events Database[34] (hereinafter referred to as NOAA historical records). This includes a total of 161 events resulting in an estimated $2.43 million in reported property damage and one injury (recorded for in Central Falls). Most of these events did not result in an emergency or disaster declaration at any government level; however, they provide some context on the recent frequency of these weather-related hazard events in the planning area. More details on these and other previous occurrences are provided in the hazard profiles that follow.

Lastly, as noted in the summary of findings from the 2020 Community Resilience Building Workshop, stakeholders from both Cities were generally in agreement that Pawtucket and Central Falls are experiencing more intense and frequent storm events and heat waves. Longer periods of elevated heat, particularly in July and August, have raised concerns about vulnerable segments of the population, including the elderly and disabled. Additionally, there was a general concern about increasing challenges of being prepared for the worst-case scenarios (i.e., major disasters, storms, and major hurricanes throughout the year, but particularly in the fall/winter months due to more intense snow and ice storms coupled with colder weather.

[33] RIEMA; Governor's Archive of Executive Orders

[34] NOAA National Centers for Environmental Information. *Storm Events Database*. Accessible online at: https://www.ncdc.noaa.gov/stormevents/

Table 17. Significant Weather Events in Providence County, 2018 – 2023

Event Type	Number of Events	Property Damage	Fatalities/Injuries
Extreme Cold	0	$0	0/0
Extreme Heat	0	$0	0/0
Flood / Flash Flood / Heavy Rain	69	$1,091,000	0/0
Hail	7	$0	0/0
Lightning	1	$5,000	0/0
Strong Wind / Thunderstorm Wind / High Wind	88	$206,300	0/3
Tornado	5	$1,295000	0/1
Tropical Storm	2	$92,300	0/0
Winter Storm / Winter Weather	26	$30,700	0/0
Total	195	$2,720,300	0/3

Source. NOAA Storm Events Database

A.3.1. COASTAL STORM

A.3.1.1 General Description

Coastal storms include hurricanes and tropical storms, in addition to nor'easters and similar low pressure storm systems with cyclonic flows.

Hurricanes and tropical storms are classified as cyclones and defined as a closed circulation of winds developing around a low-pressure center in which the winds rotate counter-clockwise (in the Northern Hemisphere) and with a diameter averaging 10 to 30 miles across. Tropical cyclones are among the most powerful and destructive meteorological systems on earth. 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. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy rainfall, and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves, and tidal flooding which can be more destructive than wind (and are covered separately in this section under Flood). As these storms move inland, they can cause severe flooding, downed trees and power lines, and widespread structural damage. Once a cyclone no longer has tropical characteristics, it is then classified as an extratropical system. Most hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which extends from June through November.

Nor'easters are extratropical storm systems that, similar to hurricanes and tropical storms, are typically characterized by a large, counterclockwise wind circulation around a low pressure center that affect the Mid-Atlantic and New England states primarily during winter months. A nor'easter gets its name from the continuously strong northeasterly winds blowing in from the ocean ahead of the storm. They can form over land or water and are notorious for producing high winds, heavy precipitation (rain and snow), and tremendous waves that crash onto

beaches, often causing beach erosion and structural damage. Wind gusts associated with these storms can exceed hurricane force (74+ miles per hour) in intensity, and when combined with snow result in blizzard conditions that can paralyze a region. Similar to hurricanes, nor'easters are capable of causing substantial damage to coastal areas due to their associated strong winds, storm surge, and heavy surf. However, unlike hurricanes and tropical storms, nor'easters are typically a winter occurrence and can sit and churn offshore for days, resulting in continuous flooding, various degrees of wave and erosion-induced damage to structures, and erosion of natural resources, such as beaches, dunes, and coastal bluffs.

A.3.1.2 Location

The entire planning area is susceptible to the occurrence of coastal storms including hurricanes, tropical storms, and nor'easters. While the entire planning area is uniformly susceptible to wind-related effects, the area's low-lying flood prone areas are at most risk to inland flooding, including those areas along the Blackstone River which are also more susceptible to the destructive forces of storm surge and tidal flooding (see Figure 21 under Flood).

A.3.1.3 Severity/Extent

The National Weather Service's Saffir-Simpson Hurricane Wind Scale, shown in **Table 18**, is used to categorize the strength and magnitude of hurricane events according to sustained wind speed, and provides estimates of potential property damage. New England is also prone to tropical storms and tropical depressions which have wind speeds less than a Category 1 Hurricane (39-73 miles per hour for tropical storms, and 38 miles per hour or less for tropical depressions) but may still cause damage across large areas.

Table 18. Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	**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	**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	**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.

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
4 **(major)**	130-156 mph	**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	**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 Hurricane Center

There is no widely used scale to classify nor'easters. However, the classification scheme developed by Gregory A. Zielinski and presented in **Table 19** is a useful index to categorize nor'easters (and other severe winter storms) by intensity. It consists of a five-level hierarchy similar to the Saffir-Simpson Hurricane Wind Scale, with a Category 1 storm being the least severe in terms of its intensity and a Category 5 storm being the most severe.

Table 19. Classification Scheme for Nor'easters

Intensity Index Category	Maximum Snowfall Amounts	Maximum Snowfall Rate	Potential Wind Speeds	Maximum Drifting Potential	Closings/Delays on Communities, Schools, and Travel	Impact on Coastal and Maritime Interests	Nature of Disruption
1	< 10 in.	Very low < 1 in./hr	Weak	Minor < 20 in.	Maybe minor (hours)	Minor	Minimal-nuisance
2	10-20+ in.	Moderate 1+ in./hr	Strong	Moderate 3 ft.	Maybe moderate (hours to a day common)	Minor to moderate	Nuisance-inconvenience
3	20-30+ in.	High 2+ in./hr	Gale force	High 4-6+ ft.	Possibly extensive/ lengthy (several days possible)	Moderate to severe	Inconvenience-crippling
4	30-40+ in.	Very High 2-3 in./hr	Gale force hurricane	Very High 6-10+ ft.	Probably extensive/ lengthy (up to a	Severe	Crippling-paralyzing

Intensity Index Category	Maximum Snowfall Amounts	Maximum Snowfall Rate	Potential Wind Speeds	Maximum Drifting Potential	Closings/Delays on Communities, Schools, and Travel	Impact on Coastal and Maritime Interests	Nature of Disruption
					week may be common)		
5	40-50+ in.	Overwhelming > 3+ in.hr	Gale force hurricane	Exceptional 10-15 ft.	Extensive/ lengthy (up to a week common)	Extreme	Paralyzing

Source: Gregory A. Zielinski, Institute for Quaternary and Climate Studies, University of Maine

The intensity scales described above are applicable to all hurricanes and nor'easters that may strike the planning area, as they are used throughout Rhode Island on a routine basis. For mitigation planning purposes, the maximum probable extent of coastal storms in the planning area is a Category 3 hurricane on the Saffir-Simpson Hurricane Wind Scale: or an Intensity Index Category 4 on Classification Scheme for Nor'easters.

A.3.1.4 Previous Occurrences

According to NOAA historical records, 32 hurricane/tropical storm tracks have come within 75 miles of the planning area since 1858. This includes 21 tropical storms, six (6) Category 1 hurricanes, three (3) Category 2 hurricanes, and two (2) Category 3 hurricanes. **Figure 13** shows the historical tracks of these storms, some of which are further described below. The figure does not include the tracks of additional extra-tropical systems, tropical depressions or nor'easters that also came within 75 miles of the planning area.

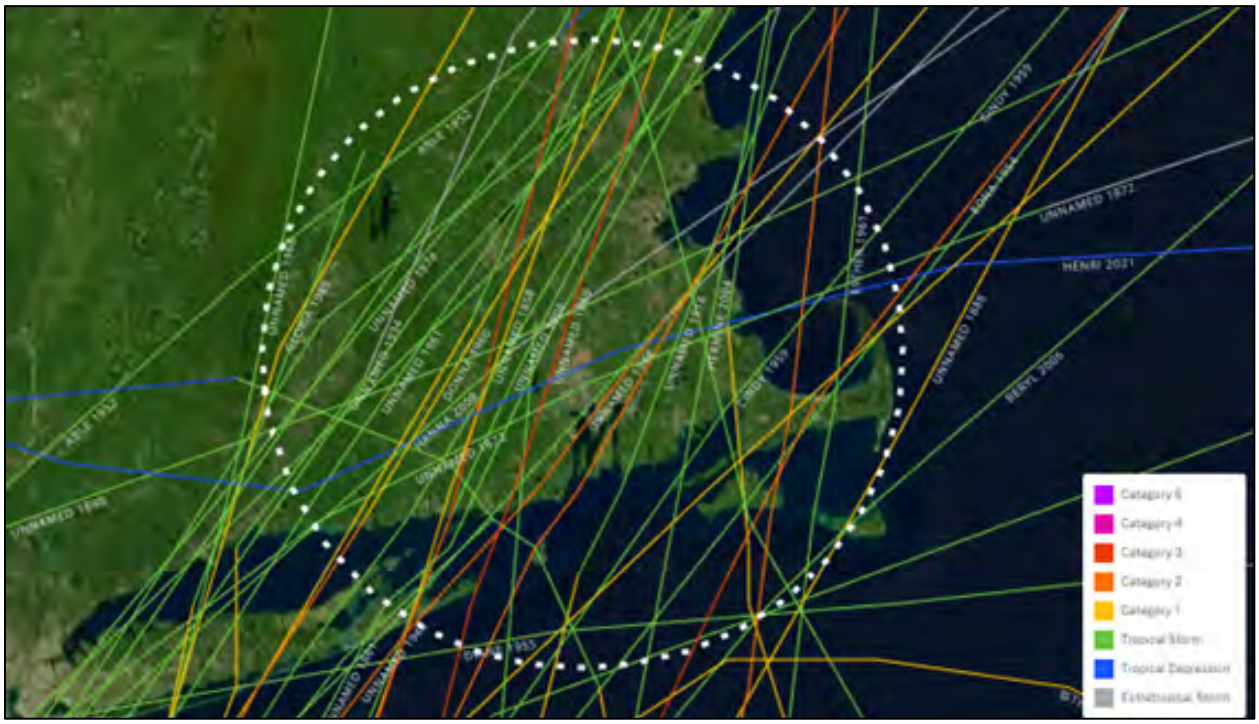
Hurricanes are relatively rare but have proven to be potentially devastating events in Rhode Island. Hurricane wind damage can be costly for coastal and inland communities, including the cities of Pawtucket and Central Falls, but storm surge along coastal areas is by far the most destructive force. Though not considered a coastal community, the City of Pawtucket is vulnerable to potential storm surge along the Seekonk and Blackstone rivers as ocean waters are funneled into the upper reaches of Narragansett Bay and past Providence. As further described in section A.3.6 under Flood, Central Falls is at only slight risk to the effects of storm surge, even under the most extreme scenarios (Category 4 hurricane).

The comparison of hurricanes to nor'easters reveals that the duration of high surge and winds in a hurricane is 6-12 hours, while a nor'easter's duration can be from 12 hours to three days. The amount of damage resulting from a strong hurricane is often more severe than a nor'easter, but Rhode Island has historically suffered more damage from nor'easters because of the greater frequency in which they occur.

LOCAL IMPACTS

- Pawtucket and Central Falls experienced minor impacts from recent tropical storms, including Henri and Elsa in 2021 and Isias in 2020. These impacts include mostly wind damage in the form of downed trees and powerlines, causing minor short-term disruptions to the communities such as power outages and traffic/mobility interruptions. Minor localized street flooding has occurred during these events as well.
- Pawtucket has suffered property damage from the last few hurricanes due to flooded sewer lines. A significant portion of the city east of the Blackstone River experiences frequent street and basement flooding during heavy rain. This is due to a combination of factors, including the inability of the current combined sewer overflow (CSO) system to handle the runoff during heavy rainfall. The pipes in the CSO system have become clogged with scum buildup over the years, decreasing the capacity of the lines. To help correct this problem, some backflow-prevention valves have been installed where the sanitary line that runs from the house connects to the CSO system.
- Winter Storms Juno in 2015 and Nemo in 2013 dropped nearly 2 feet of snow and caused widespread power outages, resulting in extended road closures that isolated residents and neighbors across both cities (*further discussed under Severe Winter Storms*).
- Local Impacts from Hurricane Sandy in 2012 included extensive coastal erosion and power outages across portions of both Pawtucket and Central Falls.
- Local impacts from Tropical Storm Irene in 2011 included heavy, rain-induced, inland flooding and wind damage. Some residents in Central Falls experienced flooding of their homes, and many were left without power for days.
- The City of Pawtucket recorded wind damage in 1985 (Hurricane Gloria) and 1991 (Hurricane Bob) due to hurricane force winds felling trees and causing damage to residential structures. In 1991, repair costs were in excess of $600,000 just due to felled trees.

Figure 13. Historical Storm Tracks Since 1958



Source: NOAA

HAZARD HISTORY

Event descriptions for some of the historic and major coastal storm events impacting the region are provided below. These summaries are based heavily on information available in the NOAA Storm Event Database, FEMA Flood Insurance Study for Providence County, and the State Hazard Mitigation Plan. Additional local impacts to Pawtucket and Central Falls are included where available.

- March 13-15, 2018: A powerful nor'easter struck the eastern United States, affecting Rhode Island. This storm brought heavy snowfall, coastal flooding, and strong winds to the region. Some parts of Rhode Island received more than a foot of snow, and coastal areas experienced inundation and erosion.
- October 29, 2012 – Hurricane Sandy, with a wind diameter stretching more than 1,000 miles, became the largest Atlantic hurricane on record and is estimated to be the second costliest in history, only surpassed by Hurricane Katrina in 2005. The storm made landfall as a "post-tropical cyclone" in Atlantic City, New Jersey with sustained winds of 90 miles per hour and a devastating storm surge for communities in the northeast area. Though damage in the planning area was limited, its effects were directly felt throughout Rhode Island with damaging winds and storm surge that caused extensive flooding and erosion along the coast. Sandy caused some property damage and power outages within Providence County, where inland wind gusts ranged from about 55 to 65 mph. More than 122,000 people in the state lost power and it is estimated that more than $39.4 million in support from four federal disaster relief programs has helped

Rhode Island recover from this disaster, the majority of which is from the NFIP ($31.1 million). This event resulted in a major disaster declaration for Providence County.

- August 27, 2011 – Hurricane Irene made landfall as a Category 1 hurricane in New Jersey, weakened to a tropical storm, and then traversed New England while producing significant amounts of rain, storm surge, inland and coastal flooding, and wind damage across the region. Gusts of wind up to 71 mph were reported in Rhode Island, and storm surge in Narragansett Bay caused some coastal damage. The storm surge experienced along the coast was generally in the two- to four-foot range with a high of 4.78 feet at Fox Point in Providence. However, most of damage was caused by wind. Sustained winds over a 6 to 12-hour long duration resulted in widespread tree damage and resulted in power outages to roughly half of Rhode Island residents. The highest sustained wind speed was 62 mph at the Physical Oceanographic Real Time System station at Conimicut Light in Narragansett Bay, Rhode Island. This event resulted in a major disaster declaration for Providence County. Damage assessment reports from FEMA put the total public assistance cost at $9,260,898.
- September 6, 2008 – Tropical Storm Hanna resulted in significant wind damage in Southeastern Providence County. The highest sustained wind of 29 mph and gusts of 40 mph were recorded at T.F. Green Airport. Several trees, wires, and a transformer were blown down but the event resulted in no loss of life or injuries, and only $13K in property damage, all from wind. Total rainfall from the storm in southeast Providence County ranged from four to five inches, but no flooding was reported.
- August 18, 1991 – Hurricane Bob was the second named storm and the first hurricane of the 1991 hurricane season, reaching a Category 3 status. The eye of the storm tracked north-northeast between Fall River and Providence, traveling at a speed of 40 mph and creating a 6-10 foot storm surge in Narragansett Bay. Southern New England experienced estimated damages of $1.5 billion, and 60 percent of residents across Southeastern New England lost power. There were also two unconfirmed tornadoes in Rhode Island. This event resulted in a major disaster declaration for Providence County.
- September 27, 1985 – Hurricane Gloria caused extensive damage along the east coast of the U.S. This event was responsible for a total of eight fatalities (two in New England) and approximately $1.94 billion in damage. At one point wind gusts were sustained at 145 mph, causing Gloria to reach a Category 4 status. When it reached New England, it was considered a Category 1 storm, with wind speeds of up to 74 mph. The storm arrived at low tide and resulted in storm surges less than 5 feet above normal, minimizing damage to the coastline. However, Gloria's winds did cause extensive wind damage in isolated areas along the shore and well inland, resulting in some long-term power outages. This event resulted in a major disaster declaration for Providence County.
- February 5-7, 1978 (Blizzard of 1978) – covered under Severe Winter Storms (section A.3.8.4).
- September 21, 1961 – Hurricane Esther caused heavy shore damage at Sakonnet Point in Little Compton and Misquamicut in Westerly.
- September 12, 1960 – Hurricane Donna caused Heavy rain and major flooding in the Blackstone River Valley.

- August 17-20, 1955 – The remnants of Hurricane Diane swept over Rhode Island, but its wind velocities were far below hurricane force. Damage to power lines was high, and at one time 82 percent of Rhode Island's homes were without electricity. Ample warning permitted people to return home from school and work early, and as a result, only two lives were lost. Property damage amounted to $170 million, most resulting from torrential rains, which caused serious river flooding. The Blackstone River crested at 15 feet above normal, and according to FEMA's Flood Insurance Study report, this remains the greatest flood of record on the river due to an average of nearly 12 inches of rain falling over the drainage basin. This event resulted in a major disaster declaration for Providence County.
- September 11, 1954 – Hurricane Edna, a Category 3 hurricane, made landfall near Martha's Vineyard and Nantucket before crossing the eastern tip of Cape Cod, Massachusetts. Hurricane force winds of 75 to 95 mph buffeted all of coastal Rhode Island and knocked out electrical power across many sections of the state. Edna arrived during a rising tide and resulted in severe flooding across Martha's Vineyard, Nantucket, and Cape Cod, where storm surges of over 6 feet were common. Farther west, storm surge values were 4 feet or less, resulting in storm tides that remained below flood stage. Rainfall amounts of up to 7 inches were common, aggravating the already saturated conditions caused by Hurricane Carol ten days earlier and resulting in major flooding in the Blackstone River Valley. The total combined rainfall for Carol and Edna was as much as 11 inches across most of Rhode Island. Edna was responsible for 21 deaths across the region. This event resulted in a major disaster declaration for Providence County.
- August 31, 1954 – Hurricane Carol, a Category 3 hurricane with wind gusts of Category 4 strength, made landfall just west of Rhode Island near Old Saybrook, Connecticut. It was the most destructive hurricane to strike Southern New England since the Great New England Hurricane of 1938. The storm swept into Rhode Island with little warning and came at high tide. The Providence tide gauge recorded a storm surge nearly 10 feet above mean high water and the central downtown area was flooded to a depth of 13 feet, inundating up to 3,500 vehicles. Wind speeds of 90 mph were recorded in Providence, with 115 mph gusts. The storm resulted in 19 fatalities across New England, and an estimated $200 million in property damage. Nearly 3,800 homes were destroyed, and the storm left most residents in Rhode Island without power. This event resulted in a major disaster declaration for Providence County.
- September 14, 1944 – Affected Rhode Island and southeastern Massachusetts; $2 million in property damage; no loss of life.
- September 21, 1938 – The most intense hurricane to strike Rhode Island occurred in 1938. Known widely as the "Great New England Hurricane of 1938" or "Long Island Express," it made landfall as a strong Category 3 hurricane on Long Island, New York and moved rapidly through New England. Initially, the hurricane was forecast to curve out into the Atlantic Ocean, and because official forecasts expected mere overcast conditions, residents were unaware of the impending storm. Approximately 600 people died in the storm in New England, most in Rhode Island (262), and up to 100 people elsewhere in the path of the storm. An additional 708 people were reported injured. The hurricane also devastated the forests of the Northeast, knocking down an estimated 2 billion trees in New York and New England. The hurricane produced wind

gusts as high as 130 mph, up to 17 inches of rainfall, and a coastal storm surge of 18 to 25 feet from New London, Connecticut to Cape Cod in Massachusetts. The Providence tide gauge reportedly measured a record storm surge of 12.66 feet during the event, which per FEMA's Flood Insurance Study report, caused flood levels of approximately 16 feet on the Seekonk River. Sustained winds of 95 mph were recorded in Rhode Island and virtually the entire state lost electrical power. Total damage is estimated at $6 billion (2004 USD), making it among the costliest hurricanes to strike the U.S. mainland. To date it remains the most powerful, costliest, and deadliest hurricane in New England history, and it is estimated that if an identical hurricane struck today it would cause $39.2 billion (2005 USD) in damage.

A.3.1.5 Probability of Future Occurrences

Coastal storms will continue to be a ***likely*** occurrence in the planning area. Based on historical event data, the annual probability of a hurricane or tropical storm coming within 75 miles of the planning area is 19 percent, though the chance of a major hurricane (Category 3-5) at landfall is much less. According to the 2024 State Hazard Mitigation Plan, the return period for a hurricane of any category striking Rhode Island is every 17 years, while the return period for a major hurricane of Category 3 and higher is 52 years.

Long-term global climate models under the Intergovernmental Panel on Climate Change (IPCC) warming scenarios indicate that it is possible that hurricanes and other coastal storms will become more intense, with stronger winds and heavier precipitation throughout the twenty-first century. Although there is insufficient scientific evidence to firmly determine the effects of climate change on future storms, large events are becoming more frequent, and research indicates the warming climate may double the frequency of Category 4 and 5 hurricanes by the end of the century and decrease the frequency of less severe hurricane events.

As noted in *Resilient Rhody*, studies of the Atlantic Basin show that storms are likely to be more intense and have higher rainfall rates. While the impact of climate change on the frequency of storms in the Atlantic Basin remains uncertain, the predicted changes in storm activity could change the frequency and intensity of associated storm surges, high winds, and precipitation events, causing serious implications for both coastal and inland communities and infrastructure systems in Rhode Island.[35]

A.3.2. DAM FAILURE

A.3.2.1 General Description

A dam failure is the structural collapse of a dam that releases the water stored in the reservoir behind the dam. Dam failures can result from natural events, human-induced events, or a combination of the two. A dam failure is usually the result of the age of the structure, inadequate spillway capacity, or structural damage caused by an earthquake or flood. Failures due to prolonged periods of rainfall can result in overtopping (the most common cause), and total failure occurs if internal erosion, overtopping, or damage results in a complete structural breach. Overtopping occurs when a dam's spillway capacity is exceeded and portions of the dam that are not designed to convey flow begin to pass water, erode away, and ultimately fail.

[35] Resilient Rhody: An Actionable Vision for Addressing the Impacts of Climate Change in Rhode Island. 2018. P. 14.

Other potential causes of dam failure include design flaws, foundation failure, internal soil erosion, inadequate maintenance, or mis-operation. Complete failure occurs if internal erosion or overtopping results in a complete structural breach, releasing a high-velocity wall of debris-laden water that rushes downstream, damaging or destroying everything in its path. The sudden release of water can lead to extensive flooding and has the potential to cause human casualties, economic loss, and environmental damage as the flows are often much larger than the capacity of downstream channels. Flood damage occurs as a result of the momentum of the flood caused by the sediment-laden water, flooding over the channel banks, and impact of debris carried by the flow. An additional hazard concern is the cascading effect of one dam failure causing multiple dam failures downstream due to the sudden release of flowing water. This type of disaster is particularly dangerous because it can occur rapidly, providing little warning and evacuation time for people living downstream.

While dam failures that occur during flood events compound an already tenuous situation and are certainly problematic, the dam failures that occur on dry days are the most dangerous. These "dry day" dam failures typically occur without warning, and downstream property owners and others in the vicinity are more vulnerable to being unexpectedly caught in life threatening situations than failures during predicted flood events.

A.3.2.2 Location

There are seven (7) dams located in the planning area, though as can be seen in **Table 20,** none of them are classified by the Rhode Island Department of Environmental Management (DEM) as "High" or "Significant" hazard dams where failure or mis-operation will probably cause loss of human life (see section A.3.2.3, *Severity/Extent* for the definition of specific hazard classifications). This includes 2 dams in Central Falls along the Blackstone River, including one dam on Broad Street (Valley Falls) and the other on Roosevelt Avenue (500 block). The other 5 dams are in Pawtucket as further described in the table and below.

Table 20. State-Regulated Dams in the Planning Area

City	River/Stream	Dam Name	State ID	Hazard
Central Falls/ Cumberland	Blackstone River	Valley Falls Pond	063	Low
Central Falls/ Pawtucket	Blackstone River	Central Falls	064	Low
Pawtucket	Blackstone River	Pawtucket Upper	065	Low
Pawtucket	Blackstone River	Pawtucket Lower	066	Low
Pawtucket	Ten Mile River	Lebanon Mill	293	Low
Pawtucket	Ten Mile River	Ten Mile Reservation	294	Low
Pawtucket	Ten Mile River	Slater Park	702	Low

Source: 2016 State of Rhode Island Dam Safety Program

Of greater concern to Central Falls and Pawtucket are the larger, higher hazard dams located outside and upstream from their jurisdiction. This includes the Woonsocket Falls Dam (Significant Hazard) upstream on the Blackstone River in Woonsocket, and the Hebronville Pond

Dam (High Hazard) located upstream on the Ten Mile River in Attleboro, Massachusetts. Brief descriptions are provided below.

1. The Woonsocket Falls Dam was built in 1960 and is owned and operated by the US Army Corps of Engineers. It is classified by DEM as a **Significant Hazard Dam**. The dam was not designed for flood damage reduction but acts as a Mill/Penstock Dam for the Thundermist hydroelectric facility owned and operated for the City of Woonsocket. When conditions warrant, USACE will operate the gates to reduce local isolated flooding upstream. The dam is also monitored by computer sensors and is hooked up to an alarm system, and the city is working on installing some type of flood stage markers in order to monitor the Blackstone River level and buy some more lead time for evacuation. According to a 2015 report by Pare Corporation, the dam is listed in "fair" condition and suffers from leaks in its upstream wall and is cracking and missing mortar. The report recommended clearing vegetation, repairing masonry and increasing the capacity of the existing spillway.[36]
2. The Hebronville Pond Dam was originally constructed in 1875 and is privately-owned by the Hebronville Mill Limited Partnership. The dam is located immediately upstream of a former mill building which has been converted into residential apartments. It is classified by the Massachusetts Department of Parks and Recreation as a **High Hazard Dam**. According to the Emergency Action Plan (EAP) that was updated in 2013, approximately 300 properties along the Blackstone River in Pawtucket are in the downstream inundation areas that could be affected in the event of a dam failure. The EAP, which includes inundation maps and a listing of roadways and residences in the inundation areas, along with specific notification and evacuation procedures, is on file with the Pawtucket/Central Falls Emergency Management Agency. According to a 2010 inspection report prepared by Pare Corporation, the dam is listed to be in "fair" condition, with noted deficiencies that included areas of unmaintained vegetation, apparent leakage through the stone masonry wall, and a deteriorated/inoperable sluiceway.

A.3.2.3 Severity/Extent

According to federal guidelines for dam safety, two factors influence the severity of a dam failure: (1) the amount of water impounded, and (2) the density, type, and value of development and infrastructure located downstream. The severity and extent of most dam failures are described by their potential point of inundation; and their hazard potential classifications are identified as follows[37]:

- *Low Hazard Potential* – Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
- *Significant Hazard Potential* – Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life but can

[36] The Sun Chronicle. Two dams in Attleboro listed as 'poor' and 'high hazard'. March 8, 2017.

[37] FEMA. Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams. April 2004.

cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.

- *High Hazard Potential* – Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.

The above hazard classifications are applicable to all dams that could potentially affect the planning area, as they are the standard used throughout Rhode Island on a routine basis. It is important to note that these hazard classifications are not related to the physical condition or structural integrity of the dam (nor the probability of its failure), but strictly to the potential for adverse downstream effects if the dam were to fail.
For mitigation planning purposes, the maximum probable extent of a dam failure in the planning area is a complete failure of a high hazard dam.

A.3.2.4 Previous Occurrences

Rhode Island has experienced many dam failures, mainly resulting from major flood events. Historically, however, the consequences of dam failures have not been well documented. During the major flooding events in March 2010, multiple dams in Rhode Island were breached and many others were overtopped and close to breaching, which resulted in the inspection of 42 dams throughout the state. According to the 2024 State Hazard Mitigation Plan, records indicate that in 2010 there were five dam failures due to excessive rain, including two significant hazard dams and three low hazard dams. No injuries or fatalities were reported. Upon a review of data available from the State of Rhode Island, the National Performance of Dams Program (NPDP) at Stanford University, the Association of State Dam Safety Officials, and NOAA's Storm Events Database, there have been no recorded dam failures causing impacts in the planning area.

A.3.2.5 Probability of Future Occurrences

Dam failures are generally considered infrequent and unlikely occurrences, however, according to the State Hazard Mitigation Plan, the potential for dam failure is a significant concern given the large number of dams across the state and the fact that there have been dam failure events in the past. Per a 2017 hazard priority assessment, the State estimated the annual probability of a dam failure occurrence in Providence County to be between 50 and 89.9 percent. It also stated that the probability of future dam failure events is not easily measured, but correlates to some extent with the probability of future major flood events coupled with preventative measures, including the routine inspection, maintenance, repair, and proper operation of dams by their owners, and as regulated by DEM's Dam Safety Section.
Due to the relatively low number of dams classified as Significant or High Hazard in proximity to Pawtucket and Central Falls, in addition to current state regulations and DEM's required monitoring and routine inspection and maintenance programs, the probability of future dam failure events is considered a ***possible*** occurrence for the planning area.
It is anticipated that the effects of climate change will not increase the probability of dam failure events, though projected increases in the frequency of heavy precipitation events (as described in section A.3.6.5 under Flood), flooding, and sediment runoff will likely place increased stress on dams and should continue to be considered in the regulation, construction, operation, and maintenance or repair of dam structures. In Rhode Island, dams that receive

construction permits for repair and/or reconstruction are designed to pass at least the one percent annual rainfall event with one foot of freeboard (a factor of safety against overtopping). If smaller rainfall events, such as 10-year and 25-year events, occur more frequently there will be little impact on the ability of the dams to operate safely. In other words, the probable maximum flood used to design and maintain existing dams may be able to accommodate changes in climate.

According to the 2024 State Hazard Mitigation Plan, a potential outcome of changing climate in Rhode Island is an increase in extreme precipitation events which may lead to more severe floods and a greater risk of dam failure. Additional projected greater periods of drought conditions and high heat may result in ground cracking, a reduction of soil strength, erosion, and subsidence in earthen dams. It also notes that at present there is no comprehensive assessment of the climate-related vulnerability and risks to existing dams. Additionally, there are no common design standards concerning the repair or modification of existing dams nor for the designed and construction of new dams operated in the face of changing climate risk.

A.3.3. EARTHQUAKE

A.3.3.1 General Description

An earthquake is the sudden motion or trembling of ground caused by an abrupt release of accumulated strain on tectonic plates that comprise the Earth's crust. While these thick plates move slowly and continuously over the interior of the earth, they collide, slide, catch, and hold – but eventually, when the mounting stress exceeds the elastic limit of the rock, faults along or near plate boundaries rupture or slip abruptly and an earthquake occurs. The ensuing seismic hazard effects on the Earth's surface include ground shaking, surface fault ruptures, and ground failures, which have the potential to cause widespread damage to buildings and infrastructure. Liquefaction, which happens when loosely packed, water-logged sediments lose their strength in response to strong shaking, often causes major damage during earthquakes. Earthquakes may also provoke secondary hazards such as tsunamis, landslides, dam failures, or large fires ignited by ruptured gas lines.

The underground point of initial rupture is known as an earthquake's focus or hypocenter, and the point at ground level directly above the hypocenter is known as its epicenter. In general, the severity of the resulting ground motion increases with the amount of energy released and decreases with distance from the epicenter. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and are followed by vibrations of gradually diminishing force called aftershocks. While the great majority of earthquakes strike near continental margins or in areas where large plates collide or move past each other, some, including those in the Northeast United States, can occur within plate boundaries.

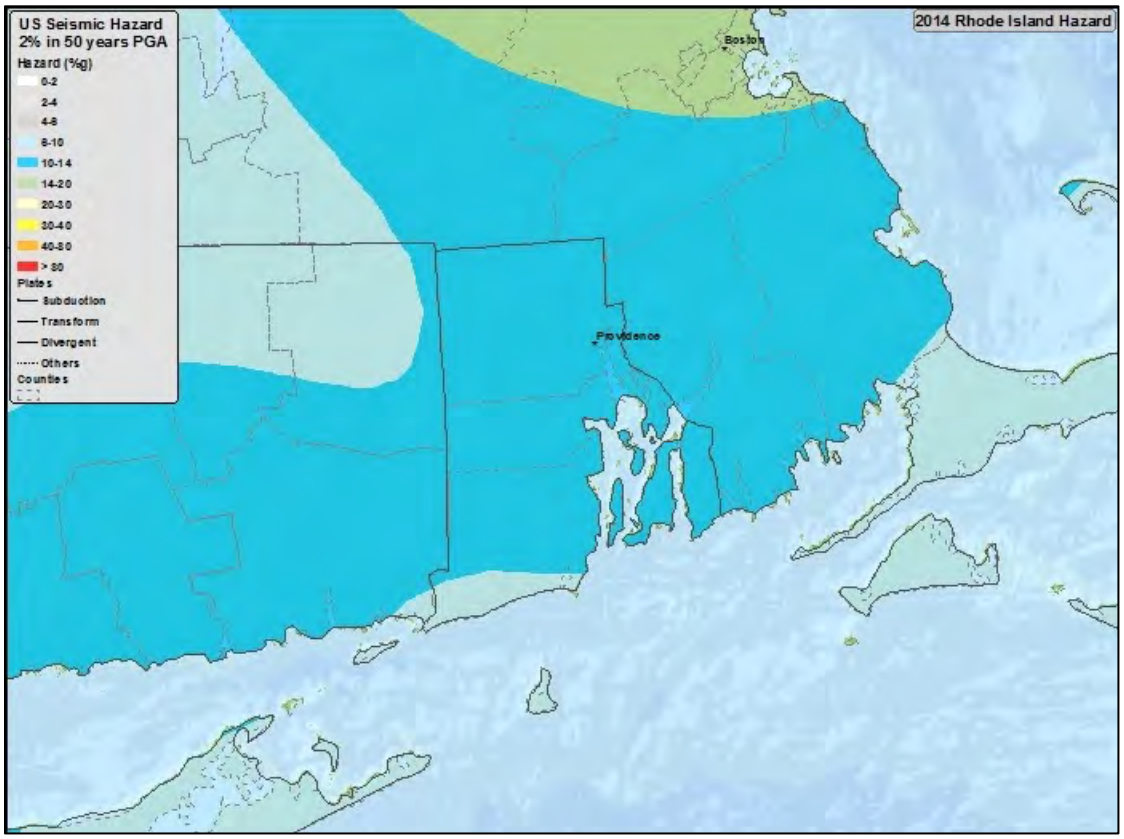
A.3.3.2 Location

The entire planning area is uniformly susceptible to the occurrence of earthquakes. Unlike other areas of the country where earthquakes occur along known fault lines, earthquakes in the Northeast do not correlate with the many known faults that exist in the region. They occur in the middle of plates, far from the plate boundaries.

The planning area (and all of Rhode Island) is located in the North Atlantic tectonic plate and is in a region of historically low seismicity. Only three or four earthquakes of Modified Mercalli

Intensity Scale (MMI) V or greater have been centered in Rhode Island, including the most recent 1951 South Kingstown earthquake which had a magnitude 4.6 on the Richter scale. Other past earthquakes centered in Narragansett Bay, which most significantly impacts Newport, Bristol, and Providence counties. Because of this low seismic level there is a general perception that the state has very little risk of sustaining any earthquake-induced damage. However, as further described in this section (under *Previous Occurrences*), areas geographically close to Rhode Island have had moderate seismic activity historically. **Figure 14** illustrates Rhode Island's earthquake risk based on a 2014 seismic hazard map developed by the United States Geological Survey (USGS) to describe the annual frequency of exceeding a set of ground motions. The figure shows seismic risk zones according to peak ground acceleration, which is expressed as a percentage of the force of gravity (%g). Peak ground acceleration is the amount of earthquake generated ground shaking that, over a specified period, is predicted to have a specified chance of being exceeded. **Figure 14** shows the peak acceleration with 2 percent probability of exceedance in 50 years, a common standard for USGS earthquake hazard maps which are applied in seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. Pawtucket and Central Falls are located in a seismic zone with a peak ground acceleration value of 10-14%g, which is considered a low risk zone in terms of potential ground shaking and damage from such an event.

Figure 14. Seismic Hazard Map for Rhode Island



Source: USGS

A.3.3.3 Severity/Extent

The magnitude of an earthquake is a measure of the amount of energy released as seismic waves at the hypocenter. The Richter Scale classifies earthquake magnitude as determined from measurements recorded by seismographs, and according to a single number on an open-ended logarithmic scale. Each unit increase in magnitude on the Richter Scale corresponds to a ten-fold increase in wave amplitude, or a 32-fold increase in energy.

The intensity of an earthquake is a measure of the strength of ground shaking and its effects on the Earth's surface at a certain location. Intensity is most commonly measured using the Modified Mercalli Intensity Scale, which is based on observed seismic effects versus any mathematical basis. The Scale is composed of 12 increasing levels of intensity (designated by Roman numerals) that range from imperceptible shaking to catastrophic destruction.

Table 21 summarizes the range of magnitudes and related intensities for earthquakes according to the Richter and Modified Mercalli Intensity (MMI) scales, along with abbreviated descriptions of effects on people, human structures, and the natural environment near the epicenter.

Table 21. Classification of Earthquake Magnitude and Intensity

Magnitude (Richter Scale)		Typical Maximum Intensity (MMI Scale)	Abbreviated Description of Effects (Near Epicenter)
1.0 to 3.0		I	Not felt except by a very few under especially favorable conditions.
3.0 to 3.9		II	Felt only by a few persons at rest, especially on upper floors of buildings.
		III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
4.0 to 4.9		IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably.
		V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
5.0 to 5.9		VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
	6.0 to 6.9	VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
7.0 and higher		VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys,

Magnitude (Richter Scale)		Typical Maximum Intensity (MMI Scale)	Abbreviated Description of Effects (Near Epicenter)
			factory stacks, columns, monuments, and walls. Heavy furniture overturned.
		IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
		X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
		XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
		XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Source: USGS

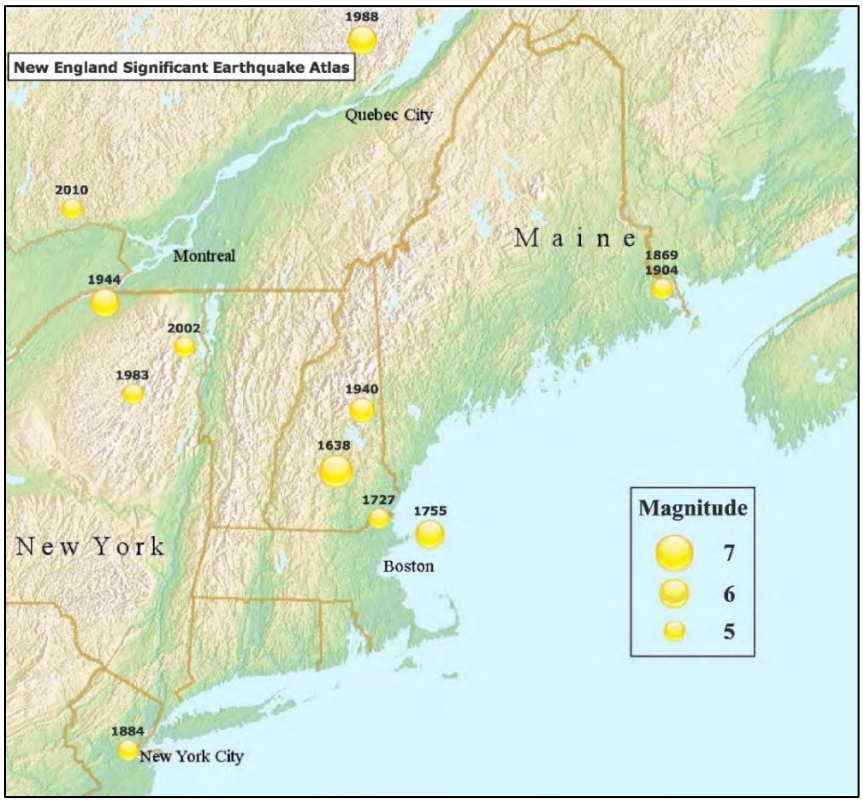
The Richter and Modified Mercalli Intensity (MMI) scales are applicable to all earthquakes that may affect the planning area, as they are used throughout Rhode Island on a routine basis. For mitigation planning purposes, the maximum probable extent of an earthquake in the planning area is a 6.5 on Richter Scale and Intensity VII on Modified Mercalli Intensity scale.

A.3.3.4 Previous Occurrences

Earthquakes occur on a regular basis in the Northeast US. According to the Weston Observatory Northeast Earthquake Catalog, more than 5,000 earthquakes have occurred in the region since 1638, including more than 1,500 earthquakes in New England. Generally, most earthquakes that occur in the Northeast US are small in magnitude and cause little to no damage, though ground shaking is felt across large areas due to the geologic composition and rock structure of the region. In terms of potential impacts, this makes the specific location of the epicenter in the Northeast less relevant than in other regions of the US.

Between 1924 and 2016, there were 105 earthquakes in the Northeast measuring a magnitude of 4.5 or greater on the Richter scale. Out of these 104 earthquakes, 10 were centered within New England and the other 94 occurred within New York State and the Province of Quebec. Historically, moderately damaging earthquakes strike somewhere in the region every few decades, and smaller earthquakes are felt approximately twice per year. The largest known New England earthquakes occurred in 1638 (magnitude 6.5) in New Hampshire, and in 1755 (magnitude 5.8) offshore from Cape Ann northeast of Boston. The most recent New England earthquake to cause moderate damage occurred in 1940 (magnitude 5.6) in central New Hampshire. Reported damage included toppled chimneys, cracked walls, broken water pipes, fallen plaster, and broken furniture. Figure 15 shows the location for some of the most significant historical events per the Weston Observatory's New England Significant Earthquake Atlas.

Figure 15. Significant New England Earthquakes



Source: Weston Observatory at Boston College

Local Impacts

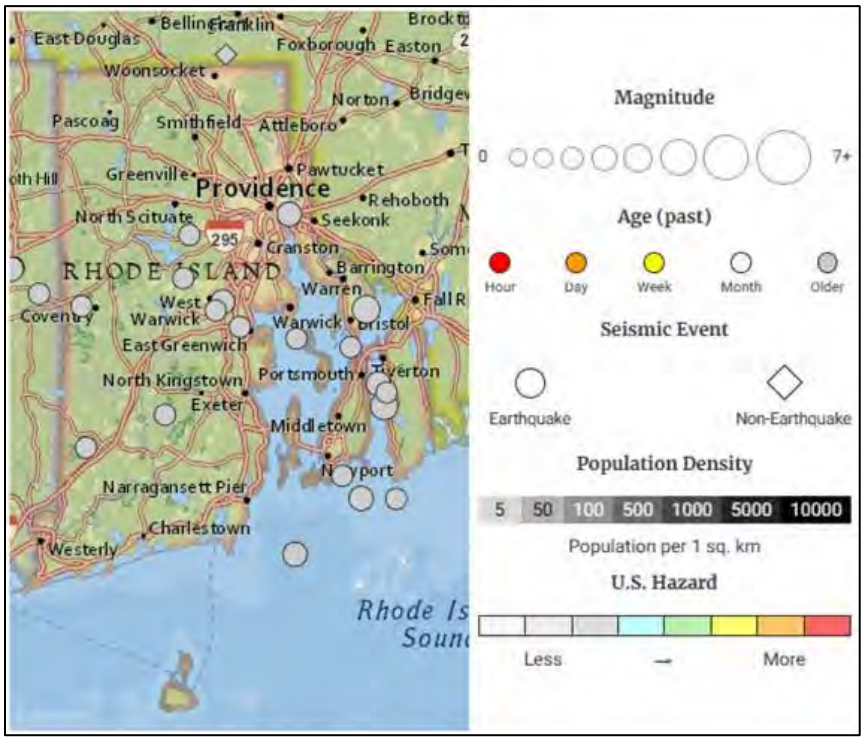
As shown in Figure 16, more than 34 significant earthquakes have been recorded with epicenters in or near Rhode Island since 1568, with no significant activity since 1951. While earthquake events do occur in the state, they do so with much less intensity than elsewhere in the region. In fact, earthquakes are more likely to be felt as a result of an event that occurs in the surrounding region rather than originating within the state. Some of the more significant earthquakes that were felt in Rhode Island are listed below (under Hazard History). Based on a review of available data through the USGS and other reliable sources, no damages or casualties associated with these previous earthquake occurrences have been recorded locally in Pawtucket or Central Falls. However past ground shaking events in the region have been felt by residents in both cities.

HAZARD HISTORY

- June 14, 1973 – A magnitude 5.2 earthquake in western Maine caused some damage in the epicenter region and was reportedly felt over an area of 250,000 square kilometers of New England and Quebec. The intensities in Rhode Island were MMI IV at Charlestown and MMI I-III at Bristol, East Providence, Harmony, and Providence.

- December 7, 1965 – A small earthquake was felt in the Narragansett Bay region with a MMI V. Both windows and doors were reported to be shaking slightly. Some 14 months later, another small earthquake (MMI V) was felt in the lower bay area.
- October 16, 1963 – A magnitude 4.5 earthquake near the coast of Massachusetts caused some cracked plaster (MMI V) at Chepachet, Rhode Island.
- June 10, 1951 – The last earthquake in Rhode Island with a magnitude of 4.0 or greater was centered near North Kingstown.
- September 4, 1944 – Minor intensities were also reported from a shock in the Massena, New York, and Cornwall, Ontario, area. Kingston, Lonsdale, Providence, Wakefield, and Woonsocket reported intensity I-III.
- December 20-24, 1940 – The strong earthquakes centered near Lake Ossipee, New Hampshire, caused some damage in the epicenter area and effects were felt in Newport, Rhode Island. Additional reports included intensity MMI IV effects in Central Falls, Pascoag, Providence, and Woonsocket, and intensity MMI I-III effects in Kingston, New Shoreham, and Wakefield.
- November 1, 1935 – Another widely felt earthquake occurred near Timiskaming, Quebec, Canada. Measured at magnitude 6.25, the shock was felt (MMI IV) on Block Island and at Providence and Woonsocket. The total area affected was about 2,500,000 square kilometers of Canada and the United States.
- November 18, 1929 – The major submarine earthquake (magnitude 7.2) in the vicinity of the Grand Banks of Newfoundland was felt throughout the New England states. Moderate vibrations were felt on Block Island and at Chepachet, Newport, Providence, and Westerly.
- February 28, 1925 – A large area, estimated at over 5,000,000 square kilometers of eastern Canada and the United States (south to Virginia and west to the Mississippi River) was affected by a magnitude 7.0 shock. The epicenter was in the St. Lawrence River region; minor damage was confined to a narrow belt on both sides of the river. Intensity effects were felt on Block Island and at Providence; intensity MMI IV, at Charlestown.
- February 27, 1883 – an earthquake that was centered in Rhode Island was felt from New London, Connecticut, to Fall River, Massachusetts. Within Rhode Island, it was felt (MMI V) from Bristol to Block Island.

Figure 16. Rhode Island's Largest Earthquakes



Source: USGS

A.3.3.5 Probability of Future Occurrences

Earthquakes with a magnitude of 3.0 and greater will remain a ***possible*** occurrence for being felt in the planning area, though based on historical data and existing seismic hazard maps, Pawtucket and Central Falls are considered susceptible to only minor ground shaking and light damages (if any). Moderately damaging earthquakes are only expected to strike somewhere in New England every few decades, and seismologists have estimated that there is about a 50 percent probability of a very damaging magnitude 5.0 earthquake occurring anywhere in the region in a 50-year period. According to the 2019 State Hazard Mitigation Plan, the likelihood of occurrence for an earthquake impacting Providence County was classified as having less than one percent annual probability. It is believed that the effects of climate change will have no relation to the probability or magnitude of future earthquake events.

A.3.4. EXTREME TEMPERATURES

A.3.4.1 General Description

According to the National Weather Service, extreme temperatures (including extreme heat and extreme cold) are the number one weather-related killer in the United States.

Extreme heat may be generally defined as temperatures that hover 10 degrees or more above the average high temperature for the region, last for prolonged periods of time, and are often accompanied by high humidity. In Rhode Island, when the outside temperature goes above 90 degrees for three (3) or more days, it is considered a heat wave. Hot temperatures and extreme heat can occur and last for any amount of time, which can vary from one day to

several weeks. At certain levels, the human body cannot maintain proper internal temperatures and may experience severe health disorders including heat cramps, heat exhaustion or heatstroke (a life-threatening condition).

Extreme cold may be generally defined as prolonged periods of time with freezing temperatures, often made worse by the impact of wind chill factors (the combined elements of air temperature and wind on exposed skin). At certain levels, the human body may suffer from frostbite or hypothermia, making extreme cold a potential severe and life-threatening hazard to people left unprotected from the elements. Freezing temperatures may cause severe damage to crops and other vegetation, and pipes may freeze and burst in structures that are poorly insulated or without heat. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. Long cold spells may cause rivers and lakes to freeze and lead to ice jams that can act as a dam, resulting in severe flooding.

A.3.4.2 Location

The entire planning area is uniformly susceptible to the occurrence of extreme temperatures. Extreme heat impacts the entire State of Rhode Island, though inland communities such as Pawtucket and Central Falls are at greater risk than coastal areas due to the lack of any moderating or cooling effects from onshore sea breezes. In addition, the more densely populated and urban environments that characterize each city make them more vulnerable to extreme heat due to the "heat island" effect (where built up areas are hotter than nearby rural areas due to human activities). Rhode Island's location in the northeastern United States makes it susceptible to extreme cold, however coastal communities are considered at greater risk due to stronger winds coming off the Atlantic Ocean which result in higher wind chills. Although the entire planning area is susceptible to extreme heat, certain locations and populations may be more vulnerable and sensitive to its impacts. Since the last plan was completed, the Rhode Island Department of Health Climate Change Program has partnered with Health Equity Zones (HEZ) to build resiliency to extreme heat and other effects of climate change. The following maps identify locations within the planning area with a higher risk for heat-related illness during extreme heat events. By identifying these higher risk areas, HEZ collaborative groups and other partners can better direct resources and outreach to these communities.

Figure 17 illustrates "urban heat hotspots" which are exposed to higher-than-average surface temperatures. Heat hotspots are more likely in dense areas with fewer trees, less green space, and more asphalt and concrete. These are also areas that have often seen historic segregation and health disparities such as high rates of asthma and chronic disease. Figure 18 illustrates "heat vulnerability" based on heat exposure and sensitivity. Sensitivity was determined based on those neighborhoods with historic inequities, which are often more sensitive to the impacts of heat stress and other effects of climate change. The reddest colors represent areas where there is both high heat exposure and high levels of sensitivity. The areas in orange and red are places where the Cities may want to direct resources and outreach (i.e., tree plantings, emergency preparedness outreach to seniors, etc.).

Figure 17. Urban Heat Hotspots

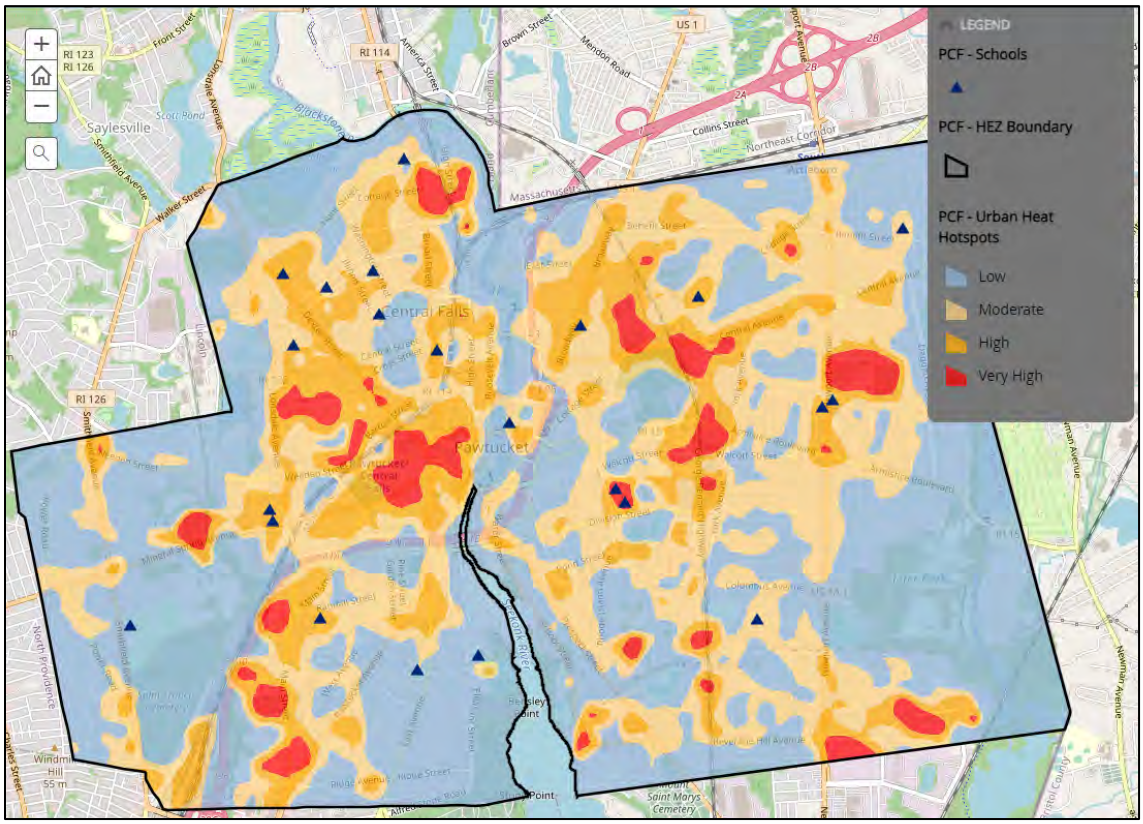
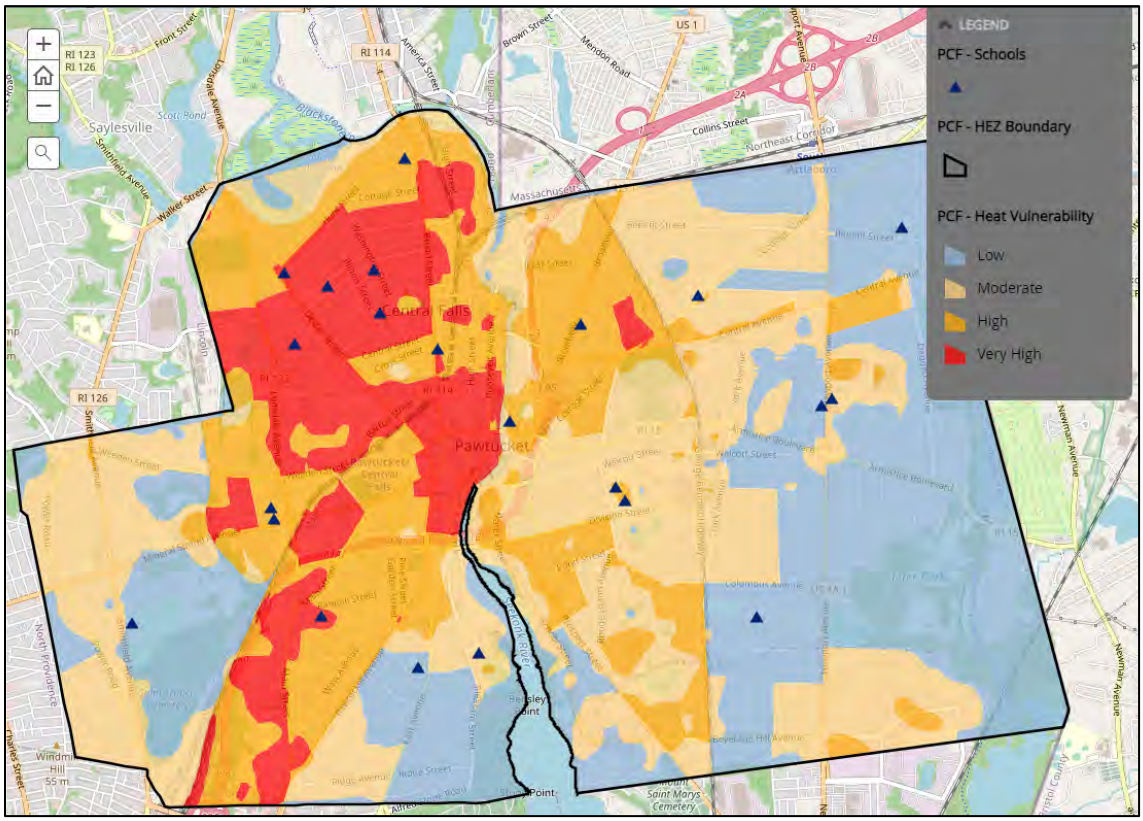


Figure 18. Heat Vulnerability



A.3.4.3 Severity/Extent

The National Weather Service's Heat Index is a measure of the effects of the combined elements of air temperature and relative humidity on the human body, particularly for people in higher risk groups (elderly persons, infants and young children, persons with respiratory difficulties, athletes, outdoor workers, and those who are sick or overweight). **Table 22** summarizes the extent of these effects, and heat alert procedures from the National Weather Service are based mainly on the Heat Index values.

Table 22. Effects of Extreme Heat on the Human Body

Heat Index	Heat Disorder
80–89° F	Fatigue possible with prolonged exposure and/or physical activity.
90–104° F	Sunstroke, heat cramps and heat exhaustion possible with prolonged exposure and/or physical activity.
105–129° F	Sunstroke, heat cramps or heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity.
130° F and Higher	Heatstroke/sunstroke highly higher likely with continued exposure.

Extreme heat conditions are defined by summertime weather that is substantially hotter and/or

more humid than average for a location at that time of year. In Rhode Island, when the outside temperature goes above 90 degrees for three (3) or more days, it is a heat wave. A heat advisory is issued when there are daytime heat indices of 95°F to 99°F for 2 or more hours over 2 consecutive days, or 100°F to 104°F for 2 or more hours over 1 day. An excessive heat warning is issued when there are daytime heat indices of ≥ 105°F for two (2) or more hours. Hot temperatures and extreme heat can occur and last for any amount of time, which can vary from one (1) day to several weeks. [38]

The National Weather Service's Wind Chill Index is used to measure the dangers of frostbite caused by the combined elements of freezing temperatures and wind. **Table 23** summarizes the extent of these effects. A wind chill index of -5°F indicates that the effects of wind and temperature on exposed flesh are the same as if the air temperature alone were five degrees below zero, even though the actual temperature could be much higher. The NWS issues a wind chill advisory when wind chill temperatures are potentially hazardous and a wind chill warning when the situation can be life-threatening.

Table 23. Effects of Extreme Cold on the Human Body

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	29	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

Wind Chill (°F) = $35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$

Where, T= Air Temperature (°F) V= Wind Speed (mph) *Effective 11/01/01*

The Heat Index and Wind Chill Index are applicable to all extreme temperature occurrences that may affect the planning area, as they are used throughout Rhode Island on a routine basis. For mitigation planning purposes, the maximum probable extent of extreme temperatures in the planning area is 5 consecutive days with a heat index exceeding 100 degrees, or a wind chill of less than -20 degrees.

A.3.4.4 Previous Occurrences

Extreme temperatures are not a very frequent occurrence in the planning area. Recent activation events noted by the LPT include the opening of a cooling center in Pawtucket during periods of extreme heat in the summer of 2023, and a warming center during extreme cold in

[38] State of Rhode Island State Hazard Mitigation Plan Update. 2019. P. 3-94.

November 2022. As summarized in **Table 24**, NOAA historical records indicate only 6 reported events in Providence County since 1996, however there were three (3) confirmed fatalities due to extreme heat, including two in Central Falls in 2008. According to the 2024 State Hazard Mitigation Plan, the annual number of hot days is increasing while the annual number of very cold days is generally decreasing. Data provided in the plan indicate the annual number of hot days (maximum temperature of 90°F or higher) for Rhode Island has been above average since the 1990s, with the highest number hot days occurring from 2015–2020 (an average of 14 hot days per year). The average number of very cold days was highest in the late 1970s and early 1980s. Beginning in the 1980s, the annual number of very cold days was below average. Recently, from 2015 to 2020, the number of very cold days has been near average.

Table 24. Previous Occurrences for Extreme Temperatures (1996 – 2023)

Date(s)	Event Type	Description	Casualties (Deaths/Injuries)	Property Damage
2/14/2016	Extreme Cold/ Wind Chill	Arctic high pressure brought strong northwest winds and extremely cold wind chills to southern New England. Many locations reported wind chills between 25 and 35 degrees below zero. Wind chills as low as 32 below zero were reported in Smithfield.	0/0	$0
2/16/2015	Extreme Cold/ Wind Chill	The Smithfield Automated Weather Observing System recorded wind chills as low as 30 below zero during a six-hour time frame.	0/0	$0
7/20/2013	Heat	Heat index values reached 92 degrees in Providence by 8am, peaked at 101 at 2pm and remained there for 3 hours before temperatures fell again. A 90-year old woman died at the Charlesgate Nursing Center in Providence. The woman was not in poor health but lived (and stayed) in a room without air conditioning.	1/0	$0
7/22/2011	Excessive Heat	A strong upper level ridge brought very hot temperatures to Southern New England. A moist southwest low-level flow increased humidity levels such that heat index values rose above 105 degrees for a period of a few hours. The Smithfield Automated Weather Observing System recorded heat	0/0	$0

Date(s)	Event Type	Description	Casualties (Deaths/Injuries)	Property Damage
		indexes of 105 to 107 over a five-hour period.		
7/6/2010	Heat	A strong ridge built into Southern New England resulting in temperatures nearing 100 with high humidity. Heat index values ranged from 100 to 106 degrees for most of Southern New England on the 6th and again on the 7th in a more limited area. Heat index values at the Smithfield Automated Weather Observing System were 100 to 104 degrees.	0/0	$0
6/9/2008	Heat	An elderly couple in Central Falls, RI was found dead in their apartment where temperatures had reached 102 degrees.	2/0	$0
Total			3/0	$0

Source: NOAA Storm Events Database

A.3.4.5 Probability of Future Occurrences

Extreme temperatures are becoming a ***highly likely*** occurrence in the planning area. It is anticipated that the effects of climate change will result in an increase in the frequency, duration and intensity of extreme heat events, and a decrease in the frequency of extreme cold events. Heat waves are projected to become much more commonplace in a warmer future with potentially major implications for human health, particularly as it relates it more vulnerable populations such as children, seniors, lower income residents, and those already dealing with respiratory or other health problems.

According to the 2019 State Hazard Mitigation Plan, the likelihood of occurrence for an extreme heat event impacting Providence County is 100 percent probability in the next 5 years. Based on history and climatic conditions, the likelihood of occurrence for extreme cold during this same period is considered between 10 and 100 percent probability. Per this same report, extreme heat and hot weather have already increased in frequency and magnitude due to climate change. For example, in 1970, Providence had four days with a maximum temperature over 90°F; however, due to climate change, this number has risen to 22 days. In addition, the number of days over 90°F is projected to continue to grow. Climate change studies estimate that by 2070, Rhode Island could have up to 50 days over 90°F per year.

Lastly, as noted in the summary of findings from the 2020 Community Resilience Building Workshop, stakeholders from both Cities are generally in agreement that Pawtucket and Central Falls are experiencing more intense and frequent heat waves. Longer periods of elevated heat, particularly in July and August, have raised concerns about vulnerable segments of the population, including the elderly and disabled.

A.3.5. FIRE

A.3.5.1 General Description

Fire is a combustion or burning, in which substances combine chemically with oxygen from the air and typically give out bright light, heat, and smoke. For the purposes of this plan, the fire hazard includes two types of fire events: urban fires and wildfires.

Urban fires occur primarily in more densely developed areas of cities and towns with the potential to rapidly spread to adjoining structures. These fires damage and destroy homes, schools, commercial buildings and vehicles. A major urban fire or conflagration is a large, destructive, and often uncontrollable fire that spreads substantial destruction. Although they can be ignited by numerous sources, major urban fires are often the result of other hazards, such as storms, earthquakes, gas leaks, transportation accidents, hazardous material spills, criminal activity (arson), or acts of terrorism. Small structural fires, which occur more frequently, can result from mundane events such as cooking, smoking, or electrical equipment/appliance malfunctions. Nationally, the leading causes of urban fires are arson, open flames, and cooking. The leading causes of fire deaths are smoking, arson, and heating, with urban fires causing the most fire deaths and injuries. Between 70 and 80 percent of deaths result from residential fires. People under the age of 5 and over the age of 55 have a much higher death rate than the average population, accounting for more than one-third of all deaths nationally.

A ***wildfire*** is an unwanted, uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Other names such as brush fire or forest fire may be used to describe the same phenomenon depending on the type of vegetation being burned. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the frequency and severity of wildfire for people and property located within wildfire hazard areas, and particularly for those in rural areas with limited capabilities for rapid fire suppression. When not quickly detected and contained, wildfires have the potential to cause extensive damage to property and threaten human life. Wildfires are part of the natural management of many forest ecosystems, but most are caused by human ignition factors. Nationally, over 80 percent of wildfires are started by negligent human behavior during dry conditions such as improperly discarding cigarettes, burning debris, or not extinguishing campfires in wooded areas. The second most common cause of wildfires is lightning strikes that occur during dry thunderstorms.

A.3.5.2 Location

URBAN FIRE

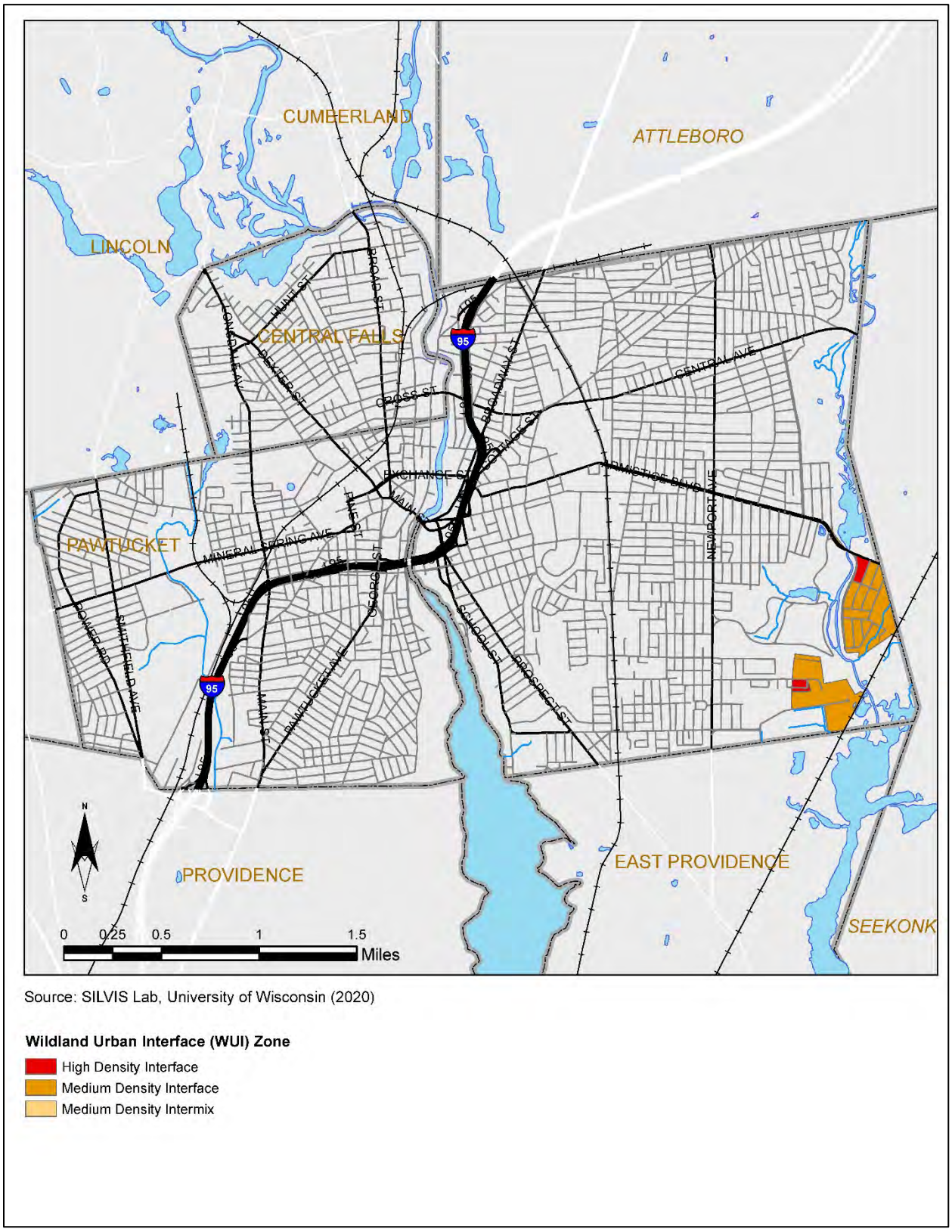
The urban fire hazard in Pawtucket and Central Falls involves areas where residential, commercial and/or industrial structures are clustered close together, increasing the possibility of a rapid spread to another structure. Specific areas of concern include locations where closely spaced wood frame structures and/or adjoining and multi-unit buildings are found such as each city's more densely developed residential districts. Other at-risk areas are characterized by adjoining buildings as found in the commercial corridors and downtown areas of the city. Some specific problem areas of concern include the following:

WILDFIRE

The wildland-urban interface is defined as the area where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Figure 19 illustrates wildfire hazard areas based on the location of wildland-urban interface zones across the planning area as mapped by the SILVIS Laboratory at the University of Wisconsin.[39] These hazard areas include two types of wildland-urban interface areas: intermix and interface. Intermix areas are described as areas where housing and vegetation intermingle; interface areas are described as areas with housing in the vicinity of contiguous wildland vegetation. Although no specific problem areas of concern were identified for either city based on previous wildfire occurrences or identified vulnerabilities, southeastern portions of Pawtucket have been mapped (and confirmed with City staff) as a potential wildland-urban interface zone that includes both intermix and interface areas.

[39] Wildland-Urban Interface (WUI) Areas for 2020: https://silvis.forest.wisc.edu/data/wui-change/

Figure 19. Wildfire Hazard Areas



Source: SILVIS Lab, University of Wisconsin-Madison

A.3.5.3 Severity/Extent

The magnitude of fire events is often characterized by their size and level of impact. For urban fires this includes the total number and value of structures and other property burned, casualties, and in some cases the number of fire companies responding. For wildfires, this includes the speed of propagation, total number of acres and structures burned, and other resulting impacts to people and property. The magnitude and severity of fire events is greatly dependent on weather, fuel conditions, and existing fire detection, control, and suppression capabilities.

For mitigation planning purposes, the maximum probable extent of a fire event in the planning area is a major urban fire affecting multiple large structures; or 100 acres burned along wildland-urban interface.

A.3.5.4 Previous Occurrences

Wildfires are a frequent occurrence in Rhode Island but are generally small and quickly contained. The worst year for wildfires was 1930, when 37,400 acres burned. Other large fires occurred in 1942 (Coventry Fire) and 1951 (Wood River Fire), but none of these events directly impacted the planning area. Recent fire occurrences have burned much smaller acreage due to quicker response times, better spotting practices, and stronger forest management policies. Urban and smaller wildfire (brush fire) events remain a very frequent occurrence in the planning area, however detailed historical data and statistics on previous fire occurrences are limited. According to the 2024 State Hazard Mitigation Plan, there were 172 wildfire events between 2019 and 2023 which burned nearly 233 acres and 7 structures. Some information from the Pawtucket Fire Department on recent structure and brush fires is summarized in **Table 25**. The State Fire Marshal's Office provided data on fire incidents as reported by Central Falls since 2018 as summarized in **Table 26**. According to this data, there have been 6 fire-related injuries, one fire-related death, and a total dollar loss of approximately $2 million in Central Falls during this period.

Table 25. Fire Data and Statistics for Pawtucket (June 2019 – October 2023)

Time Period	Number of Calls	# of Structure Fires	# of Brush Fires
3/16/2020 – 10/20/2023	61,595	131	98
6/21/2019 – 3/16/2020	12,727	96	27
Total	74,322	227	125

Source: Pawtucket Fire Department

Table 26. Fire Data and Statistics for Central Falls (2018 – November 6, 2023)

Incident Type	Number of Incidents
Building Fires	1,064
Vehicle Fires	30
Other Fires	65
Total	1,159

Source: Rhode Island Office of the State Fire Marshal

- March 14, 2020 – A massive structural fire destroyed and heavily damaged several vacant buildings at the abandoned former Paramount Card mill complex that spans the city boundary between Pawtucket and Central Falls. Approximately one million square feet of building on the site was involved. The fire sounded multiple alarms and included approximately 200 first responders. Fire departments as far as Westerly, RI and Plainfield, MA aided in response efforts. No lives were lost, and no surrounding homes were damaged, but more than 200 residents in nearby apartments had to be evacuated because their building's power was cut, or smoke was getting too close.

A major fire burns at the Union Wadding Company Mill in October 2010. *Courtesy of the Sun*

- October 13, 2010 – A major fire destroyed over half of the Union Wadding Company mill site in Pawtucket. Approximately 200 firefighters from 8 different communities spent several days extinguishing the fire, with an estimated $2.5 million in damages.
- December 2009 – In Central Falls, there was a 3-story mill building at 444 Roosevelt Avenue which burned to point where it needed to be demolished. That fire was caused by artists using a wood stove for heat.
- November 14, 2003 – A major fire at an unoccupied mill complex (Greenhalgh Mill) in Pawtucket spread rapidly to 17 properties causing over $3 million in damages. The fire, fanned by gale force winds, spread rapidly to nearby homes and structures. As the winds fueled the fire and spread large flaming embers into the community, the Pawtucket Fire Department issued a general alarm. Nearly a dozen communities responded with fire equipment and crews, limiting the potential destruction. In total, 17 properties were damaged, with eight totally destroyed.
- 1995 – a vacant mill complex was destroyed by fire in Pawtucket.

An aerial view of the fire at the Greenhalgh Mills complex in 2003. The raging, wind-whipped fire began at the abandoned textile mill and destroyed several homes and ignited buildings over a 10-

A.3.5.5 Probability of Future Occurrences

Fires will continue to be a ***highly likely*** occurrence in the planning area, though the magnitude and impact of most events will be contained due to early detection and fire suppression. The potential for larger, destructive urban fires is higher for Pawtucket and Central Falls due to several factors including large concentrations of older, wood frame structures (many without

sprinkler systems); numerous areas with adjoining buildings; and the presence of industrial facilities that include but are not limited to buildings with hazardous and flammable materials, and vacant mill sites which have been the source of major local fires in the recent past. The probability of a large urban fire turning into a catastrophic disaster is also linked to weather conditions, as high winds during dry conditions will only accelerate active fires and make suppression efforts that much more difficult.

For Central Falls in particular, the urban fire risk is extremely high for the entire city. With reduced manpower and other factors such as the old wooden housing stock of balloon frame structures and their proximity to others makes this a daily threat. The City also factors in the socioeconomic situation within the city which has been found to be a contributing reason for greater chances for fires to begin.

It is anticipated that the effects of climate change, including more frequent and prolonged drought conditions, will increase the frequency and intensity of wildfire events; however, the United States Forest Service indicates that it is difficult to project what the exact impacts of climate change may be. Another related factor that is expected to increase the probability of future wildfire events is the introduction of disease, pests, and invasive plants that result in the dieback of mature tree species thus creating increased vegetative fuel loads in forested areas.

A.3.6. FLOOD

A.3.6.1 General Description

Flooding is the most frequent and costly natural hazard in the United States. Nearly 90 percent of presidential disaster declarations result from natural events where flooding was a major cause of human casualties and property damages. Flooding may be generally defined as the partial or complete inundation of normally dry land by the overflow and accumulation of excess water.

Flooding may be classified according to three distinct hazard types:

- ***Riverine floods*** include overbank flooding from a river or stream channel onto adjacent floodplains and are generally caused by excessive precipitation from large-scale weather systems. A rapid accumulation of heavy localized downpours may also impact smaller streams and creeks to cause flash floods, characterized by a rapid rise in water level and/or high velocity flow with little warning. Other potential causes of riverine floods include ice jams or dam failures.
- ***Coastal floods*** occur along the shorelines and tidal extensions of large water bodies and are typically caused by the wind-driven waves, storm surge and heavy rainfall produced by hurricanes, tropical storms, nor'easters and other large, low-pressure coastal storms with cyclonic flows. Coastal flood hazards are often exacerbated over the long term by coastal erosion and sea level rise.
- ***Urban floods*** occur where the physical development of a community has decreased the ability of natural groundcover to absorb and retain surface water runoff, and existing drainage systems are incapable of conveying or retaining storm water flow. They are most often caused by isolated, high-intensity rainfall events of relatively short duration (1 to 3 hours). Even when

drainage systems are designed to acceptable standards, urban flooding may occur when they are obstructed by debris, sediment or other materials that limit their functional capacity.

A.3.6.2 Location

The principal sources of riverine flooding in the planning area are the Blackstone and Moshassuck rivers and their tributaries. The Blackstone River Watershed comprises a total of 640 square miles, with 382 square miles located in south central Massachusetts and 258 square miles in northern Rhode Island. The Moshassuck River watershed encompasses approximately 23.6 square miles in northeastern Rhode Island. The Moshassuck River is affected by backwater conditions from Providence River, which is tidal, but the stage can be controlled by the Fox Point Hurricane Barrier that separates the Providence River from Narragansett Bay during storm surges. The local source for coastal flooding is the Seekonk River, which begins in Pawtucket where the Blackstone River reaches sea level below Pawtucket Falls. The Seekonk River is a tidal extension of the Providence River and the northern tip of Narragansett Bay and is subject to coastal flooding and storm surge during hurricanes. Urban floods in the planning area are most typically caused by heavy precipitation events that overwhelm local drainage systems in lower-lying areas of each city.

RIVERINE FLOOD

Figure 20 shows the location of all special flood hazard areas in the planning areas as shown on currently effective (2015) FEMA Digital Flood Insurance Rate Maps (DFIRMs) as obtained through the Rhode Island Geographic Information System (RIGIS) in August 2023. Descriptions for these special flood hazard areas are provided in the *Extent* portion of this section.

COASTAL FLOOD

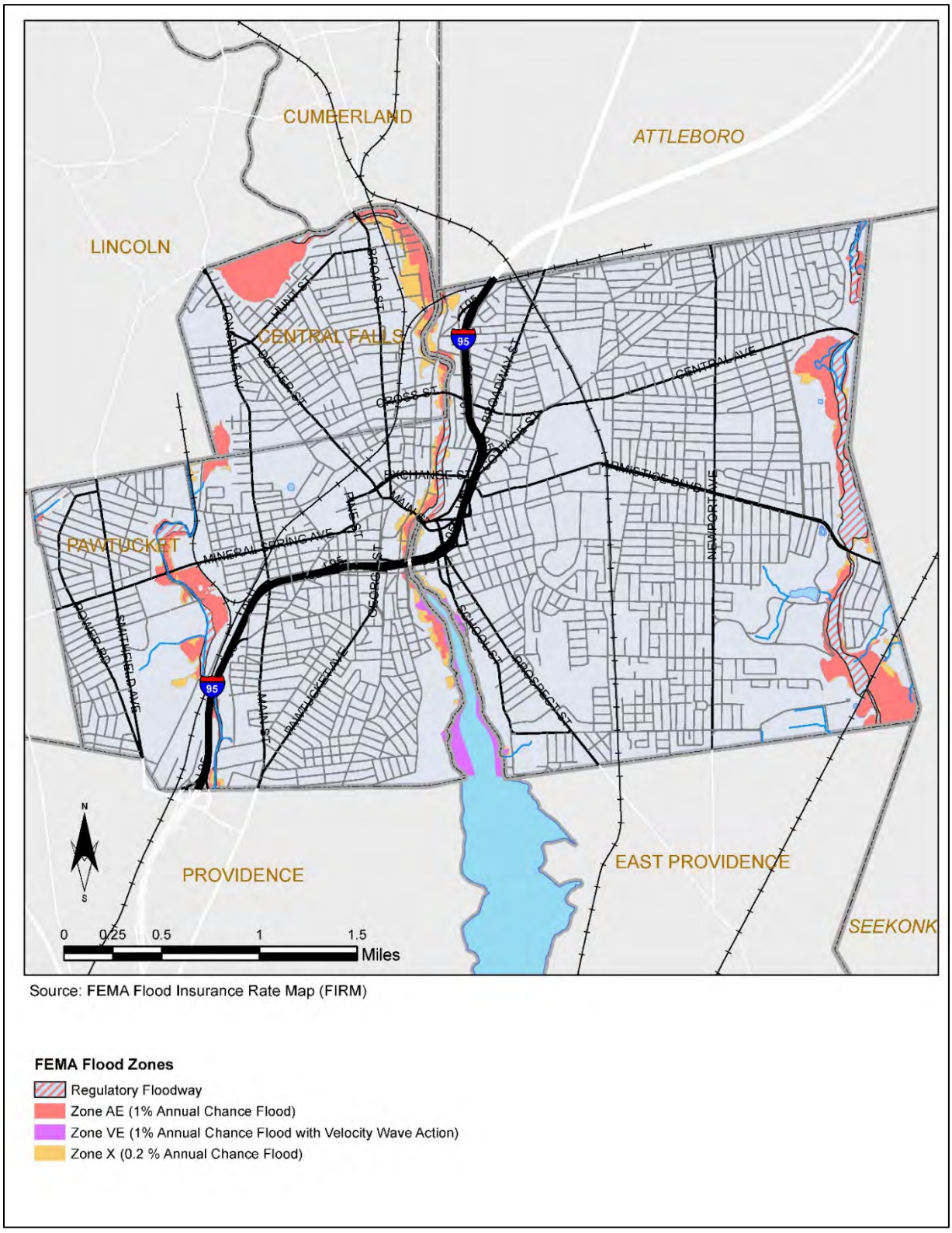
Coastal special flood hazard areas as currently mapped on FEMA DFIRMs are included in Figure 20 as listed above for riverine flood. This includes “VE Zones” which are defined as areas subject to inundation by the 1 percent annual chance flood event with additional hazards due to storm-induced velocity wave action. Figure 21 shows the location of all hurricane storm surge inundation areas. This figure illustrates areas that could be inundated by “worst case” scenarios associated with Category 1 through 4 hurricanes striking the coast of Rhode Island. Another growing concern as it relates to coastal flooding is sea level rise. Although not nearly as significant for the planning area as it is for coastal communities, sea level rise has the potential to increase the severity of tidal flooding as far north as Pawtucket. While projections for future mean high water and stillwater elevation levels are not severe for Pawtucket, the greater long-term concern associated with sea level rise is that it will amplify the magnitude of episodic coastal flood events. Figure 22 shows potential inundation areas for Pawtucket based on a 100-year coastal storm with 10 feet of sea level rise as projected in Rhode Island’s STORMTOOLS online mapping application. The figure shows the inland extent and relative depth of inundation (feet above grade) for areas along the Seekonk River as far north as Interstate 95. The flood extents and water depths are presented at the 95% confidence interval, illustrating the models are 95% confident that water levels will not exceed what is shown in the figure.

URBAN FLOOD

Urban floods often strike rapidly, terminate quickly, and occur in areas generally not considered

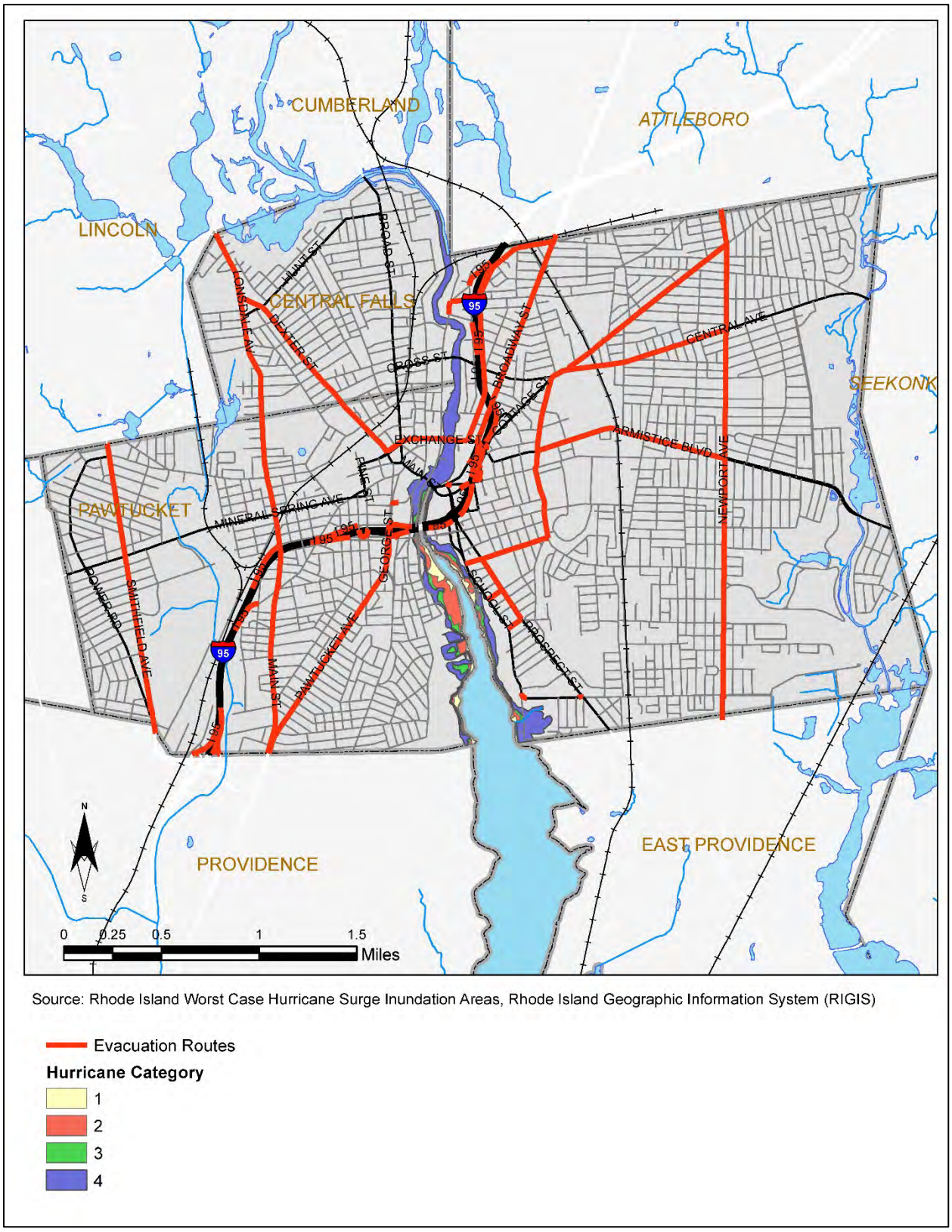
at risk to major flooding (including areas outside of mapped floodplains). Urban floods in Pawtucket and Central Falls have most often occurred as a result of very heavy precipitation that exceeds local drainage capacities, and in some cases, where sediment, brush, trash, or other debris accumulate and impede the conveyance of flood flows through stormwater systems. In addition, trees, ice, and other debris may be washed away and carried downstream to collect on bridges, culverts, and other obstructions. As flood flow increases, significant amounts of this debris often break loose, sending water and debris surging downstream until another obstruction is encountered. However, it is difficult to predict the degree to which, or the specific location where, debris may accumulate.

Figure 20. Special Flood Hazard Areas



Source: FEMA

Figure 21. Hurricane Storm Surge Inundation Areas



Source: U.S. Army Corps of Engineers, New England District

Figure 22. Flooding Impacts from Sea Level Rise + Coastal Storms in Pawtucket

Source: RI STORMTOOLS

PRINCIPAL FLOOD HAZARD PROBLEMS

Past flood events in the planning area indicate that flooding can occur during any season of the year, but spring and fall have historically produced those with greatest magnitude and effect. According to the most recent FEMA Flood Insurance Study report (October 2015), the most severe floods have been caused by storms of tropical origin, such as hurricanes, usually occurring in late summer and early fall. Winter and spring flooding is commonly caused by transcontinental storms in combination with snowmelt or ice jams. Mid-spring and fall thunderstorms can also produce limited urban flooding.
Some specific flood hazard problems and areas of concern include the following:

PAWTUCKET

- A significant portion of the city east of the Blackstone River experiences frequent street and basement flooding during heavy rain. This is due to a combination of factors, including the inability of the current combined sewer overflow (CSO) system to handle the runoff during heavy rainfall. The pipes in the CSO system have become clogged with scum buildup over the years, decreasing the capacity of the lines. To help correct this problem, some backflow-

prevention valves have been installed where the sanitary line that runs from the house connects to the CSO system.

- Significant flooding has occurred near the Moshassuck River in the vicinity of Grenville Street and Grotto Avenue and upstream of Mineral Spring Avenue. There are several wooden, multi-family housing units for the elderly on Mineral Spring Avenue that are at risk to flooding. One property, Galego Court (Pawtucket Housing Authority site) includes units subject to flooding, as well as a daycare on site (special population). The backyards of properties along Pinecrest Drive also experience periodic flooding. There are 19 residential structures in the floodplain, most of which are older buildings that have not been brought up to current floodplain standards. Two of the insured structures have reported repetitive losses (more than two significant claims due to floods) since 1978—both cases occurred on Mineral Spring Avenue adjacent to the Moshassuck River. Minor damage was suffered after the last few hurricanes due to flooded sewer lines. Currently, the City is using sandbags to "band-aid" flooding problems.
- Currently, 32 structures in the floodplain are vulnerable to basement flooding, including City Hall, which is situated at the lowest elevation in the city. Slater Mill, a national historic landmark and tourist attraction, is also on the bank of the Blackstone River. The City has contacted officials at Slater Mill to explore possible flood-proofing measures. The City has also made an effort to contact local businesses that are in the floodplain. Pawtucket officials plan to continue this effort if federal grants are available for public education.
- There are various areas in the City that experience repetitive flooding and road washout during heavy rains. A preliminary citywide inventory of streets subject to repetitive flooding and washout is listed below along with the likely cause:
    - Armistice Boulevard in vicinity of DPW Center (drainage)
    - Mineral Spring Avenue (drainage, elevation)
    - Pinecrest Drive, along rear of properties (poor design)
    - Grand Avenue @ the London Avenue intersection (drainage)
    - Grenville St./Grotto Avenue in the vicinity of Moshassuck River (poor design)
- There are four low lying bridges/culverts subject to flooding where branches from fallen trees could clog the drainage flow creating flooding: Interstate 95 over the Moshassuck River; Mineral Spring Avenue culvert over the Moshassuck River; Roosevelt Avenue bridge over the Blackstone River; and Exchange Street bridge over the Blackstone River. Main Street, Central Avenue, Interstate 95 over the Seekonk River, and Division Street are all high bridges that are in good condition and could be used for evacuation over the Moshassuck and Blackstone Rivers.
- Blackstone Falls, a high-rise building for seniors on Grove Street, has seen repeated basement flooding that has required building evacuations. The electrical and mechanical utilities have been elevated but this is still a problem of concern given the vulnerable population that resides there.
- Riverfront Lofts is an old mill site that was converted into a multi-family condominium complex, located on Exchange Court and immediately adjacent to the Blackstone River. The building has seen repeated basement flooding that has resulted in damaged residential living spaces.

CENTRAL FALLS

- The majority of flooding problems within the city of Central Falls stems from street flooding in poor drainage areas and flooded parking lots in low-lying areas. This is due to a combination of factors, including the inability of combined sewer overflow (CSO) system to handle the runoff during heavy rainfall.
- The main areas in the city prone to flooding are on the east side of the city along the Blackstone River. These streets include River Street, Crown Street, Courtland Avenue, New Haven Avenue, and Roosevelt and High Street businesses.
- On the west side of the city, Higginson Avenue can be affected by flooding due to topography and poor drainage. A section at the entrance to the City-owned Corrigan Sports Complex (10 Higginson Ave) has been affected especially hard by intense rain events that bring volumes of stormwater too large for the drainage system to accommodate, resulting in localized flooding that makes the street impassable until the flooding subsides. Flooding also extends onto the property of the business located across the street (23 Higginson Ave), where employees have been forced to wait for the water to subside before they can reach their cars. More importantly, 10 Higginson Avenue is the site where the new Central Falls High School will be built. While flooding at this location has been a problem for several years it has become increasingly urgent for this problem to be solved before construction of the school can begin. A recent engineering assessment of the stormwater sewer system (a series of catch basins along Higginson Avenue and a pipe that terminates at the Moshassuck River approximately ¼ of a mile away) intended to collect runoff from this area determined that this system is incapable of accommodating the volume of stormwater generated during sudden intense rainfall events. The engineers working on the stormwater management plan for the high school construction project have presented options to address the problem, and the City is currently working with the project engineers and the Narragansett Bay Commission to determine which solution to implement.
- There are some multi-family homes and other structures located on a few streets that repeatedly flood, including Higginson Avenue, Samoset Avenue, the High Street Underpass by Broadway Transmission & Auto, and the intersections of Broad Street & Madeira Avenue, Perry Street and Beacon Street, and Fales Street and Broad Street.

A.3.6.3 Severity/Extent

RIVERINE FLOOD

The severity of a riverine flood event is typically determined by a combination of several major factors, including: stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; the degree of vegetative clearing; and impervious surface. The periodic flooding of lands adjacent to rivers, streams and shorelines (floodplains) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is typically defined as the average time interval, in years, expected between a flood event of a particular magnitude

and an equal or larger flood. Flood magnitude (spatial extent and depths) increases with increasing recurrence interval.

Floodplain areas are delineated according to the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 10-year flood and the 100-year floodplain by the 100-year flood. A more appropriate way of expressing flood frequency is the percent chance of occurrence in any given year (annual probability). For example, the 100-year flood has a 1 percent chance of occurring in any given year, and the 500-year flood has a 0.2 percent chance of occurring in any given year. Statistically, the 1 percent annual chance flood has a 26 percent chance of occurring during a 30-year period, equal to the duration of many home mortgages. Contrary to what the term suggests, a "100-year flood" is not a flood that occurs only once every 100 years. A "100-year flood" can and often does occur in the same location multiple times in a century.

Special flood hazard areas identified on FEMA DFIRMs (as shown in Figure 20) are defined as the areas that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1-percent-annual-chance flood is also referred to as the base flood elevation (BFE), and is the national minimum standard for applying FEMA's NFIP floodplain management regulations and mandatory flood insurance purchase requirements. These areas are shown on FEMA DFIRMs as Zone A (without BFEs determined) or Zone AE (with BFEs determined). Areas that are determined to be inundated by the 0.2-percent-annual-chance flood are considered moderate flood hazard areas and are shown on FEMA DFIRMs as Zone X. Areas outside of all these areas are considered minimal flood hazard areas.

Figure 20 shows all of the above-mentioned flood hazard areas, in addition to the Regulatory Floodway. The floodway is the most hazardous portion of the mapped flood hazard area and is defined by FEMA as "the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height." Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations.

COASTAL FLOOD

The intensity and duration (or forward speed) of a storm is the most influential factor affecting the severity and impact of storm surges. While hurricanes and tropical storms often move through areas relatively quickly, nor'easters can last for days and multiple tidal cycles, often causing major coastal flooding, erosion and damage from wind-driven wave action.

Special flood hazard areas identified as "VE Zones" on FEMA DFIRMs (as shown in Figure 20) are defined as areas subject to inundation by the 1 percent annual chance flood event with additional hazards due to storm-induced velocity wave action. Mandatory flood insurance purchase requirements and floodplain management standards apply for these areas.

Figure 21 shows the location of all storm surge inundation areas for Pawtucket and Central Falls. This figure illustrates areas that could be inundated by "worst case" scenarios associated with Category 1 through 4 hurricanes striking the coast of Rhode Island.

URBAN FLOOD

The severity of urban flooding varies greatly and is highly dependent on rainfall intensity and duration, but is generally limited to minimal, localized damages and/or temporary disruptions

to transportation infrastructure. However, the lack of warning associated with urban flood events often creates significant threats to public safety due to flooded roadways, and results in increased damage to property that could have been prevented with more advance notice (particularly for vehicles left unattended in areas susceptible to urban flooding).
For mitigation planning purposes, the maximum probable extent of a flooding event in the planning area is the 1 Percent Annual Chance Flood for all inland FEMA Special Flood Hazard Areas (riverine flood); the worst-case storm surge inundation for a category 3 hurricane (coastal flood); and the 10-year Design Storm Event (urban flood).

A.3.6.4 Previous Occurrences

Floods are a frequent occurrence in the planning area. The most recent flood-related event was some localized flooding and sewer overflows that occurred during heavy rains in the summer of 2023, though no significant damage was reported. NOAA historical records include 167 flood events[40] in Providence County since 1996, causing no casualties, and approximately $33.7 million in reported property damages. **Table 27** includes some recent notable past events with local impacts specific to Pawtucket or Central Falls and/or causing at least $100,000 in total damages. The damage figures associated with these events are believed to greatly underestimate the value of actual flood losses that have occurred but gone unreported and/or unrecorded in NOAA records.

Table 27. Recent Notable Flood Events[41] (2001 – 2023)

Date(s)	Event Type	Description	Casualties (Deaths/Injuries)	Property Damage
9/11/2023	Flash Flood	Scattered thunderstorms and widespread flash flooding across Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors. In Pawtucket, Newport Avenue was flooded and cars were stuck near Armistice Boulevard.	0/0	$0
7/16/2023	Flash Flood	Widespread and substantial flash flood event across much of southern New England. In Pawtucket, Mendon Avenue at Carter Street was flooded with cars stuck.	0/0	$0
9/5/2022	Flash Flood	A cold front stalled over southern New England causing very heavy rain and significant flash flooding	0/0	$1,000,000

[40] Includes events that were classified as flood, flash flood, or coastal flood.
[41] Includes data for events reported to have occurred in the National Weather Service's Forecast Zone for Providence County, including but not limited to Pawtucket and Central Falls.

Date(s)	Event Type	Description	Casualties (Deaths/Injuries)	Property Damage
		before the front moved off the south coast during the evening. Rainfall amounts ranged from 7 to 11 inches in eastern Connecticut and the Providence metro area. In Central Falls, 6.14 inches was reported.		
8/23/2022	Flash Flood	A stationary front across Rhode Island provided the focus for heavy rain and scattered thunderstorms. Four to six inches of rain fell in the greater Providence area. In Central Falls, a car was stuck in flash flooding on Higginson Avenue. Water was reportedly up to some peoples' knees.	0/0	$8,000
6/28/2020	Flood	A mid-level short wave trough combined with an approaching cold front and a warm, humid environment produced severe thunderstorms and flash flooding across northern Rhode Island. In Pawtucket, Armistice Boulevard was flooded and impassable in front of the DPW building.	0/0	$0
9/2/2019	Flood	A cold front approaching the area triggered showers and embedded thunderstorms, with locally heavy rain. In Pawtucket, Mineral Spring Avenue at San Antonio Way and Weeden Street at the Conant Street Bridge were flooded and impassable for a time. One car was stuck in the street flooding and removed from the roadway.	0/0	$0
8/6/2016	Flood	A strong cold front moved across southern New England, producing scattered showers and thunderstorms. A few of these storms resulted in wind damage and some minor flooding. McCoy Stadium field and parking	0/0	$15,000

Date(s)	Event Type	Description	Casualties (Deaths/Injuries)	Property Damage
		lot in Pawtucket was flooding, cancelling the scheduled Pawtucket Red Sox game.		
5/31/2015	Flash Flood	A cold front moving across southern New England combined with high precipitable waters and weak flow aloft to initiate showers and thunderstorms that produced flooding and pockets of flash flooding. In Pawtucket, the intersection of Conant and Weeden Street was flooded and impassable.	0/0	$0
10/22/2014	Flood	Low pressure moving up the east coast brought a soaking rain and strong winds to much of southern New England. In addition, both downed leaves from the storm and naturally fallen leaves from before the storm clogged storm drains which resulted in street flooding. In Pawtucket, a car was stuck in flood waters on Whipple Street.	0/0	$30,000
9/2/2013	Flood	A nearly stationary warm front draped across southern New England, coupled with a very moist atmosphere, resulted in showers and thunderstorms across the area for the third day in a row. Heavy rain fell within these showers and storms and flash flooding occurred. The emergency room of Memorial Hospital flooded.	0/0	$1.5 million
6/7/2013	Flood	The remnants of Tropical Storm Andrea tracked across Southern New England bringing heavy rain (3-5 inches). This resulted in significant urban flooding, as well as river and small stream flooding. Several basements were flooded along Lockbridge Street in Pawtucket.	0/0	$0

Date(s)	Event Type	Description	Casualties (Deaths/Injuries)	Property Damage
7/28/2012	Flash Flood	Thunderstorms and heavy rains traversed the area, with many locations receiving up to two to three inches in less than an hour. This resulted in flash flooding, particularly in more urban areas. Central Avenue in Pawtucket was flooded with 6 inches of water.	0/0	$30,000
3/29/2010	Flood	A series of climate and weather events in February and March led to the worst flooding event in Rhode Island's recorded history. See *"The Great Rhode Island Flood of 2010"* below this table for more information.	0/0	$27 million
10/15/2005	Flood	A low pressure system interacted with a plume of tropical moisture as the low slowly moved parallel to the Long Island and south Massachusetts coasts, resulting in excessive rain and flooding across Rhode Island. Between 2.5 and 4.5 inches of rain fell from this event. Many roads were closed across the region and approximately 500 evacuations occurred, including along the Blackstone River in Central Falls.	0/0	$200,000
3/22/2001	Flood	Minor to moderate flooding occurred along the Blackstone and Pawtuxet Rivers as a result of melting snow and heavy rainfall. Damage was estimated at three million dollars, and affected nearly 1,400 homes and 37 businesses. The Blackstone River at Woonsocket crested at 11.65 feet on the 23rd (flood stage is 9 feet).	0/0	$3 million
Total			0/0	$32,783,000

Source: NOAA Storm Events Database

THE GREAT RHODE ISLAND FLOOD OF 2010

In late February through March 2010, three separate rainfall events resulted in about 17 to 23 inches over much of southern New England, causing major flooding and millions of dollars in damage across Rhode Island, with numerous homes, businesses, and people affected.

EVENT SUMMARY

On March 29th, 2010, a low pressure system sat just south of Long Island for two days, bringing heavy rain to much of Southern New England. A persistent southerly low-level jet brought very moist air into the area, which resulted in high rainfall rates. A coastal front along the I-95 corridor enhanced rainfall in that area. This event followed a heavy rainfall and record flooding event in mid-March as well as a second lesser rain event about a week prior. Rivers across much of Massachusetts and Rhode Island were still high from those events and warm temperatures in northern Vermont and New Hampshire resulted in a period of snowmelt, that resulted in rises on both the mainstem Connecticut and Merrimack Rivers. All of these factors led to a second record rainfall and major flooding event for Rhode Island.

The Governor's office estimated that tens of thousands of properties were impacted by the flooding and about 4,000 workers were affected when the businesses they worked in were closed during and after the flooding. Numerous schools and many businesses, as well as the state government were closed for at least a day because of the flooding. Four dams in Rhode Island were breached and many others were overtopped and close to breaching, which resulted in the inspection of 42 dams throughout the state. A portion of Interstate 95 was closed for two days after the Pawtuxet River inundated the highway with up to three feet of water. Amtrak service through the state was suspended for several days because portions of the tracks were under up to two feet of water in several locations across the state.

Officials estimated that more than 500 people were evacuated from their homes because of rising water or the threat of rising water. More than 500 Rhode Island National Guardsmen were activated during the flooding, filling sandbags, directing traffic, and aiding in evacuations. Six National Grid substations were flooded and four were close to flooded, disrupting electrical service in Westerly and Warwick. Half a dozen sewage treatment plants through the state were overwhelmed or compromised by the flooding, leading to raw sewage being discharged into area rivers and bays. Shellfishing grounds in the southern part of the state were closed temporarily over concerns of sewage and other contaminants in the water. They reopened about a week and a half later.

LOCAL IMPACTS

All 39 cities and towns in Rhode Island were affected by this event, but the most damage was seen in Warwick, West Warwick, Coventry, and Cranston. Although the majority of damage was realized by these communities along/downstream of the Pawtuxet River, the Blackstone River raged at a moderate flood level. Six to nine inches of rain fell across Providence County, resulting in rises on both the Blackstone and Moshassuck rivers in addition to several small streams. Numerous streets and basements were flooded across the planning area. In Pawtucket, tenants from lower level units of an apartment building on Exchange Court were asked to evacuate due to flooding. The force of the Blackstone River collapsed approximately 200 linear feet of the retaining wall directly behind City Hall, and another portion further downstream at the parking area to the National Grid facility. This event resulted in a major

disaster declaration for Providence County, which encompassed both the mid-March storm and this storm.

OTHER NOTABLE HISTORIC EVENTS

The second-greatest flood of record occurred in March 1968, the result of about five inches of rainfall combined with snowmelt and nearly 100-percent runoff due to the impermeability of frozen ground. High flows occurred on both Woonasquatucket and Moshassuck Rivers. Flooding on Moshassuck River occurred near Canal and Mill Streets below the USGS gage and along Interstate 95. Gage records showed this flood to be a 38-year event on the Moshassuck River. Flooding resulting from this storm was also extensive on West River, a tributary of the Moshassuck. The magnitude of this flood would have been about ten percent greater if it had not been reduced by the West Hill flood control dam in Uxbridge, Massachusetts. The estimated recurrence interval for this event is 25 years.

The greatest flood of record on the Blackstone River occurred in August 1955 and was the result of Hurricane Diane dropping an average of nearly 12 inches of rain over the drainage basin. This storm has an approximate return interval of 150 years, and the areas below High Street were inundated by several feet of water. Damages from the 1955 flood were estimated at approximately $28 million for Rhode Island, with the Woonsocket area hardest hit in the state. This event resulted in a major disaster declaration for Providence County.

The Seekonk River experienced coastal flooding during the hurricane of September 1938 and Hurricane Carol in 1954. The 1938 hurricane, which had a recurrence interval of approximately 100 years, caused flood levels of approximately 16 feet on the Seekonk River.

FLOOD INSURANCE STATISTICS

B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))

According to FEMA flood insurance records and as shown in **Table 28**, there have been a total of 144 individual losses and more than $2 million in insured damages for the planning area as recorded through the National Flood Insurance Program (NFIP) since 1978. The years in which NFIP claims included 1978, 1979, 1982, 1983, 1984, 1985, 1986, 1991, 1997, 2005, 2006, 2007, 2010, 2013, 2014, 2015, 2018, and 2020. The average claims payment per flood loss during this period was approximately $30,000. However, this information only reflects previous losses as reported through claims under the NFIP, and it is understood that many additional losses have occurred in the planning area that were either uninsured or unreported.

Table 28. NFIP Policy and Claims/Loss Statistics

Jurisdiction	# of Policies	Total Claims	Building Payments	Contents Payments	Total Payments	Average Payment
Central Falls	55	28	$98,172	$338,554	$436,726	$15,597
Pawtucket	89	39	$1,337,403	$285,156	$1,622,558	$41,604
Total	144	67	$1,435,575	$623,710	$2,059,284	$30,736

Source: FEMA NFIP Data as provided by RIEMA on October 18, 2023

REPETITIVE LOSS STRUCTURE *means a structure covered under an NFIP flood insurance policy that (1) has incurred flood-related damage on two occasions, in which the cost of repair, on average, equaled or exceeded 25% of the value of the structure at the time of each such flood event; and (2) at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.*

NFIP records have also identified nine (9) repetitive loss structures in the planning area. A repetitive loss structure is defined by FEMA as a structure covered under an NFIP flood insurance policy that (1) has incurred flood-related damage on two occasions, in which the cost of repair, on average, equaled or exceeded 25% of the value of the structure at the time of each such flood event; and (2) at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

SEVERE REPETITIVE LOSS *structure means a structure that is covered under an NFIP flood insurance policy and has incurred flood-related damage (1) for which four or more separate claims have been made under flood insurance coverage, with the amount of each claim (including building and contents payments) exceeding $5,000 and with the cumulative amount of such claims payments exceeding $20,000; or (2) for which at least two separate flood insurance claims payments (building payments only) have been made, with cumulative amount of such claims exceeding the value of the insured structure.*

In addition, NFIP records indicate that there is one severe repetitive loss structure in the planning area. As defined by FEMA, a severe repetitive loss structure is a structure that is covered under an NFIP flood insurance policy and has incurred flood-related damage (1) for which four or more separate claims have been made under flood insurance coverage, with the amount of each claim (including building and contents payments) exceeding $5,000 and with the cumulative amount of such claims payments exceeding $20,000; or (2) for which at least two separate flood insurance claims payments (building payments only) have been made, with cumulative amount of such claims exceeding the value of the insured structure.

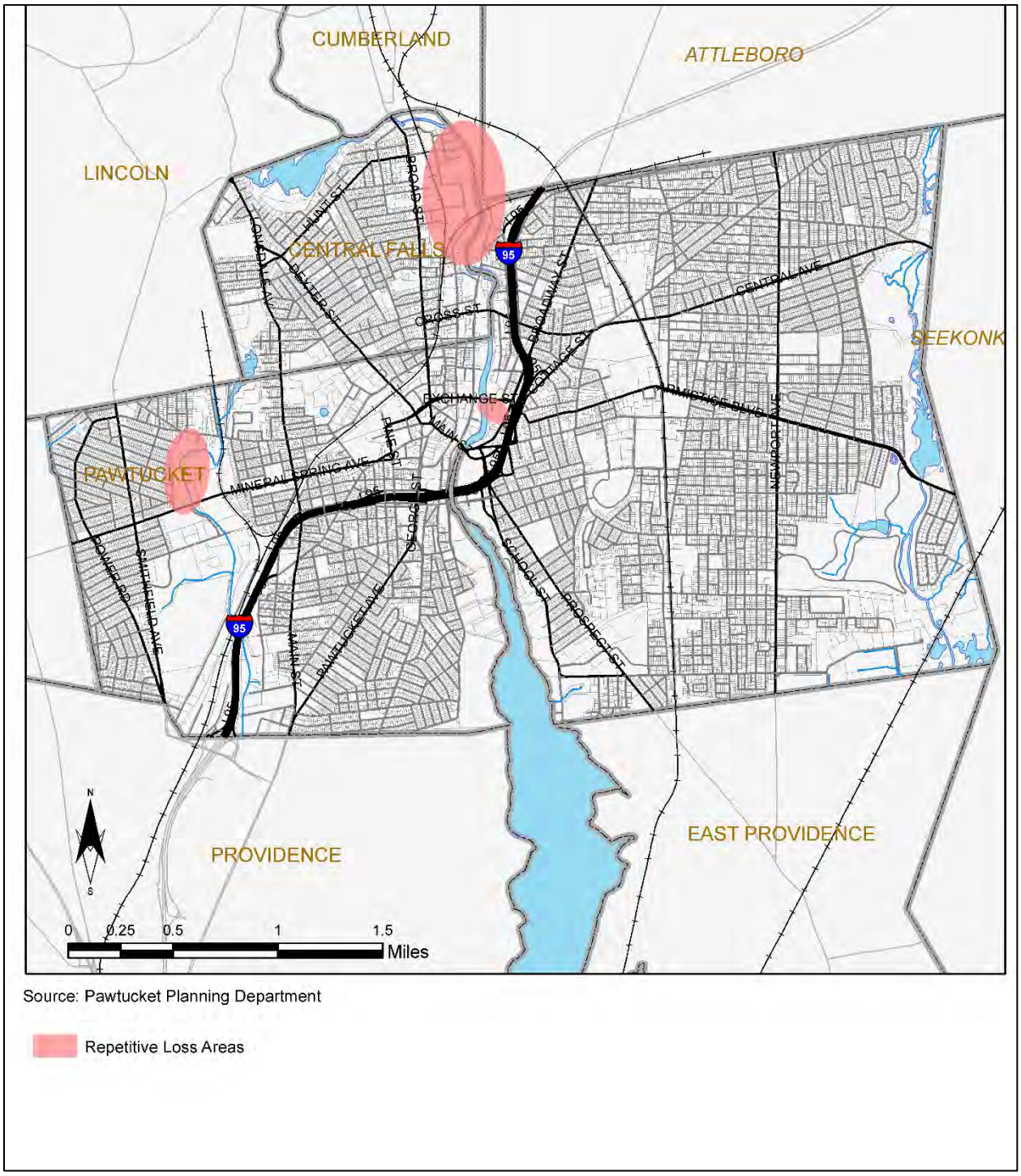
According to FEMA's NFIP data as provided by RIEMA and as shown in **Table 29**, these repetitive loss structures have accounted for 26 losses totaling nearly $1.7 million. The one severe repetitive loss structure in Pawtucket has accounted for 5 losses totaling $223,752. According to City records, the five repetitive loss properties in Central Falls include three residential structures and two industrial structures; and the four repetitive loss properties in Pawtucket include four different structure types classified as follows: Storage/Industrial, Residential, Mixed Use (commercial/residential), and Industrial (light manufacturing). The general location of these repetitive properties is illustrated in the map of Repetitive Loss Areas provided in Figure 23.

Table 29. NFIP Repetitive Loss Structure Statistics

Jurisdiction	# of RL/SRL Structures	Total Losses	Building Payments	Contents Payments	Total Payments	Average Payment
Central Falls	5	12	$65,870	$164,765	$230,635	$19,220
Pawtucket	4 (1 SRL)	14	$1,283,160	$182,642	$1,465,802	$104,700
Total	9	26	$1,349,030	$347,407	$1,696,437	$65,248

Source: FEMA NFIP Data as provided by RIEMA on October 18, 2023)

Figure 23. Repetitive Loss Areas



Source: City of Pawtucket Planning Department

A.3.6.5 Probability of Future Occurrences

Floods of varying types and extents will continue to occur in the planning area, with projected increases in extreme precipitation and other severe weather events leading to more flooding of all types. In terms of general probabilities, urban flooding is considered a ***highly likely*** occurrence while riverine flooding will remain a ***likely*** occurrence and coastal floods a ***possible*** occurrence.

Continued increases in frequency and intensity of extreme precipitation events will lead to more inland flooding, but especially urban/flash flooding in areas already dealing with stormwater drainage issues. According to the 2014 National Climate Assessment, the Northeast experienced a 71 percent increase in very heavy precipitation events from 1958 to 2012, and it is projected that this trend will continue and even worsen under all future emissions scenarios. Under the rapid emissions reduction scenario, these events would still occur nearly twice as often. For the scenario assuming continued increases in emissions, these events would occur up to five times as often.[42] Either way, severe urban flooding due to very heavy downpours is very likely to occur more frequently. It is also anticipated that the effects of climate change, including sea level rise and more intense coastal storms, will result in possible increases in the extent and frequency of storm surge and coastal flooding for the planning area.

A.3.7. INFECTIOUS DISEASE

A.3.7.1 General Description

An infectious disease is an illness due to a specific infectious agent or its toxic products that arises through transmission of that agent or its products from an infected person, animal, or inanimate source to a susceptible host; either directly or indirectly through an intermediate plant or animal host, through a vector, or through contact with the inanimate environment. Diseases such as influenza, pertussis, tuberculosis, and meningitis are examples of infectious diseases that can pose a threat to a community's population. Global, federal, state, and local agencies for human and animal health closely monitor for diseases with the potential to cause outbreaks or that could cross species, and work to develop strategies to contain their spread and to provide medical countermeasures such as antibiotics and antiviral medications to prevent or treat infection.

To gauge the potential impact of disease on Rhode Island's human population, it is helpful to classify disease occurrence in the following fashion:[43]

- **Isolated case of a high-consequence disease:** One or more cases of a particularly serious disease (e.g., botulism), whose further spread is unlikely, but place significant strain on the resources required to isolate and provide treatment for the infected.
- **Institutional outbreak:** Two (2) or more cases of similar illness with a common exposure at an institution (e.g., a school, nursing home, correctional facility).

[42] U.S. Global Change Research Program. Climate Change Impacts in the United States: U.S. National Climate Assessment. 2014.
[43] State of Rhode Island State Hazard Mitigation Plan Update. 2019. P. 3-157.

- **Epidemic:** An increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area.
- **Pandemic:** An epidemic that has spread over several countries or continents, usually affecting a large number of people.

Most infectious diseases are caused by pathogens that can be spread, directly or indirectly, from person to person. Such diseases may be seasonal (seasonal influenza) or result, in the case of new diseases, result in a global pandemic. Infectious disease dynamics depend on a range of factors, including land use, human behavior, climate, efficacy of healthcare services, population dynamics of vectors, population dynamics of intermediate hosts and the evolution of the pathogens themselves. Many of these diseases require continuous monitoring, as they present seasonal threats to the general population.

An epidemic emerges when an infectious disease occurs suddenly in numbers that are in excess of normal expectancy. Infectious disease outbreaks put a strain on the healthcare system and may cause continuity issues for local businesses. These outbreak incidents are a danger to emergency responders, healthcare providers, schools, and the public. This can include influenza (e.g., H1N1), pertussis, West Nile virus, and many other diseases. A pandemic is an epidemic that has spread over a large area, that is, it is prevalent throughout an entire country, continent, or the whole world. On March 11, 2020, the World Health Organization (WHO) officially declared the Coronavirus disease 2019 (COVID-19) outbreak a pandemic due to the global spread and severity of the disease. COVID-19 is a respiratory illness that can spread rapidly from person to person and is further described below under Previous Occurrences.

While major disease outbreaks are uncommon, public health emergencies can become stand-alone disasters that compound the threat of other natural hazards and exceed local and state capacity. There is precedent for federal assistance due to public health emergencies including West Nile Virus (2000), a mosquito-borne disease, for which a federal emergency declaration was made in New York and New Jersey, and the COVID-19 pandemic, which resulted in a major disaster declaration in all states, territories, and the District of Columbia.

A.3.7.2 Location

Rhode Island's geographic and demographic characteristics make it vulnerable to importation and spread of infectious diseases. An abundance of waterbodies and forested land throughout the state provide rich environments for vectors like mosquitos, ticks, and wild animals, all of which can carry infectious diseases, to breed and flourish. Although the entire state is susceptible to the spread of infectious diseases, factors like high population density, for instance in crowded urban centers where people are in routine, close contact with one another, can further aid transmission. For example, Central Falls, which is the smallest and most densely populated city in Rhode Island, may experience more rapid spreading of disease, not only because of its density, but also because its residents are among the lowest income groups in the state, they have great ethnic diversity, and a high number of its residents are foreign-born and frequently travel outside of the country.

The entire planning area is uniformly exposed to various types of infectious diseases with the most significant impacts felt by people (depending on specific characteristics of the disease), and potentially followed by direct or indirect impacts to the economy. People who spend more

time outdoors during mosquito and tick seasons are more susceptible to vector activity, which is more likely in or adjacent to heavily wooded and wetland areas.

A.3.7.3 Severity/Extent

As described below, the severity and extent of infectious disease is dependent on many various factors and is therefore difficult to classify given the range of potential impacts. As described in the next section, the COVID-19 pandemic has had the most significant impact on the planning area in recent history in terms of societal impacts and economic disruptions, however the severity and extent of infectious diseases will continue to vary widely.

As initially described in 2019 State Hazard Mitigation Plan, the extent of an infectious disease's impact depends on a variety of factors, including, though certainly not limited to:[44]

- The disease's virulence, transmissibility, and pathogenesis;
- Environmental conditions, including temperature and rainfall;
- Modes of transmission;
- Individuals' vulnerability factors, such as underlying medical conditions, malnutrition, behavior, and pregnancy;
- Quality and availability of healthcare services;
- Immunization prevalence; and
- Availability and accessibility of medical countermeasures that protect against and treat the disease.

For mitigation planning purposes, the maximum probable extent of an infectious disease event is a pandemic or other major disease outbreak with severe and life-threatening consequences, with confirmed cases in the planning area. The most recent example of this extent is the COVID-19 pandemic which began in 2020 and is further described in the following section.

A.3.7.4 Previous Occurrences

Public health risks, such as those presented by infectious diseases and vector-borne illnesses, are present within every community and many incidents resulting from these risks have occurred and will continue to occur throughout the planning area.

The most significant occurrence of infectious disease in Rhode Island and for the planning area was the COVID-19 pandemic that began in 2020. COVID-19 is a highly contagious, viral upper-respiratory illness that was first detected in China in late 2019. The virus quickly spread throughout the world and resulted in a global pandemic. COVID-19 symptoms include cough, difficulty breathing, fever, muscle pain, and loss of taste or smell. Severe cases may result in death, especially in individuals over the age of 65 or with underlying medical conditions, such as diabetes, lung disease, asthma, obesity, or those who are immunocompromised. COVID-19 spreads from person to person through respiratory droplets in the air or on surfaces. Through 2023, there have been more than 100 million cases of COVID-19 reported in the U.S., resulting in nearly 6.5 million hospitalizations and more than one million deaths. In Rhode Island there have been over 13,000 hospitalizations reported with more than 4,000 deaths. As further

[44] State of Rhode Island State Hazard Mitigation Plan Update. 2019. P. 3-157.

described in the next section, the COVID-19 pandemic has the potential to continue to some degree over the next several years.

Recent history has shown that seasonal influenza is among the most frequent disease outbreaks for Rhode Island, with the potential to significantly affect the operations of public and private sector healthcare. Of greatest concern is Influenza A (H3N2), which is known to be associated with severe illness, mortality, and increased hospitalization, particularly among older adults and those with compromised immune systems.

Pandemic influenza, considered to be a global outbreak, spread quickly around the world, and was observed in 1918, 1957, 1968, and in 2009 with the novel H1N1 strain. The 2009 H1N1 outbreak, though not considered a serious threat, still affected some residents in Rhode Island. The great influenza epidemic of 1918 killed millions worldwide and would likely cause hundreds to thousands of deaths in Rhode Island should a similar outbreak occur today. It is anticipated that a more serious strain of the usual flu will occur some year and that vaccines might not be ready in time to combat rapid spread.

Rhode Island is typically not vulnerable to diseases such as HIV/AIDS, SARS, Ebola, cholera, malaria, and resistant tuberculosis, though they are major concerns in some parts of the world. However, in today's era of globalization, it is easier than ever before for diseases that were once isolated to a particular region of the world to be transported to entirely new locations. COVID-19 was the most recent reminder that diseases do not recognize borders or boundaries. This was also the case during the 2014-2015 Ebola outbreak in West Africa which led to several cases of the virus being carried to the United States.

Vector-borne diseases continue to pose a significant threat to communities across Rhode Island. Mosquitoes and ticks are found throughout the state and may spread different disease-causing germs when they bite people. Among the most common tick-borne diseases are Lyme Disease, Babesiosis, and Anaplasmosis. Other diseases that are rare, but still occur, are Tularemia, Rocky Mountain spotted fever, Borrelia miyamotoi, and Powassan virus. Mosquito-borne diseases are also a seasonal threat. West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE or "Triple E") are viruses that occur in the region and can cause illness ranging from a mild fever to more serious disease like encephalitis or meningitis. There are other diseases spread by mosquitoes that people may be exposed to when traveling in other regions of the world. These include Zika virus, Dengue fever, and Chikungunya. For example, there were 98 cases of Zika in Rhode Island from 2015 to 2017 resulting from infections that occurred during travel (no local mosquito transmission was documented in the state).

LOCAL IMPACTS

COVID-19 has had a profound impact on public health, economy, and daily life in the planning area and across Rhode Island. Some of the key measures taken in response to the COVID-19 pandemic include various public health measures (including stay-at-home orders, mask mandates, social distancing, and limits on gathering sizes), testing and contact tracing, vaccination efforts, school closures/remote learning, and travel and quarantine measures. Additionally, COVID-19 had numerous, and oftentimes severe impacts on local communities, including:

- Economic Repercussion: Job losses, business closures, and economic strain on individuals and families were common within the State. Rhode Island, like other states, implemented economic relief measures.
- Healthcare System Overload: Hospitals and healthcare facilities in Rhode Island worked to increase capacity to treat COVID-19 patients. There were efforts to secure additional medical supplies and equipment.
- Protection of Vulnerable Populations: Efforts were made to protect vulnerable populations, including the elderly and those with underlying health conditions, who were at higher risk of severe illness from COVID-19.
- Educational Impact: The pandemic disrupted education, with students and teachers adapting to remote learning. Schools implemented safety measures upon reopening.

In response to the COVID-19 pandemic, the Cities of Central Falls and Pawtucket worked together through the Pawtucket Central Falls Health Equity Zone (HEZ) along with Blackstone Valley Community Health Center and the Rhode Island Department of Health (RIDOH) under the BEAT COVID-19 Task Force. The Task Force would review data and information supplied by RIDOH and coordinate outreach and targeted vaccine and testing sites for at-risk populations. The HEZ played an instrumental role in the Cities' COVID strategy by providing support for outreach and the mobilization of resources to frontline communities. The HEZ's network of connections to community-based, grassroots groups and their ability to leverage braided funding sources proved vital to the BEAT COVID-19 Task Force's success in reducing COVID-19 rates in the highest density communities in the state. For example, the City of Central Falls, with the assistance of Asthenis Pharmacy and other partners, collaborated by hosting pop-up vaccine clinics throughout the community. The clinics were operated at Knights of Columbus, Central Falls High School, Calcutt Middle School, Jenks Pediatrics, and the Blackstone Valley Community Health Center among other locations and the community came together to ensure every resident in Central Falls was vaccinated against COVID-19.
According to the latest data available from the Rhode Island Department of Health (as of March 14, 2024), a total of 149 residents of Pawtucket and 37 residents of Central Falls have died with COVID-19 listed as an underlying or contributing cause of death.[45] The majority of these deaths occurred in 2020-2021 before vaccinations were so widespread across the community.

A.3.7.5 Probability of Future Occurrences

The probability of infectious disease in the planning area is extremely variable. Many public health risks occur seasonally and are ongoing, such as the common cold and influenza. Major disease outbreaks that progress to the epidemic or pandemic stage are much less common but can last for long periods. For example, although the global COVID-19 pandemic has been contained, the disease has the potential to continue to some degree over the next several years, even as vaccines continue to be developed are distributed. Based on the information available regarding occurrences of greatest concern, the infectious disease hazard has been assigned a probability of ***likely*** (10-90 percent annual chance) for the planning area. That said,

[45] RIDOH GIS, Center for Health Data and Analysis. Rhode Island COVID-19 Death Data Set. Accessed April 3, 2024.

the probability of another pandemic is considered low based on historical frequencies of occurrence.

Given increasing trends for global travel, several diseases not typically observed in Rhode Island could continue to make their way back to the state through infected travelers. COVID-19 is the most recent and severe example of this threat. Another example is the Zika virus, transmitted from infected mosquitoes to humans, which received international attention during an outbreak in 2015 and persists today.

Climate change is also expected to have complex effects on infectious diseases, causing some to increase, others to decrease, and many to shift their distributions. According to the World Health Organization (WHO), changes in infectious disease transmission patterns are a likely major consequence of climate change but we need to learn more about the underlying complex causal relationships and apply this information to the prediction of future impacts, using more complete, better validated, integrated, models.

Among infectious diseases, water- and foodborne diseases and vector-borne diseases are among those likely to be most affected by climate change as invasive pests and associated diseases are projected to increase. As the Rhode Island climate begins to look more like the climate of the mid-Atlantic and southern states, it will likely experience higher incidents of vector-borne infectious disease. For example, with both temperature and precipitation expected to increase in Rhode Island, West Nile Virus mosquito vector activity will likely increase, as well as the vector's period of activity. Similarly, based on observations between 1964 and 2010, counts of Eastern Equine Encephalitis (EEE) have continued to rise in New England, though they remain constant in the southeastern states. According to the CDC, the number of reported disease cases in the U.S. from mosquito, tick, and flea bites tripled from 2004 to 2016, and mosquito-borne disease epidemics are happening more frequently. Annual cases of Lyme disease have increased over the last decade, and with shrinking winters, the potential for infection through tick bite continues to grow.

A.3.8. SEVERE WEATHER

A.3.8.1 General Description

Severe weather hazards include high winds, severe thunderstorms, tornadoes, and other extreme weather effects which often accompany such storm systems.

High winds can be generated from several types of weather events, including before and after frontal systems, hurricanes and tropical storms, severe thunderstorms and tornadoes, and nor'easters. Effects from high winds can include blowing debris, downed trees and/or power lines, and damage to roofs, windows, etc. High winds can cause scattered power outages and are also a hazard for the boating, shipping, and aviation industry sectors. Wind gusts of only 40 to 45 miles per hour can cause scattered power outages from trees and wires being downed. This is especially true after periods of prolonged drought or excessive rainfall, since both are situations which can weaken the root systems and make them more susceptible to the winds' effects. Winds measuring less than 30 miles per hour are not considered to be hazardous under most circumstances.

Severe thunderstorms are created when air masses of varying temperatures meet, and can occur singularly, in lines, or in clusters, but generally affect a small area when they occur.

When thunderstorm winds reach 58 miles per hour, the thunderstorm is considered severe and a warning is issued. Thunderstorms can occur during any season, but are more likely to occur during the spring and early summer months of March through June. They can occur at any time of day, but are more likely to form in the late afternoon and early evening. They can form in less than 30 minutes, giving little warning, and can move through an area very quickly or linger for several hours. The primary damaging forces associated with these storms are straight-line winds, hail, and lightning as described below, but they can also cause flash flooding or spawn tornadoes.

- *Straight-line winds*, which in extreme cases have the potential to cause wind gusts that exceed 100 miles per hour, are storm-induced winds that move in a straight direction (without rotation) and are capable of toppling trees, downing down power lines, and causing moderate to major property damage. Straight-line winds include downbursts, which result from the sudden descent of cool or cold air toward the ground. As the air hits the ground, it spreads outward with incredible force and the potential to cause widespread and tornado-like damage.
- *Hail* is formed in towering cumulonimbus clouds (thunderheads) when strong updrafts carry water droplets to a height at which they freeze. Eventually, these ice particles become too heavy for the updraft to hold up, and they fall to the ground at speeds of up to 120 miles per hour. Hail has the potential to cause minor to moderate property damage, particularly the larger hail stones associated with severe thunderstorms. The size of hailstones is a direct result of the size and severity of the storm.
- *Lightning* remains one of the top three storm-related killers in the United States and is a significant life/safety threat to people, but also has the potential to damage property and ignite both urban and wildland fires. Lightning often strikes outside of areas where it is raining, and may occur as far as 10 miles away from rainfall.

Tornadoes are violent windstorms characterized by a twisting, funnel-shaped cloud extending to the ground. Winds in most tornadoes are 100 miles per hour or less, but in the most violent and least frequent tornadoes, wind speeds can exceed 250 miles per hour. Tornadoes are most often generated by strong thunderstorm activity (but may also be spawned from hurricanes and other coastal storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. Most tornadoes are a few dozen yards wide and touch down only briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several to many miles long.

Tornadoes often develop so rapidly that little, if any, advance warning is possible making them a significant life/safety threat to people. They are more likely to occur during the spring and early summer months of March through June and can occur at any time of day, but are more likely to form in the late afternoon and early evening. Tornadoes in Rhode Island have also occurred July through October with August representing the month that has the most recorded incidents. Tornadoes associated with tropical cyclones are most frequent in September and October when the incidence of tropical storm systems is greatest.

A.3.8.2 Location

The entire planning area is uniformly susceptible to the occurrence of severe weather including high winds, severe thunderstorms, and tornadoes. While all areas of Rhode Island are at risk from high speed winds, those along Narragansett Bay and Block Island Sound are within highest wind speed area due to their direct proximity to the coast.

A.3.8.3 Severity/Extent

There is a wide range of thunderstorm types as classified by NOAA, including single-cell, multi-cell, squall line, supercell, bow echo, mesoscale convective system, mesoscale convective complex, mesoscale convective vortex, and derecho. Specific definitions aren't included here, though it's important to note that any one of these thunderstorm types can be severe. A thunderstorm is classified as "severe" when it contains one or more of the following damaging effects: winds gusting in excess of 58 miles per hour, hail measuring at least one inch in diameter, or a tornado.

The Enhanced Fujita Scale (EF-scale), shown in Table 30, is used to categorize the strength and magnitude of tornado events based on estimated wind speeds and related damage. This represents an update to the original Fujita Scale (F-scale) and has been implemented since February 2007.

Table 30. Enhanced Fujita Scale

Rating	Wind Speed (3 second gust)	Potential Damage
EF-0	65–85 mph	Light – Causes some damage to siding and shingles.
EF-1	86–110 mph	Moderate – Considerable roof damage. Winds can uproot trees and overturn singlewide mobile homes. Flagpoles bend.
EF-2	111–135 mph	Considerable – Most singlewide mobile homes destroyed. Permanent homes can shift off foundations.
EF-3	136–165 mph	Severe – Hardwood trees debarked. All but small portions of houses destroyed.
EF-4	166–200 mph	Devastating – Complete destruction of well - built residences, large sections of school buildings.
EF-5	Over 200 mph	Incredible – Significant structural deformation of mid- and high-rise buildings.

Source: NOAA

The EF-scale is applicable to all tornadoes that may affect the planning area, as it is used throughout Rhode Island on a routine basis. For mitigation planning purposes, the maximum probable extent of severe weather in the planning area is wind gusts exceeding 50 knots, hail measuring at least three-quarters of an inch in diameter, or a tornado occurrence (EF-0 or higher).

A.3.8.4 Previous Occurrences

Severe weather is a frequent occurrence in the planning area. NOAA historical records include 440 severe weather events[46] in Providence County since 1950, causing no fatalities, 41 injuries,

[46] Includes events that were classified as thunderstorm wind, high wind, strong wind, lightning, hail, or tornado.

and approximately $7.7 million in reported property damages. Most confirmed damages were caused by tornado and severe thunderstorm winds ($7 million), though $665,000 in damage was attributed to lightning and $20,000 to hail. It is believed that many additional historic events and/or losses have occurred but gone unreported or unrecorded.
Some notable recent occurrences with specific impacts in the planning area include:

- April 30, 2021 – Low pressure and its associated cold front swept across the region before sunrise. This was followed by dry but windy conditions which caused scattered damage across Southern New England. Winds were generally gusting to 40 to 50 mph. In Pawtucket a tree was downed, blocking a road and sidewalk.
- December 25, 2020 – An anomalously deep, full-latitude mid-level trough over the Mississippi Valley caused a strong frontal system which brought strong to damaging winds, heavy rain with minor flooding, and well above normal temperatures to southern New England early on Christmas Day. Winds generally gusted to 40 to 60 mph. In Pawtucket, a large tree was downed on Pawtucket Avenue.
- November 30, 2020 – Strong low pressure passed well to the west of southern New England, with strong to damaging southerly winds across the region. Winds were generally gusting to around 60 mph. In Pawtucket, a tree was downed on Seneca Avenue and another tree was downed on Pleasant Street near Jenks Way.
- February 7, 2020 – Powerful low pressure moved from eastern Pennsylvania across central Connecticut and central Massachusetts. Damaging winds occurred across much of eastern Massachusetts and Rhode Island with some damage reported farther to the west. There were widespread power outages and numerous trees down, some falling on homes and vehicles. In Central Falls, the Fire Department reported that a tree fell on Perry Street, injuring one person. Property damage was estimated at $5,000.
- November 23, 2018 –A few severe thunderstorms moved from Rhode Island into eastern Massachusetts around daybreak. As the strong low passed to the north, strong to damaging westerly winds developed during the afternoon. In Pawtucket, a large tree was downed on Hatfield Street.
- July 23, 2016 – Strong thunderstorms that produced hail and wind damage moved across much of southern New England. In Pawtucket, a large tree was downed onto a moving car on Main Street. Occupants were trapped in the car but not injured.
- July 2, 2008 – An upper level trough approaching Southern New England set off thunderstorms across much of the area. With cold temperatures aloft, hail was the main threat experienced. However, thunderstorm winds and heavy rainfall also produced some damage and complications, with portions of a few roads closed due to fallen trees or flooding.
- June 24, 2008 – A slow moving cold front provided a focus for severe thunderstorms. These thunderstorms produced very heavy rain that resulted in flash flooding, hail, and damaging winds. Quarter to golf ball sized hail damaged several windshields, dented cars and smashed windows in the area surrounding the Pawtucket YMCA. In addition, the amount of hail piled up on the roof of a bank, caused a portion of the roof to collapse. Hail had to be shoveled off the remaining portion of the roof. Property damages were estimated at $20,000.

- September 15, 2000 – Lightning struck a house in Central Falls, igniting a gas line which caused extensive damage to part of the home. Property damages were estimated at $15,000.
- May 25, 1994 – A thunderstorm moving to the east across the state brought a couple reports of large hail (up to 1.75 inches), while marble-sized hail fell at some other locations along with gusty winds.

NOAA historical records include 11 tornado events in Providence County since 1950, causing no fatalities, 24 injuries, and approximately $4.55 million in reported property damages. More information on each of these events is provided in **Table 31**. Although matching narratives were not found for most events, a review of historical storm tracks as recorded by NOAA suggests that none of these events occurred in or directly impacted Pawtucket or Central Falls.

Table 31. Previous Occurrences for Tornado in Providence County (1950 – 2023)

Date(s)	Magnitude	Description	Casualties (Deaths/Injuries)	Property Damage
9/13/2023	EF-0	An EF-1 with maximum winds of 100 mph began east of North Central State Airport along Wellington Road in the Town of Lincoln. A video did show a funnel cloud passing over the adjacent airport but found no damage. The tornado uprooted a large tree and damaged am estimated 20' by 30' section of roof on a building across the street.	0/0	$15,000
9/13/2023	EF-1	An EF-1 with maximum winds of 100 mph began in a wooded area between Chopmist Hill Road and Bungy Road in the Town of Glocester, where the tornado either snapped or uprooted an estimated 75 or more, healthy and mature trees. The tornado moved northeast and crossed Bungy Road before dissipating over an open field.	0/0	$20,000
8/18/2023	EF-2	A tornado caused significant damage along a discontinuous path in Scituate, Johnston, and North Providence. This is the strongest tornado to have struck Rhode Island since the F-2 tornado in Cranston and Providence on August 7, 1986.	1/0	$250,000
11/13/2021	EF-0	This was a continuation of a tornado that began in Windham County, CT. Maximum wind speed was estimated at 80 mph and the maximum path	0/0	$10,000

Date(s)	Magnitude	Description	Casualties (Deaths/Injuries)	Property Damage
		width was estimated at 100 yards. The tornado was in contact with the ground for 6.13 miles; approximately 4.7 miles in CT and 1.4 miles in RI. It ended at the Cucumber Hill Farm in Foster. Sheared trees and downed hardwood trees were observed on the farm. A heavy, large red trailer was also moved approximately 50 feet.		
10/23/2018	EF-1	The tornado initially touched down in North Providence, where large branches were downed. From there, damage was discontinuous as the tornado headed northeastward toward the southwest part of Lincoln, with only a few treetops snapped and downed branches. In Lincoln, the tornado caused extensive damage on Angell Road and Riata Drive. There were numerous uprooted or snapped trees, shingles blown off several houses, and large branches downed. Wind speeds were estimated to be 90-100 mph. Damage became more sporadic farther north, where a few large trees and branches were downed.	0/0	$1,000,000
8/16/2000	F0	A weak tornado briefly touched down in a high elevation portion of North Foster. The damage was isolated and limited to only trees.	0/0	$0
9/23/1989	F0	N/A – matching narrative not found in the historical Storm Data Publication.	0/3	$250,000
8/8/1986	F1	N/A – matching narrative not found in the historical Storm Data Publication.	0/0	$250,000
8/7/1986	F2	N/A – matching narrative not found in the historical Storm Data Publication.	0/20	$2,500,000
8/7/1986	F1	N/A – matching narrative not found in the historical Storm Data Publication.	0/0	$250,000

Date(s)	Magnitude	Description	Casualties (Deaths/Injuries)	Property Damage
8/26/1985	F1	N/A – matching narrative not found in the historical Storm Data Publication.	0/0	$0
Total			0/23	$4,260,000

Source: NOAA Storm Events Database

A.3.8.5 Probability of Future Occurrences

High wind and severe thunderstorm events will continue to be a ***highly likely*** occurrence in the planning area. Tornadoes will continue to be a possible occurrence, though it is unlikely that very strong tornadoes (EF-3, EF-4 or EF-5) will strike the area. According to NOAA, the effects of climate change on future severe weather events cannot be determined at the present time due to insufficient scientific evidence. However, multiple studies cite that the Northeast region of the US will continue to experience more very heavy rainfall events which are often associated with severe thunderstorms and other extreme weather events (covered under Flood). The State of Rhode Island has also projected that it will experience warmer air and water temperatures, leading to more extreme weather events, intense precipitation, and severe storms. Available historical tornado data suggests that Rhode Island can expect future tornadoes to range from EF0 to EF2 on the Enhanced Fujita Scale.

A.3.9. SEVERE WINTER STORM

A.3.9.1 General Description

Severe winter storms can range from a moderate snowfall over a period of a few hours to blizzard conditions (sustained winds or frequent gusts of 35 miles per hour or more) with blinding wind-driven snow that lasts for several days. Heavy accumulations of snow or ice can bring down trees and power lines, disabling electric power and communications for days or weeks, and can paralyze a region by shutting down all air and rail transportation and disrupting medical and emergency services. Severe winter storms are indirectly and deceptively a significant threat to human life and safety, primarily due to automobile accidents, overexertion and exposure. The cost of snow removal, repairing damages, and loss of business can have large economic impacts on local communities.

Severe winter storms may include snow, ice, sleet, freezing rain, or a mix of these wintry forms of precipitation. Heavy accumulations of snow create hazards to transportation, as well buildings with flat rooftops or other vulnerable structures not engineered to withstand heavy snow loads. Sleet – raindrops that freeze into ice pellets before reaching the ground – usually bounce when hitting a surface and do not stick to objects; however, sleet can accumulate like snow and cause a hazard to motorists. Freezing rain is rain that falls onto a surface with a temperature below freezing, forming a glaze of ice. Even small accumulations of ice or freezing rain can cause a significant hazard, especially to trees and power lines. An ice storm occurs when heavy accumulations of freezing rain falls and freezes immediately upon impact. Communications and power can be disrupted for days, and even small accumulations of ice may cause extreme hazards to motorists and pedestrians.

A.3.9.2 Location

The entire planning area is uniformly susceptible to the occurrence of severe winter storms. While all areas of Rhode Island are at risk from heavy snow and ice accumulations, those along Narragansett Bay and Block Island Sound are more at risk to the potentially high winds and coastal flood hazards that may accompany severe winter storms.

A.3.9.3 Severity/Extent

NOAA's National Centers for Environmental Information (NCEI) recently developed the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two thirds of the U.S. The RSI ranks snowstorm impacts on a scale from 1 to 5, as shown in **Table 32**. RSI values are based on the spatial extent of the storm, the amount of snowfall, and the association of these elements with population and societal impacts. NCEI has analyzed and assigned RSI values to over 500 storms going as far back as 1900 and new storms are added operationally. As such, RSI puts the regional impacts of snowstorms into a century-scale historical perspective. The index is useful for those who wish to compare regional impacts between different snowstorms, and is recommended for classifying major winter storms in combination with the Classification Scheme for Nor'easters presented in section A.3.1.3, as appropriate.

Table 32. Regional Snowfall Index (RSI)

Category	RSI Value	Description
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

Source: NOAA

The Sperry–Piltz Ice Accumulation (SPIA) Index is a scale for rating ice storm intensity, based on the expected storm size, ice accumulation, and damages on structures, especially exposed overhead utility systems. Sid Sperry of the Oklahoma Association of Electric Cooperatives and Steven Piltz from the National Weather Service office in Tulsa, Oklahoma, developed the index together. The SPIA Index uses forecast information to rate an upcoming ice storm's impact from 0 (little impact) to 5 (catastrophic damage to exposed utility systems), as shown below in Figure 24. Per the index developers, it is a tool to be used for risk management and/or winter weather preparedness.

Figure 24. Sperry–Piltz Ice Accumulation Index

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) *Revised-October, 2011	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 – 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
2	0.10 – 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 - 25	
	0.50 – 0.75	< 15	
3	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 - 35	
	0.50 – 0.75	15 - 25	
	0.75 – 1.00	< 15	
4	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 - 35	
	0.75 – 1.00	15 - 25	
	1.00 – 1.50	< 15	
5	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

Source: SPIA Index™

The RSI Index and SPIA Index are applicable to all severe winter storm events that may affect the planning area, as they are used throughout Rhode Island on a routine basis. For mitigation planning purposes, the maximum probable extent of a severe winter storm in the planning area is a Category 5 on the RSI or Intensity Index Category 4 on Classification Scheme for Nor'easters as described earlier in this chapter (section A.3.1.3 Severity/Extent).

Snow removal at Pawtucket and Main Street following the Blizzard of 1978, which still serves as the storm of record for the planning area. *Courtesy of Matt Bowling,*

A.3.9.4 Previous Occurrences

Severe winter storms are a frequent occurrence in the planning area. NOAA historical records include 202 winter storm events[47] in Providence County since 1996, causing no casualties[48] and approximately $11 million in reported property damages. It is believed that additional losses have occurred but gone unreported or unrecorded in NOAA records, and it is also worth noting that one of the most significant financial impacts from winter storms to local communities is attributed to snow removal costs – which are not included in reported property damages.

Some notable recent occurrences for the planning area are provided below. Local impacts to Pawtucket and Central Falls are included where available.:

- January 28, 2022 (Blizzard of 2022 / Winter Storm Kenan) – Explosive cyclogenesis of a low pressure center off the Mid-Atlantic coast brought a strong winter storm with blizzard conditions to all of southern New England. The storm brought extreme snowfall rates of 2 to 4 inches per hour and winds gusting to hurricane force along the coast and 50 to 60 mph inland. The heaviest snow, just under 30 inches, fell over southeast Massachusetts, and up to 2 feet fell in Rhode Island. The Blizzard of 2022 ranks as among the biggest snowstorms for the Providence area (ranking 4th in terms of total accumulation of 19.3 inches) and it resulted in a major disaster declaration for Providence County.
- December 16, 2020 – A storm system produced heavy snow, strong to damaging winds, and minor coastal flooding in southern New England. Snowfall amounts ranged from 10 to 20 inches across much of southern New England, with 9.3 inches recorded for Pawtucket.
- November 15, 2018 – An early-season nor'easter resulted in a quick thump of moderate to heavy snow in Rhode Island on the front end of the storm. Snowfall amounts ranged from 5.5 inches in southeast Providence County to 9 inches in the higher hills in the northwest.
- February 14, 2018 – An area of light freezing rain moved across Rhode Island during the morning rush hour, causing numerous traffic accidents and a few road closures due to icing.
- February 5, 2016 – Low pressure traveling along a cold front stalled south of southern New England brought heavy rain, which changed over to heavy snow as temperatures dropped.

[47] Includes events that were classified as winter storm, blizzard, heavy snow, or winter weather.

[48] Excluding indirect but storm-related casualties (e.g., automobile accidents, heart attacks while shoveling, etc.)

This snow was extraordinarily wet and heavy, bringing down trees and wires across portions of southern New England. A total of 5 to 12 inches of snow fell across northwestern Providence County.

- January 26-28, 2015 (Winter Storm Juno) – An historic winter storm brought heavy snow to southern New England with blizzard conditions for much of Rhode Island. The "Blizzard of January 2015" (also referred to as "Snowmageddon") produced very strong where gusts of 50 to 65 miles per hour were common, and 16 to 30 inches of snow fell across northwestern Providence County. This event resulted in a major disaster declaration for Providence County.
- February 7-8, 2013 (Winter Storm Nemo) – An historic winter storm deposited tremendous amounts of snow across southern New England. The storm also produced a prolonged period of very strong winds with gusts exceeding hurricane force at a few coastal locations. The strong winds, combined with a wet snow, led to extensive power outages from downed trees and wires. A total of 17 to 21 inches of snow fell across southeastern Providence County. This event resulted in a major disaster declaration for Providence County.
- January 12, 2011 – A developing nor'easter coastal storm dumped nearly two feet of snow across portions of Rhode Island in a 24-hour period. This was the second major storm of an above average winter of snowfall. The first occurred December 26 and 27, with several other relatively minor snowfalls in the month of January, and a third major storm February 1 and 2. With only a brief thaw in between the December storm and the January storm, snow piled up across southern New England resulting in numerous roof collapses, towns seeking permission to dump excess snow in area rivers and bays, and numerous disruptions to transportation. The cities of Pawtucket and Central Falls reportedly received 24 inches of snowfall during this event.
- December 26-27, 2010 (Blizzard of 2010) – A strengthening winter storm passed southeast of Nantucket and brought heavy snow and strong winds to much of Rhode Island, resulting in near blizzard conditions at times. Snowfall totals of 8 to 12 inches were observed in southeast Providence County, including 11 inches in downtown Providence. High winds brought down wires on Pawtucket Avenue in Providence.
- December 19-20, 2009 (Blizzard of 2009) – Snow spread across much of Southern New England and blizzard conditions were experienced in several locations. Snowfall totals ranged from 18 to 20 inches across Rhode Island, resulting in numerous flight cancellations out of T.F. Green Airport, school closings, and a struggle by plows to keep the roads clear. A total of 15 to 17 inches of snow fell in southeast Providence County.
- January 22-23, 2005 (Blizzard of 2005) – A major winter storm brought heavy snow, high winds, and coastal flooding to southern New England. In Rhode Island, snowfall totals of 15 to 25 inches were widely observed. Winds gusting as high as 60 mph at times (mainly around greater Providence) created near blizzard conditions at times, making travel impossible during the height of the storm. Officially, the snowfall total at T.F. Green State Airport in Warwick was 23.4 inches, which was the second greatest snowstorm for the Providence area since records began in 1905.

- February 17-18, 2003 – A major winter storm impacted southern New England with heavy snow and strong winds as it tracked southeast of Nantucket. Snowfall totals of one to two feet were widely observed throughout Rhode Island. No significant damage was reported due to the storm, primarily since the snow was fluffy and light with temperatures in the teens and 20s. Impact on travel was minimal, since the storm affected the region on President's Day and most schools were closed that week.
- March 5, 2001 – A major winter storm impacted central and northern Rhode Island with heavy snow and strong winds. The slow-moving storm, which tracked south of New England, dumped more than a foot of snow across Providence County and knocked out power to tens of thousands of customers. Schools and businesses were shut down for three days in some communities.
- April 1, 1997 (April Fool's Day Blizzard) – Heavy snow and strong winds produced blizzard and near-blizzard conditions across most of Rhode Island during the early morning hours on April 1st. Snowfall accumulations set all-time records for April across most of the state, with amounts ranging to nearly 30 inches in the extreme northern portion of the state. The heavy, wet snow made snow removal extremely difficult and highway travel was just about impossible during the height of the storm. Over a thousand tree limbs and some trees were reported down in Providence and some streets were initially left unplowed due to fallen tree limbs and wires. Schools were closed for two days.
- January 7-8, 1996 (Blizzard of 1996) – This storm was one of the most significant winter storms to hit southern New England in the past 20 years. Very heavy snowfall of one to two feet fell across the entire state, which disrupted transportation systems, closed schools, stores, and businesses. Also, the heavy snow accumulation resulted in several roof collapses which damaged homes and businesses during the week following the storm. This event resulted in a major disaster declaration for Providence County.
- March 13-17, 1993 (Blizzard of 1993) – Also referred to as the "Storm of the Century" due to its size and widespread impacts across the eastern US, this major winter storm brought high winds and heavy snow to Rhode Island. This event resulted in a major disaster declaration for Providence County.
- February 1978 (Blizzard of 1978) – The State of Rhode Island's record snowfall of 38 inches occurred from this storm which also produced hurricane-force winds across much of Southern New England. Thousands of Rhode Islanders were without power for weeks and the interstate highways were shut down. This event serves as the storm of record for Rhode Island amongst the number of severe winter storms that the state has experienced over the last several decades. The storm resulted in over 27 inches of snow accumulation in the planning area and resulted in a major disaster declaration for Providence County.

A.3.9.5 Probability of Future Occurrences

Severe winter storms will continue to be a ***highly likely*** occurrence in the planning area. According to the 2024 State Hazard Mitigation Plan, data from NOAA and the NWS indicate that

Rhode Island can expect an average annual snowfall of between 25–75 inches per year with at least two winter storm events per year.
It is anticipated that the effects of climate change will result in winters that are much shorter with fewer cold days and more precipitation, but less precipitation falling as snow and more as rain. This will result in reduced snowpack and ice coverage, earlier breakup of winter ice on lakes and rivers, and earlier spring snowmelt resulting in earlier peak river flows. Extreme snowfall events will remain likely, but specific projections are still largely undetermined. According to the State Hazard Mitigation Plan, Rhode Island may see more erratic and intense winter storms with periods of heavy snowfall followed by rain or freezing rain, leading to a greater risk of ice accumulation.

A.4. VULNERABILITY ASSESSMENT

This section provides information on the methods and results of a GIS-based vulnerability assessment for the properties and community assets that are at risk to select, geographically-defined hazards in the planning area. The GIS-based assessment included two distinct analyses: (1) for all parcels and buildings; and (2) for critical facilities or community assets as identified by each City. The approach and methodology for each analysis are provided below.

Methods and Data Sources

Vulnerability Analysis for Parcels and Buildings

The vulnerability of existing parcels and buildings to natural hazards was determined through a GIS-based exposure analysis that combined the City's current tax assessor data records with available hazard data layers used to map and illustrate hazard risk. Each City's existing tax parcel and property value data was used to estimate the number of parcels (developed and undeveloped) and buildings located in identified hazard areas along with their respective assessed values. The parcel data set provides information about the parcel size, land use type, and assessed value among other attribute data. To determine each parcel and building's vulnerability, a GIS overlay analysis was conducted in which hazard extent maps (as described and illustrated in section A.3, Hazard Profiles) were overlaid with the parcel data and existing building footprint data.
To calculate the exposure of parcels and buildings to identified hazards, each City identified the parcels with buildings that are located (completely or partially) within identified hazard zones using the ArcGIS overlay analysis (i.e., select by location using the intersect function). The number of parcels and buildings for specific land use categories (residential, commercial, industrial, etc.) was then totaled, along with the value of buildings and the total value of real property (land and buildings) associated with those parcels. These figures provide a strong indication of current hazard vulnerability, as well as potential future vulnerability as it relates to vacant and potentially developable parcels across each city.

Vulnerability Assessment for Critical Facilities and other Community Assets

> ***IMPACTS*** *are the consequences or effects of each hazard on the participant's assets identified in the vulnerability assessment. For example, impacts could be described by referencing historical disaster damages with an estimate of potential future losses (such as percentage of damage vs. total exposure).*

In support of the plan update process, LPT members and staff from each City identified their own unique critical facilities. In general. critical facilities are structures and institutions necessary for a community's response to and recovery from emergencies, and they must continue to operate during and following a disaster to reduce the severity of impacts and accelerate recovery. For Pawtucket and Central Falls, critical facilities included city halls, emergency operations centers, hospitals, fire stations, police stations, schools, shelters, and libraries (see Chapter 3: Planning Area Profile for more information and a map of these critical facilities). In addition to critical facilities, both cities identified other community assets of important value such as major employers, historic buildings/places, community facilities, private/parochial schools, daycare facilities, and parks/open space/recreation areas.

Once all critical facilities and other community assets were identified by each City, they were identified and mapped in ArcGIS based on the confirmed physical location/address. Similar to the vulnerability analysis for parcels and buildings, each was then overlaid with the identified and mappable hazard zones. For purposes of this analysis, it was assumed that the physical location of a critical facility within a hazard area (completely or partially) meant that it is exposed and potentially vulnerable to that specific hazard; however, it is recognized that more site-specific evaluations are required to confirm this assumption. Unlike the vulnerability assessment performed for parcels and buildings, the exposure analysis for other community assets was limited to location only and did not include any information on monetary values as such attribute data was not readily available. This data constraint may be addressed in future updates to this assessment.

Description of Hazard Data Sources

1. Riverine and Coastal Flooding – Hazard location and extent was determined using the currently effective (2015) FEMA Flood Insurance Rate Map (FIRM) data for the planning area as obtained through the Rhode Island Geographic Information System (RIGIS) in August 2023. The FIRM is the official map on which FEMA has delineated both the special flood hazard areas and the risk premium zones applicable to the community under the National Flood Insurance Program (NFIP). This includes high risk areas that have a 1 percent chance of being flooded in any year (often referred to as the "100-year floodplain"), which under the NFIP, is linked to mandatory purchase requirements for federally-backed mortgage loans. It also identifies moderate to low risk areas, defined as the area with a 0.2 percent chance of flooding in any year (often referred to as the "500-year floodplain"). For purposes of this exposure analysis, the following special flood hazard areas as identified in the current FIRMs were included:
    - Flood Zone AE – 1% Annual Chance Flood Hazard
    - Flood Zone VE – 1% Annual Chance Flood Hazard with Velocity Wave Action

- Flood Zone X (shaded) – 0.2% Annual Chance Flood Hazard

2. Hurricane Storm Surge – Hazard location and extent was determined using data from the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model as generated by the U.S. Army Corps of Engineers, New England District. Developed to assist emergency management officials in hurricane preparedness and operations, this data layer represents worst-case Hurricane Surge Inundation areas for Category 1 through 4 hurricanes striking the coast of Rhode Island. Hurricane surge values for the four different scenarios included in our analysis were developed by the National Hurricane Center using the PV2 basin SLOSH Model data and was obtained through the Rhode Island Geographic Information System (RIGIS) in August 2023.
3. Wildfire – Hazard location and extent was determined using updated (2020) data from the Silvis Lab at the University of Wisconsin, which in partnership with the USDA Forest Service, has developed a methodology to spatially identify wildland urban interface (WUI) areas across the US. The WUI is defined as the area where urban development meets vegetated, wildfire prone lands, and the mapping by the Silvis Lab identifies two different types of WUI areas: intermix and interface. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of contiguous wildland vegetation. More information on the data sources and methods used for this mapping is available at http://silvis.forest.wisc.edu/maps/wui.

Hazard Exposure Tables

> ***VULNERABILITY*** *is a description of which assets, including structures, systems, populations and other assets as defined by the community, within locations identified to be hazard prone, are at risk from the effects of the identified hazard(s).*

The results of the vulnerability assessment conducted for existing properties, critical facilities and other community assets are summarized on the following pages, which include a series of exposure tables for those natural hazards with geographically-defined risk areas in each city. For Pawtucket this includes riverine and coastal flooding, hurricane storm surge, and wildfire. For Central Falls this includes only riverine and coastal flooding, along with hurricane storm surge (Category 4 storms only), as there are no identified hazard zones for wildfire within its jurisdiction.

For all other natural hazards, it is generally assumed that each city's properties, critical facilities, and other community assets are uniformly exposed to potential hazard effects (for example, to severe winter storms). However, it is understood that some segments of the population and specific physical assets may inherently be more vulnerable to the effects of these hazards based on their individual characteristics. While this plan does not include an in-depth study of these specific vulnerabilities, they were acknowledged and discussed by the LPT upon completion of this hazard analysis and risk assessment and in the development of the Mitigation Strategy.

A complete listing of all the detailed hazard exposure tables for each City is provided below:

PAWTUCKET

- Table 33: Exposure to Flooding in FEMA Zone AE (1-percent-annual-chance without velocity wave action)
- Table 34: Exposure to Flooding in FEMA Zone VE (1-percent-annual-chance with velocity wave action)
- Table 35: Exposure to Flooding in FEMA Zone X (0.2 percent annual chance)
- Table 36: Exposure to Hurricane Storm Surge (Category 1)
- Table 37: Exposure to Hurricane Storm Surge (Category 2)
- Table 38: Exposure to Hurricane Storm Surge (Category 3)
- Table 39: Exposure to Hurricane Storm Surge (Category 4)
- Table 40: Exposure to Wildfire (Wildland Urban Interface)
- Table 41: Exposure of Critical Facilities
- Table 42: Exposure of Other Community Assets

CENTRAL FALLS

- Table 43: Exposure to Flooding in FEMA Zone AE (1-percent-annual-chance without velocity wave action)
- Table 44: Exposure to Flooding in FEMA Zone X (0.2 percent annual chance)
- Table 45: Exposure to Hurricane Storm Surge (Category 4)
- Table 46: Exposure of Critical Facilities
- Table 47: Exposure of Other Community Assets

Summary of Exposure Analysis

PAWTUCKET

- It is estimated that there are 114 buildings and nearly $285 million in total building value located in FEMA mapped flood zones; including 95 buildings in the 1-percent-annual-chance flood zone (100-year floodplain) and considered at high risk, and 19 buildings which are in the 0.2-percent-annual-chance flood zone (500-year floodplain) and considered at a moderate risk. Of the 95 buildings located in identified high-risk flood zones, six (6) are located in areas with velocity wave action (Zone VE). The potentially at-risk properties include all land use types as shown in tables A-14 through A-16.
- As expected, many of the properties that are in high-risk flood zones identified by FEMA are also in hurricane storm surge inundation zones as mapped by the US Army Corps of Engineers. An estimated six (6) buildings are considered at risk to storm surge flooding from a Category 3 hurricane, with an additional 19 buildings that could be inundated by the worst-case scenario Category 4 storm. None of these potentially at-risk buildings are classified as residential.

- A total of 168 buildings (mostly residential) have been identified in areas that are potentially at risk to wildfire due to their location in the mapped Wildland Urban Interface, where urban development meets vegetated, wildfire prone lands.
- The following critical facilities identified by the City of Pawtucket are in identified hazard zones and should be considered potentially at-risk to significant hazard impacts pending more site-specific evaluations:
    - Roosevelt Ave Fire Station @ 137 Roosevelt Ave (500-year floodplain, Category 4 storm surge zone)
    - Pawtucket Police Station @ 121 Roosevelt Ave (500-year floodplain, Category 4 storm surge zone)
    - Pawtucket City Hall @137 Roosevelt Ave (500-year floodplain, Category 4 storm surge zone)
- The following other community assets identified by the City of Pawtucket are in identified hazard zones and should be considered potentially at-risk to significant hazard impacts pending more site-specific evaluations:
    - Historic Places
        - Veterans Park Amphitheater (100-year floodplain, Category 4 storm surge zone)
        - Bridge Mill Power Plant (100-year floodplain, Category 4 storm surge zone)
        - Old Slater Mill Historic Site (100-year floodplain, Category 4 storm surge zone)
        - Main Street Bridge (100-year floodplain, Category 4 storm surge zone)
        - Division Street Bridge (100-year floodplain, Category 1 storm surge zone)
    - Private/Parochial Schools/Day Cares
        - Valley Community School (500-year floodplain)
        - Heritage Park Early Learning Center (100-year floodplain, Category 4 storm surge zone)
    - Parks/Open Space/Recreation Areas
        - Hodgson Rotary Park (100-year floodplain, Category 4 storm surge zone)
        - Town Landing (100-year floodplain, Category 1 storm surge zone)
        - Festival Pier (100-year floodplain with velocity wave action, Category 1 storm surge zone)
        - Max Read Field (Category 3 storm surge zone)

CENTRAL FALLS

- It is estimated that there are 63 buildings and nearly $58 million in total building value located in FEMA mapped flood zones; including 41 buildings in the 1-percent-annual-chance flood zone (100-year floodplain) and considered at high risk, and 22 buildings which are in the 0.2-percent-annual-chance flood zone (500-year floodplain) and considered at a moderate risk. Most of the potentially at-risk properties (42) are classified as residential.

- Only five (5) buildings in Central Falls could be inundated by the worst-case scenario Category 4 storm. This includes one (1) property classified as residential, two (2) as commercial, and two (2) as industrial.
- No parcels or buildings have been identified in areas that are potentially at risk to wildfire.
- None of the critical facilities or other community assets identified by the City of Central Falls are in the geographically-defined hazard areas identified above.

City of Pawtucket – Flood Exposure

Table 33. Exposure to Flooding in FEMA Zone AE (1-percent-annual-chance without velocity wave action)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	48	0.29%	25	$5,696,200	0.15%	0.20%	$8,377,300	0.21%
Commercial	34	3.04%	34	$30,164,800	3.56%	5.92%	$41,033,500	5.92%
Industrial	23	8.49%	9	$8,785,600	4.84%	9.52%	$13,071,400	9.26%
Transportation & Utilities	34	20.12%	3	$3,887,600	25.00%	49.86%	$16,406,700	30.36%
Mixed Use	8	3.76%	8	$6,334,800	3.76%	7.09%	$8,263,700	7.06%
Municipal/Institutional	17	5.76%	10	$53,369,100	5.75%	11.96%	$126,670,600	21.15%
Conservation / Open Space	23	32.39%	0	$0	0.00%	0.00%	$13,780,800	50.98%
Undeveloped (unprotected)	16	7.62%	0	$0	0.00%	0.00%	$2,582,500	14.79%
Total	203	1.07%	89	$108,238,100	0.49%	2.75%	$230,186,500	4.03%

Source: City of Pawtucket GIS Data and Tax Assessor Records; FEMA Flood Insurance Rate Map (FIRM)

Table 34. Exposure to Flooding in FEMA Zone VE (1-percent-annual-chance with velocity wave action)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Commercial	1	0.09%	1	$4,968,200	0.10%	0.97%	$5,799,900	0.84%
Industrial	1	0.37%	1	$222,600	0.54%	0.24%	$322,700	0.23%
Transportation & Utilities	3	1.78%	0	$0	0.00%	0.00%	$509,900	0.94%
Mixed Use	2	0.94%	2	$1,196,900	0.94%	1.34%	$1,983,900	1.69%

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Municipal/Institutional	6	2.03%	2	$412,300	1.15%	0.09%	$8,315,900	1.39%
Conservation / Open Space	6	8.45%	0	$0	0.00%	0.00%	$5,603,900	20.73%
Undeveloped (unprotected)	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Total	19	0.10%	6	$6,800,000	0.03%	0.17%	$22,536,200	0.39%

Source: City of Pawtucket GIS Data and Tax Assessor Records; FEMA Flood Insurance Rate Map (FIRM)

Table 35. Exposure to Flooding in FEMA Zone X (0.2 percent annual chance)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	4	0.02%	3	$1,085,400	0.02%	0.04%	$1,509,700	0.04%
Commercial	8	0.72%	6	$19,645,400	0.63%	3.86%	$24,915,000	3.59%
Industrial	2	0.74%	1	$314,300	0.54%	0.34%	$498,600	0.35%
Transportation & Utilities	2	1.18%	1	$97,600	8.33%	1.25%	$340,100	0.63%
Mixed Use	2	0.94%	2	$1,557,300	0.94%	1.74%	$2,673,300	2.28%
Municipal/Institutional	7	2.37%	6	$18,620,700	3.45%	4.17%	$25,684,900	4.29%
Conservation / Open Space	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Undeveloped (unprotected)	2	0.95%	0	$0	0.00%	0.00%	$60,000	0.34%
Total	27	0.14%	19	$41,320,700	0.10%	1.05%	$55,681,600	0.97%

Source: City of Pawtucket GIS Data and Tax Assessor Records; FEMA Flood Insurance Rate Map (FIRM)

City of Pawtucket – Storm Surge Exposure

Table 36. Exposure to Hurricane Storm Surge (Category 1)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Commercial	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Industrial	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Transportation & Utilities	1	0.59%	0	$0	0.00%	0.00%	$111,400	0.21%
Mixed Use	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Municipal/Institutional	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Conservation / Open Space	2	2.82%	0	$0	0.00%	0.00%	$1,799,900	6.66%
Undeveloped (unprotected)	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Total	3	0.02%	0	$0	0.00%	0.00%	$1,911,300	0.03%

Source: City of Pawtucket GIS Data and Tax Assessor Records; Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS)

Table 37. Exposure to Hurricane Storm Surge (Category 2)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Commercial	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Industrial	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Transportation & Utilities	3	1.78%	2	$1,180,100	16.67%	15.13%	$3,402,300	6.30%

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Mixed Use	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Municipal/Institutional	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Conservation / Open Space	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Undeveloped (unprotected)	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Total	3	0.02%	2	$1,180,100	0.01%	0.03%	$3,402,300	0.06%

Source: City of Pawtucket GIS Data and Tax Assessor Records; Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS)

Table 38. Exposure to Hurricane Storm Surge (Category 3)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Commercial	3	0.27%	2	$249,500	0.21%	0.05%	$517,800	0.04%
Industrial	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Transportation & Utilities	3	1.78%	1	$1,439,900	8.33%	18.47%	$1,805,200	4.65%
Mixed Use	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Municipal/Institutional	3	1.02%	1	$271,100	0.57%	0.32%	$514,300	0.04%
Conservation / Open Space	2	2.82%	0	$0	0.00%	0.00%	$1,828,700	0.05%
Undeveloped (unprotected)	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Total	11	0.06%	4	$1,960,500	0.02%	0.05%	$4,666,000	0.04%

Source: City of Pawtucket GIS Data and Tax Assessor Records; Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS)

Table 39. Exposure to Hurricane Storm Surge (Category 4)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Commercial	15	1.34%	8	$9,819,700	0.84%	1.93%	$13,310,100	1.92%
Industrial	1	0.37%	1	$222,600	0.54%	0.24%	$322,700	0.23%
Transportation & Utilities	9	5.33%	2	$815,500	16.67%	10.46%	$2,430,700	4.50%
Mixed Use	2	0.94%	2	$622,400	0.94%	0.70%	$1,048,600	0.90%
Municipal/Institutional	10	3.39%	6	$20,122,000	3.45%	4.51%	$24,150,700	4.03%
Conservation / Open Space	2	2.82%	0	$0	0.00%	0.00%	$461,100	1.71%
Undeveloped (unprotected)	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Total	39	0.20%	19	$31,602,200	0.10%	0.80%	$41,723,900	0.73%

Source: City of Pawtucket GIS Data and Tax Assessor Records; Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS)

City of Pawtucket – Wildfire Exposure

Table 40. Exposure to Wildfire (Wildland Urban Interface)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	172	1.03%	160	$42,690,300	0.96%	1.53%	$61,036,600	1.50%
Commercial	6	0.54%	0	$0	0.00%	0.00%	$2,560,400	0.37%
Industrial	8	2.95%	8	$10,930,000	4.30%	11.84%	$14,188,000	10.06%
Transportation & Utilities	6	3.55%	0	$0	0.00%	0.00%	$1,035,000	1.92%
Mixed Use	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Municipal/Institutional	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Conservation / Open Space	1	1.41%	0	$0	0.00%	0.00%	$77,300	0.29%
Undeveloped (unprotected)	2	0.95%	0	$0	0.00%	0.00%	$235,600	1.35%
Total	195	1.02%	168	$53,620,300	0.93%	1.36%	$79,132,900	1.38%

Source: City of Pawtucket GIS Data and Tax Assessor Records; SILVIS Lab, University of Wisconsin (2020)

City of Pawtucket – Exposure of Critical Facilities and Community Assets

Table 41. Exposure of Critical Facilities

Critical Facility Type	Critical Facility ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
EOC	Public Works Building/250 Armistice Blvd								
Hospital	Memorial Hospital of Rhode Island/111 Brewster St								
Library	Pawtucket Public Library/12 Summer St								
Fire Station	Cottage Street Fire Station/385 Cottage St								
Fire Station	Roosevelt Ave Fire Station/137 Roosevelt Ave			x				x	
Fire Station	Columbus Ave Fire Station/2 Columbus Ave								

Critical Facility Type	Critical Facility ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
Fire Station	Newport Ave Fire Station/385 Newport Ave								
Fire Station	West Ave Fire Station/394 West Ave								
Fire Station	Smithfield Ave Fire Station/301 Smithfield Ave								
School	Nathanael Greene School/285 Smithfield Avenue								
School	Shea Senior High School/485 East Avenue								
School	William E. Tolman Senior High School/150 Exchange St								
School	Agnes E. Little School/60 South Bend Street								
School	Fallon Memorial School/62 Lincoln Avenue								
School	Goff Junior High School/974 Newport Avenue								
School	Potter-Burns School/973 Newport Avenue								
School	Flora S. Curtis Memorial School/582 Benefit Street								
School	Henry J. Winters School/481 Broadway								
School	M. Virginia Cunningham School/40 Baldwin Street								
School	Samuel Slater Junior HSl/281 Mineral Spring Ave								
School/Shelter	Francis J. Varieur School/486 Pleasant Street								
School/Shelter	Elizabeth Baldwin School/50 Whitman Street								
School/Shelter	Joseph Jenks Junior High School/350 Division Street								
School/Shelter	Curvin-McCabe/466 Cottage Street								
Law Enforcement	Pawtucket Police Station/121 Roosevelt Ave			x				x	
Law Enforcement	Pawtucket Police Substation/252 Armistice Blvd								
City Hall	Pawtucket City Hall/137 Roosevelt Ave			x				x	

Source: City of Pawtucket GIS Data; FEMA Flood Insurance Rate Map (FIRM); Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS); SILVIS Lab, University of Wisconsin (2010)

Table 42. Exposure of Other Community Assets

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
Major Employers									
	Hasbro, Inc.								
	The Matlet Group								
	International Packaging Corp.								
	Collette Vacations								
	American Insulated Wire Company								
	Teknor Apex Company								
	RI Textile Company								
Historic Places									
	Sandra Feinstein-Gamm Theater								
	Pitcher-Goff House								
	Pawtucket Lodge of Elks								
	Elisha O. Potter								
	Veterans Park Amphitheater/Roosevelt Ave	x						x	
	Alfred L. Childs House/Childs-Brown House								
	Pawtucket Armory								
	Art's Auto Supply								
	Fuller Tenement House								
	St. Paul's Episcopal Church								
	Riverside Cemetery								
	Lorenzo Crandall House								
	Hope Webbing Company Mill								
	E. A. Burnham House								
	Deborah Cook Sayles Public Library								
	Pawtucket Congregational Church								
	Fifth Ward Wardroom								
	Bridge Mill Power Plant	x						x	
	Phillips Insulated Wire Company								

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
	Pawtucket Times Building								
	Foster-Payne House								
	Joseph Spaulding House								
	James Mitchell House								
	First Ward Wardroom								
	Saint Jean Baptiste Church								
	St. Mary's Church Complex								
	West High School								
	John F. Adams House								
	Nathaniel Montgomery House								
	Charles Payne House								
	Fuller Tenement House								
	Louis Kotzow House								
	Modern Diner								
	Gilbane's								
	Church Hill Grammar School								
	Frederick Scholze House								
	St. Mary's Church Complex								
	Old Slater Mill Historic Site National Hist Dist	x						x	
	Main Street Bridge	x						x	
	Division Street Bridge	x			x				
	Conant Thread Company Mills								
	Liberty Arming the Patriot								
	Pawtucket Post Office								
	Collyer Monument								
	Gately Building								
	Prospect Heights								
	Standard Paper Box Corporation								
Community Facilities									

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
	Recreation Department/Slater Park								
	Transfer Station/Grotto Ave								
	Senior Center/Main St								
Private/Parochial Schools/Day Cares									
	Blackstone Academy Charter School								
	International Charter School								
	Bishop Francis P. Keough Regional High School								
	Smithfield Avenue Nursery School								
	Woodlawn Catholic Regional School								
	Pawtucket Day Child Development Center								
	Puss 'n Boots Nursery School								
	St. Mary School								
	St. Teresa School								
	TLC Day Care Center								
	Darlington Early Childhood Center, Inc.								
	St. Leo the Great								
	St. Cecilia School								
	The Children's Workshop-East Street								
	St. Raphael Academy								
	The Tides School								
	Valley Community School			x					
	Heritage Park Early Learning Center	x						x	
	The Children's Workshop-Bev Hill								
Parks/Open Space/Recreation Areas									
	Ten Mile River								
	Swap for Max Reed Field								
	Turner Reservoir								
	Slater Memorial Park								
	Tomlinson Park								

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
	Fairlawn Playground								
	McCoy Stadium								
	Newell Avenue Park								
	Berkeley Park								
	John Street Playground								
	Goff Lot								
	School Street Lots								
	Hodgson Rotary Park	x						x	
	Slater School Playground								
	Pawtucket Soccer Complex								
	Randall Street Park								
	Town Landing	x			x				
	Pleasant Street Park								
	Payne Park Playground								
	Fairlawn Veterans Memorial Park								
	School Street Traffic Island								
	Ayotte Park Playground								
	Festival Pier		x		x				
	Boys and Girls Club Riverfront								
	School Street CRMC Access Point								
	Potter- Burns Street School								
	Agnes Little School								
	Morley Field								
	Max Read Field						x		
	Oak Hill Tennis Courts								
	Prospect Heights								
	Hank Soars Field								
	Laurel Hill Playground								
	Galego Court Athletic Field								

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
	Smithfield Avenue Park								
	John B Santos Park								
	Wilkinson Park								
	Collyer Park								

Source: City of Pawtucket GIS Data; FEMA Flood Insurance Rate Map (FIRM); Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS); SILVIS Lab, University of Wisconsin (2020)

City of Central Falls– Flood Exposure

Table 43. Exposure to Flooding in FEMA Zone AE (1-percent-annual-chance without velocity wave action)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	30	1.41%	29	$4,149,000	1.36%	1.32%	$5,165,600	1.33%
Commercial	4	1.69%	4	$14,647,300	1.69%	18.84%	$15,380,000	15.68%
Industrial	8	8.51%	6	$2,206,900	11.54%	10.13%	$3,297,000	9.94%
Transportation & Utilities	2	20.00%	0	$0	0.00%	0.00%	$71,800	10.50%
Mixed Use	2	1.17%	0	$0	0.00%	0.00%	no data	no data
Municipal/Institutional	10	9.90%	2	$734,100	3.92%	0.59%	$1,793,000	1.06%
Conservation / Open Space	6	28.57%	0	$0	0.00%	0.00%	$860,200	51.78%
Undeveloped (unprotected)	8	14.04%	0	$0	0.00%	0.00%	$160,600	8.43%
Total	70	2.48%	41	$21,737,300	1.59%	3.88%	$26,728,200	3.68%

Source: City of Central Falls GIS Data and Tax Assessor Records; FEMA Flood Insurance Rate Map (FIRM)

Table 44. Exposure to Flooding in FEMA Zone X (0.2 percent annual chance)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	13	0.61%	13	$1,946,700	0.61%	0.62%	$2,441,000	0.63%
Commercial	2	0.84%	2	$3,169,500	0.85%	4.08%	$3,380,100	3.45%
Industrial	6	6.38%	3	$3,726,000	5.77%	17.10%	$4,590,500	13.84%
Transportation & Utilities	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Mixed Use	3	1.75%	2	$671,500	1.83%	2.99%	$807,400	2.40%

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Municipal/Institutional	5	4.95%	2	$48,476,100	3.92%	39.07%	$76,615,500	45.12%
Conservation / Open Space	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Undeveloped (unprotected)	1	1.75%	0	$0	0.00%	0.00%	$6,600	0.35%
Total	30	1.06%	22	$57,989,800	0.85%	10.35%	$87,841,100	12.09%

Source: City of Central Falls GIS Data and Tax Assessor Records; FEMA Flood Insurance Rate Map (FIRM)

Table 45. Exposure to Hurricane Storm Surge (Category 4)

Land Use	Number of Parcels		Number and Value of Buildings				Value of Real Property	
	Total in Hazard Area	% in Hazard Area	Total Number in Hazard Area	Total Value in Hazard Area	% in Hazard Area	% Value in Hazard Area	Total Value in Hazard Area	% Value in Hazard Area
Residential	1	0.05%	1	$112,500	0.05%	0.04%	$166,800	0.04%
Commercial	2	0.84%	2	$10,699,200	0.85%	13.76%	$11,101,500	11.32%
Industrial	2	2.13%	2	$615,400	3.85%	2.82%	$870,900	2.63%
Transportation & Utilities	1	10.00%	0	$0	0.00%	0.00%	$59,600	8.72%
Mixed Use	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Municipal/Institutional	3	2.97%	0	$0	0.00%	0.00%	$129,700	0.08%
Conservation / Open Space	1	4.76%	0	$0	0.00%	0.00%	$212,900	12.82%
Undeveloped (unprotected)	0	0.00%	0	$0	0.00%	0.00%	$0	0.00%
Total	10	0.35%	5	$11,427,100	0.19%	2.04%	$12,541,400	1.73%

Source: City of Central Falls GIS Data and Tax Assessor Records; Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS)

City of Central Falls – Exposure of Critical Facilities and Other Community Assets

Table 46. Exposure of Critical Facilities and Community Assets

Critical Facility Type	Critical Facility ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
EOC	Public Works Building/250 Armistice Blvd								
City Hall	Central Falls City Hall/580 Broad St.								
Library	Adams Public Library/205 Central St.								
School	Captain Hunt Early Learning (PK)/12 Kendall St.								
School	Ella Risk Elementary (K-5)/949 Dexter St.								
School	Veterans Memorial Elementary (K-5)/150 Fuller Ave.								
School	Raices Dual Language Academy (K)/135 Hunt St.								
School	Calcutt Middle School/112 Washington St.								
School	Central Falls High School (9-12)/24 Summer Street								
School	The Learning Community/21 Lincoln Ave.								
School	Blackstone Valley Prey Mayoral Academy Middle School								
School	Segue Institute for Learning / 325 Cowden St.								
School	RIC Workforce Hub / 934 Dexter St.								
School	The Children's Workshop-CF / 151 Hunt St.								
School	Site of Future High School / 10 Higginson Ave., 756 & 770 Lonsdale Ave.								
Hospital	Blackstone Valley Community Healthcare/9 Chestnut St								
Law Enforcement	Central Falls Police Department/160 Illinois St.								
Public Works	Central Falls Public Works/1280 High St.								
Fire Department	Central Falls Fire Department/150 Illinois St.								

Source: City of Central Falls GIS Data; FEMA Flood Insurance Rate Map (FIRM); Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS); SILVIS Lab, University of Wisconsin (2020)

Table 47. Exposure of Other Community Assets

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
Major Employers									
	Central Falls School District								
	The City of Central Falls								
Historic Places									
	Central Falls Mill Historic District/between Roosevelt Avenue and Blackstone River								
	South Central Falls Historic District/roughly bounded by Rand, Summit, Dexter and Broad Streets								
	Jenks Park and Cogswell Tower/adjoining 580 Broad Street to the north								
	Valley Falls Mill Complex Office and Bathhouse/1359 & 1361-1363 Broad Street								
	Central Street School/379 Central Street								
	Samuel B. Conant House/104 Clay Street								
	Benjamin F. Greene House/85 Cross Street								
	St. Matthew's Church/Dexter & West Hunt Street								
	Holy Trinity Church Complex/134 Fuller Avenue								
	Central Falls Congregational Church/376 High Street								
	David D. Fales House/476 High Street								
	Conant Threat Company Mills/bounded by Pine, Conant, Carpenter, Coleman, Beecher Streets, and Lonsdale Avenue in Pawtucket; Lonsdale Avenue, Rand and Pine Streets in Central Falls (Pawtucket and Central Falls)								
Parks/Open Space/Recreation Areas									
	Jenks Park/602 Broad St. & Washington St.								
	Lincoln Almond Fitness Park/188 Earle St.								

Community Asset Type	Community Asset ID (Name/Address)	Exposure to Flooding			Exposure to Hurricane Storm Surge Inundation				Exposure to Wildfire
		Zone AE	Zone VE	Zone X	Cat 1	Cat 2	Cat 3	Cat 4	
	River Island Park & Camp Ground/1461 High St.								
	Dexter Plaza/741 Dexter St.								
	Chocolate Mill Overlook/Intersection of Charles Street & Roosevelt Ave.								
	Pierce Park/987 High St.								
	Garfield Street Playground/118 Garfield St.								
	Veterans Memorial Park/406 Hunt St.								
	Sacred Heart Park/Corner of Sacred Heart Ave. & High St.								
	Coutu Memorial Park/Hunt St. and Lewis Street								
	Macomber Stadium/964 High St.								
	Casey Club / 20 Claremon St.								
	St. Joseph's Church / 397 High St.								
	Phillips Community Garden / 26 Phillips St.								
	Quinn Square / Dexter St. & W Hunt St.								
	Louis C. Yip Soccer Field / 1304 High St.								
	The Landing / 1400-1500 Broad St.								
	Blackstone River Bikeway / High St. (Rear of Lot 60)								
	Blackstone Path / Courtland St.								
	Blackstone Path / New Haven Ave.								
	Cowden Street Court / 227 Cowden St.								
	Portion off of Jenks Park / 51 Washington St.								
	Futsal Court / 40 Ledge St.								
	Calcutt School Playground / 108 Washington St.								

Source: City of Central Falls GIS Data; FEMA Flood Insurance Rate Map (FIRM); Rhode Island Worst Case Hurricane Surge Inundation Areas, Rhode Island Geographic Information System (RIGIS); SILVIS Lab, University of Wisconsin (2020)

A.5. SUMMARY FINDINGS AND CONCLUSIONS

The Hazard Analysis and Risk Assessment completed for the cities of Pawtucket and Central Falls includes both quantitative and qualitative information to help determine the potential impact of each identified hazard on community assets. This information provides significant findings that allow the Local Planning Team to prioritize hazard risks, summarize key challenges and concerns, and identify specific hazard mitigation actions for inclusion in the Mitigation Strategy chapter.

Ranking and Prioritizing Hazards

> ***RISK*** *for the purpose of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with assets, such as buildings, infrastructure, or natural and cultural resources.*

To assist prioritizing hazard risks, the Local Planning Team applied a "Priority Risk Index" (PRI). The PRI is a tool designed to (1) summarize relevant hazard profile information as included in section A.2; and (2) measure the degree of relative risk each hazard poses to the planning area based on that information. The PRI was used to assist the Local Planning Team in ranking and prioritizing hazards based on a variety of characteristics including location, probability, potential impact, warning time, and duration.

The PRI results in numerical values that allow identified hazards to be ranked against one another – the higher the PRI value, the greater the hazard risk. PRI values are obtained by assigning varying degrees of risk to each of the five characteristics, or categories. Each degree of risk has been assigned an index value (1 to 4) and an agreed upon weighting factor, as summarized in **Table 48**.

To calculate the PRI value for a given hazard, the assigned index value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the below equation:

PRI VALUE =
(LOCATION x .20) + (PROBABILITY x .30) + (POTENTIAL IMPACT x .30) + (WARNING TIME x .10) + (DURATION x .10)

According to the weighting scheme applied for the cities of Pawtucket and Central Falls, the highest possible PRI value is 4.0. Prior to being finalized, PRI values for each hazard were reviewed and accepted by the Local Planning Team.

Table 48. Priority Risk Index (PRI)

PRI CATEGORY	DEGREE OF RISK			ASSIGNED WEIGHTING FACTOR
	LEVEL	CRITERIA	INDEX VALUE	
Location	Negligible	Less than 1% of planning area affected	1	20%
	Small	1-10% of planning area affected	2	
	Moderate	10-50% of planning area affected	3	
	Large	50-100% of planning area affected	4	
Probability	Unlikely	Less than 1% annual probability	1	30%

PRI CATEGORY	DEGREE OF RISK			ASSIGNED WEIGHTING FACTOR
	LEVEL	CRITERIA	INDEX VALUE	
	Possible	1-10% annual probability	2	
	Likely	10-90% annual probability	3	
	Highly Likely	90-100% annual probability	4	
Potential Impact *	Minor	Very few injuries, if any. Only minor property damage and minimal disruption to quality of life. Partial or complete shutdown of critical facilities for less than one day.	1	30%
	Limited	Minor injuries only. 10-25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple fatalities/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of fatalities/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one month.	4	
Warning Time	More than 24 hours		1	10%
	12 to 24 hours		2	
	6 to 12 hours		3	
	Less than 6 hours		4	
Duration	Less than 6 hours		1	10%
	6 to 24 hours		2	
	1 to 7 days		3	
	More than 1 week		4	

* Probability takes into account current and projected future conditions based on climate change.

** Potential impact is based upon the estimated *maximum probable extent* (magnitude/severity) for each hazard based on historic events or future probability data, as shown in **Table 49**.

Table 49. Maximum Probable Extent

HAZARD	MAXIMUM PROBABLE EXTENT
Coastal Storm	Category 3 hurricane on Saffir-Simpson Hurricane Wind Scale, or Intensity Index Category 4 on Classification Scheme for Nor'easters
Dam Failure	Complete failure of a high hazard dam
Earthquake	6.5 on Richter Scale and Intensity VII on Modified Mercalli Intensity scale
Extreme Temperatures	5 consecutive days with heat index exceeding 100°F, or wind chill of less than -20°F
Fire	Major urban fire, or 100 acres burned along wildland-urban interface
Flood (3 Types):	
Riverine Flood	1 Percent Annual Chance Flood for all FEMA Special Flood Hazard Areas
Coastal Flood	Worst Case Storm Surge Inundation for Category 3 Hurricane
Urban/Flash Flood	10-year Design Storm Event
Infectious Disease	Pandemic or other major disease outbreak with severe and life-threatening consequences, with confirmed cases in the planning area
Sea Level Rise	Sea level rise of 9 feet by 2100
Severe Weather	Wind gusts exceeding 50 knots, hail measuring at least three-quarters of an inch in diameter, or tornado occurrence
Severe Winter Storm	Category 5 on Regional Snowfall Index, or Intensity Index Category 4 on Classification Scheme for Nor'easters

Table 50 summarizes the degree of risk assigned for all identified hazards in the planning area based on the application of the PRI tool, along with the calculated PRI values.

Table 50. Summary of PRI Results

HAZARD	CATEGORY/DEGREE OF RISK					PRI Value
	LOCATION	PROBABILITY	POTENTIAL IMPACT*	WARNING TIME	DURATION	
Coastal Storm	Large	Likely	Catastrophic	More than 24 hours	1 to 7 days	3.3
Dam Failure	Small	Possible	Critical	Less than 6 hours	Less than 6 hours	2.4
Earthquake	Large	Possible	Minor	Less than 6 hours	Less than 6 hours	2.2
Extreme Temperatures	Large	Highly Likely	Critical	More than 24 hours	1 to 7 days	3.3
Fire	Small	Highly Likely	Critical	Less than 6 hours	6 to 24 hours	3.1
Flood (3 Types):						
Riverine Flood	Moderate	Likely	Critical	12 to 24 hours	1 to 7 days	2.9
Coastal Flood	Negligible	Possible	Minor	More than 24 hours	6 to 24 hours	1.4

HAZARD	CATEGORY/DEGREE OF RISK					PRI Value
	LOCATION	PROBABILITY	POTENTIAL IMPACT*	WARNING TIME	DURATION	
Urban/Flash Flood	Large	Highly Likely	Limited	Less than 6 hours	Less than 6 hours	3.1
Infectious Disease	Small	Likely	Critical	More than 24 hours	More than 1 week	2.7
Sea Level Rise	Negligible	Highly Likely	Minor	More than 24 hours	More than 1 week	2.2
Severe Weather	Moderate	Highly Likely	Critical	6 to 12 hours	Less than 6 hours	3.1
Severe Winter Storm	Large	Highly Likely	Limited	More than 24 hours	1 to 7 days	3.0

The calculated PRI values were used by the Local Planning Team to classify each hazard according to three defined risk levels (Low, Moderate, or High) as shown in **Table 51.** It should be noted that although some hazards are classified as posing "low" risk, their occurrence of varying or unprecedented magnitudes is still possible and they will continue to be evaluated by the cities of Pawtucket and Central Falls during future updates to this plan.

Table 51. Hazard Risk Rankings

HIGH RISK	Coastal Storm Extreme Temperatures Fire Urban/Flash Flood Severe Weather
MODERATE RISK	Severe Winter Storm Riverine Flood Infectious Disease
LOW RISK	Dam Failure Earthquake Sea Level Rise Coastal Flood

Vulnerability Summary (Problem Statements)

While many general risks and specific vulnerabilities have been identified for each hazard throughout this chapter, some of the key "problem statements" for the planning area are summarized below. These include specific issues identified by the LPT or stakeholders during the plan update process in addition to many of those hazard-specific concerns or challenges identified by community stakeholders during the 2020 Community Resilience Building Workshop. The following problem statements have been organized by hazard, as appropriate, and were used to help identify, evaluate, and prioritize specific actions for the Mitigation Strategy.

MULTIPLE HAZARDS

- The lack of a designated community center and sufficient space to provide shelter during emergencies remains an ongoing concern for the planning area.
- More public education and awareness is needed on the potential risks of current and future hazard impacts to the community, including homes and other privately-owned buildings, as well as the mitigation activities available to help reduce those risks.
- The outdated electrical grid frequently experiences power outages during storms events.
- There is inadequate generator capacity for backup power in both cities.
- Implications for disproportionately disadvantaged populations (i.e., homeless, elderly, low-income, non-English speakers) from flooding, winter storms, and extreme temperatures.
- Emergency communications with and outreach among non-English speakers.
- High rates of food insecurity across both cities.

EXTREME TEMPERATURES

- Prevalent heat islands across both cities pose threats to residents during extreme heat events.
- Lack of trees at bus stops, heat-sensitive areas, and other vulnerable locations.
- Power outages remain a significant life/safety threat to residents, especially vulnerable populations, and particularly during heatwaves in the summer months and during periods of extreme cold in winter months.

FIRE

- The potential for larger, destructive urban fires remains high for both cities due to large concentrations of older, wood frame structures and other contributing factors (see Fire hazard profile for more details).

FLOOD

- Pawtucket's City Hall, Fire Station, and Police Station are within high-risk flood hazard areas, which could hinder the City's emergency response and recovery capabilities during and following extreme weather events.

- Several historic buildings in Pawtucket are within high-risk flood hazard areas.
- Several repetitive loss properties are located within both cities.
- Low-lying roads and buildings close to riverine systems are subjected to erosion and routine flooding from rivers and stormwater runoff (see Flood hazard profile and Vulnerability Summary for more details).
- High levels of impervious surfaces (>60%) create stormwater runoff issues.
- Lack of green space for runoff in neighborhoods.
- Aged sewer and stormwater infrastructure are prone to being at capacity and cause flooding.
- Combined sewer/stormwater systems exacerbate capacity of piped systems and overflows to riverine systems.
- Overflows into rivers that flood beyond their banks will affect resident's homes, businesses, and vulnerable populations. They also pollute the rivers with pollutants, including from contaminated mill sites, which exacerbate issues for residents when contaminants infiltrate homes and businesses during flood events.

* See Flood hazard profile for more details on specific problems and areas of concern identified for each city.

SEVERE WINTER STORM

- Power outages remain a significant life/safety threat to residents, especially vulnerable populations, and particularly during periods of extreme cold following major winter storms.
- Heavy snow results in extended road closures that isolated residents and neighbors across both cities.
- Small, compact roads exacerbate hazardous driving conditions and create parking and plowing difficulties.

APPENDIX B. CAPABILITY ASSESSMENT

This section describes the overall capability of the Cities of Pawtucket and Central Falls to implement hazard mitigation activities. It consists of the following five subsections:

B.1 Overview
B.2 Methodology
B.3 Review and Incorporation of Existing Plans, Studies, and Reports
B.4 Review of Existing Capabilities
B.5 Summary of Findings and Conclusions

B.1. OVERVIEW

The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy, and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects. As in any planning process, it is important to try to establish which goals and actions are feasible, based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps to determine which types of mitigation actions are practical and likely to be implemented over time based on a local government's existing authorities, policies, programs, and resources available to support such implementation.

A capability assessment has two primary components: an inventory of a local jurisdiction's relevant plans, ordinances, programs, or activities already in place; and an analysis of its current capacity and resources to carry them out. A careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses associated with ongoing government activities that could hinder proposed mitigation activities and possibly even exacerbate hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should be leveraged and continue to be supported and enhanced through future mitigation efforts.

The capability assessment serves as a critical part of the planning process, including the development of an effective hazard mitigation strategy. Coupled with the Hazard Analysis and Risk Assessment (Appendix A), the capability assessment helps identify and target meaningful mitigation actions for incorporation into the mitigation strategy. It not only helps establish the goals for the Cities of Pawtucket and Central Falls to pursue under this Plan, but also ensures that those goals and the mitigation actions that follow are realistically achievable given current local conditions.

B.2. METHODOLOGY

To facilitate the updated inventory and analysis of local government capabilities for the Cities of Pawtucket and Central Falls, several survey instruments that were used for the initial plan were again distributed and discussed with local community staff. These included a Capability Assessment Survey, Safe Growth Survey, and National Flood Insurance Program (NFIP) Survey as further described below.

Capability Assessment Survey

The Capability Assessment Survey requested information on a variety of "capability indicators"

such as existing local plans, policies, programs, or ordinances that may reduce, or in some circumstances, increase the community's hazard vulnerability. Other indicators included information related to each jurisdiction's fiscal, administrative, and technical capabilities such as access to local budgetary and personnel resources necessary to implement mitigation measures. Survey respondents were also asked to comment on existing activities or capabilities to conduct public education and outreach, as well as the current political climate in their jurisdiction to implement mitigation actions, an important consideration for any local planning or decision-making process.

At a minimum, survey results provide an extensive inventory of existing local plans, ordinances, programs, and resources in place or under development in addition to their overall effect on hazard loss reduction as perceived by local government staff. The survey instrument thereby not only helps to accurately assess each City's current local capabilities, but also serves as a self-assessment for those local departments of staff wishing to improve their capability as identified gaps, weaknesses, or conflicts can be recast as opportunities to be addressed in the development of new mitigation actions.

Safe Growth Survey

As part of the planning process, representatives from each City's Planning Departments were asked to complete a Safe Growth Survey. This unique survey instrument was drawn from a technique recommended by David Godschalk, FAICP and professor emeritus of city and regional planning at the University of North Carolina at Chapel Hill, to help better evaluate the extent to which the Cities of Pawtucket and Central Falls are positioned to grow safely relative to their natural hazards. The survey covered six distinct topic areas including the following:

1. Land Use
2. Transportation
3. Environmental Management
4. Public Safety, Zoning Ordinance
5. Subdivision Regulations
6. Capital Improvement Program and Infrastructure Policies

While somewhat of a subjective exercise, the Safe Growth Survey was used to provide some measure of how adequately existing planning mechanisms and tools for the Cities of Pawtucket and Central Falls were being used to address the notion of safe growth as currently advocated by organizations such as FEMA and the American Planning Association (APA). In addition, the survey instrument was aimed at further integrating the subject of hazard risk management into the dialogue of local community planning and to possibly consider and identify new actions as it relates to those local planning policies or programs already in place or under development.

It is anticipated that the Safe Growth Survey will continue to be used during plan updates to help measure progress over time and to continue identifying possible mitigation actions as it relates to future growth and community development practices, and how such actions may better be incorporated into local planning mechanisms.

National Flood Insurance Program (NFIP) Survey

The NFIP Survey was designed to help gather information from the Cities of Pawtucket and Central Falls designated floodplain administrators to describe the status of their participation in

the NFIP, including existing floodplain management programs and continued compliance with federal requirements and standards. The NFIP contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to identified flood hazards. In return for meeting minimum regulatory standards, communities make the purchase of flood insurance through the NFIP available to their property owners. Participation in the NFIP is voluntary but is promoted by FEMA as a critical means to not only make flood insurance available to community residents, but also to implement and sustain an effective, long-term hazard mitigation program aimed at reducing future flood losses.

Following the completion and discussion of these surveys with local staff, the planning team conducted a more detailed review of all the relevant plans, studies, reports, and other related documents to gain a clear understanding on their existing or potential effects on hazard risk reduction. These documents are listed and further described in the next section.

B.3. REVIEW AND INCORPORATION OF EXISTING PLANS, STUDIES, AND REPORTS

A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))

Upon completion of the surveys described above, the next step in completing the updated capability assessment was to gather and review any relevant local plans, studies, and reports completed or updated since the previous hazard mitigation plan was adopted in 2018. This information was used to help gain a current understanding of each City's current ability to mitigate risk, and how local capabilities may have changed over the past five years. The 2024 State of Rhode Island Hazard Mitigation Plan, as well as other plans adopted by the Cities of Pawtucket and Central Falls in the recent past, were reviewed for consistency as well as opportunities for plan integration. The goal of this review was to support updates to this plan that easily align with and possibly incorporate key aspects of relevant plans at the state and local level.

Table 52 provides a summary of the most recent and relevant plans, studies, reports, or sources of other technical information consulted as part of the plan update process and how they were incorporated into the plan. This list is not all inclusive and does not comprise all the data sources cited separately in the Hazard Analysis and Risk Assessment. Other recent documents that were reviewed but not considered relevant for direct incorporation into the plan update included the following: Pawtucket's 20/20 Downtown Development Vision; Pawtucket Commerce Report, 2022; and Affordable Housing in Pawtucket: 2021-2022 Status Report. Other plans that were reviewed and considered during the initial development of this plan are listed below the table, with some also subsequently described in Table 53 (Planning and Regulatory Capabilities).

Table 52. Relevant Plans, Studies, and Reports for Incorporation

Plan / Study / Report	Summary Description / Incorporation
State of Rhode Island Hazard Mitigation Plan (2024)	The State of Rhode Island Hazard Mitigation Plan (SHMP) was prepared to provide sustained actions to reduce or eliminate risk to the people and infrastructure of the State from the

Plan / Study / Report	Summary Description / Incorporation
	effects of natural, technological, and human caused hazards. The 2024 version of the plan, which serves as an update to the 2019 SHMP, documents the planning process and identifies applicable hazards, vulnerabilities, and hazard mitigation strategies. Approved by FEMA and adopted by the State in February 2024, the plan will serve to direct available state resources towards creating policies and actions that provide long-term benefits to communities. Additionally, state officials can refer to the plan when making decisions regarding regulations and ordinances, granting permits, and in funding capital improvements and other community initiatives. The 2024 SHMP was incorporated as a key source of information for this plan update. This included the integration and consideration of the latest climate data and information for all natural hazards impacting Rhode Island with particular emphasis on those unique risks or impacts determined for the planning area. In addition, the goals, objectives, and actions included in Chapter 7 (Mitigation Strategy) were reviewed and considered as part of the update process to help ensure the Cities' own goals and actions remain in alignment with and can be mutually supportive of the State's overall strategy for hazard risk reduction.
Resilient Rhody: An Actionable Vision For Addressing the Impacts of Climate Change in Rhode Island (2018)	Resilient Rhody serves as the State's climate adaptation strategy by addressing the impacts of climate change on critical infrastructure and utilities, natural systems, emergency preparedness, community health, and community resilience. The recommended climate resilience actions introduced throughout the Strategy are designed to protect the state against sudden and unexpected severe weather events and address underlying chronic stresses, such as rising sea levels, aging infrastructure, and competing development priorities. The actions recommended for strengthening resilience were used to help inform the mitigation strategy update process for both Cities, but the report was primarily referenced along with the 2024 SHMP as a key source for data and information on climate change in Rhode Island. Specifically, Chapter 1 of the document provided the evidence base for why climate resilience is essential in Rhode Island by summarizing research and data on climate change impacts currently affecting the state as well as estimates and predictions for future impacts.
Pawtucket/Central Falls Municipal Resilience Program, Community	This report summarized the results and findings of a 2020 Community Resilience Building (CRB) Workshop held for the Cities of Pawtucket and Central Falls as they jointly embarked

Plan / Study / Report	Summary Description / Incorporation
Resilience Building Workshop: Summary of Findings (2020)	on certification within the newly established State of Rhode Island's Municipal Resilience Program (MRP). As an important step towards certification, Rhode Island Infrastructure Bank (RIIB) and the Nature Conservancy (TNC) provided the two Cities with a joint, community-driven process to assess current hazard and climate change impacts and to surface projects, plans, and policies for improved resilience. In October 2020, the Cities Core Project Team organized the CRB Workshop which was led by TNC in partnership with RIIB. The core directive of this effort was the engagement with and between community stakeholders to define strengths and vulnerabilities and the development, planning, and ultimately, the implementation of priority resilience actions. The Pawtucket and Central Falls CRB Workshop's central objectives were to: 1. Define top local natural and climate-related hazards of concern; 2. Identify existing and future strengths and vulnerabilities; 3. Identify and prioritize actions or the two Cities (individually and jointly); and 4. Identify opportunities to collaboratively advance actions to increase resilience alongside the other municipalities and organization across the two Cities. The resulting Summary of Findings Report and supporting materials served as a primary source of information and community-based input for incorporation into the update of this plan. These inputs include the identification of top hazards of concern for the community (riverine and urban flooding, nor'easters/high precipitation storms, and extreme and extended temperatures), in addition to vulnerable areas or community assets (infrastructural, societal, and environmental), current community concerns and challenges presented by these hazards, current strengths and assets, and specific, prioritized recommendations to improve resilience. The concerns and challenges presented by hazards were directly incorporated into the risk assessment (including "problem statements"), and the recommendations to improve resilience were incorporated into the review and consideration of mitigation actions for the updated mitigation strategy.
City of Central Falls Climate Action Plan (2023)	The Central Falls Climate Action Plan, released by Mayor Rivera in 2023, was meant to start discussions around solutions and facilitate a meaningful way for Central Falls to forge climate

Plan / Study / Report	Summary Description / Incorporation
	resilience. Developed in partnership with Groundworks RI, Southside Community Land Trust, Farm Fresh RI, and other community partners, this plan targets critical areas of concern for those who have been disproportionately impacted by climate change. Through direct communication with community organizations, including public comment opportunities, and with the direction of the community-based Municipal Resilience Workshop in 2020 (described above), the plan focuses the City's direction, recommendations, and target areas moving forward. The City's Climate Action Plan was reviewed and incorporated as a key source of information for this plan update. This included the integration and consideration of updated hazard data and vulnerability information for the risk assessment, especially as it relates to unique challenges or opportunities in Central Falls. It also included the review and incorporation of applicable recommendations for reducing hazard risks into the mitigation strategy, including those focused on addressing stormwater management, green infrastructure, and emergency safety.
FEMA Flood Insurance Study for Providence County (2023)	Last revised by FEMA on August 1, 2023, this report constitutes the revised preliminary Flood Insurance Study (FIS) report for Providence County. This latest FIS revises and updates information from the currently effective (2015) FIS report on the existence and severity of flood hazards for the study area, which includes the Cities of Pawtucket and Central Falls. The studies described in this report provide flood hazard data that will, once formally adopted as final/effective, be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management. The FIS and accompanying Flood Insurance Rate Maps (FIRMs) include relevant data and information on flood hazards for the planning area, including but not limited to descriptions of principal flood problems, flooding sources, FEMA flood zone designations, base flood elevations, and discharge rates of flooding sources. This data and information were reviewed and incorporated into the plan update process by informing the risk assessment, especially as it relates to the hazard profile and GIS-based vulnerability assessment that was prepared for the flood hazard.

Other Plans, Studies, and Reports (reviewed for 2018 Hazard Mitigation Plan)

STATE OF RHODE ISLAND

- Rhode Island 2014 Hazard Mitigation Plan Update
- State of Rhode Island Hazard Identification and Risk Assessment, January 2017

PAWTUCKET

- Land Development and Subdivision Regulations
- Capital Improvement Program Ordinance, 2017-2021
- Comprehensive Plan, 2017
- Stormwater Management Plan (SWMP) – RIPDES Small MS4 Annual Report, 2017
- Strategy for Reducing Risks from Natural Hazards in Pawtucket, Rhode Island: A Multi-Hazard Mitigation Strategy. City of Pawtucket. 2011
    - Annual Progress Report. City of Pawtucket. September 30, 2015
- Emergency Operations Plan, 2011
- Pawtucket & Central Falls Station District Vision Plan, 2017
- River Corridor Development Plan, 2013
- Riverfront Corridor Market Analysis, Pawtucket-Central Falls, 2012
- Technical Assistance Report, Strengthening Downtown, 2015
- Tidewater Site Master Plan, 2016

CENTRAL FALLS

- Central Falls Zoning Ordinance
- City of Central Falls Capital Improvement Plans, November 2015
- Comprehensive Community Plan, November 2007
- Land Development and Subdivision Review Regulations, Planning Commission, March 2009
- Attachment C: Mutual Aid in Rhode Island (excerpted from the Southern New England Fire Emergency Assistance Plan, Mutual Aid Agreement, and Operating Guide, 2004)
- Reducing Risks from Natural Hazards in Central Falls, Rhode Island – Contributions toward a 2012 Update

B.4. REVIEW OF EXISTING CAPABILITIES

C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))

Table 53 through Table 56 provide a narrative summary of the plans, reports, and other information collected and reviewed as part of the Capability Assessment Survey and as discussed with the Local Planning Team during the assessment of the Cities of Pawtucket and Central Falls existing hazard mitigation capabilities. The summary provides a better

understanding of the relevant programs, regulations, resources, and practices in place as well as their general effectiveness for hazard risk reduction. They also provide insight into any identified opportunities to improve, expand, or enhance these capabilities for hazard risk reduction purposes.

The tables are organized according to the following four types of capabilities as defined by FEMA:

- *Table 53: Planning and Regulatory Capabilities*. Includes capabilities based on the jurisdiction's implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development.
- *Table 54: Administrative and Technical Capabilities.* Includes capabilities associated with the jurisdiction's staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions.
- *Table 55: Financial Capabilities* – Refers to the fiscal resources that a jurisdiction has access to or is eligible to us to fund mitigation actions.
- *Table 56: Education and Outreach* – Refers to education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Table 53. Planning and Regulatory Capabilities

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
Plans	Does the plan address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?			
Comprehensive/Master Plan	Planning Commission City Council RI Division of Planning	Yes – Land Use and Natural Resources chapters: • Inform future land use priorities with emphasis on low impact development in proximity to floodplains. • Encourage remediation/restoration of existing wetlands to serve as a natural flood mitigation. The document can be used during review of development proposals and grant funding.	Department of Planning & Economic Development	The Services and Facilities section of the current Comprehensive Plan (2007) includes three paragraphs on natural hazard mitigation, which explain that a Hazard Mitigation Plan was prepared to meet federal standards and assist in receiving FEMA assistance, and states that the City would build an Emergency Operations Center as part of the Public Works Building. *(Note, as of 2023, the EOC in the DPW building consists of a conference room shared by the Public Works and Planning Departments).* This section also describes the combined sewer and stormwater system and speaks to the need for a Municipal Facilities Plan and, because of the high cost, the need to resolve problems caused by the combined systems

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				on a regional basis. The only action items pertaining to mitigation in the current Comp Plan are "vigorous enforcement of flood plain regulations" and "undertake a municipal facilities plan". The City's current comprehensive plan is in the process of being updated (beginning in 2024 as "Central Falls 2050") and will include a section on planning for natural hazards mitigation and climate change as required by State law.
Open Space and Recreation Plan	Planning Department Parks and Recreation	Included in Comprehensive Plan but limited direct inclusion of hazards.	Department of Planning & Economic Development	An element of the Comprehensive Plan under Open Space and Recreation. The current plan does not address hazards or identify projects to include in the mitigation strategy.
Economic Development Plan	Economic Development	Focus on Downtown revitalization and does highlight major storm impact on infrastructure and	Department of Planning &	An element of the Comprehensive Plan under Economic Development. The current plan

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
	Planning Department	business operations – not a binding document to implement mitigation actions.	Economic Development	does not address hazards or identify projects to include in the mitigation strategy.
Capital Improvements Plan	Planning Commission City Council Planning Department	Does not specifically address hazards primary focus on street conditions, sewer/sanitation, bridges, public building.	Mayor's Office & Finance	A new Capital Asset Prioritization (CAP) process was implemented in 2023 to identify and prioritize what the City wants/needs to spend money on a few years in advance. The system is a proactive approach that enables all City departments to submit items or projects for consideration and to identify opportunities to fund them. Mitigation actions could be submitted for consideration.
Emergency Operations Plan *(being updated)*	Emergency Management Agency	Includes specific hazards, capability & resources, infrastructure & services, emergency management procedures, resources (local, state, federal), dissemination of informational materials.	Emergency Management Agency	Includes specific hazards, capability & resources, infrastructure & services, emergency management procedures, resources (local, state, federal), dissemination of informational materials.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
Continuity of Operations Plan *(being updated)*	Emergency Management Agency	Included within Emergency Operations Plan – specific to 12 identified support functions (transportation, communication, public works, fire, housing and human services, medical services, search and rescue, utilities, security).	Emergency Management Agency	Included within Emergency Operations Plan – specific to 12 identified support functions (transportation, communication, public works, fire, housing and human services, medical services, search and rescue, utilities, security).
Transportation Plan	Department of Public Works-Traffic Engineering Planning Department	Included in Comprehensive Plan and does not specifically address hazards.	Department of Planning & Economic Development	An element of the Comprehensive Plan under Transportation Circulation. The current plan does not address hazards or identify projects to include in the mitigation strategy. The PCF Multimodal Master Plan ("Walk Bike PCF") released in 2020 provides a framework for increasing pedestrian and bike travel, increasing transit ridership, and reducing the use of/dependence on cars.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
Stormwater Management Plan	Department of Public Works	Completed in 2017. Green stormwater infrastructure master plan – still in use. Pine Street south area project – green infrastructure improvements done in 2022. Pine Street North – additional plans to begin 2023. Looking for additional green space/tree planting in city.	Department of Planning & Economic Development	The City does not have a Stormwater Management Plan. This needs to be developed as a standalone plan and/or be a strong component of the new Comprehensive Plan. The Services and Facilities section of element of the current Comprehensive Plan (2007) describes the combined sewer and stormwater system and speaks to the need for a Municipal Facilities Plan and, because of the high cost, the need to resolve problems caused by the combined systems on a regional basis.
Historic Preservation Plan	Pawtucket Historic District Commission	Does not specifically address hazards – more standards and goals for historic preservation.	Department of Planning & Economic Development	An element of the Comprehensive Plan under Historic Natural and Cultural Resources. The State requires the Comp Plan to "be based on an inventory of significant historical and cultural resources such as historical buildings, sites, landmarks, and scenic views. The plan must include goals, policies, and

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				implementation techniques for the protection of these resources." The new Com Plan should specifically address the historic mill buildings and sites along the Blackstone River.
Community Wildfire Protection Plan	N/A	N/A	N/A	N/A
Other special plans? (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Planning Department Blackstone Valley Tourism Council Pawtucket Foundation	**Transit Oriented Development Vision** – Investment in transit and water infrastructure, encourage dense mixed-use development through historic mill rehabilitation. **Broad Street Regeneration** – Investment in infrastructure and stormwater management along primary commercial thoroughfare from Cumberland to Pawtucket. **River Corridor Development Plan** – Targeted brownfields remediation, adaptive reuse of existing structures, infrastructure improvement, and preservation of	Department of Planning & Economic Development	**Climate Action Plan** (see Table 52) **Train Station District plan –** will contain some relevant elements. (Note – the Conant Thread District [TOD] Design Guidelines finalized in 2019 includes a recommendation to integrate stormwater management into overall design, highlights key features to be incorporated into landscape design [plants that are tolerant to drought, salt, and heat; use native species; use landscaping as part of stormwater management wherever possible], and includes a preferred plant list.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
		open space along the Blackstone River. **Stormwater Video project –** Maintenance videos for DPW staff & training; information for general public; quick reference guide developed; plant maintenance.		These guidelines are to be used by the Joint Planning Commission when new projects are reviewed.) **Transit Oriented Development Vision** – Investment in transit and water infrastructure, encourage dense mixed-use development through historic mill rehabilitation. **Broad Street Regeneration –** Investment in infrastructure and stormwater management along primary commercial thoroughfare from Cumberland to Pawtucket. *(Note – the Central Falls portion of the Broad Street Regeneration Initiative's streetscape improvements were implemented in 2021. Specifically, Broad Street was repaved, new sidewalks were installed, and new catch basins, grates, and inlets were installed. The project did not include any green stormwater infrastructure.)* **River Corridor Development Plan –** Targeted brownfields

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				remediation, adaptive reuse of existing structures, infrastructure improvement, and preservation of open space along the Blackstone River.
Building Code, Permitting, and Inspections	Are the codes adequately enforced?			
Building Code	Zoning Department, Zoning and Code Enforcement Office	The City is mandated to follow the Rhode Island Building Code (510-RICR-00-00-1) which currently incorporates the 2018 International Building Code (IBC) by reference. Adequately enforced and considered to be very effective for hazard risk reduction purposes. Key hazard resistant code provisions include but are not limited to the following: • Structural Design Requirements: provide requirements for the structural design of buildings to	Code Enforcement, Building and Construction Division	The City is mandated to follow the Rhode Island Building Code (510-RICR-00-00-1) which currently incorporates the 2018 International Building Code (IBC) by reference. Adequately enforced and considered to be very effective for hazard risk reduction purposes. Key hazard resistant code provisions include but are not limited to the following: • Structural Design Requirements: provide requirements for the structural design of buildings to

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
		ensure their resistance to various hazards, including earthquakes, high winds, and snow loads. • Wind Design Requirements: Provides specific provisions for wind design, considering the geographical location of the structure. • Seismic Design Requirements: Incorporates seismic design provisions to address earthquake hazards. • Flood-Resistant Design Requirements: Includes provisions related to flood		ensure their resistance to various hazards, including earthquakes, high winds, and snow loads. • Wind Design Requirements: Provides specific provisions for wind design, considering the geographical location of the structure. • Seismic Design Requirements: Incorporates seismic design provisions to address earthquake hazards. • Flood-Resistant Design Requirements: Includes provisions related to flood

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
		resistant design, particularly in areas prone to flooding. It may specify elevation requirements, construction materials, and other considerations to reduce the risk of flood damage. • Fire-Resistant Construction Requirements: Requirements for fire resistant construction include specifications for fire-resistant materials, assemblies, and building features. • Material and Construction Standard Requirements: Establishes standards for building materials and construction methods to ensure the durability and		resistant design, particularly in areas prone to flooding. It may specify elevation requirements, construction materials, and other considerations to reduce the risk of flood damage. • Fire-Resistant Construction Requirements: Requirements for fire resistant construction include specifications for fire-resistant materials, assemblies, and building features. Material and Construction Standard Requirements: Establishes standards for building materials and construction methods to ensure the durability and safety of structures, considering various hazards.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
		safety of structures, considering various hazards.		
ISO Mitigation Ratings	Zoning Department Planning Department	Building Code Effectiveness Grading Schedule (BCEGS): 3 Public Protection Classification (PPC): 3 Community Rating System (CRS): 8	Department of Public Works & Code Enforcement	Building Code Effectiveness Grading Schedule (BCEGS): 3 Public Protection Classification (PPC): 3 Community Rating System (CRS): N/A
Site Plan Review Requirements	Planning Department Planning Commission	Site Plan (engineer/land surveyor). Consistency with goals of Comprehensive Plan. State approvals as needed (RIDEM, CRMC, RIHPHC, NBC). Staff Technical Review (zoning, fire, traffic, engineering, water supply board). Pre-soil erosion and sediment control. Post stormwater control.	Department of Planning & Economic Development	Limited. As described in the City's Land Development & Subdivision Review Regulations, site plans for Major Land Development projects (residential development projects greater than 10 units and all non-residential development projects) must go through 3 stages of review (Master, Preliminary, and Final) by Planning Department staff and the Planning Board. Minor Land Development projects (residential projects with 10 or fewer units) must go through 2 stages of review (Preliminary and Final). Each stage of review has a

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				checklist of items that must be included in the site plans. However, until recently, the checklists have not been easily available to applicants and the plan submission has been inconsistent as a result. (The Land Development and Subdivision Review Regulations refer to the checklists as Appendix, but the lists were not included in or attached to the regulations. They are now available on the City's website.) The requirements for Preliminary and Final Plan Review seem to be sufficient, but some items have been waived in the past. The Planning Department is now implementing consistent use of the checklists to ensure that all requirements have been addressed at each stage. The process would also benefit from

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				the creation of a technical review committee to ensure thorough review.
Zoning and Development Regulations	Is the regulation an effective measure for reducing hazard impacts? Is the regulation adequately administered and enforced?			
Zoning Bylaws / Ordinances	Zoning Department Zoning Board of Appeals	Regulates various uses of property and dimensional requirements. Maintains compatible uses and limits density. Floodplain regulations articulated and stormwater/erosion controls included for new construction.	Department of Public Works & Code Enforcement	Yes, Yes. One zoning restriction that is of relevance to hazard risk reduction is maximum lot coverage, which limits the area that can be covered by buildings and paved surfaces. Despite the specification of this limit in the ordinance, too many properties in Central Falls have been paved in excess of what is allowed. Some may have been paved before the ordinance went into effect, but some are clearly newer. Plans need to clearly indicate lot coverage so that compliance with the ordinance can be determined, and approval of building permits and subsequent inspections must

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				ensure the approved plans are followed. However, it is likely that some properties are paved without proper approval, and the City needs to determine how violations will be remedied.
Subdivision Regulations	Planning Department Planning Commission	Minor and major subdivision regulations to maintain minimum lot sizes, adequate site access, safe construction, utilities, and floodway impact	Department of Planning & Economic Development	Yes, Yes. In addition to the procedures for Site Plan Review Requirements described above, the City's Land Development and Subdivision Review Regulations include General Design Standards, Public Improvement Design Standards, and Land Development and Development Plan Review Design Standards that include elements intended to reduce the risk of hazards. For example: • The General Design Standards are to be used by the Planning Board to ensure that proposed plans include adequate provisions to, among other things, "promote safety from fire, flood and other damages" and "secure an

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				adequate storm water run-off management and soil erosion plan". The design guidelines state that areas within 100-year flood zones are unsuitable for development and include specific requirements for plats that are located wholly or partly within Zone A and Zones A1-A30 (AE). • The Public Improvement Design Standards include requirements for stormwater drainage systems, structures, and facilities. Natural elements are encouraged. • Land Development & Development Plan Review Design Standards encourage reducing or limiting impervious surfaces, preserving the natural landscape, and including vegetated landscaping. The standards also include guidelines and requirements for stormwater management.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
				The Land Development & Subdivision Review Regulations include procedures, guidelines, and requirements that, if followed consistently, can be effective in reducing hazard impacts. Stormwater management and landscaping are considered in all plan reviews, but the design standards would perhaps be used more thoroughly and effectively if they were converted into a checklist for staff and the Planning Board to use as plans are reviewed. As mentioned elsewhere, establishing a Technical Review Committee would also ensure more thorough and consistent reviews.
Floodplain Regulations	Planning Department RI Department of	All city floodplains and wetlands are designated as flood hazard districts, requiring additional review from state departments (environmental management, coastal management,), notification	Department of Public Works & Code Enforcement	Yes, Yes.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
	Environmental Management (RIDEM)	of watercourse alteration, and base flood elevation building code requirements as needed.		
Stormwater Management Regulations	Department of Public Works Narragansett Bay Commission (NBC) RI Department of Environmental Management (RIDEM) Coastal Resources Management Council (CRMC)	In general, City regulations require that new construction cannot generate more water runoff than the previous condition. The Narragansett Bay Commission reviews and approves all applications for sewer connection. The Rhode Island Department of Environmental Management and the Coastal Resources Management Council review all proposed development impacting rivers, wetlands, and coastal areas. Technical review committee ensures new city projects adhere to basic engineering standards.	Department of Public Works & Code Enforcement	No, No. Design Guidelines in the Land Development & Subdivision Review Regulations include guidelines and requirements for stormwater management (see above). "All commercial and industrial developments shall use Best Management Practices for stormwater management design." The RI Stormwater Design Manual is specified as a reference for suggested BMPs. If followed thoroughly and consistently, the Stormwater Management section of the Design Guidelines would be an effective measure for reducing hazard risk reduction. Currently it is not adequately administered.

Planning/Regulatory Tool	Responsible Authority (Pawtucket)	General Description and Effectiveness for Hazard Risk Reduction (Pawtucket)	Responsible Authority (Central Falls)	General Description and Effectiveness for Hazard Risk Reduction (Central Falls)
Changes Since 2018				
Have you adopted new policies, plans, regulations, or reports, since the original plan, that could be incorporated into this plan? What has changed since the original plan?		Pawtucket/Central Falls Municipal Resilience Program, Community Resilience Building Workshop: Summary of Findings (see Table 52) The Department of Public Works completed a Green Stormwater Infrastructure Plan in late 2017.		Climate Action Plan (see Table 52) Pawtucket/Central Falls Municipal Resilience Program, Community Resilience Building Workshop: Summary of Findings (see Table 52) Green and Complete Streets Ordinance – allows for a transportation system that minimizes environmental impact and creates streets that are safe for everyone, regardless of age, ability, or mode of transportations.

Table 54. Administrative and Technical Capabilities

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
Administration	Describe capability. Is coordination effective?			
Planning Board/Commission	5 Volunteers (supported by FT City staff)	Significant coordination with Planning Department, Emergency Management, Zoning Officials, and Department of Public Works	Volunteer (supported by FT City staff)	Full-time Administrative Officer is Department Director of 4 staff. Director and one staff member coordinate application and plan review with Planning Board; Staff and Board follow the plan review process outlined in the Land Development & Subdivision Review Regulations.
Local Planning Team (for mitigation planning)	Comprised of 8-12 FT staff	Ad-Hoc, Multi-Jurisdiction committee, most active when updating hazard mitigation plan	Comprised of 8-10 FT staff	Ad-Hoc, Multi-Jurisdiction committee, most active when updating hazard mitigation plan
Maintenance Programs to Reduce Risk	As needed and comprised of FT Department of Public Works employees	Managed by the Department of Public Works (DPW) – limited by funding availability.	1 FT	The Department of Public Works (DPW) is understaffed. Tree trimming is the utility company's responsibility. Staff clears storm drains as they can; in some instances, this is done in response to urgent incidents.

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
Mutual Aid Agreements	Yes	Both Pawtucket and Central Falls are part of the state-wide mutual aid response system created by the Rhode Island Association of Fire Chief's. This agreement acts as a "common entity for exploring and improving other areas of management, operation and effectiveness of the Fire Service." The plan reduces unnecessary calls for required mutual aid. Each city is part of the Metro Control district. The Southern New England Fire Emergency Response Plan includes a list of these MOUs. They are Rotation System, Communications and Control, Regional Control Centers, Inter-city Fire Radio Network, HAZMAT Teams, Mass Victim Decontamination Teams, and Mass Casualty Incident Supply. This is in addition to agreements with adjacent fire and police departments.	Yes	Both Pawtucket and Central Falls are part of the state-wide mutual aid response system created by the Rhode Island Association of Fire Chief's. This agreement acts as a "common entity for exploring and improving other areas of management, operation and effectiveness of the Fire Service." The plan reduces unnecessary calls for required mutual aid. Each city is part of the Metro Control district. The Southern New England Fire Emergency Response Plan includes a list of these MOUs. They are Rotation System, Communications and Control, Regional Control Centers, Inter-city Fire Radio Network, HAZMAT Teams, Mass Victim Decontamination Teams, and Mass Casualty Incident Supply. The Central Falls Police Department has mutual aid

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
				agreements with Pawtucket, Cumberland and Lincoln police departments and with the Rhode Island State Police. Excellent capability for emergencies.
Staff	Is staffing adequate to administer programs/enforce regulations? Are staff trained on hazards and mitigation? Is coordination between agencies and staff effective?			
Chief Building Official	1 FT	Serves both Pawtucket and Central Falls. Frequent training and certification benchmarks. Challenge does arise for enforcement due to volume of development/permit applications. Effective coordination between agencies.	1 PT	Shared with Pawtucket (see at left)
Floodplain Administrator	1 PT	Director of Planning and Redevelopment serves as floodplain manager with assistance from staff, Chief Building Official, and Emergency Management. Manages review of all development proposals that may be impacted by hazards and	N/A	Shared with Pawtucket through Chief Building Official (see above)

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
		oversees annual NFIP recertification.		
Emergency Manager	1 FT	Frequent training and certification benchmarks. Serves as Emergency Manager for both Pawtucket and Central Falls.	1 FT	Shared with Pawtucket (see at left). Works closely with the City's Fire Department. No communication between EMA and Planning Department. *(Note that since 2018 the EM Director has moved out of the City's DPW Building to Pawtucket)*
Community Planner	1 FT	Effective up-front review of development proposals and zoning amendments but limited capacity for long-term enforcement if conditions are established. Frequent coordination with local and state agencies	1 FT	See Planning Board. Planning Director is the only staff member with a planning background, and none of the staff in the department have training specific to hazards and mitigation.
Civil Engineer	1 FT	The Department of Public Works (DPW) manages many infrastructure projects so evaluation/enforcement of hazard risk reduction can be challenging. *(Note – identified as an area of needed improvement in 2018,*	N/A	Not on staff. Potential exists to retain consulting engineer

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
		monthly meetings now occur between Planning, Zoning and DPW. Case-by-case reviews are also performed, and project initiation forms are used to monitor projects before implementation [funding, potential hazards, parties involved; remediation needs]).		
GIS Coordinator	1 FT	The City now has a full-time GIS employee. Cleaning and assessing existing data and municipal requests. Adequate staffing but coordination can be improved. Initial focus on improving existing data with future evaluation of hazard risks/mitigation. Could use more ArcGIS licenses in support of other City departments.	1 FT	The Planning Director has some GIS experience but the ability to devote time to GIS is extremely limited. One other staff member has been learning on the job. For this plan update, Central Falls GIS analysis was supported by the City of Pawtucket's GIS Coordinator,
Resource Development Staff or Grant Writers	PT	1 FT HUD funding staff person. All other grants are applied for and managed by existing FT employees. No staff person exclusively dedicated. Limited	1 PT	Yes, Yes. Works closely with city departments.

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
		coordinated effort or long-term funding strategy. Strong relationship with state agencies.		
Public Information Officer	1 FT	Housed in the Mayor's Office and primarily focuses on public relations and dissemination of information – no specific focus on hazard mitigation. City intends to hire Public Safety Director in 2018 to coordinate Emergency Management, Police, Fire, and DPW efforts. CodeRED automatic emergency information system available to residents who sign up. EMA Director also distributes flyer information at public events.	1 FT	The Mayor's Office uses the services of a professional communications firm with a specific individual designated as the City's Communications Director.
Technical	Describe capability. Has capability been used to assess/mitigate risk in the past?			
Staff with knowledge of land development and land management practices	4 FT	Housed in Planning Department and Department of Public works. Primarily focused on zoning/building compliance (including Flood Hazard Districts), sediment control, and stormwater	1 FT	The Planning Director has development and construction experience. Capability is used during the plan review process for new development projects. Experienced DPW. Housing Code

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
		management. Limited capacity for assessment of risks but ongoing efforts to implement mitigation including green stormwater infrastructure, brownfield remediation, restoration/maintenance of open space and wetlands.		Enforcement officer is a contractor.
Staff trained in construction practices related to buildings and/or infrastructure	1 FT	Building official reviews and approves all building permits. Specific enforcement of freeboard requirements in coordination with the State's Department of Environmental Management (RIDEM) when development is proposed within flood area. Coordination with fire safety officials for all portions of the city.	1 FT	The Planning Director has development and construction experience. Experienced DPW. Housing Code Enforcement officer is a contractor.
Staff with an understanding of natural hazards and risk mitigation	2 FT	Emergency Management staff maintain the strongest understanding of natural hazards and risk mitigation. Emphasis on mitigating flooding and flood related damage has been	1 FT	EMA Director and Building Official shared with Pawtucket. Experienced Public Safety Department.

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
		incorporated in the updated City Comprehensive Plan and efforts to improve sewer/water infrastructure capacity in coordination with the Narragansett Bay Commission.		
Hazards data and information	2 FT	Hazard related data is largely maintained at the state level with RIEMA and Department of Environmental Management (RIDEM). Emergency Management Agency does maintain local data that is used to inform emergency response procedures. Visual representation of hazard related data is also expected to improve with the newly hired GIS manager. Data is primarily used for assessment and response rather than mitigation.	2 FT	Shared with Pawtucket (see at left) through EMA.
Warning systems/services (e.g., Reverse 911, outdoor warning signals, etc.)	N/A	CodeRed emergency notification program to registered phones and emails (Reverse 911).	1 FT	The EMA, Fire Department, Police Department all use Code Red (Reverse 911).

Administrative/Technical Resource	Staffing (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket)	Staffing (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls)
Changes Since 2018				
Are there different or additional administrative, human, technical, and financial resources available for mitigation planning since the original plan was developed?		Narragansett Bay Commission (NBC) combined sewer overflow tunnel project has commenced which will reduce combined sewer/water overflow in Pawtucket and Central Falls.		

Table 55. Financial Capabilities

Financial Tool/Source	Accessible for Hazard Mitigation? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?	Accessible for Hazard Mitigation? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
General funds	Yes	Not used in the past and unlikely to be used in the future	Yes	Staff, equipment
Capital Improvement Program (CIP) funding	Yes	Specifically, for infrastructure and critical facilities improvements (sewer, roadways, schools, etc.)	Yes	Equipment, capital projects. A new Capital Asset Prioritization (CAP) process was implemented in 2023 to identify and prioritize what the City wants/needs to spend money on a few years in advance. The system is a proactive approach that enables all City Departments to submit items or projects for consideration and to identify opportunities to fund them. Mitigation Actions could be submitted for consideration.
Special purpose taxes	No	Discussion of tax increment financing (TIF) around future commuter rail station specifically for utility and stormwater improvements associated with anticipated development	No	No

Financial Tool/Source	Accessible for Hazard Mitigation? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?	Accessible for Hazard Mitigation? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Fees for water, sewer, gas, or electric services	Water Only	Sewer fees: Narragansett Bay Commission Gas and electric fees: National Grid Water fees: Pawtucket Water Supply Board – $4-$4.25 per hundred cubic foot (HCF)	No	No
Stormwater utility fee	No	Required sediment control and post construction stormwater mitigation required for all new construction – fees issued for non-compliance.	No	Not been used in the past. Exploring for future implementation but there is no current plan to impose a stormwater utility fee.
Development impact fees	No	N/A	No	Unlikely, given funding gap for development in the area
Incur debt through general obligation bonds and/or special tax bonds	Yes	Utilized for larger-scale infrastructure improvements.	Yes	Capital projects. A bond specific to street and sidewalk improvements was passed in 2018 and funded limited improvements in 2019-2020.

Financial Tool/Source	Accessible for Hazard Mitigation? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?	Accessible for Hazard Mitigation? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Incur debt through private activities	No	N/A	No	N/A
FEMA Hazard Mitigation Assistance (HMA)	Yes	Yes, including grant funds for hazard mitigation planning activities. FEMA's current HMA grant programs (BRIC, FMA, HMGP) remain a good source of external funding for implementing eligible and cost-effective mitigation projects in coordination with RIEMA.	Yes	No, Yes. FEMA's current HMA grant programs (BRIC, FMA, HMGP) remain a good source of external funding for implementing eligible and cost-effective mitigation projects in coordination with RIEMA.
HUD Community Development Block Grant (CDBG)	Yes	Not typically utilized but has been used in the past for planning related activities and infrastructure improvements (river wall following a flooding event).	Yes	No, Yes. The City is not an Entitlement Community but has been successful in using competitive grant application process to secure funds for street, sidewalk, streetscape (trees), and recreation facility improvements in recent years. CDBG funds have not been used specifically for mitigation efforts but are potential source.

Financial Tool/Source	Accessible for Hazard Mitigation? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?	Accessible for Hazard Mitigation? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Other federal funding programs	Yes	NOAA, EPA, USACE, and other federal agencies do make grant funding available for a variety of resilience-themed projects and initiatives that the City may be eligible to pursue in the future. This includes both pre- and post-disaster funding programs that can be very effective in supporting the implementation of cost-effective hazard mitigation projects, many of which are described in FEMA's Mitigation Resource Guide.	Yes	NOAA, EPA, USACE, and other federal agencies do make grant funding available for a variety of resilience-themed projects and initiatives that the City may be eligible to pursue in the future. This includes both pre- and post-disaster funding programs that can be very effective in supporting the implementation of cost-effective hazard mitigation projects, many of which are described in FEMA's Mitigation Resource Guide.

Financial Tool/Source	Accessible for Hazard Mitigation? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?	Accessible for Hazard Mitigation? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
State funding programs	RIEMA Department of Environmental Management (RIDEM) Narragansett Bay and Watershed Restoration Fund	Funding for hazard mitigation planning activities. Funding for stormwater improvements and planned infrastructure improvements. Municipal Resilience Program (MRP) Action Grants.	Yes	No, Yes. Municipal Resilience Program (MRP) Action Grant funds through RI Infrastructure Bank have been obtained for green stormwater infrastructure projects. The City can apply for additional funds annually. The most recent application (November 2023) requested funds to use permeable paving and landscaping to reduce stormwater runoff at a City-owned parking lot and a public plaza.
Changes Since 2018				

Are there new funding sources to consider since the original plan was developed?		Municipal Resilience Program (MRP) Action Grants. Grant eligibility must fall under Rhode Island Infrastructure Bank's broad portfolio of programs and can include but not limited to, dam retrofits or removal, road elevation, floodproofing or elevation of pump stations, berms and levies, culvert resizing, green stormwater infrastructure, solar and battery back-up power, energy efficiency, watershed restoration, urban tree planting, and coastal and riparian resiliency. EPA – Brownfields Revolving Loan, Broad Street Green Infrastructure planning Narragansett Bay Watershed Restoration Fund – "Nonpoint Source & Stormwater Pollution Control Flood Prevention and Mitigation" RIEMA Hazard Mitigation Grants RI Green Infrastructure Coalition – Tree Planting and Rain barrels		Municipal Resilience Program (MRP) Action Grants. Grant eligibility must fall under Rhode Island Infrastructure Bank's broad portfolio of programs and can include but not limited to, dam retrofits or removal, road elevation, floodproofing or elevation of pump stations, berms and levies, culvert resizing, green stormwater infrastructure, solar and battery back-up power, energy efficiency, watershed restoration, urban tree planting, and coastal and riparian resiliency. EPA – Brownfields Revolving Loan, Broad Street Green Infrastructure planning Narragansett Bay Watershed Restoration Fund – "Nonpoint Source & Stormwater Pollution Control Flood Prevention and Mitigation" RIEMA Hazard Mitigation Grants RI Green Infrastructure Coalition – Tree Planting and Rain barrels

Table 56. Education and Outreach Capabilities

Program/Organization	In Place? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?	In Place? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	The Blackstone Valley Tourism Council manages a river explorer boat that exposes local students to the importance of river ecosystems and the impact of sea level rise. Blackstone River Watershed Council and Pawtucket Neighborhood Associations also serve to disseminate various information including weather, safety, and hazard related resources	Yes	Grow Smart RI (planning), Friends of the Blackstone/Blackstone River Watershed Council (advocacy, capital projects), Blackstone Valley Tourism Council (advocacy), Groundwork Rhode Island (implementation), Clean Water Action (advocacy), The Nature Conservancy (advocacy, funding), Trust for Public Land (advocacy, funding)

Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Pawtucket EMA distribution of flood and weather hazard preparedness documentation as required for CRS certification. DPW promotes free stormwater management programs for residents (street tree planting and rain barrels). Public Meeting with EPA to discuss green infrastructure improvements along Broad Street (primary commercial corridor). DPW created videos and training materials for employees on green infrastructure and maintenance and has informational materials available for the public. Public information available at City hall, public outreach for multi-flood event properties during CRS recert annually	Yes	The Fire Department, EMA, Police Department, and Public Works educate the population with various workshops and flyers
Natural disaster or safety-related school programs	Yes	Partnership with Jacqueline Walsh School to complete stormwater management art project (rain barrels).	N/A	

Program/Organization	In Place? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?	In Place? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
		(Note - still relevant, intend to update within 2023/2024.)		
StormReady certification	Yes	The City of Pawtucket became a StormReady® Community since the initial plan was completed. Certified by the National Weather Service, StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education, and awareness.	Yes	Certified by the National Weather Service, StormReady communities are better prepared to save lives from the onslaught of severe weather through advanced planning, education, and awareness.
Firewise Communities certification	No	The National Fire Protection Association's (NFPA's) Firewise USA® program teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action.	No	The National Fire Protection Association's (NFPA's) Firewise USA® program teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action.

Public-private partnership initiatives addressing disaster-related issues	Yes	• First Student – emergency transportation • Rhode Island Energy - utilities • Laidlaw Bus Company – emergency transportation • Verizon and Cox – emergency communications • National Grid – utilities • Salvation Army – volunteer emergency support • Marriott & Aramark – emergency food and shelter • American Red Cross of RI – emergency resources support • RI Blood Center – public health and medical services • Pawtucket Foundation – long-term community recovery	Yes	Many of the same as listed at left for Pawtucket.
Changes Since 2018				
Are there different or new education and outreach programs and resources available for mitigation activities	No	N/A	No	N/A

Program/Organization	In Place? (Pawtucket)	General Description / Effectiveness for Hazard Risk Reduction (Pawtucket) Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?	In Place? (Central Falls)	General Description / Effectiveness for Hazard Risk Reduction (Central Falls) Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
since the original plan was written?				

Safe Growth Survey Results

The results of the Safe Growth Survey are summarized in Table 57. In completing the survey each respondent was asked to indicate how strongly they agree or disagree with the "Safe Growth Statements" as they relate to their own City's current plans, policies and programs for guiding future community growth and development, according to the following scale:
1 = Strongly Disagree 2 = Somewhat Disagree 3 = Neutral 4 = Somewhat Agree 5 = Strongly Agree

Table 57. Safe Growth Survey Results

MASTER PLAN	Pawtucket	Central Falls
Land Use		
1. The master plan includes a future land use map that clearly identifies natural hazard areas.	1 2 3 **[4]** 5	**[1]** 2 3 4 5
2. Current land use policies discourage development and/or redevelopment within natural hazard areas.	1 2 3 4 **[5]**	1 2 3 **[4]** 5
3. The master plan provides adequate space for expected future growth in areas located outside of natural hazard areas.	1 2 3 **[4]** 5	1 2 3 **[4]** 5
Transportation		
4. The transportation element limits access to natural hazard areas.	1 2 **[3]** 4 5	**[1]** 2 3 4 5
5. Transportation policy is used to guide future growth and development to safe locations.	1 2 **[3]** 4 5	**[1]** 2 3 4 5
6. Transportation systems are designed to function under disaster conditions (e.g., evacuation, mobility for fire/rescue apparatus, etc.).	1 2 **[3]** 4 5	1 **[2]** 3 4 5
Environmental Management		

7. Environmental features that serve to protect development from hazards (e.g., wetlands, riparian buffers, etc.) are identified and mapped.	1 2 3 **4** 5	1 **2** 3 4 5
8. Environmental policies encourage the preservation and restoration of protective ecosystems.	1 2 3 4 **5**	1 **2** 3 4 5
9. Environmental policies provide incentives to development that is located outside of protective ecosystems.	1 **2** 3 4 5	**1** 2 3 4 5
Public Safety		
10. The goals and policies of the master plan are related to and consistent with those in the Hazard Mitigation Plan.	1 2 3 **4** 5	1 2 3 **4** 5
11. Public safety is explicitly included in the plan's growth and development policies.	1 2 3 **4** 5	1 2 3 4 **5**
12. The monitoring and implementation section of the plan covers safe growth objectives.	1 2 3 **4** 5	1 **2** 3 4 5
ZONING ORDINANCE		
13. The zoning ordinance conforms to the master plan in terms of discouraging development and/or redevelopment within natural hazard areas.	1 2 3 4 **5**	1 2 3 **4** 5
14. The ordinance contains natural hazard overlay zones that set conditions for land use within such zones.	1 2 3 4 **5**	**1** 2 3 4 5

5. Rezoning procedures recognize natural hazard areas as limits on zoning changes that allow greater intensity or density of use.	1 2 3 **4** 5	1 **2** 3 4 5
6. The ordinance prohibits development within, or filling of, wetlands, floodways, and floodplains.	1 2 3 **4** 5	1 2 3 **4** 5
SUBDIVISION REGULATIONS		
7. The subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas.	1 2 **3** 4 5	1 2 3 **4** 5
8. The regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources.	1 2 **3** 4 5	**1** 2 3 4 5
9. The regulations allow density transfers where hazard areas exist.	1 **2** 3 4 5	**1** 2 3 4 5
CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE POLICIES		
0. The capital improvement program limits expenditures on projects that would encourage development and/or redevelopment in areas vulnerable to natural hazards.	1 2 **3** 4 5	**1** 2 3 4 5
1. Infrastructure policies limit the extension of existing facilities and services that would encourage development in areas vulnerable to natural hazards.	1 2 **3** 4 5	1 2 3 **4** 5
2. The capital improvements program provides funding for hazard mitigation projects identified in the Hazard Mitigation Plan.	1 2 3 **4** 5	**1** 2 3 4 5
OTHER		

3. Small area or corridor plans recognize the need to avoid or mitigate natural hazards.	1 2 3 **4** 5	**1** 2 3 4 5
4. The building code contains provisions to strengthen or elevate new or substantially improved construction to withstand hazard forces.	1 2 3 **4** 5	1 2 **3** 4 5
5. Economic development and/or redevelopment strategies include provisions for mitigating natural hazards or otherwise enhancing social and economic resiliency to hazards.	1 2 3 **4** 5	1 2 3 **4** 5

Averages were calculated for each city. Pawtucket has an average response of 3.72 (same as in 2018), putting overall responses between Neutral and Somewhat Agree (and leaning toward the latter). Central Falls has an average of 2.4 (up from 2.28 in 2018), putting overall responses between Neutral and Somewhat Disagree. The survey reflects current conditions in each city based on survey responses, and how Central Falls is growing in terms of its capabilities to mitigate risk with planning and policy development.

National Flood Insurance Program

C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))

Table 58 is based on the National Flood Insurance Program (NFIP) survey completed by each city. The survey distributed closely resembles the one in FEMA's *Local Mitigation Planning Handbook*. Both Cities currently comply with the NFIP, and the City of Pawtucket also participates in the NFIP's Community Rating System (CRS) as a Class 8 community.

Table 58. National Flood Insurance Program (NFIP) Survey Results

NFIP Topic	Source of Information	Comments Pawtucket	Comments Central Falls
Insurance Summary			
How many NFIP policies are in the community? What is the total premium and coverage?	FEMA NFIP Services, Flood Insurance Data and Analytics	As of February 29, 2024, a total of 92 NFIP policies are in force. The total premium is $76,436 for a total of $25,441,000 in coverage. The average premium paid per policy is $831.	As of February 29, 2024, a total of 55 NFIP policies are in force. The total premium is $70,684 for a total of $9,288,000 in coverage. The average premium paid per policy is $1,285.
How many claims have been paid in the community? What is the total number of paid claims? How many of the claims were for substantial damage?	FEMA NFIP Services, Flood Insurance Data and Analytics (HUDEX report)	As of February 29, 2024, there has been a total of 40 claims paid since 1978, totaling $1,686,101. The average claim amount paid is $42,153. It is unknown how many claims were for substantial damage.	As of February 29, 2024, there has been a total of 32 claims paid since 1978, totaling $808,559. The average claim amount paid is $25,267. It is unknown how many claims were for substantial damage.
How many structures are exposed to flood risk within the community?	GIS analysis (FEMA FIRMs + building footprint data)	It is estimated that 95 structures are at risk to the 1-percent annual chance flood, and 19 are at risk to the 0.2 percent annual chance flood for a combined total of 114 structures exposed to flood risk.	It is estimated that 41 structures are at risk to the 1-percent annual chance flood, and 22 are at risk to the 0.2 percent annual chance flood for a combined total of 63 structures exposed to flood risk.
Are there any repetitive or severe repetitive loss structures in the community?	FEMA NFIP Data as provided by RIEMA on 10/18/2023	Yes – 4 repetitive loss properties, including 1 severe repetitive loss properties. See Appendix A for more information.	Yes – 5 repetitive loss properties. See Appendix A for more information.
Describe any areas of flood risk with limited NFIP policy coverage	Community FPA and GIS analysis	No address-specific data has been made available by FEMA, but it is generally assumed that owners of property located in special flood hazard areas are adequately insured based on the above policy and flood risk data. However, underinsurance may be an issue for areas of flood risk outside of these mapped flood zones.	No address-specific data has been made available by FEMA, but it is generally assumed that owners of property located in special flood hazard areas are adequately insured based on the above policy and flood risk data. However, underinsurance may be an issue for areas of flood risk outside of these mapped flood zones.
Staff Resources			

Who is the Community Floodplain Administrator (FPA)?	Community FPA	Bianca Policastro Director of Planning and Redevelopment City of Pawtucket 137 Roosevelt Avenue, Pawtucket, RI 02860 bpolicastro@pawtucketri.com (410) 728-0500 x.440	John Hanley Building Official Central Falls Department of Public Works City of Central Falls jhanley@centralfallsri.us (401) 727-7400
Is the Community FPA or NFIP Coordinator Certified?	Community FPA	No	No
Is floodplain management an auxiliary function?	Community FPA	Yes	Yes
Compliance History			
Is the community in good standing with the NFIP?	Community FPA, FEMA, State NFIP Coordinator	Yes	Yes
Are there any outstanding compliance issues (i.e., current violations)?	Community FPA, FEMA, State NFIP Coordinator	No	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Community FPA	3/29/2023	4/4/2023
Regulation			
When did the community enter the NFIP?	Community Status Book	7/16/71	5/28/71
Are the FIRMs digital or paper?	Community FPA	Digital	Digital
Please list the regulations that were adopted to meet federal	Community FPA	Zoning Ordinance Flood Hazard Districts (§ 410-16) applicable to the following zones	2015 Ordinance:

NFIP requirements, including the date and section number. These may include a flood damage prevention ordinance, building codes, subdivision regulations, etc.		(A, AE, AH, AO, A99, V, and VE on FIRM maps). Require approval from RIDEM and CRMC as needed and compliance with R.I.G.L. § 23-27.3-108.1.	Section One: Article III "Flood Damage Prevention," of Chapter 10 "Buildings and Building Regulations" (Updated in 2019)
Describe any local "higher standards" that exceed NFIP minimum requirements. These may include higher finished floor elevation requirements ("freeboard"), foundation protection, more stringent building improvement rules, protection of critical facilities, low density zoning for floodplain development, preservation of floodplain storage, higher mapping and regulatory standards, etc.		• Freeboard: 1 foot above 100-year flood line • Non-construction related permits required for (filling, grading, excavation, mining, drilling, storage of materials, and temporary stream crossings • Notification of any watercourse alteration to adjacent communities, bordering states, NFIP state coordinator, FEMA risk analysis branch • Drainage paths for development within Zones AH, AO • Subdivision drainage and utility requirements • No conversion from business/commercial to residential within Flood Hazard Districts • Free of obstruction requirements for structural development	N/A (State Building Code is the standard)
Describe any additional floodplain management provisions that are integrated into other plans or processes	Community FPA	Comprehensive Plan Natural Resources Chapter Goals:	Comprehensive Plan identifies conversion of residential areas in flood plains for the expansion of the City's recreation, conservation, and open space system.

that the community uses to guide development. These may include those integrated with the general plan, small area plans, capital improvements plans, etc.		• To the maximum extent feasible, retain and restore the quality of remaining wetlands within the City. • Using the MetroBay SAMP mapping as guidance, restore one acre of riverfront area in 10 years. • Consider the acquisition of undeveloped properties along the City's waterways as potential areas of natural resource protection. • Work cooperatively with state agencies and regional authorities to correct the problem of combined sewer overflows. Capital Improvements Program 2017-2021: • Sanitary, Storm Drain and Catch basin repair: $1,600,000 • Critical public facilities, school repair: $24,000,000 Green Stormwater Infrastructure in Transit Oriented Development (TOD) District: Nonpoint Source & Stormwater Pollution Control Flood Prevention & Mitigation Plan (Draft) • The City led effort for infrastructure improvement within district that is	

		anticipated to experience significant development over the next decade and also includes recommendations for stormwater management for private development projects. The Narragansett Bay Commission, which operates the sewer system in Pawtucket, is currently working on their Combined Sewer Overflow tunnel project. • The tunnel, once completed, will address combined sewer overflow issues, and improve water quality across the City.	
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Community FPA	Yes – see above for local "higher standards" that exceed NFIP minimums.	• Drain System Maintenance • CodeRED Emergency Management System CodeRED Weather Warning delivers automated advanced warning of severe weather as soon as a bulletin is issued by the National Weather Service. The system delivers voice calls, text messages and emails to subscribed users within the direct path of the storm. • Catch Basin Maintenance + Overflow System (CSO to handle higher stormwater runoff volumes)

Please describe any existing impediments to running an effective NFIP program in the community, if any.	Community FPA	Various floodplain management practices typically fall under the jurisdiction of the Pawtucket Zoning Department, Planning Department, or the Department of public works. This overlapping responsibility can result in redundancy of efforts or inconsistency in terms of point responsibility. On an annual basis, limited development occurs within floodplains but renovation and or repair of existing infrastructure does occur more regularly.	N/A
Please identify some specific actions that your jurisdiction can take related to continued compliance with the NFIP. This may include a description of key elements that already contribute to an effective program such as building permit procedures, site plan reviews, field inspections and permanent retention of records. This may also include new actions to improve existing programs.	Community FPA	Pawtucket experiences minimal development within floodplains. Improvement can certainly be made in terms of coordination between municipal departments (Planning, Zoning, DPW, Engineering) and state/federal agencies (RIDEM, CRMC, FEMA) if proposals for development are received. The City has identified stormwater management as a major priority moving forward and intends to work with the Narragansett Bay Commission to improved strain on combined sewer/water infrastructure to mitigate flooding and maintain riverine quality.	The City's FPA has indicated that the City's Viewpoint (online permitting system) could be used to maintain digital FEMA Elevation Certificates for all construction in special flood hazard areas. He has also indicated that a flag could be set in into Viewpoint to identify permits for development of properties in floodplains, and that the flagged permits would be sent to relevant individuals for review. However, this would first require properties in floodplains to be identified and included as a data record in the Tax Assessor's database, which is where Viewpoint gets the information.

		See **Table 59** for specific actions that Pawtucket can take related to continued compliance with the NFIP.	See **Table 59** for specific actions that Pawtucket can take related to continued compliance with the NFIP.
Community Rating System (CRS)			
Does the community participate in CRS?	Community FPA, State, FEMA NFIP	Yes	No
What is the community's CRS Class Ranking?	FEMA NFIP/CRS	8	N/A
Does the plan include CRS planning requirements	Community FPA, ISO/CRS Specialist	Yes (CRS Activity 510 for Floodplain Management Planning)	Yes (CRS Activity 510 for Floodplain Management Planning)

The survey included a list of possible mitigations actions a community can take that relates to NFIP compliance. The table below lists the actions identified by each City. Of note, each City chose "Conduct a review of other regulatory programs and planning tools, such as the comprehensive plan and zoning ordinance, and report on opportunities to improve consistency with the objectives of floodplain management."

Table 59. Possible New Mitigation Actions Related to NFIP Compliance

POSSIBLE NEW MITIGATION ACTIONS RELATED TO NFIP COMPLIANCE	
Pawtucket	Central Falls
Evaluate permit application forms to determine possible modifications focused on flood hazard prevention.	Evaluate current floodplain management activities and coordinate with Insurance Services Office, Inc. to apply for participation in FEMA's Community Rating System (CRS).
Develop a checklist for review of building/development permit plans and for inspection of development in floodplains (a model is available).	Maintain a map of areas that flood frequently (e.g., areas where repetitive loss properties are located) and prioritize those areas for inspection immediately after the next flood. If outside FEMA special flood hazard areas, consider requiring existing NFIP regulatory standards (compliance with existing ordinance) through overlay zoning, etc.
Establish a goal to have each plan reviewer and building inspector attend a related training periodically (for example, ASFPM's Annual National Conference, chapter conferences, webinars, etc.).	Conduct a review of other regulatory programs and planning tools, such as the comprehensive plan and zoning ordinance, and report on opportunities to improve consistency with the objectives of floodplain management.
Encourage or require certain local staff positions to obtain and maintain Certified Floodplain Manager (CFM) certification.	Maintain supplies of FEMA/NFIP materials to help property owners evaluate measures to reduce potential hazard damage. Make available in public buildings, local library, website, etc. and inform people who they can call to learn more information.
Hold informative work sessions for newly elected officials and new appointees to planning commissions and appeals/variance boards, to provide an overview of floodplain management, the importance of participating in the NFIP, and the implications of failing to enforce the requirements of the program or failing to properly handle variance requests.	Develop handouts for permit applications on specific issues such as installation of manufactured homes in flood hazard areas according to HUD's installation standards (examples available), or guidance on improving/repairing existing buildings to better withstand potential hazards.

Conduct a review of other regulatory programs and planning tools, such as the comprehensive plan and zoning ordinance, and report on opportunities to improve consistency with the objectives of floodplain management.	

Table 60 indicates how the planning process to develop this 2024 Multi-Jurisdiction Hazard Mitigation Plan update meets many of the requirements to receive CRS credit.

Table 60. CRS Requirements Met in this Mitigation Plan

Mitigation Planning Process Tasks	Actions Taken in Planning Process	CRS Credit Requirements
Adopt Mitigation Plan	Plan formally adopted by each city.	Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. The adoption must be either a resolution or ordinance.
Planning Process - Organize	Chapter 2 describes the mitigation planning process.	Credit is based on how the community organizes to prepare its floodplain management plan.
Planning Process - Public Comment	Two public meetings were held to give the public an opportunity to provide feedback on the mitigation plan. They could review and provide feedback on the entire draft plan, which was posted to the project's web page.	The planning process must include an opportunity for the public to comment on the plan during the drafting stage and before plan approval. The term "public" includes residences, businesses, property owners, and tenants, as well as stakeholders in the community such as business leaders, civic groups, academia, nonprofit organizations, and major employers.
Planning Process - Public Involvement	The public had an opportunity to participate in the planning process through two public meetings.	Other agencies and organizations must be contacted to see if they are doing anything that may affect the community's program and to see if they can support the community's efforts.

Mitigation Planning Process Tasks	Actions Taken in Planning Process	CRS Credit Requirements
	Representatives from neighboring towns were invited to the public meetings and to review the draft plan. Representatives from large corporations in each City were also invited to participate in the public meetings.	Coordination with neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other nonprofit interests.
Existing Plans and studies	This chapter includes a review of existing plans, reports, and studies and if/how they were incorporated into the plan.	CRS requires that a plan include a review of existing studies, reports, and technical information and of the community's needs, goals, and plans for the area.
Risk Assessment - Hazard Assessment	Appendix A describes all natural hazards studied including their location, previous occurrences, and the probability of future events. Participation in the NFIP is reviewed in this chapter.	Credit is based on what the community includes in its assessment of the hazard. The minimum requirement is for the flood hazard only. However, additional credit can be earned by identifying and including a description of all other natural hazards. Credit is based on what is included in the assessment of vulnerability to the hazards identified. At a minimum the plan must include an overall summary of each hazard and its impact on the community. CRS credit is given for an assessment that includes a review of all properties that received flood insurance claims (in addition to repetitive loss properties) or an estimate of the potential

Mitigation Planning Process Tasks	Actions Taken in Planning Process	CRS Credit Requirements
		dollar losses to vulnerable structures.
Risk Assessment - Assess the Problem	Critical facilities are identified in Appendix A and they are mapped according to hazard risk. The vulnerability of each critical facility is described.	CRS credits the identification of the number and types of buildings subject to the hazards as well as the identification of critical facilities and infrastructure located in the hazard areas. CRS gives credit for a description of the development, redevelopment, and population trends and a discussion of what the future brings for development in the community.
Mitigation Strategy - Set Goals	Hazard mitigation goals are identified in Chapter 4.	Credit is based on a statement of goals of the community's floodplain management or hazard mitigation program.
Mitigation Strategy - Review Possible Activities	Chapter 4 includes justification for past mitigation actions that were or were not implemented. It also provides rationale for each of the newly identified mitigation actions.	Credit is based on a comprehensive review of floodplain management or hazard mitigation activities are reviewed in the plan. The review must include a description of why certain activities were recommended and why others were not.
Mitigation Strategy - Draft an Action Plan	The Mitigation Tracker, shown in Chapter 4, identifies for each mitigation action who is responsible for implementation, when the action is to be implemented	Credit is based on an action plan that identifies who does what, when it will be done, and how it will be financed. The actions must be prioritized and include a

Mitigation Planning Process Tasks	Actions Taken in Planning Process	CRS Credit Requirements
	and a potential funding source. Chapter 4 shows the priority order of mitigation actions and their associated cost.	review of the benefits of the proposed projects and their associated costs.
Plan Maintenance – Implement, Evaluate, and Revise	Chapter 5 indicates how the plan will be implemented and calls for updating the plan on a five-year cycle.	Credit is based on how a community monitors and evaluates its plan on annual bases and updates it on a five-year cycle.

B.5. SUMMARY FINDINGS AND CONCLUSIONS

The Cities of Pawtucket and Central Falls have proven their effectiveness at mitigating risk independently as well as jointly. Pawtucket has more resources than Central Falls in terms of administrative and technical resources, but both Cities have strong planning and regulatory capabilities. They work collaboratively across city boundaries as routinely demonstrated through a shared Chief Building Official and a joint Emergency Management Agency. The Cities share a vision for future climate resilience as expressed through the 2020 Community Resilience Building Workshop, but also for future community growth as evidenced through their shared efforts on transit-oriented development, the Broad Street Regeneration Plan, and a River Corridor Development Plan among other previous collaborations.

The cities are unique, with Central Falls relying on Pawtucket to fill gaps in their administrative capacity due to a relatively small number of full-time municipal staff. Pawtucket has a more robust economy and a well-staffed government which makes it easier for them to take the lead on mitigation project activities, though for this plan update Central Falls served as the primary local project manager for both Cities. Both Cities face financial challenges in terms of funding long-term mitigation activities, especially for larger capital projects to increase the resilience of existing buildings and infrastructure. While strong relationships with state and federal funding agencies help, each City identified budget and staff shortages as targeted areas for improvements to their existing municipal capabilities to reduce known hazard risks and build future climate resilience.

In summary, the Cities of Pawtucket and Central Falls are well-positioned to implement their identified mitigation actions. They are ready to expand and improve upon their existing policies and programs and they are each positioned to maintain compliance with the NFIP. They recognize their priorities to protect lives and properties by way of the four types of mitigation actions. Each City is poised for long-term growth and hazard resilience. This plan will be reviewed annually which provides an opportunity for the planning team to review socio-

economic conditions, environmental conditions, demographic changes, and changes to the built environment which may impact each City's ability to mitigate risk.

Lastly, while both Cities are well-positioned to reduce risk through ongoing actions and new mitigation projects, they can expand and improve on the capabilities described in this chapter. Some general and specific opportunities to address existing gaps or limitations in local capabilities to reduce risk have been identified for each capability type and are further described in Table 61. Each of these opportunities were considered by the Local Planning Team during the plan update process as potential new mitigation actions to be included in the Mitigation Strategy, and they will continue to be revisited during future reviews and updates of this plan.

Table 61. Opportunities to Expand and Improve on Capabilities to Reduce Risk.

Capability Type	City of Pawtucket	City of Central Falls
Planning & Regulatory Capabilities	• Integrate hazard mitigation and climate resilience into future updates of the City's comprehensive plan. • Conduct a detailed assessment of all relevant regulations and the City's permit review process to identify improvements to better address natural hazards, climate change, and projected future conditions (i.e., extreme heat, heavy downpour events, etc.). This includes the incorporation of nature-based solutions into existing City ordinances where most appropriate. • Improved coordination between local and state entities when reviewing development and subdivision proposals as they relate to floodplain and stormwater management regulations. • Expanded assessment of existing sewer/water infrastructure capacity. (Note – since 2018 the NBC tunnel project has started, and the City was awarded a grant to install cameras in the city stormwater system for routine assessment.) • Identify opportunities for continued brownfield remediation and open space designation along rivers.	• Integrate hazard mitigation and climate resilience into the City's comprehensive plan update process and final document for local adoption (Central Falls 2050). • Establish a Central Falls Climate Change Task Force as recommended in the City's Climate Action Plan. • Conduct a detailed assessment of all relevant regulations and the City's permit review process to identify improvements to better address natural hazards, climate change, and projected future conditions (i.e., extreme heat, heavy downpour events, etc.). This includes the incorporation of nature-based solutions into existing City ordinances where most appropriate. • Develop a comprehensive stormwater management plan that addresses flood risks and promotes Best Management Practices (BMPs), Low Impact Development (LID), green infrastructure, and other nature-based solutions. • Establish a technical review committee to assist the Planning Department with preliminary and final site plan reviews. • Convert stormwater and landscaping design standards into a checklist for use by Planning

Capability Type	City of Pawtucket	City of Central Falls
	• More frequent updates/reviews, such as updating plans on more frequent rotations, reviewing stormwater regulations at TRC meetings, and developing a checklist for what to look for during land use regulation updates. • Develop a post-disaster recovery plan and/or specific mitigation policies and procedures for guiding repairs, reconstruction and redevelopment following a disaster event.	Department staff, Planning Board members, and others during plan reviews. • Review and improve zoning enforcement as it relates to violations of impervious surface coverage.
Administrative & Technical Capabilities	• Expand and regularly update relevant data to improve mitigation efforts. • Seek and implement more capacity building initiatives for City staff as appropriate, including but not limited to continuing education and professional development opportunities on topics related to hazard mitigation and climate resilience. • Develop central tracking system to facilitate improved coordination between departments on pre-disaster mitigation/resiliency-themed projects or routine maintenance activities, as well as emergency preparedness and response operations. • Improved coordination between Planning Department, Department of Public Works, and Department of Environmental Management (RIDEM) for land disturbance projects that do not require	• Hire a Sustainability Officer as recommended in the City's Climate Action Plan. • Consider the designation or hiring of a dedicated resource development director or grants administrator for the City to provide technical expertise and administrative support across multiple departments that pursue their own external funding opportunities. • Increase capacity to use GIS to meet hazard mitigation needs. • Provide more training and continuing education opportunities for City staff on topics related to hazard mitigation and climate resilience measures. • Improve coordination/consistency in administering design guidelines in the Land Development and Subdivision Review Regulations, especially as it

Capability Type	City of Pawtucket	City of Central Falls
	building permits but do trigger sediment control and stormwater management requirements. *(Note – since 2018 the City's technical review committee now meets for major or minor land development projects and monthly meetings occur between Planning and DPW.)* • Develop systems or practices that can help the City to better cope with staff turnover or other disruptions to routine government functions and duties that support risk reduction. • Develop an improved tree maintenance program focused on preservation and expansion of healthy trees, trimming/removal of hazard trees, and other mitigation measures to reduce the urban heat island effect and decrease area vulnerabilities and impacts (i.e., power outages, etc.) associated with high winds and other extreme storm events.	relates to stormwater management Best Management Practices (BMPs) as suggested in the Rhode Island Stormwater Design Manual. • Increase staffing for the Department of Public Works to maintain capabilities for routine maintenance and risk reduction activities across the community, including but not limited to existing stormwater management systems and new green infrastructure solutions. • Develop an improved tree maintenance program focused on preservation and expansion of healthy trees, trimming/removal of hazard trees, and other mitigation measures to reduce the urban heat island effect and decrease area vulnerabilities and impacts (i.e., power outages, etc.) associated with high winds and other extreme storm events. • Develop a central data repository for data on hazard and climate-related events, preferably in a GIS-compatible format as suggested in the City's Climate Action Plan.
Financial Capabilities	• Maximize opportunities through the City's budgeting and CIP process to help fund priority hazard mitigation and climate adaptation projects, especially when a local cost-share increases the City's chances for a grant award.	• Explore the feasibility of a stormwater utility fee / enterprise fund to support needed infrastructure improvements for stormwater drainage and other flood mitigation activities. Stormwater fees would generally be based on the amount of surface water

Capability Type	City of Pawtucket	City of Central Falls
	• Designate or hire a dedicated, full-time grant writer to work across various City departments. • Align Capital Improvements Program (CIP) priorities with hazard mitigation goals including: major transportation/roadway improvements, consolidated and improved public safety complex, sewer and stormwater infrastructure improvements, and emergency shelter facilities. • Pursue dedicated funding stream from the City to assess sewer/water infrastructure capacity and need areas to minimize flooding. This includes but is not limited to exploring the feasibility of a stormwater utility fee / enterprise fund. Such a fund could support numerous infrastructure upgrades and flood mitigation projects (including through the leveraging of additional federal/state funding that requires a local match) and even the hiring of a Stormwater Manager to run the program. • Increased funding for Department of Public Works staff to keep up with routine maintenance activities that reduce hazard risks (drainage clearance, emergency response, etc.) • Identify funding for fire code compliance upgrades, particularly for underutilized or vacant former industrial properties.	runoff a property generates and sends to the City's drainage system. Such a fund could support numerous infrastructure upgrades and flood mitigation projects (including through the leveraging of additional federal/state funding that requires a local match) and even the hiring of a Stormwater Manager to run the program. • Increase the integration of hazard mitigation and climate resiliency into the City's existing CIP planning and project lists. This includes making resilience a key objective for the City's strategic, operational, and fiscal policies for municipal infrastructure and asset management. • Maximize opportunities through the City's budgeting and CIP process to help fund priority hazard mitigation and climate adaptation projects, especially when a local cost-share increases the City's chances for a grant award. • Build and support the capacity of City staff to identify and pursue external funding for mitigation/resilience-building projects, especially those routinely made available through recurring federal or state-level grant programs. • Identify funding for fire code compliance upgrades, particularly for underutilized/vacant former industrial properties.

Capability Type	City of Pawtucket	City of Central Falls
	• Coordinated funding effort to improve dam and bridge infrastructure.	• Continue to pursue funding for ongoing restoration of Moshassuck River wetlands to mitigate impact of flooding.
Education & Outreach Capabilities	• Increase use of the City's website, social media, and other readily available methods to support low-cost public education initiatives on building community resilience to hazards through individual mitigation actions for homeowners, business owners, etc. • Incorporate resilience-themed topics into existing or new education programs to increase community understanding of risk and opportunities to reduce risk through community, neighborhood, and individual actions. • Identify and seek to address unmet needs through targeted outreach and education for the community's more vulnerable populations (e.g., low income residents, seniors, non-English speakers, those with special needs, property owners in high-risk hazard areas, those who are homebound, etc.). • Expand opportunities for public/private partnerships to support public education and community outreach initiatives related to hazard awareness and risk reduction efforts.	• Continue to integrate natural hazard risk reduction as a core theme for the City's Climate Action Plan and related efforts, especially as it relates to community education and opportunities for residents to take action in support of building citywide resilience and adaptation to climate change. • Increase use of the City's website, social media, and other readily available methods to support low-cost public education initiatives on building community resilience to hazards through individual mitigation actions for homeowners, business owners, etc. • Incorporate resilience-themed topics into existing or new education programs to increase community understanding of risk and opportunities to reduce risk through community, neighborhood, and individual actions. • Identify and seek to address unmet needs through targeted outreach and education for the community's more vulnerable populations (e.g., low income residents, seniors, non-English speakers,

Capability Type	City of Pawtucket	City of Central Falls
	• Conduct general and targeted outreach to owners and renters of properties located in special flood hazard areas (or other locations of known flood risk) to promote the availability of flood insurance. • Partner with schools on future education and outreach initiatives to promote increased understanding and action by the next generation to reduce risks to natural hazards and climate-related threats. • Continue promoting resident sign-ups for the City's CodeRed emergency alert system.	those with special needs, property owners in high-risk hazard areas, those who are homebound, etc.). • Partner with schools on future education and outreach initiatives to promote increased understanding and action by the next generation to reduce risks to natural hazards and climate-related threats.

APPENDIX C. PLANNING PROCESS DOCUMENTATION

This appendix provides additional documentation of the plan development process as described in Section 2. This includes copies of meeting agendas, sign-in sheets, summary notes, and presentation slides for all Local Planning Team and Public Meetings. It also includes copies of meeting advertisements, notices, media articles, and other example documentation to demonstrate each City's efforts to promote public and stakeholder engagement in the planning process. Lastly, this section includes a copy of a completed FEMA Regulation Checklist to confirm that the plan meets all requirements of Title 44 Code of Regulations (CFR) 201.6.
Appendix C consists of the following three subsections:
C.1. Local Planning Team Meetings

- Meeting Agendas
- Sign-in Sheets
- Summary Notes
- Presentation Slides

C.2. Public and Stakeholder Engagement Activities

- Public Engagement Strategy
- Screenshots of Project Website
- Project Fact Sheet
- Press Releases
- Public Outreach List
- Public Meeting Notices/Advertisements
- Public Meeting Sign-in Sheets
- Public Meeting Presentation Slides
- Public Opinion Survey
- Public Opinion Survey Results

C.1. LOCAL PLANNING TEAM MEETINGS

- Meeting Agendas
- Sign-in Sheets
- Summary Notes
- Presentation Slides

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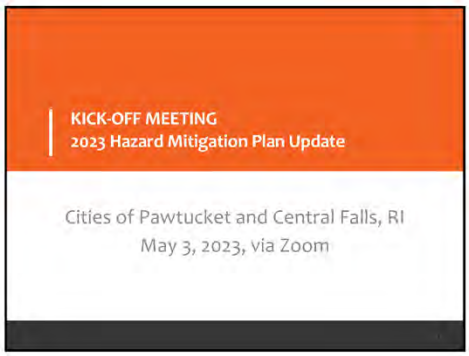

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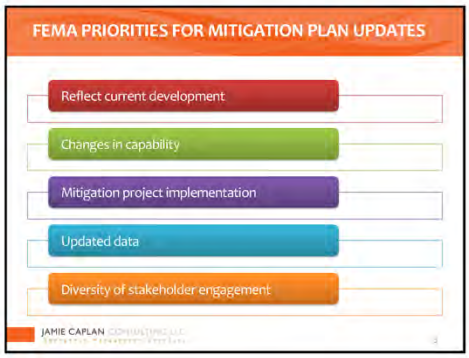

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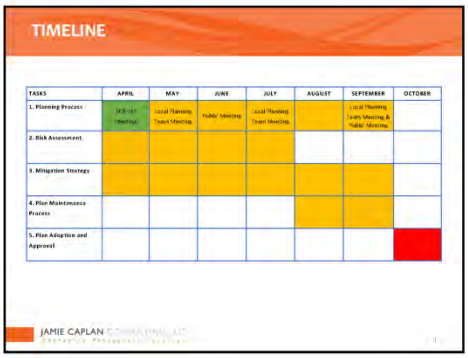

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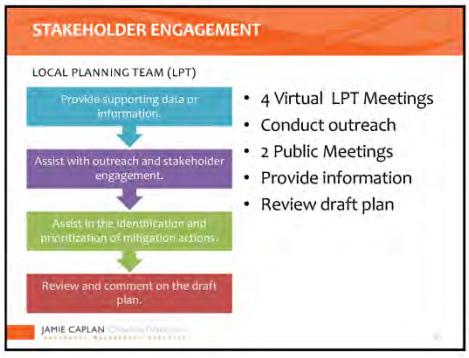

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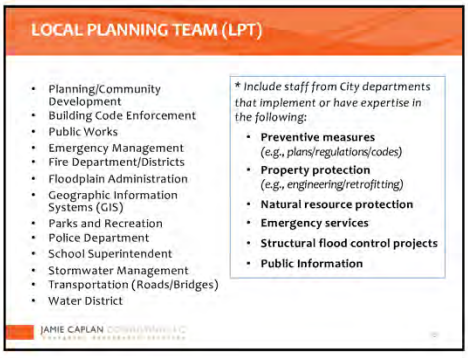

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LOCAL PLANNING TEAM (LPT) – 2018 HMP

Steering Committee

Name	Affiliation
Jose Barros	Code Enforcement, City of Central Falls
Dan Barzykowski	City of Central Falls Police Department
Robert Bradley	City of Central Falls Fire Department
Dave Deluge	Pawtucket/Central Falls Emergency Management
Peter Friedrichs	Director, City of Central Falls Planning and Economic Development
John Hanley	Zoning/Code Enforcement, City of Pawtucket
Susan Mara	Planning Director, City of Pawtucket Department of Planning and Redevelopment
Norman Menard	Emergency Management Director, Pawtucket/Central Falls Emergency Management
James Montanaro	City of Central Falls Police Department
Alisa Morrison	GIS Coordinator, City of Pawtucket, Department of Public Works
Blain Partridge	Zoning/Code Enforcement, City of Central Falls
Jay Rosa	Senior Planner, City of Pawtucket, Department of Planning and Redevelopment
Jonathan Scott	Principal Planner, City of Central Falls Planning and Economic Development
Mena Silva	City of Central Falls Fire Department
Andy Silvia	Chief of Project Development, City of Pawtucket, Department of Public Works
Michael Wilcox	Project Engineer, City of Pawtucket, Department of Public Works

Stakeholder Committee

Name	Affiliation
Tim DeChristopher	Pawtucket Resident
Jillian Finkle	Broad Street Regeneration
Jessica Henry	State Hazard Mitigation Officer, Rhode Island Emergency Management Agency
Meghan Kallman	Pawtucket City Council
Kathryn Kelly	Narragansett Bay Commission
Michael Pendragon	Blackstone River Explorer Tours
Miriam Plitt	Pawtucket Riverfront Commission
Amelia Rose	Groundwork RI
Russ Houde	Assistant Chief Engineer, Pawtucket Water Supply Board

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STAKEHOLDER ENGAGEMENT – WHO TO ENGAGE

Local and regional agencies involved in hazard mitigation activities.

Agencies that have the authority to regulate development.

Neighboring Communities or Special Districts.

Representatives of businesses, academia, and other private organizations.

Representatives of nonprofit organizations, including community-based organizations that work directly with and/or provide support to underserved communities and socially vulnerable populations.

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STAKEHOLDER ENGAGEMENT – HOW TO ENGAGE

Public meetings

Review draft plan

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INFORMATION & DATA COLLECTION

* Focus is on new/updated information (*since 2018*)
  - Risk Assessment
    - Local hazard events/impacts
    - Changes in development
    - Changes in hazard vulnerabilities
    - New/updated sources for natural/climate-related hazards
  - Mitigation Strategy
    - Changes in capabilities
    - Changes in priorities
    - Progress with 2018 mitigation actions
    - New/updated mitigation actions for 2023

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INFORMATION & DATA COLLECTION TOOLS

Risk Assessment
- GIS Data Inventory / Wish List
- Exposure Analysis Worksheets
  - Parcels and Buildings
  - Critical Facilities
  - Other Community Assets
- FEMA Repetitive Loss Property (RLP) Data Requests

Mitigation Strategy
- Mitigation Action Tracker
- Capability Assessment Surveys
  - Capability Assessment Survey
  - Safe Growth Survey
  - NFIP Survey

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MITIGATION ACTION TRACKER UPDATES

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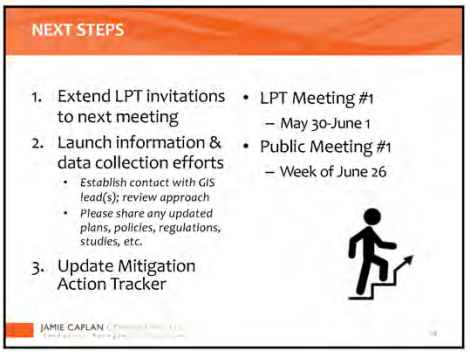

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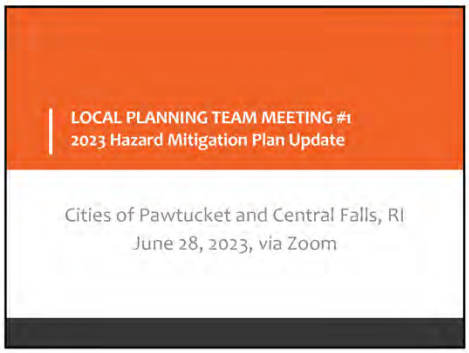

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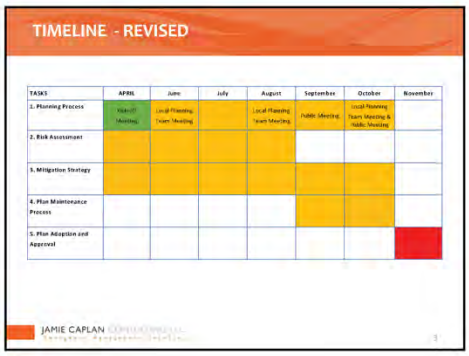

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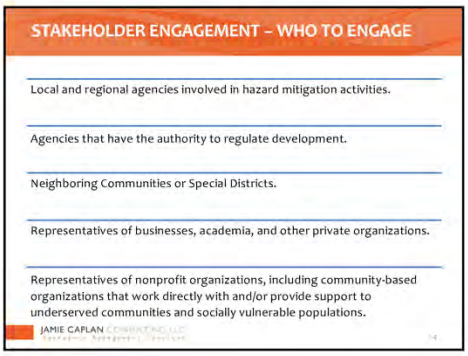

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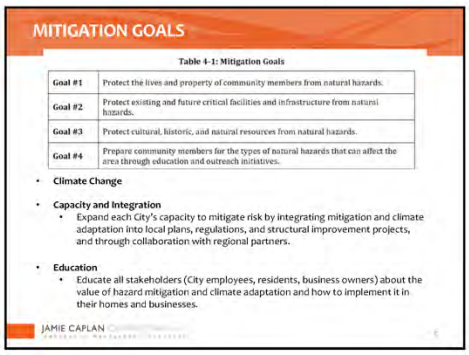

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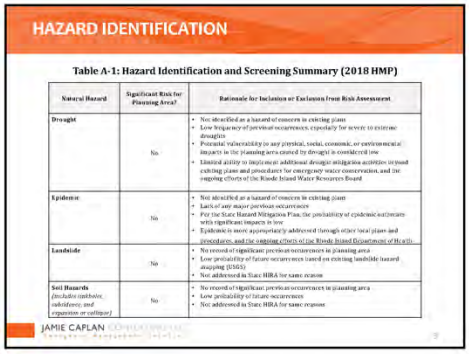

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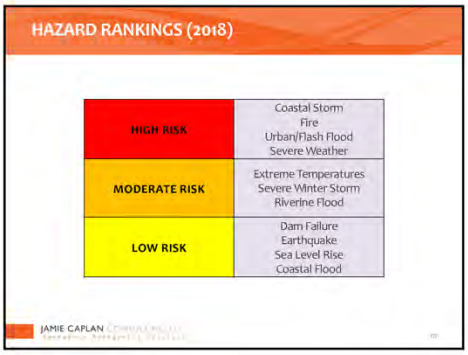

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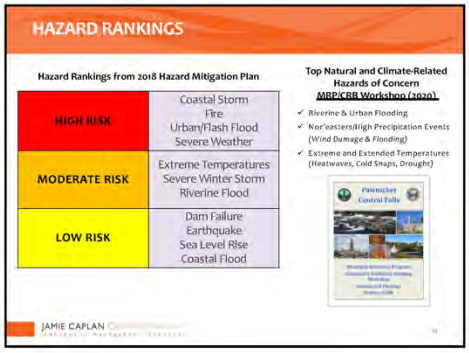

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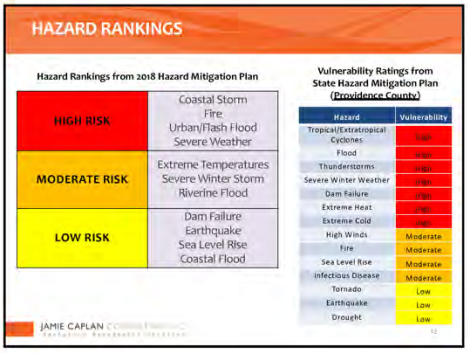

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NOAA Storm Events (Providence County, 2018–March 2023)

Event Type	# of Events	Property Damage	Fatalities	Injuries
Extreme Cold	0	$0	0	0
Extreme Heat	0	$0	0	0
Flood / Flash Flood / Heavy Rain	43	$1,090,500	0	0
Hail	6	$0	0	0
Lightning	1	$5,000	0	0
Strong Wind / Thunderstorm Wind / High Wind	81	$199,500	0	1
Tornado	2	$1,010,000	0	0
Tropical Storm	2	$92,300	0	0
Winter Storm / Winter Weather	26	$30,700	0	0
Total	161	$2,428,000	0	1

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CHANGES IN DEVELOPMENT

- What changes have occurred in hazard-prone areas since the previous plan was approved?
  - *Increases in vulnerability?*
  - *Decreases in vulnerability?*
- Any planned or anticipated changes?

"Changes in Development"

Any recent construction, planned or potential development, or conditions that may affect the risks and vulnerabilities of the community (such as changes in local plans or development regulations, population growth/decline, economic trends/impacts, shifts in the needs of underserved communities, etc.).

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VULNERABILITY ASSESSMENT

GIS-based Exposure Analysis
- Parcels and Buildings
- Critical Facilities
- Other Community Assets

"Community Assets"
- **People** *(including underserved communities and socially vulnerable populations)*
- **Structures** *(including facilities, lifelines and critical infrastructure)*
- **Systems** *(including networks and capabilities)*
- **Natural, historic, and cultural resources**
- **Activities** *that have value to the community*

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VULNERABILITY ASSESSMENT

Critical Facilities (2018)
- City Halls
- EOCs
- Fire Stations
- Police Stations
- Public Works Facilities
- Schools
- Shelters
- Hospitals
- Libraries

Critical Facility Type	Critical Facility ID (Name/Address)
Emergency Operations Center	Public Works Building/250 Armistice Blvd
Hospital	Memorial Hospital of Rhode Island/111 Brewster St
Library	Pawtucket Public Library/13 Summer St
Fire Station	Cottage Street Fire Station/385 Cottage St
Fire Station	Roosevelt Ave Fire Station/137 Roosevelt Ave
Fire Station	Columbus Ave Fire Station/2 Columbus Ave
Fire Station	Newport Ave Fire Station/385 Newport Ave
Fire Station	West Ave Fire Station/394 West Ave
Fire Station	Smithfield Ave Fire Station/301 Smithfield Ave
School	Nathanael Greene School/285 Smithfield Avenue
School	Shea Senior High School/485 East Avenue
School	William E. Tolman Senior High School/150 Exchange Street
School	Agnes E. Little School/60 South Bend Street
School	Fallon Memorial School/62 Lincoln Avenue
School	Goff Junior High School/974 Newport Avenue
School	Potter-Burns School/973 Newport Avenue
School	Flora S. Curtis Memorial School/582 Benefit Street
School	Henry J. Winters School/481 Broadway
School	M. Virginia Cunningham School/40 Baldwin Street
School	Samuel Slater Junior High School/281 Mineral Spring Avenue
School/Shelter	Francis J. Varieur School/486 Pleasant Street
School/Shelter	Elizabeth Baldwin School/50 Whitman Street
School/Shelter	Joseph Jenks Junior High School/350 Division Street
School/Shelter	Curvin McCabe/466 Cottage Street
Law Enforcement	Pawtucket Police Station/121 Roosevelt Ave
Law Enforcement	Pawtucket Police Substation/252 Armistice Blvd
City Hall	Pawtucket City Hall/137 Roosevelt Ave

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VULNERABILITY ASSESSMENT

Other Community Assets (2018)
- Community Facilities
- Major Employers
- Historic Places
- Parks
- Open Space
- Recreation Areas
- Public Schools
- Private/Parochial Schools
- Day Cares

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CAPABILITY ASSESSMENT

- Purpose:
  - To assess the current local authorities, policies, programs, and other resources available to support hazard mitigation efforts.
- Types of Capabilities:
  - Planning & Regulatory
  - Administrative & Technical
  - Financial
  - Education & Outreach
  - National Flood Insurance Program (NFIP)

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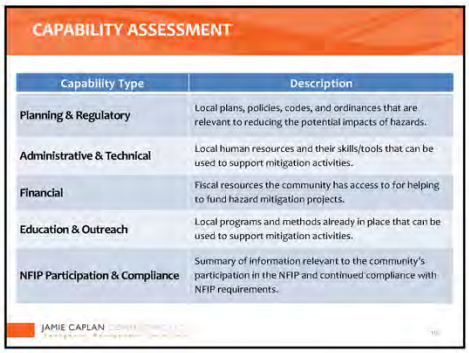

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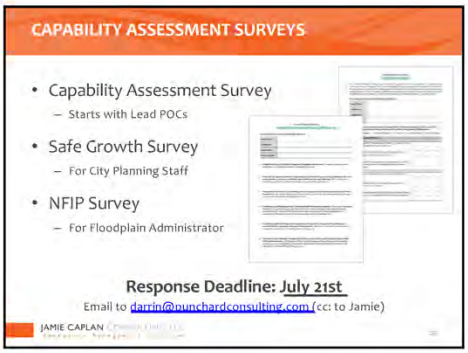

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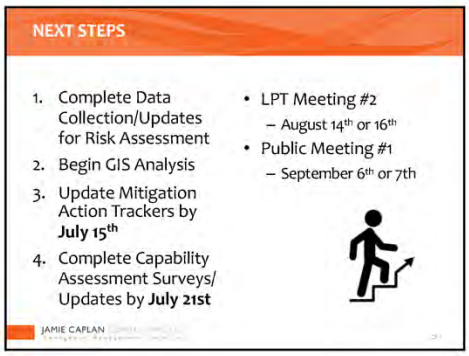

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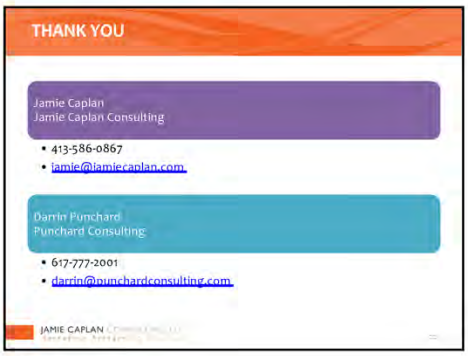

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Local Planning Team Meeting #2
November 16, 2023
10:00 am – 11:30am on Zoom
Cities of Pawtucket and Central Falls, Rhode Island
2023 Hazard Mitigation Plan Update

Join Zoom Meeting

- https://us02web.zoom.us/j/85188319887?pwd=VllQaTJmenhPaDg3WjIrSFg0RVl5UT09
- Meeting ID: 851 8831 9887
- Passcode: 601201

AGENDA

- Project Status
  - Revised Timeline
  - Outstanding Requests
- Risk Assessment Update
- Capability Assessment Update
- Mitigation Strategy Update
  - Goal Statements
  - New Mitigation Action Ideas
- Public/Stakeholder Engagement
- Next Steps
  - Schedule Public Meeting
  - Identify New Mitigation Actions
  - Share Pictures of Hazard Occurrences or High Hazard Areas

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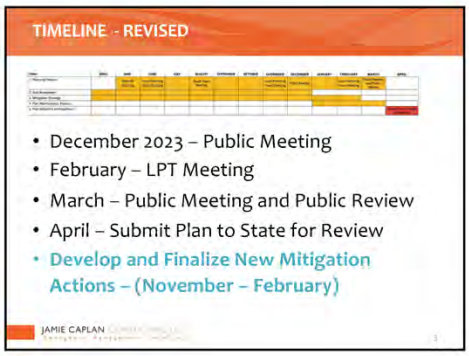

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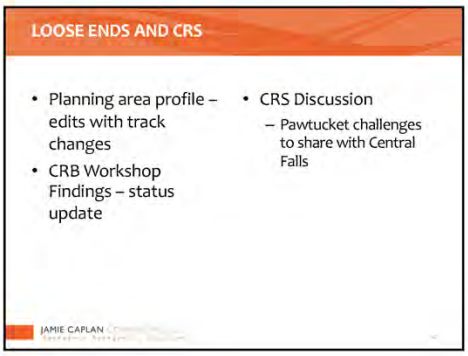

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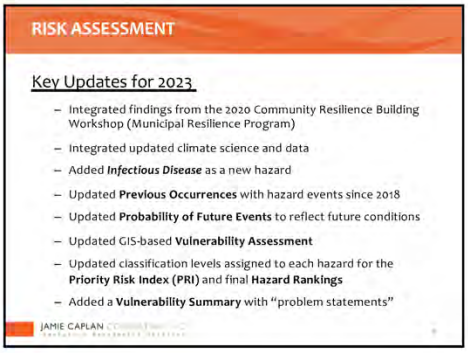

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RISK ASSESSMENT

- Hazard Identification
- Hazard Profiles
  - Description
  - Location
  - Severity/Extent
  - Previous Occurrences
  - Probability of Future Occurrences
- Vulnerability Assessment
  - Hazard Exposure (parcels, buildings, critical facilities, and other community assets)
- Summary Findings and Conclusions
  - Hazard Rankings and Vulnerability Summary

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HAZARD IDENTIFICATION

13 natural hazards considered; 10 identified for Risk Assessment:

- Coastal Storm *(hurricanes, tropical storms, and nor'easters)*
- Dam Failure
- Drought
- Earthquake
- Extreme Temperatures *(heat and cold)*
- Fire *(urban fire and wildfire)*
- Flood *(riverine, coastal, flash, and urban flooding)*
- Infectious Disease
- Landslide
- Sea Level Rise *(addressed under Flood)*
- Severe Weather *(severe thunderstorms, high winds, tornado, hail, lightning)*
- Severe Winter Storm *(snow, blizzards, ice storms)*
- Soil Hazards *(includes sinkholes, subsidence, and expansion or collapse)*

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Major Disaster Declarations (Providence County, 1953–2023)

Year	Incident Type	Description
2022	Snowstorm	Severe Winter Storm & Snowstorm
2020	Biological	COVID-19 Pandemic
2015	Severe Winter Storm	Severe Winter Storm & Snowstorm
2013	Severe Winter Storm	Severe Winter Storm & Snowstorm
2011	Hurricane	Tropical Storm Irene
2010	Severe Storm(s)	Severe Storms & Flooding
1996	Snow	Blizzard of '96 (Severe Snowstorm)
1991	Hurricane	Hurricane Bob
1985	Hurricane	Hurricane Gloria
1978	Snow	Snow & Ice
1955	Hurricane	Hurricane & Flood
1954	Hurricane	Hurricanes

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NOAA Storm Events Database (Providence County, 2018–July 2023)

Event Type	# of Events	Property Damage	Fatalities	Injuries
Extreme Cold	0	$0	0	0
Extreme Heat	0	$0	0	0
Flood / Flash Flood / Heavy Rain	59	$1,091,000	0	0
Hail	7	$0	0	0
Lightning	1	$5,000	0	0
Strong Wind / Thunderstorm Wind / High Wind	88	$206,300	0	3
Tornado	2	$1,010,000	0	0
Tropical Storm	2	$92,300	0	0
Winter Storm / Winter Weather	26	$30,700	0	0
Total	**185**	**$2,435,000**	**0**	**3**

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Anticipated Effects of Climate Change on Hazards

HAZARD	TREND	PROJECTION
Coastal Storm	Increase	Studies of the Atlantic Basin show that storms are likely to be more intense and have higher rainfall rates. Predicted changes in storm activity could increase frequency and intensity of associated storm surges, high winds, and precipitation events.
Dam Failure	Undetermined	Increased rainfall, flooding, and sediment runoff may lead to an increased risk of a dam failure as some dams may not be designed to withstand an increase in rain totals. However, the probable maximum flood used to design each dam may be able to accommodate changes in climate.
Earthquake	N/A	No anticipated effects.
Extreme Temperatures	Increase	Historically unprecedented warming is projected by the end of the 21st century. Increases are projected for the frequency, duration, and intensity of heat waves, with projected decreases in the frequency of extreme cold events.
Fire	Increase	More frequent and prolonged dry conditions are projected to increase the frequency and intensity of wildfire/brush fire events.
Flood	Increase	Continued increases in frequency and intensity of extreme precipitation events will lead to more flooding of all types, but especially urban/flash flooding.
Infectious Disease	Increase	Invasive pests and vector-borne diseases will continue to be exacerbated with climate change.
Sea Level Rise	Increase	Sea level is projected to increase by at least 9 feet by 2100, with a substantial increase in the frequency of nuisance tidal flooding and intensity of coastal storm surges.
Severe Weather	Increase	Rhode Island will experience warmer air and water temperatures, leading to more extreme weather events, intense precipitation, and severe storms.
Severe Winter Storm	Undetermined	Winters are projected to become shorter with fewer cold days and less ice coverage. Winter precipitation is projected to increase, but with less snow and more rain overall. Extreme snowfall events will remain likely, but projections are still largely undetermined.

11

VULNERABILITY ASSESSMENT

GIS-based Exposure Analysis

- Parcels & Buildings
- Critical Facilities
- Other Community Assets
  - Major employers
  - Historic buildings/places
  - Community facilities
  - Private/parochial schools
  - Daycare facilities
  - Parks, open space, and recreation areas

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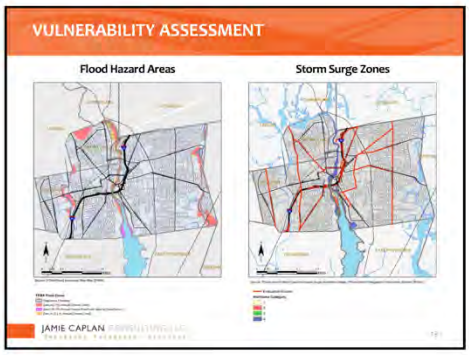
4/11/24



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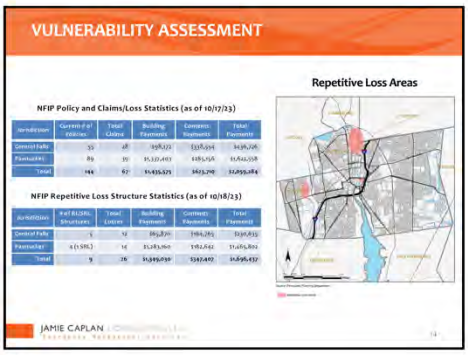

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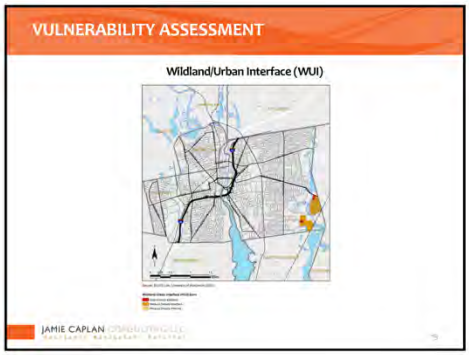

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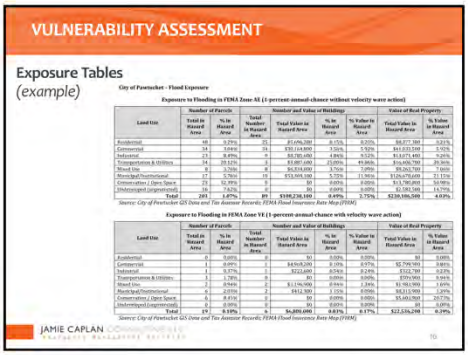

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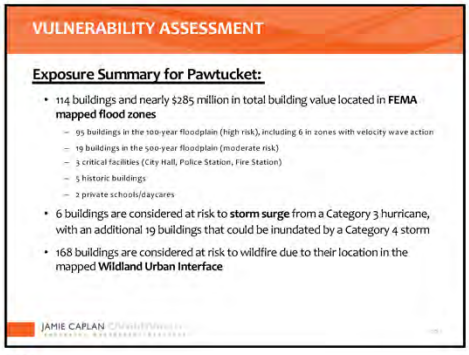

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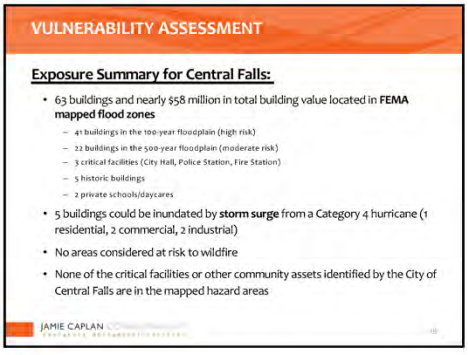

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4/11/24

EXTREME HEAT

Urban Heat Hotspots

Heat Vulnerability

Source: Rhode Island Department of Health

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HAZARD RANKINGS

Hazard Rankings from 2018 Hazard Mitigation Plan

HIGH RISK	Coastal Storm Fire Urban/Flash Flood Severe Weather
MODERATE RISK	Extreme Temperatures Severe Winter Storm Riverine Flood
LOW RISK	Dam Failure Earthquake Sea Level Rise Coastal Flood

Top Natural and Climate-Related Hazards of Concern
MRP/CRB Workshop (2020)

- ✓ Riverine & Urban Flooding
- ✓ Nor'easters/High Precipitation Events (Wind Damage & Flooding)
- ✓ Extreme and Extended Temperatures (Heatwaves, Cold Snaps, Drought)

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HAZARD RANKINGS (2023)

HIGH RISK	Coastal Storm Extreme Temperatures ↑ Fire Urban/Flash Flood Severe Weather
MODERATE RISK	Severe Winter Storm Riverine Flood Infectious Disease +
LOW RISK	Dam Failure Earthquake Sea Level Rise Coastal Flood

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PROBLEM STATEMENTS

Multiple Hazards

- The lack of a designated community center and sufficient space to provide **shelter during emergencies** remains an ongoing concern for the planning area.
- More **public education and awareness** is needed on the potential risks of current and future hazard impacts to the community, including homes and other privately-owned buildings, as well as the mitigation activities available to help reduce those risks.
- The outdated electrical grid experiences frequent **power outages** during storms events.
- There is **inadequate generator capacity** for backup power in both cities.
- Implications for **disproportionately disadvantaged populations** (i.e., homeless, elderly, low-income, non-English speakers) from flooding, winter storms, and extreme temperatures.
- Emergency communications with and outreach among **non-English speakers.**

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PROBLEM STATEMENTS

Flood

- **Pawtucket's City Hall, Fire Station, and Police Station** are in high-risk flood hazard areas, which could hinder the City's emergency response/recovery capabilities during and following extreme events.
- Several **historic buildings** in Pawtucket are within high-risk flood hazard areas.
- Several **repetitive loss properties** are located within both cities.
- **Low-lying roads and buildings close to rivers** are subjected to erosion and routine flooding from rivers and stormwater runoff (*see Flood hazard profile and Vulnerability Summary for more details*).
- High levels of **impervious surfaces** (>60%) create stormwater runoff issues.
- **Lack of green space** for runoff in neighborhoods.
- **Aged sewer and stormwater infrastructure** are prone to being at capacity and cause flooding.
- **Combined sewer/stormwater systems** exacerbate capacity of piped systems and overflows to riverine systems.
- **Overflows into rivers that flood beyond their banks** will affect resident's homes, businesses, and vulnerable populations. They also pollute the rivers with pollutants, including from contaminated mill sites, which exacerbate issues for residents when contaminants infiltrate homes and businesses during flood events.

** Flood hazard profile identifies specific problems and areas of concern for each city.*

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PROBLEM STATEMENTS

Extreme Temperatures

- Prevalent **heat islands** across both cities pose threats to residents during extreme heat events.
- High vulnerability among **sensitive populations** in both cities, facing higher risk for heat-related illnesses
- **Lack of trees** at bus stops, heat-sensitive areas, and other vulnerable locations.
- **Power outages** remain a significant life/safety threat to residents, especially vulnerable populations, and particularly during heatwaves in the summer months and during periods of extreme cold in winter months.

Fire

- The potential for **larger, destructive urban fires** remains high for both cities due to large concentrations of older, wood frame structures and other contributing factors (see Fire hazard profile for more details).

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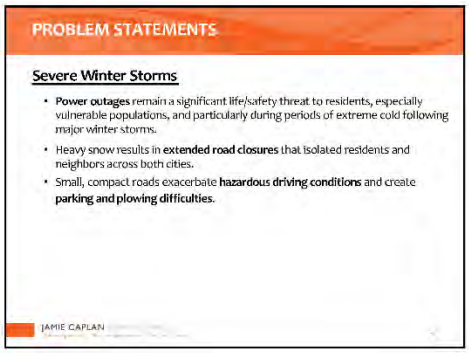

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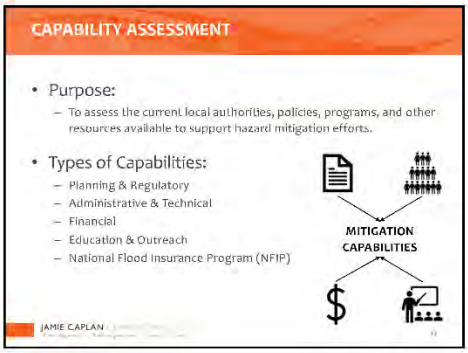

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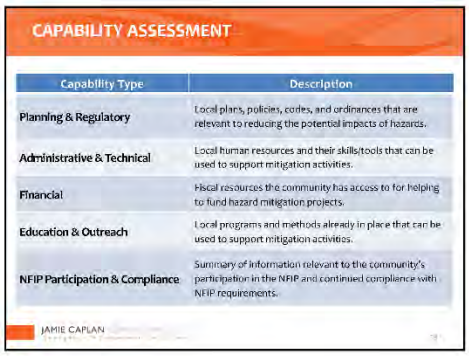

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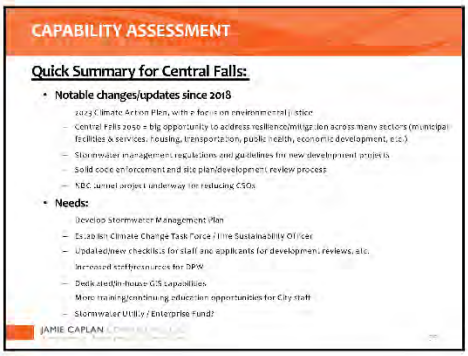

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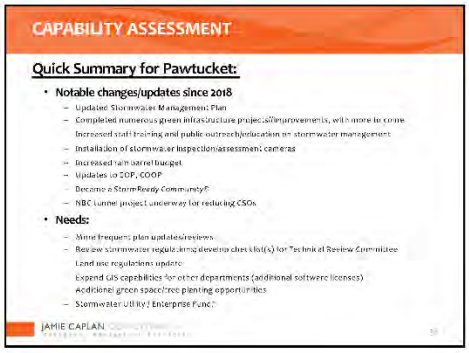

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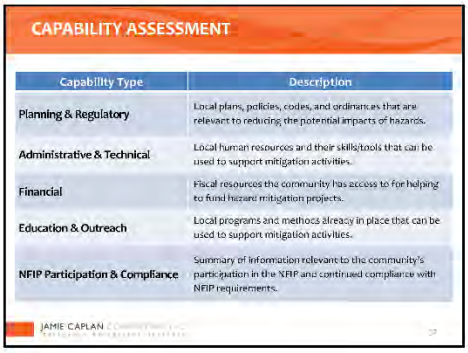

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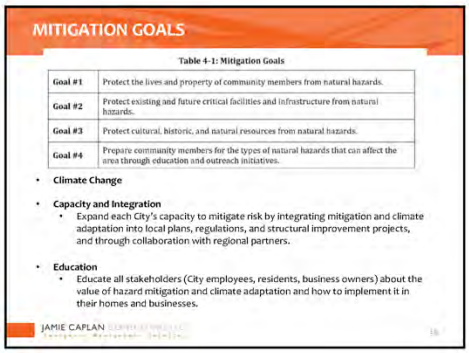

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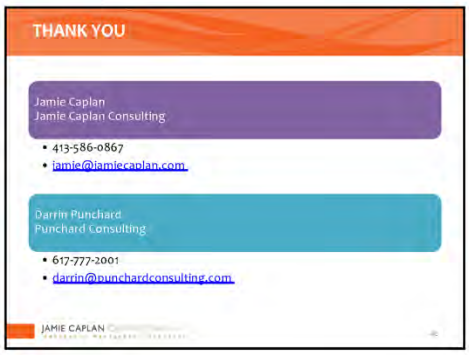

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Local Planning Team Meeting #3
May 1, 2024
12:45 pm – 2:00 pm on Zoom
Cities of Pawtucket and Central Falls, Rhode Island
2024 Hazard Mitigation Plan Update

Join Zoom Meeting

- https://us02web.zoom.us/j/87944668386?pwd=bGtleS8zcmtxTHNIUThSQkxQZXlNUT09
- Meeting ID: 879 4466 8386
- Passcode: 366674

AGENDA

- Project Update
- Public Engagement
  - Outreach for Public Meeting and Plan Review
- Final Ranking of Natural Hazards
- Mitigation Actions
  - Review Prioritized Lists of Actions
- Reviewing the Draft Plan
  - What's Included and Where to Focus
  - How to Provide Feedback
- Next Steps
  - Public Meeting
  - Plan Review

5/7/24


LOCAL PLANNING TEAM MEETING #3
2024 Hazard Mitigation Plan Update
Cities of Pawtucket and Central Falls, RI
May 1, 2024

1


MEETING AGENDA
Project Update
Public Engagement Outreach
Final Hazard Ranking
Mitigation Actions
Reviewing the Draft Plan
Next Steps
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PROJECT UPDATE SCHEDULE
• Finish Draft Plan
– Local Planning Team Review
• Public Meeting
• Public Plan Review
• RIEMA Review
• FEMA Review
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3


PUBLIC ENGAGEMENT OUTREACH
Public Meeting
Plan Review
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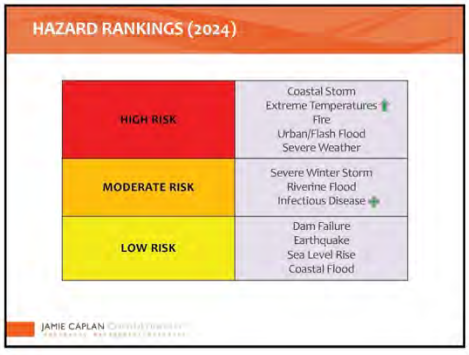
HAZARD RANKINGS (2024)
HIGH RISK
Coastal Storm
Extreme Temperatures
Fire
Urban/Flash Flood
Severe Weather
MODERATE RISK
Severe Winter Storm
Riverine Flood
Infectious Disease
LOW RISK
Dam Failure
Earthquake
Sea Level Rise
Coastal Flood
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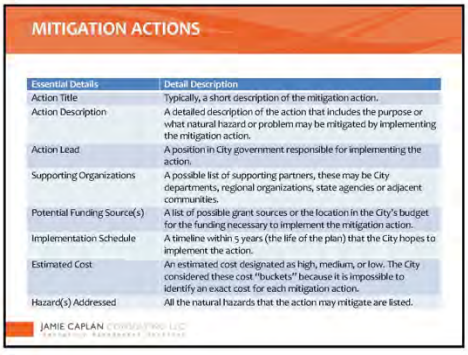
MITIGATION ACTIONS
Essential Details
Detail Description
Action Title
Typically, a short description of the mitigation action.
Action Description
A detailed description of the action that includes the purpose or what natural hazard or problem may be mitigated by implementing the mitigation action.
Action Lead
A position in City government responsible for implementing the action.
Supporting Organizations
A possible list of supporting partners, these may be City departments, regional organizations, state agencies or adjacent communities.
Potential Funding Source(s)
A list of possible grant sources or the location in the City's budget for the funding necessary to implement the mitigation action.
Implementation Schedule
A timeline within 5 years (the life of the plan) that the City hopes to implement the action.
Estimated Cost
An estimated cost designated as high, medium, or low. The City considered these cost "buckets" because it is impossible to identify an exact cost for each mitigation action.
Hazard(s) Addressed
All the natural hazards that the action may mitigate are listed.
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5/7/24

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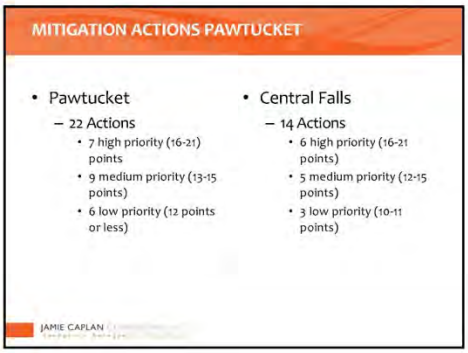

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5/7/24


REVIEWING THE DRAFT PLAN
1. Introduction
2. Planning Process
3. Profile
4. Mitigation Strategy
5. Plan Maintenance
Appendices
A – Risk Assessment
B – Capability Assessment
C – Additional Documentation
• How to Provide Feedback?
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NEXT STEPS
Plan Review
Public Meeting
Public Review
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THANK YOU
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Darrin Punchard
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• darrin@punchardconsulting.com
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15

C.2. PUBLIC AND STAKEHOLDER MEETINGS

- Public Meeting Agendas, Flyers, Press Releases and Presentations

JAMIE CAPLAN CONSULTING LLC
Emergency Management Services

PUBLIC MEETING

PAWTUCKET-CENTRAL FALLS, RI MULTI-JURISDICITIONAL HAZARD MITIGATION PLAN UPDATE

DATE: 1/24/2024
TIME: 6:00-7:00PM
LOCATION: Pawtucket City Hall, 137 Roosevelt Avenue, Pawtucket, RI, 3rd Floor City Council Chambers
ZOOM: https://us02web.zoom.us/j/88262473961?pwd=a3daOStRSlRMYTQvbXBsZkJTMmxMQT09
Meeting ID: 882 6247 3961
Passcode: 630263

AGENDA ITEMS

I. Introductions

II. What is Hazard Mitigation? What is a Hazard Mitigation Plan?

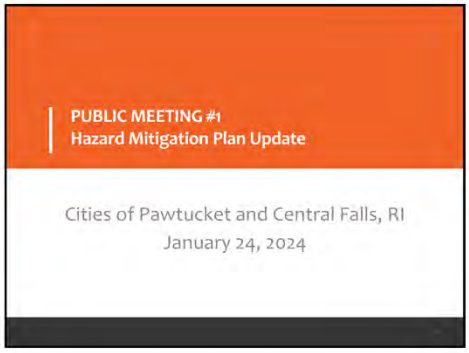
III. Identify Natural Hazards

IV. Identify Critical Facilities

V. Brainstorm Possible Mitigation Actions

VI. Next Steps

4/11/24



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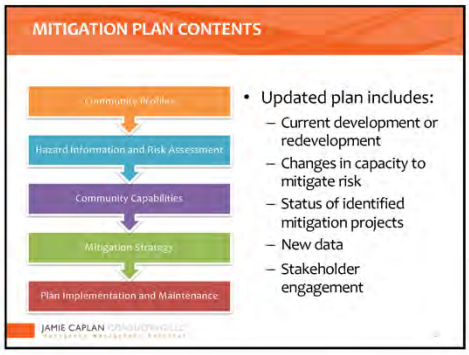

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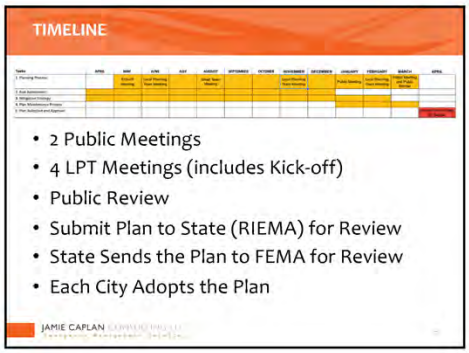

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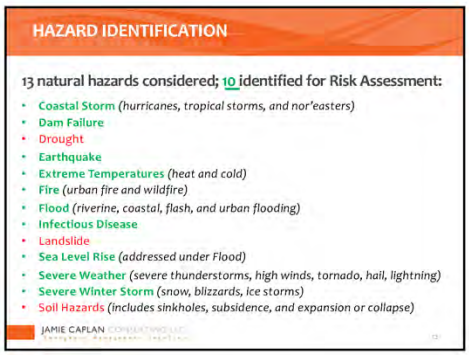

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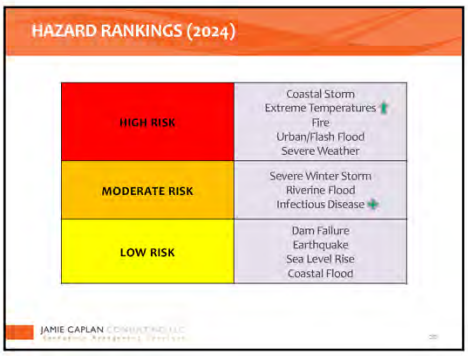

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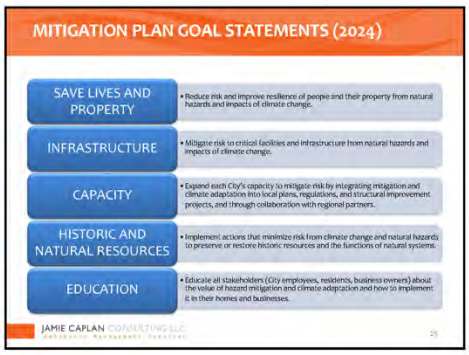

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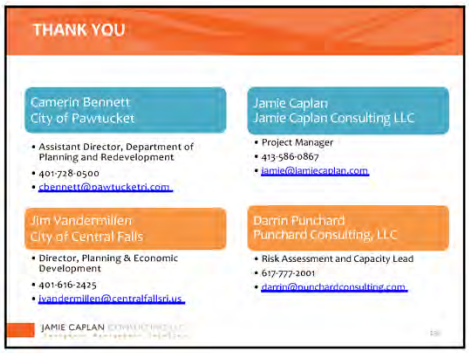
THANK YOU
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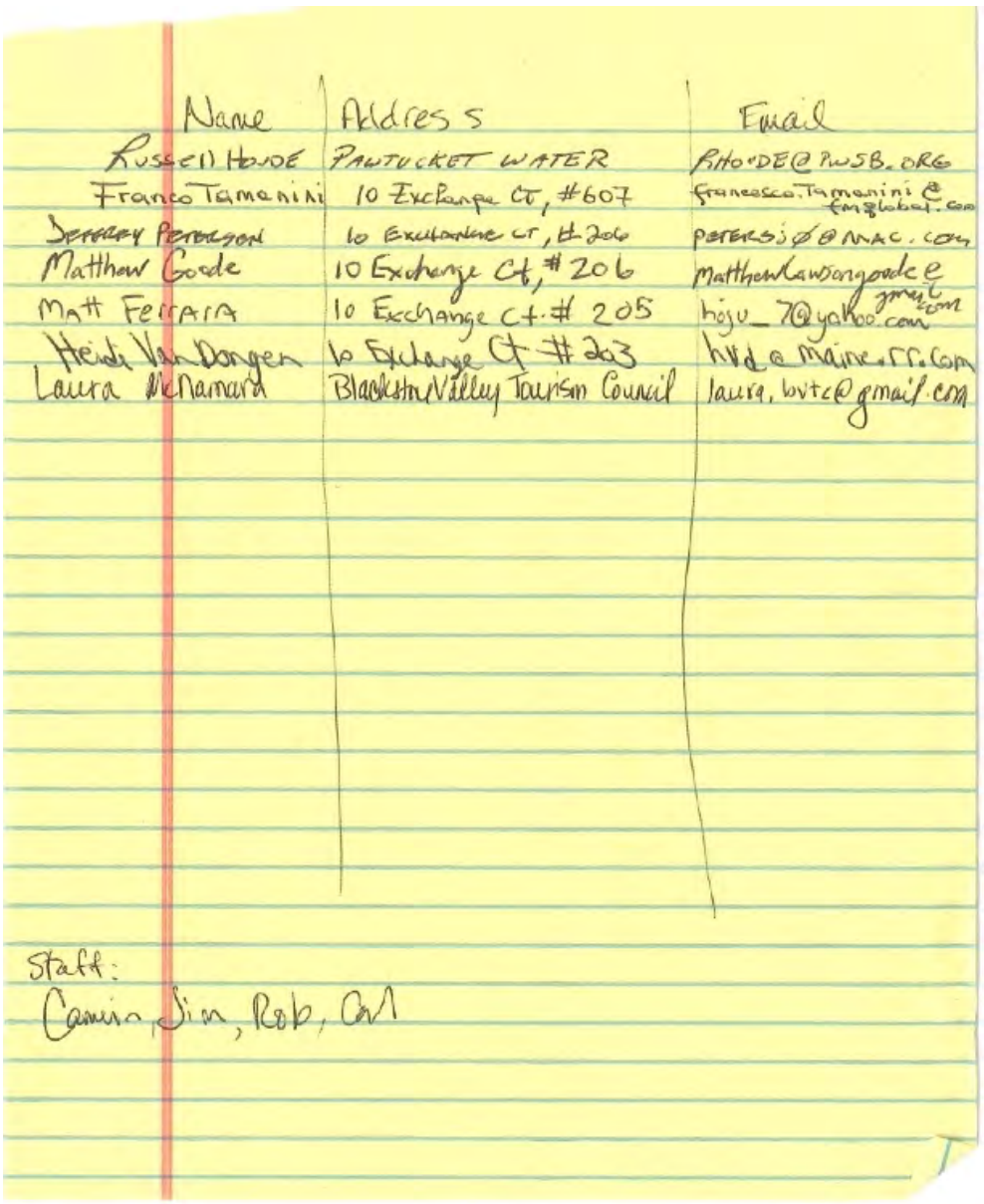

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Jeffrey Peterson	10 Exchange Ct, #206	petersj@mac.com
Matthew Goode	10 Exchange Ct, #206	matthewlawsongoode@gmail.com
Matt Ferraro	10 Exchange Ct. # 205	higu_7@yahoo.com
Heidi VanDongen	10 Exchange Ct #203	hvd@maine.rr.com
Laura McNamara	Blackstone Valley Tourism Council	laura.bvtc@gmail.com

Staff:
Carmina, Jim, Rob, Carl

THE TIMES
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ORDER CONFIRMATION

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PAWTUCKET RI 02860

Start: 01/09/2024 — Stop: 01/09/2024
Times Ord: 1 — Times Run: ***
LEG 2.00 X 125.00 — Words: 360
Total LEG 250.00
Class: 100 LEGAL
Rate: CLE — Cost: 307.50
Ad Descrpt: IDENTIFY NATURAL HAZARD R
Descr Cont: PUBLIC MEETING INVITATION
Given by: *
P.O. #:
Created: cbevi 01/04/24 13:14
Last Changed: cbevi 01/04/24 13:22

Contact:
Phone: (401)728-0500ext
Fax#: (401)555-0000
Email: mgoudreau@pawtucketri.com
Agency:

COMMENTS:
Identify Natural Hazard Risks and Recommend Mitigation Actions

PUB	ZONE	EDT	TP	RUN DATES
TIME	A	98	S	01/09

AUTHORIZATION

Under this agreement rates are subject to change with 30 days notice. In the event of a cancellation before schedule completion, I understand that the rate charged will be based upon the rate for the number of insertions used.

_____ Name (print or type)

_____ Name (signature)

(CONTINUED ON NEXT PAGE)

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ORDER CONFIRMATION (CONTINUED)

Salesperson: CLASS LEGAL Printed at 01/04/24 14:07 by cbevi-sc

Acct #: 4784 Ad #: 500934 Status: New WHOLD WHOI

Public Meeting Invitation
Identify Natural Hazard Risks and Recommend Mitigation Actions

Do you wonder if Pawtucket or Central Falls can flood, experience a tornado, or have an earthquake? What is the worst that can happen in Pawtucket or Central Falls? What can prevent those natural hazards and others from wreaking havoc?

Fortunately, the Cities of Pawtucket and Central Falls are developing an update to their Multi-Jurisdictional Hazard Mitigation Plan. This plan details all the natural hazard risks that may impact the Cities and includes a list of potential actions to mitigate those risks.

The Cities of Pawtucket and Central Falls encourages all residents and business owners to come to a public meeting to share your ideas and gather your feedback regarding which hazards present the greatest risks, which areas of Town are most susceptible to damage, and what you would like to see done to mitigate these risks?

We cannot stop winter storms, heavy rains, high winds, or earthquakes but we do not have to suffer severe consequences. The Cities of Pawtucket and Central Falls hope you will join our first of two Public Meetings on **January 24, 2024 at 6:00 pm** in the Pawtucket City Hall.

City leaders have formed a Local Planning Team (LPT). This Team is developing the Hazard Mitigation Plan Update. A Hazard Mitigation Plan, approved by the Federal Emergency Management Agency (FEMA), and adopted by the Cities, allows the Cities to apply for pre- and post-disaster hazard mitigation grant funds. Development of this plan includes **public** participation.

Public participation is essential to the development of a Hazard Mitigation Plan that represents the interests of all residents and mitigates risk to all natural hazards and the impacts of climate change.

Meeting will be held in-person and via Zoom

- Day: Thursday, January 24, 2024
- Time: 6:00-7:00PM
- Location: Pawtucket City Hall, 137 Roosevelt Avenue, Pawtucket, RI, 3rd Floor City Council Chambers
- Zoom Link: https://us02web.zoom.us/j/88262473961?pwd=a3daOStRSlRMYTQvbXBsZkJTMmxMQT09
- Meeting ID: 882 6247 3961
- Passcode: 630263

For questions regarding this meeting, please contact Camerin Bennett, Assistant Planning Director (Pawtucket) at 401-728-0500 x44 or cbennett@pawtucketri.com or Jim Vandermillen, Planning Director (Central Falls) at 401-616-2425 or jvandermillen@centralfallsri.us.

PUBLIC MEETING #2 AGENDA

PAWTUCKET-CENTRAL FALLS, RI MULTI-JURISDICITION HAZARD MITIGATION PLAN UPDATE

DATE: **THURSDAY, MAY 30, 2024**

TIME: **12:00-1:00 PM**

ZOOM: https://us02web.zoom.us/j/88072573175?pwd=SzZUano5SUdYU3ZVSkxJL0FNY0k2UT09

Meeting ID: 80 7257 3175

Passcode: 937364

AGENDA ITEMS

I. **Project Introduction**

II. **What is Hazard Mitigation?**

   i. Benefits of Hazard Mitigation

   ii. How the Plan was Developed

III. **Risk Assessment Summary**

   i. Key Updates

   ii. Hazard Identification & Vulnerability Assessment

   iii. Findings & Conclusions

   iv. Discussion

      i) Where are the hazards experienced?

      ii) What are your biggest concerns?

IV. **Hazard Mitigation Strategy**

   i. Mitigation Goals

   ii. Types of Mitigation Actions

   iii. Review of proposed actions

   iv. Discussion

      i) What types of mitigation actions are most important to you?

      ii) What specific actions do you want to see prioritized in this plan?

V. **Plan Review**

   i. What to expect and how to review

PAWTUCKET-CENTRAL FALLS, RHODE ISLAND

PUBLIC MEETING

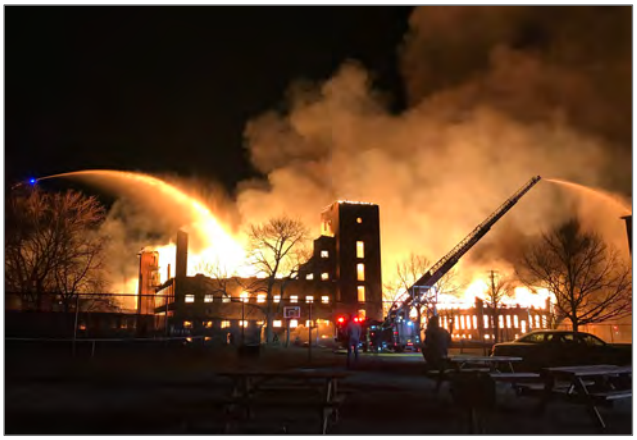
SHARE YOUR IDEAS FOR REDUCING RISK TO NATURAL HAZARDS AND CLIMATE CHANGE

Do you wonder if Pawtucket or Central Falls can flood, experience a tornado, or have an earthquake? What can prevent those natural hazards and climate change from wreaking havoc in our community?

Join our **2nd public meeting** to learn about this important project and to **share your ideas** for making Pawtucket and Central Falls **more resilient** to natural hazards and climate change.

The Local Planning Team has developed a Hazard Mitigation Plan Update to identify natural hazard risks and projects to mitigate those risks. This plan prioritizes saving lives and property.

Federal Emergency Management Agency approval, coupled with City adoption, will enable each City to access to pre- and post-disaster mitigation funds.



5/30/2024

12:00 pm – 1:00 pm

Zoom Link on City Website

FOR MEETING DETAILS CONTACT CAMERIN BENNETT, ASSISTANT PLANNING DIRECTOR (PAWTUCKET) AT 401-728-0500 X441 OR CBENNETT@PAWTUCKETRI.COM OR JIM VANDERMILLEN, PLANNING DIRECTOR (CENTRAL FALLS) AT 401-616-2425 OR JVANDERMILLEN@CENTRALFALLSRI.US

PRESS RELEASE
For Immediate Release
May 13, 2024

City of Pawtucket
Camerin Bennett, Assistant Director
Department of Planning and Redevelopment
City of Pawtucket
137 Roosevelt Avenue, 1st Floor
Pawtucket, RI 02860-2129
(401) 728-0500, X441
cbennett@pawtucketri.com

City of Central Falls
Jim Vandermillen, Director
Planning & Economic Development
City of Central Falls
1280 High Street, Central Falls, RI 02863
(401) 616-2425
jvandermillen@centralfallsri.us

The Cities of Pawtucket and Central Falls Welcome Community Input on Hazard Mitigation Plan Update

Do you wonder if Pawtucket or Central Falls can flood, experience a tornado, or have an earthquake? What is the worst that can happen in Pawtucket or Central Falls? What can prevent those natural hazards and others from wreaking havoc?

The Cities of Pawtucket and Central Falls are extending an invitation to the community to participate in a public meeting as it develops their Multi-Jurisdiction Hazard Mitigation Plan Update. This plan details all the natural hazard risks that may impact the Cities and includes a list of potential actions to mitigate those risks.

Meeting Information:

- Day: Thursday, May 30, 2024
- Time: 12:00-1:00 PM
- ZOOM: https://us02web.zoom.us/j/88072573175?pwd=SzZUano5SUdYU3ZVSkxJL0FNY0k2UT09
- Meeting ID: 80 7257 3175
- Passcode: 937364

The Cities of Pawtucket and Central Falls encourage all residents and business owners to come to this public meeting to share ideas and offer feedback on which hazards present the greatest risks, which areas of the City are most susceptible to damage, and what you would like to see done to mitigate these risks?

The Local Planning Team, in partnership with Jamie Caplan Consulting LLC, a Northampton, MA-based firm, is developing the plan. FEMA approval, coupled with City adoption, will enable each City to access pre- and post-disaster hazard mitigation grant funds.

For Further Inquiries:

- Camerin Bennett, Assistant Director (Pawtucket) at 401-728-0500 x44 or cbennett@pawtucketri.com
- Jim Vandermillen, Director (Central Falls) at 401-616-2425 or jvandermillen@centralfallsri.us

Public participation is essential to a Hazard Mitigation Plan. This plan needs to represent the interests of community members while working to mitigate risk to natural hazards and the impacts of climate change.

THE TIMES
PO BOX 823
PAWTUCKET RI 02862
(401)762-3000
Fax (401)767-8509

ORDER CONFIRMATION

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Start: 05/21/2024 — Stop: 05/21/2024
Times Ord: 1 — Times Run: ***
LEG 2.00 X 114.00 — Words: 301
Total LEG 228.00
Class: 100 LEGAL
Rate: CLE — Cost: 280.44

Contact:
Phone: (401)728-0500ext
Fax#: (401)555-0000
Email: mgoudreau@pawtucketri.com
Agency:

Ad Descrpt: PUBLIC MEETING INVITATION
Given by: *
P.O. #:
Created: cbevi 05/14/24 10:28
Last Changed: cbevi 05/14/24 10:34

PUB	ZONE	EDT	TP	RUN DATES
TIME	A		98	S 05/21

AUTHORIZATION

Under this agreement rates are subject to change with 30 days notice. In the event of a cancellation before schedule completion, I understand that the rate charged will be based upon the rate for the number of insertions used.

_____ _____
Name (print or type) Name (signature)

(CONTINUED ON NEXT PAGE)

THE TIMES
PO BOX 823
PAWTUCKET RI 02862
(401)762-3000
Fax (401)767-8509

ORDER CONFIRMATION (CONTINUED)

Salesperson: CLASS LEGAL Printed at 05/14/24 10:34 by cbevi-sc

Acct #: 4784 Ad #: 506975 Status: New WHOLD WHOI

Public Meeting Invitation
Identify Natural Hazard Risks and Recommend Mitigation Actions

The Cities of Pawtucket and Central Falls Welcome Community Input on Hazard Mitigation Plan Update

Do you wonder if Pawtucket or Central Falls can flood, experience a tornado, or have an earthquake? What is the worst that can happen in Pawtucket or Central Falls? What can prevent those natural hazards and others from wreaking havoc?

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Meeting Information:
- Day: Thursday, May 30, 2024
- Time: 12:00-1:00 PM
- In person: 394 Dexter Street, Central Falls
ZOOM:
https://us02web.zoom.us/j/88072573175?pwd=SzZUano5SUdYU3ZVSkxJL0FNY0k2UT09
- Meeting ID: 80 7257 3175
- Passcode: 937364

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Public participation is essential to a Hazard Mitigation Plan. This plan needs to represent the interests of community members while working to mitigate risk to natural hazards and the impacts of climate change.

7/3/24

PUBLIC MEETING #2
Hazard Mitigation Plan Update

Cities of Pawtucket and Central Falls, RI
May 30, 2024

PUBLIC MEETING AGENDA

- Project Introduction
- What is in a Hazard Mitigation?
  - Benefits of Hazard Mitigation
  - How the Plan was Developed
- Risk Assessment Summary
  - Key Updates
  - Hazard Identification & Vulnerability Assessment
  - Findings & Conclusions
  - Discussion
- Hazard Mitigation Strategy
  - Mitigation Goals
  - Types of Mitigation Actions
  - Review of Proposed Actions
  - Discussion
- Plan Review
  - What to Expect and How to Review

JAMIE CAPLAN

2018 HAZARD MITIGATION PLAN

- Adopted by each City
- Approved by FEMA
- Eligible for FEMA pre-disaster mitigation funding
- Update required every 5 years

JAMIE CAPLAN

HAZARD MITIGATION

- Hazard Mitigation is defined as any sustained action taken to reduce or eliminate the long-term risk to life and property from hazard events.
- Actions to minimize risk to people, property and the environment.
- Focus on natural hazards.

JAMIE CAPLAN

BENEFITS OF HAZARD MITIGATION PLANNING

- Identify cost-effective actions to reduce risk
- Focus resources on greatest vulnerabilities
- Build partnerships
- Increase awareness of hazards and risk
- Communicate priorities
- Align with other City objectives
- Save lives and money!

JAMIE CAPLAN

TIMELINE

- 2 Public Meetings
- 4 LPT Meetings (includes Kick-off)
- Public Review
- Submit Plan to State (RIEMA) for Review
- State Sends the Plan to FEMA for Review
- Each City Adopts the Plan

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LOCAL PLANNING TEAM RESPONSIBILITIES
Provide supporting data or information.
Assist with outreach and stakeholder engagement.
Assist in the identification and prioritization of mitigation actions.
Review and comment on the draft plan.
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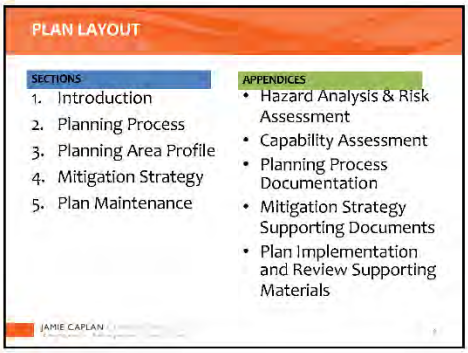
PLAN LAYOUT
SECTIONS
1. Introduction
2. Planning Process
3. Planning Area Profile
4. Mitigation Strategy
5. Plan Maintenance
APPENDICES
• Hazard Analysis & Risk Assessment
• Capability Assessment
• Planning Process Documentation
• Mitigation Strategy Supporting Documents
• Plan Implementation and Review Supporting Materials
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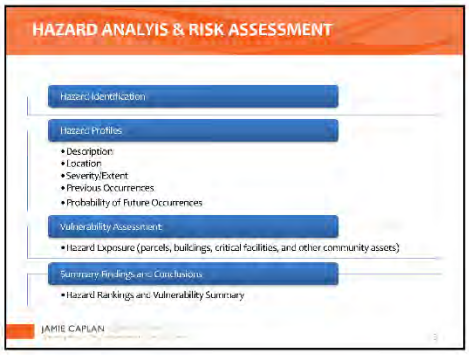
HAZARD ANALYSIS & RISK ASSESSMENT
Hazard Identification
Hazard Profiles
• Description
• Location
• Severity/Extent
• Previous Occurrences
• Probability of Future Occurrences
Vulnerability Assessment
• Hazard Exposure (parcels, buildings, critical facilities, and other community assets)
Summary Findings and Conclusions
• Hazard Rankings and Vulnerability Summary
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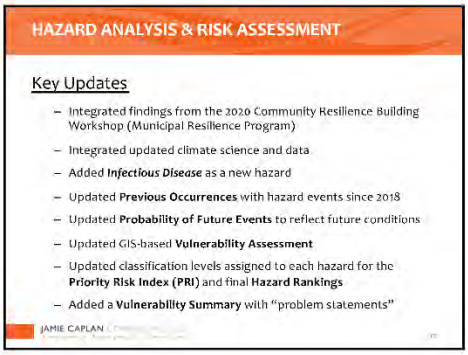
HAZARD ANALYSIS & RISK ASSESSMENT
Key Updates
– Integrated findings from the 2020 Community Resilience Building Workshop (Municipal Resilience Program)
– Integrated updated climate science and data
– Added Infectious Disease as a new hazard
– Updated Previous Occurrences with hazard events since 2018
– Updated Probability of Future Events to reflect future conditions
– Updated GIS-based Vulnerability Assessment
– Updated classification levels assigned to each hazard for the Priority Risk Index (PRI) and final Hazard Rankings
– Added a Vulnerability Summary with "problem statements"
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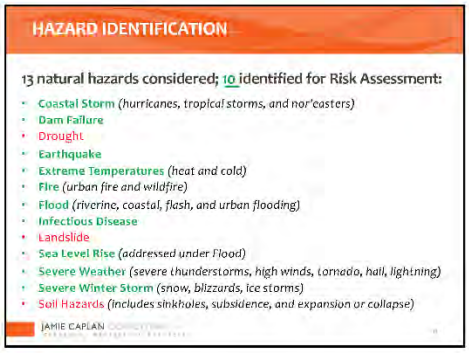
HAZARD IDENTIFICATION
13 natural hazards considered; 10 identified for Risk Assessment:
• Coastal Storm (hurricanes, tropical storms, and nor'easters)
• Dam Failure
• Drought
• Earthquake
• Extreme Temperatures (heat and cold)
• Fire (urban fire and wildfire)
• Flood (riverine, coastal, flash, and urban flooding)
• Infectious Disease
• Landslide
• Sea Level Rise (addressed under Flood)
• Severe Weather (severe thunderstorms, high winds, tornado, hail, lightning)
• Severe Winter Storm (snow, blizzards, ice storms)
• Soil Hazards (includes sinkholes, subsidence, and expansion or collapse)
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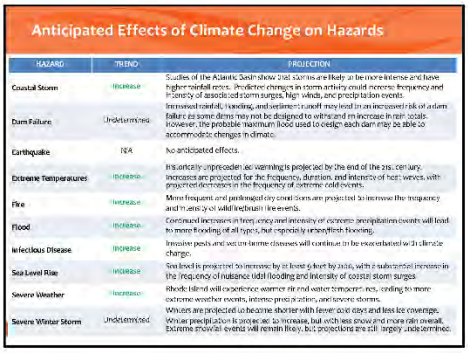
Anticipated Effects of Climate Change on Hazards
HAZARD
TREND
PROJECTION
Coastal Storm
Increase
Studies of the Atlantic Basin show that storms are likely to be more intense and have higher rainfall rates. Predictive changes in storm activity could increase frequency and intensity of associated storm surges, high winds, and precipitation events.
Dam Failure
Undetermined
Increased rainfall, flooding, and sediment runoff may lead to an increased risk of dam failure as some dams may not be designed to withstand an increase in rain totals. However, the probable maximum flood used to design each dam may be able to accommodate changes in climate.
Earthquake
N/A
No anticipated effects.
Extreme Temperatures
Increase
Historically unprecedented warmth is projected by the end of the 21st century. Increases are projected for the frequency, duration, and intensity of heat waves, with projected decreases in the frequency of extreme cold events.
Fire
Increase
More frequent and prolonged dry conditions are projected to increase the frequency and intensity of wildfire/brush fire events.
Flood
Increase
Continued increases in frequency and intensity of extreme precipitation events will lead to more flooding of all types, but especially urban/flash flooding.
Infectious Disease
Increase
Invasive pests and vectors (some diseases will continue to be exacerbated with climate change.
Sea Level Rise
Increase
Sea level is projected to increase by at least 5 feet by 2100, with a substantial increase in the frequency of nuisance tidal flooding and intensity of coastal storm surges.
Severe Weather
Increase
Rhode Island will experience warmer air and water temperatures, leading to more extreme weather events, intense precipitation, and severe storms.
Severe Winter Storm
Undetermined
Winters are projected to become shorter with fewer cold days and less ice coverage. Winter precipitation is projected to increase, but with less snow and more rain overall. Extreme snowfall events will remain likely, but projections are still largely undetermined.

7/3/24

VULNERABILITY ASSESSMENT

GIS-based Exposure Analysis

- Parcels & Buildings
- Critical Facilities
- Other Community Assets
  - Major employers
  - Historic buildings/places
  - Community facilities
  - Private/parochial schools
  - Daycare facilities
  - Parks, open space, and recreation areas

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VULNERABILITY ASSESSMENT

Flood Hazard Areas

Storm Surge Zones

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VULNERABILITY ASSESSMENT

NFIP Policy and Claims/Loss Statistics

Jurisdiction	Current # of Policies	Total Claims	Building Payments	Contents Payments	Total Payments
Central Falls	55	28	$98,172	$338,554	$436,726
Pawtucket	89	39	$1,337,403	$285,156	$1,622,558
Total	144	67	$1,435,575	$623,710	$2,059,284

NFIP Repetitive Loss Structure Statistics

Jurisdiction	# of RL/SRL Structures	Total Losses	Building Payments	Contents Payments	Total Payments
Central Falls	5	12	$65,870	$164,765	$230,635
Pawtucket	4 (1 SRL)	14	$1,283,160	$182,642	$1,465,802
Total	9	26	$1,349,030	$347,407	$1,696,437

Repetitive Loss Areas

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VULNERABILITY ASSESSMENT

Exposure Summary for Pawtucket:

- 114 buildings and nearly $285 million in total building value located in **FEMA mapped flood zones**
  - 95 buildings in the 100-year floodplain (high risk), including 6 in zones with velocity wave action
  - 19 buildings in the 500-year floodplain (moderate risk)
  - 3 critical facilities (City Hall, Police Station, Fire Station)
  - 5 historic buildings
  - 2 private schools/daycares
- 6 buildings are considered at risk to **storm surge** from a Category 3 hurricane, with an additional 19 buildings that could be inundated by a Category 4 storm
- 168 buildings are considered at risk to wildfire due to their location in the mapped **Wildland Urban Interface**

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VULNERABILITY ASSESSMENT

Exposure Summary for Central Falls:

- 63 buildings and nearly $58 million in total building value located in **FEMA mapped flood zones**
  - 41 buildings in the 100-year floodplain (high risk)
  - 22 buildings in the 500-year floodplain (moderate risk)
  - 3 critical facilities (City Hall, Police Station, Fire Station)
  - 5 historic buildings
  - 2 private schools/daycares
- 5 buildings could be inundated by **storm surge** from a Category 4 hurricane (1 residential, 2 commercial, 2 industrial)
- No areas considered at risk to wildfire
- None of the critical facilities or other community assets identified by the City of Central Falls are in the mapped hazard areas

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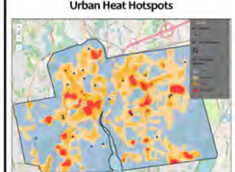
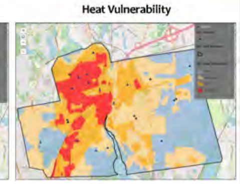
EXTREME HEAT

Urban Heat Hotspots



Heat Vulnerability



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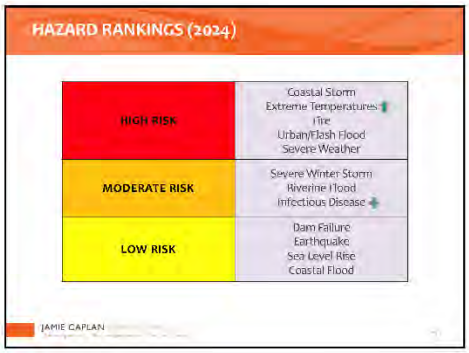
HAZARD RANKINGS (2024)
HIGH RISK
Coastal Storm
Extreme Temperatures
Fire
Urban/Flash Flood
Severe Weather
MODERATE RISK
Severe Winter Storm
Riverine Flood
Infectious Disease
LOW RISK
Dam Failure
Earthquake
Sea Level Rise
Coastal Flood
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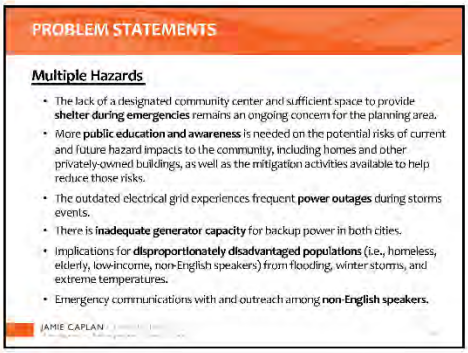
PROBLEM STATEMENTS
Multiple Hazards
The lack of a designated community center and sufficient space to provide shelter during emergencies remains an ongoing concern for the planning area.
More public education and awareness is needed on the potential risks of current and future hazard impacts to the community, including homes and other privately-owned buildings, as well as the mitigation activities available to help reduce those risks.
The outdated electrical grid experiences frequent power outages during storms events.
There is inadequate generator capacity for backup power in both cities.
Implications for disproportionately disadvantaged populations (i.e., homeless, elderly, low-income, non-English speakers) from flooding, winter storms, and extreme temperatures.
Emergency communications with and outreach among non-English speakers.
JAMIE CAPLAN


PROBLEM STATEMENTS
Flood
Pawtucket's City Hall, Fire Station, and Police Station are in high-risk flood hazard areas, which could hinder the City's emergency response/recovery capabilities during and following extreme events.
Several historic buildings in Pawtucket are within high-risk flood hazard areas.
Several repetitive loss properties are located within both cities.
Low-lying roads and buildings close to rivers are subject to erosion and routine flooding from rivers and stormwater runoff (see Flood hazard profile and Vulnerability Summary for more details).
High levels of impervious surfaces (>60%) create stormwater runoff issues.
Lack of green space for runoff in neighborhoods.
Aged sewer and stormwater infrastructure are prone to being at capacity and cause flooding.
Combined sewer/stormwater systems exacerbate capacity of piped systems and overflows in riverine systems.
Overflows into rivers that flood beyond their banks will affect resident's homes, businesses, and vulnerable populations. They also pollute the rivers with pollutants, including from contaminated mill sites, which exacerbate issues for residents when contaminants infiltrate homes and businesses during flood events.
* Flood hazard profile identifies specific problems and areas of concern for each city.
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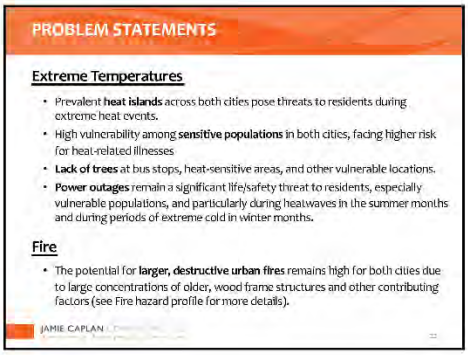
PROBLEM STATEMENTS
Extreme Temperatures
Prevalent heat islands across both cities pose threats to residents during extreme heat events.
High vulnerability among sensitive populations in both cities, facing higher risk for heat-related illnesses
Lack of trees at bus stops, heat-sensitive areas, and other vulnerable locations.
Power outages remain a significant life/safety threat to residents, especially vulnerable populations, and particularly during heatwaves in the summer months and during periods of extreme cold in winter months.
Fire
The potential for larger, destructive urban fires remains high for both cities due to large concentrations of older, wood frame structures and other contributing factors (see Fire hazard profile for more details).
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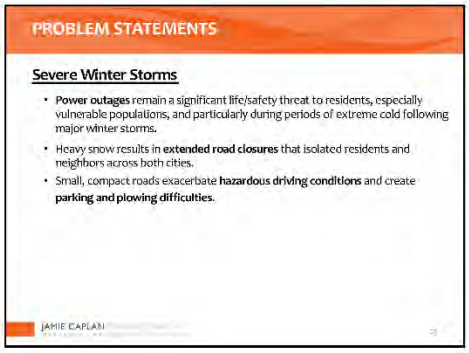
PROBLEM STATEMENTS
Severe Winter Storms
Power outages remain a significant life/safety threat to residents, especially vulnerable populations, and particularly during periods of extreme cold following major winter storms.
Heavy snow results in extended road closures that isolated residents and neighbors across both cities.
Small, compact roads exacerbate hazardous driving conditions and create parking and plowing difficulties.
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HAZARD ANALYSIS & RISK ASSESSMENT
Discussion
Where are the hazards experienced?
What are your biggest concerns?
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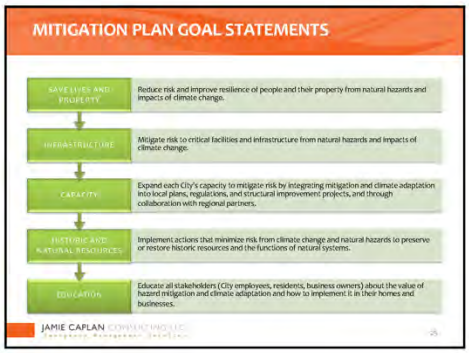
7/3/24


MITIGATION PLAN GOAL STATEMENTS
SAVE LIVES AND PROPERTY
Reduce risk and improve resilience of people and their property from natural hazards and impacts of climate change.
INFRASTRUCTURE
Mitigate risk to critical facilities and infrastructure from natural hazards and impacts of climate change.
CAPACITY
Expand each City's capacity to mitigate risk by integrating mitigation and climate adaptation into local plans, regulations, and structural improvement projects, and through collaboration with regional partners.
HISTORIC AND NATURAL RESOURCES
Implement actions that minimize risk from climate change and natural hazards to preserve or restore historic resources and the functions of natural systems.
EDUCATION
Educate all stakeholders (City employees, residents, business owners) about the value of hazard mitigation and climate adaptation and how to implement it in their homes and businesses.
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A RANGE OF MITIGATION ACTIONS
Local Plans and Regulations
Government authorities, policies, or codes that shape how land and buildings are developed and maintained.
Structure and Infrastructure
Projects modifying existing infrastructure to remove it from a hazard area, or building new structures in ways that reduce the impacts of hazards.
Natural Systems Protection
Actions that reduce damage and losses, and that preserve or restore the functions of natural systems.
Education and Awareness Programs
Sustained programs to teach the public and decision makers about hazard risks and community mitigation programs.
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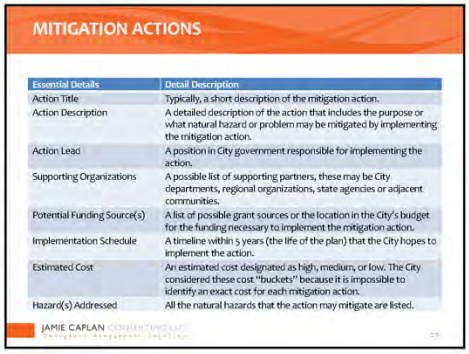
MITIGATION ACTIONS
Essential Details
Detail Description
Action Title
Typically, a short description of the mitigation action.
Action Description
A detailed description of the action that includes the purpose or what natural hazard or problem may be mitigated by implementing the mitigation action.
Action Lead
A position in City government responsible for implementing the action.
Supporting Organizations
A possible list of supporting partners, these may be City departments, regional organizations, state agencies or adjacent communities.
Potential Funding Source(s)
A list of possible grant sources or the location in the City's budget for the funding necessary to implement the mitigation action.
Implementation Schedule
A timeline within 5 years (the life of the plan) that the City hopes to implement the action.
Estimated Cost
An estimated cost designated as high, medium, or low. The City considered these cost "buckets" because it is impossible to identify an exact cost for each mitigation action.
Hazard(s) Addressed
All the natural hazards that the action may mitigate are listed.
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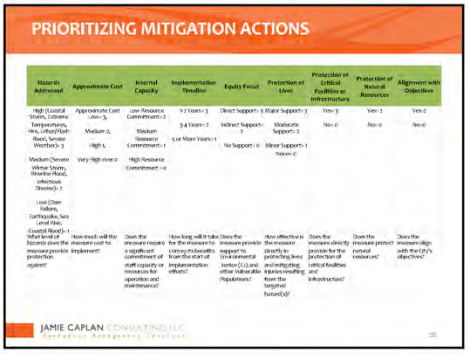
PRIORITIZING MITIGATION ACTIONS
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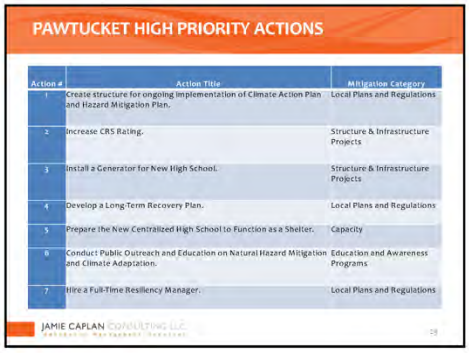
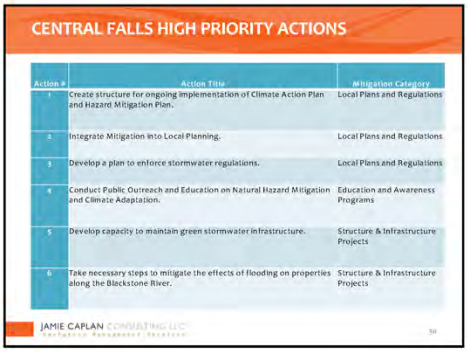
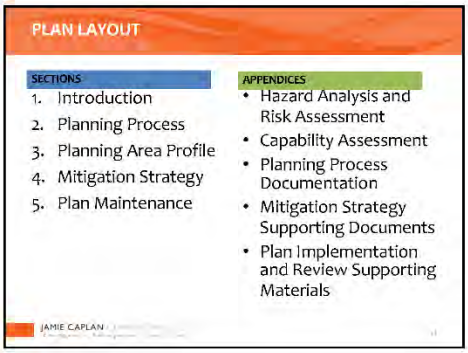

PAWTUCKET HIGH PRIORITY ACTIONS
Action #
Action Title
Mitigation Category
1
Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
Local Plans and Regulations
2
Increase CRS Rating.
Structure & Infrastructure Projects
3
Install a Generator for New High School.
Structure & Infrastructure Projects
4
Develop a Long-Term Recovery Plan.
Local Plans and Regulations
5
Prepare the New Centralized High School to Function as a Shelter.
Capacity
6
Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
Education and Awareness Programs
7
Hire a Full-Time Resiliency Manager.
Local Plans and Regulations
JAMIE CAPLAN CONSULTING LLC


CENTRAL FALLS HIGH PRIORITY ACTIONS
Action #
Action Title
Mitigation Category
1
Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
Local Plans and Regulations
2
Integrate Mitigation into Local Planning.
Local Plans and Regulations
3
Develop a plan to enforce stormwater regulations.
Local Plans and Regulations
4
Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
Education and Awareness Programs
5
Develop capacity to maintain green stormwater infrastructure.
Structure & Infrastructure Projects
6
Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
Structure & Infrastructure Projects
JAMIE CAPLAN CONSULTING LLC

5

7/3/24


HAZARD MITIGATION STRATEGY
Discussion
What types of mitigation actions are most important to you?
What specific actions do you want to see prioritized in this plan?
JAMIE CAPLAN


PLAN LAYOUT
SECTIONS
1. Introduction
2. Planning Process
3. Planning Area Profile
4. Mitigation Strategy
5. Plan Maintenance
APPENDICES
• Hazard Analysis and Risk Assessment
• Capability Assessment
• Planning Process Documentation
• Mitigation Strategy Supporting Documents
• Plan Implementation and Review Supporting Materials
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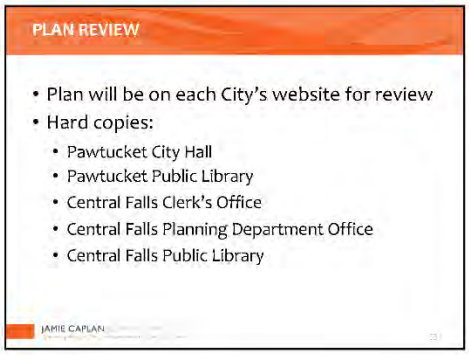
PLAN REVIEW
• Plan will be on each City's website for review
• Hard copies:
• Pawtucket City Hall
• Pawtucket Public Library
• Central Falls Clerk's Office
• Central Falls Planning Department Office
• Central Falls Public Library
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APPENDIX D. MITIGATION STRATEGY SUPPORTING DOCUMENTS

D.1. CITY OF CENTRAL FALLS MITIGATION ACTIONS

- City of Central Falls Mitigation Actions Priority Ranking Data
- City of Central Falls Mitigation Actions Sorted by Type
- City of Central Falls Mitigation Actions Sorted by Goal Statements
- City of Central Falls Mitigation Actions Sorted by Hazard
- City of Central Falls Mitigation Actions Sorted by Lead Position
- City of Central Falls Mitigation Actions Sorted by Implementation Schedule

Table 62. City of Central Falls Mitigation Actions Priority Ranking Data.

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.	3	2	1	3	3	2	3	2	2	21
2	Integrate Mitigation into Local Planning.	3	3	1	1	2	2	3	2	2	19
3	Develop capacity to maintain green stormwater infrastructure.	3	2	1	2	2	1	3	2	2	18
4	Establish an ongoing Tree Risk Assessment and Mitigation Program.	3	3	1	3	0	3	3	0	2	18
5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.	3	1	2	3	2	2	3	0	2	18
6	Prepare a Sewer/Stormwater Facilities Plan.	3	1	1	3	2	2	3	0	2	17

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
7	Reduce the urban heat island effect.	3	1	2	2	2	2	3	0	2	17
8	Provide a heating and cooling center at the El Centro Community Center.	3	1	2	3	3	3	0	0	2	17
9	Develop standing contracts for disaster cleanup response.	3	3	1	3	0	2	3	0	2	17
10	Develop a plan to enforce stormwater regulations.	3	3	1	3	0	1	3	0	2	16
11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.	3	3	2	1	3	2	0	0	2	16
12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.	3	1	0	2	2	3	3	0	2	16

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
13	Implement the Sewer/Stormwater Facilities Plan.	3	1	1	2	2	2	3	0	2	16
14	Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.	3	2	1	3	2	0	0	2	2	15
15	Protect Critical Facilities and Equipment.	3	2	0	1	0	3	3	0	2	14
16	Increase green stormwater infrastructure throughout the City.	3	2	0	2	2	1	0	2	2	14
17	Improve energy efficiency and increase use of renewable energy at City-owned properties.	3	2	1	1	0	0	3	0	2	12
18	Annually review the City Floodplain Ordinance to ensure	3	3	2	1	0	1	0	0	2	12

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
	effectiveness and consistency with regulations.										
19	Increase capacity to use GIS to meet hazard mitigation needs.	3	2	2	1	0	0	0	0	2	10

Table 63. City of Central Falls Mitigation Actions Sorted by Type.

Mitigation Category	Action #	Action Title
Natural Resources Protection	14	Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.
	17	Improve energy efficiency and increase use of renewable energy at City-owned properties.
Education and Awareness Programs	11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
Local Plans and Regulations	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	2	Integrate Mitigation into Local Planning.
	3	Develop capacity to maintain green stormwater infrastructure.
	4	Establish an ongoing Tree Risk Assessment and Mitigation Program.
	6	Prepare a Sewer/Stormwater Facilities Plan.
	10	Develop a plan to enforce stormwater regulations.
	18	Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.
	19	Increase capacity to use GIS to meet hazard mitigation needs.
Structure & Infrastructure Projects	5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.
	7	Reduce the urban heat island effect.
	8	Provide a heating and cooling center at the El Centro Community Center.
	9	Develop standing contracts for disaster cleanup response.
	12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
	13	Implement the Sewer/Stormwater Facilities Plan.

Mitigation Category	Action #	Action Title
	15	Protect Critical Facilities and Equipment.
	16	Increase green stormwater infrastructure throughout the City.

Table 64. City of Central Falls Mitigation Actions Sorted by Goal Statement.

Goal	Action #	Action Title
Capacity	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	2	Integrate Mitigation into Local Planning.
	3	Develop capacity to maintain green stormwater infrastructure.
	6	Prepare a Sewer/Stormwater Facilities Plan.
	10	Develop a plan to enforce stormwater regulations.
	18	Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.
	19	Increase capacity to use GIS to meet hazard mitigation needs.
Education	11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
Historic and Natural Resources	14	Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.
	17	Improve energy efficiency and increase use of renewable energy at City-owned properties.
Infrastructure	13	Implement the Sewer/Stormwater Facilities Plan.
	16	Increase green stormwater infrastructure throughout the City.
Save Lives and Property	4	Establish an ongoing Tree Risk Assessment and Mitigation Program.
	5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.
	7	Reduce the urban heat island effect.
	8	Provide a heating and cooling center at the El Centro Community Center.
	9	Develop standing contracts for disaster cleanup response.
	12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
	15	Protect Critical Facilities and Equipment.

Table 65. City of Central Falls Mitigation Actions sorted by Hazard.

Hazard(s) Addressed	Action #	Action Title
Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood	2	Integrate Mitigation into Local Planning.
	11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
	15	Protect Critical Facilities and Equipment.
	19	Increase capacity to use GIS to meet hazard mitigation needs.
Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
Coastal Storm, Severe Weather, Severe Winter Storm	4	Establish an ongoing Tree Risk Assessment and Mitigation Program.
	9	Develop standing contracts for disaster cleanup response.
Coastal Storm, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood	3	Develop capacity to maintain green stormwater infrastructure.
	5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.
	10	Develop a plan to enforce stormwater regulations.
	12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
	13	Implement the Sewer/Stormwater Facilities Plan.
	14	Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.
	16	Increase green stormwater infrastructure throughout the City.
	18	Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.

Hazard(s) Addressed	Action #	Action Title
Extreme Temperatures	8	Provide a heating and cooling center at the El Centro Community Center.
	17	Improve energy efficiency and increase use of renewable energy at City-owned properties.
Extreme Temperatures, Fire	7	Reduce the urban heat island effect.
Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Coastal Flood	6	Prepare a Sewer/Stormwater Facilities Plan.

Table 66. City of Central Fall Mitigation Actions sorted by Lead Position.

Responsible Position	Action #	Action Title
Department of Public Works Director	**3**	Develop capacity to maintain green stormwater infrastructure.
	6	Prepare a Sewer/Stormwater Facilities Plan.
	9	Develop standing contracts for disaster cleanup response.
	12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
	13	Implement the Sewer/Stormwater Facilities Plan.
	15	Protect Critical Facilities and Equipment.
	17	Improve energy efficiency and increase use of renewable energy at City-owned properties.
El Centro Program Manager	**8**	Provide a heating and cooling center at the El Centro Community Center.
Planning & Economic Development Director	**1**	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	2	Integrate Mitigation into Local Planning.
	5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.
	7	Reduce the urban heat island effect.
	10	Develop a plan to enforce stormwater regulations.
	14	Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.
	16	Increase green stormwater infrastructure throughout the City.
	18	Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.
	19	Increase capacity to use GIS to meet hazard mitigation needs.
Preparedness Officer	**11**	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.

Responsible Position	Action #	Action Title
Tree Warden	**4**	Establish an ongoing Tree Risk Assessment and Mitigation Program.

Table 67. City of Central Falls Implementation Schedule.

Implementation Timeline	Action #	Action Title
2024-2025	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	4	Establish an ongoing Tree Risk Assessment and Mitigation Program.
	5	Take necessary steps to mitigate the effects of urban/flash flooding on Higginson Avenue caused by heavy rainfall.
	9	Develop standing contracts for disaster cleanup response.
	10	Develop a plan to enforce stormwater regulations.
2024-2026	3	Develop capacity to maintain green stormwater infrastructure.
	6	Prepare a Sewer/Stormwater Facilities Plan.
	7	Reduce the urban heat island effect.
	8	Provide a heating and cooling center at the El Centro Community Center.
	12	Take necessary steps to mitigate the effects of flooding on properties along the Blackstone River.
	14	Take necessary steps to protect the natural habitat and recreation and education facilities on River Island from destructive effects of river flooding.
	16	Increase green stormwater infrastructure throughout the City.
2024-2027	13	Implement the Sewer/Stormwater Facilities Plan.
2024-2029	2	Integrate Mitigation into Local Planning.
	11	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
2025-2028	19	Increase capacity to use GIS to meet hazard mitigation needs.
2025-2029	15	Protect Critical Facilities and Equipment.
	17	Improve energy efficiency and increase use of renewable energy at City-owned properties.
	18	Annually review the City Floodplain Ordinance to ensure effectiveness and consistency with regulations.

D.1. CITY OF PAWTUCKET MITIGATION ACTIONS

- City of Pawtucket Mitigation Actions Priority Ranking Data
- City of Pawtucket Mitigation Actions Sorted by Type
- City of Pawtucket Mitigation Actions Sorted by Goal Statements
- City of Pawtucket Mitigation Actions Sorted by Hazard
- City of Pawtucket Mitigation Actions Sorted by Lead Position
- City of Pawtucket Mitigation Actions Sorted by Implementation Schedule

Table 68. City of City of Pawtucket Mitigation Actions Priority Ranking Data.

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.	3	2	1	3	3	2	3	2	2	**21**
2	Increase CRS Rating.	3	3	2	1	2	2	3	2	2	**20**
3	Install a Generator for New High School.	3	1	2	3	3	3	3	0	2	**20**
4	Develop a Long-Term Recovery Plan.	3	2	2	3	2	1	3	0	2	**18**
5	Prepare the New Centralized High School to Function as a Shelter.	3	0	0	3	3	3	3	0	2	**17**
6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.	3	3	2	1	3	2	0	0	2	**16**
7	Hire a Full-Time Resiliency Manager.	3	2	0	3	2	2	0	2	2	**16**

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
8	Climate Justice Plan.	3	3	1	1	3	3	0	0	2	**16**
9	Tree inventory and planting.	3	2	1	1	3	2	0	2	2	**16**
10	Increase Telecommunication Capacity in the City.	3	2	1	1	3	3	0	0	2	**15**
11	Heat Island Effect Survey.	3	3	1	1	3	2	0	0	2	**15**
12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.	3	2	1	1	0	1	3	0	2	**13**
13	Develop a Backflow Prevention Valve Rebate Program.	3	2	2	2	0	2	0	0	2	**13**
14	Mitigate Pleasant Street Flooding.	3	1	1	3	2	1	0	0	2	**13**
15	Max Read Field Flood Mitigation Improvements.	3	1	1	3	2	1	0	0	2	**13**
16	Address Stormwater Flooding at the Train Station.	3	1	1	3	2	1	0	0	2	**13**
17	Address Flooding at Armistice Boulevard.	3	1	1	3	2	1	0	0	2	**13**

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
18	Address Flooding at San Antonio Way.	3	1	1	3	2	1	0	0	2	**13**
19	Regrade and Prevent Flooding at Slater Park North Parking Lot.	3	1	1	3	2	1	0	0	2	**13**
20	Debris Plan.	3	3	1	1	0	1	0	2	2	**13**
21	Retrofit City Hall Tower.	3	0	0	3	0	1	3	0	2	**12**
22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.	3	0	0	1	0	3	3	0	2	**12**
23	Oyster Beds in Seekonk River.	3	2	1	1	0	1	0	2	2	**12**
24	Create a Plan for Renewable Energy in Municipal Buildings.	3	1	1	1	0	0	3	0	2	**11**
25	Evaluate and Upgrade the Five Pump Stations.	3	0	0	2	0	1	3	0	2	**11**
26	Increase Green Infrastructure Throughout the City.	3	1	1	1	0	0	0	2	2	**10**
27	Acquire and Preserve Open	3	0	2	1	0	0	0	2	2	**10**

Action #	Action Title	Hazards Addressed	Approximate Cost	Internal Capacity	Implementation Timeline	Equity Focus	Protection of Lives	Protection of Critical Facilities or Infrastructure	Protection of Natural Resources	Alignment with Objectives	Total
	Space along the Moshassuck River.										

Table 69. City of Pawtucket Mitigation Actions Sorted by Type.

Mitigation Category	Action #	Action Title
Local Plans and Regulations	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	4	Develop a Long-Term Recovery Plan.
	7	Hire a Full-Time Resiliency Manager.
	8	Climate Justice Plan.
	11	Heat Island Effect Survey.
	20	Debris Plan.
Structure & Infrastructure Projects	2	Increase CRS Rating.
	3	Install a Generator for New High School.
	10	Increase Telecommunication Capacity in the City.
	12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
	13	Develop a Backflow Prevention Valve Rebate Program.
	14	Mitigate Pleasant Street Flooding.
	15	Max Read Field Flood Mitigation Improvements.
	16	Address Stormwater Flooding at the Train Station.
	17	Address Flooding at Armistice Boulevard.
	18	Address Flooding at San Antonio Way.
	19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
	21	Retrofit City Hall Tower.
	22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
	24	Create a Plan for Renewable Energy in Municipal Buildings.
	25	Evaluate and Upgrade the Five Pump Stations.
Natural Resources Protection	9	Tree inventory and planting.

Mitigation Category	Action #	Action Title
	23	Oyster Beds in Seekonk River.
	26	Increase Green Infrastructure Throughout the City.
	27	Acquire and Preserve Open Space along the Moshassuck River.
Education and Awareness Programs	6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
Capacity	5	Prepare the New Centralized High School to Function as a Shelter.

Table 70. City of Pawtucket Mitigation Actions Sorted by Goal Statement.

Goal	Action #	Action Title
Capacity	11	Heat Island Effect Survey.
Education	6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
Infrastructure	10	Increase Telecommunication Capacity in the City.
	12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
	13	Develop a Backflow Prevention Valve Rebate Program.
	14	Mitigate Pleasant Street Flooding.
	15	Max Read Field Flood Mitigation Improvements.
	16	Address Stormwater Flooding at the Train Station.
	17	Address Flooding at Armistice Boulevard.
	18	Address Flooding at San Antonio Way.
	19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
	20	Debris Plan.
	21	Retrofit City Hall Tower.
	22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
	24	Create a Plan for Renewable Energy in Municipal Buildings.
	25	Evaluate and Upgrade the Five Pump Stations.
Historic and Natural Resources	9	Tree inventory and planting.
	23	Oyster Beds in Seekonk River.
	26	Increase Green Infrastructure Throughout the City.
	27	Acquire and Preserve Open Space along the Moshassuck River.

Goal	Action #	Action Title
Save Lives and Property	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	2	Increase CRS Rating.
	3	Install a Generator for New High School.
	4	Develop a Long-Term Recovery Plan.
	5	Prepare the New Centralized High School to Function as a Shelter.
	7	Hire a Full-Time Resiliency Manager.
	8	Climate Justice Plan.

Table 71. City of Pawtucket Mitigation Actions Sorted by Hazards Addressed.

Specific Hazards Addressed or Problems Addressed	Action #	Action Title
Coastal Storm, Extreme Temperatures, Fire, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flood, Infectious Disease, Dam Failure, Earthquake, Sea Level Rise, Coastal Flood	6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
	7	Hire a Full-Time Resiliency Manager.
Coastal Storm, Extreme Temperatures, Severe Weather, Severe Winter Storm, Earthquake, Coastal Flood	3	Install a Generator for New High School.
Coastal Storm, Extreme Temperatures, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level rise, Coastal Flood	24	Create a Plan for Renewable Energy in Municipal Buildings.
	26	Increase Green Infrastructure Throughout the City.
Coastal Storm, Extreme Temperatures, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Earthquake, Sea Level Rise, Coastal Flood	25	Evaluate and Upgrade the Five Pump Stations.
Coastal Storm, Extreme Temperatures, Urban/Flash Flooding, Severe Weather, Severe Winter Storm, Riverine Flooding, Seal Level Rise, Coastal Flood	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	4	Develop a Long-Term Recovery Plan.
	5	Prepare the New Centralized High School to Function as a Shelter.
	10	Increase Telecommunication Capacity in the City.
Coastal Storm, Severe Weather, Severe Winter Storm	21	Retrofit City Hall Tower.

Specific Hazards Addressed or Problems Addressed	Action #	Action Title
Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Coastal Flood	13	Develop a Backflow Prevention Valve Rebate Program.
Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Earthquake, Sea Level Rise, Coastal Flood.	22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
Coastal Storm, Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Sea Level Rise, Coastal Flood.	2	Increase CRS Rating.
	12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood	14	Mitigate Pleasant Street Flooding.
	15	Max Read Field Flood Mitigation Improvements.
	16	Address Stormwater Flooding at the Train Station.
	17	Address Flooding at Armistice Boulevard.
	18	Address Flooding at San Antonio Way.
	19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
	27	Acquire and Preserve Open Space along the Moshassuck River.
All hazards	8	Climate Justice Plan.
Extreme Temperatures	11	Heat Island Effect Survey.
Urban/Flash Flood, Severe Weather, Severe Winter Storm, Riverine Flood, Earthquake	20	Debris Plan.
Extreme Temperatures, Severe Weather, Riverine Flood	9	Tree inventory and planting.
Coastal Storm, Severe Weather, Riverine Flood	23	Oyster Beds in Seekonk River.

City of Pawtucket Mitigation Actions Sorted by Action Lead.

Action Lead	Action #	Action Title
Planning Director	**1**	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	2	Increase CRS Rating.
	8	Climate Justice Plan.
	11	Heat Island Effect Survey.

Action Lead	Action #	Action Title
	16	Address Stormwater Flooding at the Train Station.
	24	Create a Plan for Renewable Energy in Municipal Buildings.
	27	Acquire and Preserve Open Space along the Moshassuck River.
Pawtucket EMA Director	**3**	Install a Generator for New High School.
	4	Develop a Long-Term Recovery Plan.
	20	Debris Plan.
School Superintendent	**5**	Prepare the New Centralized High School to Function as a Shelter.
Preparedness Officer	**6**	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
DPW Director	**7**	Hire a Full-Time Resiliency Manager.
	9	Tree inventory and planting.
	12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
	13	Develop a Backflow Prevention Valve Rebate Program.
Commerce Director	**10**	Increase Telecommunication Capacity in the City.
DPW Director/Project Lead/City Engineer	**14**	Mitigate Pleasant Street Flooding.
DPW Director/City Engineer	**15**	Max Read Field Flood Mitigation Improvements.
	17	Address Flooding at Armistice Boulevard.
	18	Address Flooding at San Antonio Way.
	19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
	22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
	25	Evaluate and Upgrade the Five Pump Stations.
DPW Project Lead	**21**	Retrofit City Hall Tower.
Department of Public Works Director	**26**	Increase Green Infrastructure Throughout the City.

Action Lead	Action #	Action Title
Blackstone Valley Tourism Council	**23**	Oyster Beds in Seekonk River.

Table 72. City of Pawtucket Mitigation Actions Sorted by Implementation Schedule.

Implementation Schedule	Action #	Action Title
2024-2025	1	Create structure for ongoing implementation of Climate Action Plan and Hazard Mitigation Plan.
	19	Regrade and Prevent Flooding at Slater Park North Parking Lot.
	21	Retrofit City Hall Tower.
2024-2026	25	Evaluate and Upgrade the Five Pump Stations.
2024-2028	2	Increase CRS Rating.
	7	Hire a Full-Time Resiliency Manager.
	8	Climate Justice Plan.
	9	Tree inventory and planting.
	10	Increase Telecommunication Capacity in the City.
	11	Heat Island Effect Survey.
	22	Install a Video Monitoring System to Monitor Capacity and Condition of Sewer Infrastructure.
	23	Oyster Beds in Seekonk River.
	24	Create a Plan for Renewable Energy in Municipal Buildings.

Implementation Schedule	Action #	Action Title
	26	Increase Green Infrastructure Throughout the City.
	27	Acquire and Preserve Open Space along the Moshassuck River.
2024-2029	6	Conduct Public Outreach and Education on Natural Hazard Mitigation and Climate Adaptation.
2025- 2028	12	Install underground Overflow Tanks (Stormtech) in Flood Prone Areas.
2025-2026	4	Develop a Long-Term Recovery Plan.
2025-2028	20	Debris Plan.
2026-2028	13	Develop a Backflow Prevention Valve Rebate Program.
2027-2028	3	Install a Generator for New High School.
	5	Prepare the New Centralized High School to Function as a Shelter.
	14	Mitigate Pleasant Street Flooding.
	15	Max Read Field Flood Mitigation Improvements.
	16	Address Stormwater Flooding at the Train Station.
	17	Address Flooding at Armistice Boulevard.
	18	Address Flooding at San Antonio Way.

APPENDIX E. PLAN IMPLEMENTATION AND REVIEW SUPPORTING MATERIALS

E.1. Plan Update Evaluation Worksheet

Table 73. Plan Update Evaluation Worksheet.

Plan Section	Considerations	Explanation
Planning Process	Should the town invite any additional stakeholders to participate in the planning process? What public outreach activities have occurred? How can public involvement be improved?	
Risk Assessment	What disasters has the town, or the region experienced? Should the list of hazards be modified? Are new data sources, maps or studies available? If so, what have they revealed, and should the information be incorporated into the plan update? Has development in the region occurred and could it create or reduce risk?	
Capability Assessment	Has the town adopted new policies, plans, regulations, or reports that could be incorporated into this plan? Are there different or additional administrative, human, technical, and financial resources available for mitigation planning? Are there different or new education and outreach programs and resources available for mitigation activities?	
Mitigation Strategy	Is the mitigation strategy being implemented as anticipated? Were the cost and timeline estimate accurate? Should new mitigation actions be added to the Action Plan? Should existing mitigation actions be revised or removed from the plan? Are there new obstacles that were not anticipated in the plan that will need to be considered in the next plan update? Are there new funding sources to consider? Have elements of the plan been incorporated into other planning mechanisms?	
Implementation Plan	Was the plan monitored and evaluated as anticipated? What are needed improvements to the plan implementation procedures?	

E.2. Mitigation Action Progress Worksheet

Table 74. Mitigation Action Progress Worksheet.

Mitigation Action Progress Worksheet				
Progress Report Period	From Date		To Date	
Action/Project Title				
Responsible Department				
Contact Name				
Contact Phone/Email				
Project Description				
Project Goal				
Project Objective				
Project Cost				
Project Status				
Date of Project Approval	Date of Project Start	Anticipated Date of Completion	Project Canceled	Project Delayed
Explanation of Delay or Cost Overruns				
Project Report Summary				
What was accomplished for this project during this reporting period?				
What obstacles, problems, or delays did the project encounter?				
Plans for next reporting period.				