



NARRAGANSETT



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Municipal Resilience Program Community Resilience Building Summary of Findings

October 2022



Town of Narragansett, 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 of 2022 (i.e., I-95 closure) have reinforced this urgency and compelled leading communities like the Town of Narragansett 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 2022, the Town of Narragansett embarked on certification within the state of Rhode Island's Municipal Resilience Program (MRP). As part of that 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 2022, Narragansett's Core Team helped organize a Community Resilience Building 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 Narragansett.

The Narragansett 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 Narragansett employed 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 Narragansett. The Narragansett Comprehensive Plan Baseline and Roadmap Reports (2017) were particularly instructive as references. 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 Narragansett’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. The leadership displayed by the Town of Narragansett 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 Narragansett Core Team identified the top hazards for the Town. The hazards of greatest concern included coastal flooding, hurricanes and tropical storms, nor’easters and blizzards, and extensive droughts. Additional hazards highlighted by participants during the workshop included extended cold snaps and heat waves, particularly during peak tourist season. These hazards have direct and increasing impacts on the infrastructure, environment, and residents of and visitors to Narragansett. These effects are seen in residential areas, natural areas (wetlands, estuaries, beaches and dunes, forests, preserves), roads, bridges, causeways, port facilities, businesses, transportation, municipal facilities, churches, social support services, and other critical infrastructure and community assets within Narragansett.

Current Concerns and Challenges Presented by Hazards

The Town of Narragansett has several concerns and faces multiple challenges related to the impacts of natural hazards and climate change. In recent years, Narragansett 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 coastal and 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. 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 Narragansett to proactively improve their resilience.

This recent series of extreme weather events highlight that the impacts from hazards are diverse. In Narragansett, these impacts include coastal 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, as well as ill-prepared tourists and summer-time renters. The combination of these issues presents a challenge to preparedness and mitigation priorities and requires comprehensive, yet locally specific actions in Town.

The workshop participants were generally in agreement that Narragansett 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). The impact of the current Covid-19 pandemic was raised by workshop participants as well.

Specific Categories of Concerns and Challenges

As in any community, Narragansett is not uniformly vulnerable to hazards and climate change, and 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.

Roads, Bridges, Road Networks, Causeways, Dams, & Port Facilities:

- Growing number of roadways with undersized culverts that are not able to convey the immediate and projected future increased stormwater volumes due to more intense and longer duration precipitation events.
- Impact of weather resulting in degradation of Port of Galilee infrastructure including impacts to both the electrical systems as well as docks that get battered by storms. Port of Galilee is elevationally close to current sea levels. Galilee is a critical fishing port for the northeast coast of the United States, with 100' fishing vessels coming in and out of the Port, along with the Block Island ferry.
- Increasing concerns around routine flooding from tides along low lying areas adjoining the Narrow River resulting in the need for motorists to find alternative, more circuitous routes around flooding areas (i.e., nuisance flooding associated with sea level rise).
- Multiple causeways in Town that are regularly flooded resulting in closures that present access challenges for some islands. Bonnet Shores was raised as a particular concern. Other causeways of concern include Harbour Island and Great Island.
- Access to Jerusalem is restricted to Succotash Road through the Town of South Kingstown and is also a key evacuation route for South Kingstown. Succotash Road is currently subjected to routine flooding.
- Concerns about the ongoing costs for recovery and the long-term viability of the Narragansett Town Beach facilities and structures after repetitive storm events.
- Routine flooding of low-lying area in front of the Public Safety Building on Caswell Street as well as along the coast on Boston Neck Road and the adjoining sea wall.
- Boston Neck Road in front of Town Beach is the only transportation corridor in and out of the North and Central/South end of Town. This road is at six feet above current sea level but is vulnerable to flooding.
- Area of Colonel John Gardner Road in Bonnet Shores is very vulnerable particularly to a winds in a northeasterly direction (i.e., northeast fetch) as is the case with most winter storms along this coastline.

Specific Categories of Concerns and Challenges (cont'd)

- Stanton Avenue drainage outfall gets impacted by storm surge and blocked, causing precipitation and stormwater runoff to flood back over the roadway.
- Precipitation events of increasing magnitude present a management challenge especially on Starr Drive and Wesquage Pond with routine and extended flooding.
- Multiple sea walls in need of repair to maintain the existing protection from storms. This includes the Center Wall of Harbor Refuge with a cost estimate for the needed major repairs of \$8-10 million dollars (which is beyond Town's ability to fund).
- Middle Bridge Road Causeway represents a key segment of the municipal transportation system and requires an assessment to ensure future reliability and protection.
- Flooding concerns on Marine Drive heading towards Penguin Road, as well as low-lying sections on Wild Goose Road (by the last house) and on Mollusk Road by Island River.

Stormwater, Waste Systems, Drinking Water Supply:

- Age and location of water and sewer infrastructure makes the entire system especially prone to damage from large weather events, with the potential for catastrophic water access issues. Water supply infrastructure of particular concern runs under Boston Neck Road, Beach Street, Route 1a, and under select coastal beaches.
- Stormwater overloading and limited ability to convey increasingly larger runoff volumes result in direct discharge of stormwater into the ocean and other waterbodies due to Narragansett being surrounded on three sides by water (Point Judith Pond, Narragansett Bay, Atlantic Ocean, and Narrow River).
- Several of the nineteen wastewater pumping stations in Narragansett are susceptible to flooding, resulting in the potential to become inoperable. This includes pump stations at Mettatuxet, Allagash Trail, Galilee, Stanton Avenue, Bonnet Shores, and Point Judith. An inoperable pump station can have negative cascading effects throughout the entire wastewater treatment system.
- Drinking water is not owned by the Town and must be purchased from outside entities (i.e., Veolia, North Kingstown) which can limit control to match volume with need.
- Rising groundwater causes septic system seasonal flooding, although most the residential and commercial buildings in Town are on sewer.
- Wastewater pump stations designed to handle peak flows, but during lower summertime flows the sewage stays in system longer resulting in strong odors and complaints when pumps are re-activated.

Specific Categories of Concerns and Challenges (cont'd)

- Undersized culvert near Community Center by Bonnet Shores Road at Spring Brook Road that exacerbates flooding and represents a needed, low-cost project.
- Drainage at 55 Sea Ridge Road near Crosswynds isn't adequate for major rain event and washes the adjoining driveway out.

Emergency Management and Preparedness:

- In the event of a major hurricane, evacuation could be difficult due to limited main access points into and from Town. This will also present challenges for emergency management operations and maneuverability, due to current road infrastructure constraints.
- Large amounts of coastal areas - in places like Galilee and Jerusalem - are within flood zones, which places buildings and roads in jeopardy with minimal access and egress during major events.
- Rapidly aging population of residents that have limited mobility are increasingly isolated during and after disasters.
- A significantly large population of transient residents (6 months a year), students, and summer-time residents can be difficult to reach for longer-term planning and zoning discussions and purposes.
- Challenges matching hazard-related communications with the diversity of residents (i.e., students to seniors) and seasonal nature of hazards (such as rain-induced flooding in early spring, hurricane and major storms in August, and nor'easters in winter).
- Growing concerns about the severity of the recent drought in Narragansett.
- Limited transportation options for bringing elderly residents to sheltering facilities in advance of major events, coupled with reliability of landline phones versus cell phones for older members of the community can create communication challenges.
- Concentration of two elderly housing developments in center of Town near the coast, and the general unwillingness of elderly residents to leave homes for safer options during required evacuation events. Two senior facilities are in a very high-risk areas and would require evacuation in the event of a hurricane or major Nor'easter with approximately 200-300 elderly residents ranging in age from 65-100 years of age. Most residents have pets, so assurances regarding pet sheltering services would be required prior to evacuation.
- Ongoing concerns regarding the ability of existing sheltering facilities to service guests for longer periods, such as weeks or months (i.e., food, clothing, medical supplies, etc.).

Specific Categories of Concerns and Challenges (cont'd)

- Challenges of operating critical grocery stores without generators during power outages of more than 24 hours (i.e., non-refrigerated food spoilage).
- Code Red (reverse 911 system) in Town but not clear on how much of the populations is receiving messages during any given event.

Municipal Functions, Operations, & Growth:

- Large portions of Narragansett owned and managed by entities other than the municipality including the state of Rhode Island which owns three major beaches, the better part of Galilee (including commercial fishing port infrastructure), and two major road systems (Boston Neck Road, Point Judith Road). In addition, the federal facility to the south is owned by the U.S. Army as well as the Coastal Guard Facility (including Point Judith Lighthouse) which collectively represent a large percentage of the coastline in Narragansett.
- Coastal residences potentially represent most of the tax base as well as most of the exposure to extreme weather and climate-related events which presents a financial concern for the Town longer-term. Limited attention directed by the Town towards reducing the number of repetitive loss properties in collaboration with current owners in high-risk areas.
- Pier and Scarborough Hills neighborhoods are recognized environmental justice areas.
- Excessive amount of municipal staff time required to complete paperwork for reimbursements from state and federal government when major events are declared emergencies, which can delay the process due to limited staff availability.
- Decline in the number of volunteers for critical municipal functions such as at the Fire Department, as well as on various boards and commissions. Volunteers are currently primarily young people without families or older people past retirement.
- Regional collaboration opportunities can be a challenge to initiate despite the potential for better services and cost savings.
- Limited amount of affordable housing with approximately 25% of housing stock as rentals. Growing number of rentals owned and operated by “out of state”, non-residents are pricing full-time residents out of many neighborhoods, resulting in a decline in year-round populations, as well as younger couples and families.
- Need for improvements to the Town Hall, as well as other municipally owned buildings with a lack of a unified facilities management plan.

Specific Categories of Concerns and Challenges (cont'd)

Coastlines, Watersheds, Wetlands, Open Space, Forests, Trees:

- Ongoing concerns due the impacts of development encroaching on areas that can accommodate future wetlands (i.e., advancement zones), as well as growing issues with groundwater availability and saltwater intrusion.
- Groundwater resources impacted by recent droughts resulting in private drinking water wells going dry.
- Freshwater ponds adjoining Boston Neck Road are now receiving saltwater during coastal flood events that impacts the ecology of this critical freshwater natural resource.
- Tree maintenance program in place with dedicated staff. However, challenges remain to address tree trimming issues around power lines at an adequate pace. During hurricanes and tropical storms one of the biggest issues is still the loss of power due to downed trees and limbs.
- Ongoing loss of coastal salt marshes due to sea level rise on the Narrow River and at Point Judith, among other exposed areas in Narragansett.
- Erosion of bluffs at Point Judith as well as beach and dunes.
- Loss of beach material that results in overtopping of adjoining seawalls with routine storms today resulting in costly cleanup and replenishment efforts.
- Ongoing closure of the privately-owned Rose Nulman Park because there are significant erosion issues that present a potential health and safety challenge for visitors.
- Series of hummocks that lead to the Great Island Causeway which may not be habitable under future sea level rise scenarios.
- Concerns about the loss of Sprague Bridge during major hurricane or Nor'easter.



Credit: Bonnet Shores Land Trust



Credit: TripSavvy



Credit: redfin

Current Strengths and Assets

Just as certain locations, facilities, and populations in Narragansett stand out as particularly vulnerable to the effects of hazards and climate change, other features are notable assets for Narragansett'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 leaderships, staff, and residents is a very appreciated strength within and across Narragansett. Ongoing collaboration between municipal staff, committee/commission volunteers, business community, faith-based organizations, NGOs, adjoining municipalities, and various state-level organizations, among others, on priorities identified herein will help advance comprehensive, cost-effective, community resilience building actions.
- Deep experience and knowledge of the community challenges and opportunities amongst staff with ongoing coordination across various departments including leadership, Public Works, Police, and Fire was cited as a highly valued community strength.
- Keenly focused, highly professional municipal staff that proactively anticipate major events and crises in a collaborative and coordinated manner (“strong human capital”).
- Collaborative approach to community-based planning as evident by the recent Comprehensive Plan update that was spearheaded by Community Development and Public Works Departments.
- Narragansett has a strong municipal building code program that seeks to balance growth with public safety, particularly for residential structures in proximity to the coast.
- Strong attention directed to ensuring FEMA regulations are enforced via a coordinated effort between Building Officials and Community Development.
- Narragansett is enrolled in FEMA's Community Rating System with continued enrollment maintained via the Community Development Department.
- Forward thinking construction projects at the Port of Galilee that have raised the bulkheads to help reduce the impacts of flooding and sea level rise.

Current Strengths and Assets (cont'd)

- Municipality is actively pursuing design and installation of projects that reduce the impacts of flooding and sea level rise.
- Current, resilient projects in partnership with Army Corps of Engineers to raise residential structures in the FEMA Special Hazard Flood Zone.
- Focus by the Engineering Department on improving the resilience of the sewer and water systems and to help anticipate and minimize potential issues related to extreme weather and climate change. Strong partnerships between sewer and water staff, Engineering Department, and Department of Public Works.
- Each self-identified neighborhood has a neighborhood group that is strongly organized and motivated to help with issues and challenges.
- Environment and natural assets across the municipalities are a strength in that they attract tourists, recharge and filter water, provide recreational opportunities, and protect people and property from storm surge and flooding, among other benefits.
- Many committees and commissions focused on maintaining a vibrant and accessible environment for residents of and visitors to Narragansett. These include the Coastal Access Committee, Conservation Commission, Harbor Management Commission, and the local land trust, among others.
- Friends of Canonchet Farm work on invasive species removal and control. This approach provides a model for others to emulate across Narragansett.
- Solid municipal tax base that allows expenditures on improvements to municipal-owned and managed infrastructure.
- Presence of the U.S. Coast Guard in the community helps to increase the availability of resources needed during challenging times.
- Municipal staff place great deal of emphasis on ensuring various critical plans(including the Hazard Mitigation Plan, Harbor Management Plan, and Emergency Management Operations Plan) are up to date and effective during response and recovery as well as for preparedness efforts.
- Long-term residents are knowledgeable about how to prepare for storms and power outages for periods up to 72 hours.

Current Strengths and Assets (cont'd)

- Many long-term residents recognize climate-related changes having witnessed shifts along the Narragansett coastline due to sea level rise and extreme weather events.
- Strong commitments by staff, commissions, and organizations focused on conservation to continue to improve regulations and implement best stewardship practices that further protect land and natural resources. These include the Narrow River Preservation Association, Narrow River Land Trust, Salt Pond and Point Judith Pond Coalitions, Narragansett Land Conservancy, Friends of Canochet Farm, and the U.S. Fish and Wildlife Service, among others.
- Narragansett Town Beach is run and maintained via an enterprise fund.
- Narragansett has an updated and active tree maintenance program along with two Tree Wardens. Tree maintenance program strives to keep trees along roadways and proximity to power lines trimmed to help minimize the potential of power outages and impacts to motorists during and after storms.
- Community Center now has a generator and can be used as a shelter if shoreline neighborhoods need to be evacuated during major events. Town schools are backup shelters to South Kingstown High, which is the primary regional shelter. The Town Library is a designated heating and cooling center.
- Sheltering agreements in place to increase availability of additional overflow shelters in South Kingstown and North Kingstown during evacuations.
- Memorandum of Understanding with South Kingstown allows for sheltering of pets owned by residents in Narragansett during evacuation events.
- Salt Ponds Coalition has been very helpful in advancing resiliency-related projects on Harbor Island.
- Emergency Alert Notification system (i.e., Code Red) in place to assist with disaster preparedness.
- Easily accessible municipal website with useful and useable information for residents.
- Town staff with Police Department have created an evacuation map based on elevation.
- Ongoing attention directed to reducing water quality impairments on the Narrow River including securing funding and implementing adjoining stormwater system retrofits.

Current Strengths and Assets (cont'd)

- Department of Public Works proactively prepares the community for major storms through collaborative engagement and coordination with Parks and Recreation, Fire, and Police with a specific focus on areas that typically get hit the hardest (i.e., Sea Wall area, Town Beach area, Sandhill Cove area (southern end of Town), among others).
- Preemptive coastal flooding protocol for Sandhill Cove where Public Works digs out an outflow off Stanton Avenue before each big storm to keep the road from flooding based on previous experiences with blockage and closure.
- Preemptive closure of Bonnet Shores Causeway during large precipitation events as the pond filled up and caused localized flooding and hazards along the roadway for motorists.
- Stormwater management for all newly constructed roads requires permitting that ensures stormwater runoff is treated, so it is as clean as possible before entering receiving waterbodies.
- Meals on Wheels for elderly residents (especially helpful during pandemic) is run by the Parks and Recreation Department out of the Community Center. This program allows for rapid sharing of knowledge about where vulnerable people are in Narragansett and who may need further support.
- Ongoing cooperation with local grocery stores (e.g., Stop & Shop) where municipal staff can purchase orders ahead of a storm to provide food for staff working storms.
- Completion of flood-proofing project (2017-2018) that included building a berm around the wastewater treatment facility which resulted in a modification to the FEMA flood insurance rate maps and flood level designation for this location.



Credit: The Providence Journal



Credit: Town of Narragansett



Credit: VisitingNewEngland.com

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 Narragansett'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, volunteerism, conservation & recreation, increased tax base, affordable housing, tourism);
- **Infrastructure improvements** (i.e. road/bridge/causeway network, stormwater management systems, green stormwater infrastructure, beaches/ponds);
- **Quality of life improvements** (i.e. parks and recreation, open space & accessibility, sustainability, health & safety, economic prosperity, transportation);
- **Emergency management** (i.e. communications, outreach, education, continuation of services, business recovery, sheltering, pets, evacuation, vulnerable populations).

In direct response, the Community Resilience Building workshop participants developed the following actions and identified, but not ranked, them as priority or as additional actions. Mitigation/adaptation actions from the Narragansett Local Natural Hazard Mitigation Plan (2019 updated) are provided in Appendix A for cross reference.

Priority Actions

- Create and implement a Continuity of Operations Plan (COOP) that includes concerns raised around redundancy of emergency operations (evacuation, specifically) and other actionable steps to help prepare and maintain operations during major events.
- Assess, identify, design, and construct improvements to Boston Neck Road to help increase stability and resilience to escalating storm surge and sea level rise scenarios that threaten to divide the Town and present significant public safety concerns.

Priority Actions (cont'd)

- Conduct a more specific assessment and impact study of potential solutions to help maintain the Harbour Island Causeway. This could include raising the road and installing appropriately sized culvert or alternatively installing a section of bridge.
- Prevent or mitigate flooding in the Boston Neck Road area.
- Inadequate and outdated stormwater drainage infrastructure needs to be updated after a town-wide condition and impairment assessment.
- Seek out ways to address flooded causeways (i.e., Bonnet Shores, Harbour Island, Great Island) including elevating causeways. This would allow for additional water flow and would create a net positive environmental impact.
- Initiate study to determine where impervious surface removal can be conducted on a town-wide scale. Then conduct outreach and provide incentives for residents and property owners to reduce or limit the amount of impervious surface on their properties. In addition, look to remove impervious surfaces from areas within floodplain to potentially improve FEMA's Community Rating System designation for Narragansett.
- Create a resilience plan for barrier beach area and parking lot that should include pervious parking lot retrofits, improvement of dune system, and other approaches that balance the use of the public amenity with ensuring long-term resilience.
- Work closely with state and municipal stakeholders to respond to major weather events (state building commission, other local communities along the coast). Partner with them to develop plans to work together during emergency events.
- Assign town staff to develop a rebuilding strategy and plan in the aftermath of destructive storm events.
- Explore ways to establish an electronic permitting system, which can connect with state permitting infrastructure.

Priority Actions (cont'd)

- Seek out opportunities to reduce flooding along Boston Neck Road (particularly in front of the beach area heading north) to help reduce delays in emergency management responses to the North End of Town along this critical transportation route.
- Work towards further fortification of the Port of Galilee including rebuilding docks and improving and fixing the hurricane barrier and bulkheads.
- Identify actions needed along with cost estimates for reducing the exposure of all nineteen wastewater pumping stations across Narragansett beginning with those stations already experiencing operations risk for the entire system.
- Create an engineering plan to address drainage issues at the Post Office and associated seawall as well as a more comprehensive assessment of the entire area in the flood zone including all roads and stormwater infrastructure.
- Locate and apply for state funding to address sea walls in need of repair to protect from storms including a specific focus on major repair needs of the Center Wall of Harbor of Refuge (estimated cost \$8-10 million).
- Create a management and restoration plan to add stormwater infiltration protection at Starr Drive to help reduce flooding as well as improve and restore the health of the marsh in this location.
- Locate funding to both conduct a design and engineering plan and pay for needed permitting to upgrade the Stanton Avenue drainage outfall. This area collects a lot of rock and material due to storm surge that blocks stormwater runoff and causes flooding on the roadway.
- Conduct preliminary feasibility study both for the potential to elevate the Harbour Island Causeway (3', 5', and 7' elevation increases) as well as the installation of culverts on both sides of Causeway.

Priority Actions (cont'd)

- Develop a plan to address issues along the road segment between the Dunes Club and Pier Village on Boston Neck Road in front of the beach.
- Look at some of the projects that Save the Bay and others have done that use dunes as protective measure during more modest storm events like Nor'easters versus hurricanes. These examples may be relevant for beaches in Narragansett.
- Explore using sand from dredging to create a foredune and a back dune instead of placing sand against wall (dependent on the amount of sand) in various beach locations. Currently a project is underway to develop a plan for dredging along with modeling the transport of sand and options to naturally augment local beaches.
- Find funding for the Indian Trail Stormwater Outflow Project.
- Conduct stormwater infiltration studies (storm to wastewater) and flood elevation studies at all nineteen wastewater pump stations.



Credit: Katherine Gendreau Photography

Additional Actions

- Look to hire professional and dedicated grant writer to create the capacity needed to secure and manage funding for the multitude of projects needed in Narragansett to improve overall resilience.
- Continue to conduct study to determine how best to manage silting in channel between Narragansett Town Beach and the Whale Rock neighborhood (Narrow River out to Narragansett Bay) to ensure tidal flushing of Narrow River and seek ways to help reduce future closures.
- Initiate a collaborative meeting to re-engage stakeholders (including representation from state of Rhode Island, CRMC, Army Corps of Engineers, among others) to explore the reason for ongoing siltation of Narrow River and to begin a process of identifying potential long-term solutions.
- Engage coastal engineers and geologists to better understand the coastal processes and potential approaches to help retain sand on local beaches in Narragansett. Use science and information generated to inform the creation of a long-term sand replenishment and sediment management strategy for beach resources along Narragansett's coastline.
- Conduct educational outreach to residents about the conservation and beneficial use of natural systems (i.e., green stormwater infrastructure, bioswales, wetlands, etc.) to improve water supply, increase infiltration, and help reduce localized flooding.
- Review and cross walk mitigation actions (see Appendix A) from the Narragansett Hazard Mitigation Plan against priority and additional actions generated during the Community Resilience Building workshop, herein.
- Continue to work closely with Coastal Resource Management Commission (CRMC) and state regulating bodies (Rhode Island Department of Environmental Management (RIDEM), Rhode Island Department of Transportation (RIDOT) on coastal projects as well as state-owned and maintained infrastructure (i.e., Route 1a, Harbor of Refuge).

Additional Actions (cont'd)

- Conduct structural analysis of Route 1a and evaluate reconstruction needs that consider and incorporate resilience-related concerns longer-term.
- Examine best practices for municipal communications with traditionally hard to reach populations in Narragansett (i.e., transient, seasonal, students, aging, less technologically adept, etc.).
- Continue to support resilience-related improvements in the Port of Galilee including raising bulkheads, conducting asphalt repairs, upgrades to electrical systems and piers, and enhanced fire suppression systems. Also explore options to specifically design floating docks.
- Engage with neighboring municipalities regarding priority actions generated during Community Resilience Building workshops in order to foster more regional approaches and projects over time.
- Conduct education for individual homeowners and landlords on risk of flooding so residents can learn about existing and potential vulnerabilities of their properties from climate-related changes.
- Explore the potential to enhance existing shoreline fortification features where the use of nature-based solutions is not feasible in hopes of strengthening the resilience of vulnerable coastal areas.
- Examine potential options to establish a back-up Emergency Operations Center in the municipal Parks and Recreation Building. This could also serve as a temporary evacuation center for residents from Harbour Island and Galilee.
- Plan for more storm shelters and supplies (food, blankets, clothing, medical supplies) in preparation for housing residents for weeks or months.

Additional Actions (cont'd)

- Create a protocol for residents to follow during and after an evacuation event complete with identified priority actions and instructions on when and how to return home.
- Work to establish transportation options for elderly and or less mobile residents to get to sheltering facilities coupled with a direct collaboration with the Fire Department to help facilitate house visits for all known residents in need in advance of a major disaster.
- Educate public about how water is a finite supply and needs to be dealt with accordingly. This should include educating residents on alternatives for lawn care.
- Seek alternatives to putting standard lawn grass on Town properties including planting native trees and shrubs that will also reduce the time and cost associated with lawn maintenance and mowing.
- Explore the extent and magnitude of future flooding impacts on houses in Jerusalem coupled with an initial assessment of which houses could be elevated, and/or plan for acquisition and managed retreat.
- Review likely impacts to Narragansetts most vulnerable neighborhoods including Sandhill Cove, Great Island, Harbour Island, and Jerusalem. Develop a longer-term response plan in the event of properties are significantly damaged (over FEMA's 50 percent threshold).
- Establish a goal and action plan to detail status of entire Municipal Separate Storm Sewer System (MS4) efforts on an annual basis.
- Expand Tree Maintenance Program by adding an additional full-time position to bring the total number of Narragansett Tree Wardens to three full time employees.
- Advance a comprehensive, town-wide investigation into the options, locations, and cost of hardening utilities in high hazard areas.

Additional Actions (cont'd)

- Create a plan to generate ideas to improve drinking water system reliability. Also identify method for private water companies that serve Town (Veolia, North Kingstown) to participate in the forums and the improvement projects going forward.
- Explore the potential for developing a green stormwater infrastructure master plan for the Port of Galilee, Pier Village, and surrounding areas to help alleviate localized flooding and enhance the environment in Narragansett.
- Work to establish requirements for business owners to protect and restore dunes on their property through maintenance and restoration of vegetation (i.e., dune grass, among other native plant species).
- Seek to help improve the overall resiliency of the waterfront along the Narrow River through the selective removal of hard facilities and the planting of native, salt-tolerant, intertidal and subtidal vegetation.
- Initiate a public forum for residents and visitors to discuss municipal infrastructure and the need for long and short-term improvements in the face of extreme weather and climate-related challenges.
- Work to secure funding to elevate the road or install a bridge along Foddering Farm Road that would reduce risk and improve tidal flushing of an adjoining pond.
- Incentivize the installation of solar power generating system on developed and brownfield sites in Narragansett.
- Advance the establishment of an affordable and reliable electric vehicle shuttle service for residents and tourists in pilot areas of Narragansett.
- Look to define and create a core area for businesses that cater to tourists and has links to the working waterfronts in Point Judith and the Pier.

CRB Workshop Participants: Department/Organization

Town of Narragansett – Town Council Representation
Town of Narragansett – Town Managers Office
Town of Narragansett – Department of Community Development
Town of Narragansett – Department of Finance
Town of Narragansett – Department of Public Works
Town of Narragansett – Department of Engineering
Town of Narragansett – Building Inspection Department
Town of Narragansett – Police Department
Town of Narragansett – Fire Department
Town of Narragansett – Parks and Recreation Department
Narragansett Land Trust
Friends of Galilee
Lions Club
Narragansett Pier Residents Association
Harbour Island Improvement Association
Frisella-Balch & Associates
Save the Bay
Rhode Island Department of Environmental Management
Rhode Island Coastal Resources Management Council

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Jim Tierney – Town Manager – Town of Narragansett

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Michelle Kershaw – Parks and Recreation Department – Town of Narragansett

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Stephen Daignault – Department of Public Works – Town of Narragansett

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The Nature Conservancy - Sue AnderBois (Small Group Facilitator)

The Nature Conservancy – Catherine Campbell (Small Group Facilitator)

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Appendix A

Town of Narragansett Local Hazard Mitigation Plan (January 2019 Update)

Mitigation Actions

**Strategy for Reducing Risks
From Natural Hazards in
Narragansett, Rhode Island:**
A Multi-Hazard Mitigation Strategy



Acknowledgements

Gina Raimondo
Governor

RI Emergency Management Agency

Marc Pappas
Acting Director

Authors

Town of Narragansett Local Hazard Mitigation Committee
Town of Narragansett Planning Board

Approved by Narragansett Town Council
December 3, 2018

Adoption by Narragansett Town Council
January 7, 2019

Funding for development and update provided by the Town of Narragansett

Critical Roads/Evacuation Routes

Action 1

Evacuation and Sheltering

Evacuation routes have been established and are properly signed throughout Town. The Town will continue to use existing tools to ensure a timely tourist evacuation and shelter, as needed.

Priority Score: Low

Action Type: Emergency Services

Lead: Fire Chief (local EMA director)

Supporting: Police Department, Public Works, RIEMA, and American Red Cross

Time frame: As needed

Financing Options: Town budget

Cost Estimate: Low

Benefit: Protection of life and property

Shoreline Features

Action 2

Beach and Dune Replenishment

The Parks & Recreation and Engineering Departments are working with the University of Rhode Island to update the Beach Profile. The Town will use dredged material from an accepted source or will purchase sand to enhance the dune system and/or re-nourish the Town Beach.

Priority Score: Low

Action Type: Natural Resource Protection and Property Protection

Lead: Engineering Department

Supporting: Parks & Recreation, Community Development

Time Frame: Long term, or after major storms.

Financing Options: Beach Fund, Federal and State Hazard Mitigation assistance as available.

Cost Estimate: High.

Benefit: Protection of beach assets by dunes, protection of Boston Neck Road (State) by dunes, prolonged life of beach (important revenue driver for the Town). Woods Hole Group 2011 Report will be used as the basis for the implementation of this project.

Water and Waste Water Infrastructure

Action 3

Bypass Sewer Main

Block (sand bags or air-inflated plugs placed in manholes) and then re-route sewage flow in damaged areas by use of trailer-mounted pumps and portable hoses. Scope is storm and damage dependent.

The Town Engineer will develop a procedure for bypassing sewer mains where roads are compromised.

Priority Score: High

Action Type: Emergency Services

Lead: Engineering Department

Supporting: Wastewater Division

Timeframe: Long term, or after major storms.

Financing Options: Wastewater Enterprise Fund

Cost Estimate: Medium

Benefit: Protection of Life and Property

Action 4

Water Supply

Suspend water lines underneath the bridge and place hydrants on either side of the bridge (Middlebridge) where appropriate so that a suction hose can be floated between hydrants. The water line improvements to Great Island are complete because the Town installed the under-

channel line. The water line under Middlebridge is owned by Suez Water and the Town does not have any authority to complete this action item; however, it is a PUC regulated authority. The Town will work with Suez to complete this task. The Town is developing a Standard Operating Procedure (SOP) for isolating critical water mains in coastal areas (areas prone to road washouts).

Priority Score: Medium

Action Type: Emergency Services

Lead: Engineering Department, Police Department

Supporting: EMA Director, RI DOT, RIEMA

Timeframe: Medium-term

Financing Options: Town Budget, FEMA Grants

Cost Estimate: Medium

Benefit: Protection of Life and Property

Action 5

Floodproofing Pump Stations

A gravity sewer bypass has been installed for the Congdon Street pump. Staff have identified all potential flood water penetration points on the Galilee, Stanton Ave., Mettatuxet, and Allagash Trail Pump Station structures, and have surveyed each such point. During 2019, we anticipate issuing a construction contract to address each vulnerable penetration point. Flood proof sanitary sewer pump stations giving highest priority Bonnet Shores (Allagash).

Priority Score: Medium

Action Type: Property Protection

Lead: Engineering Department

Supporting: None

Timeframe: Long-term

Financing Options: Town Budget and FEMA Flood Mitigation Assistance Program

Cost Estimate: Medium

Benefit: Protection of Life and Property

Action 6

Retrofit Sewer Pumping Stations

Narragansett will consider retrofitting any sewage pumping stations that have been problematic during storms.

Priority Score: High

Action Type: Emergency Services

Lead: Engineering Department

Supporting: None

Timeframe: Medium-term

Financing Options: Town Budget and FEMA Flood Mitigation Grants

Cost Estimate: High

Benefit: Protection of Life and Property

Action 7

Scarborough WWTF Groin Rehabilitation

The Town will commission a design, and then secure permits and construction improvements to the existing riprap groin located southeast of the Scarborough WWTF. The groin serves a dual purpose; first, it helps to protect the existing plant outfall pipe in the shallow surf zone, and second it helps to protect the beach in front of the WWTF by reducing the rate of sediment transport (beach stabilization).

Priority Score: High

Action Type: Structural Projects

Lead: Engineering Department

Supporting: None

Timeframe: Medium to Long term, dependent on funding.

Financing Options: Federal and State Hazard Mitigation assistance as available.

Cost Estimate: High.

Benefit: Property Protection, Structural Projects and Maintenance – Scarborough WWTF Asset Protection.

Public/Town-Owned Assets

Action 8

Underground Utilities and Fire Alarm Communications Upgrade

The Town would like to study and implement a project to bury electrical wires and other suspended cables. The Town would like to take the above ground utilities and place them underground. In addition, the overhead fire alarm cable and equipment which connects emergency notification services to our municipal fire alarm system will be converted to newer technology using radio signaling fire alarm boxes.

Priority Score: Medium

Action Type: Structural Projects

Lead: Engineering Department, National Grid

Supporting: Fire Department

Timeframe: Long Term or following a major storm

Financing Options: Federal or State Hazard Mitigation Assistance, FEMA Public Assistance, Town Capital Improvement Project planning, Utility Company funds

Cost Estimate: High

Benefit: This will help to insure continuation of emergency notification and property protection by eliminating the more susceptible and costly cable system. This is not a project that is financially feasible at this time; however, it is a long-term goal especially if federal 60 funding becomes available to implement the project. This would eliminate property damage and protect life safety from downed utility lines, fire alarm cables, and protect from lightning storms. This would also reduce the impact from a tornado or earthquake. The Town would prioritize areas that are more susceptible to damage during a storm such as Route 1A Boston Neck Road and Ocean Road.

Action 9

Town Tree Trimming Program

The Town of Narragansett will continue to work with utility companies to develop a program for regular tree trimming. The Town issues permits to the utility companies and property owners to trim trees in public right of ways. The Town's goal is to formalize a written standard operating procedure with the utility companies and property owners with assistance from the local tree board. Plan is still ongoing in development.

Priority Score: Medium

Action Type: Emergency Services

Lead: Public Works Department

Supporting: RI DOT, RI DEM and local utility companies

Timeframe: Medium-term

Financing Options: Town Budget and Donations from local utility companies

Cost Estimate: Low

Benefit: Protection of Life and Property

Action 10

Tree Trimming Educational Program

The Town of Narragansett will create a brochure for the public to use for referral to local ordinances as well as proper care and maintenance of trees on private parcels. This Brochure will dovetail with the “Town of Narragansett Urban Forestry Management Plan”, which will include a program offered through the Town whereby the Town will supply and plant trees on private property that will be cared for and maintained by the property owner.

Priority Score: Low

Action Type: Public Education and Awareness

Lead: Public Works Department

Supporting: RI DOT, RI DEM, the Tree Board and Community Development

Timeframe: Medium-term

Financing Options: Town Budget and Donations for trees/supplies

Cost Estimate: Low

Benefit: Educational, Protection of Life and Property

Causeways

Action 11

Causeways

Keep causeways well maintained. If funding is available through either FEMA grants, other grant opportunities or as part of another improvement project, causeways should be considered for elevation with culverts, or removed for bridges. Causeways include Bonnet Causeway, Harbour Island, Wood Hill, Marine Drive, Frank Neck Road and Basin Road. The LHMC should consider this Action when funds are available in the future.

Priority Score: High

Action Type: Structural Projects: Natural Resource Protection

Lead: Planning Department, Engineering

Supporting: Public Works Department, CRMC/ RI DEM and local utility companies, Non-Profits

Timeframe: Long-term

Financing Options: FEMA, RIDOT

Cost Estimate: High

Benefit: Protection of Life and Property as well as water quality and wetland preservation.

Residential Areas

Action 12

Public Information, Outreach and Incentive Program

The Town will continue to educate the contractors and homeowners on the risks of living in hazard-prone areas and will strengthen and expand the appropriate development standards for the overlay districts. Property preservation should be encouraged through structural elevation techniques and retrofitting for wind damage. Homeowners and contractors should be educated on appropriate methods to reduce damage. Narragansett will provide information to contractors and homeowners on risks of building in hazard-prone areas. The Town should use FEMA publications or develop a town-specific list of appropriate techniques for homeowner self-inspection and suggest subsequent implementation of mitigation activities.

Action Type: Education and Awareness

Lead: Building Inspections/Zoning

Supporting: Community Development, Fire Chief (local EMA Director), Tree Board, and Institute for Business and Home Safety

Timeframe: Medium-term

Financing Options: Town Budget

Cost Estimate: Low

Benefit: Protection of Life and Property

Action 13

Property Acquisition

The Town will work to acquire repetitive loss structures. The Town currently has 19 repetitive loss properties.

Priority Score: Medium

Action Type: Property Protection

Lead: Building Official

Supporting: Town Planner

Timeframe: Long-term

Financing Options: FEMA grants, land acquisition bonds (state and municipal), land bank, and RI DEM

Cost Estimate: High

Benefit: Protection of Life and Property

Action 14

Retrofit and Elevate, Relocate

The Town has stricter policies within the flood zone by enforcing the State Code and the Local Floodplain Overlay Ordinance that has been in place since 1987. In the floodplain, elevate structures to the 100-year base flood elevation. Encourage maximum setbacks and/or relocation. While retrofitting for flood, light structural and non-structural projects can easily be done at the same time that could help protect a home from wind and earthquake shaking, providing a greater benefit at a lower cost. FEMA manuals are available on construction practices for non-residential structures.

Priority Score: Medium

Action Type: Prevention

Lead: Building Official

Supporting: Town Planner, Town Engineer
Timeframe: Long-term
Financing Options: FEMA grants
Cost Estimate: High
Benefit: Protection of Life and Property

Action 15

Policy for Rebuilding

Continue to enforce FEMA regulations for Point Judith Pond shoreline regarding 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. The LHMC feels this is still extremely important to keep within the plan but it will virtually never be completed.

Priority Score: Medium
Action Type: Prevention
Lead: Building Official
Supporting: State Floodplain Manager, RIEMA and State Building Commission
Timeframe: Dependent on Storm Activity
Financing Options: Town Budget
Cost Estimate: Low
Benefit: Protection of Life and Property

Natural Resources/Recreation Areas/Public Areas

Action 16

Open Space Acquisitions

One of the best ways to prevent flood damage is to keep flood-prone areas undeveloped. The town will try to acquire open space in flood zones through the Land Conservancy Trust, the Bonnet Shores Land Trust or Narrow River Land Trust. Special consideration should be given to erosion-prone areas or floodplains where there is a possibility of obtaining a bigger block of land (several adjoining lots) in the flood zone rather than a few separate smaller parcels. The Land Conservancy Trust (point of contact will be the Community Development Director) will pursue land for acquisition in flood-prone areas that would provide public access to coastal waters or that have experienced recurring flood damage.

Priority Score: Medium
Action Type: Natural Resource Protection
Lead: Land Conservancy Trust (Planning Department)
Supporting: Town Planner, Town Council, FEMA and RIEMA
Timeframe: Long-term
Financing Options: FEMA grants, land acquisition bonds (state and municipal), land bank, and RI DEM
Cost Estimate: High
Benefit: Protection of Life and Property

Historic Structures

Action 17

Historic Flooding Signage Town-wide

Use informational signs at areas of historic flooding showing the 1938 surge elevations along Ocean Road. These signs could be as simple as a painted blue ring around a telephone pole or a plaque indicating where floodwaters have reached. It is especially important to include inland areas where the risk is not as obvious.

Priority Score: Low

Action Type: Education and Awareness

Lead: Public Works Department

Supporting: RIEMA, Town Planner and the National Weather Service

Timeframe: Medium-term

Financing Options: FEMA grants, land acquisition bonds (state and municipal), land bank, and RI DEM

Cost Estimate: Low

Benefit: Protection of Life and Property

Action 18

Historic Flooding Informational Display in Town Hall

Create an interpretive display with photos and maps of prior flood damage. This display will be located in the Town Hall.

Priority Score: Low

Action Type: Education and Awareness

Lead: Planning Department

Supporting: Historic District Commission

Timeframe: Medium-term

Financing Options: Town Budget

Cost Estimate: Low

Benefit: Protection of Life and Property

Stormwater Assets

Action 19

Storm water Projects Critical storm water assets are slowly being threatened by sea level rise. The Town needs to take steps to retrofit these assets to prevent major damage and/or loss. The storm water assets are Stanton Ave. Outfall, Mettatuxet BMP, Petta. Terrace Level Spreader, Circuit Dr. BMP Ponds.

Priority Score: Medium

Action Type: Structural Projects

Lead: Public Works

Supporting: Engineering Department

Timeframe: Low – Medium

Financing Options: Town Funding, Grants

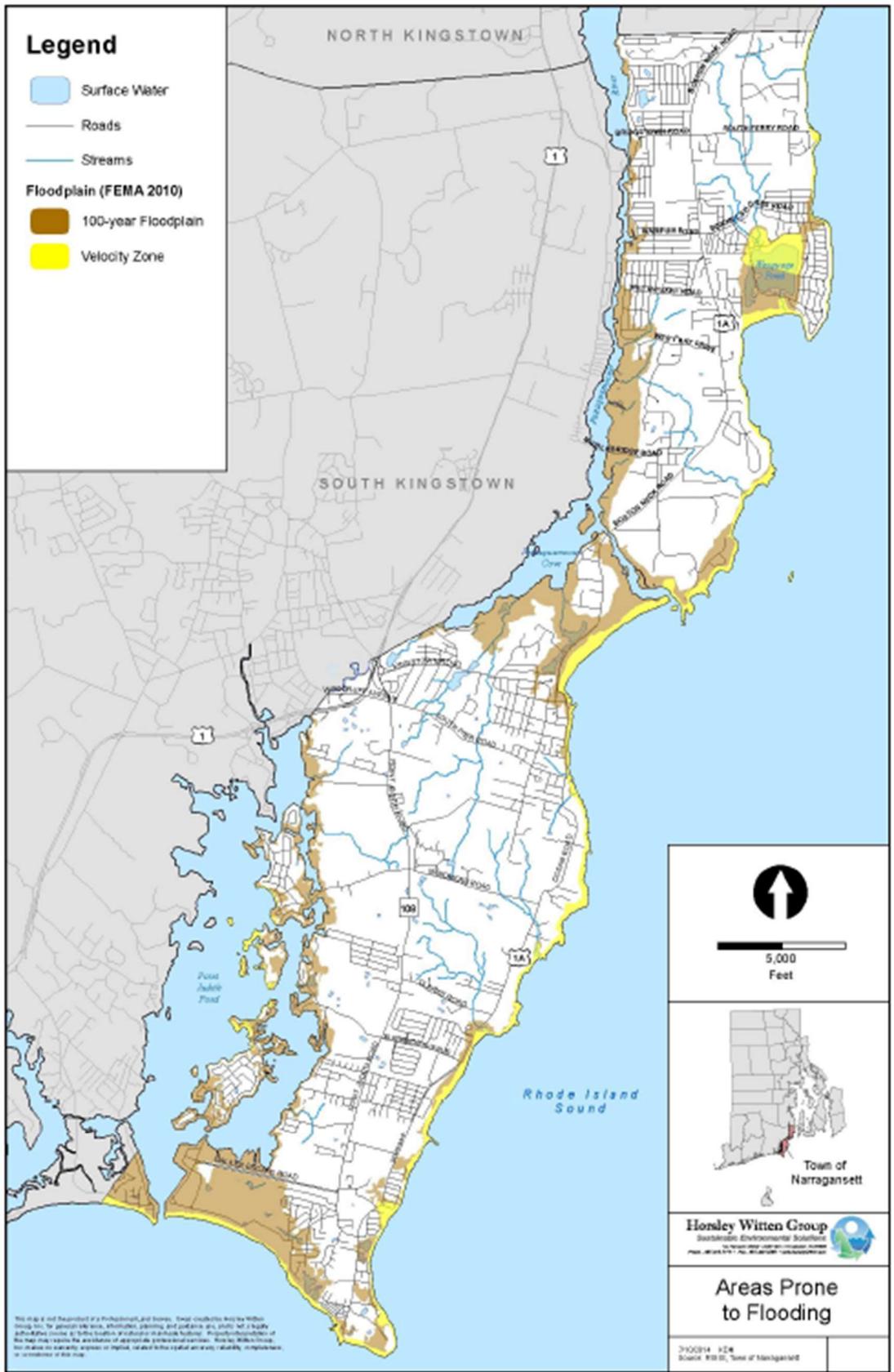
Cost Estimate: High

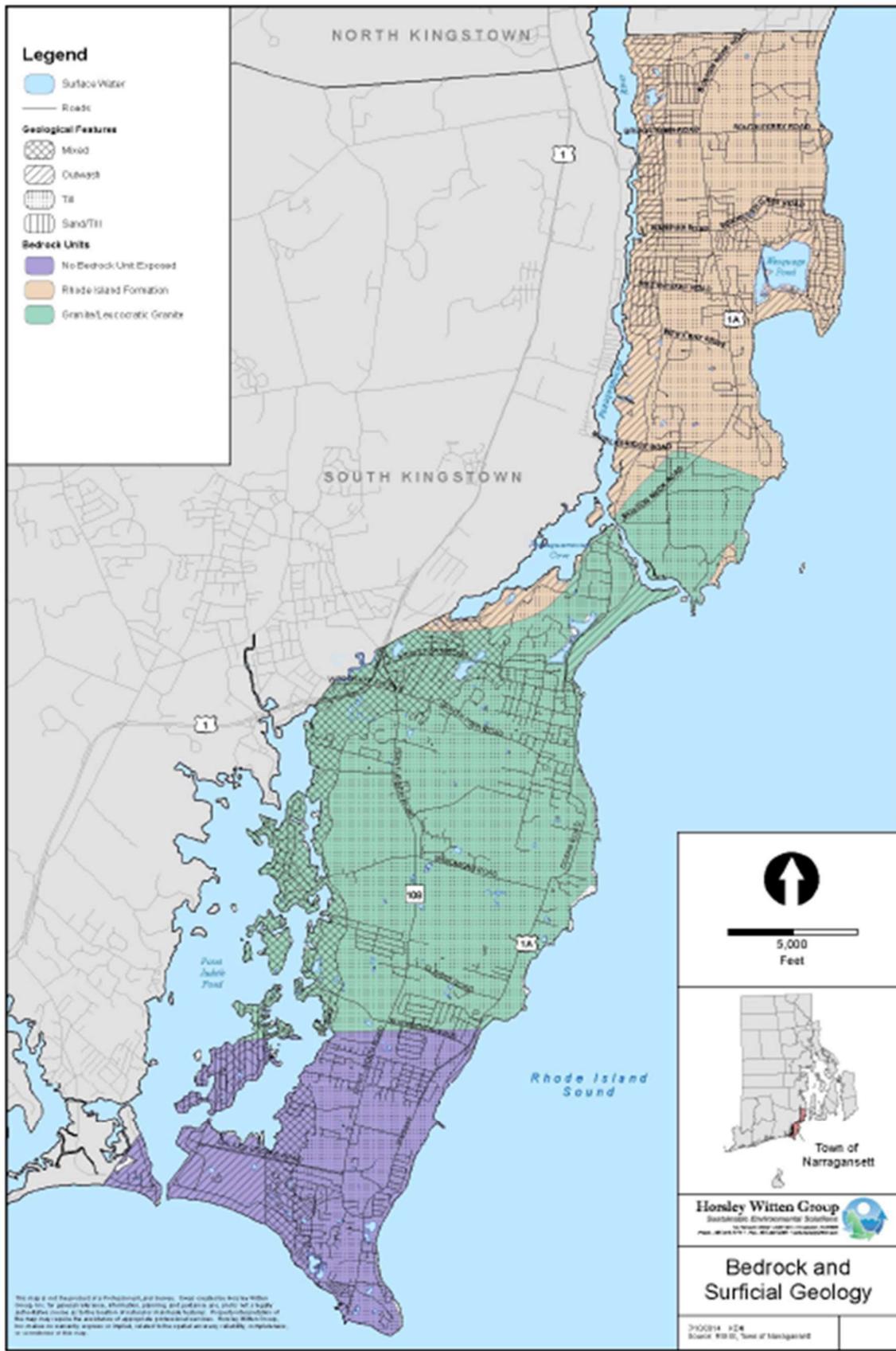
Benefit: Environmental protection of waterways

Appendix B

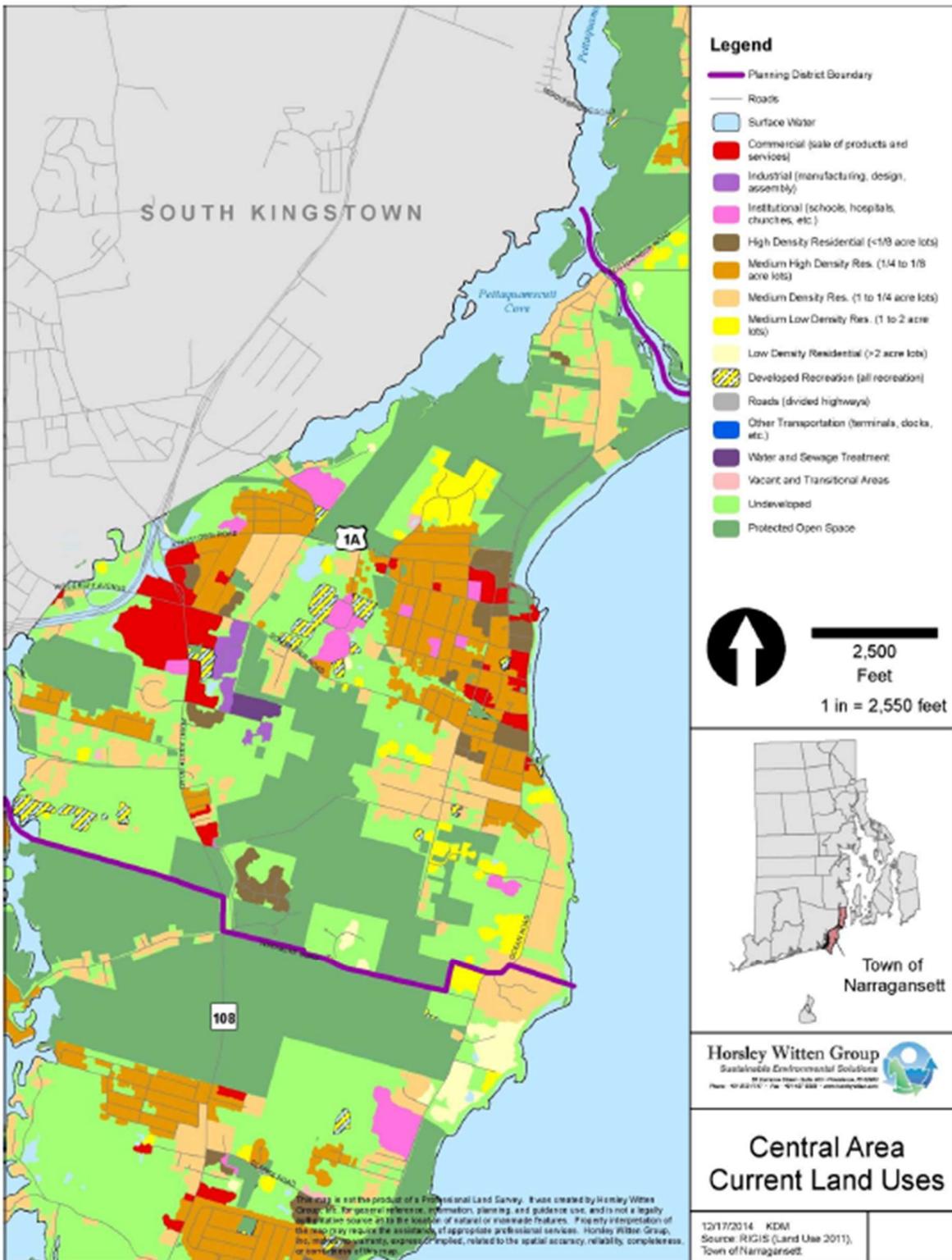
Narragansett Map Resource Packet* Used During Workshop

***Gathered from Narragansett's Comprehensive Plan Baseline and Roadmap Report (2017)**

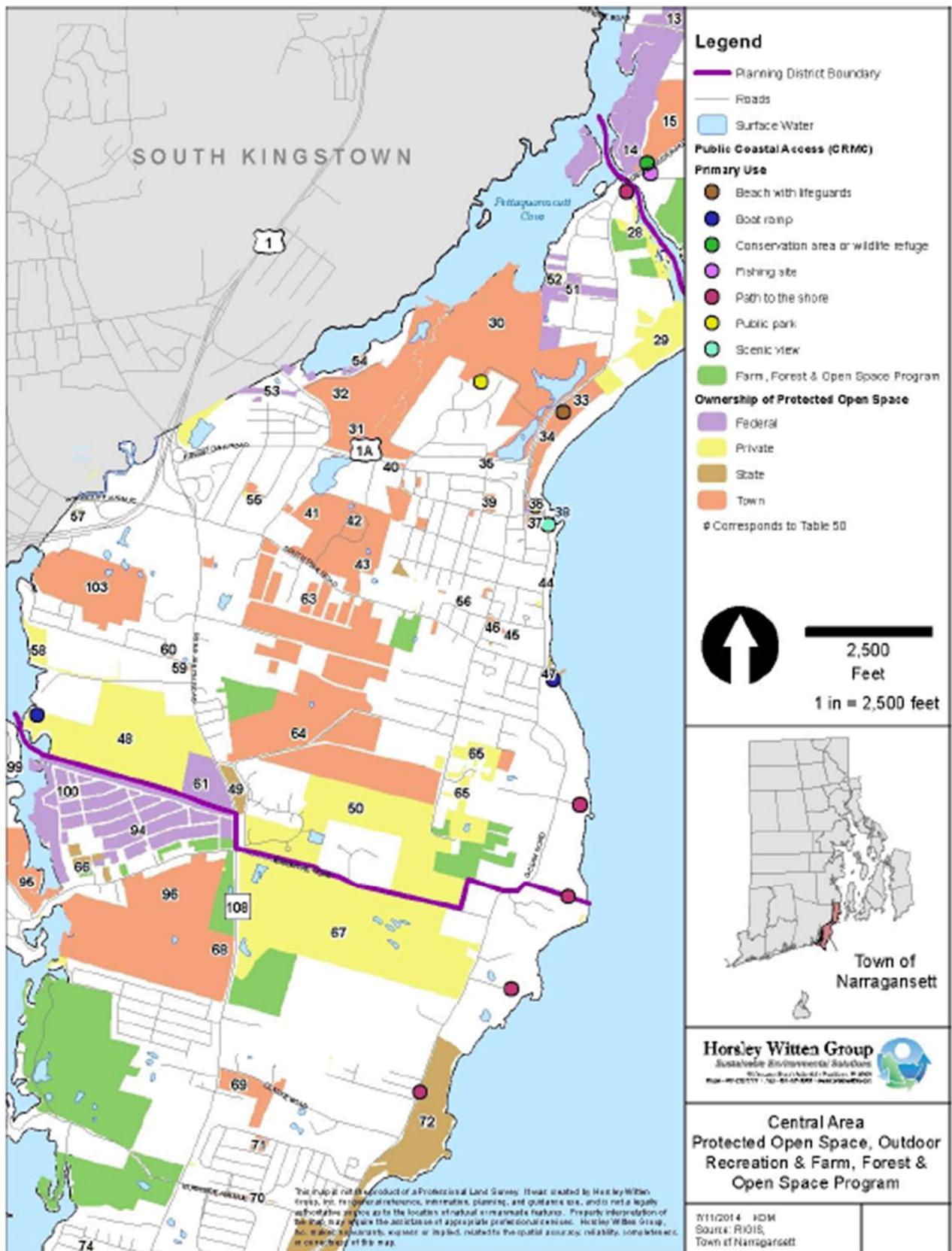




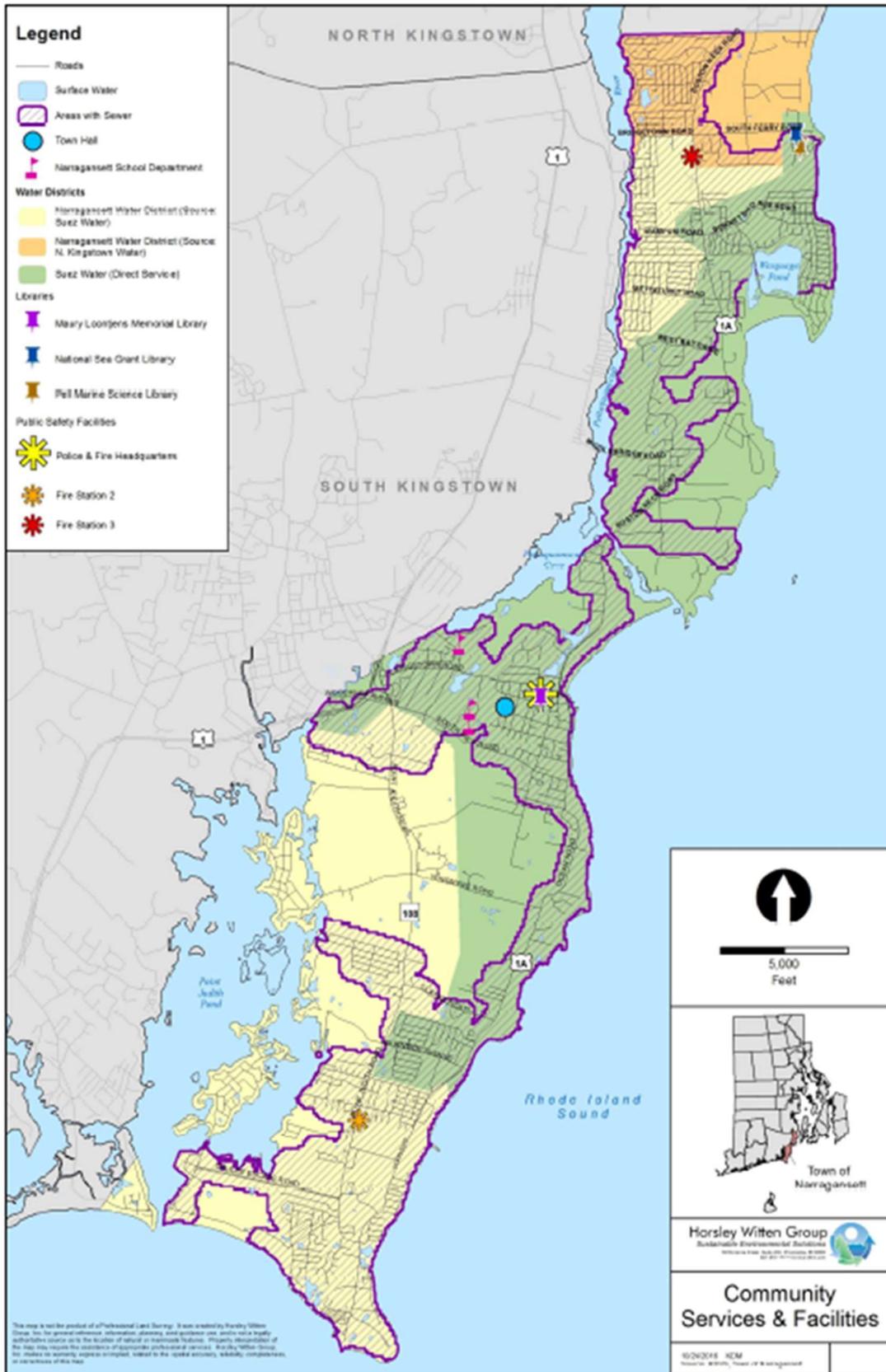
Map 12. Bedrock and Surficial Geology

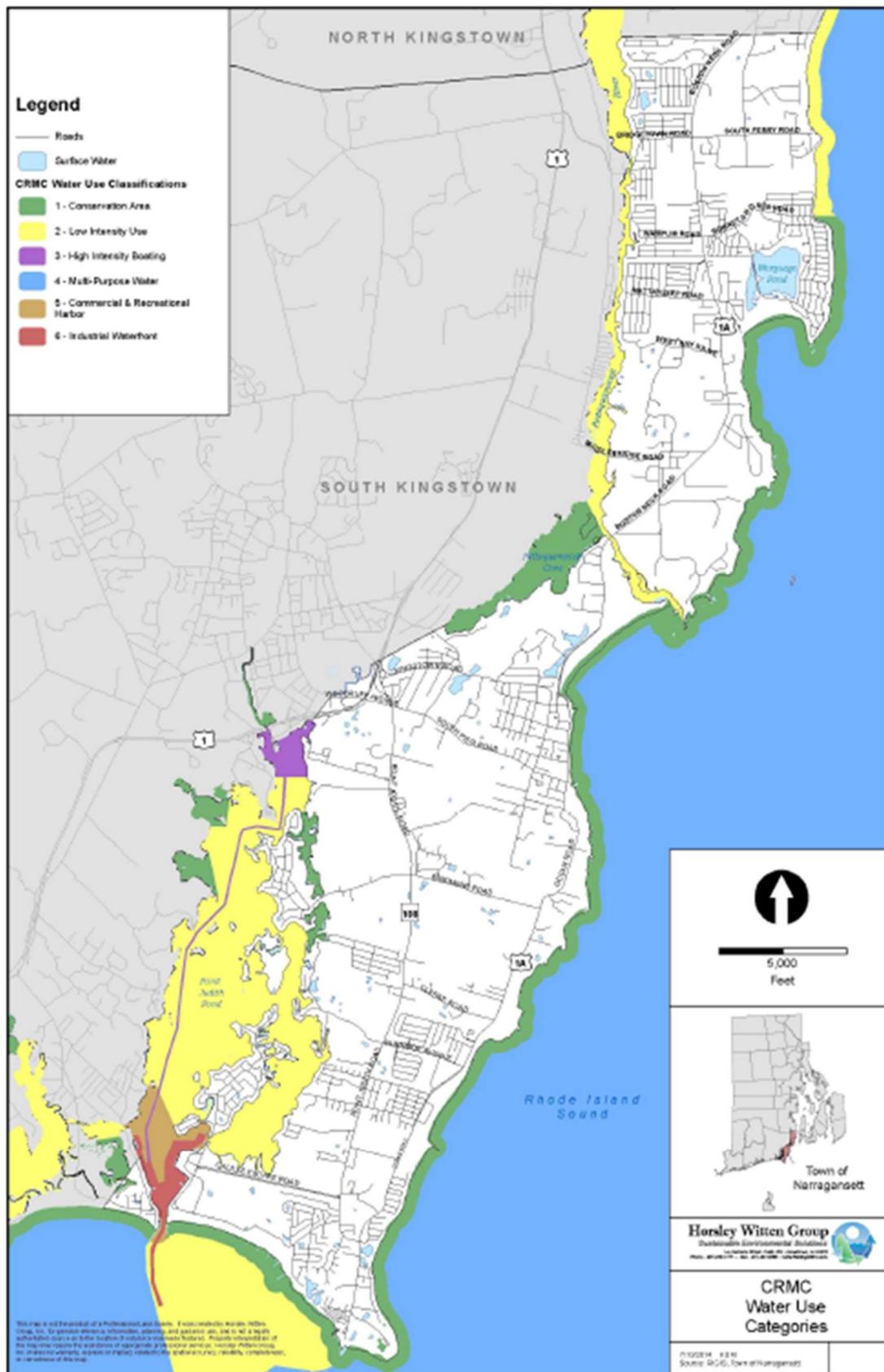


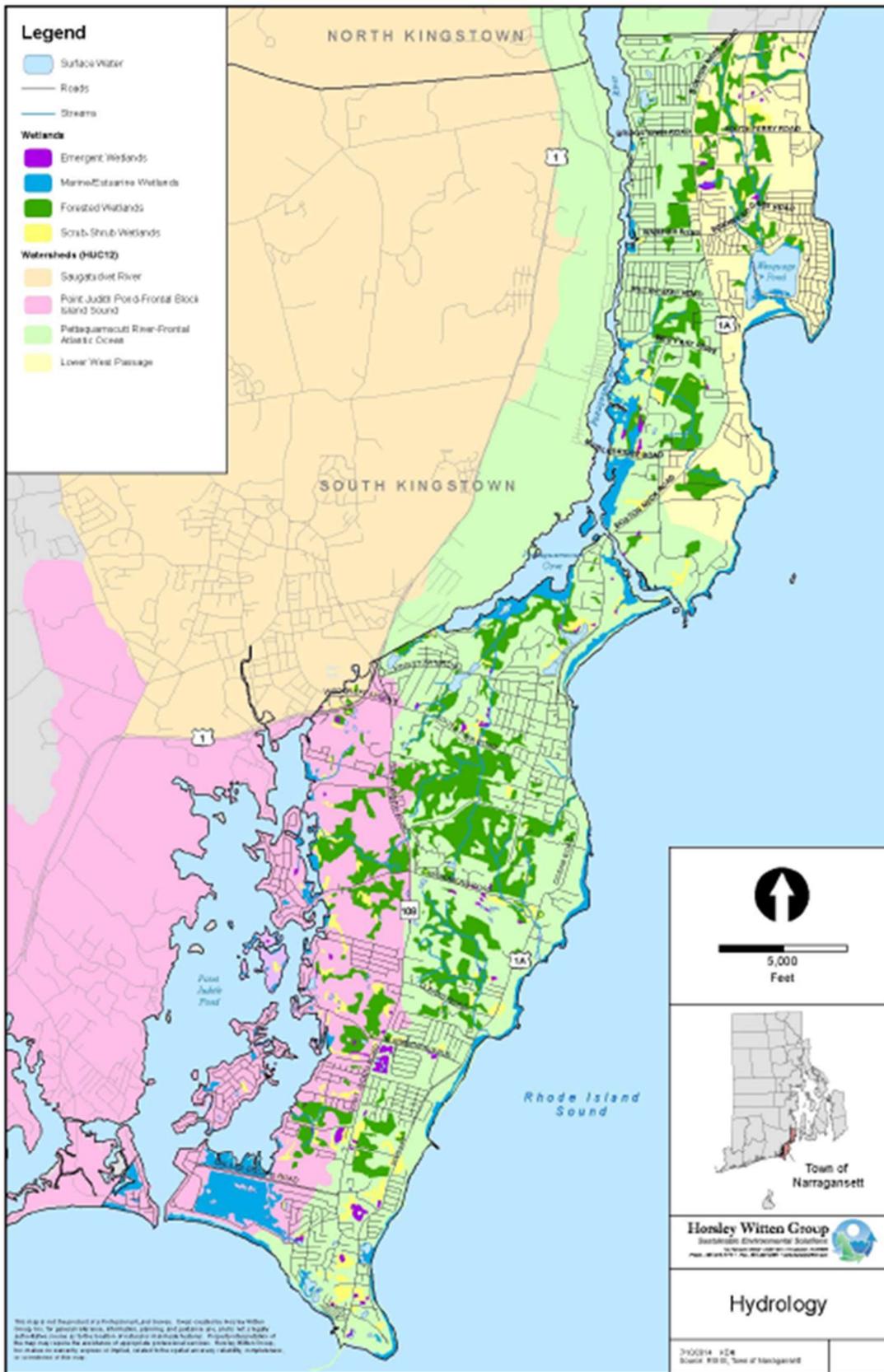
Map 4. Central Area Current Land Uses

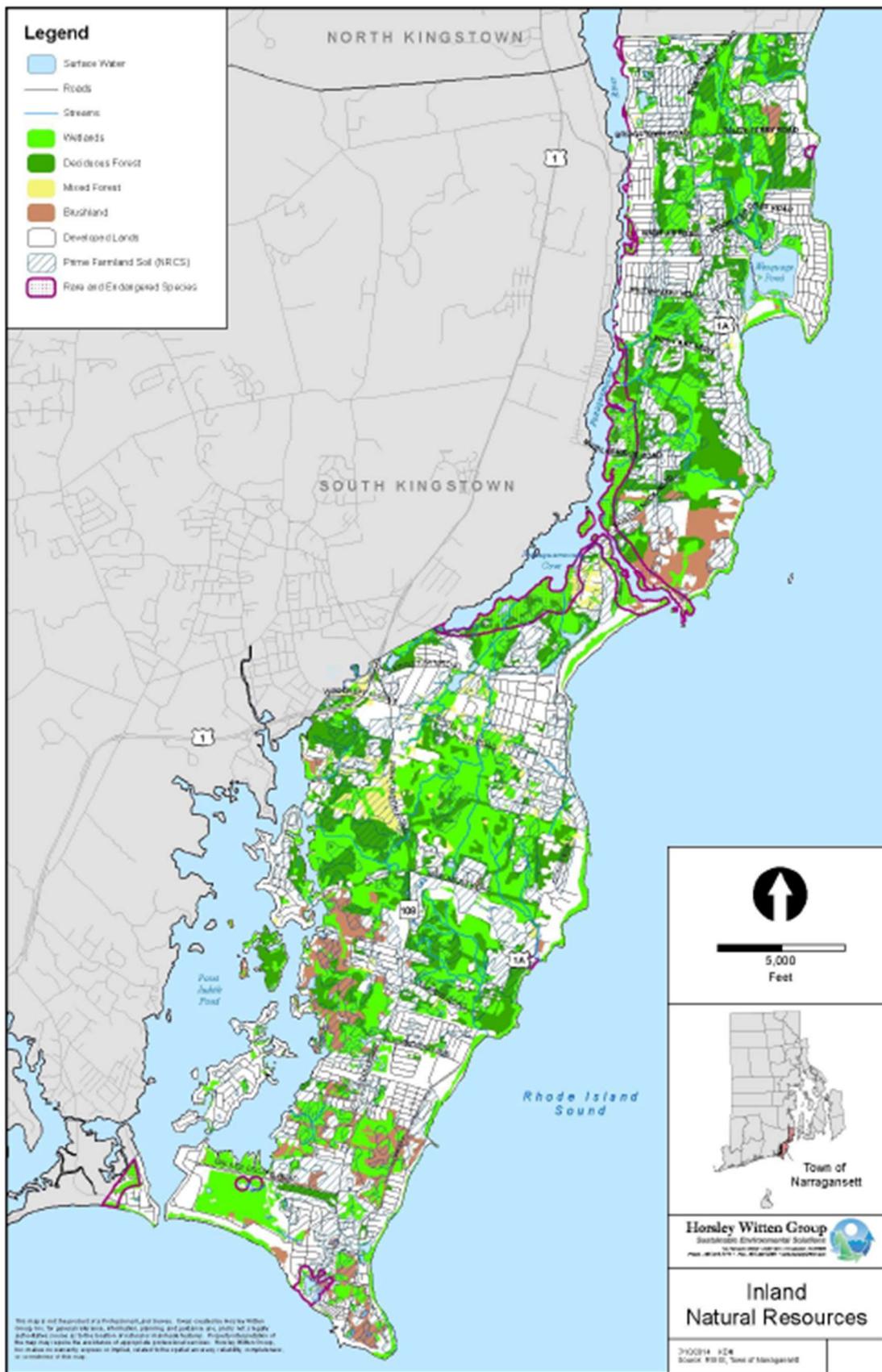


Map 19. Central Area Protected Open Space, Outdoor Recreation, and Farm, Forest & Open Space Program

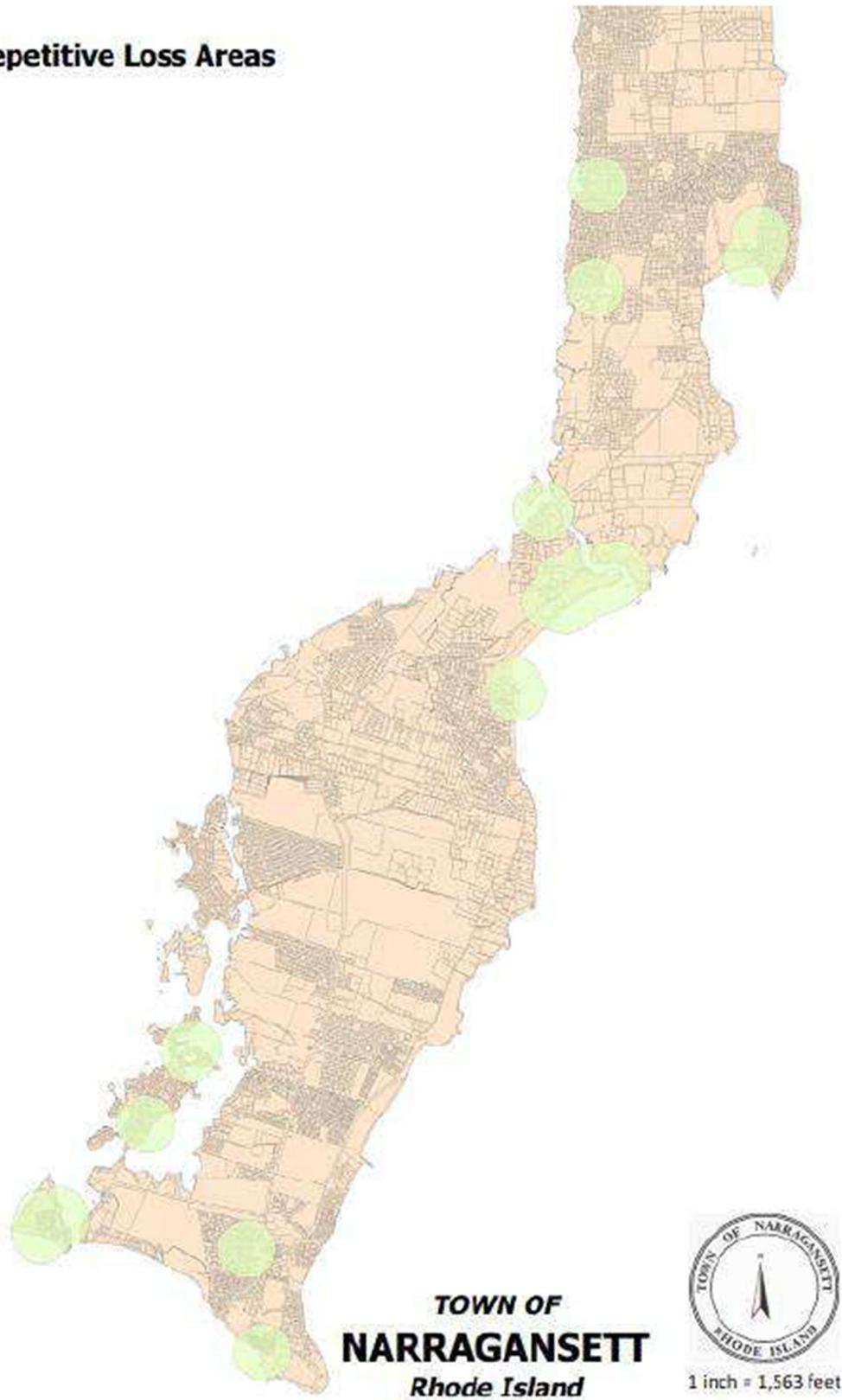


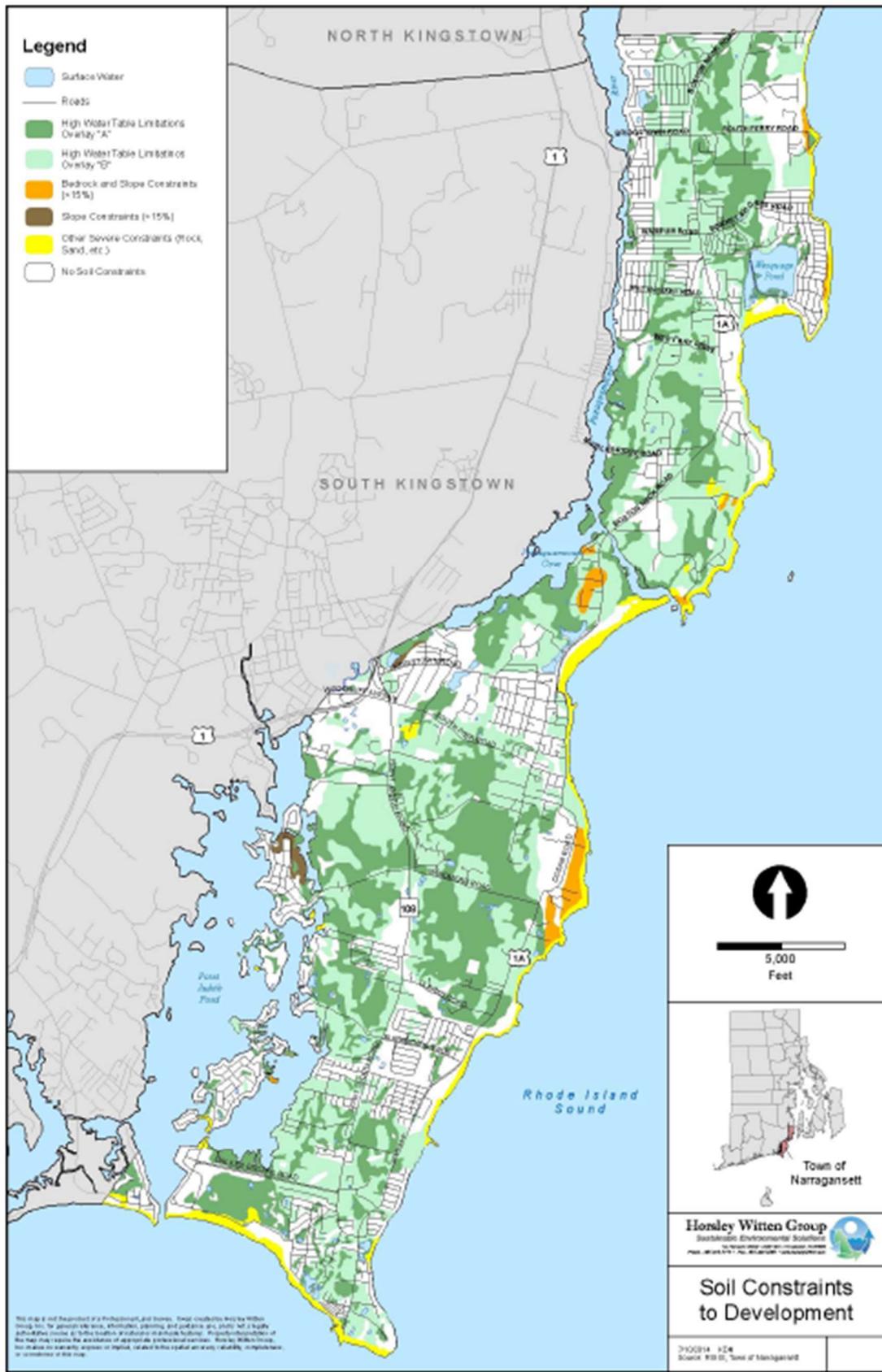






Repetitive Loss Areas

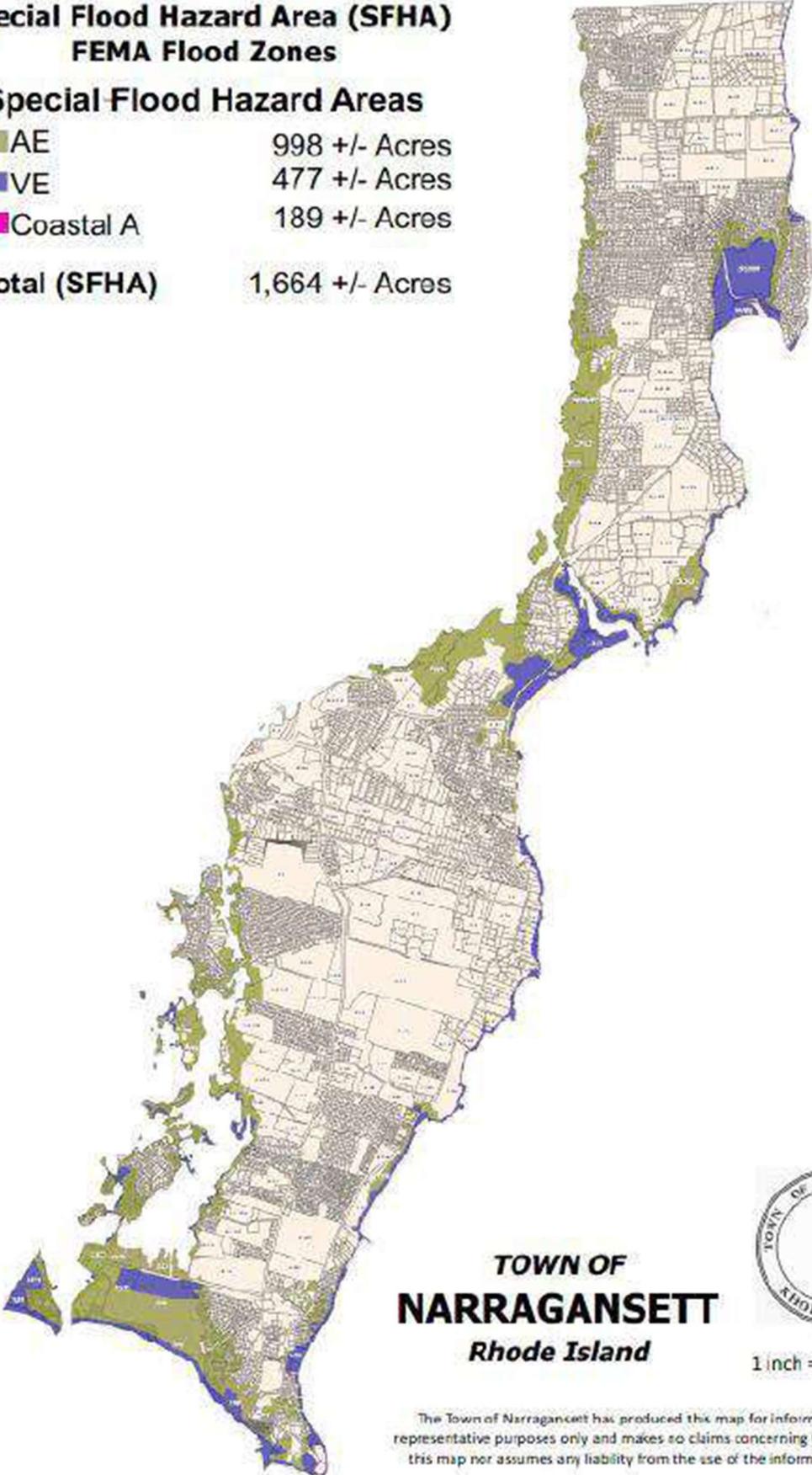


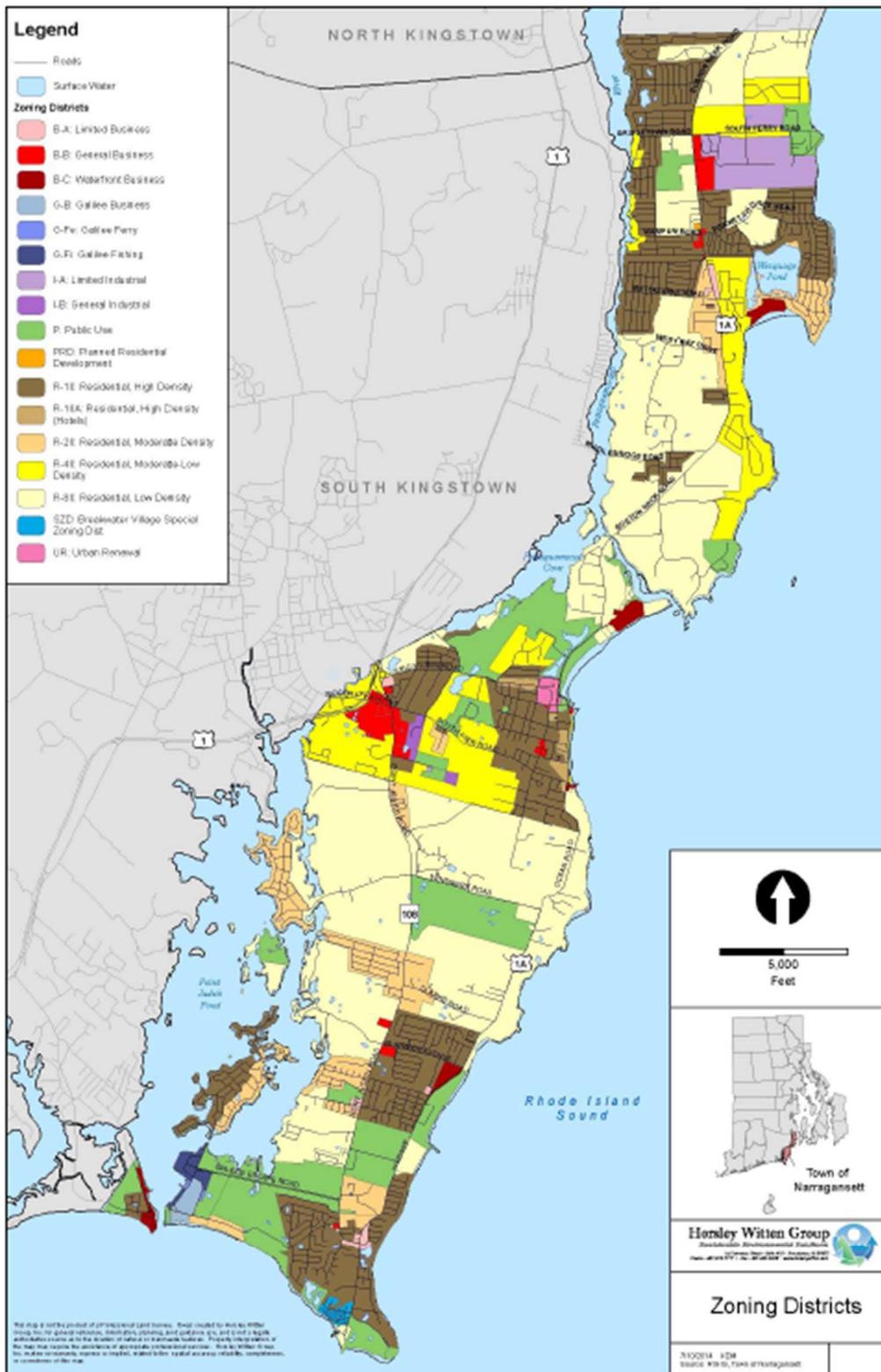


Map 13. Soil Constraints to Development

**Special Flood Hazard Area (SFHA)
FEMA Flood Zones**

| | |
|-----------------------------------|------------------------|
| Special Flood Hazard Areas | |
| ■ AE | 998 +/- Acres |
| ■ VE | 477 +/- Acres |
| ■ Coastal A | 189 +/- Acres |
| Total (SFHA) | 1,664 +/- Acres |





Map 6. Zoning Districts

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www.CommunityResilienceBuilding.org