JOHNSTON





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Municipal Resilience Program

Community Resilience Building

Summary of Findings

October 2023

Town of Johnston, Rhode Island
Community Resilience Building
Summary of Findings

Overview

The need for municipalities, regional planning organizations, corporations, states, and federal agencies to increase resilience to extreme weather events and a changing climate is strikingly evident amongst the communities across the state of Rhode Island. Recent events such as Tropical Storm Irene, Super Storm Sandy, severe winter storms (2013 & 2015), and even the recent severe flooding during the summer and fall of 2023 (i.e., I-95 closure) have reinforced this urgency and compelled leading communities like the Town of Johnston to proactively collaborate on planning and mitigating risks. Ultimately, this type of leadership is to be commended because it will reduce the vulnerability and reinforce the strengths of people, infrastructure, and ecosystems and serve as a model for other communities in Rhode Island, New England, and the nation.

In the summer of 2023, the Town of Johnston embarked on certification within the state of Rhode Island's Municipal Resilience Program (MRP). As a prerequisite to certification, the Rhode Island Infrastructure Bank (RIIB) and The Nature Conservancy (TNC) provided the Town with a community-driven process to assess current hazards and climate change impacts, and to surface projects, plans, and policies for improved resilience. In October 2023, Johnston's Core Team helped organize their Community Resilience Building process and workshop facilitated by TNC in partnership with RIIB. The core directive of this effort was the engagement with and between community members to define strengths and vulnerabilities and the development of priority resilience actions for the Town of Johnston.

The Johnston Community Resilience Building Workshop's central objectives were to:

- Define top local, natural, and climate-related hazards of concern.
- Identify existing and future strengths and vulnerabilities.
- Identify and prioritize actions for the Town.
- Identify opportunities to collaboratively advance actions to increase resilience alongside residents and organizations from across the Town and beyond.

The Town of Johnston used an "anywhere at any scale", community-driven process called Community Resilience Building (CRB) (www.CommunityResilienceBuilding.org). The CRB's tools, reports, other relevant planning documents, and local maps were integrated into the workshop process to provide both decision-support and visualization around shared issues and existing priorities across Johnston. The Johnston Hazard Mitigation Plan (2020) was particularly instructive as a reference. Using the CRB process - rich with information, experience, and dialogue - the participants produced the findings presented in this summary report. This includes an overview of the top hazards, current concerns and challenges, existing strengths, and proposed actions to improve Johnston's resilience to hazards and climate change today, and in the future.

The summary of findings transcribed in this report, like any that concern the evolving nature of risk assessment and associated action, is proffered for comments, corrections and updates from workshop attendees and other stakeholders alike. The leadership displayed by the Town of Johnston on community resilience building will benefit from the continuous participation of all those concerned.

Summary of Findings

Top Hazards and Vulnerable Areas for the Community

Prior to the CRB Workshop, the Johnston Core Team identified the top hazards for the Town. The hazards of greatest concern included flooding from waterways and stormwater runoff, major weather events such as hurricanes, tornados, and windstorms, and snow storms. Additional hazards highlighted by participants during the CRB workshop included extended drought and extreme temperature events (both hot and cold). These hazards have direct and increasing impacts on the infrastructure, environment, and residents of and visitors to Johnston. These effects are seen in residential neighborhoods, natural areas (wetlands, rivers, forests, preserves, parks), roads, bridges, businesses, municipal facilities, the waterfront, historic buildings, churches, social support services, and other critical infrastructure and community assets within Johnston.

Current Concerns and Challenges Presented by Hazards

The Town of Johnston has several concerns and faces multiple challenges related to the impacts of natural hazards and climate change. In recent years, Johnston has experienced a series of highly disruptive and damaging weather events including severe flooding (March 2010, FEMA DR-1894), Tropical Storm Irene (August 2011, FEMA DR-4027), Superstorm Sandy (October 2012, FEMA DR-4089), Nor'easter Nemo (February 2013, FEMA DR-4107), and Blizzard Juno (January 2015, FEMA DR-4212). Impacts from Irene and Sandy included widespread inland flooding, along with tree damage and associated power outages. The winter storms Nemo and Juno dropped 2-3 feet of snow with 2-3 inches per hour of accumulation at their peak. In just the last year, Rhode Island – and Johnston – have seen historic flash floods and stormwater impacts from intense and frequent storms. The magnitude and intensity of these events, and others across Rhode Island, have increased awareness of natural hazards and climate change while motivating communities such as Johnston to proactively improve their resilience.

As is projected with climate change, the impacts from these severe weather events have been varied and diverse. In Johnston this has included: inland flooding of the riverfront; riverine flooding of critical infrastructure, roads, and low-lying areas; localized flooding from stormwater runoff during intense storms and heavy precipitation events; and property damage and utility outages (lasting several days or more) from wind, snow, and ice. Longer periods of elevated heat, particularly in July and August, have raised concerns about vulnerable segments of the population, including elderly and disabled residents who are homebound and lower-income residents who may have difficulty with utility bills for temperature control in their homes. The combination of these issues presents a challenge to preparedness and mitigation priorities and requires comprehensive, yet locally specific actions in Johnston.

The workshop participants were generally in agreement that Johnston is experiencing more intense and frequent storm events and heat waves. Additionally, there was a general concern about the increasing challenges of being prepared for the worst-case scenarios (e.g., major thunderstorms and hurricanes (Cat-3 or above)) particularly in the late summer and in the fall/winter months, when more intense storms coincide with colder weather (i.e., Nor'easters, blizzards). The impact of the COVID-19 pandemic was raised by workshop participants as well.

Specific Categories of Concerns and Challenges

As in any community, Johnston is not uniformly vulnerable to hazards and climate change. Certain locations, assets, and populations have been and will be affected to a greater degree than others. Workshop participants identified the following items as their community's key areas of concern and challenges across several broad categories.

Municipal Functions, Operations, & Growth:

- Flooding due to excessive stormwater runoff occurs in a great many locations across Johnston on a routine basis.
- Historic development of residential neighborhoods during the 1950s through the 1960s in areas increasingly susceptible to flooding from river and streams and stormwater runoff.
- Ongoing cases of voluntary buyouts of residential homes as a result of previous development in low-lying areas as well as the increased impact of flooding due to more intense and longer duration precipitation events (i.e. , upwards of 5" in 12 hours").
- Dense development in certain parts of the community that are in low-lying areas that receive runoff from adjoining uplands as well as flood waters from rivers and streams.
- Currently, many residential homes are at risk of flooding impacts due to their location in active floodplains.
- Johnston is situated at the bottom of several watersheds resulting in a greater accumulation of flood water generated over the course of the entirety of a given watershed.
- Recent growth in the business community and associated level of commerce has resulted in greater congestion along municipal and state roads which gets compounded during periods of flooding and snow accumulation, particularly in certain locations such as along Atwood Avenue and from the Town Hall to the Stop & Shop Supermarket. Residents have had to travel by boat along Atwood Avenue during major flood events in the recent past.
- Limited ability of municipal boards to regulate or promote responsible development and growth in Johnston resulting in over-development and increased pressure on infrastructure such as stormwater management systems.

Specific Categories of Concerns and Challenges (cont'd)

Emergency Management & Preparedness:

- Flooding issues create challenges for emergency management professionals attempting to access residential neighborhoods, leaving residents stranded in some cases during times of need.
- Volume of calls from residents dealing with flooding overwhelms the ability of local emergency management professionals - such as fire fighters - to effective respond in a timely manner. Recent examples of routine storms resulted in the need to pump out basements in 25 different residential homes.
- Tornado during the summer of 2023 presents a concern for more events such as this in the future.
- Lack of adequate infrastructure and personnel to keep up with major storm events such as blizzards and Nor'easters resulting in delayed opening of roads and sidewalks.

Infrastructure: Roads & Road Networks, Sidewalks, Dams:

- Flooding from the Pocasset River and Atwood Avenue results in impacts running in a north to south direction that are shared by both Johnston and Cranston (located downstream).
- Flooding along Atwood Avenue, which is a primary north/south transportation corridor in Johnston, has routine and lasting impacts on the central business district and downtown area situated along this thoroughfare.
- Many water bodies that serve as receiving areas for precipitation runoff are reservoirs that are created and maintained by dams that may not be adequately maintained or structurally engineered to retain increased storage volume behind the dam.
- Growing concern regarding the status and condition of dams across Johnston due to increased precipitation and runoff events putting additional burdens on the structures of the dams.
- Flooding of low-lying areas - including Mulberry Circle, Truman Street, and Salina Avenue - is becoming more frequent.
- Ongoing concerns regarding flooding around Central Nurseries on Morgan Mill Road as well as a culvert under Morgan Mill Road that is undersized given the increasing volumes generated by precipitation events and runoff.
- Sidewalks in poor condition along Hartford Avenue reduces the walkability of the municipality and leads to increases in vehicle traffic on increasingly congested roadways.

Specific Categories of Concerns and Challenges (cont'd)

- Growing concern involving the five dams owned and maintained by the municipality due to lack of ongoing maintenance and uncertainty regarding the condition of each dam.
- Uncertainty about the condition of an additional five privately owned dams in Johnston and the level of risk present by the dams to people, property, and the environment in the event of catastrophic collapse.

Stormwater Management System:

- Increasing financial impacts and extent of damage to residential units and business development due flooding and stormwater runoff from more frequent and intense precipitation events.
- Inadequate and antiquated stormwater management systems are not able to accommodate the increasing volumes of stormwater runoff during both routine and more intense precipitation events.
- Development patterns in the 60s and 70s in the village center did not consider issue of flood resiliency, resulting in the predominance of impervious surfaces. This is resulting in increased stormwater runoff that the current stormwater management system is not able to accommodate, further resulting in localized flooding events.

Watersheds, Wetlands, Rivers, Open Space, Parks, Trees:

- Concerns regarding areas in Johnston that could serve as a storage and/or drainage area for increasing volumes of flood waters with many undeveloped or more naturally vegetated areas (i.e., ball fields, Johnston War Memorial Park, etc.) already experiencing problematic levels of flooding.

Credit: TripAdvisor

Current Strengths and Assets

Just as certain locations, facilities, and populations in Johnston stand out as particularly vulnerable to the effects of hazards and climate change, other features are notable assets for Johnston's resilience building. Workshop participants identified the following items as their community's key strengths and expressed interest in centering them as the core of future resilience-building actions.

- Clearly, the responsive and committed engagement exhibited by leadership, staff, and residents is an appreciated strength within Johnston. Ongoing collaboration between municipal staff, committee/commission volunteers, business owners, land trusts, faith-based organizations, non-governmental organizations (NGO), adjoining municipalities, and various state-level organizations, among others, on priorities identified herein will help advance comprehensive community resilience building.
- Strong leadership provided by the chief elected official (mayor), town council, and various departments such as Planning and Parks and Recreation.
- Strong political leadership on issues related to resilience and sustainability with a clear vision on how to govern and improve the community, in partnership with non-profit organizations and residents.
- Commitment by municipal leadership and staff to address environmental issues of concern to the community.
- Residents care about each other and look to help and support each other during times of crisis.
- Services provided by the Town to residents are highly valued, especially the municipal responses to hazard mitigation via the Emergency Management Agency and associated Departments such as Fire and Police as well as the Department of Public Works.
- Exemplary public safety team in Johnston with a full-time Fire Department and overall close coordination amongst all key departments (Fire, Police, Public Works, etc.) during emergencies (i.e., floods in September 2023).
- Long-standing connections and relationships between municipal staff and residents lead to greater accessibility and response during periods of crisis (i.e., "staff care about the residents"). Johnston is a close-knit community with quick and effective communications amongst departments and with residents, overall.

Current Strengths and Assets (cont'd)

- Strong business community that provides a robust array of services for residents, including a focus on waste management because of the location of the RI Resource Recovery Corporation.
- Johnston is viewed as a business-friendly community poised to welcome new enterprises within the prosperous existing business network.
- Economic development in Johnston is moving forward at a solid pace.
- Johnston has a good mix of development from rural to suburban to urban with Route 295 as the divide between rural (west of 295) and more urban development (east of 295).
- Ecologically significant river systems with relatively intact floodplains along the Woonasquatucket and Pocasset Rivers with active watershed-related organizations (i.e., Woonasquatucket River Watershed Council, etc.) working on protection and the creation of greenways that also improve the well-being and quality of life for residents in Johnston and adjoining municipalities.
- Availability and access for residents to open spaces and parks such as Snake Den, among others across the community.
- Active and engaged populus in Johnston that places value on community and articulate concerns, when needed and appropriate.
- Presence of working farms and farmland such as Dame Farm on Brown Avenue, which helps to improve the tourist attraction and economic viability of Johnston.
- Johnston is not completely built out and still has natural lands and unpaved areas able to absorb stormwater and mitigate the impacts of floods.
- Opportunities to partner with environmental organizations in Providence on projects due to the proximity of Johnston.
- Areas in Johnston offer or present opportunities to increase the overall resilience of the Town and its residents, businesses, and natural environment.
- Current opportunities to replace, upgrade, and/or retrofit infrastructure to enhance public amenities and reduce the impacts of hazards such as flooding due to stormwater runoff (i.e., culverts, storm drains, bridges, etc.) as well as ambient heat conditions (i.e., urban tree canopy) in the more urban areas of Johnston.

Current Strengths and Assets (cont'd)

- Municipality has track record of being able to gather, manage, and effectively process large amounts of debris generated during major storm events.
- Johnston is located near major electric and gas distribution facilities, which often results in the municipality receiving power restoration earlier than many surrounding communities.
- Johnston is situated in proximity to the city of Providence, which increases access to more regional services as well as cultural and job opportunities for residents.
- Large number of important transportation links (Route 6, 5, 14, 44, etc.) merge within Johnston creating an important transportation hub and conduit for residents and visitors as well as for emergency management professionals during times of crisis.
- Emergency equipment and vehicles, including fire trucks, are of the highest quality, with the oldest trucks being only 5 years old.
- Presence of 2 miles of the Woonasquatucket River Greenway within Johnston which provides an outstanding public amenity that is well used and loved by residents and visitors alike.
- Johnston falls within part of the Narragansett Bay Commission system, which add resources and expertise to portions of the municipality.
- Mutual Aid agreement in place with the state of Rhode Island if local resources become overwhelmed during and in the aftermath of a major disaster.

Credit: Wikipedia

Credit: Johnston Senior High School

Credit: Rhode Island Monthly

Recommendations to Improve Resilience

A common theme among workshop participants was the need to continue community-based planning efforts focused on developing adaptive measures to reduce Johnston's vulnerability to extreme weather, climate change, and other common concerns raised. To that end, the workshop participants helped to identify several priority topics requiring more immediate and/or ongoing attention including:

- **Long-term vision and growth** (i.e., responsible/sustainable growth, conservation & recreation, flood resilient development/infrastructure, transportation, education);
- **Infrastructure improvements** (i.e., roads, stormwater management systems, green stormwater infrastructure, riverfront, sidewalks, public amenities, voluntary buyouts);
- **Quality of life improvements** (i.e., parks and recreation, open space & river access, sustainability, health & safety, economic prosperity, housing, food security);
- **Emergency management** (i.e., communications, outreach, education, continuation of services, business recovery, vulnerable populations).

In direct response, the Community Resilience Building workshop participants developed the following actions and identified, but did not rank, them as priority or as additional actions. Mitigation actions from the Johnston Hazard Mitigation Plan (2020) are provided in Appendix A for cross reference with actions presented here. Maps provided during the CRB Workshop gathered from the Johnston Hazard Mitigation Plan are provided in Appendix B.

Priority Actions

Capacity Building

- Establish a resiliency working group in Johnston tasked with helping to gather input from residents on needs, identify and prioritize projects, and work with various departments and partners to advance efforts (projects, policies, and practices) to promote and secure a more resilient, sustainable, and equitable future for the community.

Priority Actions (cont'd)

- Educate residents on the importance of keeping storm drains clear of debris in neighborhoods in hopes of encouraging residents to help reduce the extent of localized flooding events.

- Identify opportunities for workforce training and advancement on sustainability practices and management approaches.

- Create a public service announcement regarding the need to retain localized stormwater runoff at the residential scale by allowing roof downspouts to drain onto undeveloped portions of lots versus draining directly to the street and into the municipal storm drain system.

<u>Capital Projects</u>

- Document the extent and duration of flooding along Atwood Avenue with particular focus on the intersection with Hartford Avenue to inform a comprehensive engineering design to reduce flooding impacts in the short and long-term. Leverage existing federal grant and other funding sources to move from design to proactive implementation of flood reducing measures and projects in this specific intersection and other deemed priority by the municipality along Atwood Avenue.

- Work to improve the condition of two culverts along Dean Avenue to help reduce localized flooding issues.

- Advance "end of road" opportunities to reduce stormwater runoff on roadways that drain directly into rivers and streams by installing green stormwater infrastructure to help improve water quality and mitigate localized flooding issues.

- Continue to explore locations and modifications that can help to reduce localized flooding such as building new retention ponds and installing green stormwater infrastructure such as raingardens and bioswales near residential homes and public spaces such as parks and schools.

Priority Actions (cont'd)

Plans/Preparedness/Studies/Outreach

- Develop a green streets plan for the village center (Atwood and Hartford) that addresses immediate and long-term flooding issues by working with the business community to decrease impervious cover and install green stormwater infrastructure and other nature-based solutions (i.e., tree pits, bioswales, rain gardens, etc.). Reach out to municipal staff in Westerly to learn more about the comprehensive green infrastructure plan they developed for their downtown area.

- Explore further the potential for establishing a stormwater management district in Johnston, including gathering initial input from stakeholders.

- Reexamine the watershed-wide culvert assessment study conducted by Woonasquatucket River Watershed Council to help prioritize culverts in need of retrofitting and/or replacement to improve stormwater management activities comprehensively.

- Look to extend the voluntary buyout program for at-risk properties along the Pocasset River. Potentially acquire more properties from willing homeowners, and then remove structures to enhance flood storage capacity through wetland restoration coupled with passive recreation projects.

- Conduct town-wide assessment of all culverts coupled with a prioritization process to identify those locations in need of immediate upgrades, replacement, and/or retrofit to proactively reduce impacts to people, property, and the environment.

Additional Actions

Capacity Building

- Foster further collaboration between municipal staff and leadership with non-profits such as Woonasquatucket River Watershed Council on public engagement and ways to improve the overall quality of life for residents by reducing the impacts of extreme weather and climate change (i.e., flooding and extreme temperatures.).

- Expand on municipal capabilities to reach residents via mass phone messaging to also include requests of residents to conduct best management practices, such as clearing storm drains of debris or leaving snow on property versus shoveling into the street where it can become a safety concern for other motorists and emergency management professionals.

- Explore the potential of repurposing a municipal or private facility into a resilience hub for Johnston where residents could come in times of crisis as well as to learn about steps and measures, they can take individually and collectively to increase the resiliency of their communities.

- Hire more municipal personnel to help manage snow removal and storm clean-up activities during and after major events.

Capital Projects

- Work to improve the sidewalks along Hartford Avenue.

- Collaborate with Woonasquatucket River Watershed Council to work with the Johnston business community on implementing green stormwater infrastructure projects and other resiliency measures in commercial building. Utilize recent lessons learned and examples from work with the Providence business community on similar resiliency-related efforts.

- Expand the Woonasquatucket Greenway Trail by looking at properties that are being acquired through voluntary buyout programs (i.e., “co-benefits and buyouts and green infrastructure”).

Additional Actions (cont'd)

Plans/Preparedness/Studies/Outreach

- Update the antiquated aesthetic of business development (i.e., "strip mall vibe from the 1970s") along Atwood Avenue in hopes of creating more mixed-use development with walkways and green spaces that are more appealing to residents and visitors and conducive to commerce and economic prosperity.

- Increase the diversity, quantity, and distribution of green spaces and parks across Johnston to help elevate the quality of life for residents and create more areas for young families and seniors to meet and create community.

- Create a flexible, yet comprehensive, debris management plan for Johnston that defines collection points and deposition/process locations in strategic and easily accessible locations across the community.

- Commit staff to attend the "Building Community Support for Sustainable Stormwater Funding (& other community initiatives" course offered through the Narragansett Bay Research Reserve.

- Work to develop a strategic snow management plan for Johnston that helps minimize the additional flooding issues sometimes created by depositing snow in areas already subjected to flooding.

- Look to establish requirements such as ordinances and/or regulations for new and significant redevelopment projects to retain and store stormwater runoff generated on sites (example – Farm Fresh building in Providence).

- Increase on-site retention of stormwater runoff by modifying municipal subdivision regulations to also require the use of green stormwater infrastructure.

- Conduct an annual review of municipal sheltering system to ensure the facilities can house and serve people (food, shelter, showers, supplies) during extended periods of crisis (multiple weeks).

Additional Actions (cont'd)

- Continue to advance the assessment of dams along Hartford Avenue - including at the Johnston War Memorial Park and Route 6 - to determine current condition of dams and spillways. Also assess improvement needs that would increase functionality and reduce potential for catastrophic failures in the future.

- Identify dams that are no longer serving a function in the waterways of Johnston and find funding and partners to remove dams to prevent uncontrolled failures, which could potentially result in impacts to people, property, and the environment in the future.

- Prepare emergency access and catastrophic failure plans for high-hazard dams in Johnston.

- Conduct comprehensive assessment of current condition of sidewalks, with focus on identifying opportunities to increase the walkability of the community.

- Review and identify, in partnership with the Woonasquatucket River Watershed Council, any opportunities to improve stormwater storage capacity and flood retention as part of the superfund clean-up efforts along the Woonasquatucket River (i.e., Lyman Avenue to Route 44).

- Maximize the benefits of the clean water consent decree that Rhode Island Department of Transportation is operating under currently.

- Conduct outreach to residents to expand knowledge and understanding of the flooding issues in flood-prone, low-lying areas in Johnston.

Credit: AllTrails

Credit: Town of Johnston

Credit: Rhode Island

CRB Workshop Participants: Department/Organization

Town of Johnston – Office of Mayor
Town of Johnston – Town Council Representative
Town of Johnston – Fire Department
Town of Johnston – Planning Department
Town of Johnston – Department of Public Works
Town of Johnston – Parks and Recreation Department
Town of Johnston – Department of Development & Public Service
Town of Johnston – Buildings and Grounds
Town of Johnston – Police Department
Town of Johnston – Planning Commission
Town of Johnston – Zoning Commission
Town of Johnston – Residents
Rhode Island Resource Recovery Corporation
Woonasquatucket River Watershed Council
Oak Reservoir Homeowners Association
Our Lady of Grace Church

Johnston Core Project Team

Joseph Polisena, Jr. – Mayor – Town of Johnston
Thomas Deller – Director – Planning Department – Town of Johnston
Dominique Turner – Deputy Chief of Staff – Town of Johnston
Taylor Russo – Assistant Director – Department of Development & Public Service
Ben Ng – Engineering Aid – Department of Development and Public Service
Chief Mark Vieira – Police Chief – Town of Johnston

Online CRB Workshop Facilitation Team

Rhode Island Infrastructure Bank - Kim Korioth (MRP Lead)
The Nature Conservancy - Adam Whelchel, Ph.D. (Lead Facilitator)
The Nature Conservancy – Sue AnderBois (Small Group Facilitator)
State of Rhode Island – DEM – Jennifer West (Small Group Facilitator)
Rhode Island Dept. of Administration – Roberta Groch (Small Group Facilitator)
The Nature Conservancy - Kai Lo Muscio (MRP Coordinator/IT Manager/Scribe)
The Nature Conservancy – Angela Tuoni (Scribe)
The Nature Conservancy – Chris Gaynor (Scribe)
The Nature Conservancy – Tim Mooney (Scribe)

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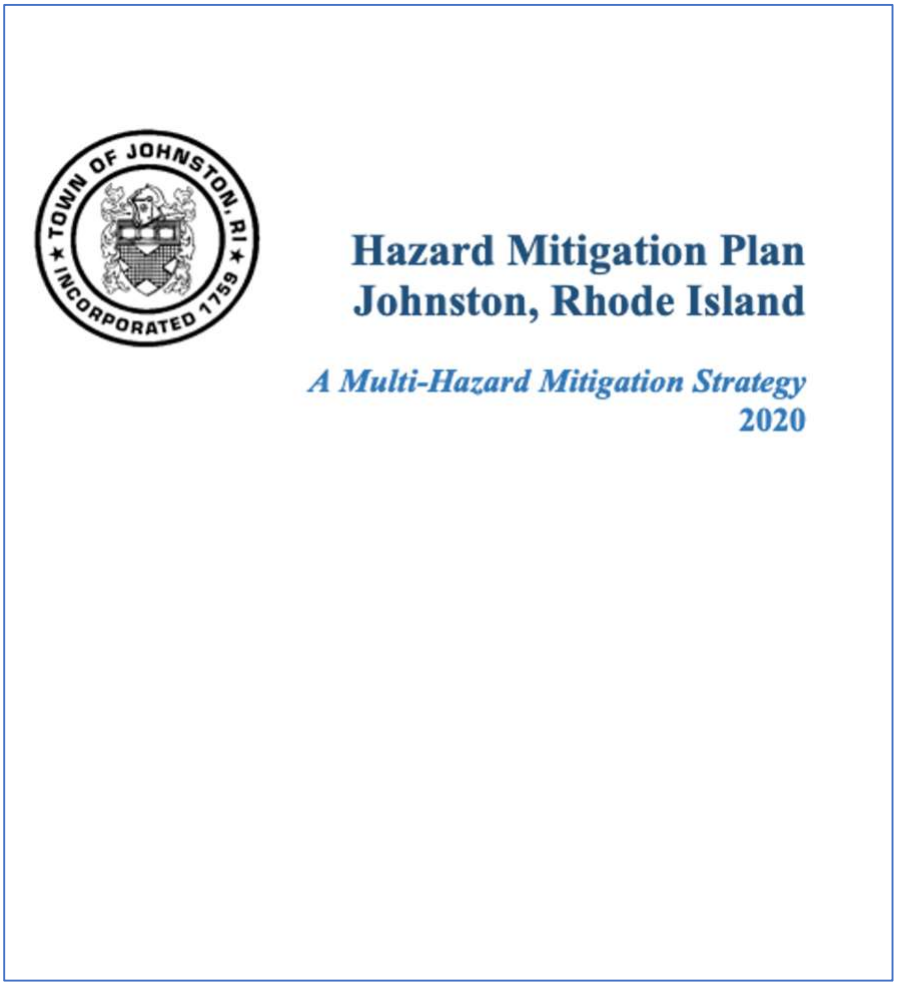
Appendix A

Town of Johnston
Hazard Mitigation Plan
(2020)



Mitigation and Risk Matrix

Table 13

Vulnerable Areas	Location	Ownership	Primary Problems/Effects	Natural Hazard	Mitigation Benefits	Risk: Historical = H Potential=P	2010 Flood Impact
Priority 1 **Pocasset River Neighborhoods**	Park Place Apartments - Park Street	Private	• Vulnerable population at risk - 62 units including low / moderate income residents	Flooding Hurricane	• Increase public safety • Lower cost and time for recovery • Maintain access during flood	H	Yes; 11 units flooded
	Priscilla Lane	Public/Private	• Public safety • Public health • Property damage • Economic hardship • Environmental damage • Repetitive loss/NFIP • Pump stations will not function with flood mitigation measures • Public safety (especially at the one-lane bridge on Morgan Ave where some drivers to speed up to avoid delays, "play chicken") • Creates bottleneck that floods upstream properties		• Maintain utilities during flood • Protect health and property • Reduce NFIP claims • Provide adequate sewer pump station service	H	Yes
	S. Bennett/ River Dr/Melody Ln/LaFazia Dr					H	Yes
	River St (off Plainfield Pike)					H	Yes
	Rotary Drive					H	No
	Bingley Terrace					H	Yes
	River Dr and S. Bennett Dr sewer pump stations					H	Yes
	Morgan Ave & Morgan Mill Road bridge				• Increase public safety • Support economic development	H	Yes
	Pocasset Mill Flood Wall	Private	• Economic hardship • Public safety		• Economic development	H	Yes
Priority 2	Mill St / Mill St Bridge	Town Road	• Business interrupted • Detours on narrow, winding residential roads	Flooding	• Maintain business access • Support economic development	H	Yes
Priority 3	Mulberry Circle	Town Roads	• Unsanitary conditions • Access hindered • Sinkhole/safety • Public safety	Surface runoff Flooding Hurricane	• Health and safety protection • Pollution prevention • Public Safety	H	Yes
	Vincent/Sprague Circle					H	Yes
	Roberts Circle					H	Yes
	Golden View					H	Yes

Vulnerable Areas	Location	Ownership	Primary Problems/Effects	Natural Hazard	Mitigation Benefits	Risk: Historical = H Potential=P	2010 Flood Impact
Upland Neighborhood Flooding	Lincoln/Malom		• Property damage • Environmental damage • Decreased property value			H	Yes
	Starr St / Mill St					H	Yes
	Pembroke Dr					H	Yes
	Maribeth Dr					H	Yes
	Monson St					H	Yes
	Ipswich St					H	Yes
	Harbourd Rd					H	Yes
	Strawberry Ln/ Salina Ave					H	Yes
	Disarro / Assapumpset Brook		• DEM violation for stream erosion	Flooding Scouring		H	Yes
Priority 4 **Local Roads Subject to Stormwater Damage**	Belfield Drive	Town Roads	• Evacuation hindered	Flooding Hurricane	• Public Safety • Maintain access during flood • Reduced detour routes	H	Yes
	Old Pocasset Road at Dry Brook		• Vulnerable population at risk • Emergency access to Briarcliffe Manor			H	Yes
	Boulder Drive		• Access limited • Public safety			H	Yes
	Central at Dry Brook		• Public safety			H	Yes
Priority 5 **Sewer Pump Stations and Treatment Facilities**	Othe municipal pump stations: Sweet Hill Dr, Rotary Dr, Industrial Ln, Susan Cir, Fox Tail Dr, Jennifer Dr, Ostend St, Sprague Cir, Morgan Mill Rd, Candace Ct	Town	• Facilities cannot handle flows • Public health, property damage • Public safety • Potential pollution to waterways	Flood, Ice, Fire, Wind Earthquake, Tornado, Hurricane	• Limits health and pollution risks • No interruption of essential service	H, P	Pumps did not fail but were submerged
	NBC pump station, Central Ave	NBC				H,P	
	RIRRC pump stations, Shun Pike, Lakeshore Commerce Center	RIRRC				P	No
	Ledges Apt pump station	Private				P	No
	Park Place Apt pump sta					P	No
	Package WWTF, Briarcliffe Manor					P	No

Vulnerable Areas	Location	Ownership	Primary Problems/Effects	Natural Hazard	Mitigation Benefits	Risk: Historical = H Potential=P	2010 Flood Impact
Priority 6 **DPW Facilities**	100 Irons Avenue (adjacent to Woonasquatucket River)	Town	• Threat to public safety • Lack of access to fueling operations • Damage of development files, plans, and maps	Flooding Hurricane Severe Winter Storm	• No loss of service to public vehicles during storm/flood • Protection of public files • Continued response to emergency needs townwide	P	Yes - roof leak
Priority 7 **Drainage Infrastructure-culverts, detention/ retention basins**	W of Atwood Ave - Plaza strips (Stop & Shop Plaza)	Private	• Business interruption • Public Access	Flooding Hurricane Severe Winter Storm	• Maintain access during flood • Provide redevelopment options with appropriate stormwater mgmt • Health and safety protection • Pollution prevention	H	Yes
	Atwood Ave at Route 6	RIDOT					
	S of Hartford Ave - former Stuarts Plaza	Private	• Redevelopment options limited • Damage to property			H	Yes
	Central Ave at former FM Global	Private				H	Yes
	Greenville Ave at Manton bridge	Public	• Public health • Property damage • Economic hardship • Public safety (especially at the one-			H	Yes
	Hartford Ave at War Memorial Park, / Old Pocasset Road	Public and Private				H	No
	Industrial Lane	Public				H	Yes
	Highland Ave					H	Yes
	Mill & John St					H	Yes
	Niverville					H	Yes
	Reservoir Ave (2 areas)					H	Yes
	Central at I-295	RIDOT	• Stormwater discharged beneath bridge			H	Yes
	Shun Pike at Cedar Swamp	Public	• Access hindered to RIRRC • Business interruption			H	Yes
Priority 8 **Woonasqua-tucket River Neighborhoods**	Riverside Ave	Public/Private	• Public safety • Public health • Property damage • Economic hardship • Environmental damage	Flooding Hurricane Severe Winter Storm	• Health and safety protection • Pollution prevention • Provision of Town services	H	No
	Allendale Ave at Allendale Dam	Public				H	No
	Angell St at Greystone Pond Dam	Public				H	No

Vulnerable Areas	Location	Ownership	Primary Problems/Effects	Natural Hazard	Mitigation Benefits	Risk: Historical = H Potential=P	2010 Flood Impact
American Heritage River *EPA Centerdale Superfund - sediment contamination*	Railroad Ave	Public/Private	• Public health • Loss of access			H	No
	Hillside Ave	Public/Private				H	No
	Parks and Bike Path	Town and State				H	Yes
	Johnston DPW 100 Irons Ave	Municipal	*See DPW Facility listing*			P	No
Priority 9 **Residences and Businesses**	Townwide	Private	• Property at risk • Business interruption • Emergency access limited	Heavy Rains Hurricane Severe Winter Storm	• Decrease costs of cleanup • Prevent or minimize damage to property • Lower cost and time for recovery • Decrease or eliminate economic hardship	H, P	
	Properties reporting damage, 2010 flood: • W of Greenville Ave, E of Atwood • N & S of Hartford Ave, Rtes 6 and 6A, E of Dale Ave • N & S of Central, E of Deer View • W & S of Oak Swamp Reservoir • E & W of Atwood, N of Plainfield Pk • SW of Putnam Pk • E & W of Greenville • S of Cherry Hill Rd					H	Yes
	Repetitive Loss Properties					H	Yes
Priority 10 **High Hazard Dams**	• Almy Reservoir • Hughesdale Pond • Oak Swamp Reservoir • Simmons Lower Reservoir • Simmons Upper Reservoir	Town	• Possible loss of life • Downstream property damage • Flooded roads • Loss of recreation areas • Loss of habitat • Safety and health issues	Dam failure Hurricane Flood Earthquake	• Prevent or minimize damage to property • Maintain public access • Maintain recreation assets • Public safety • Protect habitat	P	No
Priority 11 **Tree Damage**	Townwide	Public/Private	• Public safety, loss of traffic signals • Loss of electricity • Debris disposal	Wind, Hurricane Severe Winter Storm	• Health and safety protection • Maintenance of utilities	P, H	No

Vulnerable Areas	Location	Ownership	Primary Problems/Effects	Natural Hazard	Mitigation Benefits	Risk: Historical = H Potential=P	2010 Flood Impact
				Ice Storm			
Priority 12 **RIRRC Landfill**	Shun Pike	RIRRC	• Access for solid waste disposal, statewide • Cap damage could result in release of contaminants; habitat destruction	Hurricane, earthquake	• Provide access for safe and sanitary disposal of solid waste and construction & demolition material • Maintain integrity of landfill cap	P	No
Priority 13 **Nursing Homes and Senior Housing**	• Cherry Hill, • Cherry Hill at Greenville • Bridges at Cherry Hill • Morgan Health Center • Briarcliffe Manor *(see Priority 3)* • Pocasset Bay Manor	Private	• Evacuation of vulnerable population • High demand for emergency response	Hurricane, flood, earthquake Hurricane Severe Winter Storm	• Public safety • Emergency response	P	No
	• 8 Forand Circle • 25 Nardolillo St • 10 Cheryl Drive • 204 Greenville • 1609 Plainfield • 150 Rosemont • Simmonsville Ave	Johnston Housing Authority				P	No
Priority 14 ***High Rise Buildings (65'+)***	• Cherry Hill • Bridge at Cherry Hill • FM Global and garage • Atwood Medical Ctr • FPL	Private	• Ladder limitations may constrain emergency evacuation and fire-fighting capability	Fire	• Emergency evacuation • Fire fighting	P	No
Priority 15 **Historical Buildings**	• Clemence-Irons House, Geo Waterman Rd • Historical Society, Putnam Ave	Public/Private	• Loss of Electricity • Public safety; • Property damage	Flood, Fire, Earthquake, Windstorm	• Property protection	P P	No No
Priority 16	• Caesarville Pond	Private	• Loss of recreation areas	Dam Failure,		P	No

Vulnerable Areas	Location	Ownership	Primary Problems/Effects	Natural Hazard	Mitigation Benefits	Risk: Historical = H Potential=P	2010 Flood Impact
Significant Hazard Dams	• Dexter Farm Pond • Kimball Reservoir • Pocasset Pond		• Loss of habitat	Hurricane Flood Earthquake	• Maintain recreation assets • Public safety • Protect habitat		

5.3 Action Plan

Table 14 identifies priority actions, responsible parties, potential funding sources, and time frame for optimal implementation. Implementation is highly dependent upon availability of federal and state funds as local capacity is severely constrained.

Table 14: Implementation

Location	Specific Action	Responsible Party[1]	Existing and Potential Resources[2]	Time frame
Priority 1: Pocasset River Neighborhoods				
Park Place Apartments, Park Street	Design Flood Wall	Department of Public Works (DPW) Director	NRCS/FEMA	
	Construct flood wall	same	HMGP/ BRIC/ SRL/CDBG-DS	
Priscilla Lane	Construct mill bypass	same	NRCS/FEMA	
River Dr/River Street	Property Acquisition	same	NRCS/FEMA	
Melody Ln/ LaFazia Dr	Elevate structures	same	HMGP/ BRIC/ SRL	
Rotary Drive	Flood wall, design and construct	same	NRCS/FEMA	
Bingley Terrace	Acquisition	Town Planner	HMGP/ PDM/ SRL	
River Dr and S. Bennett Dr sewer pump stations	Relocate pump stations	DPW	NRCS/HMGP/BRIC	
Morgan Ave & Morgan Mill Road bridge	Reconstruct bridges	DPW	RIDOT/FHWA	
Pocasset Mill	Flood wall, design and construct	City of Cranston (design); DPW with developer (construction)	HMGP/ BRIC/ NRCS	
Repetitive Loss Properties	Acquisition or elevation	Town Planner	NRCS/HMGP/ BRIC/ SRL	
Priority 2: Mill Street Bridge				
Mill St / Mill St Bridge	Reconstruct bridge	DPW	CDBG/FEMA	
Priority 3: Upland Neighborhood Flooding				
Mulberry Circle	Storm drain replacement	DPW	HMGP/BRIC/CDBG-DS	
Vincent/Sprague Circle	Headwall replacement	DPW	same	
Roberts Circle	Repair sinkholes	same	same	

Location	Specific Action	Responsible Party[1]	Existing and Potential Resources[2]	Time frame
Golden View	Stormwater management	same	same	
Lincoln/Malom	Drain replacement	same	same	
Starr St / Mill St	Drain replacement	same	same	
Pembroke Dr	Stormwater management	same	same	
Maribeth Dr	Manhole and catch basin repairs	same	same	
Monson St	Stormwater management	same	same	
Ipswich St	Stormwater management	same	same	
Harbourd Rd	Drain pipe replacement	same	same	
Strawberry Ln/	Stormwater management	same	same	
Salina Ave	Stormwater management	same	same	
Disarro / Assapumpset Brook	Restore stream banks	same	Section 319 Non-point Source	
Priority 4: Local Roads Subject to Stormwater Damage				
Belfield Drive	Stormwater management	DPW	HMGP/BRIC/CDBG-DS	
Old Pocasset Road at Dry Brook	Increase culvert capacity	same	same	
Boulder Drive	Stormwater management	same	same	
Central at Dry Brook	Stormwater management	same	same	
Priority 5: Sewer Pump Stations and Treatment Facilities				
Other municipal pump stations: Sweet Hill Dr, Rotary Dr, Industrial Ln, Susan Cir, Fox Tail Dr, Jennifer Dr, Ostend St, Sprague Cir, Morgan Mill Rd, Candace Ct	Maintain functionality through equipment upgrade	DPW	HMGP/BRIC/CDBG-DS	
Priority 6: DPW Facilities				
100 Irons Avenue (adjacent to Woonasquatucket River)	Flood proof	DPW	HMGP/ BRIC	
Priority 7: Drainage Infrastructure-culverts, detention/retention basins				
Atwood Ave at Route 6	Stormwater management	RIDOT	FHWA	
S of Hartford Ave – redevelopment of former Stuarts Plaza	Design stormwater management to minimize Pocasset River impacts	Private developer	Private	
Central Ave at former FM Global	Create and maintain ponds for stormwater management and aesthetics	RIDOT	FHWA	
Greenville Ave at Manton bridge	Maintain structure	RIDOT	FHWA	
Hartford Ave at War Memorial Park, / Old Pocasset Road	Stormwater management	DPW	HMGP/BRIC	
Industrial Lane	Same	DPW/RIDOT	HMGP/BRIC/FHWA	
Highland Ave	Same	DPW	HMGP/BRIC	
Mill & John St	Same	Same	Same	

Location	Specific Action	Responsible Party[1]	Existing and Potential Resources[2]	Time frame
Niverville	Same	Same	Same	
Central at I-295	Same	DPW/RIDOT	FHWA	
Shun Pike at Cedar Swamp Bk	Culvert repair	DPW/RIRRC	HMGP/BRIC	
Riverside Ave	Same	DPW	HMGP/BRIC	
Priority 8: Woonasquatucket River Neighborhoods				
Allendale Ave at Allendale Dam	Dam maintenance and site remediation	DPW/EPA	HMGP/BRIC/EPA	
Angell St at Greystone Pond Dam	Same	Same	HMGP/BRIC	
Railroad Ave	Stormwater management	Same	HMGP/BRIC	
Hillside Ave	Stormwater management	Same	HMGP/BRIC	
Parks and Bike Path	Floodplain management	DPW/RIDOT	HMGP/BRIC	
Priority 9: Residences and Businesses				
Townwide: Properties reporting damage, 2010 flood:	Private responsibility		NFIP	*ongoing*
Priority 10: High Hazard Dams				
Almy Reservoir	To be cleared for DEM inspection	DPW	To be determined	
Hughesdale Pond	Same	Same	Same	
Oak Swamp Reservoir	Ready for DEM inspection	Same	Same	
Simmons Lower Reservoir	To be cleared for DEM inspection	Same	Same	
Simmons Upper Reservoir	Same	Same	Same	
Priority 11: Tree Damage				
Townwide	Remove dead limbs; trim around utility lines	DPW, National Grid, private	BRIC	*ongoing*
Priority 12: RIRRC Landfill				
Shun Pike	Maintain operation of statewide facility	RIRRC		
Priority 13: Nursing Homes and Senior Housing				
Cherry Hill	Maintain	JHA		*ongoing*
Cherry Hill at Greenville	Maintain	JHA		*ongoing*
Bridges at Cherry Hill	Maintain	JHA		*ongoing*
Morgan Health Center	Maintain	JHA		*ongoing*
Briarcliffe Manor *(see Priority 3)*	Maintain	JHA		*ongoing*
Pocasset Bay Manor	Maintain	JHA		*ongoing*
8 Forand Circle	Maintain	JHA		*ongoing*
25 Nardolillo St	Maintain	JHA		*ongoing*
10 Cheryl Drive	Maintain	JHA		*ongoing*
204 Greenville	Maintain	JHA		*ongoing*
1609 Plainfield	Maintain	JHA		*ongoing*
150 Rosemont	Maintain	JHA		*ongoing*
Simmonsville Ave	Maintain	JHA		*ongoing*
Priority 14: High Rise Buildings (65'+)				

Location	Specific Action	Responsible Party[1]	Existing and Potential Resources[2]	Time frame
Cherry Hill	Assure emergency access	FD and private		*ongoing*
Bridge at Cherry Hill	Same	FD and private		*ongoing*
FM Global and garage	Same	FD and private		*ongoing*
Atwood Medical Ctr	Same	FD and private		*ongoing*
FPL	Same	FD and private		*ongoing*
Priority 15: Historical Buildings				
Clemence-Irons House, Geo Waterman Rd	Maintain	Historic New England	HMGP/BRIC	As needed
Historical Society, Putnam Ave	Maintain	JHC	HMGP/BRIC	As needed
Priority 16: Significant Hazard Dams				
Caesarville Pond	To be cleared for DEM inspection	DPW	To be determined	
Dexter Farm Pond	Same	Same	Same	
Kimball Reservoir	Same	Same	Same	
Pocasset Pond	Same	Same	Same	
Emergency Communication				
Emergency alerts	Convert to Code Red	FD	To be determined	
Town Policy Amendments				
Low Impact Development	Planning Board Training	Town Planner	none	
Land Development and Subdivision Regulation	Cumulative impact amendment	Town Planner	none	
Land Development and Subdivision Regulation	Design standards upgrade	Town Planner	None	
Soil and Erosion Control Ordinance	Amendment	Town Engineer	none	
Distribution of Flyers	Education	DPW	none	Ongoing
Illegal sewer connections	Smoke testing	DPW	To be determined	
Zoning Map Amendment in high hazard areas (dams)	Non-residential or low density res.	Town Engineer	none	

[1] **Responsible Parties**

Johnston Department of Public Works (DPW)
Johnston Housing Authority (JHA)
Johnston Historical Commission (JHC)
Johnston Fire Department (FD)
Rhode Island Department of Transportation (RIDOT)
Johnston Emergency Management Agency (EMA)

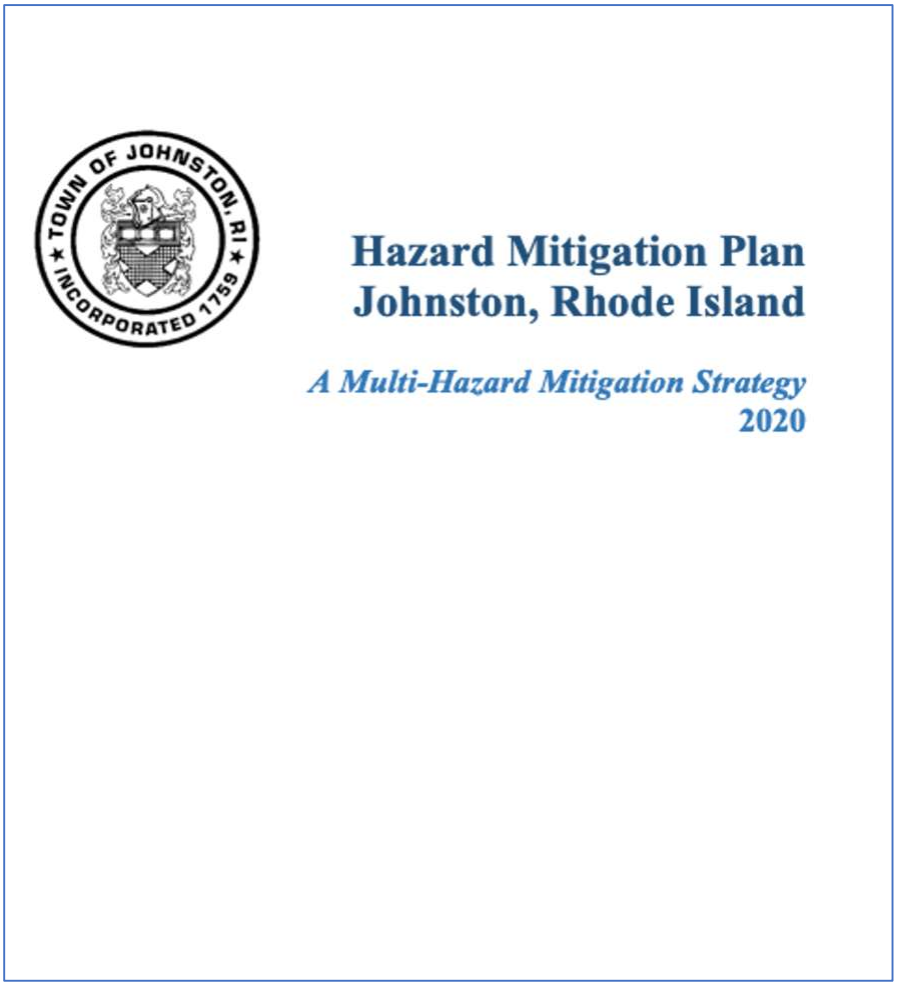
[2] **Funding Sources**

Hazard Mitigation Grant Program (HMGP)
Building Resilient Infrastructure and Communities (BRIC)

Flood Mitigation Assistance (FMA)
Repetitive Flood Claims (RFC)
Severe Repetitive Loss (SRL)
Community Development Block Grant (CDBG)
Community Development Block Grant - Disaster Supplemental (CDBG-DS)
Natural Resources Conservation Service (NRCS)
Federal Highway Administration (FHWA)

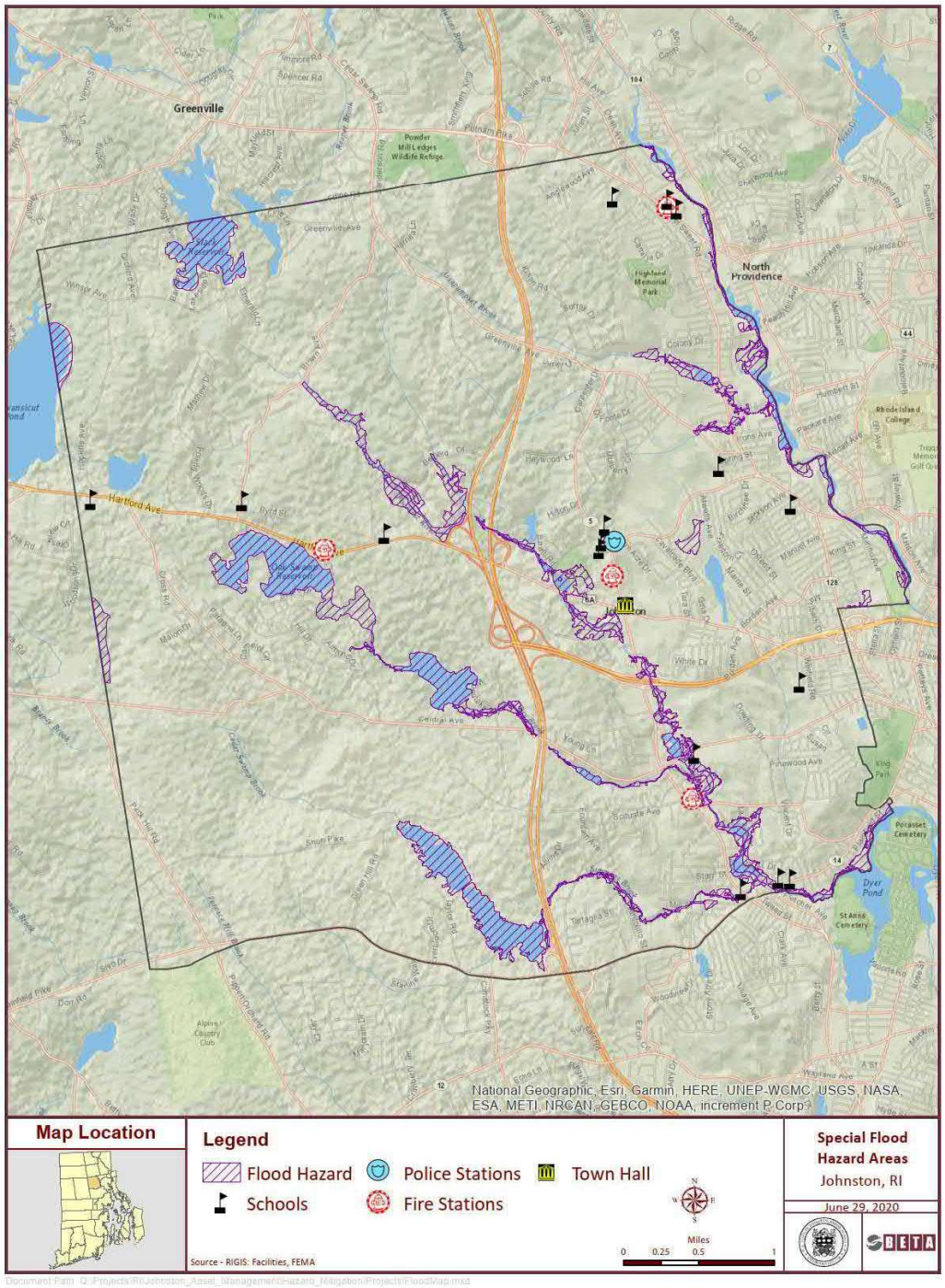
Appendix B

Johnston
Map Resource Packet*
Used During
Workshop

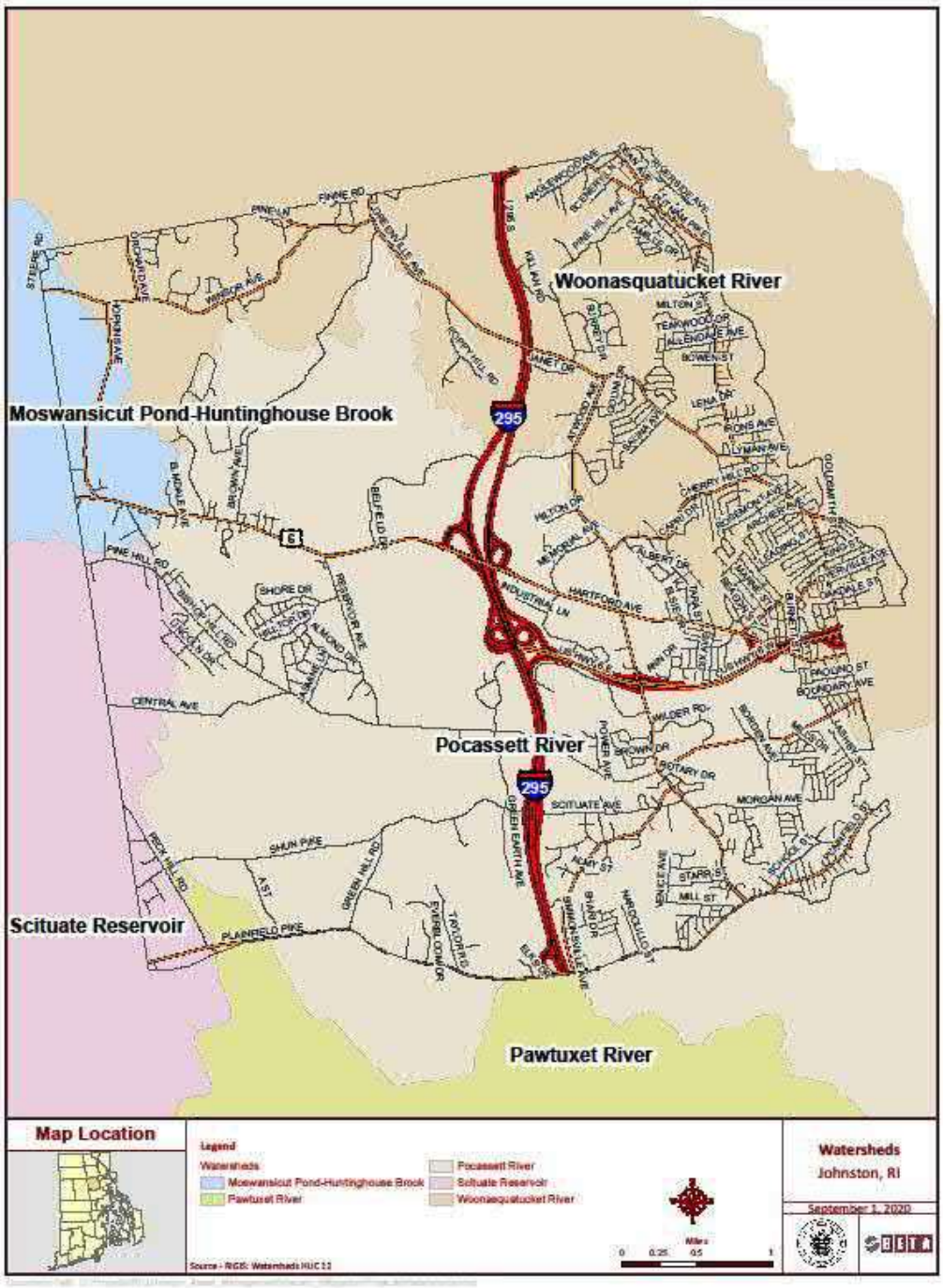


***Gathered from Johnston's Hazard Mitigation Plan (2020)**

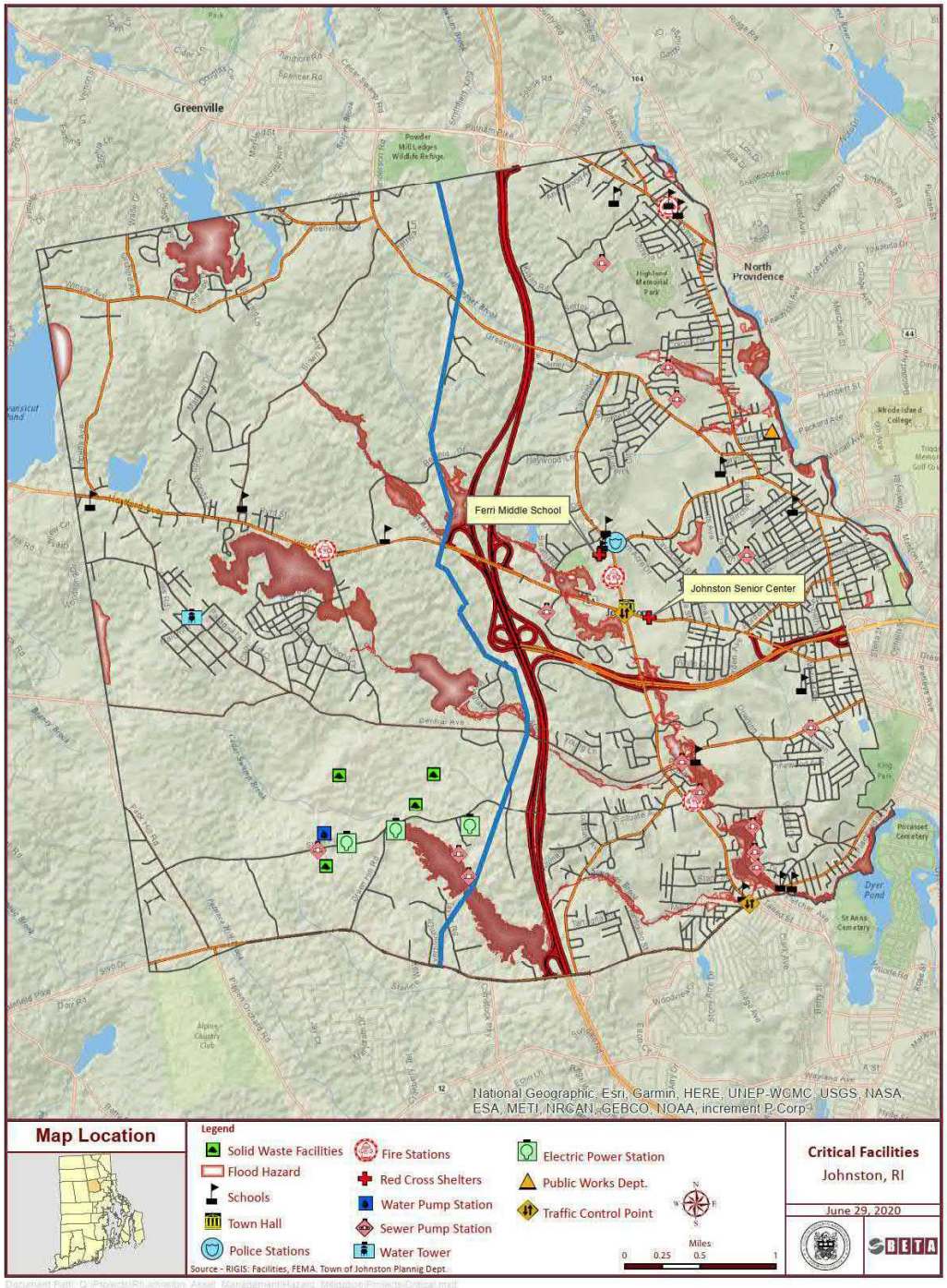
Map 2: Special Flood Hazard Areas and Waterbodies



Map 1: Watersheds, Johnston, RI



Map 5: Critical Facilities



Heavy snow can affect the entire State of Rhode Island, but the highest amounts occur in the northern areas of the state and some coastal communities as shown in Figure 3 below. This figure is based on best available data from NOAA's Global Historical Climate Network Daily dataset. This dataset summarizes daily snowfall totals reported by stations in Rhode Island. The total snowfall from 2010 to 2018 was summarized by station and averaged for the reporting time period.

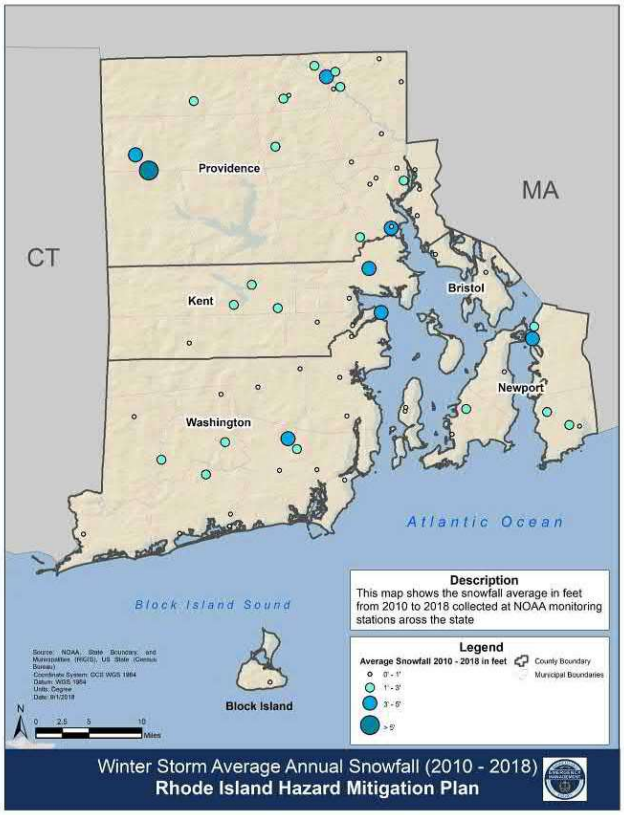


Figure 3: Rhode Island Average Annual Snowfall Reported 2010 - 2018

Extent

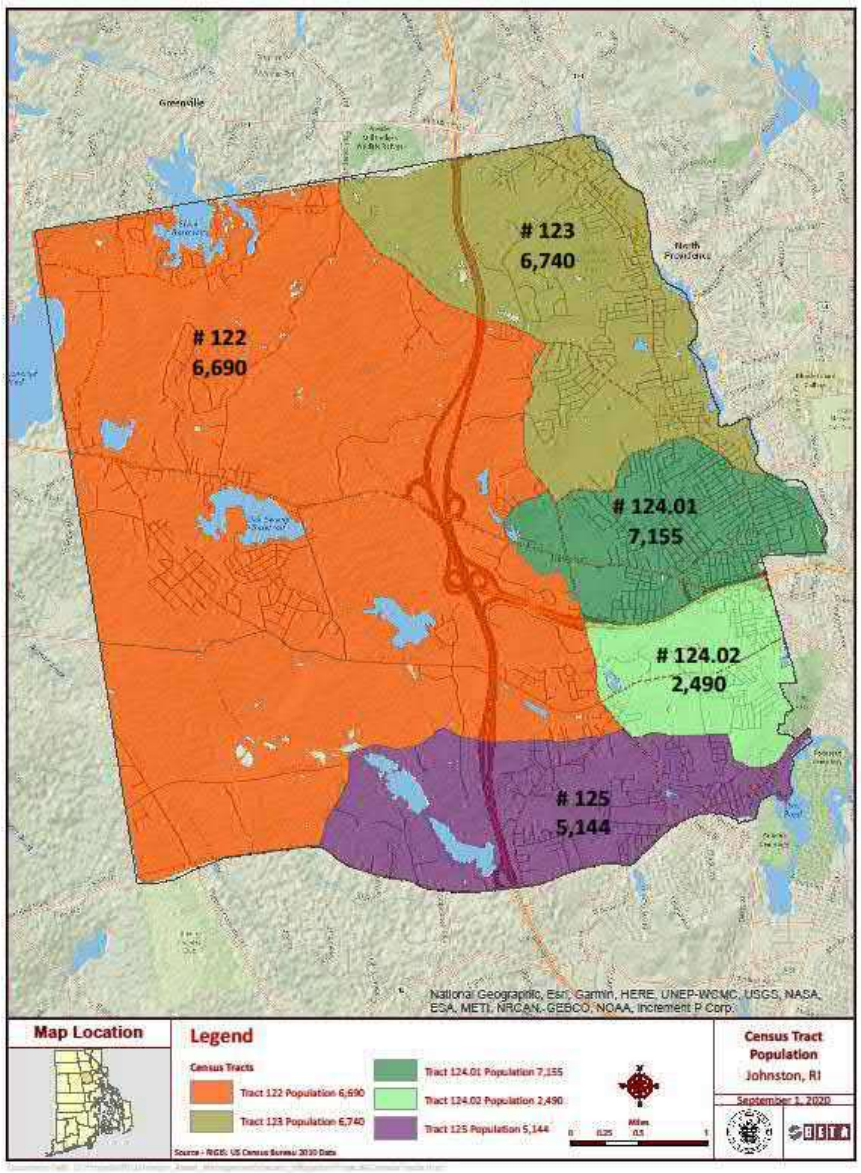
Based on the data collected from 1981 to 2010, the average annual snowfall for Rhode Island is 33.8 inches, which exceeds the national average of 22.4 inches. The known record snowfall occurred from February 5th to February 7th, 1978, during the Blizzard of 1978. The storm produced hurricane- force winds and resulted in over 27 inches of snow accumulation in Providence and up to 38 inches of snow accumulation in other parts of the state. This event serves as the storm of record for Rhode Island.

Even though there is no universally accepted scale to measure a snowstorm, the Northeast Snowfall Impact Scale (NESIS), developed by Paul Kocin and Louis Uccellini of the National Weather Service (NWS), characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10-inch

1.2.2. Demographics / Census, Housing

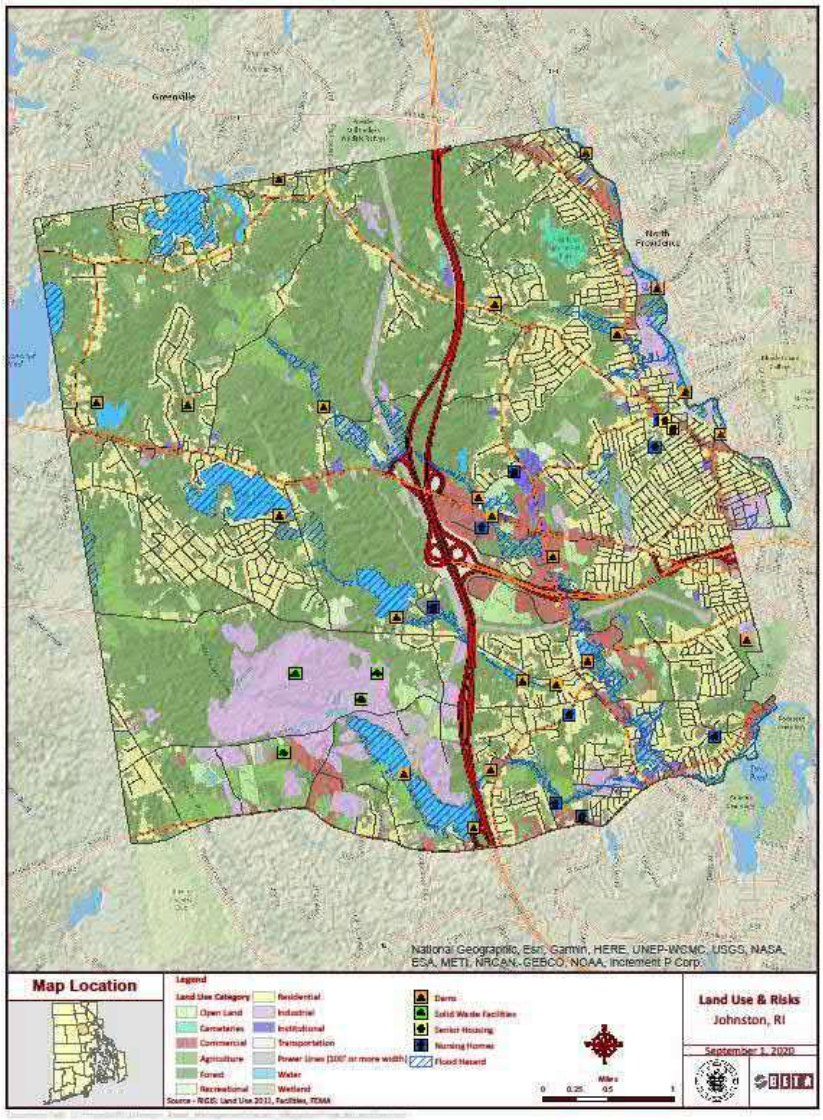
The Amercian Community Survey (ACS) estimated the Town of Johnston's population at 29,471 in 2019, up from 28,769 as reported in the 2010 census. The Town of Johnston's overall density is 1,207 people per square mile. However, as illustrated in Map 3, the majority of the Town of Johnston's population resides in the easterly portion of the town.

Map 3: Population by Census Tracts



The existing land uses in the Town categorized as urban include densely populated residential areas, commercial uses, industrial uses, mixed industrial-commercial uses, urban infill areas, gravel pits, quarries, waste disposal, government and institutional, transportation, communications, utilities, and abutting wetland areas. The exurban land uses identified in this Plan include areas used for medium density residential uses. The remaining rural areas include low density residential properties, recreation, conservation, and open space properties, forest, brushland, and remaining abutting freshwater wetlands and water bodies. These land use patterns and conditions consist of characteristics that each present unique threats and concerns. Refer to Map 4 below of the Town of Johnston.

Map 4: Land Uses & Risks



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