Jamestown, Rhode Island

Hazard Mitigation Plan 2025 Update

Weston & Sampson℠

Natural Hazard Mitigation Plan Update

Jamestown, Rhode Island

Acknowledgements

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With Consulting Assistance from Weston & Sampson

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1. Introduction

The Town of Jamestown prepared this Hazard Mitigation Plan to create an actionable roadmap for reducing the impacts of natural hazards and climate change within the community. This Chapter further discusses components and local goals for hazard mitigation.

1.1. What is Hazard Mitigation Planning?

Hazard mitigation planning (HMP) is the process of reducing the potential severity of natural or naturally instigated hazards through anticipation and planning. As part of producing this plan, Jamestown assessed a variety of natural hazards that pose a risk to the health and welfare of residents. The planning team then identified specific vulnerabilities associated with those hazards current and future impacts. Then the team considered the Town's particular capabilities in order to update and add specific mitigation actions to protect homes, businesses, and the critical infrastructure that keeps the Town running. The mitigation actions required to address different vulnerabilities may range from engineering solutions (for example, replacing a deteriorating seawall to protect vulnerable roads) to preparedness planning (for example, preparing and implementing an emergency response plan in advance of an imminent hurricane). In addition to proactively identifying needed protections for residents and resources available to respond in advance of a natural hazards event, a Hazard Mitigation Plan decreases the extent, and demands for, municipal emergency response and assistance by outlining strategic actions ahead of a natural disaster. This plan presents the strategy developed by the Town of Jamestown to prepare for, and mitigate, the potential loss of life and property in the event of a range of natural disasters.

What are Natural Hazards?
Natural hazards are a source of harm or difficulty created by a meteorological, environmental or geological event (such as extreme wind events, tornadoes, winter weather as well as earthquakes flooding, and fires).

Vulnerability is a description of which community "assets" (e.g., people, structures, systems, natural resources, cultural resources, historic resources, etc.) are at risk from the effects of a natural hazard.

Hazard Mitigation is the effort to reduce impacts from natural hazards through community planning, policy changes, educational programs, infrastructure projects, and other activities.

Climate change refers to long-term fluctuations in Earth's average weather patterns. These fluctuations are driven by a combination of natural and human activities, primarily due to the increase in greenhouse gases in the atmosphere. Human activities that are the common cause of climate change include burning of fossil fuels, deforestation, and land use changes. Impacts of climate change including changing temperatures, precipitation, and wind patterns. Climate change has increased the frequency and intensity of these natural hazards and many others, creating a greater need for proactive planning. Chapter 3 includes additional information on natural hazard severity and risk.

Resilience is the ability to withstand and swiftly recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.

1.2. Benefits of Hazard Mitigation Planning

An HMP identifies natural hazards that threaten the community, analyzes vulnerable assets and critical infrastructure, and outlines a set of goals, policies and priority action items to address vulnerabilities, particularly in the face of climate change. Some of the benefits that hazard mitigation planning provides include:

1. **Increasing public awareness of natural hazards that may affect how the community reduces overall risk.** By providing education and outreach, individuals are able to understand how natural hazards may affect their lives and what the region, the Town, and they as individuals can do and are doing to minimize impacts of those hazards.

2. **Proactive planning creates efficiency beyond town limits.** Developing an HMP allows state and local governments to work together and combine hazard risk reduction with other community goals and plans.
3. **The community's greatest vulnerabilities can be prioritized to receive resources.** Developing a plan of hazard mitigation measures considers a prioritization process that reflects the cost and benefit of safety, property protection, technical, political, legal, environmental, economic, social, administrative, and other community objectives, quantitatively and/or qualitatively.
4. **The implementation of an HMP saves taxpayer money.** According to FEMA, one dollar spent on federal hazard mitigation grants saves an average of six dollars on disaster response (NIBS, 2019).
5. **Maintaining a FEMA compliant HMP also makes the municipality eligible for federal grant funding (FEMA, 2023).** To be eligible for hazard mitigation funding through FEMA Grants, local governments must prepare an HMP that meets the requirements established in the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000. The HMP also ensures that federally funded projects reflect a community's priorities and offer solutions to specific threats.

1.3. Organization of the HMP

This plan presents comprehensive results of the HMP planning process. Findings have been informed through a variety of methods, including data collection and analysis, public input during HMP workshops and outreach events, and meetings with the steering committee and Local Hazard Mitigation Committee. This plan is organized into nine chapters, which are outlined in Figure 1-1 below.

Figure 1-1: Organization of the Hazard Mitigation Plan

1.3.1. Update to Previous Plan

This plan is an update to Jamestown's previous Hazard Mitigation Plan, approved in 2017. This plan includes a new structure and format, adjusted so that the plan is in alignment with FEMA's 2023 Local Mitigation Planning Handbook. This plan also responds to the community's experience since 2017 with more frequent and severe storms, as well as increasing coastal erosion.

1.4. Jamestown's Natural Hazard Mitigation & Climate Adaptation Goals

Jamestown's Local Hazard Mitigation Committee (documented in Section 2.2.2) established goals and objectives for natural hazard mitigation planning. This effort included a review and update of the goals listed in the 2017 HMP. The following are Jamestown's set of goals for the 2024 update:

1. Prevent and reduce the loss of life, injury, public health impacts and property damages resulting from all major natural hazards.
2. Identify and seek funding for measures to mitigate or eliminate each known significant hazard.
3. Integrate hazard mitigation planning as an integral factor in all relevant municipal departments, committees, and boards.
4. Prevent and/or reduce the damage to public infrastructure and community assets resulting from natural hazards.
5. Encourage the business community, major institutions and non-profits to work with the Town to develop, review and implement the HMP.
6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation and solutions for hazards affecting multiple communities.
7. Ensure that future development meets federal, state and local standards for preventing and reducing the impacts of natural hazards.
8. Take maximum advantage of resources from FEMA and RIEMA to educate town staff and the public about hazard mitigation.
9. Consider the impacts of climate change and incorporate climate sustainability, mitigation, and resiliency into hazard mitigation and other Town plans and policies.

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2. Planning Process

The Jamestown HMP has been informed through a variety of methods, including data collection and analysis, public input during HMP workshops, and meetings with the steering committee and Local Hazard Mitigation Committee. The subsequent pages describe the involvement of the committees and public in the HMP planning process in more detail.

2.1. Overview of Plan Development

The HMP planning process proceeded according to the timeline shown in Table 2.1.

Table 2.1: HMP Planning Timeline

TASK	2024					
	Feb	Mar	Apr	May	Jun	Jul
1. Review Current Plans/Update Requirements						
2. Work with Local Planning Team	Meeting Kickoff	ID Assets, Hazards, Vulnerability	Action Planning	Review Draft HMP		
3. Community Engagement	Public Workshop				Public Listening Session	
4. Community Profile & Draft Plan						
5. Draft/Review by Local Planning Team					Town Council Hearing	
6. Facilitate RIEMA/FEMA Approval						

2.2. Committee and Staff Participation

Development of the updated Jamestown Hazard Mitigation Plan was a concerted effort on the part of Jamestown's Planning Department, who served as lead contact for the plan. The Planning Department convened stakeholders for the Local Hazard Mitigation Planning Committee ("the LHMC").

2.2.1. Lead Contact for HMP Development

The Town of Jamestown's Planning Director, Lisa Bryer, served as the lead client contact for the development of the HMP. She will also serve as the ongoing Hazard Mitigation Manager for Hazard Mitigation Plan updates. She met with Weston & Sampson regularly throughout the planning process and played an important role in identifying critical infrastructure, involving key stakeholders, and documenting the Town's capacity to mitigate hazards alongside ongoing operations. To assist in drafting the plan, the lead contact also suggested and made available reports, maps, and other pertinent information related to natural hazards in Jamestown.

2.2.2. Local Hazard Mitigation Committee

For this plan update, the lead contact reached out to other Town staff with specific subject-matter expertise and members of the public, who had expressed interest, to join the Local Hazard Mitigation Committee (LHMC). The LHMC met approximately monthly between January and April to review and update sections of the previous plan, set goals and objectives, provide input on historic hazard events, and develop and prioritize mitigation actions. The committee provided input between meetings, and they played an important role in identifying critical infrastructure and community

lifelines[1] and involving key stakeholders that were missing from initial meetings, capturing the Town's capacity to mitigate hazards alongside ongoing operations. Table 2.2 lists the Town staff and members of the public who participated in on the committee.

Table 2.2: Local Hazard Mitigation Committee

Name	Title/Affiliation
Lisa Bryer	Town Planner
Christina Collins	Director of Finance
James Campbell	Chief of Police
Michael Gray	Public Works Director
Bart Totten	Harbormaster
Edward Mello	Town Administrator
Peter Medeiros	Building & Zoning Official
Howard Tighe	Fire Chief
Jean Lambert	Civil Engineer/Environmental Scientist
Rae-Anne Culp	State Mitigation Planning Supervisor
Michael White	Town Council Member
Bob Hunte	Public Participation Member
Marian Falla	Public Participation Member

During the LHMC workshops, Weston & Sampson provided information about HMP planning requirements as well as information about probability of future hazards that may impact the Town of Jamestown and reviewed the Town's vulnerability to these hazards. Participants identified and prioritized community assets and lifelines, and used these workshops to identify key actions that will improve the Town's resilience to natural and climate-related hazards.

Municipal staff and a representative from RIEMA participated in these workshops and helped align the HMP update with the operational policies and hazard mitigation strategies at different levels of government and implementation. Agenda topics from each meeting are shown in Table 2.3.

To enhance accessibility, workshops were conducted as of online sessions. LHMC workshops were organized around topic areas that included:

- LHMC Meeting 1—Asset, vulnerability, and impact identification.
- LHMC Meeting 2—Mitigation action development.
- LHMC Meeting 3—Mitigation action prioritization.
- LHMC Meeting 4—Review draft plan.

[1] Critical infrastructure and community lifelines are discussed further in Chapter 3.

Table 2.3 Local Hazard Mitigation Committee Schedule

Meeting	Date	Meeting Topics
LHMC Meeting #1	February 2, 2024	• Overview of Hazard Mitigation Planning • Scope and Schedule • Outreach Strategy • Questions/ Discussion/ Action Items
LHMC Meeting #2	March 14, 2024	• Overview of work in progress • Stakeholder Outreach and Engagement Plan • Hazard Profiles • Assets and Critical Facilities • Goals • Mitigation Actions: Past • Next Steps
LHMC Meeting #3	April 3, 2024	• Overview of work in progress • Public Outreach Update • Review Assets and Critical Facilities • Mitigation Actions: Future • Outreach and LHMC Meetings • Next Steps
LHMC Meeting #4	June 6, 2024	• Review Draft HMP • Plan Evaluation and Maintenance • Next Steps
LHMC Meeting #5	To be scheduled after comment period for draft final plan	• Hazard Mitigation Action Review Meeting (Required by RIEMA)

2.3. Review of Existing Plans

As part of the planning process, Weston & Sampson worked with the lead contact to identify and review relevant current and future planning efforts that can support and expand upon the work of the HMP. As part of this plan update, the planning team reviewed the previous HMP, as well as the 2014 Comprehensive Plan, the 2012 Emergency Operations Plan and the draft Harbor Management Plan. Key focus areas of these efforts include developing plans to reduce the impact of extreme events, preparing the community for extreme events and chronic impacts, and mitigating risks to the built

and natural environments from natural hazards. There are a variety of ordinances and regulations, as well as committees and task forces, that further the Town's efforts to proactively address natural hazards and climate change, which are discussed in Chapter 5 in the Capabilities Assessment.

2.4. Public Engagement

Jamestown developed a robust public engagement and outreach strategy aimed at reaching an extensive range of community members. To truly mitigate hazards, the Town recognized the need to develop strategies for protecting and supporting those who are most exposed. Priority populations include people or communities who may be disproportionately impacted by climate change due to life circumstances that systematically increase their exposure to climate hazards or make it harder to respond. In addition to factors such as income, race, and language barriers, other factors like physical ability, access to transportation, health status, and age shape whether someone or their community will be disproportionately affected by climate change. This is because of underlying contributors such as racial inequality, financial insecurity, or accessibility barriers that create vulnerability.

To better understand the experiences of the residents and businesses of Jamestown, the engagement strategy included multiple approaches. Engagement techniques ranged from website and social media postings, in-person material distribution, and public meetings. Community members were able to provide feedback through survey responses and in-person conversations.

Getting the Word Out: This first step involved advertising opportunities for public input, which included public meetings and a survey. Public Meetings were announced to community members through virtual, hard copy, and community outreach network methods. These included notices in the press and posting on the town's website, as listed in Appendix B.

Figure 2-1: Public Engagement Images for Social Media and Print

Public Meeting 1: The first public meeting was held in-person on February 28, 2024, from 6:00 to 8:00 PM, and was primarily focused on informing the public about the history and purpose of the HMP update, FEMA mitigation funding programs, project work plan, and the overall planning process. The meeting included a discussion of local vulnerabilities, strengths, historic hazard impacts on the community, and potential adaptation action items.

Public Meeting 2: The second public meeting was held on June 17 combined with Town Council adoption to present the initial results and review the draft HMP Update. The final HMP draft was published on June 11 and the public was invited to submit comments on the draft plan and in the following two weeks through an online comment form.

The town received 3 comments from the public on the draft plan, on a variety of items, including suggestions for assets, areas for clarification and additional public input. Many assets were already listed in separate sections and were not added, and other suggested additions were not historic so the Town determined it was best not to add these. Other comments suggested clarifying the vulnerability at Mackerel Cove as vulnerable not just to Nor'easters but also King Tides and south winds, a comment that has been incorporated into the final plan. Other comments expressed confusion about contingency policies related to water access during a drought, so details have been added to the drought hazard discussion. Finally, comments expressed a desire for broader participation from the public as well as town employees and committee members, a goal shared by the town and already reflected in public engagement action items.

Public Survey: Weston & Sampson posted an online survey to capture the public's input on hazards, community assets, vulnerabilities and priority actions. A copy of the survey questions and responses is included in Appendix C.

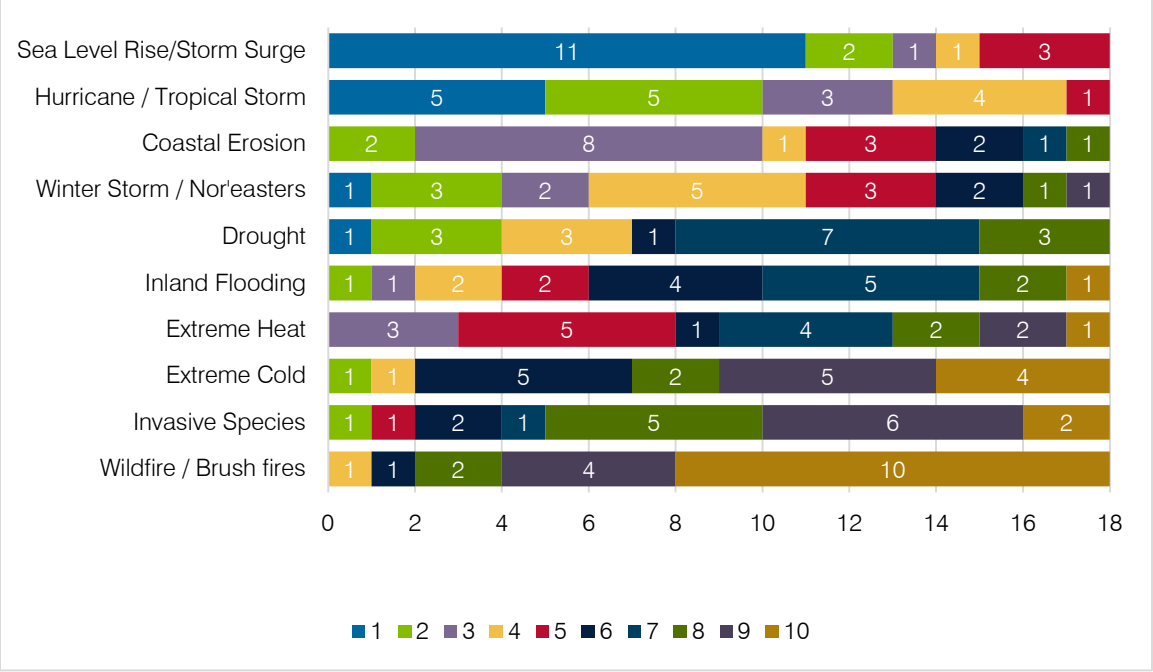
The online survey allowed residents to engage with the project on their own time, and as their schedule allowed. The survey was posted from February 20 until April 8. A link to the survey was posted on the Town website and advertised through the Recreation Department and Philomenian Library's respective Facebook pages. Flyers about the survey were also posted at the police station, library and McQuade's local market. The online survey received nineteen responses.

Among other questions, survey takers were asked:

> Which natural hazards are you most concerned about? Arrange the hazards in order of concern from 1 (most) to 10 (least).

The natural hazard impacts that were of top concern to respondents were sea level rise/storm surge, hurricanes/tropical storms, coastal erosion, and winter storms (Figure 2-2).

Figure 2-2: Hazards with Concern Ranking



Later in the survey, when asked to specify areas of Town vulnerable to climate hazards, half of respondents named Mackerel Cove as an area of concern. Several respondents also listed Zeek's Creek and North Road at Great Creek. Residents reported being most concerned about damage to

their home during a natural hazard event, but more respondents reported experiencing power outages than damage to their homes in previous events. When asked what level importance it is for Jamestown to prioritize different sites in town in protecting them from natural hazards, residents overwhelmingly indicated roads and bridges were especially important. In another question residents indicated that infrastructure, like roads and bridges, as well as environmental resources like beaches were some of the most susceptible areas to natural hazard damage.

In terms of hazard preparedness, many of the respondents reported having a backup generator (15/19), an emergency kit (14/19) and commitments (13/19) to check on vulnerable neighbors. Respondents expressed a preference for email updates from the Town (11/19) as the method to receive information about hazard mitigation, as well as update/reports/fact sheets posted online (11/19) and social media postings (9/19).

2.5. Final Plan Collaborator Review

The LHMC reviewed the final HMP Update on June 6, 2024. Appendix F lists the additional collaborators with whom the draft HMP was shared for review. These collaborators included 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 private and non-profit interests. The updated draft plan was shared electronically on June 11, 2024, and recipients were asked to respond within approximately 14 days. No comments were received from these collaborators.

2.6. FEMA Review Tool

All aspects of the planning process were created and implemented in accordance with the updated FEMA Local Mitigation Planning Policy Guide (2022 version, effective April 19, 2023). The FEMA Local Mitigation Review tool has been filled out to help guide the development of the plan and to ensure that the planning elements are captured. Please see Appendix A FEMA Review Tool to see the alignment between this plan and the review tool.

3

3. Risk Assessment: Community Assets

Assets are defined broadly as anything that is important to the character and function of a community (FEMA, 2023). Assets can be built, natural, or non-physical elements. They range from emergency facilities and critical infrastructure to community events that help shape collective identity and social cohesion. This chapter details the asset categories, community lifelines, and the list of assets in Jamestown. This analysis is the first step in the risk assessment to identify local vulnerabilities to natural hazards (Chapter 4) and develop mitigation action strategy (Chapter 6).

3.1. Asset Categories

The following sections discuss categories of community assets and how community assets are categorized into community lifelines.

3.1.1. Primary Categories

Assets are organized into the seven categories, which have been defined based on FEMA guidance (FEMA, 2022), as shown in Table 3.1. While some assets could potentially be listed under multiple categories, this HMP shows them under just one, best-fit category. The categories are used for organizational purposes and categorization does not affect the prioritization of mitigation actions or vulnerability assessment.

Table 3.1 Asset Categories

Primary Category	Definition
People (including underserved communities and socially vulnerable populations):	Densely populated areas and locations with concentrations of businesses, as well as locations with particularly socially vulnerable populations (e.g., elderly, children, visiting populations).
Structures (including facilities, lifelines, and critical infrastructure):	Built facilities that provide community lifeline services. A community lifeline enables the continuation of critical government and business functions and is essential to human health and safety or economic security.
Systems (including networks and capabilities:	A collection of components that perform a critical service for the community. Systems are linear type assets. Systems may include horizontal assets associated with linear type assets.
Natural Resources:	Natural resources are: • Areas that provide protective function to reduce magnitude of hazard impact and increase resiliency. • Areas of sensitive habitat that are vulnerable to hazard events. • Protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc.
Historical and Cultural Resources:	Assets that possess historical, cultural, archaeological or paleontological significance. Such assets may include sites, contextual information, structures, districts, and objects significantly associated with or representative of earlier people, cultures, maritime heritage, and human activities and events.
Economic Assets:	Entities that produce a financial benefit for the owner or community
Community Assets:	Activities that benefit the community by increasing community morale and well-being. Activities may include education and knowledge transfer.

3.1.2. Community Lifelines

"Community Lifelines" is a FEMA-defined term that refers to assets of a community that support basic survival needs. As defined by FEMA, "a lifeline enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security" (FEMA, 2020).

For the purposes of hazard mitigation planning and the asset inventory, community lifelines are used to categorize all assets in terms of these critical functions. Not all assets are community lifelines. Lifelines in Jamestown can be classified into the following eight FEMA-defined categories:

Law enforcement and government services, as well as the associated assets that maintain communal security, provide search and rescue, evacuations, and firefighting capabilities, and promote responder safety.

Support systems that enable the sustainment of life, such as temporary emergency shelter, water treatment, transmission, and distribution systems; food retail and distribution networks; and wastewater collection and treatment systems.

Service providers for electric power infrastructure, composed of generation, transmission, and distribution systems, as well as gas and liquid fuel processing, transportation, and delivery systems. Disruptions can have a limiting effect on the functionality of other community lifelines.

Infrastructure and service providers for medical care, public health, patient movement, fatality management, behavioral health, veterinary support, and health or medical supply chains.

Infrastructure owners and operators of broadband internet, cellular networks, landlines, cable services, satellite communications services, and broadcast networks (radio and television). Communications systems encompass a large set of diverse modes of delivery and technologies, often intertwined but largely operating independently. Services include elements such as alerts, warnings, and messages, as well as 911 and dispatch. Also includes accessibility of financial services.

Multiple modes of transportation that often serve complementary functions and create redundancy, adding to the inherent resilience in overall transportation networks. Transportation infrastructure generally includes highways/roadways, mass transit, railway, aviation, maritime, pipeline, and intermodal systems.

Systems that mitigate threats to public health/welfare and the environment. This includes assessment of facilities that use, generate, and store hazardous substances, as well as specialized conveyance assets and efforts to identify, contain, and remove incident debris, pollution, contaminants, oil or other hazardous substances.

Systems for Potable Water and Wastewater Management. This includes potable water intake, treatment, storage, and distribution. It also includes Wastewater collection, storage, treatment, and discharge.

3.2. Town of Jamestown Assets

The Town of Jamestown identified its assets through the input of the LHMC, information from the public survey, as well as using preexisting Rhode Island Geographic Information Systems (RIGIS) data. Figure 3-1 summarizes the number of assets by category for Jamestown, as well as the proportion that are community lifelines. The following sections of this chapter provide on each asset category.

Maps of community assets are included in Appendix C.

Figure 3-1 Assets by Category

3.2.1. People Assets

Part of the FEMA process involves identifying community assets. People are a community's most important asset. Identifying areas with geographic concentrations of people, especially socially vulnerable people is a crucial step in mitigating the hazards that may affect them. Understanding a

community's demographic makeup can inform an understanding of which groups within a community may be most vulnerable.

Population

According to the 2022 American Community Survey (ACS), the Town of Jamestown has a:

- Population of 5,554 residents (Though this number is estimated to increase to greater than 7,500 seasonally)
- Median age of 58.3
- Race and ethnicity mix of 95.6% white, 0.3% American Indian and Alaska Native, 0.1% black, 4.0% two or more races, and 0.7% Hispanic
- Median household income of over $131,875
- 4.4% of persons living below the poverty line
- Primarily owner occupied, single unit housing
- 2.1% of the population is foreign-born
- Educated population (68.3% holds a bachelor's degree or higher)

One way to identify vulnerable populations is to consider if the community has Environmental Justice (EJ) populations that face entrenched disparities that can hamper their safety during hazard events. The state of Rhode Island defines "Environmental Justice Focus Areas" as census tracts where the median income is less than 65% of the state median income, where the minority population is greater than 40% of the population, at least 25% of the population lack English language proficiency or minorities compose 25% of the population and the median income in the area is less than 150% of the statewide median income. Jamestown does not contain any Environmental Justice Focus areas.

Another way to understand a community's vulnerability is through dependency ratios. Dependency ratios can help deepen our understanding of what proportion of the population is working age, vs. what proportion are children or seniors who may be more vulnerable to natural hazards. Dependency ratios are derived by dividing "dependent" aged population totals by the 18-64 age population. Dependent populations are defined as under 18 ("child") and 65 and older ("old age"). The analysis looks at these two groups of "dependents" separately as separate ratios can give insights into whether the dependent population is made up more of children or seniors. Jamestown has the highest age-dependency ratio in the region, at 89.2, meaning there are 89.2 dependents for every 100 working-age persons in the Town. Jamestown's child-dependency ratio is notably low, the lowest in the region at 26.6, meaning there are only 26.6 children for every 100 working-age persons in the Town. This is quite different than in some of the other municipalities in the region. For example, in Barrington, the child dependency ratio is 49.1 and the old-age dependency ratio is 27.5.

Table 3.2 Summary Demographic Indicators

Indicator	Bristol County	Newport County	Barrington	Bristol	Warren	Jamestown	Little Compton	Middletown	Newport	Portsmouth	Tiverton
Median age (years)	43.9	46.4	42.9	40.6	*50.8*	*58.3*	*59.3*	*44.3*	*37.4*	*48.5*	*48.3*
Sex ratio (males per 100 females)	94.2	98.2	88.4	97	*97.8*	*104.3*	*97.6*	*101.3*	*94.3*	*102.7*	*94.7*
Age dependency ratio	61.8	67	76.6	52.8	*60.2*	*89.2*	*94.1*	*69.9*	*52*	*80.5*	*64*
Old-age dependency ratio	32.4	39.9	27.5	31.5	*41.2*	*62.5*	*69.8*	*38.4*	*30.9*	*45.1*	*39.1*
Child dependency ratio	29.4	27.1	49.1	21.3	*19*	*26.6*	*24.3*	*31.5*	*21.2*	*35.4*	*24.9*

Source: (U.S. Census Bureau, 2022)

These statistics align with the vulnerable populations identified through the planning process.

According to input at the public workshops and from the LHMC, priority populations in Jamestown include seniors, and those with special needs including independent senior and semi-independent special needs/group home housing.

Facilities that Serve these Populations

People Assets are defined as "assets that serve populations that are more vulnerable to disaster (e.g., elderly, children, visiting populations) and/or serve densely populated areas" (FEMA, 2022).

Table 3.3: People Assets

Asset Type	Name	Location	Community Lifeline
Schools/ Daycare	Lawn Avenue School	55 Lawn Avenue	Food, Hydration, Shelter
	Melrose Avenue School	76 Melrose Avenue	Food, Hydration, Shelter
	Jamestown Early Learning Center	87 North Road	Food, Hydration, Shelter
Elderly Housing	Pemberton Avenue Senior Housing (three complexes)	45 Pemberton Avenue	Food, Hydration, Shelter
Special Needs Housing	Special Needs Facilities-Hammett Court,	2 Hammett Court	Food, Hydration, Shelter
	Special Needs Facilities-Pemberton Ave.	58 Pemberton Avenue	Food, Hydration, Shelter
	Special Needs Facilities-Stanchion St.	20 Stanchion Avenue	Food, Hydration, Shelter
Health and Human Services	Senior Center	6 West Street	Food, Hydration, Shelter

3.2.2. Structures Assets

"Structure" assets are built facilities including residential, commercial, and industrial facilities that may be in harm's way during a hazard event. Many of these structures provide community lifeline services. Jamestown is a small, rural, island community with a central village and larger lot residential and farmland beyond, with some smaller lot neighborhoods. The village is a focal point for commercial, business, and civic activity in Jamestown. There is an extensive amount of conservation land and undevelopable wetlands, and 29% of the Town's land area is permanently protected (Town of Jamestown, 2015).

Asset Type	Name	Location	Community Lifeline
Police Stations	Jamestown Police Department / Jamestown Harbor Office	250 Conanicus Avenue	Safety & Security
Fire Stations	Jamestown Fire Department	50 Narragansett Avenue	Safety & Security
Town Offices	Jamestown Town Hall	93 Narragansett Avenue	Safety & Security
	Jamestown Parks and Recreation	41 Conanicus Avenue	

Asset Type	Name	Location	Community Lifeline
	Jamestown Senior Association	6 West Street	
	Historical Society	92 Narragansett Avenue	
	Philomenian Town Library	26 North Road	
	Jamestown Water Division	93 Narragansett Avenue	Water Systems
State Offices	RIDEM Division of Marine Fisheries	3 Ft. Wetherill Road	
Critical vehicle and equipment storage facilities	Jamestown Ambulance Barn	11 Knowles Court	Health & Medical
	Jamestown Public Works Highway Garage	5 Freebody Drive	Transportation
Emergency Operations Centers	Emergency Management Agency – Jamestown Police Department	250 Conanicus Avenue	Safety & Security
Bridges	Jamestown-Verrazano Bridge	East to North Kingstown	Transportation
	Newport Bridge	West to Newport	Transportation
	North Road at Zeek's Creek	North Road	Transportation
Dams	North Pond Dam	Carr Pond	Water Systems
	South Pond Dam	Watson Pond	Water Systems
Roads	North Road/Zeek's Creek	Between Westwind Drive and Weeden Lane	Transportation
	Beavertail Road at Mackerel Cove	Between Hamilton Avenue/Southwest Avenue intersection and Ft. Getty Road	Transportation
	Route 138	Connecting Jamestown Verrazzano Bridge and Newport Pell Bridge	Transportation

Note: The LHMC indicated there are no hazardous materials sites in Jamestown, a type of structure asset that would typically be listed in this table.

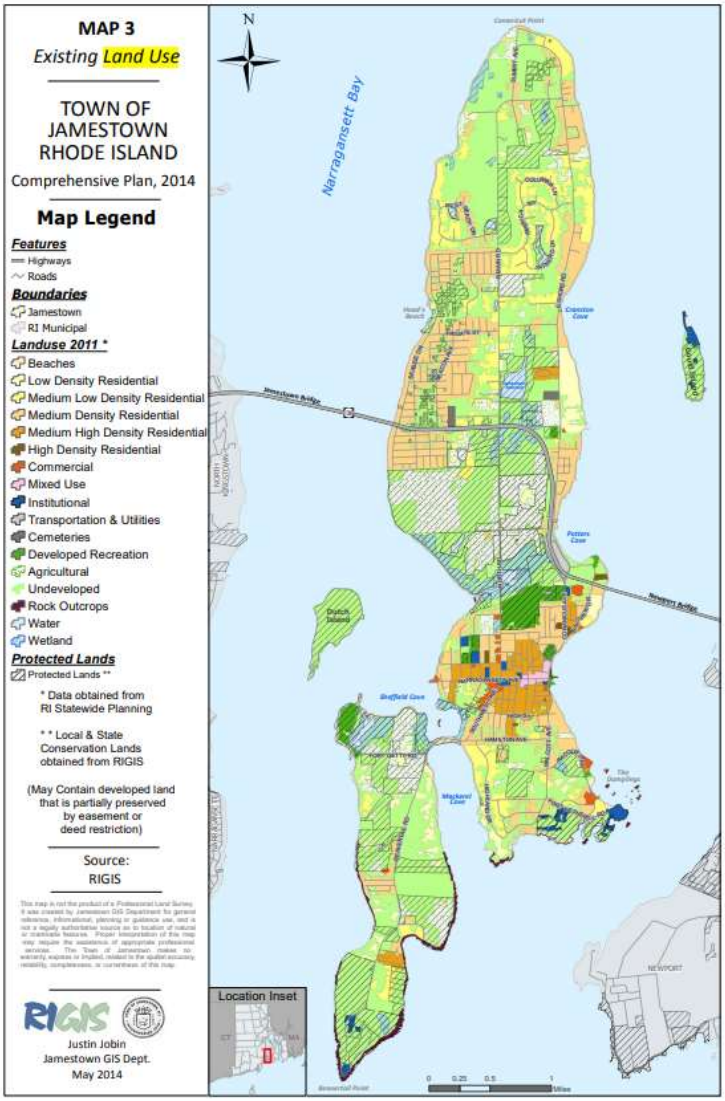
Critical infrastructure like dams and levees provide recreation, water supply, floodplain management, energy, and other essential functions. Dam owners and operators can be private, non-profit, or public. These structures and their owners are a vital component of local hazard mitigation.

FEMA's Hazard Potential Classification System for Dams provides an indication of the consequences of failure of a dam in the United States. This system contains three classes Low, Significant, and High, each representing the degree of potential damage to downstream life and property (FEMA, 2004). The Town of Jamestown owns and operates two dams, as shown in Table 3-3, above. Both dams are considered to have "Significant" hazard potential indicating that failure or mis-operation will not cause loss of human life but could cause economic loss.

Development Since Previous HMP

The majority of Jamestown's land use by parcels is comprised of residential development (nearly 46% of the Town's land cover), agriculture (approximately 10% of the Town's land cover), and conservation land (just over 19% of the Town's land cover) (Town of Jamestown, 2015). The majority of residential areas in Jamestown consist of single-family homes. Residential parcels are dispersed throughout the Town, with medium to high density residential development found clustered around Narragansett Avenue. Agricultural development is also dispersed throughout the Town. Minimal commercial and no industrial development is found throughout Jamestown. Conservation lands are dispersed throughout town and provides residents with easy access to natural space from any part of Town.

Table 3.4: Jamestown Land Uses



Source: Jamestown Comprehensive Plan, 2015

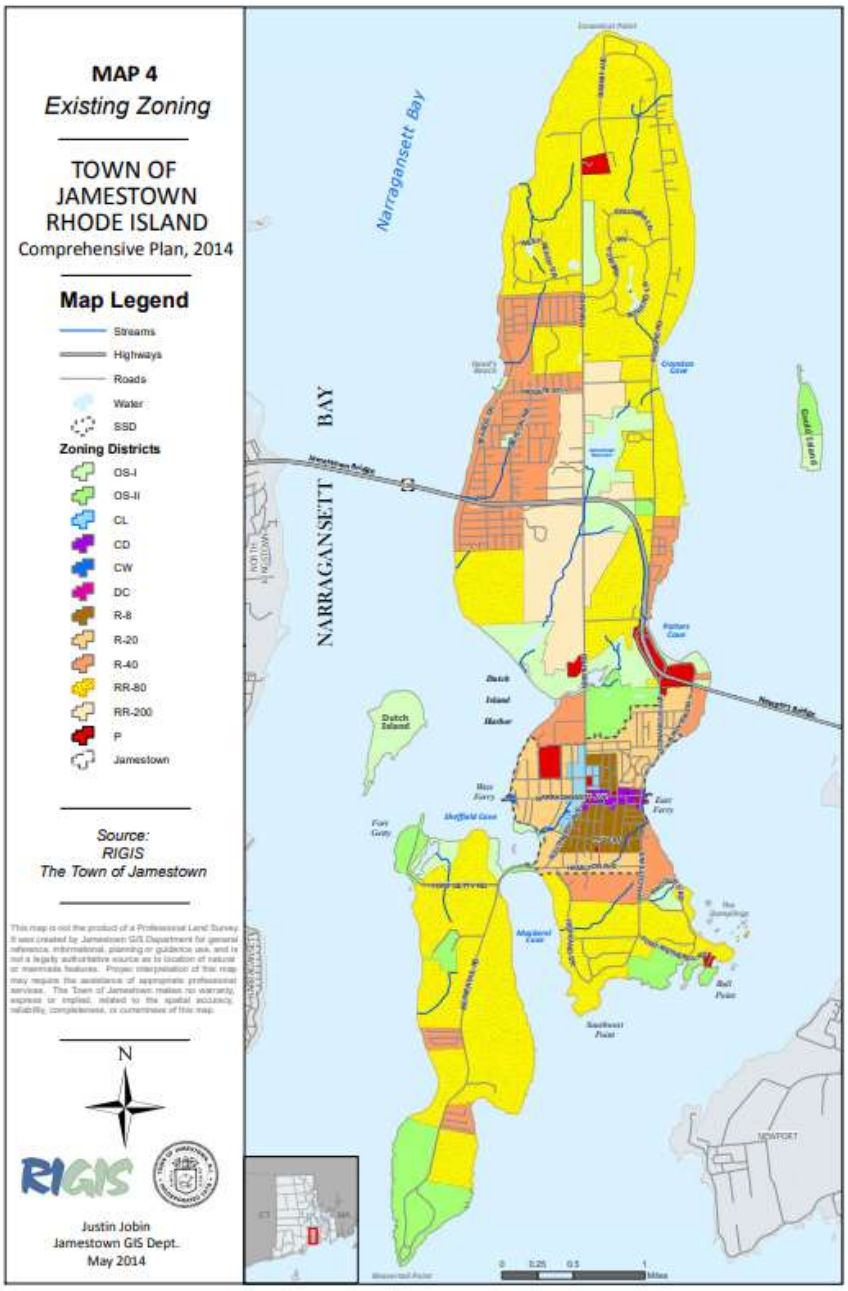
Jamestown's land use goals include:

- Protect Jamestown's rural character.
- Preserve and protect unique, fragile, and scenic coastal areas.
- Preserve and manage significant conservation and open space on throughout Jamestown.

Jamestown regulates land use and development through zoning, which has the capacity to guide the development of vacant land. There are six conventional use districts in Jamestown and three overlay districts:

- Open Space I (OS-I)
- Open Space II (OS-II)
- Rural Residential District (RR-200)
- Rural Residential District (RR-80)
- Residential District (R-40)
- Residential District (R-8)
- Commercial Limited (CL)
- Commercial Downtown (CD)
- Commercial Waterfront (CW)
- Downtown Condominium (DC)
- Public (P)
- Special Districts
    - High Groundwater Table and Impervious Layer Overlay District
    - Jamestown Village Special Development District

Table 3.5: Jamestown Zoning Districts



Source: Jamestown Comprehensive Plan

Though the Town has seen larger homes built and existing homes enlarged in low lying areas as well as flood prone areas, any new development is subject to current building code for wind and flooding (wave action). Major developments have included 3 units at 63 Conancius Avenue as well as Seaview Plat development (a new and expanded redevelopment of an existing development. There has also been a development at Jamestown Shores on Seaside Drive. Accessory Dwelling

Units have been permitted by right in certain situations throughout town and may have an impact on our vulnerable populations as many are used to age in place.

Table 3.6: Building Permits in Jamestown since 2015

Year	Number of new building-start permits
2015	12
2016	18
2017	11
2018	19
2019	6
2020	1
2021	2
2022	5
2023	18

Potential Future Development

The Town's 2015 Comprehensive Plan projects approximately 5% growth in population from 2010 to 2040, rising from 5,405 to 5,674 residents. The 2020 Decennial Census found Jamestown's population to be 5,559. The Comprehensive Plan aims to increase the number of low-moderate income (LMI) housing units over the next few decades. Full buildout is still approximately 20 years away, but the Town is considering how long-term investments in development might be impacted by natural hazards in the near and long-term.

3.2.4. Systems Assets

Systems are defined as "a collection of components that perform a critical service for the community. Systems are linear type assets. Systems may include horizontal assets associated with linear type assets" (FEMA, 2022).

Table 3.7: Systems Assets

Asset Type	Name	Approximate Location	Community Lifeline
Cell Towers/Antennas	T-Mobile	Atop water tower – 96 Howland Avenue	Communications
	Verizon Wireless	Atop water tower– 96 Howland Avenue	Communications
	AT&T	Atop water tower– 96 Howland Avenue	Communications
	Police	250 Conanicus Avenue	Safety & Security
Phone Infrastructure	Phone Substation at Watson and Pemberton	38 Watson Avenue	Communications
Public and private utility facilities	(Electric) Substation	11 Clark Street	Energy
Public Transportation	East Ferry	1 Ferry Wharf	Transportation
	West Ferry	251 Narragansett Avenue	Transportation
	Fort Wetherill Boat Basin	Fort Wetherill Road	Transportation
	Jamestown Boat Yard	60 Dumpling Drive	Transportation
	Clark Boat Yard	110 Racquet Road	Transportation
Sewer Infrastructure	Wastewater Treatment Facility	1 Freebody Drive	Water Systems
	Dutch Harbor Pump Station	Avenue B	Water Systems
	Maple Avenue Pump Station	Maple Avenue	Water Systems

Asset Type	Name	Approximate Location	Community Lifeline
	Bayview Drive Pump Station	Bayview Drive	
	Beavertail Pump Station	Beavertail Road and Southwest Avenue	
Water Storage Tank	Water Treatment Facility	1 Freebody Drive	Water Systems
	Water Storage Tank	96 Howland Avenue	Water Systems

3.2.5. Natural Resources Assets

Natural Resources are defined as "areas that provide protective function to reduce magnitude of hazard impact and increase resiliency, areas of sensitive habitat that are vulnerable to hazard events, and protection of areas that are important to community objectives, such as the protection of sensitive habitat, provide socio-economic benefits, etc." (FEMA, 2022).

Table 3.8: Natural Resources Assets

Asset Type	Name	Approximate Location	Community Lifeline
Park	Beavertail State Park	Beavertail Road	
	Fort Wetherill Park	3 Fort Wetherill Road	
Harbors/Landings	Mackerel Cove		
	Jamestown Shores		
	Potter's Cove		
	Fort Getty		
	East Ferry	1 East Ferry Wharf	
	West Ferry	252 Narragansett Avenue	
Marshes	Fox Hill Marsh		
	Sheffield Cove Marsh		
	Hull Cove Swamp		
	Racquet Road Thicket		
	Great Creek Marsh		

Asset Type	Name	Approximate Location	Community Lifeline
Pond	Fox Hill Pond		
Campground	Fort Getty Campground	1050 Fort Getty Road	

3.2.6. Cultural and Historic Resources Assets

Cultural and Historic Resources are defined as "assets that possess historical, cultural, archaeological or paleontological significance, including sites, contextual information, structures, districts, and objects significantly associated with or representative of earlier people, cultures, maritime heritage, and human activities and events." (FEMA, 2022).

Table 3.9: Cultural and Historic Resources Assets

Asset Type	Name	Location	Community Lifeline
Historic Area	Great Creek Archeological District		
	Windmill Hill Historic District		
	Beavertail Lighthouse	Beavertail Road	
	Conanicut Battery National Historic Park	Beavertail Road	
	Joyner Archeological Site	Eldred Avenue	
	Keeler Archeological Site	Eldred Avenue	
	Fort Dumpling Site	Ocean Street	
	Artillery Park and Town Cemetery	North Road and Narragansett Avenue	
	Jamestown Windmill	North Road	
	Horsehead	240 Highland Drive	
	Friends Meeting House	North Road and Weeden Lane	
	Dutch Island Lighthouse	Dutch Island	
	Conanicut Island Lighthouse	64 North Bay View Avenue	
	Shoreby Hill Historic District	Shoreby Hill	
Archeological Resources	Jamestown Archeological District		
Indigenous Burial Grounds	Narragansett Indian Burial Ground	Watson Avenue	

Asset Type	Name	Location	Community Lifeline
Town Historic Records/Archives	Town Hall	93 Narragansett Avenue	
	Jamestown Historical Society Museum	92 Narragansett Avenue	
Historic Cemeteries	Governor Carr Lot	East Shore Road	
	Town Cemetery	North Road	
	Cottrell & Green Lot	Fort Getty Road	
	Arnold Lot	Fort Getty Road	
	Cedar Cemetery	Eldred Avenue	
	Friends Cemetery	Eldred Avenue	
	Tew Cemetery	North Road	
	Paine Cemetery	East Shore Road	
	St. Mark Roman Catholic Cemetery	East Shore Road	
Stone Walls	Multiple	North Road	
	Multiple	Beavertail Road	
Scenic Sites and Landscapes	Multiple	Multiple	

3.2.7. Economic and Community Assets

Economic assets are defined as entities that produce a financial benefit for the owner or community, while community assets are defined as "Activities that benefit the community by increasing community morale and well-being. Activities may include education and knowledge transfer" (FEMA, 2022).

Table 3.10: Economic and Community Assets

Asset Type	Name	Location	Community Lifeline
Major Employers	TPG Dutch Harbor Boatyard	252 Narragansett Avenue	
	TPG Conanicut Marina	1 East Ferry Wharf	
	Clark's Marine	110 Racquet Road	
	Jamestown Boatyard	60 Dumpling Drive	
	Town of Jamestown & Public Schools	Various	

Asset Type	Name	Location	Community Lifeline
Employment Hub	Narragansett Avenue		
	North Road		
Goods/Services	McQuade's Market	5 Clark Street	Food, Hydration, Shelter
	Food Bank – Baptist Church	99 Narragansett Avenue	Food, Hydration, Shelter
	Mini-mart – Cumberland Farms	27 North Road	Food, Hydration, Shelter
	Medical – Jamestown Family Practice	20 Southwest Avenue	Health & Medical

4

4. Risk Assessment: Natural Hazards, Asset Vulnerabilities, and Community Impacts

Natural hazards have the potential to cause damage, or the total loss of physical assets, including the structures, infrastructure, and natural, historic, and cultural resources within Jamestown. Natural hazards can also harm people, especially particularly vulnerable priority populations, and disrupt the municipal processes and operations, and activities that have value to the Jamestown community.

FEMA defines risk as "the potential for damage or loss when natural hazards interact with people or assets." (FEMA, 2022) Assets can be a range of resources—buildings, infrastructure or natural and cultural resources. The ways in which natural hazards interact with a community's people, property and assets is what will determine if that hazard causes a disaster. A risk assessment is a robust, data-driven analysis that allows a community to plan for where a community's assets are vulnerable to hazards.

4.1. Applicable Hazards, Terms & Methods

As previously stated in Section 1.1, Natural Hazards are harmful meteorological, environmental, or geological events (such as extreme wind events, tornadoes, winter weather as well as earthquakes, flooding, and fires). Table 4.1 outlines hazard profiles that were developed based on the natural hazards that can affect Jamestown.

Table 4.1: Natural Hazards that Apply to Jamestown

The hazards listed above are not a complete listing of hazards that may impact Jamestown. These hazards were chosen by the LHMC because of their applicability to Jamestown and align with the State of Rhode Island's draft Hazard Mitigation Plan. These hazards should those that impact Rhode Island most frequently and have the highest potential to cause fatalities, injuries, property and infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss. The following hazards will not be addressed in this plan:

- Avalanche
- Expansive soils
- Land Subsidence
- Landslides
- Volcanoes
- Tsunamis

The following sections in this chapter include analysis of each applicable hazard. For each natural hazard, this plan analyzes:

- Where might it happen in Jamestown (location)?
- How severe or intense may it be (extent)?
- How may it change in the future (probability)?
- Which assets are at risk from it (vulnerability)?
- What effects will it have on the community assets including populations (impacts)?

1. Description: What are the defining characteristics of the hazard?

2. Location: Where in Jamestown might the hazard occur and over what extent of the Town?

3. Previous Occurrence(s) of the Hazard Event: Where has the hazard happened in the past (previous occurrences) and how likely it is to occur (frequency)?

    i. Extent (Severity or Magnitude): FEMA defines extent as "the range of anticipated intensities of the identified hazard(s)" (FEMA, 2022). This can be expressed in varying scientific charts and scales, as relevant to the hazard and Jamestown. Extent can be summarized as how serious the hazard event is.

    ii. Frequency: Frequency refers to the likelihood of occurrences over a given period of time.

    iii. Location: Location is the geographic boundary in which a hazard occurs. This may include areas larger or smaller than the Town of Jamestown's jurisdiction.

4. Severity/Intensity: The likely magnitude of the hazard, using industry standard scales where applicable. For example, the National Hurricane Center's categorizations of tropical storms and hurricanes was used to define the range of hurricanes that may affect areas of Rhode Island. When no standard scale is available, a qualitative description is provided.

5. Probability of Future Hazard Events due to Climate Change: Climate projections indicate a change in long-term weather patterns. This section identifies how climate change may affect the probability of natural hazards occurring, and to what degree they may change. Probability, by definitions is likelihood of a hazard occurring or reoccurring. This includes the effects of future conditions, including long term weather patterns, temperatures, and sea levels, on the type, location, and range of anticipated intensities of the hazard.

6. Vulnerability: A description of which assets within locations identified to be hazard prone are at risk from the effects of the identified hazard(s). To determine which assets identified in Chapter 3 are located within an area identified to be hazard prone, presently or in the future, the natural hazard profiles presented in this chapter were utilized. For inland and coastal flooding, GIS

mapping of assets and areas of flooding were utilized to describe vulnerability, as further described in Section 4.9. For all other hazards, the identified hazard is not mapped or cannot be mapped and therefore a qualitative analysis that relies on local knowledge and rational decision making was used to identify vulnerability. Vulnerability discussions focus on specific assets that are most important and most susceptible to damage or loss from hazards.

7. Impacts: Consequences or effects of each hazard on the town's assets identified in the vulnerability assessment. The categories below discus general impacts that can be the result of natural hazards affecting Jamestown's assets. The impacts in Table 4.1 are discussed throughout this chapter. There are three ways to analyze impacts:

    i. Historical Analysis: Historical analysis uses data on the impacts and losses of previous hazard events, which can be used to predict the anticipated impacts and losses for a similar future event. For Jamestown, a formal historical analysis was not utilized; however, information from those in attendance at the CRB workshops was included in the narrative in this Chapter.

    ii. Exposure Analysis: An exposure analysis identifies the existing and future assets in known hazard areas. GIS is often used for this analysis and to make maps to visualize the risk. An exposure analysis can quantify the number, type and value of structures, community lifelines and other assets in areas of identified hazards. It can identify any assets exposed to multiple hazards. Exposure analysis can also help a community understand areas that may be vulnerable if buildings, infrastructure and community lifelines are built in hazard-prone areas. For Jamestown, an exposure analysis was used for coastal flooding.

    iii. Scenario analysis: A scenario analysis asks "what if" a certain event occurs. This kind of analysis uses a hypothetical situation to think through potential impacts and losses. A scenario analysis can be completed narratively by walking through a scenario with the planning team and documenting what could happen. It can also be completed using modeling. FEMA's HAZUS program is one of the most common scenario analysis tools for hazard mitigation. For Jamestown, FEMA's HAZUS-MH Version 2.2 SP1 was used to estimate potential losses from earthquakes, flooding, and hurricanes.

Table 4.2 provides a set of examples of the types of impacts that natural hazards can have on people, property, and regional systems.

Table 4.2:

Types of Impacts due to Occurrence of Natural Hazards

Impact	Examples
Loss of Life	• Death
Physical Injuries	• Cuts, bruises, broken bones, or amputations.
Public Health	• Spread of disease, bacterial infections, and vector-borne illnesses • Elevated rates of emergency room visits • Respiratory problems arising from air pollution, allergens, and mold
Displacement	• Forced abandonment of the home due to unsafe living conditions, either permanently or temporarily
Psychological Impacts	• Trauma • Anxiety • Stress • PTSD
Impacts to Daily Life	• Cancellation or postponement of sporting or other events that are important to the community • Damage to parks, community centers inhibits recreation • Destruction of historic or cultural landmarks
Property Damage	• Damage to physical structures • Damage to contents within homes and buildings • Damage to vehicles
Building Damage	• Structural damage to roofs, walls, or foundations • Collapse or destruction
Utility Infrastructure Damage	• Damage to power lines, communications towers, and water, wastewater, and gas mains resulting in power outages, loss of water, wastewater, or gas services, and loss of communication, radio signal, or internet
Transportation Infrastructure Damage	• Damage to or debris build-up on roads, bridges, railways, or airports that render them impassable or unsafe to use
Disruption to Lifelines	• Medical facilities, emergency services, or transportation networks are unable to provide essential services due to damage or debris
Water Resources	• Disruption to agriculture practices • Yield reduction or damage to drinking water wells
Business Impacts	• Lost wages • Closure of or interruption to businesses • Increased insurance premiums • Increased costs for repairs/rebuilding • Decreased property values

Impact	Examples
	• Disruption of industry and the transport of goods and services • Decreased tourism revenues
Utilities	• Increased cost of utilities • Disruption of utilities creating travel delays or lack or services
Building Damage	• Structural damage to roofs, walls, or foundations • Collapse or destruction
Economic	• Lost wages • Closure of or interruption to businesses • Increased insurance premiums • Increased costs for repairs/rebuilding • Decreased property values • Disruption of industry and the transport of goods and services • Decreased tourism revenues
Government Services	• Increased demand for state and municipal government services • Cost to repair services
Municipal Resources	• Increased need for municipal resources • Disruption of resources
Contamination	• Air pollution from dust and debris • Transport of toxic chemicals by floodwaters • Release of hazardous materials into soil and water • Decreased water quality • Sewage release into waterways
Ecological	• Loss of wildlife • Loss or destruction of habitat • Disruption to migratory patterns • Loss of biodiversity • Loss of or damage to natural resources • Changes in groundwater temperature
Geological	• Landslides • Erosion • Removal of topsoil • Debris deposit • Altered nutrient balance

Table 4.3 provides definitions of hazard location, extent, frequency, and probability. The definitions support the basis of determination in Table 3.2. In accordance with guidance from FEMA, quantification and definitions are necessary.

Table 4.3: Summary of Natural Hazard Risks for the Town of Jamestown

Points	Description
Hazard Extent (Severity/Intensity)	
Minor	Limited damages to property, no damage to public infrastructure (roads, bridges, trains, airports, public parks); contained geographic area (e.g., one or two neighborhoods); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.
Serious	Scattered major property damage (more than 10% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services briefly interrupted up to 1 day; some minor injuries.
Extensive	Consistent major property damage (more than 25%); major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and possible fatalities.
Catastrophic	Property and public infrastructure destroyed (more than 50%); essential services stopped for 30 days or more, multiple injuries and fatalities.
Present Frequency of Hazard	
Very Low	Events that occur less frequently than once in 100 years (less than 1% chance per year).
Low	Events that occur from once in 50 years to once in 100 years (1% to 2% chance per year).
Medium	Events that occur from once in 5 years to once in 50 years (2% to 20% chance per year).
High	Events that occur more frequently than once in 5 years (greater than 20% chance per year).
Future Probability of Hazard	
Very Low	Events that are projected to occur less frequently than once in 100 years (less than 1% chance per year).
Low	Events that are projected to occur from once in 50 years to once in 100 years (1% to 2% chance per year).
Medium	Events that are projected to occur from once in 5 years to once in 50 years (2% to 20% chance per year).
High	Events that are projected occur more frequently than once in 5 years (greater than 20% chance per year).
Location of Hazard	
N/A	Hazard has not yet affected the Town over the last 10 years
Small	Less than 10% of the Town is or could be affected by the hazard
Medium	Between 10-50% of the Town is or could be affected by the hazard
Large	More than 50% of the Town is or could be affected by the hazard

Table 4.4, below, provides a summary of the natural hazards analyzed in this plan and how they apply for Jamestown. This evaluation takes into account historical records, the extent, frequency, location, and anticipated future probability. Information regarding future projections for specific scenarios is not available for every natural hazard, each hazard section contains best available science, and discusses projections in the context of specific future scenarios when available and appropriate.

Table 4.4: Summary of Natural Hazard Risks for the Town of Jamestown (update since 2017)

Natural Hazard	Previous Occurrence in Jamestown	Present			Future
		Extent	Frequency	Location	Probability of Occurrence
Hurricanes / Tropical Cyclones	Yes	Catastrophic	Low	Townwide	Medium
Tornadoes	No	Serious	Very Low	N/A	Medium
High Wind / Thunderstorms	Yes	Minor	High	Townwide	High
Severe Winter Weather	Yes	Serious	High	Townwide	High
Sea Level Rise	Yes	Serious	High	Coastal	High
Inland Flooding	Yes	Serious	High	Townwide	High
Coastal Flooding	Yes	Serious	Low	Coastal	High
Coastal Erosion	Yes	Serious	High	Coastal	High
Dam Breach	No	Serious	Low	Variable	Cannot be predicted
Earthquakes	No	Minor	Very Low	N/A	Cannot be predicted
Wildfires	Yes	Minor	High	Variable	Medium
Drought / Extreme Heat	Yes	Minor	Medium	Townwide	High

4.3. Previous Federal/State Disaster Declarations

To understand the importance of hazard mitigation, it is useful to know the types and frequencies of disasters that occur in Rhode Island. Since 1991, there have been 15 Federal or State Disaster Declarations in Newport County, which includes the Town of Jamestown. These disasters and the related assistance from FEMA are described in Table 4.5.

Table 4.5: Federal/State Disaster Declarations since 2000

Disaster Name	Declaration Date	Disaster Number	Type of Assistance
Severe Storms and Inland and Coastal Flooding	May 25, 2007	DR-1704	FEMA Hazard Mitigation Grant Program
Severe Storms and Flooding	March 29, 2010	DR-1894	FEMA Hazard Mitigation Grant Program
Tropical Storm Irene	September 3, 2011	DR-4027	No funding reported
Hurricane Sandy	November 3, 2012	DR-4089	FEMA Hazard Mitigation Grant Program
Severe Winter Storm and Snowstorm	March 22, 2013	DR-4107	FEMA Hazard Mitigation Grant Program
Severe Winter Storm and Snowstorm	March 22, 2013	DR-4212	FEMA Hazard Mitigation Grant Program
COVID-19 Pandemic	March 30, 2020	DR-4505	FEMA Individual & Households Program; FEMA Hazard Mitigation Grant Program
Severe Winter Storm and Snowstorm	May 12, 2022	DR-4653	FEMA Public Assistance; FEMA Individual & Households Program; FEMA Hazard Mitigation Grant Program
Severe Storms and Flooding	January 9, 2024	DR-4766	FEMA Public Assistance

Source: FEMA, 2024

4.4. Hurricanes / Tropical Cyclones

4.4.1. Description

Hurricanes originate from tropical storms, which form rotating cloud systems, developing over tropical or subtropical waters. There are four classifications of these types of storms (tropical cyclones) (NOAA National Hurricane Center, 2024):

1. Tropical Depression - A tropical cyclone with maximum sustained winds of 38 mph (33 knots) or less.
2. Tropical Storm - A tropical cyclone with maximum sustained winds of 39 to 73 mph (34 to 63 knots).
3. Hurricane - A tropical cyclone with maximum sustained winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called typhoons; similar storms in the Indian Ocean and South Pacific Ocean are called cyclones.
4. Major Hurricane - A tropical cyclone with maximum sustained winds of 111 mph (96 knots) or higher, corresponding to a Category 3, 4 or 5 on the Saffir-Simpson Hurricane Wind Scale.

The counterclockwise rotation of a hurricane's wind field in combination with the forward motion of the hurricane typically causes the highest surge levels to occur to the right of the hurricane's forward track. This phenomenon has been observed in regions where the shoreline is typically straight, not fragmented by large inlets and bays, and when a hurricane travels generally perpendicular to the shore. In Rhode Island, the increased wind stress from the rotational wind field has a large effect on the level of surge. The contribution to surge generation from the forward motion of the storm can be greater than the contribution made by an increase in hurricane intensity.

Due to Jamestown's geography, hurricane storm surge poses a tremendous threat on south and east facing shores. Wave run-up causes coastal flooding to commence as much as 6 hours before the eye comes ashore with the most significant surge occurring within one hour of landfall. Heavy rains from hurricanes can cause flooding in the low-lying areas of Jamestown, and hurricane winds can cause damage to property and infrastructure throughout the Town.

4.4.2. Location

The entire state of Rhode Island is vulnerable to hurricanes and tropical storms, depending on the storm's track. All of Jamestown may be affected by a hurricane or tropical storm. Some areas will have more significant impacts such as low-lying areas, which includes the beaches.

4.4.3. Severity/Intensity

Hurricane season is from June 1 to November 30 each year. Hurricanes are classified by their damage potential according to the Robert Simpson and Herbert Saffir scale, which was last updated in 2021. Direct hits, especially by higher category storms, can be catastrophic for the Town. The

greater the strength of the hurricane, the more extensive the damage will be. The severity and speed of a hurricane will determine how long the storm lasts and how extensive the damage will be. Table 4.6 below is the Saffir-Simpson Hurricane Scale, as adapted from the National Hurricane Center (NOAA, 2024).

Table 4.6: Saffir-Simpson Hurricane Scale

Scale No. (Category)	Winds (mph)	Potential Damage
1	74–95	**Minimal:** Damage is primarily to shrubbery and trees, mobile homes, and some signs. No real damage is done to structures.
2	96–110	**Moderate:** Some trees topple, some roof coverings are damaged, and major damage is done to mobile homes.
3	111–129	**Extensive:** Large trees topple, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.
4	130–156	**Extreme:** Extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail; and some curtain walls fail.
5	>157	**Catastrophic:** Roof damage is considerable and widespread, window and door damage is severe, there are extensive glass failures, and entire buildings could fail.

Source: NOAA, 2024

4.4.4. Previous Occurrences and Frequency

Jamestown has been impacted by two tropical storms since the previous hazard mitigation plan update. Tropical storms occurred on August 4, 2020, and August 22, 2021.

4.4.5. Probability of Future Hazard Events, including Due to Climate Change

Both historic events and models of future conditions suggest that climate change will cause the intensity of tropical storms and hurricanes to increase, though uncertainty remains over the relationship between the frequency of tropical cyclones and climate change. The IPCC reports low confidence in observations of long-term changes to tropical cyclone frequency, partly due to inadequate historical data (IPCC, 2021). There is some evidence of a relative increase in the frequency of tropical cyclones in the Atlantic, resulting from a poleward shift in hurricane activity due to warmer temperatures (Shelton, 2022). Together with the increasing intensity and duration of tropical cyclones, these changes are likely to lead to significant changes in this hazard for the Atlantic coast (Dinan, 2017; Marsooli et al., 2019). A recent study of Atlantic tropical cyclones downscaled from climate reanalysis indicates increasing activity over the past 150 years, with a significant uptick since 1990 (Emanuel, 2021). The Draft 2024 Rhode Island State Hazard Mitigation Plan predicts the

return period for a hurricane of any category on the Saffir-Simpson scale to be 17 years, and the return period for a major hurricane of Category 3 or higher to be 52 years. Climate change will likely result in increased storm intensity. This increased intensity is caused by warmer sea surface temperatures which provide more energy to the storm systems (RIEMA, 2024). This can result in higher wind speeds and more rainfall, leading to more damage and more flooding.

4.4.6. Vulnerability and Impacts

Hurricane force winds can destroy buildings and mobile homes. Items that are not secured can quickly become airborne debris that can cause severe injury. Hurricanes can also spawn tornadoes. Heavy rain associated with hurricanes can cause extreme flooding. Jamestown is at increased risk of becoming inaccessible for rescue crews during major hurricanes. During a hurricane, the island could become isolated and have limited resources to address local issues in the aftermath of the storm. A combination of storm surge, high winds, flooding, and coastal erosion would make it difficult for first responders to reach less populated portions of the Town. The bridges could also be forced to close until after the storm passes or even be damaged beyond repair from the storm. Emergency evacuation routes are an imperative aspect of ensuring residents can escape a severe storm well in advance.

Using HAZUS information, the estimated damages that would occur in Jamestown from a Category 2 and Category 4 hurricane were assessed. Past hurricanes and tropical cyclones are known to have displaced significant numbers of residents. Related data are compiled in Appendix E.

Table 4.7: Impacts of Hurricanes and Tropical Cyclones on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Death and Injury • Mental health impacts such as anxiety or PTSD • Displacement • Loss of property
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Damage to buildings from high winds, flying debris, or flooding • Power outages • Damage to critical facilities is possible • Damage to bridges and roadways
Systems	Impacts to transportation systems, and electricity and water systems: • Damage to transportation infrastructure such as roads or bridges can impact emergency responses and daily travel • Damage to telecommunications infrastructure can disrupt communications

Asset Category	Possible Impacts
	• Widespread power outages can disrupt critical facilities, emergency response centers, water treatment plants, and hospitals • Water supply interruptions from flooding or damage to water treatment plants and pipelines • Flooding can overwhelm wastewater systems causing contamination and health risks • Utility services such as gas may be disrupted • Water Treatment Plant is located within a Flood Zone and could result in environmental and public health concerns
Natural/Cultural/Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Historic buildings may not be able to withstand high winds • Increased coastal erosion • Potential for flash flooding and storm surge
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Decreased economic activity • Expensive response and recovery costs • Damage to businesses or business closures • School closures • Diminished property value along coastline • Increased flood insurance costs for residents within flood zones

4.5. Tornadoes

4.5.1. Description

Tornadoes are narrow, violently rotating columns of air that extend from the base of a thunderstorm to the ground. These windstorms develop when cool air overlays warm air, causing the warm air to rise rapidly. They are visible when dust and debris are collected in the rotating column. Tornadoes are measured on the Enhanced Fujita (EF) scale, which ranges from EF-0 (light damage) with three-second gust wind speeds of 65–84 miles per hour to EF-5 (incredible damage) with three-second guest wind speeds of over 200 miles per hour. Tornadoes tend to form when cold, dry air clashes with warm, humid air.

The following are common factors in tornado formation:

- Very high winds in the middle and upper levels of the atmosphere
- Clockwise turning of the wind with height (i.e., from southeast at the surface to west aloft)
- Increasing wind speed in the lowest 10,000 feet of the atmosphere (i.e., 20 miles per hour at the surface and 50 miles per hour at 7,000 feet)

- Very warm, moist air near the ground, with unusually cool air aloft
- A forcing mechanism such as a cold front or leftover weather boundary from previous shower or thunderstorm activity

Tornadoes can form along severe thunderstorm squall lines, from individual supercell thunderstorms, or from tropical cyclones. Most tornadoes occur in the late afternoon and evening hours when the temperatures are the highest. The most common months for tornadoes to occur in Rhode Island are June, July, and August. They can cause damage to buildings and even threaten human lives. According to the 2024 Rhode Island HMP, "tornadoes have been known to lift and move objects weighing more than three tons, toss homes more than 300 feet from their foundations, and siphon millions of tons of water" (RIEMA, 2024).

4.5.2. Location

Jamestown is not located in a region known for frequent tornado activity. However, there is still the possibility of a tornado touching down in Jamestown. Tornadoes can strike anywhere in Jamestown and, depending on the size, they can impact part of all of the Town. No tornadoes have made landfall in Jamestown since at least 1950, although dozens have touched down in Rhode Island. Tornadoes are most likely to form in areas with flat terrain and lots of open land. Jamestown is relatively small and narrow with steep cliffs, which make it less vulnerable to tornadoes. The type and age of infrastructure plays a role in vulnerability of facilities to tornadoes. In general, concrete, brick and steel-framed structures tend to fare better in tornadoes than older, wood-framed structures.

4.5.3. Severity/Intensity

Tornadoes are among the most devastating local storms that Jamestown can face. Major tornadoes can cause significant, widespread damage and cause facilities to be severely damaged. Jamestown has not experienced a tornado since at least 1950, but casualties could be high, many people would be displaced, buildings would be damaged or destroyed, and businesses would suffer damage and loss.

Since 2007, the National Weather Service uses the Enhanced Fujita Scale (EF Scale) to categorize tornadoes based on the amount of damage created rather than directly measure wind speed. This scale is considerably more sophisticated than the original Fujita Scale and provides an extensive understanding of the

Table 4.8 depicts the EF Scale.

Table 4.8: Enhanced Fujita Scale

Scale	Class	Wind Speed		Description
		MPH	KM/H	
EF-0	Weak	65-85	105-137	Gale
EF-1	Weak	86-110	138-177	Moderate
EF-2	Strong	111-135	178-217	Significant
EF-3	Strong	146-165	218-266	Severe
EF-4	Violent	166-200	267-322	Devastating
EF-5	Violent	>200	> 322	Incredible

Source: NWS, 2023

4.5.4. Previous Occurrences and Frequency

The United States averages roughly 1,200 tornadoes per year while Rhode Island has only experienced 14 since 1950 (Insurance Information Institute, 2024; RIEMA, 2024). Since Rhode Island experiences far fewer tornadoes than other parts of the country, residents may be less prepared to react to a tornado. There have been no tornadoes reported in Jamestown since the 2017 HMP.

While there have been no tornadoes recorded in Jamestown, an EF-0 tornado touched down in Newport County in Portsmouth in 2019. The tornado caused no significant damage or any casualties in Newport, where the tornado occurred (NOAA, 2024).

4.5.5. Probability of Future Hazard Events, including Due to Climate Change

The relationship between tornadoes and climate change is uncertain, but certain atmospheric factors that influence tornado development can be exacerbated by climate change. Climate change is expected to increase the number of severe thunderstorms around New England. According to the 2024 Rhode Island HMP, "tornadoes form when warm, moist air near the surface clashes with cooler, drier air aloft, creating atmospheric instability. Climate change can alter temperature and humidity patterns, potentially affecting the conditions necessary for tornado formation." Changes in frequency and intensity of tornadoes will likely depend on how climate change impacts extreme weather patterns. Tornadoes are expected to become more powerful and less predictable with potential for a longer tornado season, as temperatures increase and precipitation patterns change.

Jamestown still faces a limited threat of a direct hit from a tornado. Even with changing weather patterns, the threat remains low. However, aging critical infrastructure and an overall lack of public education on tornadoes could lead to more damage if one does occur.

4.5.6. Vulnerability and Impacts

Tornadoes can cause severe injury or even death. Tornadoes can destroy homes, businesses, and other structures, leaving people without shelter and their possessions destroyed or lost. Tornadoes can also cause economic impacts, such as lost wages, business interruption, and increased insurance premiums. Infrastructure such as power lines, communication towers, water mains, and gas mains are vulnerable to tornadoes. Damage to such infrastructure can cause power outages, disruptions to communication, and water contamination. Tornadoes can also disrupt transportation systems, including roads, railways, and airports, by blocking them with debris, making them impassable or unsafe to use. Although no tornadoes have touched down in Jamestown since at least the last HMP, it does not mean the impacts are moot. Tornadoes are among the most catastrophic weather events and would have widespread impacts given the small size of Conanicut Island. Tornadoes can grow as much as one mile in diameter, according to the National Weather Service. The entire width of Jamestown is approximately one mile wide. While unlikely, a large tornado could damage the entire island. Due to its limited connections to the mainland, evacuations would also be difficult, unless conducted well in advance.

Table 4.9: Impacts of Tornadoes on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Death or injury • Flying debris can cause death or injury • Mental health impacts such as anxiety or PTSD • Displacement
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Damage to buildings and infrastructure from high winds and flying debris • Critical facility damage • Power outages
Systems	Impacts to transportation systems, and electricity and water systems: • Damage to roadways, bridges, and other transportation infrastructure can disrupt daily travel • Damage to telecommunications infrastructure can disrupt communications • Downed power lines can cause power outages • Damage to water treatment plants, pump stations, or water distribution systems can lead to a loss of clean drinking water and sanitation services
Natural/Cultural/Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Uprooting or damaging trees • Destroyed vegetation or altered landscapes • Downed utility lines can cause wildfires
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Decreased economic activity • Business closures • School closures

4.6. High Wind and Thunderstorms

4.6.1. Description

Thunderstorms form when atmospheric conditions combine to provide moisture, lift, and warm unstable air that can rise rapidly. As warm surface air rises, it transfers heat from the surface of the Earth to the upper levels of the atmosphere (i.e., the process of convection). The water vapor it

contains begins to cool, releasing the heat, and the vapor condenses into a cloud. The cloud eventually grows upward into areas where the temperature is below freezing. Some of the water vapor turns to ice and some of it turns into water droplets; both have electrical charges. When a sufficient charge builds up, the energy is discharged in a bolt of lightning, which causes the sound waves we hear as thunder. An average thunderstorm is 15 miles across and lasts 30 minutes; severe thunderstorms can be much larger and longer. Southern New England typically experiences 10 to 15 days per year with severe thunderstorms. Thunderstorms can occur at any time of the day during any month but are most common during summer afternoons and evenings and in conjunction with frontal boundaries.

Severe thunderstorms can cause significant property damage and result in injury or even death. Thunderstorms are considered "severe" if it produces the following weather effects (NWS, 2024):

- Formation of a tornado
- High winds of 58mph or greater
- Hail at least one inch in diameter

Although this plan does not require a tornado to form for a thunderstorm to be considered "severe," tornadoes often accompany severe thunderstorms. Additional information on tornadoes can be found in Section 4.5 of this chapter.

4.6.2. Location

Thunderstorms can impact all of Jamestown, but there are factors that create increased vulnerability. Areas of Jamestown that are more exposed or have fewer natural windbreaks, such as hills, ridges, or open fields, may experience stronger winds. Additionally, areas with sparse vegetation or where trees have been removed posed an increased risk of impacts from high winds. Meanwhile, locations with more trees maybe at increased risk of wildfire development due to lightning strikes. Locations near large bodies of water, such as rivers or lakes, can experience increased wind speeds due to unobstructed airflow across the water surface. Bodies of water can also increase the risk of thunderstorms, as the water bodies contribute moisture to the atmosphere, enhancing instability and providing a source of energy for thunderstorms to develop.

Jamestown is particularly vulnerable to high wind events and flooding from thunderstorms. Two bridges connect the community to the mainland and are closed to traffic when sustained wind speeds reach 68 miles per hour.

4.6.3. Severity/Intensity

Thunderstorm severity can vary widely, from short-term, localized events to large-scale storms that result in major consequences, including flooding and direct damage to people, buildings, and ecosystems throughout a region. Thunderstorms can rapidly descend on Jamestown, but they are typically predicable, especially severe thunderstorms.
Severe thunderstorms can be widespread and cause lasting damage. Lightning, wind, and hail cause billions of dollars in damage and take the lives of hundreds each year.

All thunderstorms, even those not classified as "severe," are dangerous due to the lightning they produce. Lightning often strikes outside of areas where it is raining and may occur as far as 10 miles away from rainfall. It can strike from any part of the storm and may even strike after the storm has seemed to pass. Hundreds of people across the nation are injured annually by lightning, most commonly when they are moving to a safe place but have waited too long to seek shelter. Lightning strike victims often suffer long-term effects such as memory loss, sleep disorders, weakness and fatigue, chronic pain, depression and muscle spasms. Lightning has the potential to start both house fires and wildfires. Lightning causes an average of 55-60 fatalities and 400 injuries. There were over $1.3 billion in insured losses due to lightning nationwide in 2021 (RIEMA, 2024).

Wind is the motion of air past a given point caused by a difference in pressure from one place to another. Severe wind poses a threat to Rhode Island in many forms, including that produced by severe thunderstorms and tropical weather systems. The effects can include blowing debris, interruptions in elevated power and communications utilities and intensified effects of winter weather. Harm to people and animals as well as damage to property and infrastructure may be the result. Two basic types of damaging wind events other than tropical systems affect Rhode Island: synoptic-scale winds and thunderstorm winds. Synoptic-scale winds are high winds that occur typically with cold frontal passages or Nor'easters. When thunderstorm winds exceed 58 MPH, the thunderstorm is considered severe and a warning is issued. "Downbursts" cause the high winds in a thunderstorm. Downburst winds result from the sudden descent of cool or cold air toward the ground. As the air hits the ground, it spreads outward, creating high winds. Unlike tornadoes, downburst winds move in a straight line, without rotation. The term "microburst" refers to a small downburst with damaging winds up to 168 MPH and less than 2.5 miles in length. The term "macroburst" refers to a large downburst that can extend greater than 2.5 miles with winds up to 134 MPH and can last 5 to 30 minutes (Rhode Island Emergency Management Agency, 2014).

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 MPH. Hail falls along paths called swaths, which can vary from a few square acres to up to 10 miles wide and 100 miles long (Rhode Island Emergency Management Agency, 2014). The following table illustrates hail comparisons:

Table 4.10: Hail Size Comparison and Damage Descriptions

Diameter (in)	Size Description	Potential Damage Impacts
0.25	Pea Size	No damage
0.5	Mothball, peanut, USB Plug	Slight damage to vegetation
0.75	Penny Size	Increased damage to crops and vegetation
0.875	Nickel Size	Severe damage to crops and vegetation, damage begins to glass and plastic
1	Quarter Size	Increased glass damage, damage begins to bodies of vehicles

Diameter (in)	Size Description	Potential Damage Impacts
1.25	Half Dollar Size	Large scale glass damage, begin roof damage, risk of injury to exposed persons
1.5	Ping Pong Ball Size	Large scale glass damage, begin roof damage, increased risk of injury to exposed persons
1.75	Golf Ball Size	Severe roof damage, risk of injuries to exposed persons
2	Lime Size	Potential structural damage, risk of very severe injuries to exposed persons
2.5	Tennis Ball Size	Extensive structural damage, risk of very severe injuries or death to exposed persons

Source: State of Rhode Island Hazard Mitigation Plan, 2024

4.6.4. Previous Occurrences and Frequency

Since the previous Hazard Mitigation Plan in 2017, there have been 36 occurrences of strong wind, high wind, thunderstorm wind, lightning, or hail in Newport County (NOAA, 2024). In total, these 36 events caused approximately $182,400 in damage and one death. No injuries outside of the one death were reported from these incidents. Table 4.11 presents the results of the NOAA's Storm Events Database. Strong winds, high winds, and thunderstorm winds are separately classified by NOAA, as depicted in the table below (NWS, 2021). However, they are referred to as "high winds" for analysis purposes throughout this report.

Table 4.11: High Wind and Thunderstorm Events in Jamestown

Date	Event Description
July 28, 2015	Lightning
January 19, 2016	Strong Wind
February 16, 2016	High Wind
February 25, 2016	Thunderstorm Wind
April 3, 2016	High Wind
June 21, 2016	Hail
September 5, 2016	Strong Wind
October 23, 2016	Strong Wind
December 27, 2016	Strong Wind
October 29, 2017	High Wind
March 2, 2018	High Wind
December 28, 2018	Strong Wind
January 24, 2019	Strong Wind
February 25, 2019	High Wind

Date	Event Description
June 29, 2019	Thunderstorm Wind
August 8, 2019	Thunderstorm Wind
October 10, 2019	Strong Wind
October 16, 2019	Strong Wind
October 16, 2019	Strong Wind
October 16, 2019	High Wind
February 7, 2020	High Wind
April 13, 2020	High Wind
July 14, 2020	Thunderstorm Wind
August 25, 2020	Thunderstorm Wind
August 25, 2020	Thunderstorm Wind
November 15, 2020	Strong Wind
March 2, 2021	High Wind
October 27, 2021	High Wind
November 12, 2021	High Wind
November 13, 2021	Thunderstorm Wind
November 13, 2021	Thunderstorm Wind
February 18, 2022	High Wind
April 19, 2022	High Wind
December 16, 2022	Strong Wind
December 23, 2022	High Wind
June 27, 2023	Lightning
December 18, 2023	High Wind

Source: NOAA, 2024

4.6.5. Probability of Future Hazard Events, including Due to Climate Change

Climate models and projections are imperfect but can assist in providing long-term considerations for what Jamestown will experience as a result of climate change over the lifespan of this HMP. There are indications that severe thunderstorms will increase in severity and frequency as global temperatures warm, and moisture grows in the atmosphere. These atmospheric changes create the necessary ingredients for thunderstorms to form with high winds. According to the 2024 Rhode Island HMP, the state overall can expect to experience approximately 18 to 27 thunderstorms each year moving forward. Jamestown maybe slightly more at risk of such severe weather due to its location along the coast, especially as an island.

Climate change may also influence the conditions necessary for hail formation. Warmer surface temperatures and variability in the atmosphere may make predicting severe thunderstorms more difficult. The development of hail may become even less predictable.

4.6.6. Vulnerability and Impacts

Building construction, location, and nearby trees or other tall structures will have a large impact on how vulnerable an individual facility is to a lightning strike. A rough estimate of a structure's likelihood of being struck by lightning can be calculated using the structure's ground surface area, height, and striking distance between the downward-moving tip of the stepped leader (negatively charged channel jumping from cloud to earth) and the object. In general, buildings are more likely to be struck by lightning if they are located on high ground or if they have tall protrusions such as steeples or poles which the stepped leader can jump to. Electrical and communications utilities are also vulnerable to direct lightning strikes. Damage to these lines has the potential to cause power and communications outages for businesses, residencies, and critical facilities (RIEMA, 2024). When people are unable to find proper shelter, they can be directly exposed to lightning, which can be deadly in some circumstances.

Structure vulnerability to hail is determined mainly by construction and exposure. Metal siding and roofing is better able to stand up to the damages of a hailstorm than many other materials, although it may also be damaged by denting. Exposed windows and vehicles are also susceptible to damage. Crops are extremely susceptible to hailstorm damage, as even the smallest hail stones can rip apart unsheltered vegetation.

Human vulnerability is largely determined by the availability and reception of early warnings for the approach of severe storms, and by the availability of nearby shelter. Swimming, boating, and fishing are particularly dangerous during periods of frequent lightning strikes, which can also cause power outages, topple trees, and spark fires. Individuals who immediately seek shelter in a sturdy building or metal-roofed vehicle are much safer than those who remain outdoors. Early warnings of severe storms are also vital for aircraft flying through the area (RIEMA, 2024).

If wind speeds reach at least 68 mph, the only two bridges that connect Jamestown to Newport and the mainland are closed. This is one of the more significant concerns with regards to thunderstorms and high winds as it could disconnect Jamestown from the rest of Rhode Island. Access to hospitals and other critical needs could be cutoff during the high wind events and lead to indirect consequences.

Table 4.12: Impacts of High Winds and Thunderstorms on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Death and injury • Mental health impacts such as anxiety and PTSD • Displacement
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Falling objects, trees, or debris can damage buildings or critical infrastructure • Fallen power lines • High winds and hail can damage buildings or infrastructure • Bridges are closed when winds exceed 68 mph
Systems	Impacts to transportation systems, and electricity and water systems: • Electrical infrastructure damage • Communications disruptions from damage to telecommunications infrastructure • Power outages • Transportation disruptions from heavy rain, high winds, or flooding • Severe storms can overwhelm water treatment plants and wastewater facilities leading to contamination and water supply disruptions
Natural/Cultural/Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Flash floods or riverine flooding • Potential for wildfire due to lightning strikes • Potential for tornadoes to form
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Severe storms may cause business closures • Cancellations of community or sporting events

4.8. Severe Winter Weather

4.8.1. Description

Jamestown faces the risk of heavy snow and ice accumulation as well as extreme cold every winter. Nor'easters are often the most impactful winter storm suffered by the island. Though Nor'easters do not exclusively occur in the winter, they will be discussed in this section. Severe winter storms are types of extratropical cyclones, which are formed when a cold mass of air meets with a warm mass of air and create a front.

The Draft 2024 Rhode Island State Hazard Mitigation Plan defines the following effects of winter weather:

Cold Wave/Extreme Cold - A rapid fall in temperature within a 24-hour period requiring substantially increased protection to agriculture, industry, commerce, and social activities. As evidenced by past incidents across the U.S., extreme cold can cause impact to human life and property.

Heavy Snow - Generally means snowfall accumulating to 4 inches or more in depth in 12 hours or less; or snowfall accumulating to 6 inches or more in depth in 24 hours or less.

Ice Storm – Describes occasions when damaging accumulations of ice are expected during freezing rain situations. Significant accumulations of ice pull down trees and utility lines resulting in loss of power and communication. These accumulations of ice make walking and driving extremely dangerous. Significant ice accumulations are usually accumulations of ¼ inch or greater.

Nor'easter – Type of extratropical storm that can bring significant rain/snowfall to the state, high wind speeds, coastal flooding, and blizzard-like conditions for prolonged periods due to an extremely low pressure system deriving moisture from the Atlantic.

Winter Storm - Hazardous winter weather in the form of heavy snow, freezing rain, or heavy sleet. It may also include extremely low temperatures and increased wind.

4.8.2. Location

When severe winter weather occurs, it typically impacts the entire state of Rhode Island. Therefore, the entire Town of Jamestown may be affected by a severe winter storm; however, microclimates within the Town may increase the vulnerability in specific areas. Given its proximity to the mouth of Narragansett Bay, Jamestown is particularly vulnerable to storm surge and coastal flooding during Nor'easters. Mackerel Cove is especially susceptible to Nor'easters. Extreme cold would likely impact all of Jamestown and can be particularly dangerous for elderly community members and those without adequate shelter.

4.8.3. Severity/Intensity

Snowfall is a component of multiple hazards, including Nor'easters and other severe winter storms. Since 2005, the Regional Snowfall Index (RSI) has become the descriptor of choice for measuring winter events that affect the eastern two-thirds of the U.S. The RSI ranks snowstorm impacts on a scale from 1 to 5, as shown in Table 4.13. Similar to the Fujita scale for tornadoes or the Saffir-Simpson scale for hurricanes, the RSI provides information on the spatial extent of a storm, total snowfall, and population (NOAA, 2024). The RSI is a regional index. Each of the six climate regions in the eastern two-thirds of the nation (as identified by the NOAA National Centers for Environmental Information) has a separate index, calculated according to region-specific parameters and thresholds. The RSI is important because, with it, a storm event and its societal impacts can be assessed in the context of a region's historical events. Snowfall thresholds in Rhode Island (in the Northeast region) are 4, 10, 20, and 30 inches of snowfall.

Except for hurricanes, most severe storms in Jamestown occur between November and April, when the jet stream moves over the East Coast. This is when low-pressure systems are more frequent. Storms can last anywhere from a few hours to several days. Weather forecasting abilities will provide Jamestown, at minimum, a few hours warning prior to an extreme winter weather event. Severe winter storms are relatively common in Jamestown, but ice-related dangers are rarer.

Winter storms in Jamestown are likely to range in severity from minor to serious. While recent winter storms have been relatively short in duration, the impacts of the storm are often statewide. The main concern about a severe winter storm in Jamestown is the potential to isolate citizens and businesses if roads are blocked by snow and/or ice, or if interruptions in electricity occur. Power outages have a potential to cause widespread, permanent damage or great harm to residents and businesses alike. Loss of power and internet communication following a winter storm can create dangerous scenarios when temperatures dip and furnaces cannot function effectively. High winds may also cause trees to fall and heavy snowfall can weaken roofs.

Table 4.13: Regional Snowfall Index Categories, Corresponding RSI Values, and Description

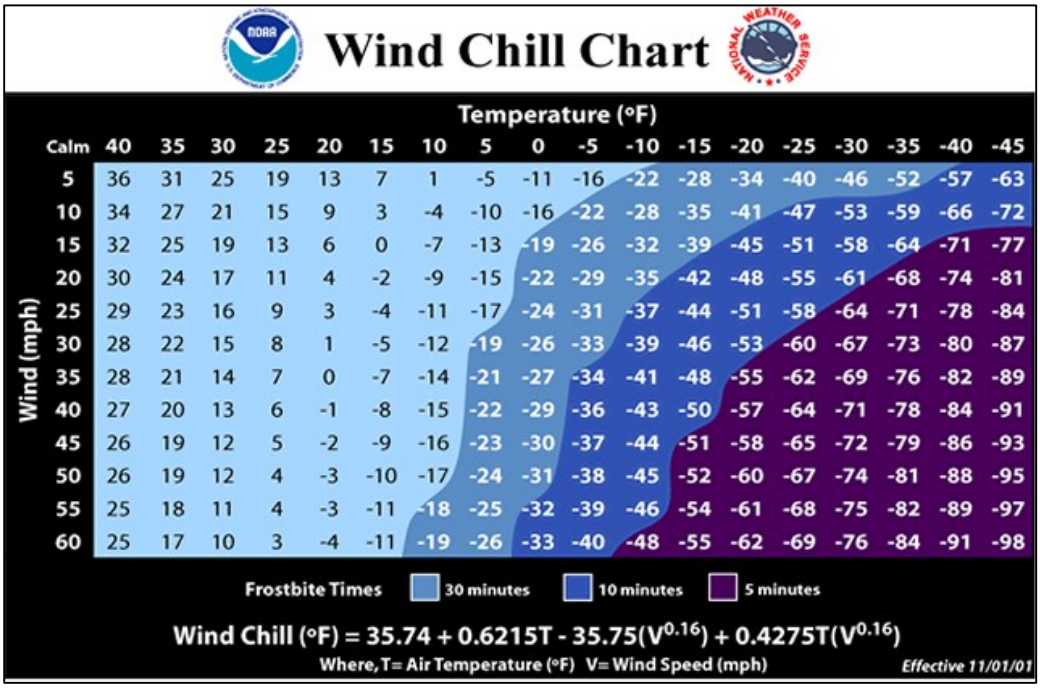
Category	RSI Value	Northeast Threshold	Description	Number of Events in New England (1973–2022)
1	1–3	Less than 4 inches	Notable	75
2	3–6	4–10 inches	Significant	23
3	6–10	10–20 inches	Major	7
4	10–18	20–30 inches	Crippling	4
5	18.0+	30+ inches	Extreme	3

Source: National Centers for Environmental Information, 2024

Extreme cold can result in severe health problems, including frostbite and hypothermia. Extremely cold temperatures paired with high winds can accelerate these threats due to extraordinarily cold wind chills.

Figure *4-1* provides a visual representation of how temperature and wind speed can result in far lower, more dangerous temperatures. The NWS issues a Wind Chill Advisory if the Wind Chill Index is forecast to dip to –15°F to – 24°F for at least 3 hours, based on sustained winds (not gusts). For example, frostbite can occur in 30 minutes at warmer than usual temperatures if wind speeds are greater.

Figure 4-1: National Weather Service Wind Chill Chart



Source: NOAA, 2023

4.8.4. Previous Occurrences and Frequency

Jamestown does have an extensive history of winter storms. According to the Draft 2024 Rhode Island State Hazard Mitigation Plan, Jamestown averages slightly fewer inches of snow than the state per year. The most recent storm that warranted a Presidential Disaster Declaration was Winter Storm Kenan which occurred January 28 and 29, 2022. Winter Storm Kenan resulted in blizzard conditions with wind gusts reaching up to hurricane force in some areas. FEMA provided more than 2.6 million dollars to reimburse the Rhode Island Department of Transportation for road treatment and snow removal due to the storm (RIEMA, 2024).

Since the previous 2017 Hazard Mitigation Plan, the NOAA Storm Events Database lists 26 notable winter weather events, including two extreme cold days. All these storm events caused heavy snowfall and storm in the Town.

Table 4.14: Winter Weather Events in Jamestown

Date of Occurrence	Type of Hazard
February 2, 2015	Winter Weather
February 8-9, 2015	Winter Weather
February 14-15, 2015	Heavy Snow
February 16, 2015	Extreme Cold/Wind Chill
February 24-25, 2015	Winter Weather
March 1-2, 2015	Winter Weather
March 5, 2015	Heavy Snow
January 23-24, 2016	Heavy Snow
February 5, 2016	Heavy Snow
February 8, 2016	Winter Weather
February 14, 2016	Extreme Cold/Wind Chill
March 21, 2016	Winter Weather
January 7, 2017	Winter Storm
February 9, 2017	Winter Storm
March 10, 2017	Winter Storm
December 14, 2017	Winter Weather
January 4, 2018	Winter Weather
March 13, 2018	Blizzard
March 3-4, 2019	Winter Weather
December 16-17, 2020	Heavy Snow
February 7, 2021	Heavy Snow
January 28-29, 2022	Blizzard
February 27-28, 2023	Heavy Snow

Source: NOAA, 2024

4.8.5. Probability of Future Hazard Events, including Due to Climate Change

Predicting the probability of winter storm occurrences is challenging due to the large number of factors involved. Data from the National Center for Environmental Information indicates that Rhode Island can expect at least two winter storm events per year (RIEMA, 2024). Climate change can lead to greater variability in precipitation patterns, which may result in more erratic and intense winter storms with periods of heavy snowfall followed by rain or freezing rain (RIEMA, 2024). It's also possible that a generally warming climate may lead to generally milder winters for Rhode Island with

individual storms becoming more intense. However, fewer extreme cold days are expected regardless of climate change's impact on storm intensity and frequency.

While evidence for the frequency is unclear, climate change is expected to increase the intensity of individual winter storms. Increased sea surface temperature in the Atlantic Ocean due to climate change will cause air moving north over the ocean to hold more moisture. As a result, when these fronts meet cold air systems moving from the north, an even greater amount of precipitation than normal can be anticipated to fall on Rhode Island. Although no one storm can be linked directly to climate change, the severity of rain and snow events has increased dramatically in recent years. The amount of precipitation released by the heaviest storms in the Northeast has increased by 55 percent since 1958 (U.S. Global Change Research Program, 2018). Other research has found that increasing water temperatures and reduced sea ice extent in the Arctic are changing atmospheric circulation patterns that favor the development of winter storms in the eastern U.S. by sending more cold air to the Eastern Seaboard (Rawlins, 2022).

4.8.6. Vulnerability and Impacts

Severe winter weather has the potential to paralyze the entire town. Heavy snow and ice can yield dangerous travel conditions and result in public transportation closures. Prolonged closures of roads and public transportation systems can inhibit the delivery of critical services or the ability to obtain vital resources. Heavy snow has the capacity to cause power outages or frozen pipes. Extended power outages, the cost of snow removal, and repairing damages can have severe economic impacts on smaller communities. Jamestown's Department of Public Works (DPW) provides snow and ice removal services from public roadways. However, Town resources could be overwhelmed if a snowstorm or Nor'easter were to bring multiple feet of snow, for example. If the bridges or roads connecting Jamestown to Rhode Island become impassable, the Town may face a serious multi-hazard scenario. The elderly and the sick are populations of particular concern during these events. Jamestown has 66 elderly/special needs rental units of housing, 11 group homes beds in 3 homes, 5 supportive (assisted) units. Many homes are on private wells and have no access to drinking water during a power outage (Town of Jamestown, 2015).

Extreme cold scenarios are equally impactful as major snow events. Extremely cold temperatures can impact public health, transportation, agriculture, energy, water resources, and infrastructure. The elderly, the homeless, and people with disabilities are especially vulnerable during instances of extreme cold. Cold weather can cause frostbite or hypothermia. Power outages during cold weather events may cause pipes to freeze and burst. Even underground pipes are subject to freezing and bursting, potentially leading to water main breaks. Power outages may also result in the inappropriate use of space heaters or generators in poorly ventilated areas, potentially leading to carbon monoxide poisoning. If extreme cold is accompanied by snow or ice, travel conditions can become extremely dangerous, and public transportation may shut down. Winter storms were the fourth highest priority hazards according to the public survey.

Table 4.15: Impacts of Severe Winter Weather on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Death and injury • Increased instances of frostbite and hypothermia • Stranded or isolated communities • Snow removal and post-storm recovery injuries
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Heavy snow loads may cause roof collapse • Increased heating demands • Frozen pipes leading to water leaks and flooding when temperatures rise
Systems	Impacts to transportation systems, and electricity and water systems: • Power grid strain from increased heating, potentially resulting in power outages • Transportation disruptions due to low visibility, icy road conditions, or heavy snow • Communications disruptions from damaged infrastructure due to ice and freezing rain • Water supply interruptions caused by frozen pipes that burst
Natural/Cultural/Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Historic buildings may not be capable of handling snow loads and may be more susceptible to roof collapse • Flooding may occur after rapid melting of snow • Chemicals used to treat roadways may contaminate natural environments and water bodies if used in large quantities
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Increased heating costs • Disruption of essential services • Cancellation of community and/or sporting events • Reduced economic activity • Expensive response and recovery costs • School closures

4.9. Sea Level Rise

4.9.1. Description

Sea Level Rise, or SLR, is "an increase in ocean surface height relative to land in a specific location" (RIEMA, 2024). SLR is the result of warming polar ice caps and thermal expansion. As sea ice melts, the freshwater flows into the ocean and subsequently raises ocean heights. Thermal expansion is the result of warmer surface water temperatures, nearly 1.5 degrees warmer today than the turn of the century, causing the volume of water to increase. Since the 1930s, Rhode Island's coastline has averaged approximately one inch of sea level rise per decade (RIEMA, 2024). Although one inch may not appear to be much, it can have both direct and indirect effects. Direct effects may be found in high tide flooding or nuisance flooding. Indirect effects may include beach erosion, enhanced storm surge, and saltwater groundwater intrusion.

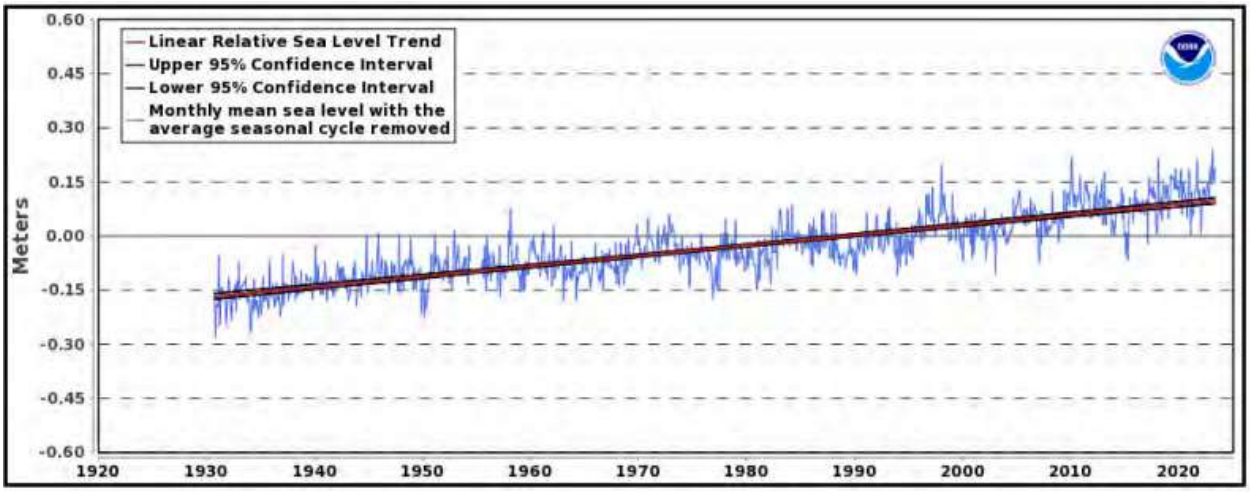
4.9.2. Location

Sea level rise has been ongoing throughout New England for decades. Although the process is macroscale, it can affect assets across Jamestown. A 2013 report by the Rhode Island Statewide Planning Program identified the impact SLR may have on roadways and critical infrastructure across Jamestown. Low elevations are more likely to experience direct effects from flooding as a result of sea level rise. Coastal properties may see high tide flooding and nuisance flooding (also known as "sunny day" flooding) in the coming decades.

4.9.3. Severity/Intensity

SLR is a slow, ongoing process that has steadily increased over the past century. NOAA tracks sea level data for the area around Jamestown. Figure 4-2 illustrates the trend of sea level rise as it has increased since 1939.

Figure 4-2: Newport, RI Sea Level Trend



Source: NOAA, 2024

4.9.4. Previous Occurrences and Frequency

Sea level rise is not reported the same as other natural hazards. According to the Rhode Island HMP, sea levels have risen more than 10 inches since 1930 and localized temperatures have risen as much as 3 degrees Fahrenheit in some locations. CRMC manages a database of shoreline change maps across Rhode Island. Jamestown's entire coastline is mapped and illustrates an ongoing trend of diminishing shoreline. The rate of change varies throughout the island, but it ranges from just a few feet to dozens of feet in lost coastline. This is indicative of the impact SLR has continued to have on Jamestown over the past century.

4.9.5. Probability of Future Hazard Events, including Due to Climate Change

SLR is expected to continue and worsen over the next few decades. According to the Rhode Island HMP, the state could see one foot of SLR by 2050 and as much as three to five feet by the end of the century, which would have significant impacts on Jamestown. Climate change and warming oceans are unlikely to slowdown in the near future. As polar ice caps continue to melt and oceans warm to upward of 2 degrees Celsius, sea levels will continue to rise and threaten coastal properties and infrastructure. Higher sea levels will result in higher storm surge, high tide and nuisance flooding, coastal erosion, and saltwater groundwater intrusion.

4.9.6. Vulnerability and Impacts

SLR presents a town wide threat to Jamestown and will likely have lasting impacts on daily life and long-term visions of the future. The Rhode Island Statewide Planning Program developed a "coastal sea level rise and storm surge: transportation fact sheet. Table 4.16 is taken from Figure 4, "Top 10 Road Assets in Jamestown vulnerable to sea level rise" in the fact sheet.

Table 4.16: Top 10 Road Assets in Jamestown Vulnerable to Sea Level Rise (SLR)

Mun. Rank	Road Name	Amount of Flooded Roadway by SLR				Total Linear Feet	Evac. Route	Intermodal Facility	Functional Classification
		1ft	3ft	5ft	7ft				
1	Conanicus Road	0	0	1,558	389	1,946	Yes	Yes	Minor Art.
2	North Road	0	1,257	328	207	1,791	Yes	Yes	Minor Art.
3	East Shore Road	0	0	529	1,349	1,878	Yes	No	Minor Art.

Mun. Rank	Road Name	Amount of Flooded Roadway by SLR				Total Linear Feet	Evac. Route	Intermodal Facility	Functional Classification
		1ft	3ft	5ft	7ft				
4	Beavertail Road	0	0	1,038	651	1,689	Yes	No	Major Coll.
5	Fort Getty Road	0	332	658	405	1,396	Yes	No	Local
6	Seaside Drive	0	0	830	608	1,438	Yes	No	Local
7	Pell Bridge	6	10	7	7	30	No	No	Freeways
8	State Hwy 138 E	3	7	7	9	27	No	No	Freeways
9	State Hwy 138 W	6	11	7	10	34	No	No	Freeways
10	Racquet Road	0	0	574	145	719	No	No	Local

Source: Rhode Island Statewide Planning Program, 2013

This table demonstrates that there is a major risk to Conanicus Road and various other arteries across Jamestown. Even with just 1ft of sea level rise, which may occur as soon as 2050, three separate freeways are at risk of localized flooding.

Table 4.17: Impacts due to SLR in Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Migration inland or to the mainland due to recurring inundation • Isolation due to road closures • Increase in vector-borne diseases and bacterial infections • A need to find alternative sources of freshwater as a result of saltwater intrusion
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Damage to facilities • Inundation during high tides or at any time depending on the severity of SLR
Systems	Impacts to transportation systems, and electricity and water systems: • Bridge and roadway infrastructure closures

Asset Category	Possible Impacts
	• Jamestown WWTF could experience inundation from storm surge as a result of SLR
Natural/Cultural/ Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Damage or destruction of the natural environment • Ecosystem degradation and reduced water quality due to increased sedimentation, nutrients, and contaminants from agriculture practices, stormwater runoff, and septic overflow. • Loss of habitat • Coastal erosion • Changes in river and stream ecology • Forest health degradation • Damage to cultural resources and sites • Damage to historic buildings and sites • Parks and public spaces could experience damage or disruptions • Saltwater intrusion
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Business interruption • Limited patrons resulting in reduced revenue • Increased costs of maintenance • Increase in demand for municipal services • Increased cost for response and repairs • Temporary loss of community activities • Diminished property value along coastline • Increased flood insurance costs for residents within flood zones

4.10. Inland Flooding

4.10.1. Description

Extreme precipitation events can result in flooding, often characterized as "inland flooding" to distinguish it from coastal flooding. This section addresses the risks associated with flooding from high precipitation events, which include convective storms (thunderstorms or other typically sudden and extreme precipitation events), Nor'easters, and hurricanes. Also included are inland flood events caused by extreme rainfall events, riverine overtopping, overwhelmed stormwater systems, ice jams blocking drainage described in greater detail below. Dam failure can also result in inland flooding and is discussed further in Section 4.13.

Riverine Flooding: Riverine flooding occurs when excessive rainfall over an extended period collects across a watershed and causes a river to exceed its natural drainage capacity.

Stormwater Drainage Flooding: Stormwater drainage flooding is caused by high-intensity rainfall in combination with high amounts of impervious surface area that prevents infiltration. This causes stormwater drainage systems to reach a state of over-capacity, rather than rain causing a river system to exceed its capacity. Drainage systems are designed to remove surface water from developed areas as quickly as possible to prevent localized flooding on streets and other urban areas. They make use of conveyance systems that channel water away from developed areas to surrounding streams, bypassing natural processes of water infiltration into the ground, groundwater storage, and evapotranspiration (plant water uptake and respiration). Since drainage systems reduce the amount of time that rainfall takes to reach surrounding streams, riverine flooding in developed areas can be exacerbated and may occur more quickly and reach greater depths than less densely developed areas. In addition, undersized, poorly maintained, or clogged drainage system increase the frequency and/or severity of this type of flooding.

Flash Flooding: Flooding that occurs following heavy or extended period of rain so rapidly that people are unable to respond. The flooding is characterized by high velocity waters that often rush through Towns destroying buildings and taking lives. According to the Rhode Island HMP, most flash flooding in Rhode Island is due to hurricanes, Nor'easters, or stationary thunderstorms that bring large amounts of precipitation in a short period of time. Factors that contribute to the severity and speed of flash flooding may include rainfall intensity, duration, drainage condition, ground conditions. These are the likeliest flood event to cause death, whether by drowning or debris.

Ice Jams: An ice jam is an accumulation of ice that acts as a natural dam and restricts the flow of a body of water. There are two types of ice jams: a freeze-up jam and a breakup jam. A freeze-up jam usually occurs in early to mid-winter during extremely cold weather when super-cooled water and ice formations extend to nearly the entire depth of the river channel. This type of jam can act as a dam and begin to back up the flowing water behind it. The second type, a breakup jam, forms because of the breakup of the ice cover at ice-out: large pieces of ice move downstream, potentially piling up at culverts, around bridge abutments, and at curves in river channels. Breakup ice jams occur when warm temperatures and heavy rains cause rapid snowmelt. The melting snow, combined with the heavy rain, causes frozen rivers to swell. The rising water breaks the ice layers into large chunks, which float downstream and pile up near narrow passages and obstructions (bridges and dams). Ice jams may build up to a thickness great enough to raise the water level and cause flooding upstream of the obstruction.

4.10.2. Location

Floods can impact a small portion of the Town or the entire Town of Jamestown. Areas of lower elevation are more likely to experience impacts from flooding. Precipitation can land in any location within Jamestown and cause localized flooding. Lowland areas, properties and roadways along waterbodies, and locations with poor drainage are likeliest to experience inland flooding.

4.10.3. Severity/Intensity

Rainfall events with greater return periods will have much more rain than a smaller return period, and thus will cause more flooding and greater damage. The table below outlines the amount of precipitation that would fall during various return periods in Jamestown.

Table 4.18: 2030, 24-hour rainfall depth

Return Interval	1 year	2 years	5 years	10 years	25 years	50 years	100 years
Depth (inches)	2.8	3.3	4.1	4.9	6.1	7.3	8.6

Flooding from precipitation can vary in severity and intensity depending on several factors, including the amount and duration of rainfall, topography, soil conditions, land use patterns, and the capacity of drainage infrastructure. Increases in intensity and duration of precipitation on rainy days can lead to flooding, stress on built infrastructure and ecosystems, and consequent impacts on human health.

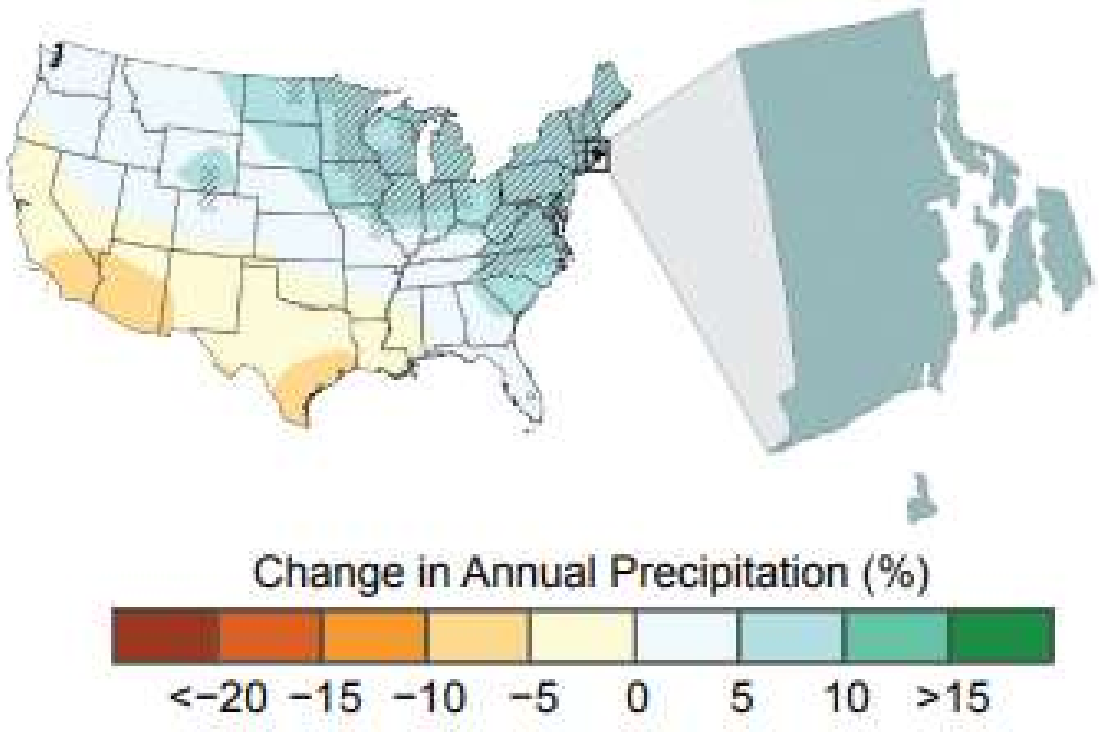
4.10.4. Previous Occurrences and Frequency

Since the previous hazard mitigation plan update in 2017, no inland flooding events occurred within Jamestown's boundaries outside of Nor'easters and extra-tropical systems. A total of seven flash flood events and eight flood events occurred in all of Newport County since 1950 (RIEMA, 2024).

4.10.5. Probability of Future Hazard Events, including Due to Climate Change

Forecasting precipitation under climate change is complex, but scientists expect that there will be more precipitation overall in Rhode Island, on an annual basis and in most years: higher temperatures will mean the moisture-holding capacity of the atmosphere increases, but also that evaporation rates are higher. Patterns to date suggest that annual precipitation is likely to be more variable, and fall over few days, but that precipitation will be more intense on days when it does rain or snow. According to climate projections for Rhode Island, annual precipitation will increase and fall more intensely at the daily to weekly scale. This may lead to downpours that backup stormwater drains and cause localized flooding. As shown in Figure 4-3, all of Rhode Island is expected to experience a roughly 5% increase in annual precipitation by mid-century compared to the end of the 20th century (NOAA, 2022).

Figure 4-3: Projected Change in Annual Precipitation



Source: NOAA National Centers for Environmental Information, 2022

4.10.6. Vulnerability and Impacts

Precipitation flooding includes stormwater flooding, riverine flooding, and flooding from dam overtopping. Riverine flooding is most likely to impact areas closest to bodies of water, while stormwater flooding can occur anywhere in the Town. Stormwater flooding is often concentrated to smaller areas including parking lots and roadways. Dam overtopping can impact areas adjacent to and downstream of the dam. Dams are categorized by DCR as "high hazard," "significant hazard," and "low hazard." Both of Jamestown's dams are classified as "significant" hazard dams. Higher hazard dams post a greater risk to downstream populations.

Much of the infrastructure in Jamestown, including bridges, stormwater systems, and roadways were designed based on historical rain events. With increased frequency and severity of storm events, inland flooding could become an increased vulnerability for the Town to manage. Recently, more frequent occurrences of flood events larger than the historic have occurred and put vital infrastructure at risk. Much of the population of Jamestown lives on local roads, and damage to the road network could impact a large percentage of the population and result in inability for them to get to work, appointments, and other essential locations.

Using HAZUS information, the estimated damages that would occur in Jamestown from 100- and 500-year flood events were assessed. Past flooding events are known to have displaced significant numbers of residents. Related data are compiled in Appendix E.

In addition, as part of exposure analysis, community assets were mapped with flood zones and projected sea level rise in Map 2 in Appendix C. Some community assets that are at risk of flooding due to their proximity to mapped inland flood zones include:

- North Pond Dam
- South Pond Dam

There are some community assets of historical significance in Jamestown that are vulnerable to flooding due to their proximity to flood zones, as well:

- Fort Getty/Fort Wetherill
- Beavertail Light

Table 4.19: Impacts due to Flooding from Precipitation

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Physical injury or death • Increase in physiological stressors • Displacement due to building damage • Isolation due to road closures • Mold and allergens from water damage creates an increased risk to people with existing respiratory damage • Increase in vector-borne diseases and bacterial infections • Increased rate of emergency room visits
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Water damage to internal and external of buildings, including houses, governmental buildings, community lifelines, and critical infrastructure • Damage to facilities
Systems	Impacts to transportation systems, and electricity and water systems: • Disruption to roadways because of water and debris blocking routes and road washouts, making transportation networks impassible or unsafe • Damage to utility infrastructure • Bridge support scour • Dams are at higher risk of overtopping or experiencing damage from flooding
Natural/Cultural/Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Damage or destruction of the natural environment • Ecosystem degradation and reduced water quality due to increased sedimentation, nutrients, and contaminants from agriculture practices, stormwater runoff, and septic overflow. • Loss of habitat

Asset Category	Possible Impacts
	• Erosion • Changes in river and stream ecology • Forest health degradation • Damage to cultural resources and sites • Damage to historic buildings and sites • Parks and public spaces could experience damage or disruptions
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Business interruption • Limited patrons resulting in reduced revenue • Increased costs of maintenance • Increase in demand for municipal services • Increased cost for response and repairs • Temporary loss of community activities

4.11. Coastal Flooding

4.11.1. Description

The Rhode Island HMP defines coastal flooding as the "result of storm surge or wind-driven waves, often caused by hurricanes, extra-tropical storms, and Nor'easters" (RIEMA, 2024). SLR can influence the extent of coastal flooding as rising water levels and tides encroach on what were once beaches and dry land. In the event of an extratropical system, storm surge may have devastating impacts. These are unusually large waves that crash further inland, resulting from a storm. They may overtop coastal barriers and force seawater up freshwater bodies and even infiltrate groundwater and agricultural lands with saltwater.

4.11.2. Location

Properties that lie adjacent to the coastline are particularly vulnerable to these types of floods. Jamestown is particularly prone to coastal flooding and storm surge since it's an island. Floods can impact a small portion or the entirety of the Town. Areas of lower elevation are more likely to experience impacts from flooding.

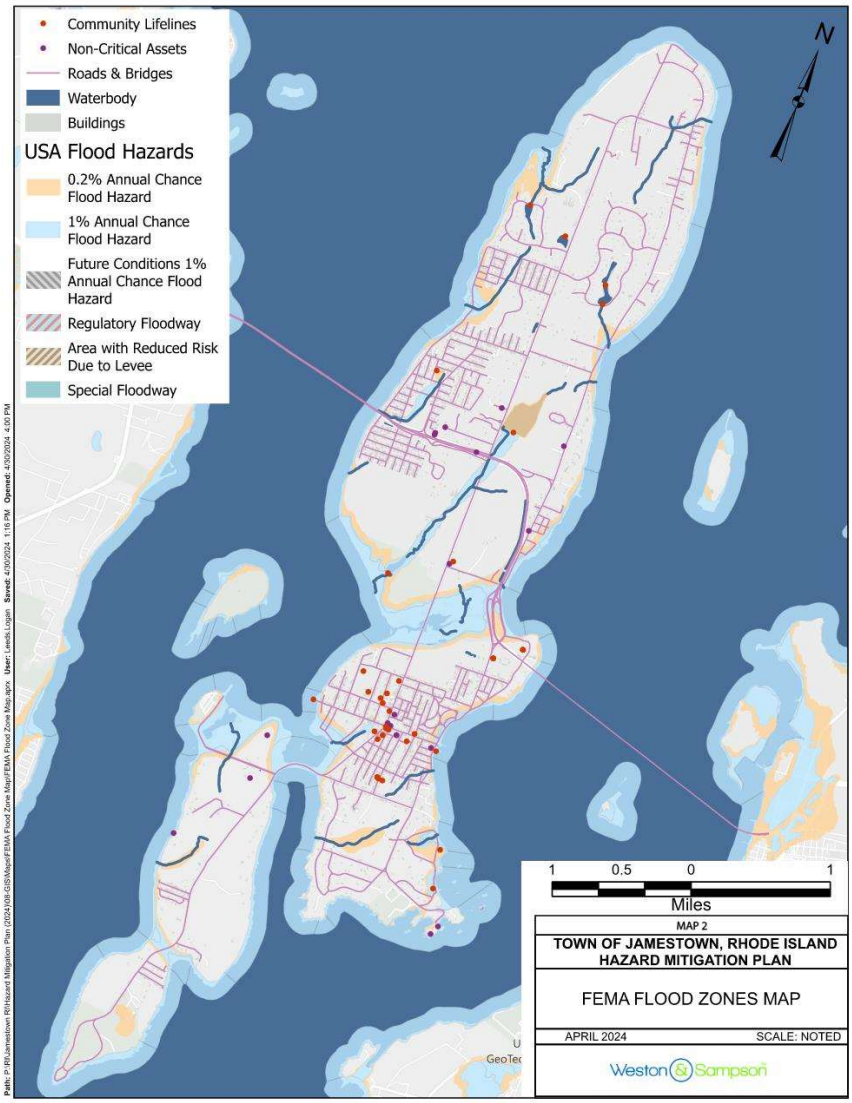
The Federal Emergency Management Agency (FEMA) characterizes the current hazard using floodplain boundaries. These data include the locations of FEMA flood zones:

- The 1 percent annual chance event (also sometimes referred to as 100-year flood) zones, including both A Zones and V Zones
- The 0.2 percent change event (or 500-year flood) zones

While A and V Zones are more likely to experience flooding than X zones, it is still possible to experience flooding in X zones.

Figure 4-4 shows FEMA Flood Zones in Jamestown. This map is also included in Appendix C.

Figure 4-4: FEMA Flood Zones in Jamestown



4.11.3. Severity/Intensity

Coastal flooding, especially in the form of storm surge, can cause widespread damage and result in casualties across Jamestown. Approximately 17% of Jamestown is found within the flood zone. Total Area within each flood zone is shown in *Table 4.20: Land Area in Flood Zone*.

Table 4.20: Land Area in Flood Zone

Flood Zone	Area Within Flood Zone (Acres)	Area Within Flood Zone (%)
A	14.8	0.2%
AE	48.2	0.8%
VE	572.0	9.4%
X	384.4	6.3%
TOTAL	6,095	16.7%

Source: RIGIS

4.11.4. Previous Occurrences and Frequency

Coastal flooding events typically occurred as part of hurricanes, Nor'easters, and major thunderstorms, which have been discussed in other sections within this chapter. The Rhode Island HMP noted eight coastal flooding events between 1950 and 2023 in the entirety of Newport County. No coastal flooding events were identified by NOAA's Storm Events database, although extratropical storms have resulted in storm surge in recent years.

There are some areas and properties that are more susceptible to flooding than others. As defined by FEMA, a repetitive loss property is any NFIP insured property which has been paid two or more flood claims of $1,000 or more in any given 10-year period (FEMA, 2020). Therefore, repetitive loss data does not represent all losses due to flooding and the number of buildings that experience losses due to flooding is likely higher. Uninsured properties do not receive any aid from FEMA, with the exception of during a disaster declaration, when they may be able to receive a grant for individual assistance. Insured properties can apply for a mitigation grant while uninsured properties cannot.

Since 2017 Hazard Mitigation Plan, there have been 5 NFIP claims. Two were closed without payment and one had a payout for slightly less than $50,000, while the other two were paid out between one and two thousand dollars. National Flood Insurance Report (NFIP) dataset for the Town reports 132 active policies as of May 24, 2024. FEMA provided repetitive loss data that indicates there is one repetitive loss property in Jamestown. The identified repetitive loss property has received an aggregated total building payment of $ 25,153.96 from FEMA on 2 total losses.

4.11.5. Probability of Future Hazard Events, including Due to Climate Change

Jamestown will continue to experience coastal flood events as sea levels rise and storms become more frequent and intensify. Properties within the 100- or 500-year floodplain are likely to experience inundation more frequently than those inland. Table 4.21 outlines the probability of flooding occurrence by recurrence interval.

Table 4.21: Flood Recurrence Probability

Recurrence Interval	Annual Chance of Occurrence	Recurrence Interval Chance of Occurrence	30-Year Chance of Occurrence (Typical Residential Mortgage Term)
10-Year	10%	65%	95.8%
50-Year	2%	64%	45.5%
100-Year	1%	63.4%	26%
500-Year	0.2%	63.2%	5.8%

Source: Rhode Island HMP, 2024

Although the chance of occurrence over the 30-year horizon drops by roughly half with each recurrence interval, it is important to note that those within the 100-year floodplain, or 10% of Jamestown residents have a 1-in-4 chance that their home will be inundated in the next 30 years. SLR may increase this chance and force homeowners to consider moving farther inland or out of Jamestown entirely.

4.11.6. Vulnerability and Impacts

Jamestown is highly vulnerable to coastal flooding and many assets, including key roads, are highly threatened by inundation. Portions of North Road are located in the VE Zone and Beavertail Road was specifically identified within the Rhode Island HMP as an area prone to coastal flooding and having vulnerable access routes. During flooding, the island becomes isolated. Access via Beavertail Road is no longer possible and resources cannot assist in other areas. The Town also fears that the Jamestown WWTF could be impacted. The Jamestown WWTF is located close to the coast, which could lead to health problems and unsanitary conditions if damaged. Pump stations, including the Maple Avenue and west end of Narragansett Avenue/Dutch Harbor, are also vulnerable to coastal flooding and saltwater intrusion.

Using HAZUS information, the estimated damages that would occur in Jamestown from 100- and 500-year flood events were assessed. Past flooding events are known to have displaced significant numbers of residents. Related data are compiled in Appendix E.

In addition, as part of exposure analysis, community assets were mapped with flood zones and projected sea level rise in Map 2 in Appendix C. Some community assets that are at risk of flooding due to their proximity to mapped coastal flood zones include:

- South Pond Dam
- East Ferry
- West Ferry
- Jamestown Boatyard

There are some community assets of historical significance in Jamestown that are vulnerable to flooding due to their proximity to coastal flood zones, as well:

- Fort Getty/Fort Wetherill
- Beavertail Light

Table 4.22: Impacts due to Coastal Flooding in Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Physical injury or death, including drowning • Increase in physiological stressors • Displacement due to building damage and inundation • Isolation due to road closures • Mold and allergens from water damage creates an increased risk to people with existing respiratory damage • Increase in vector-borne diseases and bacterial infections • Increased rate of emergency room visits
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Water damage to internal and external of buildings, including houses, governmental buildings, community lifelines, and critical infrastructure • Damage to facilities, especially Jamestown WWTF
Systems	Impacts to transportation systems, and electricity and water systems: • Disruption to roadways because of water and debris blocking routes and road washouts, making transportation networks impassible or unsafe • Damage to utility infrastructure • Bridge failure • Dams are at higher risk of overtopping or experiencing damage from flooding
Natural/Cultural/ Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Damage or destruction of the natural environment • Ecosystem degradation and reduced water quality due to increased sedimentation, nutrients, and contaminants from agriculture practices, stormwater runoff, and septic overflow. • Loss of habitat • Erosion • Changes in river and stream ecology • Forest health degradation • Damage to cultural resources and sites • Damage to historic buildings and sites • Parks and public spaces could experience damage or disruptions
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being:

Asset Category	Possible Impacts
	• Business interruption • Limited patrons resulting in reduced revenue • Increased costs of maintenance • Increase in demand for municipal services • Increased cost for response and repairs • Temporary loss of community activities • Diminished property value along the coast • Increased flood insurance costs for residents within flood zones

4.12. Coastal Erosion

4.12.1. Description

Coastal zones are dynamic areas constantly undergoing change in response to a multitude of factors, including sea level rise (SLR), wave and current patterns, hurricanes, coastal flooding and human influences. High winds and associated marine flooding from storm events such as hurricanes, Nor'easters, flooding and SLR, increase the risk exposure along developed coastal lands. Storm impacts and long-term erosion threatens developed areas with potential loss of life and billions of dollars in property damage. In addition to the natural processes that cause erosion, human alterations are affecting erosion rates (RIEMA, 2024).

Erosion has been wearing away bluffs and moving beaches and barriers along the U.S. coastal and Great Lakes shores from the powers of flooding, storm surge, rising sea levels, and high surf. As shorelines retreat inland, waterfront homes, public infrastructure such as roads, bridges, wastewater treatment facilities, and stormwater drainage systems, eventually become severely damaged. The Heinz Center report on the "Evaluation of Erosion Hazards" predicts that over the next 60 years erosion may claim one out of four houses within 500 feet of the U.S. shoreline. Most of the damage will occur in low-lying areas – areas also subject to the highest risk of flooding. Additional damage will also occur along coastal bluffs as waves reach higher on the shoreline and erode the toe of the bluff and gravity takes its course (RIEMA, 2024).

The beaches, barrier spits and coastal bluffs of Rhode Island are vital economic, environmental, and cultural resources. A healthy, wide sandy beach provides protection against the effects of storm surge, coastal flooding, and high surf impacts. The beach and barrier environment provides habitat for marine and terrestrial organisms with beach dependent life stages and is home to species of indigenous and endemic Rhode Island plants. Beaches, barrier spits and coastal bluffs are also the basis for the tourism industry, exceeding by a factor of three all other industries combined when providing direct income to the State (RIEMA, 2024).
Rhode Island's beaches and barriers serve as natural protective buffers between the ocean and the land. During storm events, a beach is able to modify its slope and overall morphology to dissipate the waves. The beach profile is flattened, and the waves coming inshore shoal further out offshore, thus minimizing further erosion. Beaches recover when sand is moved back onto the shore by fair

weather waves, and then is blown inland to reestablish the frontal dunes. The final stage of recovery of the beach and dunes occurs when vegetation grows back over these new dunes. Hence, the narrowing of healthy beaches in response to a high wave event is often a temporary condition (RIEMA, 2024).

4.12.2. Location

The low-lying areas of Jamestown, particularly the sandy beaches, are vulnerable to erosion because of storm surges, waves, and tidal forces. About a third of the coastline is elevated and rocky. However, there are several areas of Jamestown facing serious erosion threats. The first area, which would impact residencies and roads, is the east side of Jamestown, north of Potter Cove and an area of low-lying shoreline along Bayview Drive along Taylor Point, which has lost 8-to-10 feet of the sandy buffer separating the road from the East Passage of Narragansett Bay. The second area is the Mackerel Cove beach, which protects a causeway serving as the only link to the Beavertail Peninsula. Superstorm Sandy devastated the dunes along the causeway (a stretch of Southwest Ave), leaving the road more vulnerable to flooding, especially when storms co-occur with high tides. North Bayview Drive, which runs along the northern tip of Jamestown has experienced roadway failure from both coastal erosion and overland flow and was closed to traffic in 2014.

The Coastal Resources Management Council (CRMC) has adopted shoreline change maps that delineate shoreline rates of change that will be applied to pertinent sections of the Council's regulatory programs to address issues including setbacks of activities from coastal features. These shorelines change maps detail erosion rates for the shoreline and are further detailed into shoreline segments for each map. In total there are 21 such maps for Jamestown (CRMC, 2018).

4.12.3. Severity/Intensity

The average coastal erosion rate is 2.75 feet per year in Rhode Island (CRMC, 2018). Rhode Island's shoreline is naturally eroding and migrating over time. Most of this erosion occurs during short term storm events such as hurricanes and Nor'easters, although factors such as sea level rise and coastal armoring also contribute to erosion (CRMC, 2018). The vulnerability of many of Rhode Island's beaches and shoreline areas to coastal erosion and flooding tends to dramatically increase as manmade structures are allowed to be built along the shoreline thus impeding the natural, dynamic system of the beach.

Coastal armoring and the construction of jetties and groins may save the beach or one private property owner, but it severely impacts sediment deposits from occurring down shore of the structure, thus accelerating erosion activity and negatively impacting property owners in these locations. There are several seawalls constructed along the east side of Jamestown that are designed to prevent the action of tides and waves from flooding roads and buildings. However, these seawalls conflict with dynamic nature of the coast and prevent the natural exchange of sediment between lands and sea (Shipman and Stojanovic, 2007). Although these seawalls provide an important function in that they reduce the hazards of coastal flooding, they may also contribute to the coastal erosion of beaches. The CRMC is in the process of developing a Shoreline Change Special Area Management Plan (SAMP), which will provide a long-term place for coastal cities and

towns to plan for and be more resilient to natural processes like erosion, SLR, and flooding (RIEMA, 2024). It is important to enact mitigation strategies because erosion poses a significant threat to property owners, the public and the state's natural resources.

4.12.4. Previous Occurrences and Frequency

Superstorm Sandy had substantial coastal erosion impacts in several areas of Jamestown: extensive dune destruction in Mackerel Cove, and portions of Bayview Drive and Potter Cove were eroded. These areas, in particular Mackerel Cove, have historically been impacted by erosion during significant storm events. In 2011 and 2012 during Tropical Storm Irene and Superstorm Sandy the East Ferry seawall that runs along Conanicus Avenue near the downtown commercial district of Jamestown and the Dumpling seawall along Dumpling Drive were damaged, however, both have since been repaired. The unnamed storms of 2022, 2023 and 2024 have significantly impacted Mackerel Cove Beach and causeway, needing road repair and beach replenishment and replanting. In 2023, the East Ferry Seawall experienced further damage from coastal storms requiring RIDOT rebuilding another section that failed.

4.12.5. Probability of Future Hazard Events, including Due to Climate Change

Coastal erosion consistently occurs and is not necessarily visible over short time horizons. Other hazards, including hurricanes, Nor'easters, sea level rise, and coastal flooding, can facilitate additional erosion. Following major storms, entire coastlines can appear different. Erosion will continue to occur on short and long-term scales. Major natural disasters will have demonstrably large impacts on shorelines and may even destroy beaches along the coast. Sea level rise is likely to exacerbate these issues as the wave action slowly depletes existing coastlines and higher tides encroach closer toward existing property.

4.12.6. Vulnerability and Impacts

Coastal erosion presents a significant threat to Jamestown given its topography and classification as an island. Storms consistently erode beaches and cliff-faces, which can lead to flooding and even landslides. Beach erosion in particular leaves property owners along the coast vulnerable to additional flooding as seawater encroaches further inland. Property owners near cliffs may risk damage from partial or complete collapse or landslides. Beaches that once acted as a barrier from storm surge and high velocity waves may no longer be as effective or extensive. Sea level rise is expected to enhance the need for wider beaches to prevent coastal flooding, but coastal erosion will continue to make this challenging. Properties around Jamestown Shores and the southern portion of East Shore Road are particularly vulnerable to the impacts of coastal erosion due to their proximity to the ocean.

4.14. Dam Breach

4.14.1. Description

Dam failures can result from natural events, human-induced events, or a combination of the two. Failures can occur from prolonged periods of rainfall or flooding resulting in overtopping, the most common cause of dam failure. Overtopping occurs when a dam's spillway capacity is exceeded and portions of the dam that re not designed to convey flow begin to pass water, erode away, and ultimately fail. Other causes of dam failure include design flaws, structural damage, internal soil erosion, inadequate maintenance, or mis-operation. Complete failure can lead to high velocity flow of debris-laden water that rushes downstream, damaging or destroying everything in its path. Multi-hazard disasters may result if a major storm cause dam failure while Jamestown is dealing with direct impacts from the storm. However, "Dry Day" dam failures, or those that occur without warning or cause by a different hazard, are often more damaging since downstream homeowners and residents do not expect the failure.

Intense storms may produce a flood in just minutes. Flash floods can occur quickly and become even more dangerous following dam failures. Rapid downstream flow can cause additional dams to fail and threaten even more lives.

Dams are classified by size and hazard ratings. The size classification provides a relative description of small, medium, or large, based on the storage capacity and height of the impounded water (RIEMA, 2024). The hazard classification relates to the probable consequences of failure or mis-operation of the dam; however, it does not relate to the current condition or the likelihood of failure of the dam. Six dams exist in Jamestown, and none are considered high risk.

The hazard classifications are defined in the Rhode Island Dam Safety Regulations as follows:

Table 4.23: Dam Hazard Potential Classification

Category	Description	Inspection Timeline	Number of Dams
High	Failure or mis-operation will result in a probable loss of human life	Two Years	0
Significant	Failure or mis-operation results in no probable loss of human life but can cause major economic loss, disruption of lifeline facilities or impact other concerns detrimental to the public's health, safety, or welfare	Five Years	2
Low	Failure of mis-operation results in no probable loss of human life and low economic losses	Downstream conditions reassessed to determine if reclassification of dam is necessary	4

4.14.2. Location

Conanicut Island is home to six dams along four separate ponds and brooks. These dams are spread out across the northern portion of Conanicut Island. Primarily located within suburban or rural landscapes, few homes are directly around the waterbodies that have dams and are at risk of failure. Table 4.24 outlines the six dams and their respective information.

Table 4.24: Jamestown Dam Locations and Classifications

Dam Name	Dam Type	Waterbody	Classification
W Reach Drive Pond	N/A	N/A	Low
Tefft Pond	N/A	N/A	Low
Rainbow Upper	Earth	Jamestown Brook	Low
Rainbow Lower	Earth	Jamestown Brook	Low
Jamestown Reservoir (North Pond / Carr's Pond)	Rockfill/Earth	Jamestown Brook	Significant
Jamestown Lower Reservoir (South Pond / Watson Pond)	Earth/Concrete	Jamestown Brook	Significant

Source: RIGIS, 2024

4.14.3. Severity/Intensity

Jamestown faces a low to moderate risk of dam failure given the "low" or "significant" classification of all six dams across Jamestown. These categories indicate that there is a minor threat of infrastructural failure. However, as these dams age and storms become more intense, the risk of dam breach will increase. Residents who live downstream from these dams, especially those that are considered "significant," are at highest risk. These households should have an emergency plan in place for evacuation preparedness and preplanned actions that can be taken in the event of dam failure. Jamestown maintains an approved Emergency Action Plan (EAP) for Jamestown Reservoir and Lower Reservoir Dams. The EAP establishes a monitoring system, which can activate the plan; identifies officials, organizations, agencies, and respective responsibilities for plan implementation; and identifies areas, structures, facilities, and roads that maybe affected by dam failure.

4.14.4. Previous Occurrences and Frequency

Rhode Island has experienced multiple dam failures, primarily following major flood events (RIEMA, 2024). Rhode Island has had 109 dam incidents, many of which have not resulted in property damage, injury, or death (RIEMA, 2024). Jamestown has no recorded history of dam failure.

4.14.5. Probability of Future Hazard Events, including Due to Climate Change

The probability of future dam failure events is not easily measured. Given the lack of previous dam incidents on Conanicut Island, it remains unclear how likely a failure is or how significant a storm

would have to be to cause a breach. However, climate change continues to increase the intensity of storms and may increase the threat of dam failure. Routine inspections, regular maintenance, and proper repair all have the potential to reduce the threat of failure.

4.14.6. Vulnerability and Impacts

Dam breach is of significant concern for the LHMC as such a scenario could occur with little to no warning and have widespread catastrophic impacts. The Town continues to advance its prediction processes and be ready in advance of overtopping. Concerns over rescue attempts and the strain that would place on the Town's existing capacity are ongoing. Neighborhoods downstream from the Jamestown Brook would be at greatest risk due to the large quantity of water flowing at a high velocity. However, the bigger threat would be from the debris flow that would form as water rushed into more densely populated areas. For most of Jamestown, this remains a low concern. The majority of development is found in the east and housing is spread out in areas around the existing dams.

Table 4.25: Impacts of Dam Breach on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Death and Injury • Mental health impacts such as anxiety or PTSD • Displacement • Loss of property
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Damage to buildings from flooding and flowing debris • Power outages • Damage to critical facilities • Damage to roadways
Systems	Impacts to transportation systems, and electricity and water systems: • Damage to transportation infrastructure such as roads or bridges can impact emergency responses and daily travel • Damage to telecommunications infrastructure can disrupt communications • Widespread power outages can disrupt critical facilities, emergency response centers and water treatment plants • Water supply interruptions from flooding or damage to water treatment plants and pipelines • Flooding can overwhelm wastewater systems causing contamination and health risks • Utility services such as gas may be disrupted
Natural/Cultural/ Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Historic buildings may not be able to withstand the water velocity or impacts from floating debris

Asset Category	Possible Impacts
	• Potential for flash flooding
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Decreased economic activity • Expensive response and recovery costs • Damage to businesses or business closures • School closures

4.15. Earthquakes

4.15.1. Description

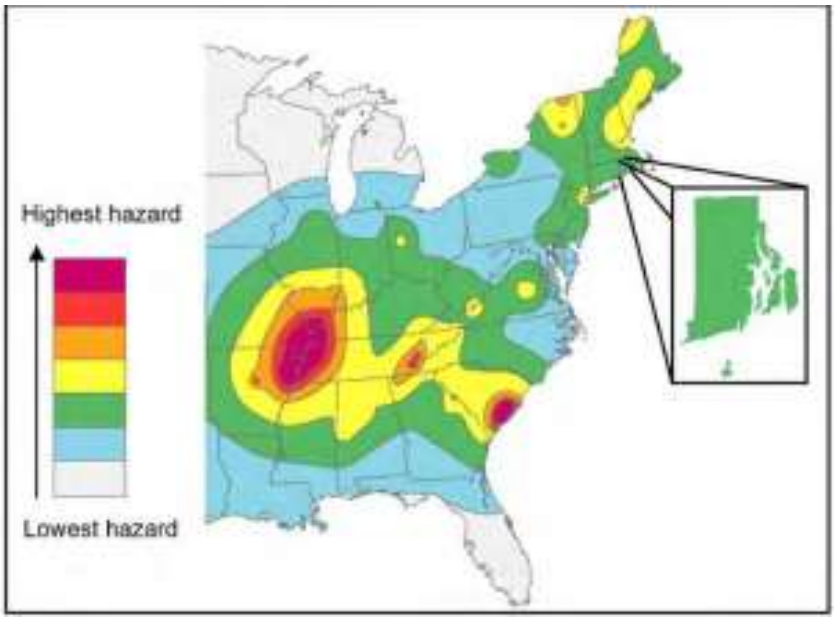
An earthquake is experienced as the vibration of the Earth's surface that follows the release of seismic energy in the Earth's crust. Seismic energy is released when cracks in the crust (called faults) suddenly slip. Earthquakes happen at the edges of the world's tectonic plates, which rub against each other as they move across the surface of the Earth. The stresses of tectonic plate motions also build up within the interiors of the tectonic plates, causing some faults to slip there and cause intraplate earthquakes—though these are much rarer than the plate boundary earthquakes that are common in places such as California (Richardson, n.d.). Scientists are still exploring the cause of intraplate earthquakes; many believe they occur along geologic features that were created millions of years ago and are now weaker than the surrounding areas (Kafka, 2020). New England experiences intraplate earthquakes when stress is released within the interior of the North American plate. Ground shaking and the liquefaction resulting from it are the primary causes of earthquake damage. This damage can vary locally due to soil types that can amplify shaking or are susceptible to liquefaction.

The Rhode Island HMP provides detailed information on the likelihood of earthquakes in the state. Jamestown is no more or less prone than other portions of the state to an earthquake. However, subsequent hazards that form following an earthquake, like tsunamis, are more likely to cause damage to Jamestown given its topography as an island.

4.15.2. Location

New England earthquake epicenters may not follow the major mapped geologic faults of the region, nor are they confined to any geologic structures or terrains. Because earthquakes have been detected all over New England, seismologists suspect that a strong earthquake could be centered anywhere in the region, although it is possible that earthquakes tend to re-occur along pre-existing planes of weakness (Kafka, 2020). Generally, USGS seismic hazard maps show that Rhode Island has a low to moderate level of seismic hazard compared to other areas of the country (RIEMA, 2024).

Figure 4-5: Rhode Island Earthquake Hazard Designation



Source: Rhode Island Hazard Mitigation Plan, 2024

Peak ground accelerations (PGA) with a 2 percent probability of being exceeded in 50 years are predicted to be moderate in Jamestown, around 20– 30 percent the force of gravity. Shaking at this level is known to cause some property damage, such as broken chimneys.

Figure 4-6: Rhode Island Peak Ground Acceleration

Source: Rhode Island Hazard Mitigation Plan, 2024

4.15.3. Severity/Intensity

The location of an earthquake is commonly described by its focal depth and the geographic position of its epicenter. The focal depth of an earthquake is the depth from the surface to the region where the earthquake's energy originates (the focus). Globally, earthquakes with focal depths up to about 43.5 miles are classified as shallow.

Earthquakes with focal depths of 43.5 to 186 miles are classified as intermediate. The focus of deep earthquakes may reach depths of more than 435 miles. Most earthquakes have focal depths of 20 miles or less. The depth to the Earth's core is about 3,960 miles, so even the deepest earthquakes originate in relatively shallow parts of the Earth's interior. The epicenter of an earthquake is the point on the Earth's surface directly above the focus.

Seismic waves are the vibrations from earthquakes that travel through the Earth and are recorded on instruments called seismographs. The magnitude of an earthquake is a seismograph-measured value of the amplitude of the seismic waves. The most widely known scale for earthquake magnitude is the Richter scale, developed in 1935 as a mathematical device to compare earthquakes. The Richter scale has no upper limit.
Importantly, it does not express damage: an earthquake in a densely populated area, which results in many deaths and considerable damage, can have the same magnitude as an earthquake in a remote area that causes no damage. It is the presence of vulnerable assets and populations near an earthquake epicenter, combined with the earthquake magnitude, that determines the amount of damage and where that damage takes place.

The severity of an earthquake is based on the observed effects of ground shaking on people, buildings, and natural features. Intensity is expressed by the Modified Mercalli Intensity (MMI) scale, which describes how strongly an earthquake was felt at a particular location using values ranging from I to XII. Seismic hazards are also expressed in terms of PGA, which USGS defines as the greatest acceleration that "is experienced by a particle on the ground." More precisely, seismic hazards are described in terms of spectral acceleration, defined by USGS as "approximately what is experienced by a building, as modeled by a particle on a massless vertical rod having the same natural period of vibration as the building" in terms of percent of acceleration force of gravity (percent g).

Table 4.26 summarizes the MMI scale, associated damage, and corresponding PGAs and Richter scale magnitudes. The typical comparisons between Mercalli intensity and Richter magnitudes are biased toward the type of earthquakes that happen in California. Smaller magnitude earthquakes can be felt over larger regions in New England, so the Mercalli descriptions for "equivalent"-magnitude earthquakes are not always accurate in this region. For example, a 4.2 magnitude is typically considered to be equivalent to MMI II ("felt only by a few persons"); this may be true on the West Coast, but an earthquake of that magnitude in New England can be felt my many more people over a wide area, sometimes so strongly that people get scared and run out of their buildings (as is typically described for an MMI IV or V earthquake).

Table 4.26: MMI and Equivalent PGA and Richter Scale Magnitude

Mercalli Intensity	Richter Scale Magnitude	Verbal Description	Witness Observations	Acceleration (%g)	Velocity
I	1 to 2	Instrumental	None	< 0.17%	< 0.1
II	2 to 3	Feeble	Noticed only by sensitive people	.1.40%	1.1
III	3 to 4	Slight	Resembles vibrations caused by heavy traffic	1.40%	1.1
IV	4	Moderate	Felt by people walking, rocking of free-standing objects	3.90%	3.4
V	4 to 5	Rather Strong	Sleepers awakened; bells ring	9.20%	8.1
VI	5 to 6	Strong	Trees sway, some damage from falling objects	18.00%	16
VII	6	Very Strong	General alarm, cracking of walls	34.00%	31
VIII	6 to 7	Destructive	Chimneys fall and some damage to building	65.00%	60
IX	7	Ruinous	Ground crack, houses begin to collapse, pipes break	124.00%	116

Mercalli Intensity	Richter Scale Magnitude	Verbal Description	Witness Observations	Acceleration (%g)	Velocity
X	7 to 8	Disastrous	Ground badly cracked, many buildings destroyed; some landslides	> 124.00%	> 116
XI	8	Very Disastrous	Few buildings remain standing, bridges destroyed	>124.00%	> 116
XII	8 or greater	Catastrophic	Total destruction, objects thrown in air, shaking and distortion of ground	>124.00%	> 116

Source: Rhode Island Hazard Mitigation Plan, 2024

Jamestown can be expected to have a low to moderate risk of earthquake damage compared to other areas of the country. However, the damage incurred by even a moderate earthquake would still be relatively high. Therefore, Jamestown can be characterized as a "high impact, low probability" earthquake region (Ebel, 2019). Impacts in Jamestown can vary based on types of construction, building density, and soil type, among other factors.

4.15.4. Previous Occurrences and Frequency

Earthquakes cannot be predicted and may occur at any time. USGS seismic hazard maps are used to determine the likelihood that a given earthquake severity will be exceeded over a defined period. However, these maps are not useful for predicting the timing of individual events.

A 1994 report by USGS, based on a meeting of experts at the Massachusetts Institute of Technology, provides an estimated probability of occurrence for earthquakes above magnitude 5.0 (earthquakes of this size can cause damage near their epicenters, and in general larger-magnitude earthquakes can cause damage over larger areas). This report found that the probability of a magnitude 5.0 or greater earthquake centered somewhere in New England in a 10-year period is about 10 to 15 percent, which the Intergovernmental Panel on Climate Change classifies as "unlikely." This probability rises to about 41 to 56 percent for a 50-year period. Larger earthquakes have lower probabilities of occurrence.

Meanwhile, small earthquakes (magnitude 1 to 1.5) like those experienced in Newport in 2019, typically occur once or twice a month throughout New England (McCarthy, 2021). The rate of earthquake occurrence in New England appears to be fairly constant over time (Northeast States Emergency Consortium, n.d.). There is no research indicating any effects of climate change on the frequency or severity of the earthquakes in the Commonwealth.

A 4.6-magnitude quake hit Kingstown in 1951, the highest intensity ever recorded in Rhode Island. However, only three earthquakes have ever hit Newport County over the last 70 years. On April 5th, 2024, a 4.8-magnitude earthquake originating in New Jersey was felt as far northeast as the south shore of Rhode Island, near Jamestown. However, there have been no epicenters located in Jamestown in recent years.

4.15.5. Probability of Future Hazard Events, including Due to Climate Change

The impacts of climate change on the frequency and severity of earthquakes on Jamestown are unclear. Some scientists and researchers have speculated that the effects that sea level rise will have on groundwater levels near the coast may increase the areas exposed to liquefaction risk. Other and research have considered the impacts of extreme precipitation events on increased frequency and intensity of earthquakes. The likelihood of future seismic events is unlikely to change substantially throughout the implementation of this plan, as changes work on a long geologic time scale.

4.15.6. Vulnerability and Impacts

Earthquakes can result in building collapse, roadway structural damage, water and gas line breakage, flooding, and fires. Landslides may also be triggered by earthquakes. Jamestown is well-prepared in the event of an earthquake. As discussed in Chapter 5, Jamestown's building codes require that structures are able to withstand a direct hit by a 3.0 magnitude earthquake, which are quite rare.

The most significant concern is that the island could be cut off from the mainland in the event of an earthquake. The Federal Highway Administration has conducted studies and provides bridge developers with guidance on ensuring bridges are able to withstand earthquakes. According to the National Bridge Inventory, the Jamestown-Verrazano Bridge was built in 1993 and Newport Bridge was built in 1969. Although both bridges have fair ratings, the risk of a collapse or damage from an earthquake remains a relevant concern. Due to their significant importance to daily movement, evacuation processes, and recovery efforts, additional steps maybe necessary to ensure they are capable of withstanding earthquakes.

Using HAZUS information, the estimated damages that would occur in Jamestown from Magnitude 5.0 and 7.0 earthquakes were assessed. Related data are compiled in Appendix E.

Table 4.27: Impacts of Earthquakes on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Loss of life or severe injury • Vehicle accidents • Injury from debris or falling objects • First responders are particularly at-risk
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Significant structural damage, especially if buildings are not constructed to withstand seismic forces or if there are insufficient evacuation plans • Critical facilities can be impacted or damaged from ground shaking and falling debris • Bridge collapse
Systems	Impacts to transportation systems, and electricity and water systems: • Disruption of government operations • Seismic activity can damage communication infrastructure such as phone lines, cell networks, and data networks • Power outages from damaged electrical infrastructure • Disruption of gas lines, electric lines, or phone service
Natural/Cultural/ Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Potential to trigger secondary hazards such as fires, flash flooding, hazardous materials release, slope failure, dam failure, and tsunamis • Contamination of the environment from hazardous materials • Significant injury to animals or livestock • Historic buildings may not be able to withstand ground shaking due to outdated construction standards
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Expensive response and recovery efforts can drain local resources • Closure of businesses due to damage • Disruption of delivery services due to dangerous transportation conditions

Wildfires

4.16.1. Description

The National Weather Service defines a wildfire as any free burning uncontainable wildland fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment (RIEMA, 2024). Wildfires can occur naturally, by accident, and on rare occasions, by human action. Wildfires are strongly influenced by multiple factors, including weather, topography, fuel type, fuel distribution, fuel moisture content, and drought conditions (RIEMA, 2024).

The 2024 Rhode Island HMP splits the Wildland-Urban Interface (WUI), or "the area where human improvements such as homes, ranches and farms come in contact with the wildlands," into two types: intermixed and interface. The Intermix WUI are areas where housing and vegetation intermingle, and interface WUI are areas with housing in the vicinity of dense, contiguous wildland vegetation" (RIEMA, 2024). Newport County, which includes Jamestown, has approximately 41 square miles of intermix and 8 square miles of interface area (RIEMA, 2024).

Wildfires pose serious threats to human safety and property in suburban and rural sections of Jamestown. They can destroy crops, timber resources, recreation areas, and wildlife habitat.

Figure 4-7. Wildfire Hazard Potential
Source: Northeast-Midwest Wildfire Risk

4.16.2. Location

Jamestown is at a low to moderate risk of wildfire due to its limited WUI and small land area. However, the Town is comprised of a significant amount of open space. Roughly 1,423 acres are considered pasture or brushland, which is highly susceptible to burning (RIGIS, 2024). Wildfires that develop in the WUI threaten infrastructure and livelihoods, but those in remote regions of Jamestown can also endanger people since it maybe less accessible to fire protection services, spreading the fire even further.

Open air burning, the act of any fire in the outdoors or in a structure not completely enclosed by walls and a roof, require a written permit from the Jamestown Fire Department when risk of wildfires is low. Open air burning can increase the risk of wildfires and if the risk of wildfires is heightened the decisions of permit issuance is superseded by state law (RIDEM, 2024).

Figure 4-7 depicts wildfire hazard potential across Jamestown as low to moderate with dark blue areas displaying low potential and yellow displaying moderate potential, per the Northeast-Midwest Wildfire Risk Explorer.

4.16.3. Severity/Intensity

Wildfires have the potential to cause widespread property damage and loss of life if they become uncontrollable. To determine the threat of wildfires on localities, Rhode Island utilizes two systems: the National Fire Danger Rating System and the Characteristic Fire Intensity Scale.

The National Fire Danger Rating System, depicted in Table 4.28, is used to identify the risk of a wildfire starting based on environmental factors. High winds, drought, and unusually high temperatures can increase the risk of wildfires starting and spreading.

Table 4.28: National Fire Danger Rating System

Rating	Description
Low	Fuels do not ignite easily from small embers, but a more intense heat source, such as lightning, may start fires in duff or dry rotten wood. Fires in open, dry grasslands may easily burn a few hours after a rain, but most wood fires will spread slowly, creeping or smoldering. Control of fires is generally easy.
Moderate	Fires can start from most accidental causes, but the number of fire starts is usually low. If a fire does start in an open, dry grassland, it will burn and spread quickly on windy days. Most wood fires will spread slowly to moderately. Average fire intensity will be moderate except in heavy concentrations of fuel, which may burn hot. Fires are still not likely to become serious and are often easy to control
High	Fires can start easily from most causes and small fuels (such as grasses and needles) will ignite readily. Unattended campfires and brush fires are likely to escape. Fires will spread easily, with some areas of high intensity burning on slopes or concentrated fuels. Fires can become serious and difficult to control unless they are put out while they are still small.
Very High	Fires will start easily from most causes. The fires will spread rapidly and have a quick increase in intensity, right after ignition. Small fires can quickly become large fires and exhibit extreme fire intensity, such as long-distance spotting and fire whirls. These fires can be difficult to control and will often become much larger and longer-lasting fires.
Extreme	Fires of all types start quickly and burn intensely. All fires are potentially serious and can spread very quickly with intense burning. Small fires become big fires much faster than at the "very high" level. Spot fires are probable, with long-distance spotting likely. These fires are very difficult to fight and may become very dangerous and often last for several days.

Source: Rhode Island State Hazard Mitigation Plan, 2024

The Characteristic Fire Intensity Scale, used within the Southern Wildfire Risk Assessment Summary Report, is used to determine the severity across 5 classes, ranging from 1 ("very low") to 5 ("very high"). Fire intensity is measured by the energy released from the fire as well as characteristics such as flame length. A commonly used measure of fire intensity is fireline intensity, which refers to the rate of heat transfer per unit length of fire (measured in kW m^{-1} or kilowatt meters) and measures the energy released from the flame (Keeley, 2008). Fireline intensity tends to correlate with flame length. Table 4.29 outlines the Characteristic Fire Intensity Scale.

Table 4.29: Characteristic Fire Intensity Scale

Class	Level of Intensity	Description
1	Very Low	Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.
2	Low	Small flames usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.
3	Moderate	Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.
4	High	Large flames, up to 30 feet in length, short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.
5	Very High	Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Source: Rhode Island State Hazard Mitigation Plan, 2024

4.16.4. Previous Occurrences and Frequency

Jamestown has not experienced a wildfire or brushfire since the 2017 HMP, according to the NOAA Storm Events Database. The Rhode Island HMP recorded ten wildfire events comprising over 61 acres within Newport County since 2019, but none directly affected Jamestown (RIEMA, 2024).

4.16.5. Probability of Future Hazard Events, including Due to Climate Change

Future wildfires are difficult to predict due to the number of variables that can produce and sustain them. The Rhode Island HMP indicates that the likelihood of wildfire in Jamestown is low. It's limited land area and topography also lend to a low wildfire risk. However, precipitation changes, extensive drought, and warmer temperatures, may lead to higher risk of wildfire. Human behavior can also facilitate the development of wildfires, which cannot be determined, including failure to maintain open fires, uncontrolled building fires, and improperly disposing of lit cigarettes. These human-caused incidents can result in growing fires during particularly warm and dry periods.

4.16.6. Vulnerability and Impacts

Wildfires can have extensive and far-reaching impacts. Wildfire smoke can contain harmful pollutants that can cause respiratory problems, especially for people with pre-existing conditions like asthma or COPD. Exposure to smoke can also lead to eye irritation, headaches, and other health effects. Wildfires can also cause physical injuries such as burns and can even potentially be fatal. During wildfire events, people may be displaced from their homes due to the need to evacuate. Wildfires can cause severe structural damage to homes and businesses alike, as well as other property. The loss of personal possessions and cherished belongings can have emotional and financial impacts on individuals and families. Wildfires can destroy or damage critical lifelines such as power lines, water treatment facilities, and transportation infrastructure. This can lead to disruptions in basic services such as electricity, clean water, and transportation. Wildfires can cause soil erosion and other changes to the landscape that impact water quality. This can lead to contamination of drinking water supplies. Wildfires can also impact air quality, which can have implications for the health of individuals and for the operation of critical infrastructure such as airports. Lastly, wildfires can decimate natural landscapes as well as local populations of flora and fauna.

The small land area and isolation from the mainland presents a unique challenge that other municipalities may not experience from wildfires. Firstly, Jamestown solely depends on a volunteer fire department that has limited resources and members, though the Town does have roughly 100 members at any given time. The Department has three engine companies, a ladder company, and a tanker company. Although this may be sufficient to suppress a small wildfire, larger ones may pose a challenge. Additional resources would have to travel over one of the bridges, shipped, or airlifted. Emergency evacuation plans would have to be coordinated in advance of the fire spreading widely.

Table 4.30: Impacts of Wildfire on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Death or injury • Displacement or evacuation

Asset Category	Possible Impacts
	• Loss of property • Mental health impacts such as anxiety or PTSD • Worsening of chronic respiratory illnesses due to smoke and increased particles in the air
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Burning structures • Charring of exterior surfaces • Damage to roofs, walls, or windows • Heat generated by wildfires can weaken or melt building materials
Systems	Impacts to transportation systems, and electricity and water systems: • Wildfire can damage utility infrastructure, including power lines, gas pipelines, and water lines, leading to disruptions in services • Damage to infrastructure such as roads or bridges can disrupt travel and emergency responses
Natural/Cultural/ Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Wildfires can decimate habitats and harm or displace wildlife • Displacement of wildlife can lead to conflicts with human populations • Post-fire landscapes are vulnerable to colonization by invasive plant species which can outcompete native vegetation and disrupt ecosystem function
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Increased insurance claims • Reduced economic activity in areas affected by wildfire • Need for emergency shelters • Expensive response and recovery costs

4.17. Drought and Extreme Heat

4.17.1. Description

Drought is an extended duration of time characterized by below normal levels of precipitation. The duration of a drought can vary widely and occur throughout Rhode Island. Drought differs from other natural hazards as it is a climatic shift that occurs over a long period of time, rather than a sudden event. Droughts can lead to crop failure, water supply shortages, species endangerment, and threaten human health. Higher annual average temperatures and long periods of heat can prolong droughts and their impacts on the environment. The Rhode Island HMP defines extreme heat as "temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks."

Four methods are used to define the severity of drought: agricultural, hydrological, meteorological, and socio-economic. The following definitions are taken directly from the 2024 Rhode Island HMP:

- Agricultural: When the amount of moisture in the soil no longer meets the needs of previously grown crops
- Hydrological: When surface and subsurface water levels are significantly below their normal levels
- Meteorological: When there is a significant departure from the normal levels of precipitation
- Socio-Economic: When the water deficiency begins to significantly affect the population

The Rhode Island Drought Steering Committee utilizes six indices and classification schemes to determine drought severity:

- Palmer Drought Severity Index (PDI): analyzes soil moisture on a regional level
- Crop Moisture Index: determines short-term conditions of agricultural drought
- Annual Precipitation Data: NWS publishes annual precipitation data used to identify regional precipitation trends.
- Groundwater level data: United States Geological Survey (USGS) reports how many months groundwater levels are below normal.
- Stream flow conditions: USGS records the number of months that stream flow levels are below normal
- Surface water reservoir levels: Reported by water suppliers on the height of reservoirs relative to expectations and historical trends

The six criteria are then combined to provide drought classifications for the entire state. Since drought can impact wide areas, the statewide classification is still adequate to describe Jamestown's drought.

Table 4.31 presents the Rhode Island Drought Classifications and data used to determine each drought level.

Table 4.31: State of Rhode Island Drought Classifications

Drought Level	PDI	CMI	Precipitation	Groundwater	Stream Flow	Surface Water Reservoirs
Normal	-1.0 to -1.99	0.0 to -1.0 Slightly dry	Slightly dry	1 month below normal	2 consecutive months below normal	Reservoir levels at or near normal for the time of year
Advisory	-2.0 to -2.99	1.0 to -1.9 Abnormally dry	2 months cumulative below 65% of normal	At least 2 out of 3 months below normal	3 consecutive months below normal	Small index reservoir below normal
Watch	-3.0 to -3.99	2.0 to -2.9 Excessively dry	1 of the following criteria met: • 3-month cum. <65% or 6 • months cum. <70% or 12 • months cum. <70%	4-5 consecutive months below normal	At least 4 out of 5 consecutive months below normal	Medium index reservoir normal
Warning	-4.0 and below	> -2.9 Severely Dry	2 of 3 of the above criteria met: • 3 months cum. <65% and • 6 months cum. <65% and • 12 months cum. <65% or • 3 months cum. <65% and • 12 months <65%	6-7 consecutive months below normal	At least 6 out of 7 consecutive months below normal	Large index reservoir below normal
Emergency	-4.0 and below	> -2.9 Severely Dry	Same criteria as Warning and previous month was a warning	7 months below normal observation wells recording monthly record lows	> 7 months below normal	Continuation of previous month's conditions

Source: Rhode Island Hazard Mitigation Plan, 2024

4.17.2. Location

Jamestown faces a major threat from drought due to its lack of potable water. Although the island has not faced a drought in recent years, if one does occur, it could threaten the water supply for residents. The main water catchment area on Conanicut Island is the Jamestown Brook Watershed, which provides runoff for both the North and South Reservoirs. The North Reservoir acts as the primary water supply for the Town while the South provides a secondary source in case of emergency. Drought and high temperatures pose a significant risk to these surface waterbodies due to the human, environmental, and economic impacts that may arise if they are unable to maintain adequate water levels.

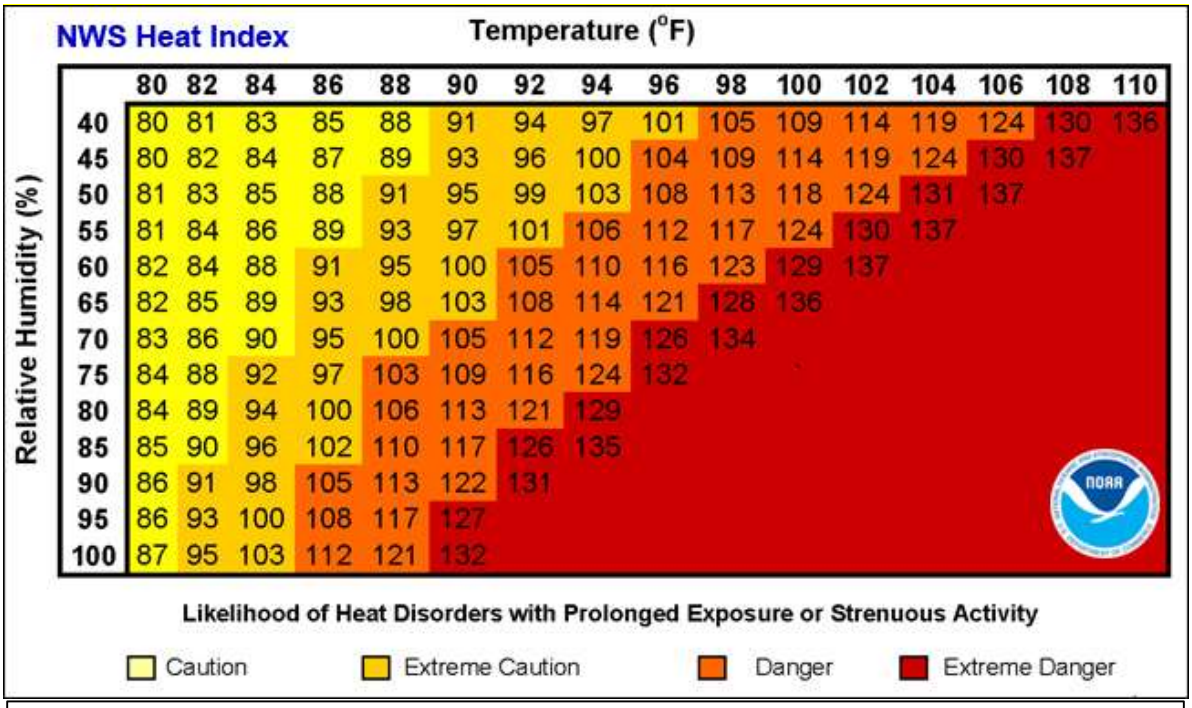
4.17.3. Severity/Intensity

Jamestown averages approximately 40 inches of precipitation per year, slightly below Rhode Island's average. According to the Jamestown Comprehensive Community Plan, over 55% of the Island's residents get their drinking water from the public water supply. Drought can have wide reaching impacts and can last years or even decades. However, short-term extreme high temperatures can also have devastating impacts. Heat waves are extreme heat phenomena that can affect Jamestown. Heat waves are identifiable as 3 or more consecutive days when maximum temperatures greater than 90°F occur. This implies that there is an extended period of unusually high temperatures, causing stress on everyday operations and physical health (EEA & EOPSS, 2018).

Another extreme heat phenomenon that is relevant for Jamestown is the urban heat island (UHI) effect. The term "heat island" describes built-up areas that are hotter than nearby rural or shaded areas. An urban environment like the town also exacerbates the effects of extreme heat through the presence of impervious surfaces. Increased tree canopy and other engineered green infrastructure solutions, such as bioretention basins, rain gardens, green roofs, and highly reflective surfaces, as well as built shade structures have the potential to reduce the UHI effect in Jamestown.

Relative humidity can worsen human health effects as temperatures increase. The extent of extreme heat temperatures is generally measured through the NWS Heat Index, which is based both on temperature and relative humidity, and describes a temperature equivalent to what a person would feel at a baseline humidity level. Figure 4-8 presents the heat index chart as published by the National Weather Service and NOAA.

Figure 4-8: National Weather Service Heat Index



Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Source: NWS, 2023

4.17.4. Previous Occurrences and Frequency

Extended droughts are rare in Rhode Island with a two-month long drought occurring between September and November 2016 in Newport County (NOAA, 2024). No extreme heat events were reported by the NOAA Storm Events Database. The USDA also declared a "Secretarial Drought Disaster" in 2020 and 2022. The U.S. Drought Monitor found that Newport County at least "abnormally dry" approximately 25% of the weeks between 2000 and 2023. The variability in how agencies identify droughts demonstrates the complexity in these long-term events. Overall, drought declarations have increased in southern New England over the past two decades. Whether conditions are simply "abnormally dry" or federally deemed a "drought," the frequency of such events are increasing as temperatures rise.

4.17.5. Probability of Future Hazard Events, including Due to Climate Change

Climate change has already had devastating impacts on temperature and precipitation patterns. Climate change continues to threaten prolonged drought due to warmer temperatures and an increased demand for water resources. Using the U.S. Drought Monitor as a proxy for future likelihood of drought, it appears that, on average, one-in-four weeks each year are expected to experience drought-like conditions (RIEMA, 2024).

Extreme heat is expected to become more common in Rhode Island as greenhouse gases emissions continue to trap heat and warm the planet. Rising average temperatures produce a more variable climate system which may result in an increase in the frequency and severity of extreme temperature events (RIEMA, 2024). The Climate Explorer tool from the federal government provides future projection of days with a maximum temperature over 90 degrees Fahrenheit through the year 2099. By 2030, Jamestown is expected to experience an average of ~8 days per year with a temperature greater than 90 degrees. This number is projected to at least double by mid-century and could quadruple by the end of the century (NEMAC, 2024).

4.17.6. Vulnerability and Impacts

Droughts can lead to water scarcity, which can affect drinking water supplies, sanitation, and hygiene. Lack of access to safe drinking water can lead to dehydration, malnutrition, and waterborne illnesses, which can be especially harmful to children and vulnerable populations. Droughts can cause the soil to dry out, shrink, and crack, which can lead to settlement and subsidence of buildings. This can result in damage to foundations, walls, and other structural elements. Droughts can impact water infrastructure, including reservoirs, wells, and pipelines. Lower water levels can impact water quality and availability, leading to water rationing and potentially causing damage to infrastructure due to exposure. Finally, droughts can impact soil quality by reducing moisture levels, leading to soil erosion, degradation, and reduced fertility. This can impact agriculture, food production, and ecosystem health.

Extreme high temperatures can have severe impacts on the Town of Jamestown. During instances of extreme heat, the frequency of heat stroke, heat stress, or heat related illness is higher. High temperatures can cause people to lose fluids more quickly than usual, leading to dehydration. Dehydration can cause headaches, dizziness, and fatigue. This is especially true for individuals who work physically demanding jobs outside, such as landscapers or construction workers. These individuals should be considered vulnerable during episodes of extreme heat. Extreme heat can cause materials such as concrete, asphalt, and steel to expand and contract, leading to cracking, warping, and other forms of structural damage. High temperatures also increase the demand on the water supply, which can potentially lead to shortages. Jamestown is currently in the process of negotiating its agreement for purchase of potable water with North Kingstown. If North Kingstown's water supply was not sufficient, the National Guard would step in to assist Jamestown's water supply emergency needs. This has previously happened before in 1991. High temperatures also increase the risk of wildfires, which can cause significant damage to structures and infrastructure.

Table 4.32: Impacts of Extreme High Temperatures and Drought on Jamestown

Asset Category	Possible Impacts
People	Impacts to people's health, welfare, and safety, including underserved communities and socially vulnerable populations: • Increased risk of dehydration, death, heat-related illness, heat exhaustion, and heat stroke • Most at-risk populations include children, the elderly, the homeless, and those that work outside • Dry soils can increase the number of airborne particles such as pollen and smoke with can worsen chronic respiratory illness
Structures	Impacts to buildings, facilities, lifelines, and critical infrastructure: • Extreme heat can lead to structural damage such as cracking or warping • Power outages, especially in areas powered by hydroelectric power plants • Drying or cracking of sediments can cause foundation damage to structures or the settlement/ subsidence of buildings
Systems	Impacts to transportation systems, and electricity and water systems: • Power grid strain from air conditioning use, potentially resulting in power outages • Extreme heat can cause pavement to soften and buckle leading to road closures and transportation disruptions • Reduced water availability can complicate firefighting efforts • Decrease in groundwater supplies may cause shortages or rationing of water • Waterways can recede which can limit the size of ship that can navigate shallower waters, potentially impacting the delivery of goods and services
Natural/Cultural/ Historic Resources	Impacts to ecosystems, natural habitats, community areas, historical facilities and locations, and cultural resources: • Potential increase of wildfires during extreme heat • Extreme temperatures may alter migrations, allow for invasive species, decrease crop yields, and adversely affect livestock • Damage to wildlife habitat, degradation of air and water quality, wildfires, degradation of landscape quality, loss of biodiversity, soil erosion • Loss of wetlands, lakes, and vegetation • Impact on crop production and supplies of animal feed • Increased potential for fires

Asset Category	Possible Impacts
Economic and Community Assets	Impacts to people's ability to work and make a living, and impacts to activities that benefit the community by increasing community morale and well-being: • Waterways can recede which can limit the size of ship that can navigate shallower waters, potentially impacting the delivery of goods and services • Potential to drain state and local resources, which can have a significant fiscal impact on local government

4.18. Summary

The following table summarizes changes in population patterns and land use and development and how those impact hazards in Jamestown.

4.18.1. Changes in Population Patterns

Vulnerable Populations

The statistics discussed in Table 4.33 are relevant to the evaluation of the impact of how population patterns influence the impact of the hazards evaluated for this plan:

Table 4.33: Vulnerable Population Trends and Natural Hazards

Population Trend	Influence on Natural Hazard Impact(s)
The Town's elderly population has increased as a percent of population by 12%, going from making up 18% of the population in 2010 to 31% of the population in 2020. The elderly population is not particularly concentrated in any area of the island according to census data.	Older adults may have limited mobility and limited access to transportation, which may make it harder to evacuate quickly in sudden natural hazard events like floods, wildfires or hurricanes. This and financial limitations also can make it challenging to undertake preparatory activities, reach shelters or obtain food, water or needed medicines during high wind events, hurricanes, or severe winter weather. Events which effect travel within Town and to neighboring communities can disrupt caregiving services during a disaster. The stress of natural disasters can also exacerbate chronic health conditions and make it harder for elderly individuals to cope with natural disaster impacts.
The Town's population of people of color has increased as a percent of population slightly from 2010 to 2020, from 4.7% to 6.9% of population, with the largest	Populations of color may have limited access to savings, insurance, and recovery funds can hinder their ability to rebuild after a disaster. Communities of color tend to experience higher rates of

Table 4.33: Vulnerable Population Trends and Natural Hazards

Population Trend	Influence on Natural Hazard Impact(s)
increase among the Hispanic population (+34) and population of two or more races (+57).	underlying health conditions (such as asthma, diabetes, and hypertension) that can be exacerbated by disasters. Some people of color, particularly immigrants and refugees, may face language barriers or fear of interacting with government agencies due to immigration status.
The percentage of households living below the poverty line has decreased significantly, going from 3.4% of the population in 2010 to 9.4% in 2020.	The decline in the population living below the poverty line may mean that Jamestown's population overall has increased access to resources that enable them to prepare for, live during and recover after a disaster.
The number of vacant homes has remained steady, making up 21% of all housing units. There are fewer vacant homes as a percent of all homes in the Village center (approximately 10%), while there are more vacant homes (between 20-30%) in other areas of the Town (American Community Survey Data via PolicyMap).	The presence of a seasonal population can introduce additional complexity in planning for and responding to natural hazards. Natural hazard events that occur during the Town's "peak season" may overwhelm local emergency services and shelters. Seasonal residents may be unfamiliar with evacuation routes on the island or specific areas with increased risk (for example areas of Town with recurrent flooding). The typical disasters that are exacerbated by a seasonal population include **hurricanes, high wind/thunderstorms, inland/coastal flooding, wildfires and extreme heat**. Droughts could reduce the safe yield of North Pond, the primary water supply, which is already under pressure during peak demand periods in summer.

4.18.2. Changes in Land Use and Development

The Town of Jamestown has not seen major changes in land use or development since the last HMP. The Town has seen approximately 10 homes built per year between 2015 and 2023. Development is restricted in areas reserved for conservation and open space zoning districts. Jamestown also has zoning regulations (High Groundwater Table and Impervious Layer Overlay District) in place that limit development in areas with a high groundwater table and impervious soils (particularly Jamestown Shores), in order to reduce groundwater contamination and manage storm runoff. The town also has limited public water and sewer services, which limits the development potential of at risk areas like Jamestown Shores. The Town has existing enforceable policy that was implemented prior to the last plan. As a result, the Town saw a decrease in vulnerable development over the term of the 2016 plan. The Town will continue to implement this approach.

Table 4.34: Land Use and Development Trends and Natural Hazards	
Land Use and Development Trend	Influence on Natural Hazard Impact(s)
Consistent, low rates of new development.	All new developments will exacerbate heat island effect during **extreme heat** if the development includes tree removal and adding black surfaces such as asphalt and roofs. New developments will create new demand for limited water resources, which is of special consideration during **droughts**. Development adjacent to wooded and forested areas can increase risk of **wildfire**. The impact of new developments on flooding risk is limited due to Jamestown's implementation of the High Groundwater and Shallow Impervious Surface Layer Overlay District regulations. Sea-level rise poses a direct threat to Jamestown's water supply infrastructure, particularly the town's surface water reservoirs (North and South Ponds). The rising sea levels can lead to saltwater intrusion, especially during storm surges, which would degrade the quality of the freshwater supply.

Table 4.35 provides definitions of hazard location, extent, frequency, and probability. The definitions support the basis of determination in Table 4.36.

Table 4.35: Description of Natural Hazard Risks for the Town of Jamestown

Points	Description
Hazard Extent (Severity/Intensity)	
Minor	Limited damages to property, no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e., one or two neighborhoods); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.
Serious	Scattered major property damage (more than 10% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services briefly interrupted up to 1 day; some minor injuries.
Extensive	Consistent major property damage (more than 25%); major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and possible fatalities.

Points	Description
Catastrophic	Property and public infrastructure destroyed (more than 50%); essential services stopped for 30 days or more, multiple injuries and fatalities.
Present Frequency of Hazard	
Very Low	Events that occur less frequently than once in 100 years (less than 1% chance per year).
Low	Events that occur from once in 50 years to once in 100 years (1% to 2% chance per year).
Medium	Events that occur from once in 5 years to once in 50 years (2% to 20% chance per year).
High	Events that occur more frequently than once in 5 years (greater than 20% chance per year).
Future Probability of Hazard	
Very Low	Events that are projected to occur less frequently than once in 100 years (less than 1% chance per year).
Low	Events that are projected to occur from once in 50 years to once in 100 years (1% to 2% chance per year).
Medium	Events that are projected to occur from once in 5 years to once in 50 years (2% to 20% chance per year).
High	Events that are projected occur more frequently than once in 5 years (greater than 20% chance per year).
Location of Hazard	
N/A	Hazard has not yet affected town area
Small	Less than 10% of the town is or could be affected by the hazard
Medium	Between 10-50% of the town is or could be affected by the hazard
Large	More than 50% of the town is or could be affected by the hazard

Table 4.36, below, provides a summary of the natural hazards affecting Jamestown. This evaluation takes into account historical records, the extent, frequency, location, and anticipated future probability. Information regarding future projections for specific scenarios is not available for every natural hazard, each hazard section contains best available science, and discusses projections in the context of specific future scenarios when available and appropriate.

Table 4.36: Summary of Natural Hazard Risks for the Town of Jamestown

Natural Hazard	Previous Occurrence of Hazard Event in Jamestown	Present			Future
		Extent	Frequency	Location	Probability of Occurrence
Hurricanes / Tropical Cyclones	Yes	Catastrophic	Low	Town wide	Medium
Tornadoes	No	Serious	Very Low	N/A	Medium
High Wind / Thunderstorms	Yes	Minor	High	Town wide	High
Severe Winter Weather	Yes	Serious	High	Town wide	High
Sea Level Rise	Yes	Serious	High	Coastal	High
Inland Flooding	Yes	Serious	High	Town wide	High
Coastal Flooding	Yes	Serious	Low	Coastal	High
Coastal Erosion	Yes	Serious	High	Coastal	High
Dam Breach	No	Serious	Low	Variable	Cannot be predicted
Earthquakes	No	Minor	Very Low	N/A	Cannot be predicted
Wildfires	Yes	Minor	High	Variable	Medium
Drought / Extreme Heat	Yes	Minor	Medium	Town wide	High

The natural hazard impacts that were of top concern to respondents to this HMP's survey were sea level rise/storm surge, hurricanes/tropical storms, coastal erosion, and winter storms. Half of survey takers identified Mackerel Cove as a vulnerable area and several respondents also listed Zeek's

Creek and North Road at Great Creek. When asked what level importance it is for Jamestown to prioritize different sites in town in protecting them from natural hazards, residents overwhelmingly indicated roads and bridges were very important, which aligns with the public's observation about the vulnerability of these key assets to coastal flooding, erosion and winter storms.

5

5. Community Capabilities

The Town of Jamestown has a unique set of capabilities, in the form of laws, polices, programs, staff, funding, and other resources to carry out the HMP and to increase local climate resilience. This chapter reviews the Town's capabilities and describes the resources Jamestown has available to accomplish hazard mitigation and reduce disaster losses now and in the future. There are five types of mitigation capabilities, which are noted and defined below, in accordance with FEMA's Local Mitigation Planning Handbook:

1. **Compliance with the National Flood Insurance Program.**
2. **Planning and regulatory capabilities** are the codes, ordinances, policies, laws, plans, and programs that guide growth and development.
3. **Administrative and technical capabilities** are the town's staff, skills, and tools.
4. **Financial capabilities** are the resources to fund mitigation actions.
5. **Education and outreach capabilities** are programs and methods that can communicate about and encourage risk reduction.

In each section, the Town's existing capabilities and gaps in capabilities are discussed.

5.1. National Flood Insurance Program Compliance

Communities across the country build their floodplain management capabilities by participating in the National Flood Insurance Program (NFIP). The NFIP supports flood risk reduction before and

after disasters. It helps reduce the socioeconomic impact of floods. The NFIP allows property owners and renters in participating communities to purchase federal flood insurance policies to recover financial losses after a flood. To participate in the NFIP, communities adopt and enforce floodplain management policies to reduce the effects of flooding.

5.1.1. Existing Capabilities

Staff Resources

Jamestown's Building and Zoning Official is currently responsible for administering the requirements of the NFIP. The Building and Zoning Official has been trained on the NFIP requirements, including the Rhode Island Building code R-322, RISBC2 Manual as well as ASCE-24 Manual – Flood Resistant Design Construction. The Building and Zoning Official is responsible for damage assessment following a natural disaster incident, but does not have other responsibilities, such as tracking and compiling Letters of Map Changes. The Building and Zoning Official enforces FEMA regulations for rebuilding following substantial damage. All new structures will be elevated to FEMA regulations and retrofitted to withstand future damages. This is part of the ongoing policy and standard practice for the Building Official by enforcing the State Building Code. The Town has an inordinate number of demolitions and rebuilds and whenever someone rebuilds, they must comply with all FEMA regulations.

Regulation

The Town of Jamestown entered the NFIP in 1978. The initial Flood Insurance Rate Map (FIRM) became effective on April 20, 1972 (https://www.fema.gov/cis/RI.pdf). The current effective FIRM date is September 4, 2013 (https://www.fema.gov/cis/RI.pdf).The town's current flood insurance study became effective July 6, 2021 (Federal Emergency Management Agency, 2021).

Applicants wishing to build in the flood plain must get a permit from Rhode Island Coastal Resources Management Council (CRMC). During the construction process the Town's Building Department is responsible for monitoring and compliance. The Town reviews and records elevation certificates.

Community Rating System

The Town of Jamestown, although has certified staff, does not currently participate in FEMA's Community Rating System Program (CRS) (https://www.fema.gov/cis/RI.pdf). According to FEMA data, the total cost of premiums in Jamestown is $ 126,716. Jamestown's previous HMP indicated a desire to join the CRS, and this remains a goal for the Town in this HMP, though the Town recognizes that this will add additional workload to a small-town staff.

Insurance Summary

The Town of Jamestown currently has 132 active policies in effect with total premiums paid of $126,716. According to data provided by FEMA, as of May 23, 2024, there is one repetitive loss property located in Jamestown, which is a single family residential property.

NFIP Compliance History

There are no known NFIP compliance issues for the Town of Jamestown.

5.1.2. Capability Gaps

Based on evaluation with the NFIP Compliance, the following gaps in capabilities are identified and can be incorporated into the mitigation strategy:

- Though Jamestown does not currently participate, Jamestown aims participate in FEMA's CRS program. The CRS program is an incentive program that promotes floodplain management regulations that go beyond the minimum requirements set by the NFIP. The CRS program has 19 creditable activities. When communities implement these activities, they receive points. The more points a community scores, the greater the discount on flood insurance premiums will be for citizens of that community. In order to join the CRS program, Jamestown must remain in good standing with the NFIP and have enough credit points to achieve a Class 9 rating (500 points). The first step toward joining the program is completing an application and providing a letter of interest to FEMA.

5.2. Planning and Regulatory Capabilities

Planning and regulatory capabilities encompass a wide range of tools such as codes, bylaws, policies, laws, plans, and programs that guide growth and development. These capabilities play a crucial role in either supporting risk reduction or creating areas that are more vulnerable to disasters. These strategies are aimed at breaking the cycle of disaster damage and equivalent replacement. Additionally, effective law and regulation for disaster risk reduction are critical in shaping choices for sustainable development and building resilience to disasters.

5.2.1. Existing Capabilities

The following discusses Jamestown's current planning and regulatory capabilities to address natural hazards.

Building Code

Jamestown uses the Rhode Island State Building Code through the Building Code Commission. The Code is implemented statewide and enforced through the building official in each municipality. The Code consist of uniform regulations to control construction, reconstruction, repair, removal, demolition, and inspection of all buildings. The NFIP standards, wind, and snow loads are all an

integral part of the State Building Code, ensuring that all new construction and substantial improvements meet national flood resistant standards through consistent statewide application of the NFIP minimum criteria.

Jamestown has adopted stronger building codes for construction and re-construction permits than necessary to address earthquake hazards. The codes ensure that structures, other than single- or two-family dwellings built or modified since 1977 will withstand an earthquake that registers up to 3.0 on the Richter scale. The building code also considers flooding hazards. The Code currently allows for construction in flood-hazard areas, provided that the building is structurally flood-proofed and the first-floor elevation is above the base flood elevation (BFE).

Land Use / Development Bylaws and Regulations

The following discusses various municipal codes related to natural hazard mitigation and climate change resilience.

High Groundwater Ordinance

The High Groundwater Ordinance was adopted by the Town Council in 2003 and amended several times to protect groundwater from various hazards, including nitrification, pathogens, and microbiological organisms. The goal of the ordinance has been to reduce impervious surface coverage, integrate stormwater management processes throughout the Town, protect wetlands and their buffers, and reduce impediments of groundwater flow.

Article V – Stormwater Management

Article V covers Stormwater Management practices within Jamestown. Three separate sections covering prohibition of illicit discharges, soil erosion and sediment control, and post construction stormwater control are covered within this Article. This article also ensures that Jamestown complies with federal regulations set by the Environmental Protection Agency regarding water quality and pollutant discharge. It establishes stormwater management and erosion control standards to minimize adverse impacts from development in downstream or offsite areas. The law protects water resources, prevents pollutants from entering municipal storm drains, controls the volume and rate of runoff resulting from development, requires practices to treat stormwater runoff, protects groundwater and surface water from degradation or depletion, promotes infiltration and the recharge of groundwater, and requires practices that minimize soil erosion and sedimentation. It also ensures that stormwater management is incorporated into the site plan review process.

Zoning Code

Jamestown's zoning ordinance contains several overlay districts to mitigate the effects of natural disasters. The High Groundwater Table and Impervious Layer Overlay District covers several acres and has special regulations for development. It covers an area where natural physical limitations render the land unsuitable for development without restrictions, where nonconforming lots predominate, no public water and sewer are available, and the water table is within four feet of the surface (Town of Jamestown, 2024). The Town has a community floodplain ordinance within the zoning laws that establishes a floodplain overlay district. All development within the district is

permitted by right but must be in compliance with additional regulations outlined within the zoning ordinance.

Local Plans

There are a variety of local plans that inform and relate to the Hazard Mitigation Plan. These plans include:

- Stormwater Management Plan (2021)
- Jamestown Brook Watershed Plan (2021)
- Water Supply System Management Plan (2018)
- Emergency Operations Plan (2012)
- Comprehensive Community Plan (2015, update in process)
- Harbor Management Plan (2015, update in process)

These plans present an opportunity for synthesized planning efforts. Action items found in these plans align with action items identified in the hazard mitigation plan, and vice versa. The watershed plan has goals around stormwater management that will be aligned with HMP goals around a stormwater management plan. Actions to coordinate with RIDOT around maintaining the Rt 138 Pump Station that came out of the watershed plan will align with similar coordination needed around roads and bridges identified in this plan and related to bicycle lane planning (an action from the Comprehensive Plan). The draft Harbor Management plan identifies the importance of facilities at East Ferry, Fort Wetherhill and West ferry for public access, while this plan identifies East and West Ferry as potentially vulnerable areas with sea level rise. West Ferry is also an area of focus because of its importance for commercial fishermen and to the continuation of Jamestown's working waterfront (also identified in the 2014 Comprehensive Plan). This plan recognizes the need to integrate the Harbor Management Plan into an updated emergency operations plan, specifically around procedures/education to prevent vessels from breaking off moorings in storm events, as well as incorporating the Harbor Commission's storm preparation monitoring and activities to protect waterfront facilities and publicize hazard mitigation plans before storms.

5.2.2. Capability Gaps

Based on evaluation with the planning and regulatory capabilities, the following gaps in capabilities are identified and can be incorporated into the mitigation strategy:

- A review of local bylaws & regulations for climate resilience provisions could be completed to enhance the ability to regulate approaches to mitigation the impact of natural hazards on community assets.
- When local plans are updated or developed, HMP Mitigation Actions discussed in Section 6.2.2 should be integrated and incorporated, for more effective implementation of Mitigation Actions.

5.3. Administrative and Technical Capabilities

Administrative and technical capabilities are the Town's staff, skills and tools, as well as capacity. They also include the ability to access, coordinate and implement natural hazard mitigation resources effectively. Administrative and technical capabilities are "people-powered" capabilities. This category includes other public and private sector resources, such as county, regional, quasigovernmental or nongovernmental agencies, community-based organizations, and grassroots groups.

5.3.1. Existing Capabilities

The following discusses Jamestown's current administrative and technical capabilities to address natural hazards.

Staff Capacity and Training

The emergency management team consists of a director, deputy director, and two support staff. Each of these members typically work for the police or fire department. Volunteers are also important for implementing emergency management practices. The fire department works in coordination with the police department to create a strong emergency management framework for Jamestown. The police department even has a list of seniors to conduct wellness checks on. In the event of a natural disaster, there is also an at-risk population list that senior officials can reference to identify where to send necessary resources.

However, the LHMC expressed concerns around the extent of emergency staffing in the event of a major disaster. Portions of the island are isolated and may be difficult to reach, especially if roads are washed out or blocked.

Internal Communications

Communication during a disaster is critical for ensuring the safety and well-being of the affected community.

The LHMC report there is generally effective communication infrastructure among town departments. The Town Emergency Management Director, currently the Police Chief, holds event specific meetings as well as debrief meetings to determine what was handled appropriately and what may be handled differently in the future based on the current Emergency Operations Plan (EOP). This manual is currently in the process of being updated. Departments involved in the EOP include, Police, Fire, Administration, Public Works, School, Finance, Building and Recreation.

External Communications

- The Jamestown website is used for external communication and is able to show banners about hazard conditions to residents who visit the website.
- The Town also utilizes the CodeRED program to alert citizens about emergencies and general community news directly on their smartphones.
- The LHMC also identified its schools and libraries as effective ways to communicate information to the community.

Regional Coordination and Collaboration

Jamestown works with a number of regional partners to prepare and respond to natural hazard events. These include:

- The Town of Jamestown partners with the CRMC to plan and manage coastal resources within the Town. These regional efforts are used to ensure mitigation processes are in place for coastal hazards and SLR. CRMC receives funding from federal and state funds, which are used to support staff and operational costs.

  CRMC has been integral in coordinating local efforts in hazard scenarios as well as providing consultation to municipalities in preparation of future hazards. The Council worked with local, state, and federal partners to recover post-Sandy and wrote the 2018 Shoreline Change (Beach) SAMP, which is still used today to inform coastal erosion and various other hazards along the coast.

- Jamestown utilizes the Rhode Island Sea Grant College Program and University of Rhode Island Coastal Resources Center (RISG/CRC) to gather data and inform its climate change resilience decisions. Its extensive research on SLR and coastal hazards across the state helps inform Jamestown's regulations and planning for future hazard mitigation. URI also provides geospatial technology services to contractual partners. Jamestown uses the URI Environmental Data Center to populate its GIS data.

- Jamestown has access to the Emergency Watershed Protection, or EWP, program through the United States Department of Agriculture – Natural Resource Conservation Service (NRCS). This program provides technical and financial assistance for property owners to recover following a natural disaster. NRCS may cover up to 75% of the construction cost of emergency measures under the 75% with the remaining 25% coming from local sources.

- The Rhode Island Emergency Management Agency (RIEMA) is tasked with protecting life and property in the event of a disaster or crisis situation through an emergency management program of mitigation, preparedness, response, and recovery.

Local Committees and Task Forces

The Town has established several committees that are directly involved with aspects of hazard mitigation:

- The Local Hazard Mitigation Committee that is the main advisory body for this plan.

- The Capital Planning Committee was established in 2014 and is responsible for reviewing capital projects in order to analyze and determine the essential elements, costs, and benefits of proposed projects.

- The Conservation Commission promotes and develops local natural resources, protect watershed resources, and preserve naturally aesthetic areas within Jamestown. It provides stewardship, education, and advocacy on behalf of the Town's natural and recreational assets.

- The Jamestown Harbor Management Commission is tasked with regulating and managing Jamestown waterways.

Assistance from Non-Governmental Organizations

Strategically located open space provides significant buffering capacity against many natural hazard events, especially flooding and storm surge. The Conanicut Island Land Trust was established in 1984 to preserve natural resources across Jamestown. The Trust holds in excess of 430 acres of Jamestown, or roughly 12% of the island (Conanicut Island Land Trust, 2024). These protected areas protect species and open space while simultaneously acting as carbon sinks and natural barriers or basins for storm surge, extreme precipitation, and other natural hazards.

5.3.2. Capability Gaps

Based on evaluation with the administrative and technical capabilities, the following gaps in capabilities are identified and can be incorporated into the mitigation strategy:

- Creating consistent feedback mechanisms for community input was one challenge for the LHMC. While other planning processes got more feedback, there was a relatively small response rate to this plan's survey.
- Having a centralized place to disseminate hazard data, that is hyperlinked to other communications might be helpful in establishing habits and expectations for communication with the public.
- Establishing a regular meeting and action plan review process for the LHMC will ensure that interim progress is made in between five year plans.
- The LHMC noted the town would benefit from increased funding for additional staff positions.
- The Town may want to consider creating a page on the Town's website related to Natural Hazards as well as an email distribution list for updates.
- Enacting a program to encourage signups for outreach systems would help more community members get information prior to, during, and following a natural hazard event. In particular, priority populations should be targeted.
- The Town would benefit from stronger connections to reach the priority population of seniors.

5.4. Financial Capabilities

Financial capability in this HMP refers to the resources to fund mitigation actions. Talking about funding and financial capabilities is important because mitigation actions have varying cost and utility. Mitigation actions like outreach programs are lower cost and often use staff time and existing budgets but do not provide for direct protection. Other actions, like earthquake retrofits, could require substantial funding from local, state and federal partners but help to address specific physical threats.

5.4.1. Existing Capabilities

The LHMC identified the following financial methods as being used in the recent past to fund mitigation activities:

- Capital improvement project funding
- Authority to levy taxes for specific purposes
- Fees for water, and sewer infrastructure
- State funding programs
- Incurring debt through general obligation bonds and/or special tax bonds
- Other federal funding programs

5.4.2. Capability Gaps

The LHMC indicated the desire and need to apply for state and federal grant funding for additional monies for hazard mitigation activity. The Town of Jamestown should target FEMA funding sources such as the Hazard Mitigation Grant Program, Flood Mitigation Assistance grants, or Building Resilient Infrastructure and Communities grants. Historically, a barrier to applying for these grants has been staff capacity as well as Jamestown's designation as a Native American burial ground of the Narragansett Tribe.

5.5. Education and Outreach

Education and outreach to the community are vital components of both preparedness and response. These capabilities are programs and methods that communicate opportunities for risk reduction, and may be run by the Town or a community-based partner.

5.5.1. Existing Capabilities

- The Jamestown website is used for education and outreach. The website contains links to information on emergency management protocols, governmental services, and important information during hazardous conditions.
- The Town utilizes the CodeRED emergency notification system to alert residents about emergencies.

5.5.2. Capability Gaps

Based on evaluation with the education and outreach capabilities, the following gaps in capabilities are identified and can be incorporated into the mitigation strategy:

- The LHMC noted a need to educate the community on the risks of driving into flooded roadways, because of the risk to both those who do so and to the rest of the Town as resources must switch to rescue operations.
- The LHMC indicated a need to increase education and outreach to the community regarding preparedness and hazard mitigation. Preparing a formal communication plan for priority populations will improve equity in outreach.

- The Town may consider developing education and outreach related to invasives, wells, trees, sea level rise, increased storm events and flooding, among other topics.

6

6. Mitigation Actions

The mitigation actions are one of the most important components of the HMP. They serve as the blueprint for reducing the potential losses identified in the risk and vulnerability assessment. They can be a measure, project, plan, or activity proposed to achieve the Town's mission and goals and reduce current and future vulnerabilities described in the risk assessment (Chapter 4).

There are many different types of hazard mitigation actions that generally fall into the following four categories (FEMA, Local Mitigation Planning Handbook, 2023):

Local Plans and Regulations: These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.

Structure and Infrastructure Projects: These actions 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.

Natural Systems Protection and Nature-based Solutions: This type of action can include green infrastructure and low impact development, nature-based solutions, Engineering with Nature and bioengineering to incorporate natural features or processes into the built environment.

Education and Awareness Programs: These types of actions keep residents informed about potential natural disasters. Many of these types of actions are eligible for funding through the FEMA HMA program.

Through the stakeholder and community engagement process discussed in Chapter 2, mitigation actions and an action plan for implementation were developed to help achieve the mitigation goals (See Chapter 1 Section 1.5 for mitigation goals). This provides a framework to prioritize and implement actions to reduce risks from hazards.

6.1. Status of 2017 HMP Mitigation Actions

Town staff reviewed the mitigation measures identified in the 2017 HMP and determined whether measures identified in that plan had been implemented or deferred. For implemented projects, they were categorized as either complete or in progress, with the latter referring to projects were still under development or had begun but not yet completed. If measures had been deferred, the LHMC evaluated whether the measure should be deleted or carried forward into this 2024 HMP Update. The decision on whether to delete or retain a particular measure was based on the STC's assessment of the continued relevance or effectiveness of the measure and whether the deferral of action on the measure was due to the inability of the town to take action on the measure. Table 6-1 lists all mitigation actions from the 2017 HMP and their current status.

Table 6.1: Status of 2017 HMP Mitigation Actions

2017 Action #	Priority	Potential Program	Description	Status	Retain for 2024 Plan?	Rationale
1	Medium	Future Proposed Development	Map vulnerable areas and critical facilities for future proposed residential and commercial development	Completed	Remove	
2	Medium	Develop Stormwater Mitigation Plan Requirements	Develop stormwater mitigation plan	Incomplete	Retain	Address basements, foundations relative to groundwater table and flooding, erosion and shedding water onto adjacent properties
3	Medium	Review the Harbor Plan and the Management Emergency Operations Plan after every storm or every three years	It is important to review and revise these plans to ensure the adequacy of emergency operations. Revisions should be proposed as necessary to meet adequacy	In Progress	Revise	
4	High	North Pond Dam	Implement structural improvements to prevent catastrophic failure	Complete	Revise	Structural repairs complete at North Pond Dam, but not at South Pond Dam
5	High	Reduce vulnerability to utility and communication lines	Tree Damage Mitigation Program to trim trees adjacent to utility lines to avoid power outages and therefore, maintain communication systems during and after hurricanes, thunderstorms, ice storms, and windstorms.	Complete	Retain	

2017 Action #	Priority	Potential Program	Description	Status	Retain for 2024 Plan?	Rationale
6	High	Debris Management Plan	Develop Internal Town policy for prompt removal and proper siting of fallen debris and tree limbs which decreases potential of road and property blockage.	Ongoing	Retain	
7	High	Infrastructure Improvements	Evaluate existing condition of bridges concerning their foundation, structure. and drainage properties. Retrofit and repair as needed.	In Progress	Revise	
8	High	Local Road Hazard Assessment	Evaluate town and state roads (with RIDOT) that are at risk for impact due to storm events/sea level rise and determine capital budget implications or other funding sources.	In Progress	Revise	
9a	High	Public Education and Outreach	Develop and make preparedness and response material available concerning evacuation routes, emergency shelters, and maps of risks and critical facilities of Jamestown.	Partially Complete	Retain	This action is part of standard Emergency Operations Plan preparation.
9b	High	Public Education and Outreach	Organize and conduct training program for Town officials, employees, boards, and commissions regarding hazard mitigation, including flood mitigation, and actions/ responsibilities during a natural disaster.	Not Started	Retain	
10	Medium	Inflow and Infiltration of Sewer System	Prioritize projects that mitigate infiltration of groundwater into the sewer lines.	In Progress	Retain	
11	Low	Water Treatment Facility	The long term, low priority project involves planning for a new access and infrastructure to service the existing Water Treatment Facility	Not Started	Retain	
12	Medium	Shoreline Protection and Retrofit	Develop shoreline sea level rise resilience plan which involves shoreline protection strategies	Not Completed	Revise	

2017 Action #	Priority	Potential Program	Description	Status	Retain for 2024 Plan?	Rationale
13	High	Continue Agreement for purchase of Potable Water among other strategies	The Town should maintain and test regularly the emergency hose and reels so that they are ready if needed. The Town should keep the agreement current with the Town of North Kingstown.	In Progress	Retain	

6.2. Mitigation Action and Adaptation Strategy for 2024-2028

The LHMC developed an updated mitigation action and adaptation strategy for this HMP Update. The actions were developed from a multi-faceted approach, including the following:

- The goals and objectives endorsed by the LHMC (see Chapter 1 for details).
- Input from stakeholders through the HMP Workshops and the community through public meetings and survey input (see Chapter 2 for details).
- Actions included in related town plans and reports; (see Chapter 2.3 for details).
- Identified community assets, (see Chapter 3 for details).
- A hazard and climate change risk and vulnerability assessment (see Chapter 4 for details).
- The Town's capacity to mitigate and respond to hazard events as described in Chapter 5.
- The progress of actions from the 2017 HMP (see Chapter 6 Section 6.1 for details).

The actions include both specific projects and recognize broader results to be achieved by implementing a project. The level of specificity differs based on the input received and the currently available data associated with the mitigation action. In some cases, actions are broader because the specific steps to accomplish the result may not be determined at this point in time. These actions will all be tracked an updated during the annual plan maintenance and review, discussed in greater detail in Chapter 7.

6.2.1. Prioritization of Potential Actions

The LHMC used the STAPLEE system to assist in prioritizing certain actions over others. Each of the STAPLEE criterion (as shown in Table 6.2) were assigned a score from 1-3 (as shown in Table 6.3). This process and the scoring rubric are presented below:

Table 6.2: STAPLEE Criteria

Letter	Criteria	Details
S	Social	Does the measure treat people fairly? Does it adversely affect one segment of the population? Will it cause Social Disruption?
T	Technical	Will it work? Does it create more problems than it solves? Is it the most useful action in light of the goals?
A	Administrative	Is there capacity to implement and manage the project? (staff, technical experts, funding) Is there an ongoing administrative requirement that will be required (who will maintain)?
P	Political	Is there political support to implement and maintain the action? Who are the stakeholders? Did they get to participate? Is there public support to implement and maintain the action?
L	Legal	Does your organization have the authority to implement? Is there a clear and legal basis or precedent for the activity? Are there liability implications and/or legal consequences?
E	Economic	Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development? Does it reduce direct property losses or indirect economic losses?
E	Environmental	Does it comply with environmental regulations or have adverse environmental impacts?

Table 6.3 STAPLEE Scoring Rubric

Scoring Rubric	Score
Very Favorable / High Priority	3
Neutral	2
Not Favorable	1

After each action item was scored for each criterion, the score of all criteria was summed, to give a total STAPLEE score. These were then divided into low (7-16), medium (17-18) and high (19-21) priorities by score. The prioritized list of Jamestown's 2024 - 2029 Mitigation Actions, with STAPLEE scoring is available in Appendix G.

For each mitigation action considered to be part of the 5-year plan, the following characteristics were defined such that the Town is able to tie the actions to the risk assessment and mitigation goals, define who is responsible for implementing/ administering the identified mitigation action, understand general cost and benefit of an action, understand available funding source(s), determine the expected timeframe for the action, and confirm consistency with and integration into other local plans.

Generally, each action item is provided with the following information:

- **2024 Action #:** Action number for 2024 HMP for quick reference.
- **2017 Action #:** Action number from 2017 HMP for quick reference.
- **Action Description:** Brief narrative describing the action.
- **Goals Addressed:** This column lists which goals the mitigation action aims to accomplish. Some actions contribute toward more than one goal. The goals are listed in Section 1.5
- **Hazards/Risks Addressed:** Actions may mitigate a single or multiple hazards, which will be indicated for each action. All the hazards discussed in Chapter 4 were addressed when developing the priority list, and there is at least one action associated with each hazard. Some actions address all hazards and are listed as such.
- **Overall Priority:** This column shows the ranking based on the process described in Section 6.2.1.
- **Responsible Party:** Many hazard mitigation actions and climate adaptation measures will require a multi-department strategy where several departments share responsibility. The designation of implementation responsibility is assigned to Town staff based on the responsibility of each department.
- **Partner Agencies:** Some mitigation actions may require cooperation with outside entities, such as Rhode Island state departments, neighboring communities, regional organizations, or private entities. In those cases, the relevant entities are included in additional to the town department.
- **Potential Funding Source:** The Town's general funds are considered a default potential funding source unless the Town pursues additional funding. The identification of potential funding sources is preliminary and may vary depending on numerous factors. These factors include, but are not limited to, changes in grant eligibility criteria, program objectives, and funding availability. The funding sources identified are not a guarantee that a specific project will be eligible for, or receive, funding. Upon adoption of this plan, the local representatives responsible for implementation should begin to explore potential funding sources in more detail. Potential grants were assigned based on eligibility and competitiveness, but the recommendations may not be comprehensive. Please note that grant eligibility and scoring criteria should also be reviewed prior to applying. Grants may

also only be a source of funding for a single stage of a project. In many cases, the actions will require a combination of funding sources. Funding sources abbreviated in the Table include:

  - Coastal Resources Management Council (CRMC)
  - Rhode Island Infrastructure Bank Municipal Resilience Program (RIIB MRP)
  - Rhode Island Commerce Corporation (RICC)
  - National Fish and Wildlife Foundation National Coastal Resilience Fund (NFWF NCRF)
  - Southern New England Program (SNEP)

- **Timeframe:** This column indicates the estimated timeline for completing the mitigation action.
- **Integration Opportunity into Local Plans:** For successful implementation of mitigation actions, they must be incorporate into local plans. This column indicates where mitigation actions may be integrated into another local plan or planning mechanism.

The mitigation strategy, or action plan, is the heart of the plan and the primary tool to get funding, assign priorities, guide decisions, and track progress in future plan updates.

Table 6.4: Jamestown 2024 – 2029 Detailed Mitigation Actions

Action Item by Year		Action	Action Detail	Goals Addressed	Hazards Addressed	STAPLEE Priority Score	Responsible Party	Partner Agency	Potential Funding Source	Timeframe	Integration Opportunity
2024	2017										
1	3	Review Harbor Management Plan and EOP regularly	Incorporate newly completed Harbor Management Plan into Emergency Operations Plan Update and update after at least every three years, or after significant storm events, as necessary.	3, 9	Hurricanes/ Tropical Cyclones, Severe Winter Weather, Sea Level Rise, Coastal Flooding, High Winds & Thunderstorms	19	Police Chief		Town General Funds	3 years	Harbor Management Plan, Emergency Operations Plan
2	5	Reduce vulnerability to utility and communication lines	Tree Damage Mitigation Program to trim trees adjacent to utility lines to avoid power outages and therefore, maintain communication systems during and after hurricanes, thunderstorms, ice storms, and windstorms.	1, 5	Hurricanes/ Tropical Cyclones, Severe Winter Weather, High Winds & Thunderstorms	19	DPW Director		Town General Funds	Ongoing	Emergency Operations Plan
3	7	Bridge Repair Coordination	Coordinate with RIDOT to prioritize retrofit and repair of bridges, especially those that are vulnerable to sea level rise and climate change.	1,4, 5, 6	Sea Level Rise, Coastal Flooding	19	Town Administrator	RIDOT	Town General Funds	Ongoing	
4	8	Vulnerable Roads Coordination	Coordinate with RIDOT to evaluate roads, especially that are vulnerable to sea level rise and prioritize improvements to vulnerable roads.	1,4, 5, 6	Sea Level Rise, Coastal Flooding, Coastal Erosion	19	Town Administrator	RIDOT	Town General Funds	Ongoing	
5	9b	Public Education and Outreach	Organize and conduct training program for town officials, employees, boards, and commissions regarding hazard mitigation, including flood mitigation, and actions/responsibilities during a natural disaster	1, 8	All hazards	18	Police Chief		Town General Funds	Annually	
6	10	Inflow and Infiltration of Sewer System	Continue to implement program to mitigate the infiltration of groundwater and inflow into the sewer lines	1, 3, 9	Hurricanes/ Tropical Cyclones, Severe Winter Weather, Coastal Flooding, Inland Flooding	21	Director of DPW		Town General Funds	Ongoing	
7	11	New Access for Water Treatment Facility	Develop plan for a new access and infrastructure to service the existing Water Treatment Facility	1, 3, 9	Sea Level Rise, Coastal Flooding	19	Director of DPW	RIDOT	Town General Funds	Within the next 5 years	Water Supply Plan
8	12	Climate Adaptation Plan	Develop climate adaptation plan to address sea level rise and other climate hazards in order to improve resilience of general community infrastructure.	1, 3, 9	Sea Level Rise, Coastal Flooding, Wildfires, Drought & Extreme Heat	16	Planning Director		RIIB MRP, RICC,CRMC, SNEP	Within the next 5 years	

Action Item by Year		Action	Action Detail	Goals Addressed	Hazards Addressed	STAPLEE Priority Score	Responsible Party	Partner Agency	Potential Funding Source	Timeframe	Integration Opportunity
2024	2017										
9	13	Continue Agreement for purchase of Potable Water among other strategies	The Town should maintain and test regularly the emergency hose and reels so that they are ready if needed. The Town should continue to pursue a formal agreement with the Town of North Kingstown for potable water in times of drought.	1, 4, 6	Drought & Extreme Heat	20	DPW Director	Town of North Kingstown	Town General Funds	Ongoing	
10		Conanicus Seawall Repair	Develop plan with RIDOT to raise the remaining seawall at Conanicus Avenue	1, 3, 4	Sea Level Rise, Coastal Flooding, Coastal Erosion	15	Town Administrator	RIDOT	Town General Funds	Within the next 5 years	
11		Potter's Cove Shoreline Hardening	Develop a plan for structural repairs and shoreline hardening at Town Owned Potter's Cove Parking Lot at Freebody Drive	1, 4	Sea Level Rise, Coastal Flooding, Coastal Erosion	13	DPW Director		RIDEM, RIIB MRP, SNEP	Within the next 5 years	
12		Formal Agreement for Private Road Use During Conanicus Ave Closure	Develop contingency plan and or formal agreement for use of private roads in the event of Conanicus Ave closure	1	Hurricanes/ Tropical Cyclones, Severe Winter Weather, Coastal Flooding	16	Town Administrator		Town General Funds	Within the next 5 years	
13		Floodproof Pump Stations	Floodproof vulnerable pump stations, including, but not limited to the stations at Dutch Harbor and Maple Ave.	1, 3, 9	Hurricanes/ Tropical Cyclones, Severe Winter Weather, Coastal Flooding	18	DPW Director		RIDEM, RIIB MRP, SNEP	Within the next 5 years	
14		Dune Restoration at Mackerel Cover	Pursue funding and implement dune restoration/mitigation at Mackerel Cove beach (also covered under Vulnerable Roads Coordination)	4, 8	Hurricanes/ Tropical Cyclones, Severe Winter Weather, Coastal Flooding, Coastal Erosion	14	Recreation Director		RIDEM, RIIB MRP, SNEP, NFWF NCRF	Within the next 5 years	
15		Outreach to Seniors	Improve outreach and communications to seniors in the event of natural hazards	1, 8	All hazards	19	Police Chief		Town General Funds	Within next 2 years	Emergency Operations Plan
16	2	Develop Stormwater Mitigation Plan Requirements	Develop stormwater mitigation plan	1, 4	Inland Flooding, Coastal Flooding, Sea Level Rise	18	Town Planner		RIIB, MRP	Within the next 5 years	
17	4	South Pond Dam	Implement structural improvements to prevent catastrophic failure	1, 4	Inland Flooding, Dam Failures	19	DPW Director		Town General Funds	Within the next 5 years	

Action Item by Year		Action	Action Detail	Goals Addressed	Hazards Addressed	STAPLEE Priority Score	Responsible Party	Partner Agency	Potential Funding Source	Timeframe	Integration Opportunity
2024	2017										
18	6	Debris Management Plan	Develop Internal Town policy for prompt removal and proper siting of fallen debris and tree limbs which decreases potential blockage or road and property blockage	1, 4	Hurricanes/ Tropical Cyclones, Severe Winter Weather, Coastal Flooding, High Winds and Thunderstorms, Tornado, Earthquake	17	DPW Director		Town General Funds	Within the next 5 years	
19	9a	Preparedness and Response Public Education and Outreach	Develop and make preparedness and response material available concerning evacuation routes, emergency shelters, and maps of risks and critical facilities of Jamestown.	1, 3, 9	All hazards	18	Police Chief		Town General Funds	Within the next 5 years	Emergency Operations Plan
20		Join the Community Rating System	Appoint a CRS Coordinator and prepare documentation of at least 500 CRS points. Complete application and submit letter of interest.	1, 2, 7	Inland Flooding, Coastal Flooding	18	Town Engineer		Town General Funds	Within the next 3 years	

7

7. Plan Maintenance

HMPs are intended to serve as living documents. In order to be impactful, they must be regularly updated to reflect the current state of hazards, vulnerabilities, goals, strategies, and public sentiment. The three main components of plan maintenance are: monitoring, evaluating, and updating the plan.

Included in this chapter is a multi-pronged strategy to always keep the HMP as effective as possible. Monitoring, evaluating, and updating the plan will be intertwined with public engagement, integration with other local, regional, and state planning mechanisms, and plan implementation. These processes will run on an ongoing basis with the expectation there is coordination and collaboration between monitoring, evaluating, and updating the plan.

The Hazard Mitigation Manager will:

- Track the progress of the HMP Mitigation Actions (see Section 7.1).
- Reconvene the LHMC annually to monitor, evaluate, update, and integrate the plan (see Section 7.1, 7.2, 7.3, and 7.4).
- Share HMP progress with the public, at least once a year (see Section 7.5).
- Make all monitoring information publicly available (see Section 7.1).
- Notify the public when new information has been posted or updated (see Section 7.5).
- Provide the public opportunities to give input on this information (see Section 7.5).

7.1. Monitoring the Plan

As required by FEMA, monitoring the plan refers to tracking the implementation of the HMP over time.

Who: The Hazard Mitigation Manager will take ownership of monitoring the plan.

How: The Hazard Mitigation Manager will monitor the status of mitigation actions (Chapter 6) through an internal tracking system using Excel. This should be made publicly available.

When: Monitoring will take place on an ongoing basis with annual meetings to formally update the status of Mitigation Actions. In advance of this meeting, the Hazard Mitigation Manager will send out notices to the LHMC that will include a shared document where all LHMC members can collaborate to review status of mitigation actions and identify any new mitigation actions that may be under consideration or in progress as part of ongoing Town efforts.

7.2. Evaluating the Plan

As required by FEMA, evaluating the plan refers to assessing the effectiveness of the plan at achieving its stated purpose and goals.

Who and When: The LHMC will meet annually to evaluate the effectiveness of the plan. The LHMC may also be called to meet after a major event or storm to evaluate the effectiveness of the plan.

How: The LHMC will:

- Review the 2024 HMP Goals.
- Discuss how mitigation actions are or are not meeting 2024 HMP Goals and where improvements or adjustments may be needed (e.g., re-prioritization of projects, integrating with other planning processes more effectively, adding new data to climate projections, etc.

7.3. Updating the Plan

This section discusses plan updates by maintaining eligibility with FEMA and major disasters.

7.3.1. Plan Updates to Maintain FEMA Funding Eligibility

As required by FEMA, updating the plan refers to reviewing and revising the HMP at least once every five years. HMPs expire five years from the date approved by FEMA. To maintain eligibility for certain types of non-emergency disaster assistance from FEMA, an entity such as the Town of Jamestown must have an approved active HMP.

HMPs must be updated every five years for their jurisdictions to maintain funding eligibility. The Hazard Mitigation Manager typically initiates the process to complete a comprehensive update to the HMP. As a best practice, the comprehensive update should be initiated approximately 18 months prior to an HMP's expiration. This process generally includes:

- Re-engaging the LHMC.
- Considering expansion of the LHMC.
- Confirming FEMA's most recent requirements and guidance.
- Gathering updated information and relevant documents.
- Defining a list of stakeholders (such as the Stakeholders discussed in Chapter 2).
- Initiating an outreach and engagement process.
- Undertaking the planning steps to prepare required HMP sections.
- Completing and reviewing the draft Plan and submitting for approval.

The Town may elect to complete this process in-house or with guidance from an outside contractor.

7.3.2. Plan Updates Due to Major Disaster Events or New Conditions

FEMA recommends that HMPs also be revisited and updated after a major disaster event (a State or Federally declared disaster) or if new conditions significantly change risk (such as new climate projections or local risk and vulnerability assessment efforts). The Hazard Mitigation Manager will initiate the process to complete any updates needed in these circumstances. The decision to update the plan will be based on the annual monitoring and evaluation process.

7.4. Integrating the HMP

The Town of Jamestown understands that HMPs work best when integrated into other Town planning mechanisms. The Town has aimed to maximize the co-benefits of coordinating hazard mitigation projects with planning and implementation activities, to ensure both comprehensive planning, as well as to secure every potential dollar for mitigation projects.

Jamestown has aimed for a two-way exchange of information and incorporation of ideas and concepts between its hazard mitigation plans and other planning mechanisms. Jamestown has integrated and continues to integrate the ideas, information, and strategy of its mitigation plans into other planning and regulatory mechanisms:

- **Building and Zoning Regulations:** The local hazard mitigation plan can integrate with building and zoning regulations to ensure that new construction and development are designed to withstand potential hazards.

- **Community Comprehensive Plan:** Jamestown's most recent Comprehensive Plan was adopted in 2015. That plan incorporated the analysis and goals of the draft Hazard Mitigation Plan, which was ultimately approved in 2017. This 2022 Hazard Mitigation Plan will be referenced within Jamestown's 2024 Comprehensive Plan Update, which will have its planning process begin in the second half of 2024.

- **Emergency Management Plan:** The local hazard mitigation plan can integrate with the emergency management plan to ensure that hazard mitigation strategies are coordinated with emergency response efforts.

- **Harbor Management Plan:** Jamestown's 2024 update to its Harbor Management Plan incorporates the 2017 Hazard Mitigation Plan, and this Hazard Mitigation Plan update reflects the strategies and goals of the updated Harbor Management Plan.

- **Partnerships:** Developing strong partnerships between planners and emergency managers can help to fully integrate land use and hazard planning efforts.

Integration will be a topic of discussion at each annual update meeting. HMP goals and mitigation actions will be integrated into other Town planning mechanisms. At each annual LHMC meeting, there will be an update on the progress of integration of mitigation actions into relevant planning

mechanisms and a discussion of other planning mechanisms that should be integrated into the next five-year HMP update.

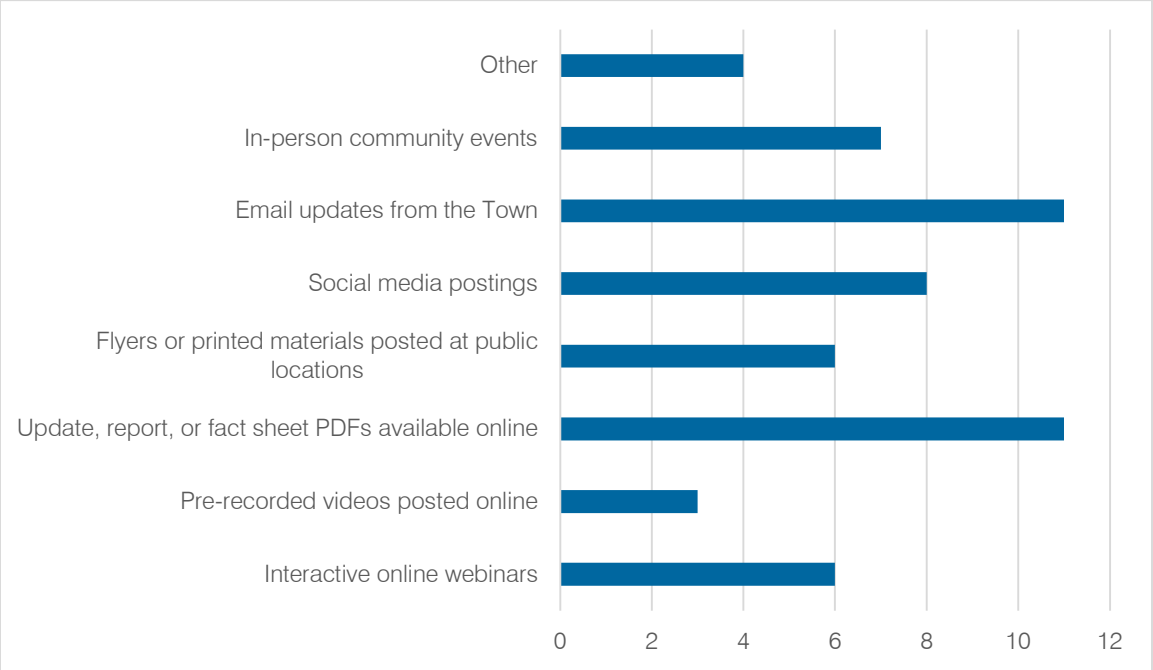
7.5. Public Participation throughout Plan Maintenance

Public engagement is a critical part of the plan maintenance process. Public input, education, and support are crucial to ensuring that the plan is effective, equitable, and impactful.

A coordinated public engagement effort will be led by the Hazard Mitigation Manager, however, should be coordinated or delegated to community engagement staff to ensure alignment with other Town outreach efforts.

The public survey indicated that residents would like to be informed about future plan updates via emails from the Town, fact sheets on the Town website, or social media.

Figure 7-1: Favorite Community Hazard Update Methods



Below are four categories of engagement activities that will solicit different types of results.

- **Public Education** activities are solely focused on transparency and providing the public with information regarding the monitoring, evaluation, and implementation of the Plan. Additionally, providing supporting general education on how to make individualized hazard preparedness plans for households.
- **Public Input** activities are focused on soliciting feedback, ideas, concerns, and other input. These activities will aim to be as inclusive and accessible as possible. Public input should gather feedback from all communities, particularly those who are:
    - most affected by hazards

    - underheard
    - underserved
    - historically excluded.
- **Active Engagement** refers to the LHMC's role to continue monitoring and adjusting to the effectiveness, performance, and equity of the HMP as it goes through maintenance, implementation, and integration with other planning mechanisms.
- **Reactionary Engagement** refers to activities that directly follow a large storm or event. These activities will be particularly concerned with the safety of residents, performance of projects, and impacts on priority populations.

Below are activities in each of these categories that the Town may undertake, as appropriate for the situation, at the discretion of the Hazard Mitigation Manager, and the LHMC:

- **Public Education:** Provide website updates, flyers, presentations, social media posts, up to date GIS maps and data, as appropriate, in multiple languages and with accessibility considerations.
- **Public Input:** Host workshops, distribute surveys, facilitate public meetings, provide a presence at public events, solicit public comments, provide interactive maps, and/or interview community groups or local experts, all as determined by the LHMC at the annual meeting. Public input will include translation and interpretation as necessary and center accessibility.
- **Active Engagement:** Re-engage the Stakeholders, involve community groups, involve student groups, as appropriate. Training Town staff on how to work with residents who are experiencing hazards before an event occurs.
- **Reactionary Engagement:** Initiate surveys, hold public meetings, undertaking door-knocking Incorporate feedback and engagement received to maintain a feedback loop of knowledge on the process and allow for flexibility to pivot ideas when needed.

The Town is committed to developing equitable and impactful public participation. This means that greater attention will be paid to those who are most vulnerable to hazards and who do not have as many pathways for making their needs and opinions heard. The following steps will be taken to ensure that the HMP and its maintenance will be equitable:

- **Population:** Priority populations will be considered as a priority for outreach and engagement.
- **Projects/issues:** Issues or projects that are most valuable to these populations will be identified (through soliciting input or interviewing community groups/local experts).
- **Actions:** Findings will be incorporated into the implementation, monitoring, evaluation, updating of the plan, and integration with other planning processes. The Hazard Mitigation Manager will be responsible for incorporating this information with support from the LHMC.

Public engagement activities will align with the annual evaluation, monitoring, and plan update meetings as well as with large storms or events.

8

8. Adoption

Once the draft of the Jamestown HMP is reviewed by the LHMC, Stakeholders, and the general public, the Plan is reviewed by RIEMA and FEMA. When the Plan is finally approved by FEMA, it enters into the five year "maintenance" phase.

This Section describes the timeline for plan adoption and includes documentation of the Plan adoption by the Town Council.

8.1. Timeline for Plan Adoption

The timeline for Plan Adoption is as follows:

Town Council approval to submit the draft Plan	June 17, 2024
Jamestown HMP 2024 submitted to RIEMA	July 9, 2024
Jamestown HMP submitted to FEMA for final review	December 6, 2024
FEMA issued an Approved Pending Adoption status	December 10, 2024
The Town Council officially adopted the Jamestown HMP 2024 during a regularly scheduled meeting.	Date TBD

8.2. Plan Adoption

The Certificate of Adoption is provided on the following page:

Town of Jamestown

Town Clerk's Office
Town Hall, 93 Narragansett Avenue
Jamestown, Rhode Island 02835-1199
401-423-9800 • Fax 423-7230
email: rfagan@jamestownri.net

Roberta J. Fagan
Town Clerk
Probate Clerk

Office of the Town Clerk
C E R T I F I C A T E

I, Roberta J. Fagan, Town Clerk of the Town of Jamestown, County of Newport, Rhode Island, having by law the custody of the seal, and the records, books, documents and papers of or appertaining to said Town, hereby certify the annexed to be true copies of papers appertaining to said Town, and on file and of record in this office:

At the regular meeting of the Jamestown Town Council held Monday, June 17, 2024, during the Public Hearing to following was approved:

1. To direct the project Consultant Weston & Sampson to finalize the JHMP for final review by RIEMA; and

2. Approval and adoption of Resolution 2024-17, a Resolution of the Town of Jamestown Adopting the 2024 Jamestown Hazard Mitigation Plan Update, and to include any modifications received under the public review period and any required by RIEMA and FEMA during their reviews to the JHMP.

In attestation whereof, I have hereunto set my hand, and have affixed the Seal of said Town, this 24th day of June, 2024

Roberta J. Fagan
Roberta J. Fagan
Town Clerk

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Appendix A FEMA Review Tool

Local Mitigation Plan Review Tool

Cover Page

The Local Mitigation Plan Review Tool (PRT) demonstrates how the local mitigation plan meets the regulation in 44 CFR § 201.6 and offers states and FEMA Mitigation Planners an opportunity to provide feedback to the local governments, including special districts.

1. The Multi-Jurisdictional Summary Sheet is a worksheet that is used to document how each jurisdiction met the requirements of the plan elements (Planning Process; Risk Assessment; Mitigation Strategy; Plan Maintenance; Plan Update; and Plan Adoption).
2. The Plan Review Checklist summarizes FEMA's evaluation of whether the plan has addressed all requirements.

For greater clarification of the elements in the Plan Review Checklist, please see Section 4 of this guide. Definitions of the terms and phrases used in the PRT can be found in Appendix E of this guide.

Plan Information	
Jurisdiction(s)	Jamestown, RI
Title of Plan	Jamestown Hazard Mitigation Plan
New Plan or Update	Update
Single- or Multi-Jurisdiction	Single-jurisdiction
Date of Plan	7/9/2024
Local Point of Contact	
Title	Town Planner
Agency	Town of Jamestown
Address	93 Narragansett Avenue, Jamestown, RI 02835
Phone Number	401-423-7209
Email	lbryer@jamestownri.net

Additional Point of Contact	
Title	Town Administrator
Agency	Town of Jamestown
Address	93 Narragansett Avenue
Phone Number	401-423-9805
Email	emello@jamestownri.net

Review Information	
State Review	
State Reviewer(s) and Title	Click or tap here to enter text.
State Review Date	Click or tap to enter a date.
FEMA Review	
FEMA Reviewer(s) and Title	Click or tap here to enter text.
Date Received in FEMA Region	Click or tap to enter a date.
Plan Not Approved	Click or tap to enter a date.
Plan Approvable Pending Adoption	Click or tap to enter a date.
Plan Approved	Click or tap to enter a date.

Multi-Jurisdictional Summary Sheet

#	Jurisdiction Name	Requirements Met (Y/N)						
		A. Planning Process	B. Risk Assessment	C. Mitigation Strategy	D. Plan Maintenance	E. Plan Update	F. Plan Adoption	G. State Requirements
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Plan Review Checklist

The Plan Review Checklist is completed by FEMA. States and local governments are encouraged, but not required, to use the PRT as a checklist to ensure all requirements have been met prior to submitting the plan for review and approval. The purpose of the checklist is to identify the location of relevant or applicable content in the plan by element/sub-element and to determine if each requirement has been "met" or "not met." FEMA completes the "required revisions" summary at the bottom of each element to clearly explain the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is "not met." Sub-elements in each summary should be referenced using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each element and sub-element are described in detail in Section 4: Local Plan Requirements of this guide.

Plan updates must include information from the current planning process.

If some elements of the plan do not require an update, due to minimal or no changes between updates, the plan must document the reasons for that.

Multi-jurisdictional elements must cover information unique to all participating jurisdictions.

Element A: Planning Process

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))		
A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved?	Chapter 2.0 Section 2.1, 2.2, 2.3 Table 2.1 Planning Process Schedule Table 2.3 Local Hazard Mitigation Committee Table 2.4 HMP Meeting Schedule Appendix B. Public Engagement Log Appendix F: Final Invited Review Collaborator List	Choose an item.

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process?	Chapter 1. Introduction Chapter 2. Planning Process	Choose an item.
A2. Does the plan document an opportunity for 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 private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))		
A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity?	Section 2.4, Section 2.5 Appendix F Final Invited Review Collaborator List	Choose an item.
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))		
A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan?	Section 2.4 Public Engagement Appendix B Public Engagement Log Appendix C Survey Responses	Choose an item.
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3))		
A4-a. Does the plan document what existing plans, studies, reports and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?	Section 2.3 Review of Existing Plans Section 5.2 Planning and Regulatory Capabilities Plans and reports were referenced throughout the HMP.	Choose an item.

Element A Requirements	Location in Plan (section and/or page number)	Met / Not Met
ELEMENT A REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element B: Risk Assessment

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
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)(2)(i))		
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	Chapter 4, Sections 4.1 -4.13, **See subsections ending in .1 (Description)**	Choose an item.
B1-b. Does the plan include information on the location of each identified hazard?	Chapter 4, Sections 4.1 -4.13, **See subsections ending in .2 (Location)**	Choose an item.
B1-c. Does the plan describe the extent for each identified hazard?	Chapter 4, Sections 4.1 -4.13, **See subsections ending in .3 (Severity/Intensity)**	Choose an item.
B1-d. Does the plan include the history of previous hazard events for each identified hazard?	Chapter 4, Sections 4.1 -4.13, **See subsections ending in .4 (Previous occurrences)**	Choose an item.

Element B Requirements	Location in Plan (section and/or page number)	Met / Not Met
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature and sea levels), on the type, location and range of anticipated intensities of identified hazards?	Chapter 4, Sections 4.1 -4.13, **See subsections ending in .5 (Probability of Future Events)**	Choose an item.
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?	Not applicable	Choose an item.
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii))		
B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards?	Chapter 4 Table 4-34	Choose an item.
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?	Chapter 4, Sections 4.1 -4.13, **See subsections ending in .6 (Vulnerability)** Also see **subsections in 4.15** on population patterns and changes in development	Choose an item.
B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?	Chapter 5, Section 5.1.1	Choose an item.
ELEMENT B REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element C: Mitigation Strategy

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C1. Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement 44 CFR § 201.6(c)(3))		
C1-a. Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?	Chapter 5 5.2.1 Existing Capabilities - Building Codes and Land Use Sections	Choose an item.
C1-b. Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?	Chapter 5, Sections 5.1-5.5 + Chapter 6, Section 7.6 Action and Adaptation Strategy for 2024-2028	Choose an item.
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))		
C2-a. Does the plan contain a narrative description or a table/list of their participation activities?	Section 5.1 NFIP Flood Insurance Program Compliance	Choose an item.
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement 44 CFR § 201.6(c)(3)(i))		
C3-a. Does the plan include goals to reduce the risk from the hazards identified in the plan?	Section 1.4	Choose an item.
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 44 CFR § 201.6(c)(3)(ii))		
C4-a. Does the plan include an analysis of a comprehensive range of actions/projects that each jurisdiction considered to reduce the impacts of hazards identified in the risk assessment?	Section 6.2 Mitigation Action and Adaptation Strategy for 2024-2028	Choose an item.
C4-b. Does the plan include one or more action(s) per jurisdiction for each of the hazards as identified within the plan's risk assessment?	Section 6.2 Mitigation Action and Adaptation Strategy for 2024-2028	Choose an item.

Element C Requirements	Location in Plan (section and/or page number)	Met / Not Met
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction? (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))		
C5-a. Does the plan describe the criteria used for prioritizing actions?	Section 6.2.1 Prioritization of Potential Actions	Choose an item.
C5-b. Does the plan provide the position, office, department or agency responsible for implementing/administrating the identified mitigation actions, as well as potential funding sources and expected time frame?	Table 6.4 Jamestown 2024-2028 Detailed Mitigation Actions with responsible party, funding, timeframe	Choose an item.
ELEMENT C REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element D: Plan Maintenance

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
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))		
D1-a. Does the plan describe how communities will continue to seek future public participation after the plan has been approved?	Chapter 7, Plan Maintenance, Section 7.5 Public Participation	Choose an item.
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))		
D2-a. Does the plan describe the process that will be followed to track the progress/status of the mitigation actions identified within the Mitigation Strategy, along with when this process will occur and who will be responsible for the process?	Section 7.1 Monitoring the Plan	Choose an item.

Element D Requirements	Location in Plan (section and/or page number)	Met / Not Met
D2-b. Does the plan describe the process that will be followed to evaluate the plan for effectiveness? This process must identify the criteria that will be used to evaluate the information in the plan, along with when this process will occur and who will be responsible.	Section 7.2 Evaluating the Plan	Choose an item.
D2-c. Does the plan describe the process that will be followed to update the plan, along with when this process will occur and who will be responsible for the process?	Section 7.3 Updating the Plan	Choose an item.
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))		
D3-a. Does the plan describe the process the community will follow to integrate the ideas, information and strategy of the mitigation plan into other planning mechanisms?	Section 7.4 Integrating the Plan	Choose an item.
D3-b. Does the plan identify the planning mechanisms for each plan participant into which the ideas, information and strategy from the mitigation plan may be integrated?	Section 7.4 Integrating the Plan	Choose an item.
D3-c. For multi-jurisdictional plans, does the plan describe each participant's individual process for integrating information from the mitigation strategy into their identified planning mechanisms?	Not applicable	Choose an item.
ELEMENT D REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element E: Plan Update

Element E Requirements	Location in Plan (section and/or page number)	Met / Not Met
E1. Was the plan revised to reflect changes in development? (Requirement 44 CFR § 201.6(d)(3))		
E1-a. Does the plan describe the changes in development that have occurred in hazard-prone areas that have increased or decreased each community's vulnerability since the previous plan was approved?	Section 3.2.2 Subsection Development Since Previous HMP (Page 3-10) Also see **subsections in 4.15** on population patterns and changes in development	Choose an item.
E2. Was the plan revised to reflect changes in priorities and progress in local mitigation efforts? (Requirement 44 CFR § 201.6(d)(3))		
E2-a. Does the plan describe how it was revised due to changes in community priorities?	Section 1.3.1 Update to Previous Plan	Choose an item.
E2-b. Does the plan include a status update for all mitigation actions identified in the previous mitigation plan?	Section 6.1 Status of 2017 HMP Mitigation Actions column for status	Choose an item.
E2-c. Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?	Section 7.4 Integrating the HMP	Choose an item.
ELEMENT E REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element F: Plan Adoption

Element F Requirements	Location in Plan (section and/or page number)	Met / Not Met
F1. For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance? (Requirement 44 CFR § 201.6(c)(5))		
F1-a. Does the participant include documentation of adoption?	Section 8.2 Integrating the HMP	Choose an item.
F2. For multi-jurisdictional 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))		
F2-a. Did each participant adopt the plan and provide documentation of that adoption?	Click or tap here to enter text.	Choose an item.
ELEMENT F REQUIRED REVISIONS		
Required Revision: Click or tap here to enter text.		

Element G: High Hazard Potential Dams (Optional)

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD1. Did the plan describe the incorporation of existing plans, studies, reports and technical information for HHPDs?		
HHPD1-a. Does the plan describe how the local government worked with local dam owners and/or the state dam safety agency?	Click or tap here to enter text.	Choose an item.
HHPD1-b. Does the plan incorporate information shared by the state and/or local dam owners?	Click or tap here to enter text.	Choose an item.
HHPD2. Did the plan address HHPDs in the risk assessment?		
HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?	Click or tap here to enter text.	Choose an item.

HHPD Requirements	Location in Plan (section and/or page number)	Met / Not Met
HHPD2-b. Does the plan document the limitations and describe how to address deficiencies?	Click or tap here to enter text.	Choose an item.
HHPD3. Did the plan include mitigation goals to reduce long-term vulnerabilities from HHPDs?		
HHPD3-a. Does the plan address how to reduce vulnerabilities to and from HHPDs as part of its own goals or with other long-term strategies?	Click or tap here to enter text.	Choose an item.
HHPD3-b. Does the plan link proposed actions to reducing long-term vulnerabilities that are consistent with its goals?	Click or tap here to enter text.	Choose an item.
HHPD4-a. Did the plan include actions that address HHPDs and prioritize mitigation actions to reduce vulnerabilities from HHPDs?		
HHPD4-a. Does the plan describe specific actions to address HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-b. Does the plan describe the criteria used to prioritize actions related to HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD4-c. Does the plan identify the position, office, department or agency responsible for implementing and administering the action to mitigate hazards to or from HHPDs?	Click or tap here to enter text.	Choose an item.
HHPD Required Revisions		
Required Revision: Click or tap here to enter text.		

Element H: Additional State Requirements (Optional)

Element H Requirements	Location in Plan (section and/or page number)	Met / Not Met
This space is for the State to include additional requirements		
Hazard Mitigation Review Meeting	Section 2.2, Section 2.2.2, Table 2.3	Choose an item.

Plan Assessment

These comments can be used to help guide your annual/regularly scheduled updates and the next plan update.

Element A. Planning Process

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Element B. Risk Assessment

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Element C. Mitigation Strategy

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Element D. Plan Maintenance

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Element E. Plan Update

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Element G. HHPD Requirements (Optional)

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Element H. Additional State Requirements (Optional)

Strengths

[insert comments]

Opportunities for Improvement

[insert comments]

Appendix B Public Engagement Log

Public Engagement Log

Outreach methods for each area of input/education

Mechanism	*Detail*
Dedicated Town Webpage	https://www.jamestownri.gov/town-departments/planning
Town Physical Locations	Town Library Police Station
Town Social Media	Recreation Department Town Library
Local Business Physical Location Bulletin Boards	McQuade's Market
Local Paper	Jamestown Press

Areas for public input/education

Area	Details	Technology
Web Page	A webpage that will be regularly updated with information on HMP	www.jamestownri.gov/town-departments/planning
Surveys	A public survey to addresses the most significant hazards and priorities within the Town	Microsoft Forms survey TinyURL shortened weblink & QR code/link
Public Meetings	Two (2) public meetings (one providing an overview of HMP process and the opportunity to discuss hazards/mitigation strategies; second to discuss a realistic vision and mitigation actions	Streamed live

Public Meeting Detail

Powerpoint presentations with opportunity for Q&A.

Public Meetings	Date	Topic/ Details
Meeting 1	February 28, 2024, 6-8PM	*Overview of HMP Process with Opportunity for Q&A*
Meeting 2	June 17, 2024 6PM	*Presentation of mitigation actions based on the feedback received*

Output of Strategy

- HMP will be updated based on comments we receive through public meetings, surveys, and questions/comments added to the web page
- Final HMP will contain appendices with workshop slides and/or summaries, survey questions, and public comments
- Final plan will be posted on Town website

Public Meeting Slides

See following pages.

Public Meeting Slides

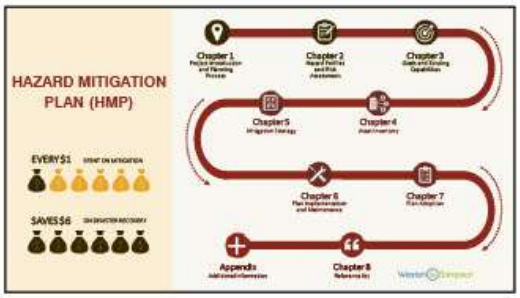
7

8

9

10

11



12

1

TODAY'S AGENDA

- What is Hazard Mitigation Planning?
- Project Process
- Project Timeline
- Sample Goals
- Community Assets and Critical Facilities
- Existing Capabilities
- Mitigation Actions
- Next Steps

2

WHAT IS HAZARD MITIGATION?

Any sustained actions taken to reduce or eliminate the long-term risk to human life and property from hazards…

…through planning, policy, education, infrastructure projects, and more.

3

VALUE OF HAZARD MITIGATION PLANNING

Grant eligibility
Equitable outcomes
Preparedness planning
Building consensus

EVERY $1 SPENT ON MITIGATION

SAVES $6 ON DISASTER RECOVERY

4

WHAT DOES THIS PLAN DO?

1. Identify and Profile the Hazards
2. Determine the Risk (Threat)
3. Determine the Vulnerability
4. Develop Goals & Strategies to Reduce Long-Term Risks and/or Vulnerability

5

HAZARDS IMPACTING JAMESTOWN

HURRICANE WIND
COASTAL HAZARDS
WIND
SEVERE WEATHER
TORNADOES
INLAND FLOODING
SEVERE WINTER WEATHER
DROUGHT
WILDFIRE
SEISMIC HAZARDS
GEOLOGICAL HAZARDS
DAM FAILURES
EXTREME HEAT

6

PROJECT PROCESS

- Gather data
- Review & update existing data with stakeholders, county & town staff, and more.
- Identify vulnerabilities and risks to natural hazards and climate change, including flooding, sea level rise, severe storms, and extreme heat.
- Update progress from the previous plan.
- Build and prioritize a list of strategies to build resilience.
- Make a protocol for implementation.

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TIMELINE

14

Sample Goals

- Reduce damage caused by **Severe Weather** in Jamestown.
- Minimize the damage caused by **Tornadoes** in Jamestown.
- Prevent damage caused by **Brush Fire** in Jamestown.
- Minimize impacts of **Hurricanes** in Jamestown.
- Reduce **Flood Damage** in Jamestown.
- Protect **Health and Safety** of residents in Jamestown.

15

COMMUNITY ASSETS & CRITICAL FACILITIES

Locations and resources that are vital to the function and character of Jamestown.

- Built Environment
- Vulnerable Populations
- Cultural Resources
- Natural Resources
- Economic Centers

16

EXISTING CAPABILITIES

Existing authorities, policies, programs, and resources that reduce hazard impacts or could be used to implement hazard mitigation activities.

- Planning Mechanisms
- Funding Mechanisms
- Administrative Capacity
- Education and Outreach
- Existing Mitigation Measures Addressing Natural Hazards

17

MITIGATION ACTIONS

Mitigation actions are evaluated alongside goals and objectives to determine measures to reduce natural hazard vulnerabilities under the following categories:

- Life Safety
- Property Protection
- Technical
- Political
- Legal
- Environmental
- Social
- Administrative
- Local Champion
- Other Community Objectives

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2017 Mitigation Actions

ACTION #	PRIORITY	POTENTIAL PROGRAM	DESCRIPTION OF STRATEGY
1	Medium	Future Proposed Development	Map vulnerable areas and critical facilities for future proposed residential and commercial development
2	Medium	Update Stormwater Mitigation Plan Requirements	Update of stormwater mitigation plan
3	Medium	Revise the Harbor Plan and the Management Emergency Operations Plan after every storm or every three years	It is important to review and revise these plans to ensure the adequacy of emergency operations. Revisions should be prepared as necessary to meet adequacy
4	High	Marsh Pond Dam	Perform structural repairs to prevent catastrophic failure
5	High	Reduce vulnerability to utility and communication lines	[illegible]
6	High	Debris Management Plan	[illegible]
7	High	Infrastructure Improvements	[illegible]
8	High	Local Road Hazard Assessment	[illegible]
9a	High	Public Education and Outreach	[illegible]
9b	High	Public Education and Outreach	[illegible]
10	Medium	Inflow and Infiltration of Sewer System	Program to mitigate the infiltration of groundwater into the sewer lines
11	Low	Water Treatment Facility	[illegible]
12	Medium	Shoreline Protection and Retreat	[illegible]
13	High	Continue Agreement for purchase of Potable Water	[illegible]

19

NEXT STEPS- PUBLIC INVOLVEMENT

- Public Meeting 2/28
- Survey Open 2/20-3/15
- Please share in your networks! If you have shared on a Facebook page or Instagram, please take a screenshot and send to Lisa.

20

NEXT STEPS

- W&S to develop hazard profiles
- Work with the Town to determine critical facilities
- Next committee meeting:
  - Critical facilities
  - Hazard vulnerability
- Future committee meeting:
  - Develop mitigation goals
  - Develop actions

21

QUESTIONS?
THANK YOU

22

4

Advertisement Log for Public Engagement

Date	Detail
2/22/2024	Published ad for survey and public meeting #1 in Legal Notices section of Jamestown Press
2/26/2024	Published article for survey and public meeting on Town Website
04/21/24	Published ad about survey in general advertisements section of Jamestown Press
03/27/2024	Recreation Department posted about survey on Facebook
04/02/2024	Town Library posted image about survey on Facebook
04/02/2024	Posted flyer about survey at Town Library
04/02/2024	Posted flyer about survey at Police Station
04/02/2024	Posted flyer about survey at McQuade's Market

Public Engagement Log Backup Documentation

THE JAMESTOWN PRESS
A WEEKLY NEWSPAPER SERVING CONANICUT ISLAND
WWW.JAMESTOWNPRESS.COM

LEGAL NOTICES

By ohtadmin on February 22, 2024

JAMESTOWN RI, NATURAL HAZARD MITIGATION PLAN UPDATE — NOTICE OF PUBLIC MEETING

February 28, 2024, 6 p.m.

Jamestown Town Hall – Council

Chambers, 93 Narragansett Avenue

The Town of Jamestown (the

Town) is in the process of updating its Natural Hazard Mitigation Plan (HMP). Updates to the HMP are prepared every five years to stay current with Federal

Emergency Management Agency requirements and to ensure effective response to natural hazards.

The Town seeks the public's input in update of the HMP. There three principal ways to provide input:

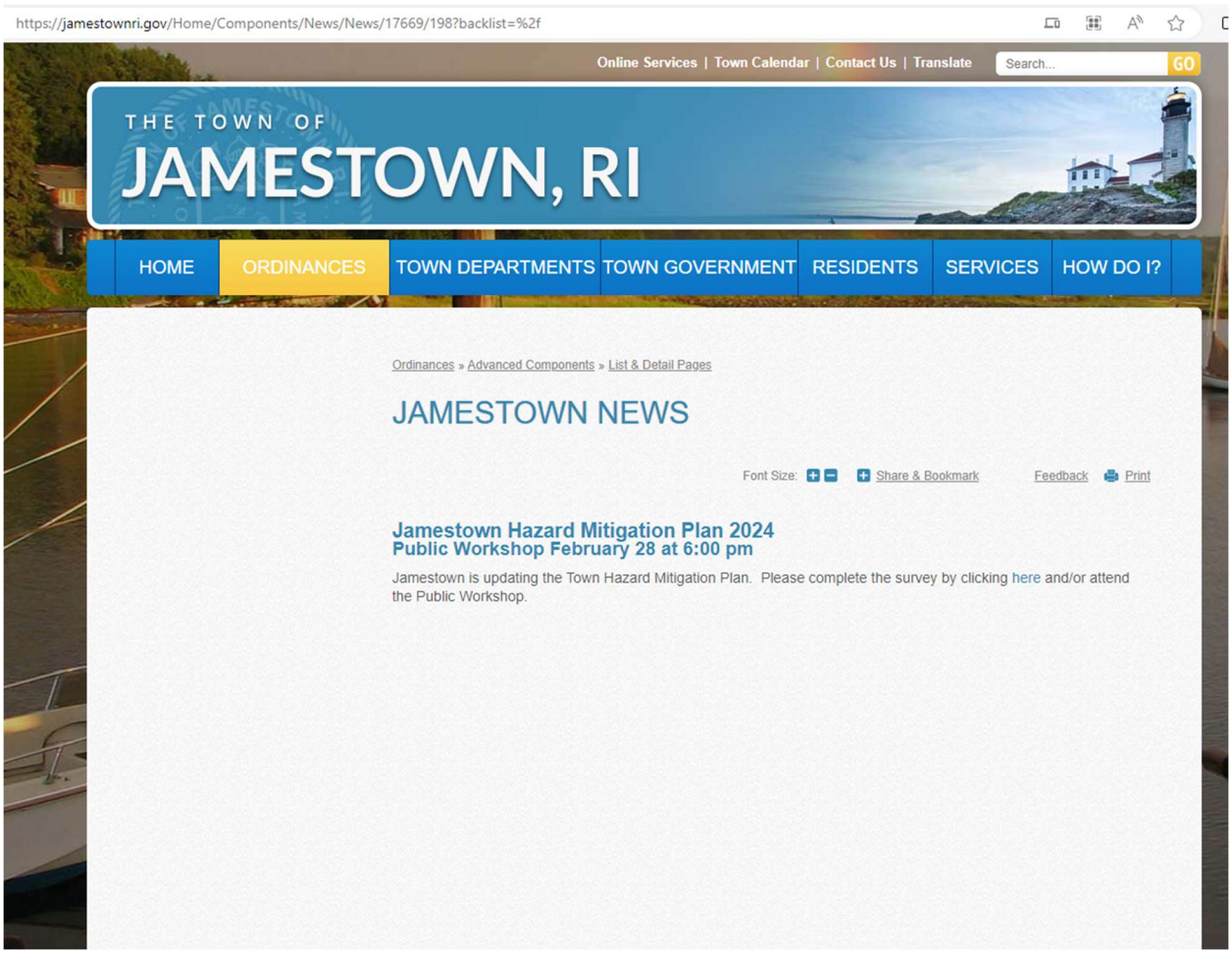
1. Public Meetings. There will be two meetings and a hearing specifically for public input—an introductory workshop, which will be held on February 28, 2024 at 6:00 in Town Council Chambers; and a public listening session, which will be scheduled once a draft HMP update has been developed. Following update of the draft HMP to include public comment, a public hearing will be held to adopt the new HMP.

2. Public Survey. A public survey is being prepared and will be posted on the Town's website at: www.jamestownri. gov/. See the "News" items on the first page. It also can be found at tinyurl.com/Jamestown- HazardSurvey.

3. Public Comment. A HMP draft will be posted on the Town's website for public comment prior to the public listening session. A final draft of the HMP will be posted on the Town's website prior to the public hearing.

The Town looks forward to receiving your input and your participation at the first public meeting on February 28 as noted above.

Feb. 22, 2024


https://jamestownri.gov/Home/Components/News/News/17669/198?backlist=%2f
Online Services | Town Calendar | Contact Us | Translate
Search...
GO
THE TOWN OF
JAMESTOWN, RI
HOME
ORDINANCES
TOWN DEPARTMENTS
TOWN GOVERNMENT
RESIDENTS
SERVICES
HOW DO I?
Ordinances » Advanced Components » List & Detail Pages
JAMESTOWN NEWS
Font Size:
Share & Bookmark
Feedback
Print
Jamestown Hazard Mitigation Plan 2024
Public Workshop February 28 at 6:00 pm
Jamestown is updating the Town Hazard Mitigation Plan. Please complete the survey by clicking here and/or attend the Public Workshop.

Community grant deadline Friday

The Rhode Island Foundation is offering libraries, neighborhood groups and nonprofit organizations the opportunity to apply for grants of up to $10,000 to pay for proposals that bring people together as a community.

The deadline is Friday, March 22.

"Communities thrive where people, places and traditions meet," said David Cicilline, president of the foundation. "We want your best suggestions for enhancing the quality of life, building relationships, enlivening neighborhoods and improving community connections."

Since launching the community grants program in 2016, the foundation has awarded about $3 million to hundreds of projects across Rhode Island. Work has ranged from constructing performance spaces to persevering urban farms to hosting neighborhood meals to increasing the accessibility of historic places.

Local recipients have included the Jamestown Community Chorus, which received $5,000 to support its talent show. Melrose School was awarded $5,000 to renovate its playground and the Conanicut Island Land Trust received $4,000 to help support its 10,000-square-foot pollinator garden at Godena Farm.

Proposals should build social networks, improve the quality of life, promote collaboration and increase community engagement. Priority will be given to proposals that include in-kind contributions, including matching grants, volunteer participation and donated space. Other considerations may include whether projects serve historically marginalized groups, including people who identify as Asian, Black, Latino or indigenous.

The grants are intended to support one-time costs and expenses. Applicants will not be eligible for renewed aid for the same project in future years. Capital campaigns, endowments, for-profit entities, individuals, political groups and lobbying efforts are not eligible.

Chorus set to celebrate 75th anniversary

To commemorate its diamond jubilee, the Jamestown Community Chorus is planning a series of special events leading to its December production, including interviews, videos, photo ops, seminars and performances.

Help, however, is needed from the public to make that happen. The chorus is encouraging the community to scour their family archives for information and mementoes related to the chorus. The chorus also will sell Christmas ornaments to commemorate its 75-year anniversary.

Alumni of the chorus will be invited to join current members to perform familiar songs. Interviews also will be conducted to document the nonprofit organization's history. People should e-mail cantabile50@gmail.com to learn more. Updates also will be posted at jamestowncchorus.com.

The chorus was founded by Rita Murray in 1949 in conjunction with a women's crafting group. Men were soon invited to join. Since 1989, the chorus has been directed by B.J. Whitehouse.

Vietnam veterans to host roundtable on war

The local VFW and American Legion posts will commemorate National Vietnam War Veterans Day with a roundtable discussion from troops in Jamestown who fought in the war.

Doors will open at 9:30 a.m. Friday, March 29, at the senior center, 6 West St. The commemoration will begin at 10 a.m. with memories of U.S. Army Corp. Joseph Tommy Vandevender, the only Jamestown man to die in Vietnam.

Local veterans will then have the opportunity to share their stories about the war followed by comments from family members of deceased Vietnam veterans.

There will be a map of South Vietnam on display so veterans can show where they served during the war. There also will be a table for veterans to display memorabilia they may have saved, including photos, uniform decorations and medals, for more than 50 years.

While the event is focused on Vietnam veterans and family members, the public is welcome to attend.

The Vietnam War Veterans Recognition Act of 2017 set March 29 as the annual holiday to recognize those veterans. On that day in 1973, the last American combat troops departed Vietnam. Veterans in Jamestown commemorated the holiday for the first time in 2023 with a ceremony at the grave of Vandevender in Cedar Cemetery.

The commemoration should end about 11:30 a.m. followed by a hot lunch for veterans to give their families a chance to continue the conversation on an informal basis. All Vietnam veterans in Jamestown are encouraged to attend.

NOTICE

Town of Jamestown
Water Department
Maintenance

The Water Department will be flushing water mains throughout the distribution system **Thursday, March 21, 2024 through Friday, April 30, 2024 from 7:00 AM to 5:00 PM.** Flushing removes sediment from the system and improves water quality. Your water may become discolored during this period and particular care should be taken while washing clothes. Your cooperation is appreciated.

facebook Log In

Jamestown Parks and Recreation
1d ·

Jamestown Parks and Recreation
Recreation Center

Send message

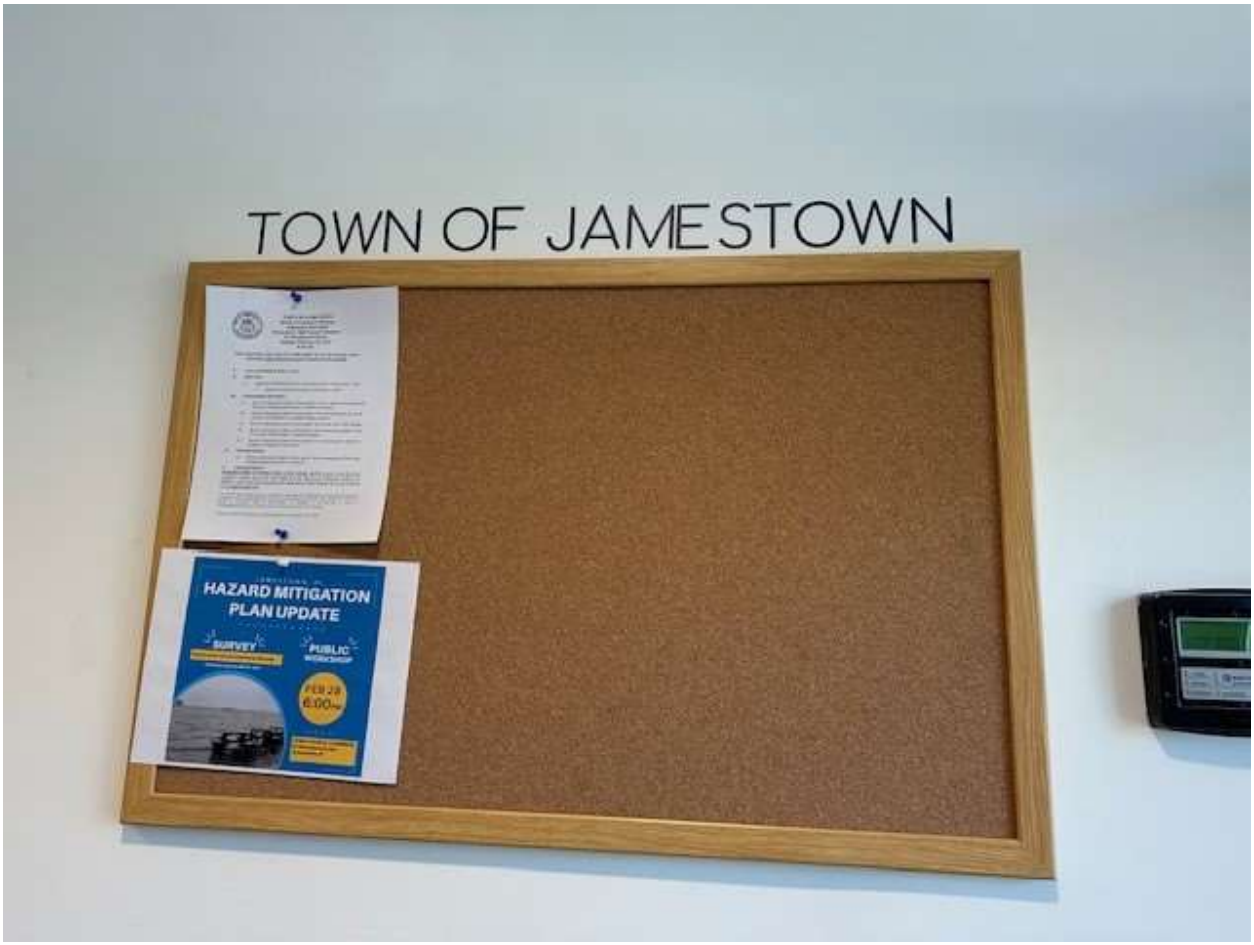
Jamestown Philomenian Library
Yesterday at 11:00 AM ·

Sharing on behalf of the Jamestown Planning Department:

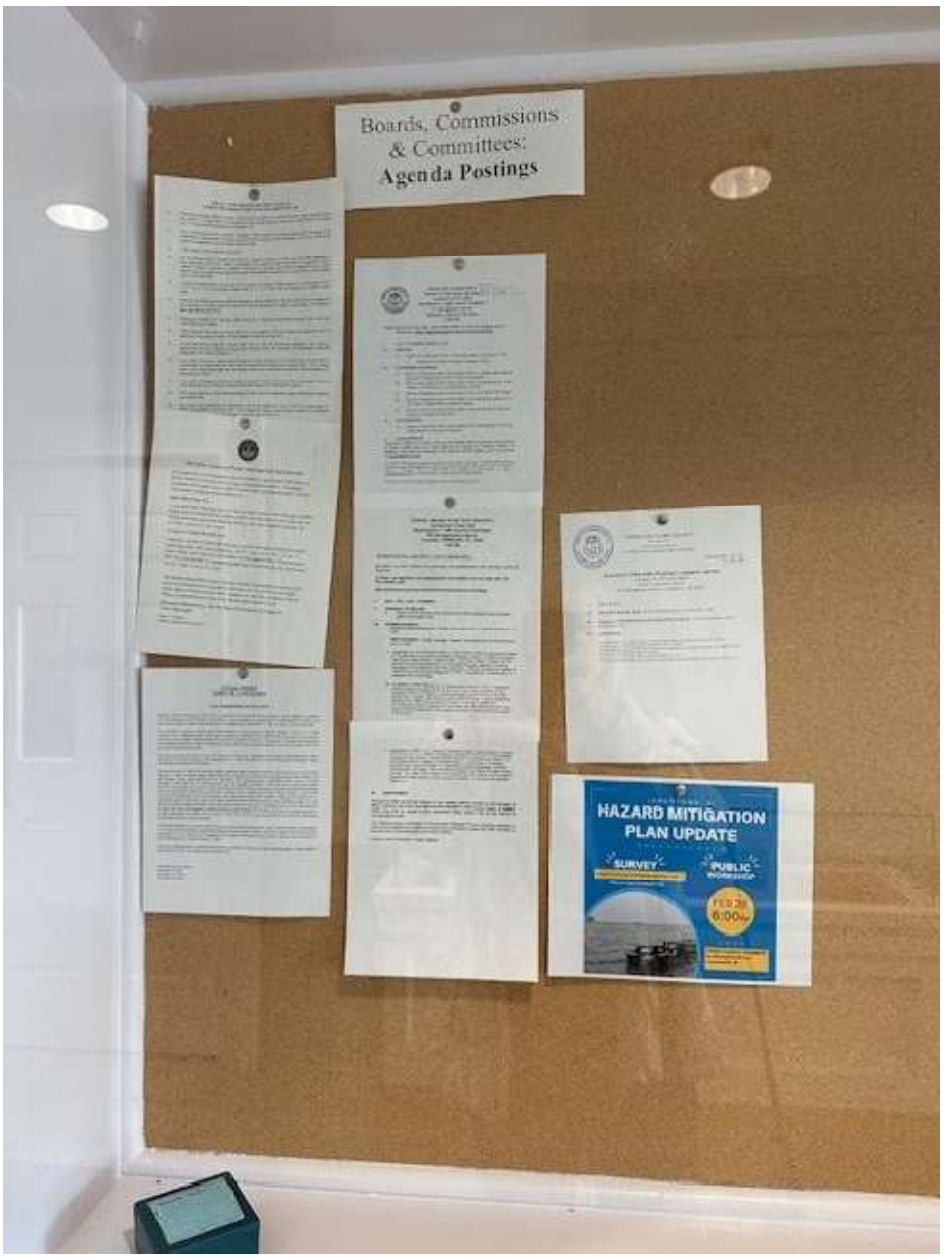
Help shape the plan to protect Jamestown's People & Places.

Share your experience of Flooding, Storms, Drought and other Hazards. Scan the QR code or follow the link below:

Tinyurl.com/jamestownhazardsurvey



Advertisement posted at Town Library 04/02/2024



Advertisement posted at Police Station 04/02/2024

Survey poster posted at McQuade's Market

Appendix C Survey Responses

Jamestown, RI Hazard Mitigation Plan Public Survey

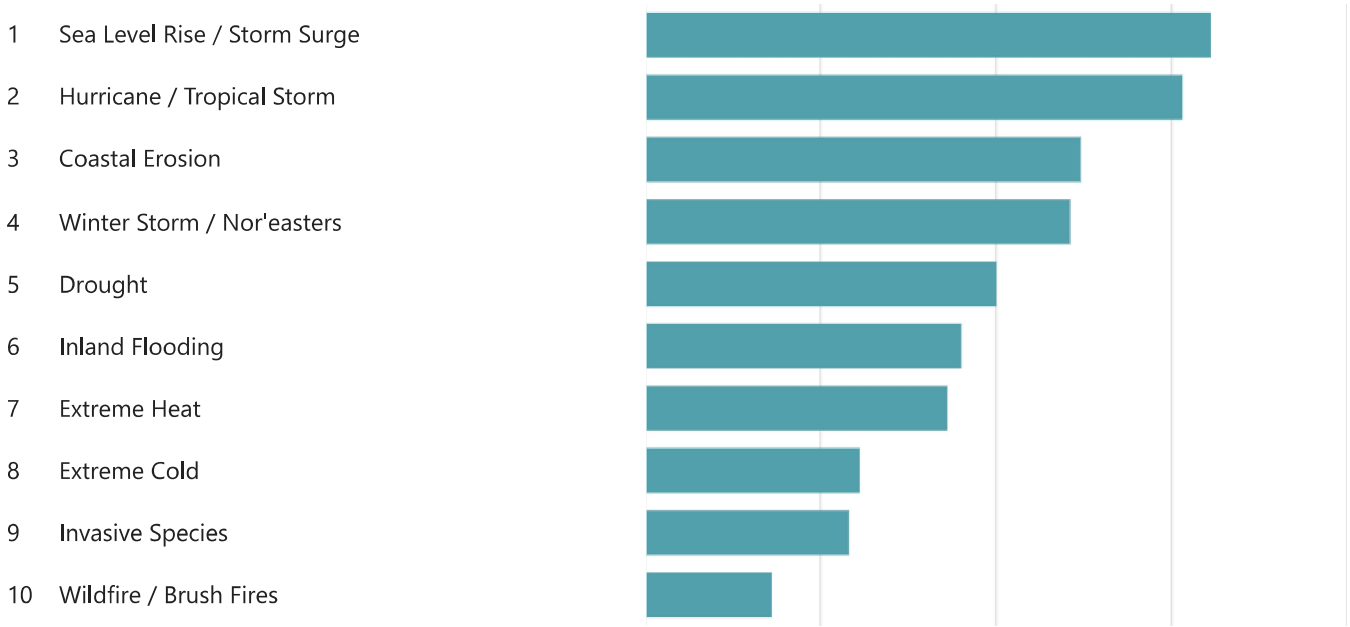
19 Responses

23:02 Average time to complete

Closed Status

1. Which natural hazards are you most concerned about?

   Click and drag each option to rearrange or use the up and down arrows. On a computer you may need to hover your mouse for the arrow to appear.



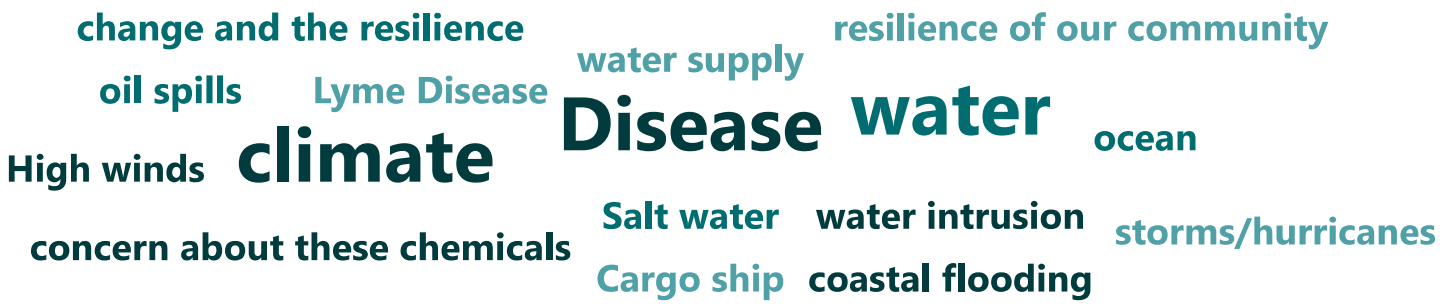
2. Are there any other natural hazards you are concerned about?

11
Responses

Latest Responses

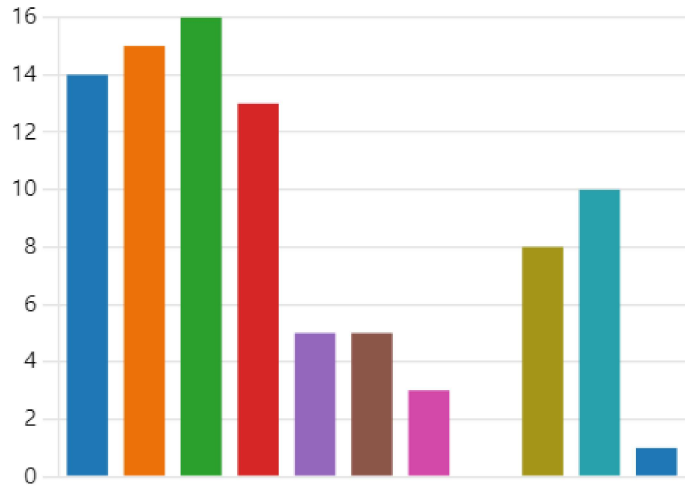
"Pesticides from people's lawns running into the ocean/ocean health (maybe ...

2 respondents (**18**%) answered **Disease** for this question.



3. If any, which natural hazards have you personally experienced in Jamestown?

Sea Level Rise / Storm Surge	14
Hurricane / Tropical Storm	15
Winter Storm / Nor'easters	16
Coastal Erosion	13
Inland Flooding	5
Extreme Heat	5
Extreme Cold	3
Wildfire / Brush Fires	0
Drought	8
Invasive Species	10
Other	1



4. Tell us more about your experiences with natural hazards. Please add specify areas of Town that are vulnerable to climate hazards and from what type of hazard.

15
Responses

Latest Responses

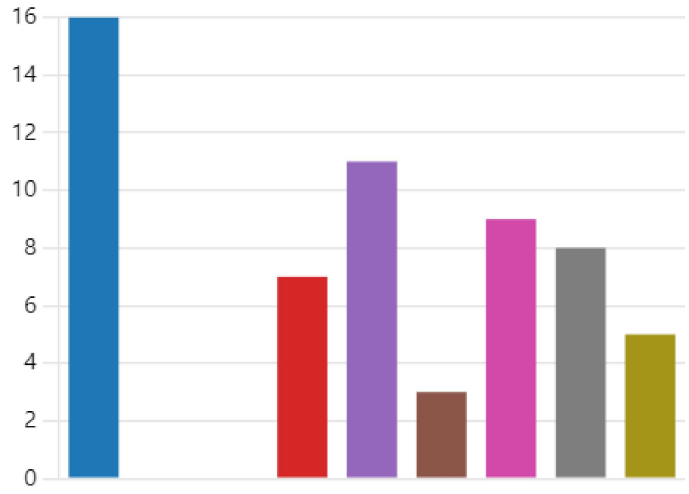
"It hasn't affected me personally but it's concerning that zeek's creek area of ...

"Mackerel cove blocked off multiple times this year alone "

8 respondents (**53**%) answered **Mackerel Cove** for this question.

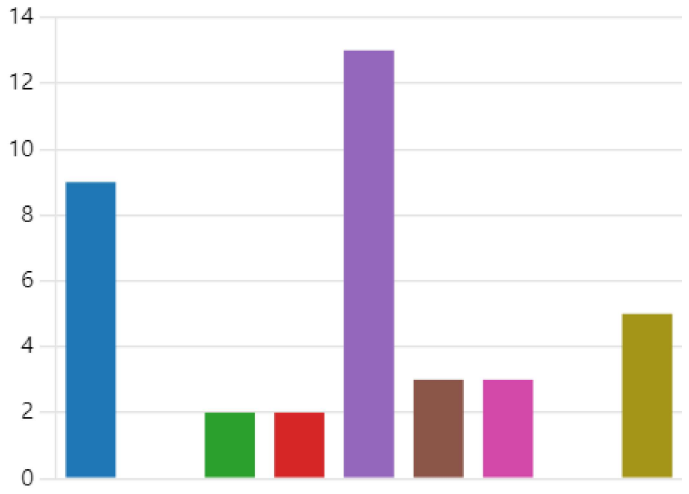
5. What problems from natural hazards concern you the most?

Damage to my home	16
Access to shelter because I am c...	0
My job could be affected	0
Limited access to food or supplies	7
Power outage	11
Limited access to transportation	3
Limited access to medical care	9
Contaminated drinking water	8
Other	5



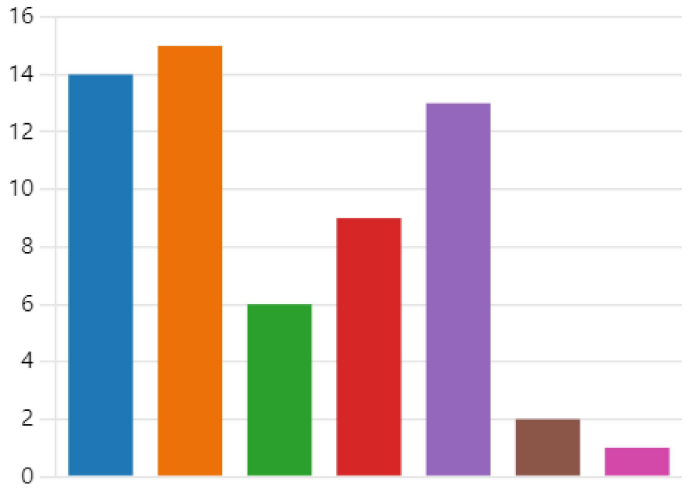
6. If any, what problems from natural hazards have you experienced in Jamestown?

Damage to my home	9
Access to shelter because I am c...	0
My job was affected	2
Limited access to food or supplies	2
Power outage	13
Limited access to transportation	3
Limited access to medical care	3
Contaminated drinking water	0
Other	5



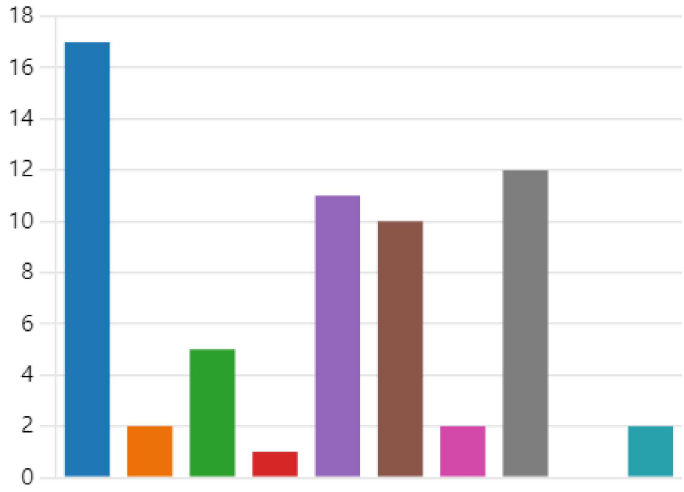
7. If anything, what do you do to prepare for an natural hazard event?

I have an emergency kit with su...	14
I have a back up generator in ca...	15
I know where the nearest shelte...	6
I know what the evacuation rout...	9
I check on a vulnerable neighbo...	13
A neighbor checks on me to off...	2
Other	1

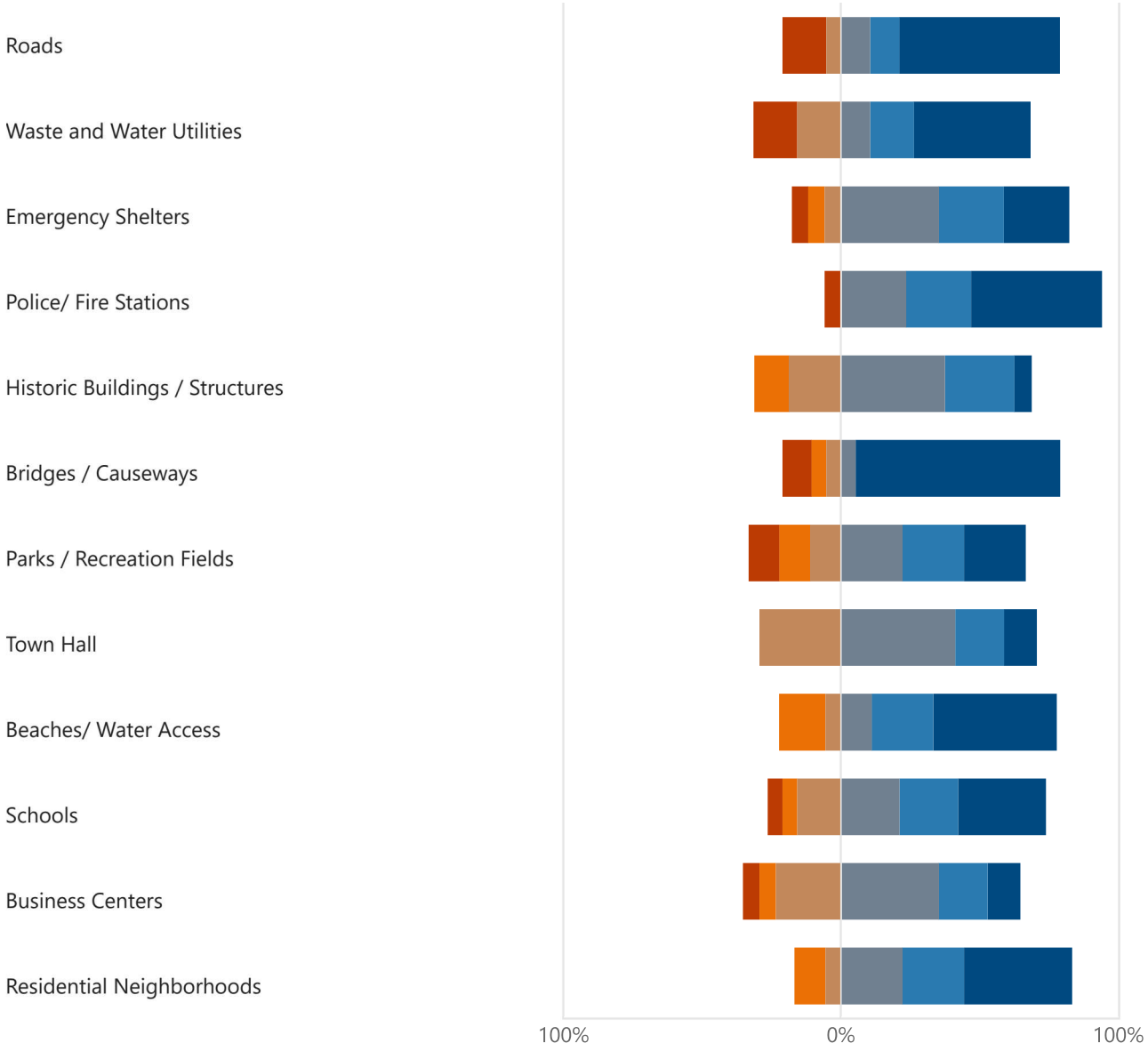


8. What actions have you taken to reduce the risk of Natural Hazards for your property?

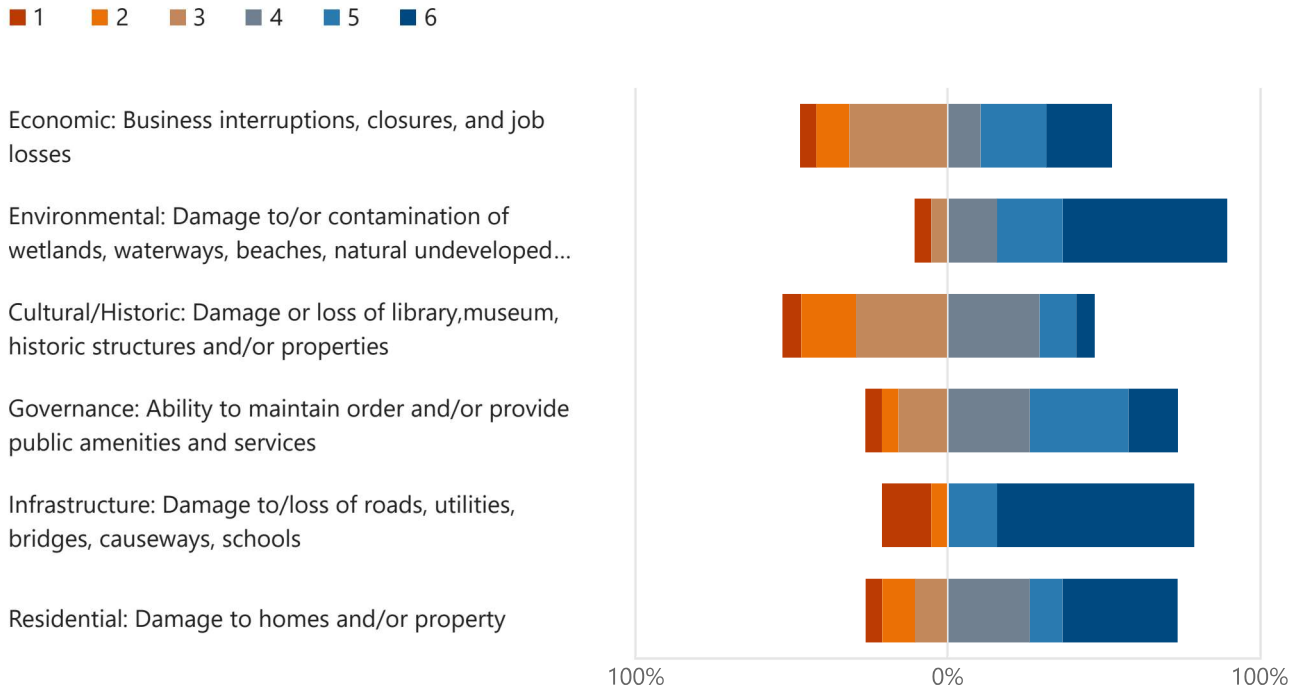
Purchased a homeowners/rente...	17
Purchased flood insurance	2
Elevated HVAC above floodplain	5
Replaced windows with impact r...	1
Trimmed or removed trees close...	11
Installed sump pump	10
Replaced roofing with high win...	2
Bought a generator	12
Installed flood protection meas...	0
Other	2



9. How important is it to you for Jamestown to prioritize protecting each of community assets listed below from natural hazards? Please rank 1-6, 1 being the least important and 6 being the most important.


Roads
Waste and Water Utilities
Emergency Shelters
Police/ Fire Stations
Historic Buildings / Structures
Bridges / Causeways
Parks / Recreation Fields
Town Hall
Beaches/ Water Access
Schools
Business Centers
Residential Neighborhoods
100%
0%
100%

10. Which of the following categories are most susceptible to natural hazards in Jamestown? Please rank 1-6, 1 being the least susceptible and 6 being the most susceptible.



11. What does the Town do well to prepare for natural hazards?

    For example: Warming or cooling stations, snow removal, winter road treatment, public notifications about extreme events, resources for the unhoused, prioritizing vulnerable populations.

17
Responses

Latest Responses

"*Always appreciate the calls regarding natural hazards or alerts. Also the sno...*

"*Plowing, reservoir monitoring and conservation, notifications of extreme eve...*

"*Clean up after the fact* "

5 respondents (**29**%) answered **snow removal** for this question.

12. What could the Town improve on or begin doing to prepare for natural hazards?

    For example: Warming or cooling stations, snow removal, winter road treatment, public notifications about extreme events, resources for the unhoused, prioritizing vulnerable populations.

13
Responses

Latest Responses

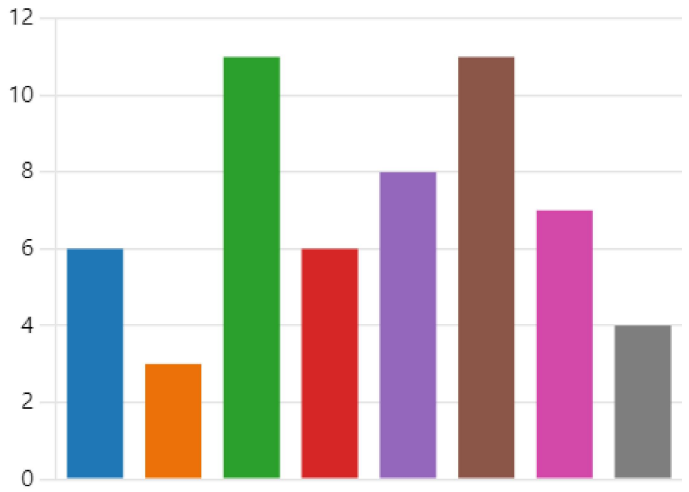
"I would like to see more oversight and restrictions with well water use durin..."

"Mackerel cove resiliency plan"

4 respondents (**31**%) answered **roads** for this question.

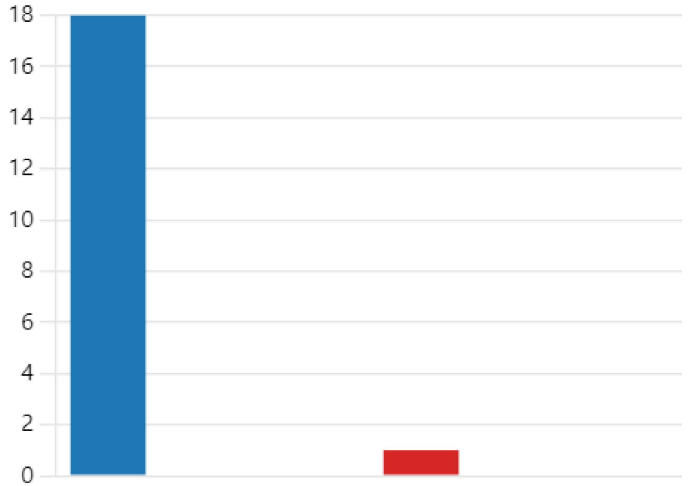
13. How would you like to receive information about hazard mitigation in Jamestown?

Interactive online webinars	6
Pre-recorded videos posted onli...	3
Update, report, or fact sheet PD...	11
Flyers or printed materials poste...	6
Social media postings	8
Email updates from the Town	11
In-person community events	7
Other	4



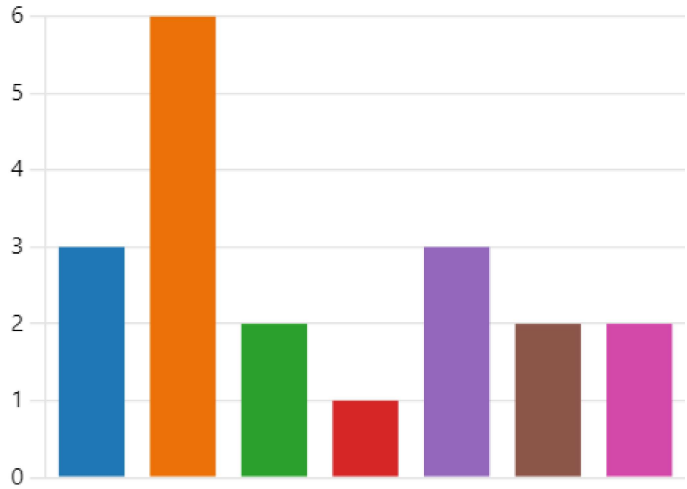
14. What is your current housing situation?

I own my home	18
I rent my home	0
I am a student living in student ...	0
I am a seasonal resident	1
I do not currently have permane...	0
Other	0



15. How long have you lived or worked in Jamestown?

Under 5 years	3
6-10 years	6
11-20 years	2
21-30 years	1
31-40 years	3
41-50 years	2
Over 50 years	2



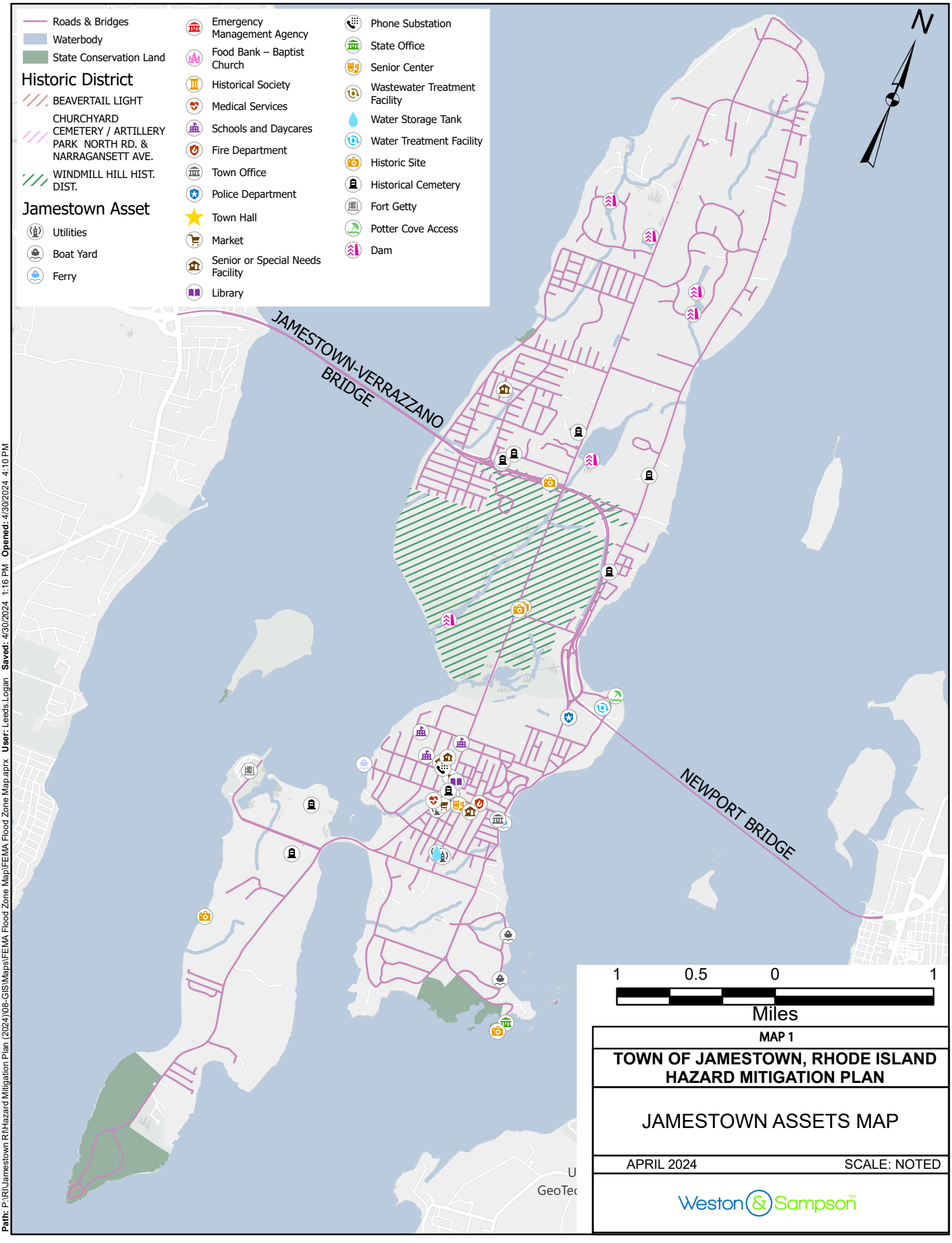
16. What else would you like us to know about hazards that you or others face in Jamestown?

9
Responses

Latest Responses

5 respondents (**56**%) answered **Road** for this question.

Appendix D Community Assets Maps



MAP 1

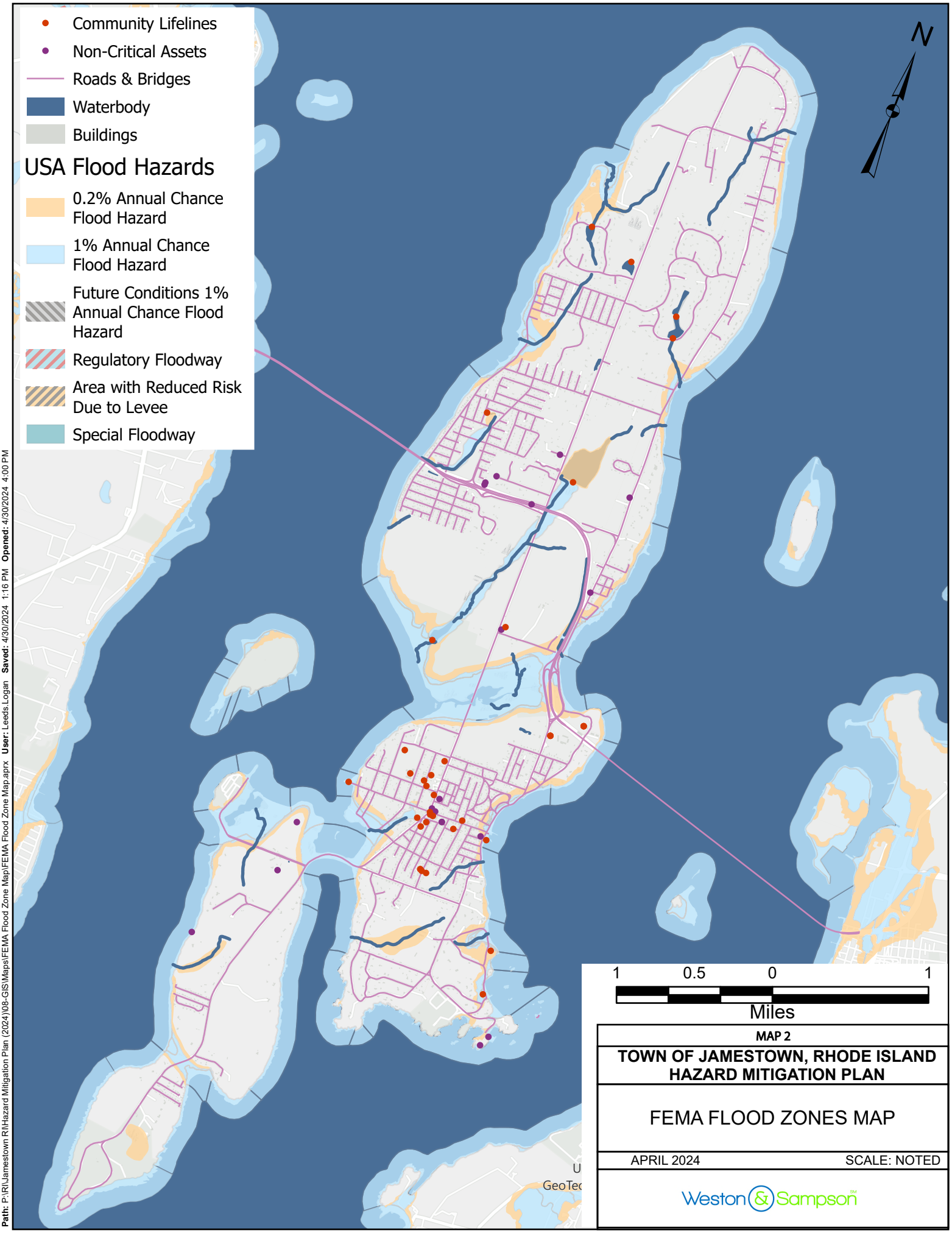
TOWN OF JAMESTOWN, RHODE ISLAND HAZARD MITIGATION PLAN

JAMESTOWN ASSETS MAP

APRIL 2024 SCALE: NOTED

Weston & Sampson

Path: P:\RI\Jamestown RI\Hazard Mitigation Plan (2024)\08-GIS\Maps\FEMA Flood Zone Map\FEMA Flood Zone Map.aprx User: Leeds.Logan Saved: 4/30/2024 1:16 PM Opened: 4/30/2024 4:10 PM



MAP 2

TOWN OF JAMESTOWN, RHODE ISLAND
HAZARD MITIGATION PLAN

FEMA FLOOD ZONES MAP

APRIL 2024 SCALE: NOTED

Weston & Sampson

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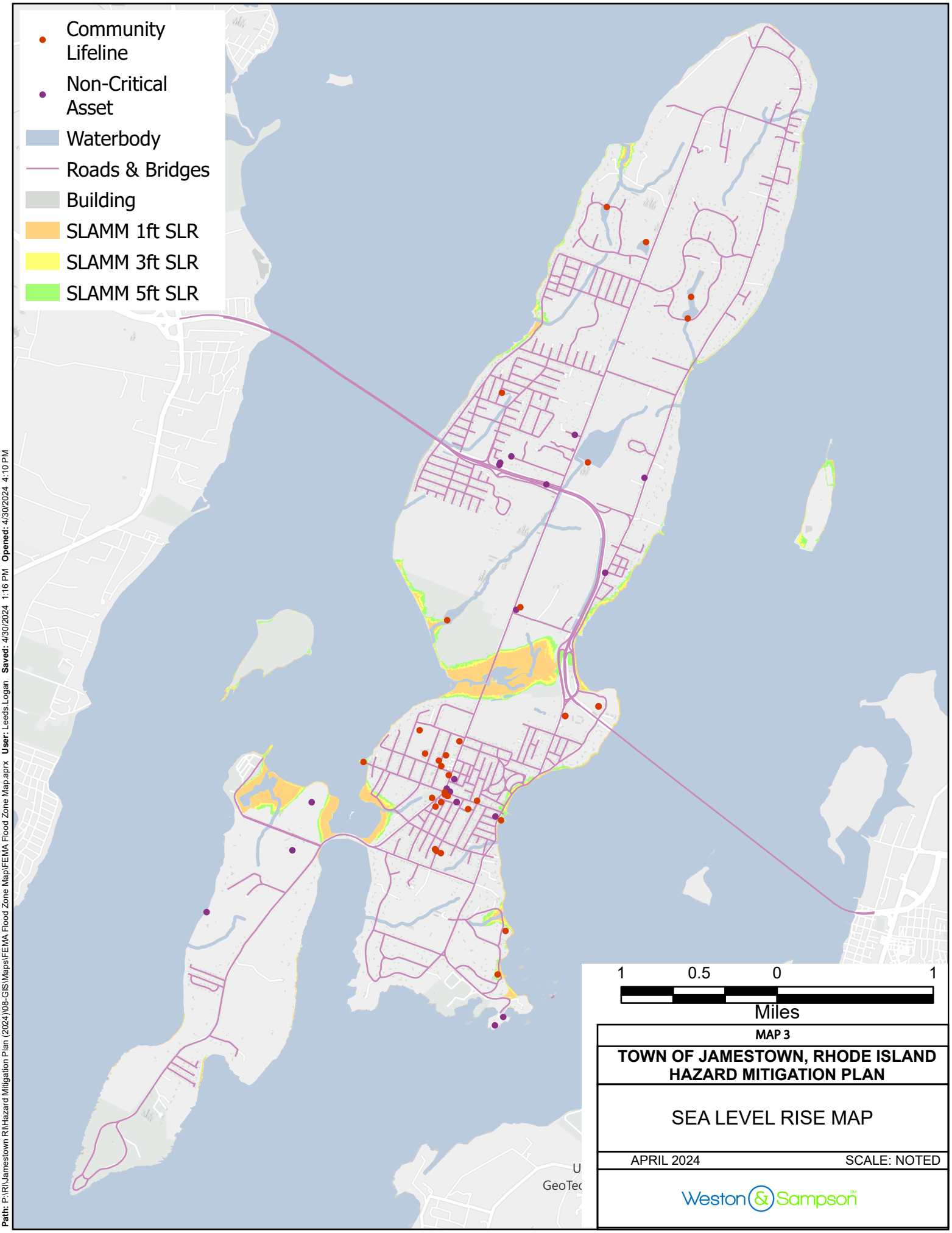

MAP 3

TOWN OF JAMESTOWN, RHODE ISLAND
HAZARD MITIGATION PLAN

SEA LEVEL RISE MAP

APRIL 2024 SCALE: NOTED

Weston & Sampson

Appendix E Hazus Results

Hazus- Earthquake in Jamestown, RI

FACILITY TYPE	TOTAL	At LEAST MODERATE		COMPLETE		WITH	
		Mag 5	Mag 7	Mag 5	Mag 7	Mag 5	Mag 7
Hospitals	0	0	0	0	0	0	0
Schools	2	2	2	0	2	0	0
Emergency Op Centers	1	1	1	0	1	0	0
Police Stations	1	1	1	0	1	0	0
Fire Stations	1	1	1	0	1	0	0

	MAGNITUDE 5.0	MAGNITUDE 7.0
Building Stock		
Estimated total number of buildings	3,094	
Estimated total building replacement value (Year 2021 $) (Millions of dollars)	1,620	
Building Damages		
# of buildings sustaining slight damage	917	801
# of buildings sustaining moderate damage	485	1,078
# of buildings sustaining extensive damage	128	455
# of buildings completely damaged	32	462

	MAGNITUDE 5.0	MAGNITUDE 7.0
Population Needs		
# of households displaced	28	222
#of people seeking temporary public shelter	11	85
# life threatening injuriest (depends on time of day)	3	41
# deaths (depends on time of day)	5	73
Debris		
Building debris generated (millions of tons)	0.03	0.17
# of truckloads to clear building debris (@25 tons/truck)	1,160	6,600
Building-Related Econominc Loss (Millions of Dollars)		
Income Losses	32.0935	126.3428
Direct Building Losses	213.77	912.90

Direct Repairs (transportation and utility)	73.81	201.81

Hazus- Hurricane in Jamestown, RI

	CATEGORY 2	CATEGORY 4
BUILDING STOCK		
Estimated total number of buildings	3,094	
Estimated total building replacement value (Year 2021 $) (Millions of Dollars)	1,620	
BUILDING DAMAGES		
# of buildings sustaining minor damage	575.11	1,066.79
# of buildings sustaining moderate damage	97.82	396.44
# of buildings sustaining severe damage	8.26	90.72
# of buildings destroyed	4.62	51.68
POPULATION NEEDS		
# of displaced people	0	23
# of people seeking temporary public shelter	0	0
DEBRIS		
Total debris generated (tons)	3,649	11,391
Tree debris generated (tons)	1,446	2,951
Brick/wood debris generated (tons)	2,203	8,399
Concrete/steel debris generated (tons)	0	41
# of truckloads to clear building debris (@25 tons/truck)	88	338
VALUE OF DAMAGE (Thousands of Dollars)		
Total property damage	36,332.44	152,894.04
Total losses due to business interruption	4,120.81	18,339.39

Hazus- Flood in Jamestown, RI

	100-Year	500-Year
BUILDING STOCK		
Estimated total number of buildings	3,094	
Estimated total building replacement value (Year 2021 $) (Millions of Dollars)	1,620	
BUILDING DAMAGES		
Damage Level 1-10	1	6
Damage Level 11-20	5	17
Damage Level 21-30	0	8
Damage Level 31-40	0	1
Damage Level 41-50	0	1
Damage Level >50 (Substantial)	0	4
POPULATION NEEDS		
# of displaced people	1,162	3,648
# of people seeking short term shelter	37	59
Total debris generated (tons)	28,994	262,031
Finishes (tons)	15,981	71,264
Structure (tons)	7,915	117,352
Foundation (tons)	5,098	73,415
# of truckloads to clear building debris (@25 tons/truck)	1,160	10,482
VALUE OF DAMAGE		
Building Loss (Year 2021 $)(Millions of Dollars)	28.85	65.83
Total Losses Due to Business Interruption (Year 2021 $)(Millions of Dollars)	156.91	173.02

Appendix F Final Invited Review Collaborator List

Final Invited Review Collaborator List

The lists below indicate the additional collaborators with whom the draft HMP was shared for review that included 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 private and non-profit interests. These contributors are in addition to the robust set of stakeholders listed in Appendix B. The updated draft plan was shared electronically at the beginning of June 2024 and recipients were asked to respond within ~14 days. No substantive additional comments were received.

First Name	Last Name	Title	Affiliation
Patricia	Reynolds	Director of Planning and Economic Development	Town of Newport
Nicole	LaFontaine	Director of Planning and Development	Town of North Kingstown
Rae-Anne	Culp	State Hazard Mitigation Officer	RIEMA
Michael	DeLuca	Town Planner	Town of Narragansett
Anne	Kuhn	Chair, Jamestown Conservation Commission	Jamestown Conservation Commission

Appendix G Jamestown 2024 – 2029 Prioritized Mitigation Actions with STAPLEE Scoring

Jamestown 2024 – 2029 Prioritized Mitigation Actions with STAPLEE Scoring

2024	2017	Action	Action Detail	STAPLEE							Priority Score	Priority
				Social	Technical	Administrative	Political	Legal	Economic	Environmental		
1	3	Review Harbor Management Plan and EOP regularly	Incorporate newly completed Harbor Management Plan into Emergency Operations Plan Update and update after at least every three years, or after significant storm events, as necessary.	3	3	3	3	3	2	2	19	High
2	5	Reduce vulnerability to utility and communication lines	Tree Damage Mitigation Program to trim trees adjacent to utility lines to avoid power outages and therefore, maintain communication systems during and after hurricanes, thunderstorms, ice storms, and windstorms.	3	3	3	3	2	3	2	19	High
3	7	Bridge Repair Coordination	Coordinate with RIDOT to prioritize retrofit and repair of bridges, especially those that are vulnerable to sea level rise and climate change.	3	3	3	2	2	3	2	18	Medium
4	8	Vulnerable Roads Coordination	Coordinate with RIDOT to evaluate roads, especially that are vulnerable to sea level rise and prioritize improvements to vulnerable roads.	3	3	3	2	2	3	2	18	Medium
5	9b	Public Education and Outreach	Organize and conduct training program for town officials, employees, boards, and commissions regarding hazard mitigation, including flood mitigation, and actions/responsibilities during a natural disaster	3	3	3	3	3	3	2	20	High
6	10	Inflow and Infiltration of Sewer System	Continue to implement program to mitigate the infiltration of groundwater and inflow into the sewer lines	3	3	3	3	3	3	3	21	High
7	11	New Access for Water Treatment Facility	Develop plan for a new access and infrastructure to service the existing Water Treatment Facility	3	3	3	2	2	3	3	19	High
8	12	Climate Adaptation Plan	Develop climate adaptation plan to address sea level rise and other climate hazards in order to improve resilience of general community infrastructure.	2	2	2	2	3	3	2	16	Low
9	13	Continue Agreement for purchase of Potable Water	The Town should maintain and test regularly the emergency hose and reels so that they are ready if needed. The Town should continue to pursue a formal agreement with the Town of North Kingstown for potable water in times of drought.	3	3	3	3	3	3	2	20	High
10		Conanicus Seawall Repair	Develop plan with RIDOT to raise the remaining seawall at Conanicus Avenue	2	3	2	2	3	3	2	17	Medium

2024	2017	Action	Action Detail	STAPLEE							Priority Score	Priority
				Social	Technical	Administrative	Political	Legal	Economic	Environmental		
11		Potter's Cove Shoreline Hardening	Develop a plan for structural repairs and shoreline hardening at Town Owned Potter's Cove Parking Lot at Freebody Drive	2	2	2	2	3	2	2	15	Low
12		Formal Agreement for Private Road Use During Conanicus Ave Closure	Develop contingency plan and or formal agreement for use of private roads in the event of Conanicus Ave closure	3	3	3	2	3	2	2	18	Medium
13		Floodproof Pump Stations	Floodproof vulnerable pump stations, including, but not limited to the stations at Dutch Harbor and Maple Ave.	3	3	3	2	3	3	3	20	High
14		Dune Restoration at Mackerel Cover	Pursue funding and implement dune restoration/mitigation at Mackerel Cove beach	1	1	2	2	3	2	3	14	Low
15		Outreach to Seniors	Improve outreach and communications to seniors in the event of natural hazards	3	3	2	2	3	3	3	19	High
16	2	Develop Stormwater Mitigation Plan	Develop stormwater mitigation plan	3	2	3	2	3	2	3	18	Medium
17	4	South Pond Dam	Implement structural improvements to prevent catastrophic failure	3	3	3	2	2	3	3	19	High
18	6	Debris Management Plan	Develop Internal Town policy for prompt removal and proper siting of fallen debris and tree limbs which decreases potential blockage or road and property blockage	2	2	3	2	3	2	3	17	Low
19	9a	Public Education and Outreach	Develop and make preparedness and response material available concerning evacuation routes, emergency shelters, and maps of risks and critical facilities of Jamestown.	3	2	2	3	3	3	2	18	Medium
20		Join the Community Rating System	Appoint a CRS Coordinator and prepare documentation of at least 500 CRS points. Complete application and submit letter of interest.	3	3	2	2	3	3	2	18	Medium