Town of Newington, New Hampshire

Newington Master Plan

2020 -2030

May 2020

Description of the Newington Town Seal (cover page)

The flat barge-like vessel in the center of the Town Seal portrays the Piscataqua River Gundalow, a work horse of river transportation. It was of shallow draft with ample cargo space to carry bricks, wood for kilns, lumber, farm produce, and southern cotton from the port of Portsmouth to upriver mills.

The arrows in the stump commemorate early attacks by Native Americans. The flintlock musket, powder horn and plow, abandoned in the furrow, honor the embattled farmer ancestors and every generation since who have served in all the wars of the Colony and the Republic.

The spears of grass surrounding the emblem are the feed grass timothy, a species that was first discovered on the Newington shores of the Piscataqua.

Newington Planning Board

Russ Cook
Chris Cross
Denis Hebert, Chair
Ben Johnson
Erika Mantz, Vice Chair
Rick Sterns
James Weiner
Peter Welch
Ex Officio: Mike Marconi, Board of Selectmen

Certifications

The Newington Planning Board Master Plan 2020-2030 was prepared and adopted by the Newington Planning Board with the assistance of the Rockingham Planning Commission.

_____ _____

Denis Herbert, Chair, Newington Planning Board Date

Certified and filed by the Newington Town Clerk

_____ _____

Certification Date

Record of revisions to the Newington Master Plan 2020-2030

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APPENDICES:

John Frink Rowe (1909-1986), good citizen, Navy man, artist, author, staunch protector of the town he loved, and member of the Newington Planning Board from 1954 to 1986. Preparation of Newington's first master plan commenced in 1985 under the direction of Captain Rowe.

NMP 2020-2030: INTRODUCTION

THE CONCEPTS BELOW ARE FROM JOHN F. ROWE, PICTURED AT LEFT, AN EARLY PLANNING ADVOCATE AND CHAIR OF THE PLANNING BOARD. THEY ARE ADAPTED BY CURRENT PLANNING BOARD MEMBER COMMENTS WITH EACH NEW MASTER PLAN.

Community planning is a Newington tradition dating back to 1640 when local residents established the first town forest in America that set aside land from which timber, firewood, and grazing areas were kept for the common good. Faced with massive federal & state takings of Newington land in the 1950's, the town became one of the first in New Hampshire to adopt a zoning ordinance to divide Newington into distinct land use districts. This early adventure in master planning allowed Newington to retain the historic character of its residential district, on lands originally owned by Newington families for over a century in some cases and passed from one generation to another, a legacy which has gone by the board in many southern NH towns. For over 50 years, Newington has been consistent that developments in the residential district must be compatible and benefit the quality of life of our residents. Districting has also enabled Newington to create separate attractive districts for business growth that restricted such developments to the waterfront and turnpike area and by doing so has boosted local finances and is primarily responsible for the lowest property tax rate in New Hampshire.

A basic tenet of early planning has been the proposition that, although situated in an area of rapid growth, the Town of Newington was interested in maintaining as much as possible its quiet, rural atmosphere, and in preserving its historic resources. This condition has now slowly undergone new challenge with the passing of the larger landowners, breaking up estates to meet the demand of heirs, many of whom reside in other areas and may have little sentimental attachment to the town when weighed against financial gain. Moreover, once the profit appetite is wetted with the initial fringe development along existing roads, demand will build for construction of parallel and interior roads to gain access to the back lots, with the possible end result that the town could become a fully developed suburban community.

There are some factors, however, that may serve to retard unbridled growth. Of great importance is the steadfast adherence to land use regulations by future Boards. Planner should face the fact that the town of the future will have little semblance to the present, and that the expenses associated with change should be borne by those who stand to gain from development. Controlled growth is wisely provided for in current master plan and town ordinances. All townspeople should be aware of these provisions and should make their wishes known to land use Boards if the turn of events is contrary to their best interest.

Our Master Plan sets forth policy for growth, identifies the capacity to do so, and guides all town officials and the courts as to how Newington residents desire to temper such growth. It is their right to do so when it is passed on a sound statistical, scientific, and commonly supported Master Plan. In a period in which legal challenges to town land use controls have become common place, any town operating in the absence of, or in contradiction to, an adopted Master Plan, does so at considerable legal risk.

Aerial Photo Map

Newington, NH

Date: 2018

2015 1' Aerial Photo

Pease Development Authority Boundary

RPC Standard Legend

- RPC Towns 2013
- Water Feature
- Tidal Feature
- Shoreline; Stream
- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature
- State Road

2015 NHDOT / USGS 1' Aerial Photo

The New Hampshire Department of Transportation partnered with the US Geological Survey (USGS) and additional state and federal partners to acquire high resolution, leaf-off, color, aerial photography. This 1' (.35m) GSD multispectral digital orthoimagery was compiled to meet a 3.0 meter (9.84') horizontal accuracy at 95% confidence level based on NSSDA testing guidelines. These images were geometrically corrected to achieve a uniform scale. Each frame was adjusted for topographic relief, lens distortion and camera tilt.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the Study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-2012. The roads within the Rockingham Planning Region have been updated by NH Department of Transportation through local input by the RPC where available.

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NH GRANIT

New Hampshire DOT

Document Path: S:\d-std_gis\d-2018\d-map\Map 1L - Aerial Photo.mxd

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Insert 2015 Aerial photo

NMP 2020-2030: VISION

NEWINGTON'S VISION

A vision articulates the desires of citizens affected by the Master Plan (MP[1]). Newington citizens have consistently focused on preserving a community identity that retains a rural character. Newington is a prosperous, safe, well-planned community with thriving commercial and industrial districts, all while retaining rural neighborhoods in the residential district. The town balances our rural residential character while continuing to promote:

- Waterfront industry and a deep-water working port
- High value commercial and industrial uses in their districts
- Preservation of our historical and environmental resources

Newington intends to remain a progressive NH community focusing on a quality of life for our residents. Newington will continue to collaborate well with our neighbors on regional opportunities to solve regional problems, but also to eliminate further loss of land and control for Federal, State, and utility uses.

COMMUNITY OUTREACH RECONFIRMING NEWINGTON'S VISION

Newington partnered with the Rockingham Planning Commission (RPC) to gather information from residents about Newington's future. Residents provided input via a paper or on-line survey in September 2017. Seventy-five surveys were received with half of the respondents indicating they had been residents for 10 years or less. The RPC held three visioning sessions in November 2017, with 15-20 residents at each of the three sessions. The information collected from the surveys, listening sessions, and land use boards agree with the qualities, attributes, and priorities in the planning board's Master Plan for implementing Newington's vision. A summary and direct inputs received from respondents to both the survey and visioning sessions are found in Appendix IX - A and IX-B respectively.

The "word cloud", above, illustrates characteristics of Newington valued by residents as indicated in the community survey. The prominence of the word reflects the frequency and the number of times a word appeared in resident responses.

[1] RSA 675:2(a) The master plan shall include a vision section that serves to direct other sections of the plan. This section shall contain a set of statements which articulate the desires of the citizens affected by the master plan, not only for their locality but for the region and the whole state. It shall contain a set of guiding principles and priorities to implement that vision.

NMP 2020-2030: DEVELOPMENT POLICIES

NEWINGTON DEVELOPMENT POLICIES

A town's Master Plan is primarily a policy document containing a set of guiding principles to implement its vision. From the initial master plan in 1965, the town has consistently endorsed these development policies and they remain **Newington's official position** for evaluating future land uses:

Policy 1: Preserve Newington's rural residential character with ample open access. Protection of Newington's residential areas is central to the Master Plan to include conservation of accessible wetlands, forests, agriculture land and open space for recreation. *The purpose is to ensure the quality of life in Newington's residential areas is protected from incompatible uses*[1].

Policy 2: Promote industrial development, providing that conflicts between incompatible land uses are minimized, the environment is not adversely affected, and public safety is ensured. *Newington takes a relatively positive attitude towards commercial and industrial growth as providing strong tax revenues and diversity for the town.* Conflicting, less desirable land uses will be limited to avoid a scarcity of industrial land. Negative impacts of materials and processes hazardous to the environment and nearby residents warrant appropriate mitigation.

Policy 3: Encourage attractive and efficient commercial and office development. Such development does not generate large traffic volume, nor create municipal burdens to the taxpayers, resulting from inefficient service-demanding uses.

Policy 4: Reserve Piscataqua shorefront for seaport-based industry. New Hampshire's limited deep-water frontage is a prime resource that shall be reserved for optimum sea-based use so that the economic benefits can be realized to the fullest extent.

Policy 5: Seek a range of housing appropriate for a high land value area, recognizing constraints such as federal and state agencies precluding residential housing in over 55% of land in town. Balancing the need for a variety of housing types with a limited amount of developable land and lack of infrastructure is a complex problem that requires the consideration of innovative housing techniques, such as accessory dwelling units

Policy 6: Maintain and develop community services and facilities in a manner consistent with orderly growth and Newington's rural character, while not placing a financial burden on the community. Town services will need periodic updates, but must retain the fiscal discipline to avoid wasteful, premature expansion that exceeds matching the broad needs of a small, slow-growing population.

[1] Incompatible uses are those that do not contribute directly to the betterment of the residential district; examples include but are not limited: utility transmission lines, Federal/State transportation activity raising residential safety issues.

Policy 7: **Protect the shorelines and tributaries of Great Bay, Little Bay, and Piscataqua River while improving access for all.** *The purpose is to promote uses that recognize the area's designation as a National Estuarine Research Reserve by enriching estuarian life, improving bay water quality, and protecting diverse wildlife habitats in and along the waterways.* Encourage low-impact public access to the bay and make improvements that adapt the shoreline to endure climate change.

Policy 8: Protect Newington's historic architecture, scenic fields & forests, and cultural heritage. Such historic features and viewscapes stir a rich sense of heritage for Newington residents. They warrant extra dedication to preserve these sites or to incorporate them into future developments for cost effective preservation.

NMP 2020-2030 – Strategies for Implementing Policies

STRATEGIES AND ACTIONS FOR IMPLEMENTING OUR VISION

Policy 1: Preserve Newington's rural residential character with ample open access

- Strategy 1: Highly scrutinize development that have excess levels of conflict with residential life

  Action: Restrict development in the residential district that does not provide a direct benefit to the quality of life for those residing in the district and takes away from the residential use of the property, such as new utility easements and infrastructure, flight paths, and transportation corridors.

- Strategy 2: Protection of agricultural lands and agricultural activities.

  Action: Work with the landowners and regional land conservation organizations to prioritize agricultural lands for protection through conservation easements, land purchase, and current use.

- Strategy 3: Protection of shorelands, wetlands, streams, and ponds.
  Action: Review stormwater management, buffer, and setback regulations to identify opportunities to strengthen protection of surface water resources.

- Strategy 4: Identification and protection of wildlife corridors and recreational travel routes for people.

  Action: Review the NH Wildlife Action Plan maps for Newington to identify wildlife habitat types and opportunities to protect wildlife corridors. Add safe bike lanes, and areas for off-road walking trails.

- Strategy 5: Preservation of woodlands and other open spaces through the use of land purchase, conservation easements, and current use in the residential areas.

  Action: Work with landowners and regional land conservation organizations to prioritize woodland and other undeveloped land in the residential district for protection through fee simple purchase of land and conservation easements. Support regional strategies for land conservation, such as the NH Fish and Game Wildlife Action Plan, and The Land Conservation Plan for New Hampshire's Coastal Watersheds.

Policy 2: Promote industrial development, providing that conflicts between incompatible land uses are minimized, the environment is not adversely affected, and public safety is ensured.

- Strategy 1: Encourage responsible industrial development to broaden the tax base and provide quality jobs.

  Action: Support the Economic Development Committee's efforts to market Newington's industrial zones to industries that create skilled jobs and lay groundwork for new industries with future high demand. Scrutinize sites for excessive noise, light, odors, fumes, dust, and vibration.

- Strategy 2: Improve the safety of the transportation network in the industrial district by improving major highway access, preserving Shattuck Way for industrial uses, and proposing new cross-lot access to waterfront and industry facilities.

  Action: Require applicants to identify routes for vehicles waterfront and commercial zones.

  Action: Encourage industrial development that can use existing rail service.

- Strategy 3: Town of Newington continues to mandate land use along the Piscataqua River be dependent upon ocean-going transport to ensure continued delivery of materials essential to the state.

  Action: Market Newington's shorefront industrial zone to industries requiring ocean-going transport and prevent uses that conflict with heavy, ocean-based industry.

  Action: Coordinate with NH Port Authority on marine issues.

Policy 3: Encourage attractive and efficient commercial and office development.

- Strategy 1: Encourage responsible commercial development prioritizing attractive site design.

  Action: Update site plan development regulations to foster attractive site design, mitigating offsite environmental conflicts.

- Strategy 2: Plan for the possible decline of brick and mortar retail facilities and for technology and environment shifts that undermine or replace the current commercial and industry base.

  Action: Review Town land use regulations to identify ways to encourage development in areas of underutilized existing commercial and retail development, including allowing offices, hotels, hospital and medical services, and similar businesses in commercial zones.

  Action: Allow for development of the perimeter of the of parking area in the mall to expand opportunities for commercial and office development.

- Strategy 3: Improve the transportation network in the Woodbury Avenue commercial and office district.

Action: Allow interconnections in commercial redevelopment areas, control access to Woodbury Avenue, improve aesthetics, and plan for bicycle and pedestrian movement.

Policy 4: Reserve Piscataqua shorefront for seaport-based industry growth.

- Strategy 1: Ensure land use along the Piscataqua River that is dependent upon ocean-going transport.

  Action: Market Newington's shorefront industrial zone to industries requiring ocean-going transport; vigorously deter uses in conflict with or that restrict heavy, ocean-based industry; seek to expand rail and bus transportation; upgrade utilities and resource sea-supported industry.

  Action: Coordinate with NH Port Authority on marine issues.

- Strategy 2: Ensure development in industrial district allows full expansion of waterfront industry and that conflicting uses in industrial zone are removed so that full use of waterfront is ensured.

  Action: Review zoning uses for full compatibility for expanding waterfront into industry/office zones.

Policy 5: Seek a range of housing appropriate for a high land value area, recognizing issues highlighted in the box, below.

- Strategy 1: Encourage flexible design and siting in the development of new housing.

  Action: Review land use regulations to identify opportunities for zoning to regulate the design and location of a use based on site characteristics.

- Strategy 2: Support housing options, such as accessory dwelling units, duplex structures, and age-restricted housing developments to provide housing opportunities to a wide spectrum of residents.

  Action: Review land use regulations to enable different types of housing in Newington consistent with the town's rural character.

  Action: Maintain a low tax rate to help residents offset the region's high home assessments.

Policy 6: Maintain and develop community services and facilities in a manner consistent with orderly growth and Newington's rural character, while not placing a financial burden on the community.

- Strategy 1: Review findings from the Master Plan community survey and visioning sessions to identify priority programs and services as expressed by Newington residents.

  Action: Undertake community conversations to fully define financial impacts of services most desired by residents, including recreational programs as well as governmental services.

- Strategy 2: Assess the present status of all municipally-owned buildings and determine if they adequately provide services for residents.

Action: Develop an inventory of municipally owned-buildings and municipally-led programs to gain a better understanding of current resources, determine what resources are in demand, and what resources/programs are lacking.
Action: Update the Capital Improvements Plan (CIP).

Issues that diminish the available land and density choices for and supply of housing in the town of Newington:

Outside federal and state agencies have precluded residential housing in over 55% of Newington's land.
NH-PDA reclassified the town and Pease AFB designated 30-unit mobile home site as non-residential.
NH-DOT purchased drive-in theater lot town discussed for high density housing (16 acres w/sewer).
NH-Port Authority has taken over very large acreages for aviation runway and Spaulding Turnpike/Interstate highway.

Federal Dept of Interior, State Fish & Game, and Town of Newington have preserved forest, fields, prime wetlands with buffers, and open space for conservation and wildlife home habitat that precludes residential development.
Reflects the higher priority for conservation of estuarian reserve, wetlands, and wildlife habitats for these locations than the value to state/town for residential and affordable housing.

Safety considerations limit non-residential zones and immediate transition areas to no or low-density housing.
Industrial, waterfront areas have high level noise, hazardous materials, and dangerous traffic mix.
Pease Tradeport aviation has crash hazard that limits housing density for safety & noise.

Newington waste treatment plant designed for industrial waste with limited residential sewer mix.
Lacks land for expansion to add additional tanks and filtration for full town sewage treatment.
Distributed additional buildout land available make running long sewer lines cost prohibitive.
Much bay-level land in south Newington has poor draining soils not supporting septic systems.

Newington's low tax rate and elderly & low-income exemptions shield older, lower income residents from displacement widespread in other high-land value towns in southern New Hampshire

Newington allows most single-family home sites to add an accessory dwelling unit but requires 50% more land for new 2-unit dwellings.

Scarcity of land and short access to high paying job locations make residential land values very high ($200K+)
High costs and low-density restrictions result in affordable housing development as not cost effective
Town too small (and lacks interest in operating/subsidizing a town housing authority.

Policy 7: Protect the shorelines and tributaries of Great Bay, Little Bay, and Piscataqua River while improving access for all.

- Strategy 1: Plan carefully with regards to development along the estuary to minimize the risk of shoreline erosion.

  Action: Consult the Town's Climate Change Vulnerability Assessment produced by the Rockingham Planning Commission to identify shoreline areas and infrastructure at risk of coastal flooding, storm surge, and erosion, and identify inland migration routes for shoreline habitats to adapt as water levels rise.

- Strategy 2: Enhance access to the waterfront, especially pedestrian and bicycle access, and take steps to increase the number of public access points.

  Action: Develop a management plan for Fox Point and other shorefront recreation areas managed by the Town to enable greater resident access and manage use to prevent erosion and habitat degradation.

- Strategy 3: Support and defend Great Bay as a National Estuarine Reserve, a national network of protected areas that promote long-term research, education and stewardship.

  Action: Enforce local land use regulations to ensure land use development does not negatively impact the natural and cultural resources of Great Bay.

Policy 8: Protect Newington's historic architecture, scenic fields & forests, and cultural heritage.

- Strategy 1: Boost awareness of the historic character and ambience of Newington's Old Town Center.

  Action: Leverage limited municipal funding for preservation by seeking historic and cultural preservation grant funds from the Land and Community Heritage Investment Program.

- Strategy 2: Preserve farmlands, forests, and open space associated with the Town Forest at Town Center and the Knights Brook corridor to the northwest.

  Action: Work with landowners and regional land conservation organizations to preserve these prioritized parcels through conservation easement and land purchase.

NMP 2020-2030: EXISTING LAND USE

INTRODUCTION

In the most northeast section of Rockingham County in southeast New Hampshire lies the small town of Newington. This New England town occupies a peninsula surrounded on three sides by inland salt water bays and rivers and on the south shares a land boundary with the Town of Greenland and City of Portsmouth. The town encompasses 12.5 square miles, of which 8.2 square miles is land and 4.2 square miles is water. Newington is relatively flat rising from sea level to an elevation of only 130 feet near Newington Village center. The town's population has yet to exceed 1,000 inhabitants but is growing slowly as many residential homes replace the large farmsteads lost to agricultural decline.

HISTORICAL LAND USE

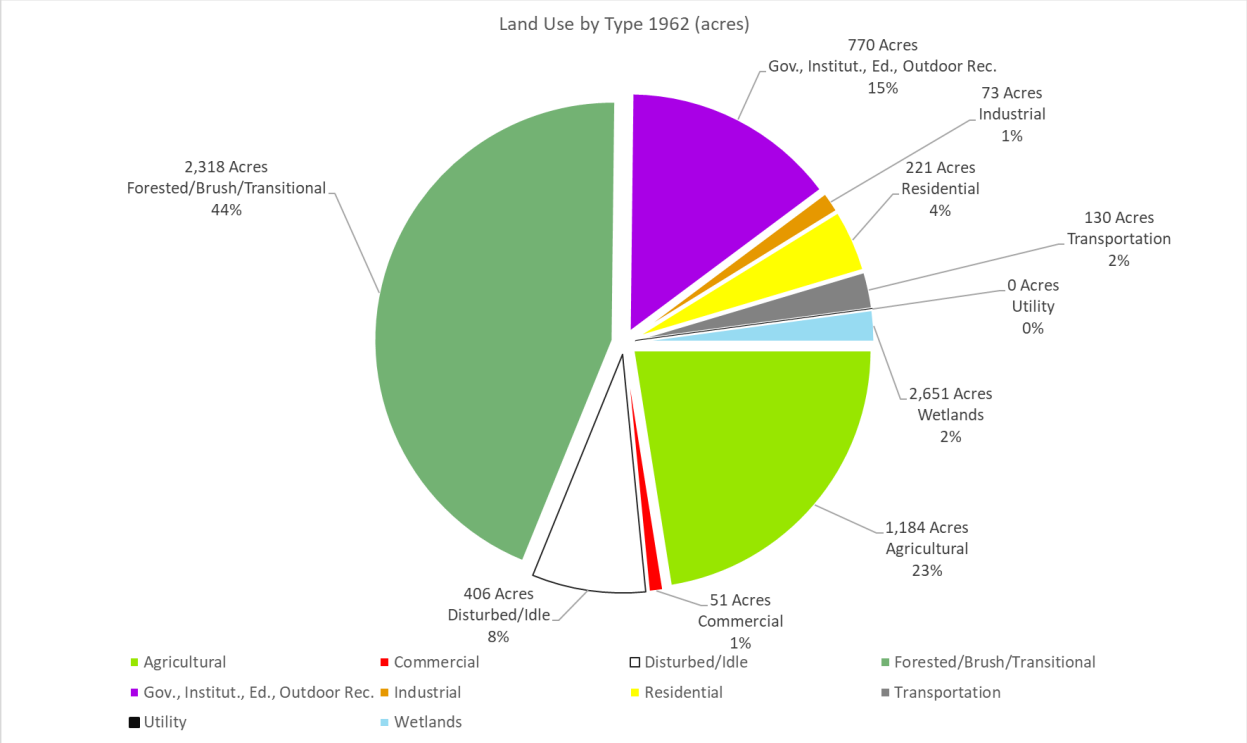
For most of its history, Newington was a town comprised of rural farmsteads and forestland alongside tidal waters. During the 1700s and 1800s, the land use transitioned from forests to farms, some shorefront industry, and a transportation route from coastal to inland New Hampshire. Some parts have seen little change -- even today our residential area retains a traditional New England landscape. Other parts have been divided into land use zones that have enabled distinct commercial, office, and industrial areas. The early 1900s saw the rise then rapid fall of wooden shipbuilding along the Piscataqua River. In the mid-1900s the center core of Newington was carved into a military airport occupying 4.2 square miles, over 50% of the land area. Pease Air Force Base opened in 1956 during the East-West Cold War but lasted less than 40 years. The impact to private ownership was permanent, however, as the majority of the base has been retained under State and Federal land use control. The NH Air National Guard occupies some airport area to support military operations, however the majority of land east of the runway has been redeveloped as the Pease International Tradeport. The land to the west has been conserved from development to establish the 1000+ acre Great Bay National Wildlife Refuge. Only 69 acres of the land taken have been returned to Newington, the original Town Forest.

LAND USE MAPS – PAST 50 YEARS TO PRESENT

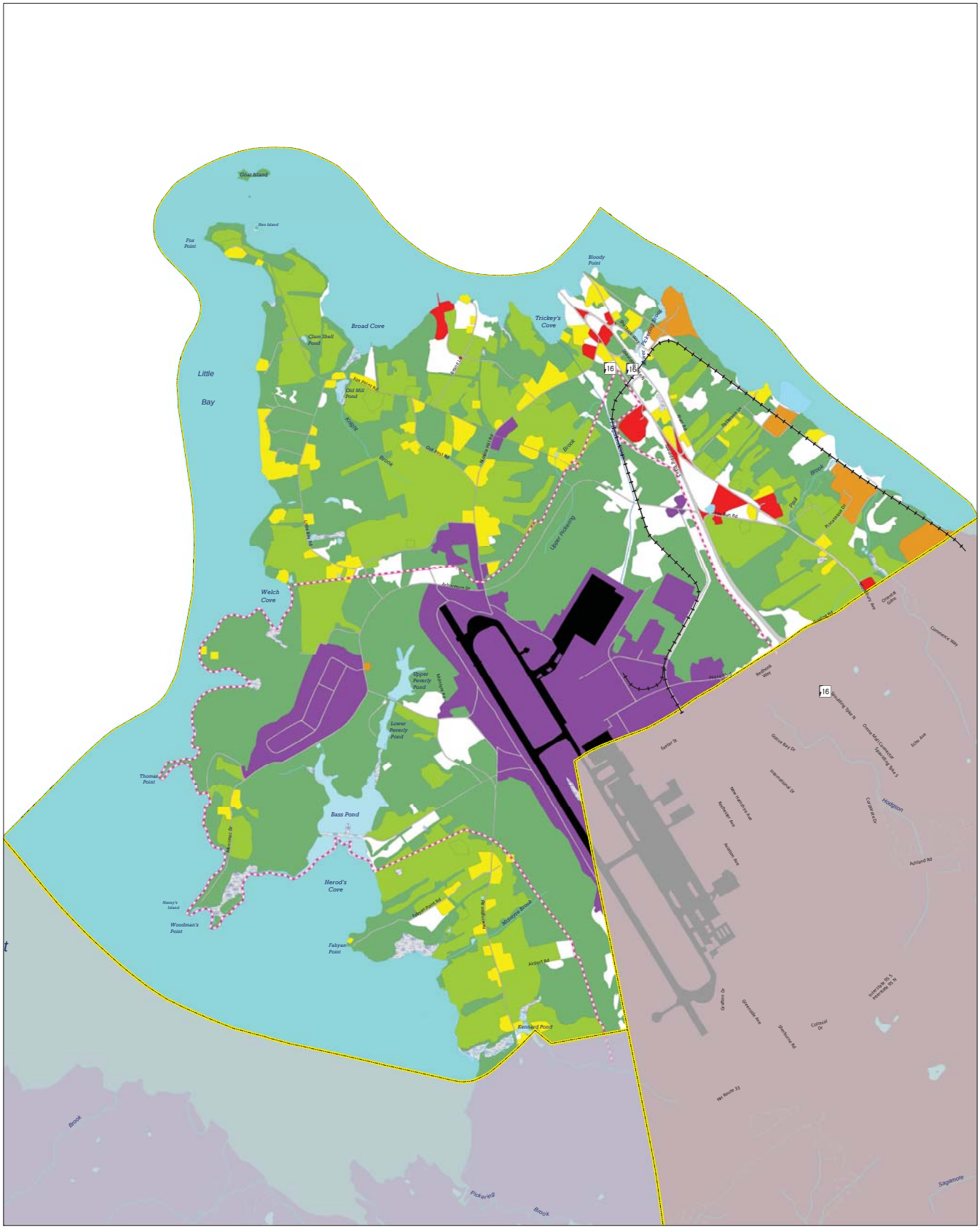
This Existing Land Use chapter[1] uses maps to highlight the recent progression of land use in Newington and describes generalized land use characteristics that will help guide the development of recommendations in the Future Land Use chapter. It contains existing land use information, derived from geographic information system (GIS) data, town records, and local knowledge. The maps and pie charts were adjusted to use the same major land use categories over the last 50 years.

[1] NH RSA 674:2, II. (b) states a Master Plan shall include a "land use section upon which all the following sections shall be based. This section shall translate the vision statements into physical terms. Based on a study of population, economic activity, and natural, historic, and cultural resources, it shall show existing conditions and the proposed location, extent, and intensity of future land use."

1962 Existing Land Use



By 1962, the loss of half (2,600+ acres) of Newington's land area to Pease Air Force Base had converted 650+ acres into a military runway, taxi ramps, weapons storage, and airbase support structures while disturbing or idling an additional 400+ acres still in transition. The Air Force retained the remaining Newington land as forest and brush fields, but it no longer would provide livelihood for the town's longtime residents. As a result, the once primary land use of agricultural had a rapid drop below 1200 acres; this decline would continue.



1962 Land Use Map* Newington

Date: Fall 2018

Railroad

Pease Air Force Base Boundary (1962, 1974)

1962 Landuse

Land Use Type

- Residential
- Commercial
- Gov't/Institut./Ed./ Outdoor Rec
- Industrial
- Transportation
- Utilities
- Disturbed/Idle
- Agricultural
- Forested/ Brush
- Water
- Wetlands

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NH GRANIT

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

***Land Use ***

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RPC extends every effort to ensure map data is current and complete, however, errors do happen. Please let us know if you spot errors or omissions.

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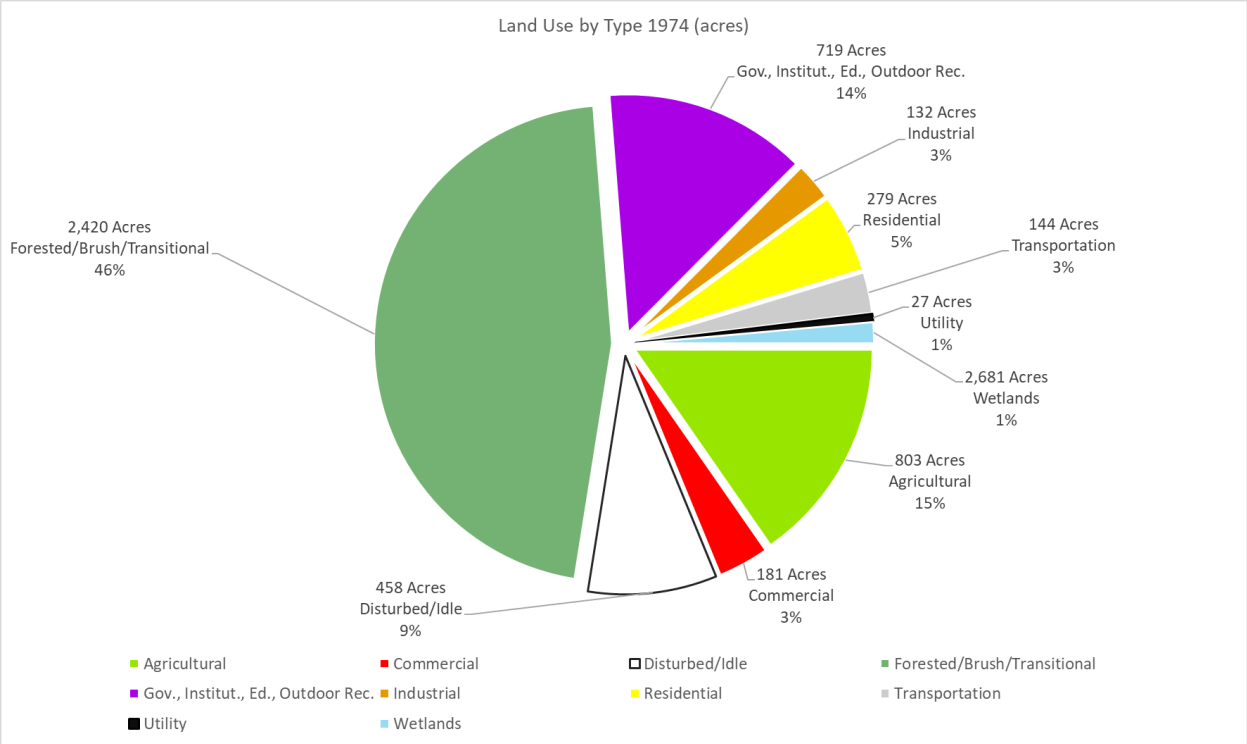
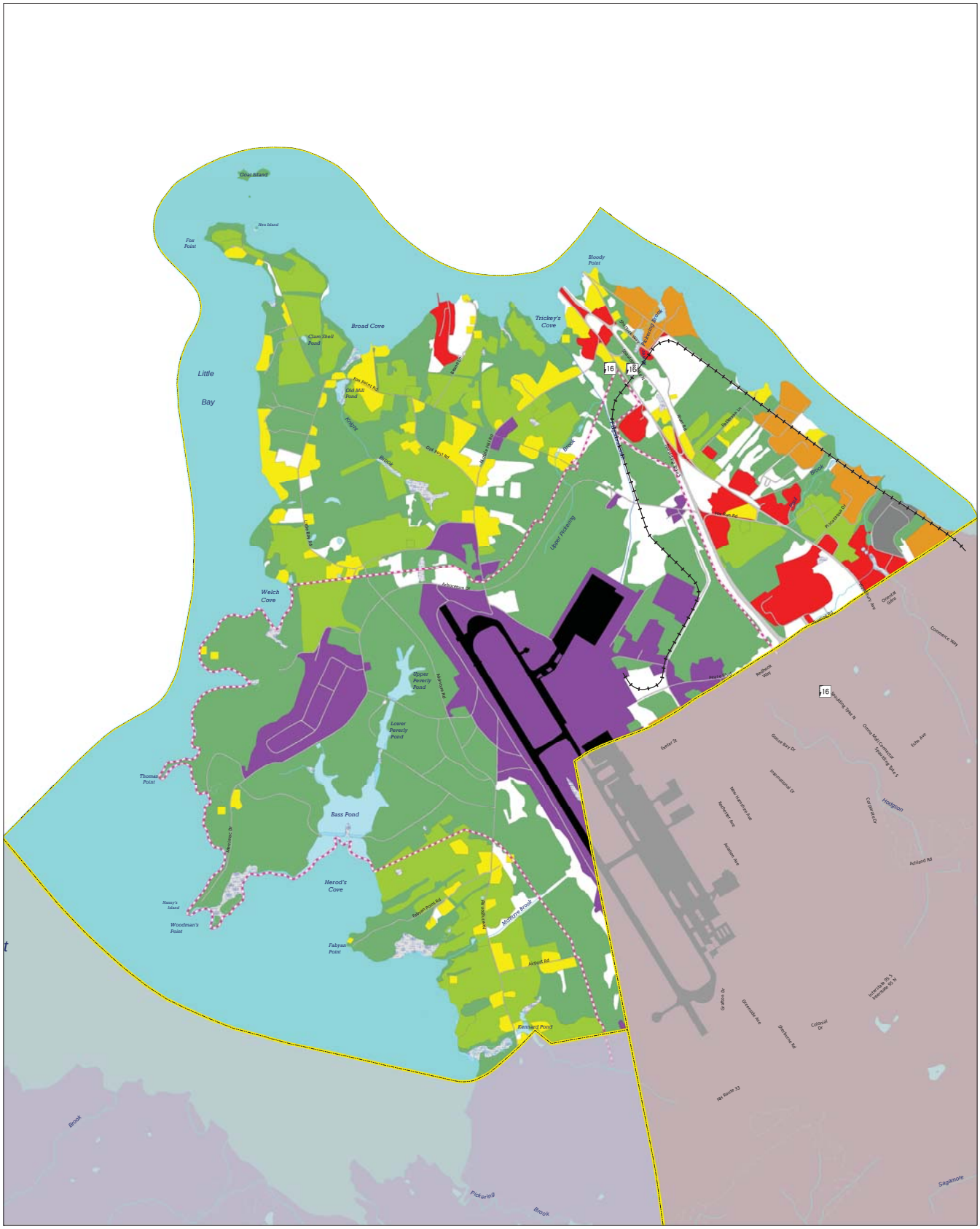


By 1970's, regional growth of the seacoast was channeled by Newington's early zoning east of the Spaulding Turnpike into commercial and industrial development. The town secured its first shopping mall, its first energy plant, and many sea-supported industries gaining a strong tax base. Agricultural use further declined by another one third and would continue to do so.



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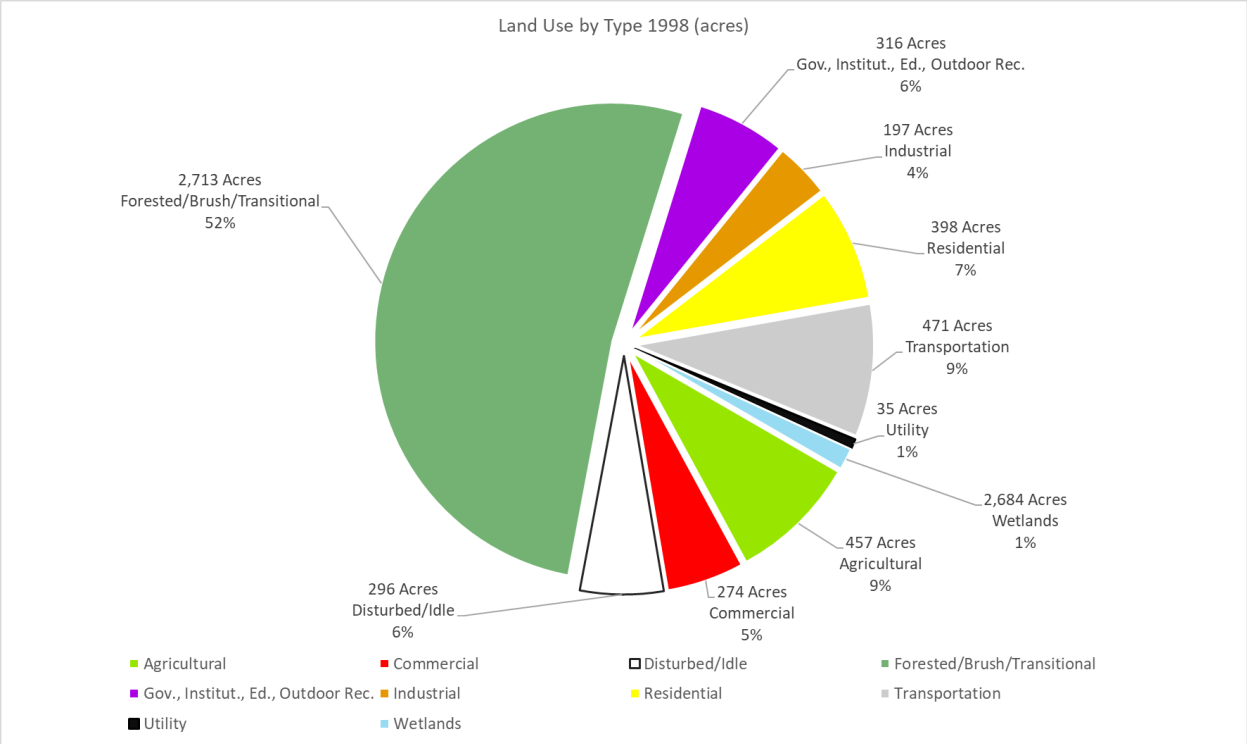
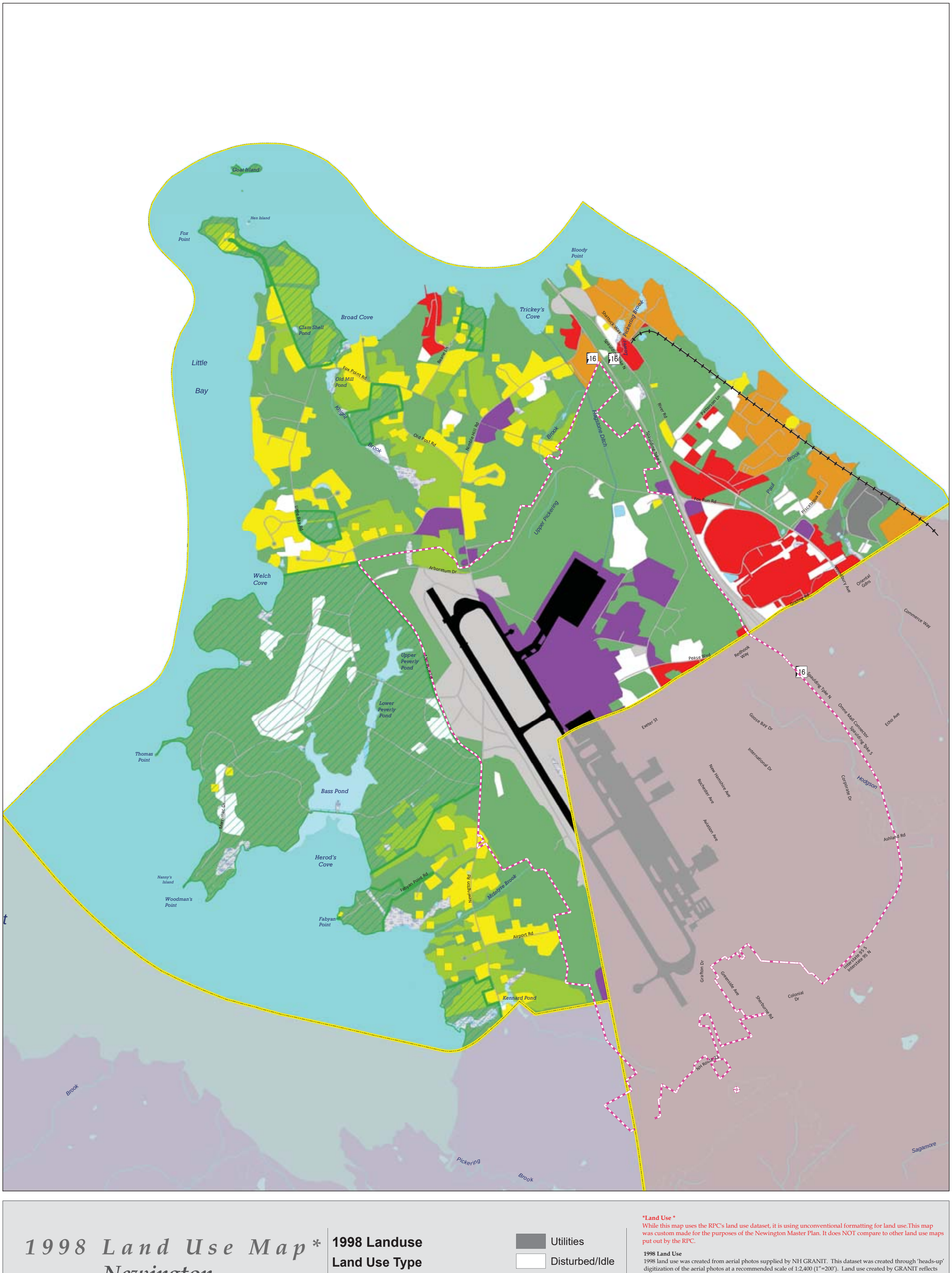
Document Path: C:\Users\hrjhu\Desktop\Nate_GIS_Data\Newington_MP\Map 9P - 1974 Landuse.mxd

1998 Existing Land Use



Major shifts in land use came with the 1990's closure of Pease Air Force Base. The Air Force Base boundary is replaced by the Pease Development Authority boundary and the Great Bay National Wildlife Refuge is established. Government use dropped by 400 acres as the military airport became a state transportation use and a commercial trade port. Residential growth rose 50%, spurred by Newington's first subdivisions that converted small family farmsteads into 6-10 homesites. Newington's Fox Run Mall and northern shopping sites further expanded the commercial base to today's level. The disturbed/idle land total declined adding to other uses like forest and fields.



1998 Land Use Map*

Newington

Date: Fall 2018

- Pease Development Authority Boundary
- Railroad
- Natural Resource Protection District

1998 Landuse

Land Use Type

- Residential
- Commercial
- Gov't/Institut./Ed./ Outdoor Rec
- Industrial
- Transportation
- Utilities
- Disturbed/Idle
- Agricultural
- Forested/ Brush
- Water
- Wetlands

ROCKINGHAM PLANNING COMMISSION theRPC.org

NH GRANIT

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
- Tidal Feature
- Shoreline; Stream
- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature

***Land Use ***
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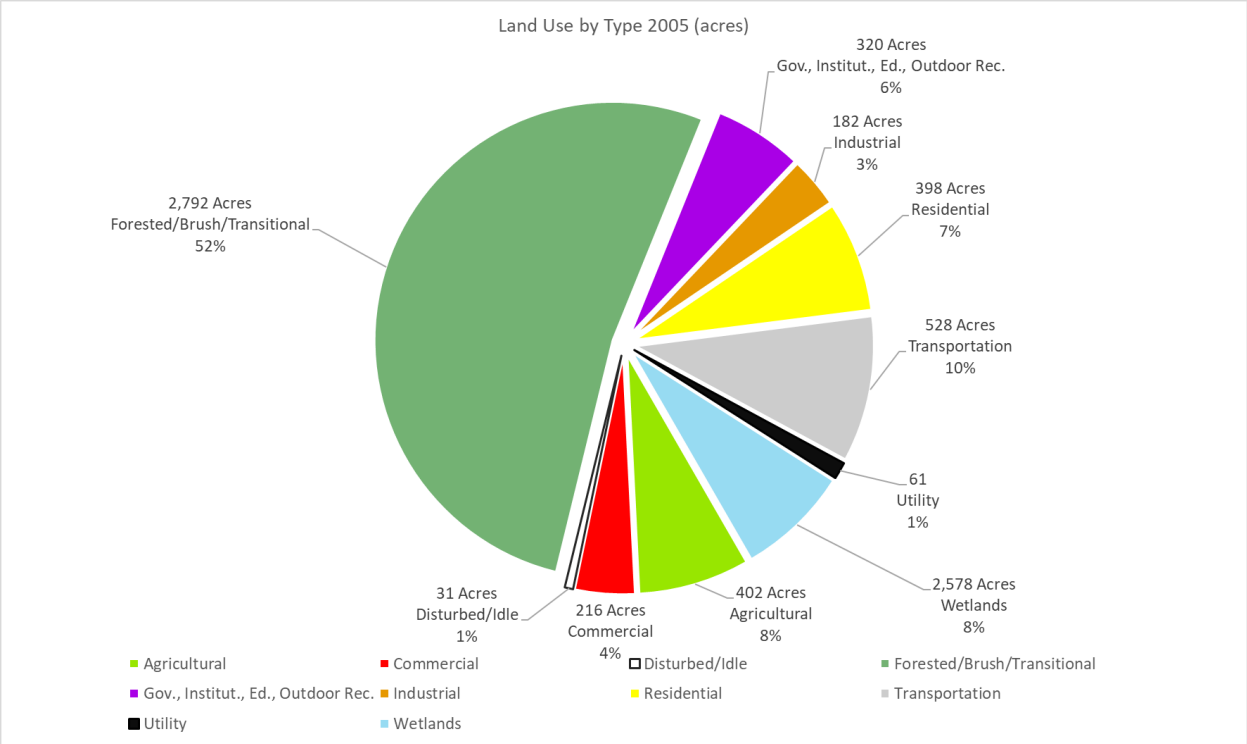
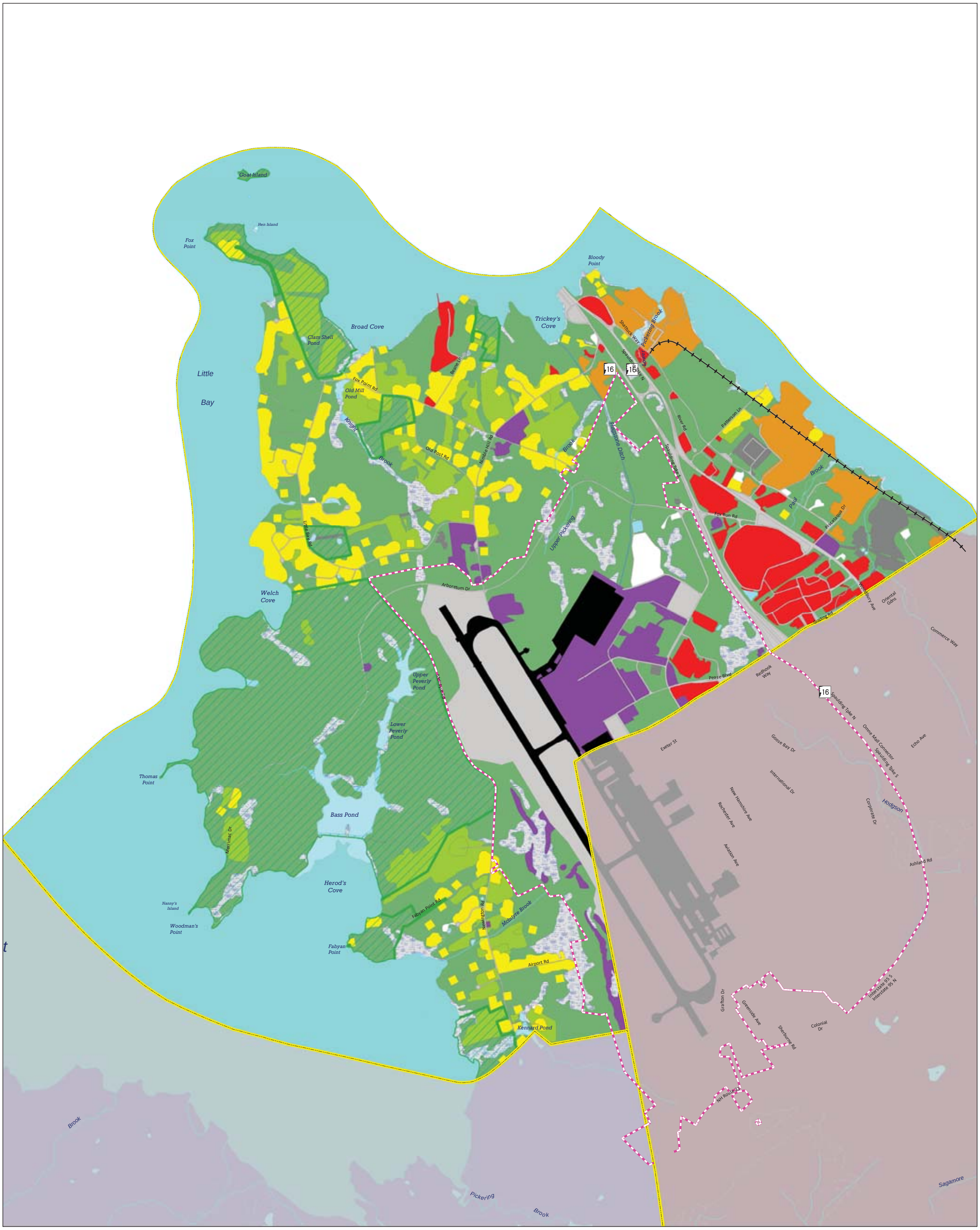
2005 Existing Land Use



Transportation use rose by 10% with a 2nd expansion of the Spaulding Turnpike and the construction of Shattuck Way. Utility land use doubled with the addition of a second energy plant.



2005 Land Use Map*

Newington

Date: Fall 2018

- Railroad
- Pease Development Authority Boundary
- Natural Resource Protection District

2005 Landuse

Land Use Type

- Residential
- Commercial
- Gov't/Institut./Ed./ Outdoor Rec
- Industrial
- Transportation
- Utilities
- Disturbed/Idle
- Agricultural
- Forested/ Brush
- Water
- Wetlands

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NH GRANIT

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
- Tidal Feature
- Shoreline; Stream
- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature

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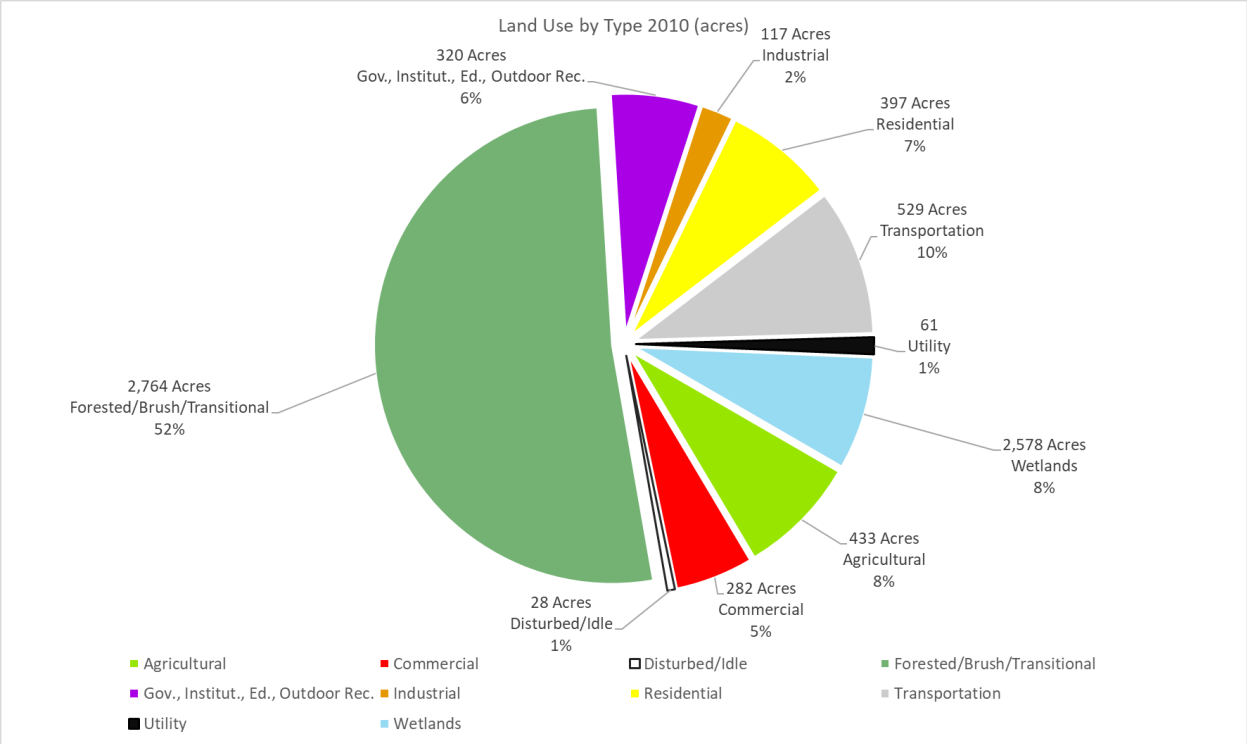
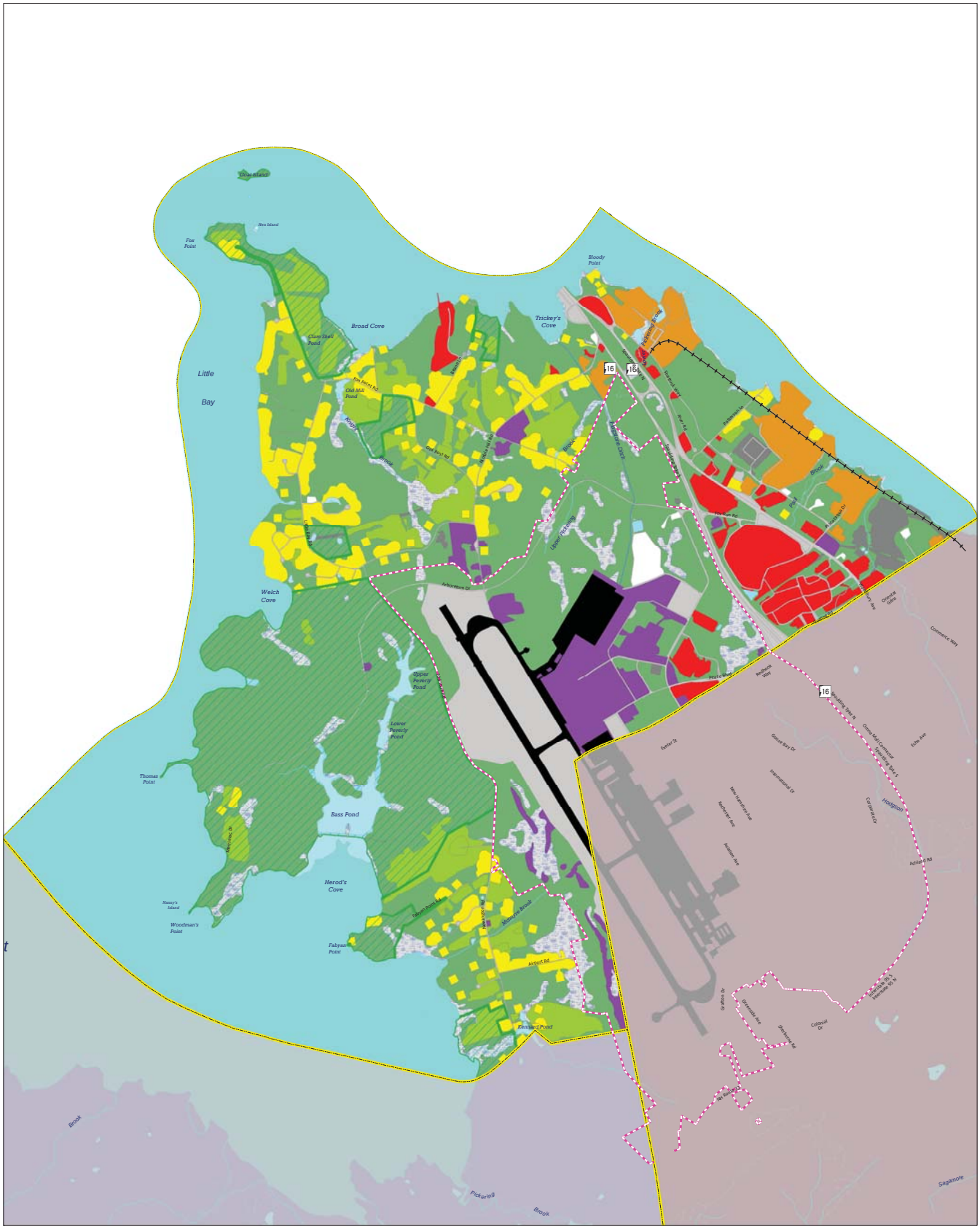
2010 Existing Land Use



During the recession and recovery before and after 2009, land use had no significant change.



2010 Land Use Map* Newington

Date: Fall 2018

- Railroad
- Pease Development Authority Boundary
- Natural Resource Protection District

2010 Landuse

Land Use Type

- Residential
- Commercial
- Gov't/Institut./Ed./ Outdoor Rec
- Industrial
- Transportation
- Utilities
- Disturbed/Idle
- Agricultural
- Forested/ Brush
- Water
- Wetlands

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
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- Shoreline; Stream
- Apparent Wetland Limit
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NH GRANIT

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

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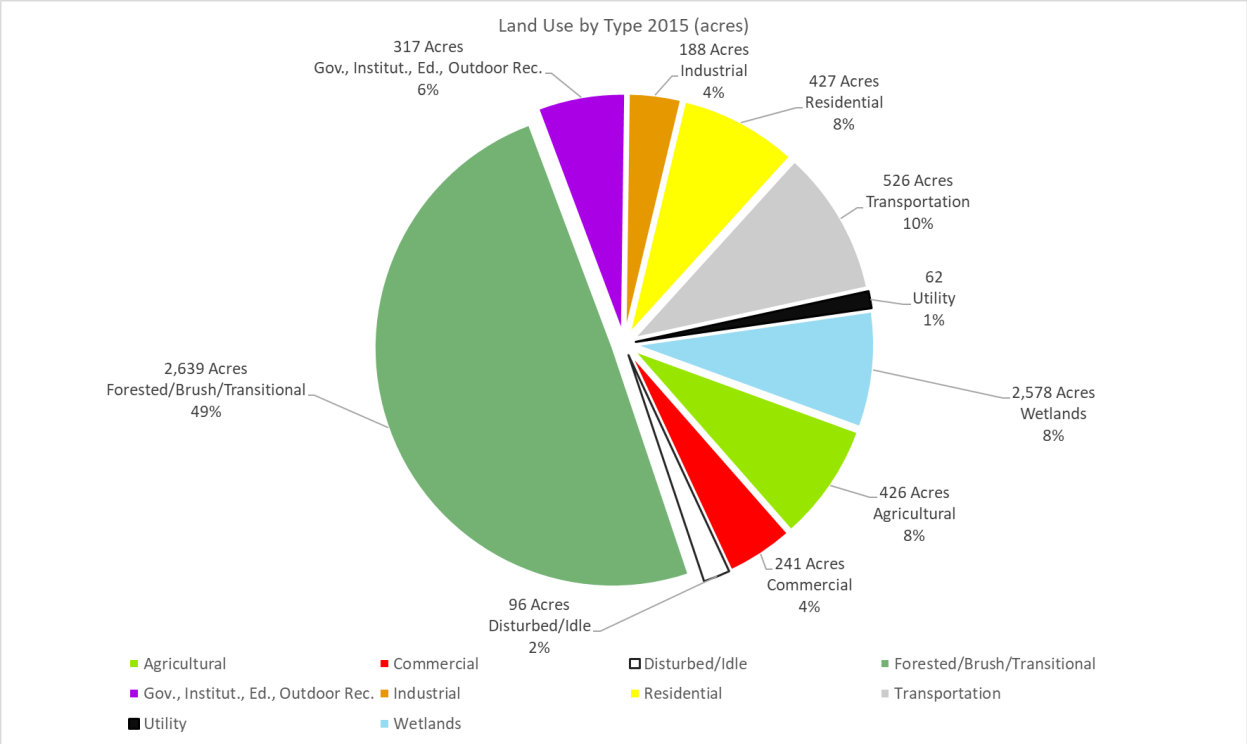
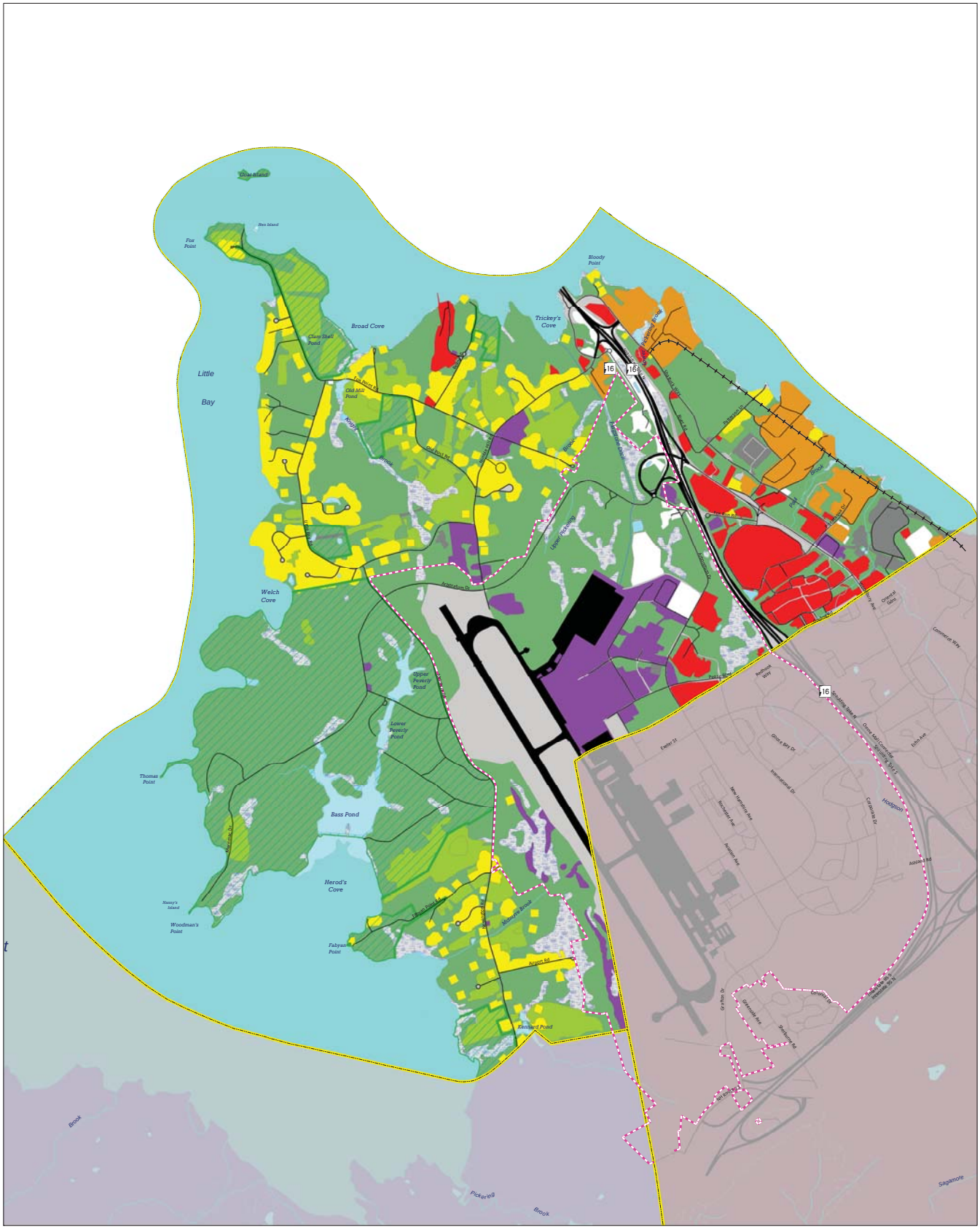
Document Path: C:\Users\hrjba\Desktop\Nate_GIS_Data\Newington_MP\Map 9P - 2010 Landuse.mxd

2015 Existing Land Use



As with all previous analyses, forested land remained the predominant land use and transportation remained the second most common use. Currently, Newington has low and steady growth in industry, commercial and residential land use.



2015 Land Use Map* Newington

Date: Fall 2018

- Railroad
- Pease Development Authority Boundary
- Natural Resource Protection District

2015 Landuse

Land Use Type

- Residential
- Commercial
- Gov't/Institut./Ed./ Outdoor Rec
- Industrial
- Transportation
- Utilities
- Disturbed/Idle
- Agricultural
- Forested/ Brush
- Water
- Wetlands

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
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NH GRANIT

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0 0.125 0.25 0.5 0.75 1 Miles

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LAND USE SUMMARY TABLE – PAST AND PRESENT

TABLE 1 – SUMMARY OF HISTORICAL LAND USE

Land Use Type	1962 acres	1974 acres	1998 acres	2005 acres	2010 acres	2015 acres	1962 to 2015 Change Acres	1962 to 2015 Percent Change	2005 to 2015 Change Acres	2010 to 2015 Percent Change
Agricultural	1,184.0	802.5	466.7	402.2	433.4	425.8	-758.2	-64.0%	+23.6	+5.9%
Commercial	50.9	181.0	229.7	225.0	225.0	241.3	190.5	374.3%	+16.3	+7.3%
Disturbed/Idle	405.7	457.6	286.4	30.6	27.5	96.3	-309.4	-76.3%	+65.7	+214.7%
Forested/Brush/Transitional	2,318.3	2,419.8	2,735.4	2,792.2	2,764.0	2,639.1	320.8	13.8%	-153.1	-5.5%
Government, Institutional, Education, Outdoor Recreation	770.4	724.6	319.6	311.2	311.2	316.6	-453.8	-58.9%	+5.4	+1.7%
Industrial	73.1	131.9	190.9	182.2	182.2	188.3	115.2	157.5%	+6.1	+3.4%
Residential	221.0	273.0	403.8	398.4	397.0	426.7	205.8	93.1%	+28.4	+7.1%
Transportation	130.2	143.6	488.4	527.8	529.2	526.0	395.7	303.9%	-1.9	-0.4%
Utility	0.0	26.7	34.7	61.2	61.2	61.5	61.5	N/A	+0.4	+0.6%
Tidal Waters	2,651.0	2,681.2	2,684.3	2,577.6	2,577.6	2,577.9	-73.1	-2.8%	+0.3	0.0%
Wetlands	112.2	74.8	76.9	408.5	408.5	417.3	305.1	271.8%	+8.8	+2.20%
Total Acres	***7,916.8***									

Note: Data for the years 1962, 1974, and 1998 were compiled with a slightly different methodology than 2005, 2010, and 2015. This accounts for some variance between the various land uses when no actual change has taken place. A definition of land uses in this table may be found in the Appendix.

LAND USE TRENDS

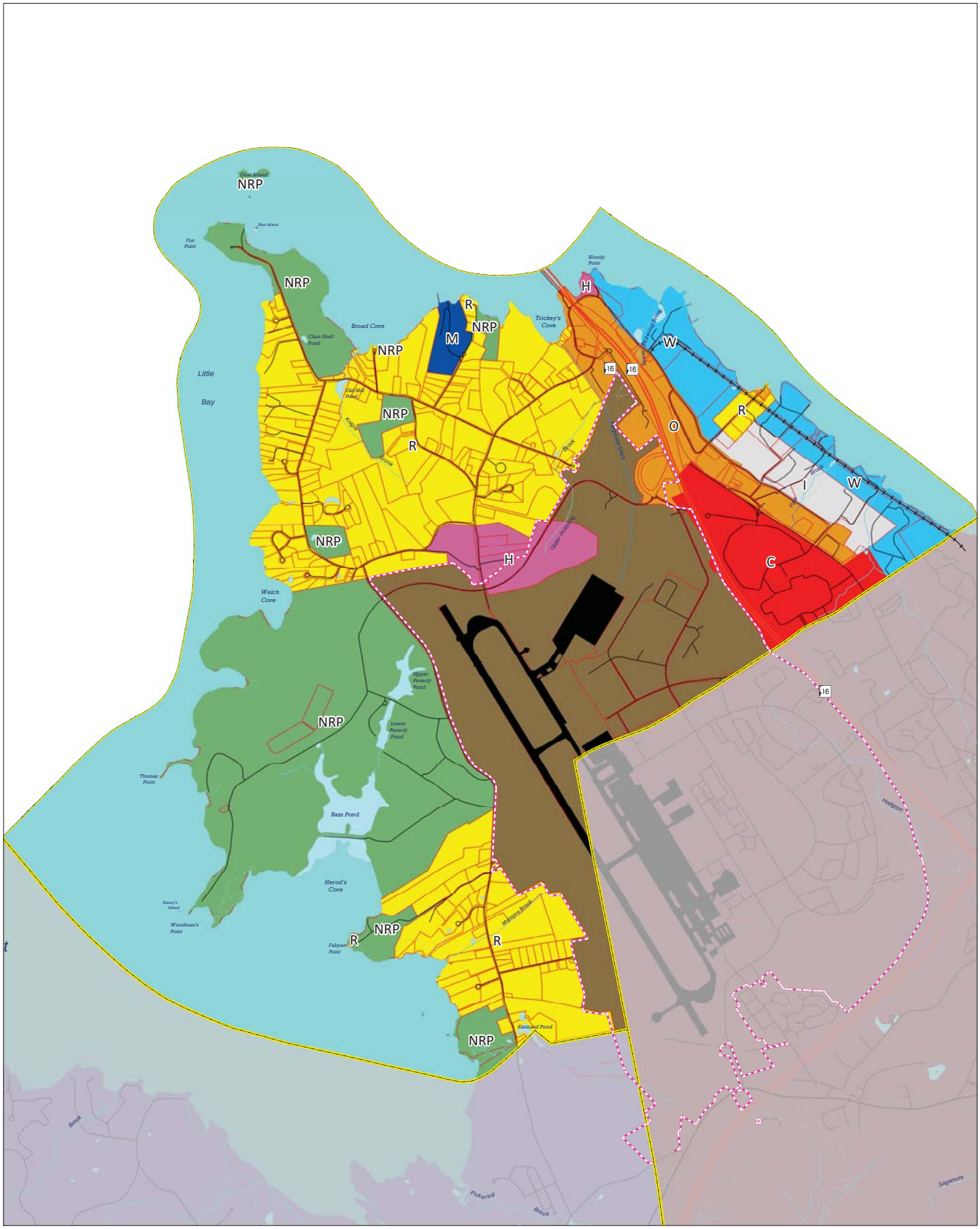
Trends in land use can be determined by the maps on previous pages depicting land use in Newington from 1962 - 2015. Noteworthy trends include:

- Forest and field have remained the dominant land use through joint conservation effort by the US Air Force, federal and state agencies, and especially local residents. Nearly half of Newington has remained forest and fields, although slight declines are likely ahead for this prized land use.
- There has been a 64% decline in Active Agricultural use; this likely will continue in decline
- 93% increase in Residential land with further gains in housing expected
- 304% increase in land dedicated to Transportation with an airport and the Spaulding Turnpike
- A 130% increase in Utility acreage, from 27 acres in 1974 to 62 acres in 2015.
- Continued increases in impervious surfaces such as roads, parking lots, driveways, and rooftops that prevent rainwater and snowmelt from soaking into the ground. Analysis of land use by the Piscataqua Region Estuaries Partnership (PREP) estimated 24% of Newington was impervious surface in 2015, an increase from 13% in 1990. Although Newington's watersheds are short runs to tidal waters, they are vulnerable to flooding if not kept clear of debris.

ZONING DISTRICTS

A trend critical to the history of land use in Newington is the taking of land by eminent domain in 1952 to create the Pease Air Force Base. This single action removed 4.2 square miles (50+%) of land in Newington from local control, preventing the Town from guiding development. Immediately after the loss of land to Pease Air Force Base, Newington became one of the first towns in New Hampshire to establish land use districts to direct land use on the remaining acres under town control. The town's three primary Zoning Districts of Residential, Commercial, and Industry clearly segmented land use separated by major transportation routes minimizing incompatible use conflicts. The Residential areas encompass 2,133 acres, or 38% of the town. The Commercial Zone encompasses 280 acres, or 5% of land area in Newington. (Note: Newington's Office Zone was established in 1994 out of the Commercial Zone as a transition to the industrial land uses on the east side of town. The Office Zone portion encompasses 176 acres or 3% of the Town's land area). The current zoning map planned for the town for Newington and the current zoning map used by the Pease Development Authority for the Tradeport.

The following maps depict the current zoning in the Town of Newington as of 2018 and the zoning map used by the Pease Development Authority in 2018 for the Tradeport.



Zoning (2019) Newington

Date: Fall 2018

- Railroad
- Pease Development Authority Boundary
- Parcels

Commercial	Office
Historic	Residential
Industrial	Waterfront Industrial
Marina	Pease Tradeport
Natural Resource Protection District	

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
- Tidal Feature
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- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature

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NH GRANIT

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

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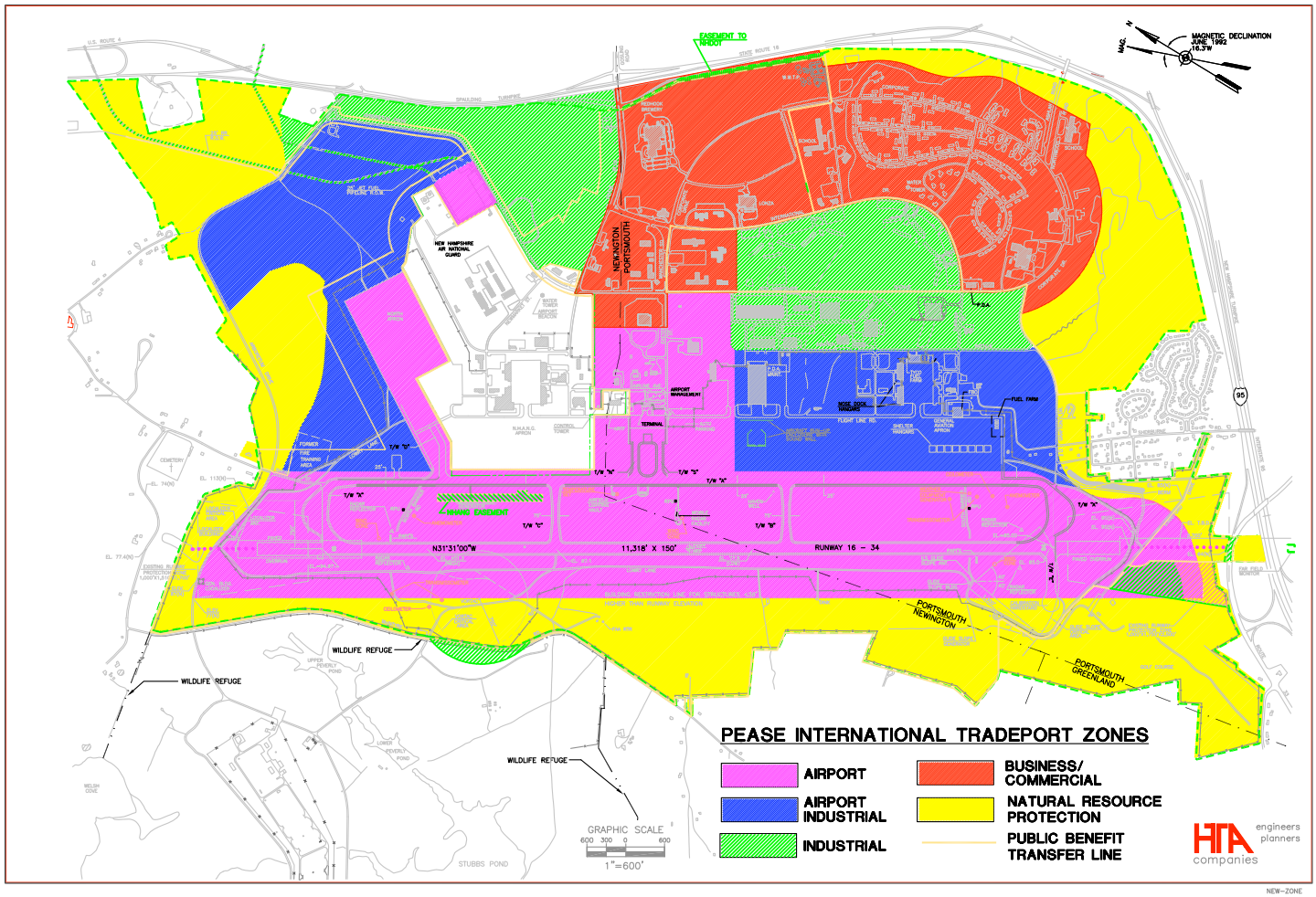
Pease Zoning Map



INDUSTRIAL AND WATERFRONT INDUSTRIAL ZONES

Newington's proximity to the tidal Piscataqua River and the Spaulding Turnpike provides the town with critical assets enabling robust industrial and commercial activity. The Piscataqua River waterfront in Newington comprises a substantial portion of New Hampshire's only deep-water port. This land is of enormous economic value to the town, region, and state, and since the enactment of zoning in Newington in 1952, Town officials have worked thoughtfully and deliberately to ensure land is reserved in the Industrial Zones for optimum utilization so that its economic benefit may be realized to the fullest. Newington's Industrial Zones are host to three major tank farms, housing 63 tanks with a combined capacity of 3.1 million barrels. There are also two electric generating plants and several other manufacturing enterprises providing above average employment opportunity. Most of the industrial facilities are dependent on proximity to ocean going transport. These ocean dependent industries cover 331 acres; utility industrial facilities account for an additional 61 acres.

COMMERICAL ZONE

The Commercial Zone encompasses 280 acres, or 5% of land area in Newington. The zone is dominated by retail uses and restaurants, including two of the largest shopping malls in the state, the Fox Run Mall and the Crossings at Fox Run. These two malls account for over one million square feet of retail floor space and are the highest revenue generating properties in the Commercial Zone, accounting for 60% of the tax revenues raised in the zone. The Fox Run Mall encompasses 612,000 square feet of floor area and the Crossings at Fox Run covers 415,000 square feet. The present malls would be better served by additional access point to provide connection between the Crossing at Fox Run and the Fox Run Mall. Most small New Hampshire towns devote only a small area to commercial uses, usually less than 2% of land area. With the current population estimated to be only 800 residents, Newington's commercial establishments are patronized primarily by people from outside the community. While the zone is nearly fully developed, redevelopment is a likely possibility. The Town of Newington will be monitoring the evolution of the commercial sector in Town. Across the nation, retail malls have seen dramatic declines in patronage due to online retail competition. Although closures of malls have occurred, the more common response has been to re-purpose malls to provide professional office space, health care services, and other non-retail uses.

OFFICE ZONE

Newington's Office Zone was established in 1994 and encompasses 176 acres or 3% of the Town's land area. It serves as a transition zone between industrial land uses on the east side of town and retail and commercial land uses on the west side of town. In addition to office use, the Town's Zoning Ordinance permits light industry, warehousing, medical clinics, hotels, and other similar uses.

RESIDENTIAL ZONES

Newington has three distinct areas of town zoned Residential: Patterson Lane, South Newington, and the area near the town center, sometimes referred to as Newington Village. These residential zone areas encompass 2,133 acres, or 38% of the town.

- Patterson Lane is the smallest residential zone with over 30 acres and nearly 20 home sites along a single roadway.
- South Newington is a 607-acre zone with over 75 dwellings and a mile of local highways.
- Newington Center is a 1,514-acre zone with over 275 existing dwellings, protected open space, town buildings, and several miles of roadway.

NEWINGTON'S TAX BASE

A town's land use creates more than a town character; it creates value for the owners of the property. While the property value is owned by the residents and businesses of a town, the real property has long been taxed by the government since colonial days. Each town assesses the highest value use of the property to form a tax base for the community. By its location and early steps to grow high value land uses, Newington, with a small and stable population, has built one of the highest per capita property values in the state. When coupled with sound fiscal discipline by town residents, Newington's local government has been able to consistently deliver one of the lowest tax rates in the New Hampshire. This is even more significant when you consider that over half the land value of Newington is excluded from the tax base due to State control of the Pease Tradeport and Spaulding Turnpike, as well as Federally owned conservation land at the Great Bay National Wildlife Refuge.

NEWINGTON PROPERTY TAX BASE (2017)

UTILITY BASE (50%)		
Energy Generation Facilities (2)		$494,252,700
Transmission Systems (Electric, Gas)		$35,815,500
Distribution Systems (Electric, Gas, Communications)		$14,789,400
	Utility Subtotal	$544,857,600
COMMERCIAL BASE (22%)		
Retail Mall Properties (2)		$96,186,500
Retail Product Sales (Chain stores, Auto sales, Storage Buildings)		$92,223,500
Retail Services (Repairs, Restaurants, Medical care, Entertainment)		$45,422,200
	Commercial Subtotal	$233,832,200

RESIDENTIAL BASE (17%)

Single Family (262 dwellings)	$158,491,500
Multi-Family (46 dwellings)	$28,927,900
Residential Subtotal	$187,419,400

INDUSTRIAL BASE (11%)

Manufacturing (Energy, Optic Cable, Electronic, Wall Board)	$69,512,300
Bulk Storage (Oil & Gasoline Fuel, Asphalt, Propane, Gypsum, Salt)	$48,855,400
Industrial Subtotal	$118,367,700

TOTAL NEWINGTON TAX BASE (100%) **$1,084,476,900**

OPEN SPACE PROTECTION

There is a long tradition of open space protection and land conservation in Newington, with 1,483 acres, or 18% of land area protected from development. The land may be protected through a deed restriction, conservation easement, or other legal restriction, and all are tied to the title of the land, regardless of its subsequent ownership. Such land may be given to the Town or an organization specializing in managing conservation land. Conserved land is not required to be open to the public, unless it is the specific request of the landowner or is required by an entity providing funding to purchase the land or the conservation easement. One of the primary purposes of open space protection is to protect the land's natural resources and values. Table 6 lists conserved lands in Newington.

TABLE 6 – CONSERVED LAND

Conservation Land Name	Tax Map-Lot #	Owner	Acres
Great Bay National Wildlife Refuge	45-1	US Fish & Wildlife Service	1,100
Fox Point	1-1	Town of Newington	110
Town Forest	Pease	Town of Newington	69
Frink Farm	17-8	Frink Family	38
Jack Mazeau	53-6, 53-7, 55-1	NH Fish & Game Dept	37
Baird Estate	53-5	Estate of Barbara Baird	35
Fabyan Point	50-1	US Fish & Wildlife Service	34
Flynn Pit	23-2	Town of Newington	19
Paul Bean	6-2	NH Fish and Game Dept	13

Bloody Point	N/A	NH Dept of Transportation	3
Beane Farm	19-9	Northeast Medical	3
Carter's Rocks	5-2	Town of Newington	1
TOTAL ACRES			1,483

COASTAL HAZARDS, CLIMATE CHANGE, AND ADAPTATION PLANNING

In 2017, the Rockingham Planning Commission completed a Vulnerability Assessment for the Town of Newington to map and assess the impacts of flooding from sea-level rise, storm surge, and increased precipitation events on roads and transportation assets, critical facilities and infrastructure, and natural resources. Newington has significant miles of coastal tidally-influenced shoreline along the Great Bay, Little Bay, and Piscataqua River, however due to an increase in elevation landward only certain areas are particularly vulnerable to flooding from seasonal high tides, coastal storms, and sea-level rise. These high-risk flood areas include land currently used for commercial, industrial, residential and recreational development, and small sections of local roads. The following areas are most susceptible to sea-level rise and storm related flooding:

- North Shattuck Way under highway loop and along the Piscataqua River industrial waterfront
- Great Bay Marina and low-lying supporting lands
- Fox Point and Knight's Brook conservation lands
- Residential parcels properties along the west and southwest shorelines
- Fabyan Point, Herod's Cove, and throughout the Great Bay Wildlife Refuge

Several waterfront businesses may experience modest to moderate flood impacts from sea-level rise and coastal storms. Planning members and staff from the Rockingham Planning Commission met with representatives from Great Bay Marina, Sprague Energy and Little Bay Lobster Company to present results from the Vulnerability Assessment report and review maps of high potential flood risk areas. The goal of these meetings was to facilitate discussion about the working waterfront and how best to protect its sustained use by commercial businesses.

Few residential parcels are impacted by projected sea-level rise and storm related flooding. No homes are directly impacted but rather flood inundation is limited to undeveloped portions of residential lots. These high-risk flood areas should be designated as "no build" areas including roads, buildings, structures and septic systems, and driveways except where crossing is necessary to gain access to buildable land. Any crossings within high risk flood areas should be designed to accommodate future projected sea-level rise and storm surge conditions. Drainage watersheds need to cleared frequently to function well.

The complete report and maps are available from the Rockingham Planning Commission.

EXISTING LAND USE RECOMMENDATIONS

There is a strong consensus among Newington residents and officials about land use in the community, and a high degree of satisfaction with how land use zones enable a mix of land use types. Decisions about future land use can be guided by the following recommendations:

- Preserving rural residential character
- Maintaining waterfront industrial activity along the Piscataqua River
- Encouraging high value land use
- Preparing for changes to the town's commercial shopping areas

NMP 2020-2030: FUTURE LAND USE

INTRODUCTION

The Future Land Use Chapter of the Master Plan builds on the vision and strategies described in the Vision Chapter and the recommendations found in the Existing Land Use Chapter. The planning documents recognize the interdependent relationship between how land in Newington is used in the future and the Town's continued prosperity. There is pressure to develop land in Newington beyond what current ordinances allow and the Town needs to ensure land use decisions are based on enabling the highest and best use of the land, resisting efforts to make hasty decisions that could have long-term consequences.

This chapter is intended to serve as a guide for the community as it explores methods by which the Town can modify its zoning ordinance and local land use regulations in a way that balances Newington's rural residential character, high value commercial and industrial districts, and preservation of the town's historical and environmental resources.

NEWINGTON'S DEVELOPMENT POLICIES

Policy 1: Preserve Newington's rural residential character with ample open access.

Policy 2: Promote industrial development, providing that conflicts between incompatible land uses are minimized, the environment is not adversely affected, and public safety is ensured.

Policy 3: Encourage attractive and efficient commercial and office development.

Policy 4: Reserve Piscataqua shorefront for seaport-based industry.

Policy 5: Seek a range of housing appropriate for a high land value area, recognizing that existing land use constraints precludes residential housing in over 55% of land in town.[1]

Policy 6: Maintain and develop community services and facilities in a manner consistent with orderly growth and Newington's rural character, while not placing a financial burden on the community.

Policy 7: Protect the shorelines and tributaries of Great Bay, Little Bay, and Piscataqua River while improving access for all.

Policy 8: Protect Newington's historic architecture, scenic fields & forests, and cultural heritage.

[1] Upland residential land is 1,511 acres or 27% of the Town's land area.

POPULATION

Table 1 provides information on past and projected population for the Town as well as Rockingham and Strafford Counties and the State of New Hampshire. Newington has the lowest number of residents for any community in Rockingham County and ranks 198 out of 235 municipalities in the state.

TABLE 1 – PAST AND PROJECTED POPULATIONS

Sources: 2000 and 2010 US Census
2020 and 2030 projections provided by the NH Office of Strategic Initiatives

	2000	2010	2020	2030
Newington	775	753	770	788
Rockingham County	278,733	295,223	307,013	321,441
Strafford County	112,686	123,180	128,801	136,372
New Hampshire	1,235,786	1,316,470	1,349,908	1,402,878

Population projections are useful for planning purposes to enable the Town to gauge future demand for services, including fire and police, water and sewer, and schools. Population projections for Newington do not indicate any drastic changes, but projections for Rockingham and Strafford Counties and the State of New Hampshire do indicate population growth that will put development pressure on undeveloped land in Newington, impacts roadways that travel through Newington, and increase the demand for retail and service industries that are in Newington. The NH Office of Strategic Initiatives estimates the ten-year population growth between 2020 and 2030 to be 2.3%, or 18 people. These estimates are based on historical trends in population and so it is important to note that the town's population could grow by several hundred people if new residential subdivisions are created resulting in more homes.

BUILD OUT ANALYSIS AND SCENARIO PLANNING

The Newington Planning Board, as part of the Master Plan update process, worked with the Rockingham Planning Commission (RPC) to analyze land development which may occur in the future under the Town's current land use regulations. This type of exercise is called a build out analysis and provides the Planning Board with information on development potential.

To conduct the build out analysis, the RPC used the Town's parcel data and land use regulations to estimate how undeveloped land could be developed in the future. A build out analysis is purely a planning exercise and does not predict the type of development but identifies where the development may occur.

The Planning Board can use this information to make changes to land use regulations in order to guide the type of development the town may desire.

A build out analysis uses scenario planning to consider alternate futures for a community based on competing development scenarios. There is no time line assigned to a build out analysis. Scenarios contemplated for Newington can be potential growth strategies for the future. They are neither forecasts nor predictions but represent an effort to tie land use planning into the needs and desires of the community. The essential requirement for any development scenario is that it be plausible, within the realm of what exists and what could be developed.

Working with the RPC, the Newington Planning Board identified two residential development scenarios:

- Scenario 1 - potential development under existing land use regulations.
- Scenario 2 - potential development under existing land use regulations, modified to reflect the density of development that currently exists in the Little Bay Road neighborhood. The Planning Board believes this is the type of residential development expected in the future.

TABLE 2 – RESIDENTIAL BUILD OUT ANALYSIS – SCENARIOS 1 AND 2

	Existing Conditions	Build Out Analysis Scenario #1	Build Out Analysis Scenario #2
Housing Units	354	631	579
Population	789	1,407	1,291
Acres	427	1,261	1,261
Estimated additional expected Accessory Dwelling Units (ADUs)		94	86

As illustrated in Table 2, Town records indicate there are 354 housing units in Newington in 2019. Scenario 1 of the build out analysis estimates an additional 274 units could be built under existing local land use regulations, for a total of 631 units. Scenario 2 of the build out analysis, modeled after the Little Bay Road neighborhood, estimates an additional 225 units could be built, for a total of 579 units. It is important to note that the build out analysis is a computer analysis based on a model that estimates the maximum number of new units.

Newington's current Zoning Ordinance permits Accessory Dwelling Units (ADUs) in the Residential District and defines ADUs as a subordinate dwelling unit that is within or attached to a single-family dwelling unit

and provides independent living facilities for one or more persons. The build out analysis estimates ADUs will account for an additional five more units.

The Planning Board also identified a third scenario, for non-residential development:

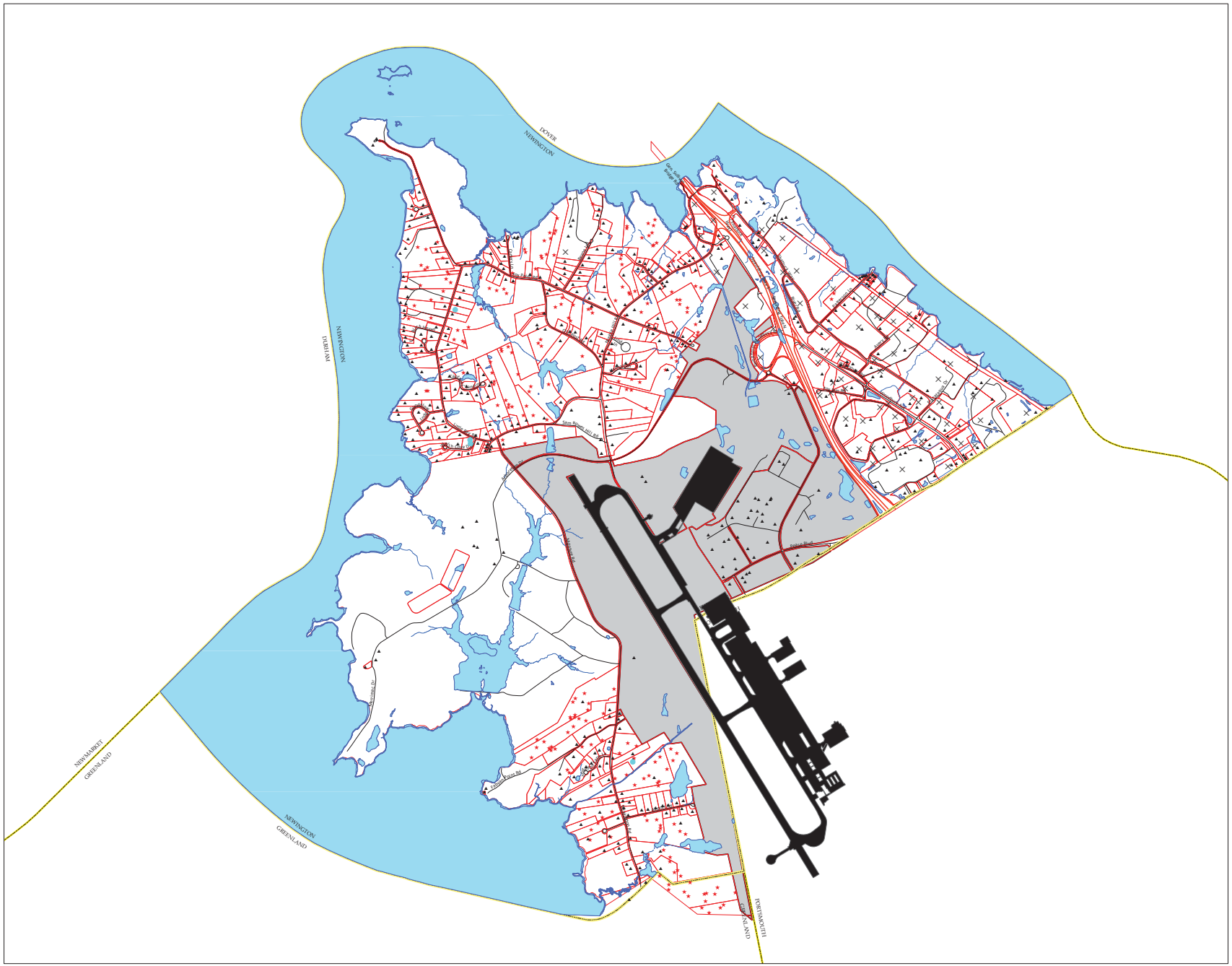
- Scenario 3 – potential new non-residential development under existing zoning and if an additional floor of space were allowed in non-residential zones.

TABLE 2 – COMMERCIAL BUILD OUT ANALYSIS – SCENARIO 3

	Existing Conditions	Build Out Analysis	Build out Analysis with Extra Floor
Units	168	228	228
New Square Footage	NA	45,555,109	60,698,668
Acres	746	2,554	2,554

Town records estimate there are 168 non-residential properties in Newington. As illustrated in Table 3, Scenario 3 of the build out analysis estimates current zoning would enable 60 more non-residential properties, adding 45,555,109 additional square feet, for a total of 228 units. If an additional floor was allowed on non-residential buildings the result would be another 15,143,559 square feet, for a total of 60,698,668 square feet.

Scenarios considered for future land use in the Town of Newington visualize the intersection of new development, economic vitality, and the surrounding transportation system. Evaluating the tradeoffs and opportunities between competing development scenarios enables residents and Town boards to identify potential changes to local land use regulations and economic development policies.



Map 9 - All Buildings At Build Out (Little Bay Scenario)

Newington Build Out

March 2019

- Existing Buildings

New Buildings

Building Use Designation

- Non-Residential
- Single Family Residential
- Existing Buildings
- Airfield
- Highway
- Local and Private Road
- ExistingParcels
- Pease Zones (not considered)

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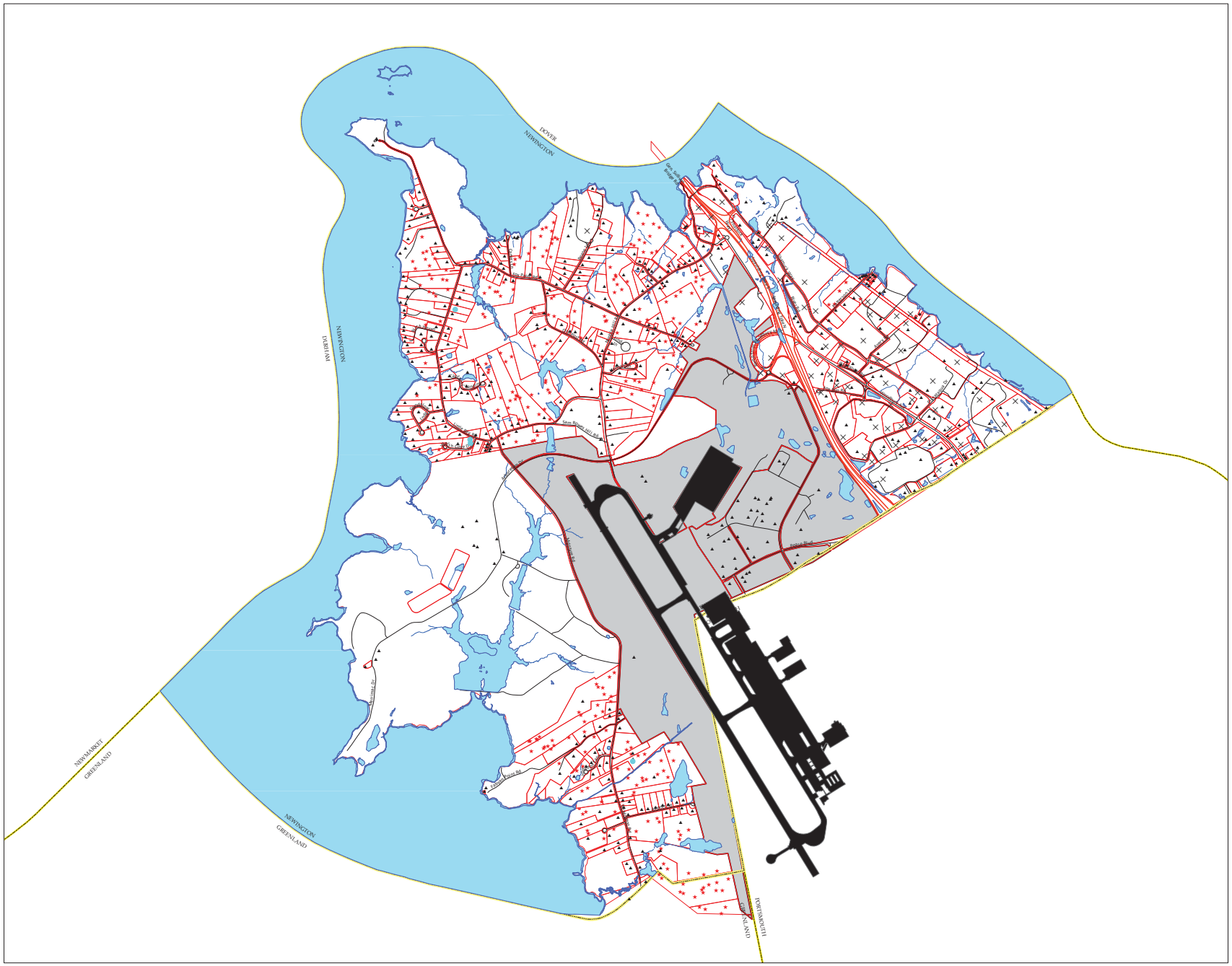

Map 8 - All Buildings At Build Out

Newington Build Out

March 2019

- Existing Buildings

New Buildings

Building Use Designation

- Non-Residential
- Single Family Residential
- Existing Buildings
- Airfield
- Highway
- Local and Private Road
- ExistingParcels
- Pease Zones (not considered)

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FUTURE LAND USE IN THE INDUSTRIAL AND WATERFRONT INDUSTRIAL ZONES

Future land use in the Industrial and Waterfront Industrial Zones will be based upon encouraging responsible industrial development that broadens the Town's tax base, provides quality jobs, and ensures land use along the Piscataqua River be dependent upon businesses using ocean-going transport. It is incumbent on the Planning Board to protect these zones from non-waterfront industrial use.

New building growth could result in taller buildings. This will have implications on the types of businesses and industries staying and coming to Newington. Increasing the building height to allow existing businesses to expand and new businesses to locate in town will create additional traffic in areas where there is little land left for additional roads. As a result, access to existing transportation corridors and intersections need to be enhanced, including the extension of Shattuck Way to Interstate 95 for industrial uses, expansion of rail service, and a proposed new cross-lot access to waterfront and industrial facilities. These factors may require land development applicants to identify routes for vehicles serving the industrial and waterfront zones and adding piers along the waterfront.

Intense competition in the national energy market may put the existing energy generating plants in Newington at risk. The existing infrastructure that serves these plants is valuable and it will be important for the Town to monitor this situation and suggest alternative land uses.

FUTURE LAND USE IN THE COMMERCIAL AND OFFICE ZONES

Future land use in the Commercial and Office Zones will be based upon encouraging the redevelopment of existing commercial sites to enhance attractiveness and efficiency, allowing development of parking lot perimeters, improving the transportation network along Woodbury Avenue, and planning for the possible redevelopment of existing facilities. As in the Industrial and Waterfront Industrial Zones, new building growth may be the result of higher building heights.

Key to enabling these activities is updating the Town's site plan development regulations to foster attractive site design to encourage commercial and retail development in undeveloped areas in the zone. The Town desires to be business friendly while being cautious regarding the types of development that is best for Newington.

FUTURE LAND USE IN THE RESIDENTIAL ZONE

Future land use in the Residential Zone will be based upon preservation of Newington's rural residential character, protection of agricultural lands and agricultural activities, and protection of natural resources, including wetlands, streams, ponds, and woodlands.

Key to enabling these activities is protecting the Residential Zone from development that may negatively impact quality of life, such as flight paths, transportation corridors, and new utility easements, as well as working with landowners and conservation organizations to open space from development.

In June 2017, a law went into effect in New Hampshire requiring municipalities to allow internal or attached accessory dwelling units (ADUs) in all zoning districts where single-family dwellings are permitted. The purpose of the law was to enable more diverse affordable housing opportunities for all residents, including elderly and disabled people and their caregivers. The Town has taken its own approach to meeting the requirements of this law by allowing ADUs on existing and new buildable sites in the residential zone, enabling affordable and higher density housing that is more in line with maintaining Newington's rural and open neighborhoods. The Planning Board estimates that within the 10-year timeframe of this Master Plan approximately 10% of existing homes and 20% of new homes will include an ADU, an average of 15%. While this provision will increase density, Newington's rural character will remain relatively the same.

TRANSPORTATION

Newington has a unique transportation network, encompassing rural roads, a major state highway, a deep-water port, rail service, and portions of Portsmouth International Airport at Pease. This network is key to mobility and economic development in town, and future land use, particularly in the Industrial, Waterfront Industrial, and Commercial and Office Zones, will benefit from improving access and connectivity between properties.

UTILITIES AND INFRASTRUCTURE

For a community of less than 800 people, Newington has a complex mix of utilities and infrastructure, including two power generation facilities, a waste water treatment plant, a public water system managed by the City of Portsmouth, and several utility easements bisecting the town. Preventing additional transmission line corridors through residential areas that do not directly serve homes is important for protecting residential neighborhoods from conflicting land use.

NATURAL RESOURCES AND CONSERVATION

Natural resources in Newington include soils, fresh water and tidal streams and rivers, Great Bay, groundwater and aquifers, wetlands, farmland and forests, and plant and animal communities, including fisheries. Threats to natural resources include contamination of surface waters, groundwater and drinking water supplies, loss of productive farmland to development, and fragmentation of wildlife habitat by roads and buildings. Future land use decisions need to include on-going protection of these resources through voluntary land conservation, stormwater management, and environmental stewardship.

HISTORIC RESOURCES

Newington's historic landscape of rural roads, stone walls, homes, farms, forests and fields are valued by residents. The Town established an Historic District Commission in 1972, designated the center of town as a Local Historic District in 1974, and designated Bloody Point as second Local Historic District in 1975. An historic building survey completed by the Rockingham Planning Commission identified 38 structures dating from 1690 to 1860. The Town can continue to protect historic resources through maintenance of buildings in the Old Town Center, enforcing the Scenic Road Ordinance, and preserving open spaces surrounding historic homesteads.

CLIMATE CHANGE AND ADAPTATION PLANNING

Newington's location along Little Bay, Great Bay, and the Piscataqua River create shoreland at risk of flooding due to sea-level rise and storm surge. A Vulnerability Assessment report completed in 2017 for the Town by the Rockingham Planning Commission identified parcels and infrastructure most susceptible to sea-level rise and storm related flooding due to an increase in the intensity of precipitation events, including land along Great Bay Marina, Fox Point, Fabyan Point, and Shattuck Way. Additional impacts of coastal flooding may include sensitive wildlife habitat associated with Knight Brook, Pickering Brook, Paul Brooks, and the Great Bay National Wildlife Refuge.

Future land use decisions should include adaptation planning strategies, including designing infrastructure improvements to accommodate sea-level rise and providing information about potential flood hazards to businesses and residents.

FUTURE LAND USE RECOMMENDATIONS

Newington intends to remain a prosperous, safe and well-planned community with rural residential neighborhoods and thriving commercial and industrial districts. The town will continue to collaborate with neighbors on regional opportunities but will work to prevent future loss of land for Federal, State, and utility uses.

Recommendations for future land use in Newington include:

- Protect residential neighborhoods from development that has excess levels of conflict with residential life.
- Ensure Newington's shorefront industrial zone is used by industries requiring ocean-going transit and prevent uses that conflict with heavy, ocean-based industry.
- Encourage development in areas of existing, underutilized commercial and retail parcels.
- Improve the transportation network in the Woodbury Avenue commercial and office district.
- Protect wetlands, shorelands, streams and ponds from the impact of development.
- Protect agricultural lands and agricultural activities.
- Preserve woodlands, open spaces, and wildlife habitat.

NMP 2020-2030: HOUSING

INTRODUCTION

Housing can be one of the most challenging and important issues to be addressed in a Master Plan.[1] The need for a community to provide housing diversity is required by state law. Two Rockingham County Supreme Court Cases (*Britton v. Town of Chester* and *Soares and Lewis Builders v. Atkinson*) have led to the requirement that towns assess the housing needs of all income groups and adopt zoning and land use regulations that enable housing diversity.

For communities like Newington this requirement is difficult for many reasons. As a seacoast community the town has extremely high land costs, one of the primary factors in housing costs and a reason why the availability of affordable housing has not kept pace. In addition, federal and state agencies have precluded residential housing in over 55% of Newington's land area. Residential development is prevented on land owned by the Pease Development Authority, NH Department of Transportation, NH Port Authority, US Department of the Interior, and NH Fish and Game. The Town envisioned the development of affordable housing on the former drive-in movie theater property but the NH Department of Transportation took the land for their use.

To address the affordable housing challenge, the Town has amended the Zoning Ordinance to allow most single-family home sites to add an accessory dwelling unit (ADU), as required by NH RSA 674:71-73. Accessory dwelling units are residential living units attached to or associated with a single-family dwelling, providing independent living facilities for one or more persons. The Planning Board recognizes that increasing affordable housing requires the creation of long-term solutions for Newington and towns in the region.

This chapter assesses the existing housing stock and housing costs in Newington in comparison to surrounding communities, reviews the Town's existing residential zoning requirements, provides information on the 2015 Regional Housing Needs Assessment prepared by the Rockingham Planning Commission, and provides recommendations to address present and future housing needs.

DESCRIPTION OF HOUSING IN NEWINGTON

Newington has three distinct areas of town zoned Residential: Patterson Lane, South Newington, and the area near the town center, sometimes referred to as Newington Village. These residential zone areas encompass 2,133 acres, or 38% of the town.

[1] NH RSA 675:2.III - The master plan may also include the following sections: (I) A housing section which assesses local housing conditions and projects future housing needs of residents of all levels of income and ages in the municipality and the region as identified in the regional housing needs assessment performed by the regional planning commission pursuant RSA 36:47. II, and which integrates the availability of human services with other planning undertaken by the community.

Newington's existing housing stock is comprised of primarily single-family homes located along town roads and small subdivisions. A few homes are located on the east side of the Spaulding Turnpike, adjacent to the waterfront industrial district. According to the US Census Bureau's 2017 American Community Survey, there were a total of 355 housing units in town, with 333 (94%) of those home being single-family, 17 duplex units (5%), and 5 (1%) multi-family units. The Planning Board estimates there are 35-40 accessory dwelling units in town, comprising 10% of the housing stock.

Table 1 depicts the types of housing units in Newington, the surrounding communities of Greenland, Portsmouth and Stratham, as well as Rockingham County and the State of New Hampshire, based on the 2017 American Community Survey. Newington has the highest percentage of single-family homes when compared to surrounding towns; the percentage of duplex units, 5%, is comparable to other towns, Rockingham County, and New Hampshire state-wide.

To enable more affordable and higher density housing the Town permits Accessory Dwelling Units (ADUs) in the Residential District and defines ADUs as a subordinate dwelling unit that is within or attached to a single-family dwelling unit and provides independent living facilities. The Town is supporting the creation of workforce housing by enabling ADUs in the Residential District, with the current potential of 355 ADUs.

TABLE 1 – HOUSING UNIT TYPES

Source: 2017 American Community Survey

	Single Family Units		**Duplex Units**		**Multi-Family Units**		**Manufactured Units**		**Boat, RV, Van**		
	# of Units	%	# of Units	%	# of Units	%	# of Units	%	# of units	%	**Total Units**
Newington	333	94%	17	5%	5	1%	0	-	0	-	**355**
New Castle	531	94%	28	5%	4	1%	0	-	0	-	**563**
Greenland	1,424	92%	37	2%	57	4%	34	2%	0	-	**1,552**
Rye	2,301	86%	79	3%	144	5%	151	6%	0	-	**2,675**
Stratham	2,601	89%	51	2%	215	7%	31	1%	15	.5%	**2,913**
Portsmouth	5,248	50%	672	6%	4,349	42%	170	2%	0	-	**10,439**
Rockingham County	95,877	73%	4,886	4%	22,930	18%	6,426	5%	68	.05%	**130,817**
New Hampshire	432,983	67%	34,596	6%	105,065	17%	35,389	6%	166	.02%	**627,619**

Table 2 highlights the number of housing units in Newington, surrounding towns, Rockingham County, and the state of New Hampshire for the period 1990 – 2017. Excluding Portsmouth, which saw a decrease

in the number of housing units for the period due to the closure of Pease Air Force Base, Newington had a substantially smaller increase in housing units (10.9%) compared to surrounding towns, the county and the state.

TABLE 2 – HOUSING COUNTS – OCCUPIED HOUSING UNITS

Sources: 1990, 2000 and 2010 US Census; 2017 American Community Survey

	1990 Housing Units	2000 Housing Units	2010 Housing Units	2017 Housing Units	Total Change 1990-2017	Percent Change 1990-2017
Newington	320	305	326	355	35	10.9%
New Castle	345	488	537	563	218	63.1%
Greenland	1,082	1,244	1,443	1,552	470	43.4%
Portsmouth	11,369	10,186	10,625	10,439	-930	-8.2%
Rye	1,905	2,645	2,852	2,918	1,013	53.1%
Stratham	1,917	2,371	2,864	2,913	996	51.9%
Rockingham County	101,773	113,023	126,709	130,817	29,044	28.5%
New Hampshire	503,904	547,024	614,754	627,619	123,715	24.5%

Newington and towns in the Seacoast region continue to experience a strong housing market resulting in high housing costs. The New Hampshire Housing Finance Authority (NHHFA) compiles a housing purchase price database annually for new and existing homes. Results from 2018 for Newington and surrounding towns are shown in Table 3.

TABLE 3 – 2018 MEDIAN PURCHASE PRICE FOR HOMES

Source: NH Housing Finance Authority

Town/Area	Median Home Purchase Price 2018
Newington	$613,766
New Castle	$765,000
Greenland	$475,000
Portsmouth	$449,500
Rye	$650,466
Stratham	$386,533
Rockingham County	$330,000
New Hampshire	$254,000

Based on the sales data, the median purchase price for a home in Newington was $613,766, higher than surrounding towns, the County and the State.

Like housing stock and home purchase price, measures of income are important characteristics of a community. Table 4 illustrates income data from the 2017 American Community Survey for Newington, surrounding towns, Rockingham County, and New Hampshire. In 2017, the median household income in Newington was $96,667, higher than Portsmouth, Rockingham County and New Hampshire but less than Greenland and Stratham.

TABLE 1 – MEDIAN HOUSEHOLD INCOME AND PER CAPITA INCOME

Source: 2017 American Community Survey

Town/Areas	2017 Median Household Income	2017 Median Per Capita Income
Newington	$96,667	$46,688
New Castle	$113,281	$92,842
Greenland	$105,609	$49,777
Portsmouth	$72,384	$47,836
Rye	$103,792	$62,850
Stratham	$107,297	$54,956
Rockingham County	$85,619	$43,474
New Hampshire	$71,305	$36,914

HOUSING NEEDS ASSESSMENT

The high cost of housing in the region is challenging the belief that affordable housing means low-income housing. The term affordable housing means housing that does not cost more than approximately one-third of a family's income. Indications are that the lack of affordable housing in the region is becoming a barrier to labor force development. Recognizing the relationship between housing and jobs is important because the long-term economic sustainability of the region will depend on part on the region's ability to provide adequate housing for its workers.

New Hampshire RSA 674:2 requires the housing chapter of a town Master Plan include an assessment of local housing conditions and a projection of future housing needs for residents of all income levels and ages. The Regional Housing Needs Assessment completed by the Rockingham Planning Commission (RPC)

for the 2015 Regional Master Plan provides data for Newington that satisfies this statutory requirement. http://www.rpc-nh.org/application/files/6014/6100/8417/6_RMPHousing.pdf

The RPC updated the Regional Housing Needs Assessment in 2015 to quantify and project the demand for housing in the RPC region in the horizon year of 2020, and to estimate the present and projected needs for housing that is considered affordable for various income groupings, for both owned and rented units. The 2015 Assessment used data from the 2010 US Census and the update reflects the passage of NH RSA 36:37 Workforce Housing by the NH Legislature in 2008. This statute provided definitions for "affordable" and "workforce" housing and placed new emphasis on the obligations that communities in New Hampshire have to accommodate the development of such housing.

Table 5 displays the Estimated Proportional Fair Share Workforce Housing Need for Newington and surrounding towns. This data is the best estimate currently for determining the number of workforce housing units (owner and renter units combined) a community should be providing.

TABLE 5 – ESTIMATED PROPORTIONAL FAIR SHARE WORKFORCE HOUSING NEED

Source: Rockingham Planning Commission 2015 Regional Master Plan

Town	2010 Households US Census	2020 Households NH OSI Estimate	Estimated Workforce Housing Need 2020 (units)
Newington	297	280	120
New Castle	449	415	178
Greenland	1,382	1,490	640
Portsmouth	10,452	10,409	4,468
Rye	2,270	2,262	971
Stratham	2,746	3,047	1,308

The Regional Housing Needs Assessment relied on estimates from the NH Office of Strategic Initiatives for the number of households in Newington and surrounding towns in 2020. As depicted in Table 5, OSI estimated the number of households in Newington to decrease from 297 recorded in the 2010 Census to 280 in 2020. The Assessment estimates Newington needs to provide 120 affordable housing units to meet the Town's fair share of affordable housing within the region.

Based on the Town's current zoning, there is a limited amount of land (1,540 acres) available for residential development. Generally, areas east of the Spaulding Turnpike have water and sewer and land to the west is served by water. The Patterson Lane neighborhood is zoned residential; however, a stated goal of the 2010 Master Plan was the phasing out of residential uses there because of the proximity to heavy waterfront industry. The 2010 Master Plan also noted that multifamily housing on Patterson Lane

is not appropriate and violates sound land planning principles due to its proximity to existing heavy industrial uses.

Table 6 illustrates the constraints on additional land being available for residential development in Newington.

TABLE 6: LAND USES AS A PERCENT OF THE TOWN'S AREA

Land Use	Acres	Percentage of land in Newington
Upland Residential	1,540	27%
Pease Tradeport	1,436	25%
Great Bay National Wildlife Refuge	1,088	19%
Commercial and Industrial Development	790	14%
Conservation and Municipal Lands	553	10%
Spaulding Turnpike	152	3%
Wetlands in Residential District	116	2%

In addition to the limited availability of land for residential development, land values in Newington are an impediment to workforce housing. Newington has some of the highest in the state, with an 80,000 square foot buildable lot selling for approximately $300,000.

ANALYSIS OF EXISTING ZONING

The Town's current Zoning Ordinance permits residential uses in the Residential District. Newington has established eleven Zoning Districts, described below:

- Residential District – the principle use is for single-family dwellings. Permitted uses include single-family dwellings, two-family dwellings, and accessory dwelling units (ADUs). One ADU is permitted on parcels containing one existing single-family detached family dwelling with nor other accessory dwelling residences.
- Office District – the principle use is office buildings, research and development facilities, and light manufacturing.
- Commercial District – the principal use is retail sales, office buildings, research and development facilities, and light manufacturing.
- Marina District – the principle use is the repair, servicing, storage, dockage, moorage and maintenance of vessels.
- Industrial District – the principle use is industry and associated uses.

- Waterfront Industry and Commerce District – the principle use is activities dependent upon the ocean for transport of resources.
- Historic Districts – established for the preservation of places and structures of architectural and heritage value.
- Shattuck Way Overlay District – established to enable specific setback requirements in this corridor.
- Pease Tradeport District – land use in this District is under the regulatory authority of the Pease Development Authority.
- Natural Resource Protection District – established to conserve natural resources, protect wildlife habitat, protect significant potable water resources, and to provide the public with opportunities for passive recreation.
- Wetlands Overlay District – established to protect the public health, safety, and general welfare, as well as the wetland's ecological integrity and function.

The Zoning Ordinance requires a minimum of 80,000 square feet for a single-family residence and 120,000 square feet for a two-family residence. Lots which fall within the Wetlands Overlay District may require greater acreage as areas designated as wetland may be used to fulfill no more than 50% of the minimum lot size.

A Build Out Analysis conducted for the Planning Board by the Rockingham Planning Commission in 2019 estimated an additional 274 units[2] could be built under existing land use regulations; this estimate does not include the opportunity for ADUs to be constructed subordinate to a single-family dwelling unit. The Build Out Analysis is discussed in the Future Land Use Chapter of the Master Plan.

HOUSING RECOMMENDATIONS

- Encourage flexible design and siting in the development of new housing by reviewing Town land use regulations to identify opportunities to regulate housing design and location based on site characteristics and enable different types of housing.

- Support housing options such as Accessory Dwelling Units (ADUs), duplex structures, and age-restricted housing development to provide long-term opportunity for a wide spectrum of residents.

- Maintain low tax rates to help elderly and younger resident offset the region's high home assessments.

- Establish a safe distance for development from gas transmission lines.

[2] It is important to note that the Build Out Analysis relies on a computer model which estimates the maximum number of additional units

NMP 2020-2030: TRANSPORTATION

INTRODUCTION

This chapter provides an overview of Newington's transportation network, identifies current transportation issues and recommends actions to improve transportation in and around the community. As Newington strives to enhance the town's economic vitality, quality of life and environment, a multi-modal planning approach to mobility becomes more important. This approach considers multiple forms of transportation, adjacent land uses and the connecting street network to develop innovative transportation solutions that balance the needs and finances of the community and protection of the environment.

NEWINGTON'S TRANSPORTATION NETWORK

Newington has a complex transportation network for a town where residents make up less than 1% of the daily transportation volume. The network encompasses rural roads, a major state turnpike, a deep-water port, rail service and an international airport. This network is key to mobility for its citizens and economic development in town. Future land use, particularly in the Industrial, Waterfront Industrial, Commercial, and Office zones, will occur with improved access and interconnections between properties.

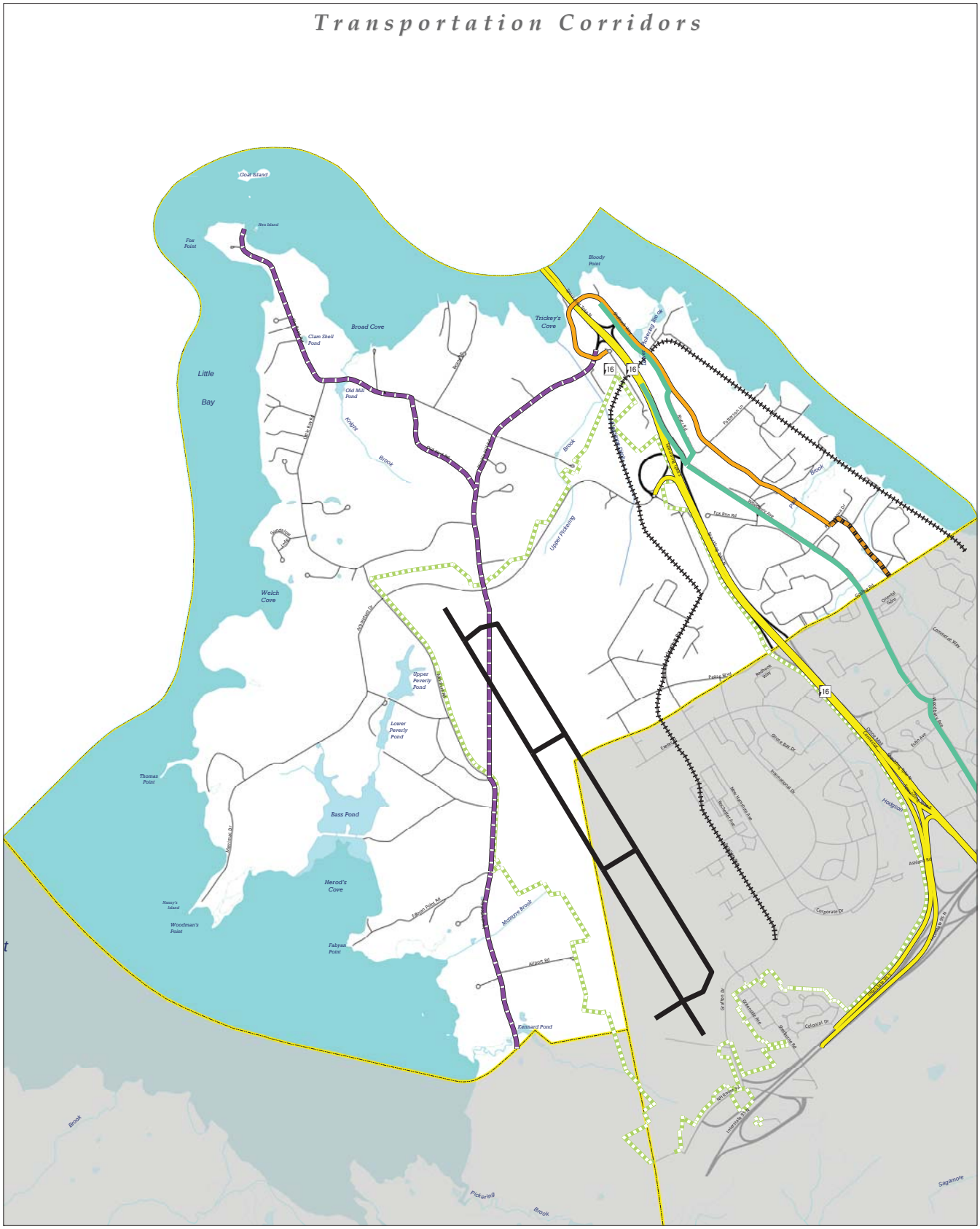
In the 1990's the Newington Planning Board developed a transportation strategy in conjunction with the N.H. Department of Transportation (DOT) and Rockingham Planning Commission (RPC) based on key travel corridors for efficient access and movement. The Planning Board identified seven arterial and collector corridors. Arterial corridors are the busiest roads, providing local connections but primarily pass people and goods through Newington quickly. Collector corridors provide similar pass through, but are slower and allow for more stops, crossflow traffic and turnoffs for local access. Remaining local roads are feeder and cross-traffic routes. Arterial corridors dominate with most converging towards Bloody Point, steered by years of limited cross-town access established by Pease Air Force Base.

From their development, Newington roads have been a mix of private, town and state-owned routes; the Planning Board sees this multi-ownership balance continuing. The board has identified seven arterial and collector corridors which are described below and displayed on Map 1.

- Waterway Corridor – Native Americans and early settlers used the waterways of the Piscataqua River, Little Bay and Great Bay to reach within a half mile of any point in Newington. Travel took little effort for even heavy shiploads but was slow and dependent on the current and winds.

- Heritage Corridor – Early land travel crossed the dry, highest land from Greenland to Fox Point or Bloody Point. The horse, wagon and stagecoach followed the Hampton to Dover trail along what became Route 151 to the Furber Point or Bloody Point ferries, or down Old Post Road to Fox Point and the first Piscataqua River Bridge.

Transportation Corridors



Transportation Corridors

Newington

Date: Fall 2019

ROCKINGHAM PLANNING COMMISSION
theRPC.org

NH GRANIT

0 0.125 0.25 0.5 0.75 1 Miles

- Waterway (Gundalow)
- Heritage - Stage/Coach Line
- Woodbury
- Railway
- Air Corridor
- Spaulding Turnpike
- Shattuck Way ICR
- Shattuck Way ICR - Future Extension
- Pease Development Authority Boundary

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
- Tidal Feature
- Shoreline; Stream
- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature

Transportation Corridors: These transportation corridors were defined by the Town of Newington Planning Board and conveyed to the Rockingham Planning Commission to be shown on this map for the purpose of use in the town's masterplan.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the Study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-2012. The roads within the Rockingham Planning Region have been updated by NH Department of Transportation through local input by the RPC where available.

Although these data have been processed successfully on a computer system at the Rockingham Planning Commission, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data to evaluate data set limitations, restrictions or intended use. Rockingham Planning Commission shall not be held liable for improper or incorrect use of the data described and/or contained herein.

RPC extends every effort to ensure map data is current and complete, however, errors do happen. Please let us know if you spot errors or omissions.

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- Woodbury Corridor – Early travelers from Portsmouth going inland followed Woodbury Avenue to Old Dover Road to River Road to Bloody Point. This corridor became the start of NH Route 16 and US Route 4, an inland gateway through the heart of Newington's industrial and commercial zones. To preserve through traffic capacity, the Newington Planning Board has adopted a strict policy of limited direct access to north Woodbury Avenue from adjacent property. The Planning Board favors feeder roads serving multiple businesses at spaced intersections and encourages private side or back road connections between adjacent lands and businesses. The Woodbury Corridor Annual Average Daily Traffic (AADT) volume in 2018 was 11,000–14,000 vehicles.

- Railway Corridor – In 1873, brewer Frank Jones financed the rail lines along the Piscataqua's western shoreline and the Bloody Point to Dover Point bridge, securing heavy industry access in eastern Newington with fisheries, Shattuck shipyards and storage docks for minerals, oil and gas. In the 1950's, the U.S. Air Force established a rail right-of-way that still exists today and leads from Newington Station into the Pease Tradeport and south. This right-of-way is owned by the Pease Development Authority and has been abandoned; the rails have been removed.

- Air Transport Corridor – The flat sands and gravel slopes in central Newington, previously converted from forestland to farmland, became the future runways of Portsmouth Field, and then Pease Air Force Base. This established an air corridor for commercial cargo and passengers and continued military use as Portsmouth International Airport at Pease.

- Spaulding Turnpike Corridor – By the mid 1950's transportation demands increased into inland New Hampshire and the first "bypass" to the Woodbury Avenue corridor was added as a major multi-lane arterial about the same time as Pease Air Force Base was being built. As traffic has increased, lanes have been added and interchanges limited to feeder connections at Gosling Road, Woodbury Avenue and Shattuck Way. The Spaulding Turnpike AADT volume for 2018 ranged from 56,000–70,000 vehicles.

- Shattuck Way Industrial Corridor – In the mid 1990's the Planning Board identified Shattuck Way as a second heavy industrial traffic bypass to Woodbury Avenue, preserving the route's capacity to serve Newington's growing commercial zone and increasing pass through traffic along Woodbury Avenue. The arrival of a regional gas mainline and second energy plant to the town spurred the Planning Board to commission the Industrial Corridor Road Study with town funds and to direct the energy plant to construct Shattuck Way. In 2019 N.H. DOT listed Shattuck Way as a candidate for designation as a Critical Urban Freight Corridor (CUFC). If designated, Shattuck Way would be eligible for improvement funds from the New Hampshire Freight Plan for projects that support national transportation goals. The Shattuck Way AADT volume in 2017 was 2,600 vehicles, most of which are heavy trucks. In the future, extending Shattuck Way to the Portsmouth line, along Portsmouth's Business Commerce Way to Market Street, would complete the waterfront freight route to Interstate 95.

Improving the transportation network brings together not only the town but multiple state and regional agencies who use several established plans and programs to coordinate ideas and resources.

- The State of New Hampshire has a Long-Range Transportation Plan which is administered regionally by the Rockingham Planning Commission (RPC) and contains the region's adopted policies, goals and objectives, and specific project proposals to improve the transportation system of southeast New Hampshire through the year 2045. The plan reflects the goals and objectives of RPC member communities, including Newington, N.H. DOT, and the RPC's Regional Master Plan. The 2023-2045 Long Range Transportation Plan includes a project at Pease Boulevard/New Hampshire Avenue/Arboretum Drive to add a northbound right-turn lane on New Hampshire Avenue at the intersection with Arboretum Drive and Pease Boulevard.

- The region has a Transportation Improvement Program (TIP) which is administered by the RPC for Newington and other towns in the region. The TIP is a multi-year program of regional transportation improvement projects scheduled for implementation over four succeeding federal fiscal years. The TIP is prepared by the RPC, NH DOT, regional transit agencies and municipalities. The 2019-2022 TIP includes projects in or abutting Newington, including reconstruction of the Spaulding Turnpike and replacement of the General Sullivan Bridge to provide a bicyclist and pedestrian connection between Newington and Dover.

NEWINGTON'S ROADS AND INTERSECTIONS

Newington is a balance of state, town, and private roads. The town was once served by five state routes: 1st NH Turnpike (Old Post Road and Fox Point Road to 1st Piscataqua bridge), Route 151 (Newington and Nimble Hill Road), Routes 4 and 16 (Woodbury Avenue/Old Dover Road/River Road) and Spaulding Turnpike (STP). Routes 4 and 16 have been consolidated into the Spaulding Turnpike and N.H. DOT has been negotiating with Newington to accept maintenance responsibility for the remaining state road. Woodbury Avenue and Newington Road are the State routes not transitioned as of this Master Plan. Table 1 provides an inventory completed in 2019 of all roads in Newington, both state and town maintained.

TABLE 1 – INVENTORY OF ROADS IN NEWINGTON

Road Name	Legal Class	Length (ft)	Paved Width (ft)	Right-of-way Width (ft)	Condition of Road based on 2018 Pavement Condition Assessment Index*
Airport Road	V	2,640	16	33	79/100
Avery Road	Private	2,000	24	75	NA
Beane's Lane	V	1,580	21	50	93/100
Brickyard Way	V	340	21	50	86/100
Captain's Landing	V	1,500	25	50	79/100
Carter's Lane	V	1,200	12	unknown	50/100
Coleman Drive	V	850	21	50	78/100

Road Name	Legal Class	Length (ft)	Paved Width (ft)	Right-of-way Width (ft)	Condition of Road based on 2018 Pavement Condition Assessment Index*
Dumpling Cove	V	895	26	50	92/100
Fabyan Point Road	V/Private	1,100/3,150	25/10	50/10	99/100
Fox Point Road	V	7,075	18-21	43-50	78/100
Fox Run Road	V	2,270	16-36	50	NA
Gosling Road	V	5,500	26-46	unknown	67/100
Gundalow Landing	V	1,300	21	50	89/100
Hannah Lane	V	1,000	25	50	66/100
Hodgdon Farm	V	1,246	26	50	65/100
Little Bay Road	V	9,715	21	32-40	90/100
Little Bay Road Ext.	V	370	20	unknown	82/100
Lydia Lane	V	250	22	50	99/100
Mall Ring Roads	Private	10,700	30	unknown	NA
McIntyre Road & Bridge	V	7,660	21	50	81/100
Motts Cove	V	693	26	50	75/100
Newington Road	II	6,440	21	50	NA
Nimble Hill Road	V	8,180	22	50	73/100
Old Dover Road	V	1,110	23	unknown	44/100
Old Post Road	V	3,270	18-21	28-36	81/100
Patterson Lane	V	2,590	20-21	38-60	72/100
Piscataqua Drive	V	720	36	60	99/100
River Road	V	2,039	21	50	68/100
Rowe's Way	Private	570	24	30	NA
Shattuck Way	V	6,104	36	60	83/100
Spaulding Turnpike	I	12,400	76	300+	NA
Swan Island	V	850	21	50	37/100
Welsh Cove Drive	V	1,300	21	50	89/100
Wilcox Way	V	Under	construction	50	NA
Woodbury Avenue	V	7,310	60	100+	99/100

*The Pavement Condition Index (PCI) is a quantitative number ranging from 0 to 100 that represents the quality of the linear feet of Town owned roads for maintenance purposes. The higher the number, the greater the general pavement condition. The PCI is calculated from road data inventory inputs such as the presence of cracking, potholes, and rutting.

Roads in New Hampshire are categorized into classes per NH RSA 229:5. Roads in Newington fall into the following categories:

- Class I highways are highways on the primary state highway system.
- Class II highways are highways on the secondary state highway system.
- Class V highways are highways that the town has the duty to maintain regularly and are known as town roads.

Scenic Roads - Preservation of Newington's historic and rural character is a primary goal of the Master Plan. The Town has acted proactively to protect the scenic qualities of Newington's local roads by designating all Class V roads west of the Spaulding Turnpike as Scenic Roads, per NH RSA 231:157-158. This statute states stone walls and trees in the public right of way cannot be removed or altered without the consent of the Planning Board, unless they are within three feet of the traveled surface and interfere with public safety. In emergency situations, the road agent may cut and remove trees with the permission of the Board of Selectmen. A Scenic Road designation does not preclude paving the road, nor does it limit the property rights of abutters.

Cul-de-sac Streets – Cul-de-sac streets enhance privacy and the lack of thru-traffic may improve safety. However, due to the possibility of a tree limb or electrical wire blocking access for emergency vehicles, long cul-de-sacs should be prohibited.

Road Management and Maintenance Plan - The Rockingham Planning Commission completed a Road Management and Maintenance Plan for the Town of Newington in 2019. The plan provides an inventory of local roads and assessment of road conditions to enable the town to plan for pavement maintenance and rehabilitation. The Board of Selectmen and the road agent have adopted the plan as a basis for future maintenance of Newington roads, taking into consideration the impacts of climate change and the increase in extreme precipitation events on culverts and other road infrastructure. The plan is available in the Appendix.

Woodbury Avenue/Gosling Road Intersection – A large amount of commercial and retail activity occurs on Woodbury Avenue and Gosling Road, generating a substantial amount of traffic at this intersection. Continued growth and development will stress the capacity of traffic control signals.

Woodbury Avenue/Piscataqua Road Intersection – Woodbury Avenue serves as a primary arterial in Newington, moving traffic between the commercial, industrial and retail uses along the corridor both in Newington and Portsmouth, and the Spaulding Turnpike. The current roadway is deficient, however, in that it is only designed to facilitate motor vehicle traffic. The roadway is six lanes wide in places and there are no designated pedestrian crossing points at the entry to Fox Run Mall at Piscataqua Road, the entry road for The Crossings or the onramp for the Spaulding Turnpike at Exit 4. Current signalized and unsignalized intersections are not designed to accommodate pedestrian crossings as they include no sidewalks, crosswalks, signal heads or other facilities designed to provide access to, or improve the safety of, non-motorized roadway users. Current development activities in the area have increased the number and type of uses occurring along the corridor and any roadway improvements facilitated by new development should include rebuilding intersections to be pedestrian and bicycle friendly as well as accommodating movement along and across the roadway.

Traffic Safety – There is concern in town that Newington Road/Nimble Hill Road/Little Bay Road/McIntyre Road are being utilized to avoid congestion and construction on the Spaulding Turnpike, and to connect to Route 33 in Greenland. Drivers using GPS and traffic diversion apps are accessing local roads, resulting in increased traffic volume and speeds through the center of town.

Access between Newington and Pease Tradeport – To enhance commerce and mobility for residents, the town and Pease Development Authority need to re-address access options for roadway interconnections along Arboretum Drive at Nimble Hill Road, McIntyre Road Bridge (town owned), and other locations.

PUBLIC TRANSPORTATION

Newington's business district is served by two public transportation systems: the Cooperative Alliance for Seacoast Transportation (COAST) and UNH Wildcat Transit. COAST's trunk Route 2 connects Rochester, Dover, Newington and Portsmouth with Newington service to the Mall at Fox Run, the Crossings and businesses along Shattuck Way. COAST Route 40/Pease Trolley connects the mall complex, Walmart, Pease Tradeport and downtown Portsmouth. Both services operate Monday-Saturday. UNH Wildcat Transit Route 4 connects Durham, Newington and downtown Portsmouth with stops at the malls, Walmart and along Woodbury Avenue. These services are valuable in connecting both employees and customers to Newington businesses that make up a large portion of the local tax base. Larger employers increasingly expect transit to be provided by municipalities as a core public service.

Newington's village center and residential areas are more difficult to serve cost effectively with fixed route transit given their low population density. Newington, like much of the state, will see a growing need for transportation options in the coming decade with the aging of the baby boom generation. Newington has a relatively high population of older adults with a median age (53.7 years), among the highest in the state. According to the AARP, approximately 20% of Americans over age 65 don't drive but need transportation assistance to continue to live independent, active lives and be able to age in place. Ensuring adequate and flexible transportation options for residents was a theme at the master plan visioning forums.

COAST currently provides demand response paratransit service within 0.75 miles of transit stops for individuals with disabilities under the Americans with Disabilities Act (ADA). COAST also provides medical transportation for seniors and individuals with disabilities through its TripLink call center that is not restricted based on ADA eligibility.

Private sector transportation options such as traditional taxis as well as Uber and Lyft are available in the region and can be appropriate options for many who don't drive or prefer not to drive, are relatively tech savvy and able to pay market rates. A limitation of these options is that they are generally not accessible for individuals with wheelchairs or other mobility devices.

A cost-effective solution for senior transportation that is expanding in many parts of the state is volunteer driver programs. Volunteer programs such as TASC, Ready Rides and the Portsmouth Senior Transportation Program serve many Seacoast communities, coordinating volunteers to provide rides to medical appointments and other trip types. None currently serve Newington. Programs make decisions

to add communities to their service area based on a combination of available local volunteers and a commitment of municipal funds. Developing local volunteer driver capacity, or addressing growing senior transportation needs, will be an important consideration for the town in the coming decade.

PORT FACILITIES

Portsmouth Harbor and the Piscataqua River are the largest and the sole deep-draft port in the state handling approximately 3.5 million tons of shipping annually. Fed by the confluence of multiple rivers into the Great Bay Estuary, the harbor is a tidal estuary and is unencumbered by ice, providing year-round access for goods essential to the commerce of New Hampshire. The NH Port Authority, under the Pease Development Authority (PDA), controls over 1,500 moorings and multiple state docks. Newington's waterfront district occupies over 50% of the harbor. It is unique because of the town's commitment to only allow ocean-dependent industry in this zone. Continuing this policy is essential for the state's economy and as a continuing source of over 60% of the town's revenue.

The port encompasses a 6.2 mile-long channel along the Piscataqua River, 42 feet deep, with air draft of 135 feet and generally 400-600 feet wide. The channel runs northwesterly from deep water between New Castle and Seavey Island to a turning basin approximately 1,700 feet past the Atlantic Terminal Sales dock in Newington. Bedrock at bends in the river was blasted in 1966 to widen the channel to approximately 700 feet to ease ship passage. The harbor includes two 42-feet deep turning basins. The first turning basin is located opposite the Port Authority dock in Portsmouth and is 1,000 feet wide. The second is at the end of the channel in Newington and is 800 feet wide. This upper turning basin is scheduled for a deepening and widening in 2022 provided state and federal funds are available.

Management of the port is the responsibility of the Pease Development Authority's Division of Ports and Harbors, which oversees state piers in the harbor. Newington has five active commercial piers located at Pickering Riverside, Little Bay Lobster, Tyco, Sea 3 and Sprague (two land locations) with over three million barrels of bulk storage facilities for oil, gasoline, liquified petroleum gas, asphalt, salt and numerous other materials. The port also handles large quantities of salt and gypsum rock. Industries located in Newington that rely on the port facilities include Little Bay Lobster Company, the world's largest harvester of lobsters; two generating plants; EP Newington Energy and Granite LLC Energy; Sea-3 propane facilities; Riverside Pickering marine contractors; and SubCon, a manufacturer of deep sea fiber optic cables. The Sprague Energy Terminals off Shattuck Way provide storage for fuel, heating oil and kerosene, as well as dry bulk and liquid bulk material storage and handling. In Newington, access to port facilities is made via Shattuck Way and Woodbury Avenue within a mile of interstate turnpikes.

Multiple options for additional piers await development adjacent to the former Mobil Oil tank farm site, at the Mahoney/WWI shipyard site and at the prior Air Force fuel farm site with nearby land site connections for these piers range from a few acres to over 15 acres. Newington has no

funds or access to grants to support port facilities; however, it is actively involved in long-range planning for port expansion in support of the Pease Development Authority Division of Ports and Harbors as they seek grant funds to rehabilitate facilities.

Harbor escort, security and emergency response for the port are shared responsibilities: escort tugs complete over 800 round trip movements for 195 ship movements each year (generating $35K per round trip). Rescue vessels from the City of Portsmouth, Town of Newington, U.S. Coast Guard, U.S. Navy and Moran commercial firm serve the harbor; there is no mutual aid contract. Casualty landing points are designated at Great Bay Marina, N.H. Port Authority and the Coast Guard station (staffed by 25 people per shift). Also, pre-positioned containment boom barges for spill containment are positioned on moorings. For fire suppression, Drum Terino and Town Point tugs have capabilities at 500 gpm, Handy Four tug at 1000 gpm and two Navy contract tugs at Little Bay Lobster providing 3500 gpm each (additional shipyard capabilities from U.S. Navy). Policing is provided by 12 individual, federal, state and local departments around the harbor.

RAIL CORRIDORS

Pan Am Railways owns and operates the Newington Branch rail corridor that runs through Newington's Waterfront Industrial Zone near the shore of the Piscataqua River. Freight service is available via the Portsmouth Branch, which begins at Rockingham Junction in Newfields and travels through Stratham, Greenland and Portsmouth before entering Newington. The Newington Branch is 3.5 miles in length and terminates at the C.H. Sprague and Son's bulk storage facility. The Pease Development Authority is preserving a State-owned rail corridor from the Sprague facility across the Spaulding Turnpike and southward along the aviation industry zone. Should heavy rail be needed for future Tradeport industry or a potential light rail commuter rail system is viable, it could continue to the south Tradeport access roadway and reconnect with the PanAm rail in Greenland.

PEASE AIR TRAVEL

Portsmouth International Airport at Pease is owned and operated by the Pease Development Authority. The military is a major tenant with the Pease Air National Guard sharing the runway with general aviation flights and aircraft training operators. The airport is a military port of entry and a U.S. Customs port. Domestic and international terminal passenger services are seeing an increase in the number of passenger airlines serving the airport. Work is underway to expand the terminal to add a new concourse and passenger and baggage screening facilities.

BICYCLIST AND PEDESTRIAN ROUTES

Public input forums and the community survey conducted for the Master Plan identified frequent use of local roads by residents for running, walking and bicycling, and the need to provide better safety for

bicyclists and pedestrians. The town takes a different approach to bicyclists and pedestrian routes depending on their location:

- Town residential roads are beautiful routes but offer little if any shoulder to provide a margin of safety for bicyclists and pedestrians. Residents prefer to avoid curbed sidewalks in favor of side trails and paths in order to enjoy the rural character of the areas. A complicating factor is that many older residential roads have little if any shoulder right of way (ROW) which could be safely used for walking or biking. Options for providing safer routes for bicyclists and pedestrians include widening the shoulder in areas where the ROW and terrain permit and establishing stone dust or asphalt paths separated from the road by a grass strip. The separated paths would provide the safety of being separated from vehicular traffic with a more rural feel but would be costly and require additional care to maintain.

- Town roads in the business districts with commercial and office traffic are required to have curbed sidewalks and crossing safety improvements, utilizing an existing sidewalk network and parking lot aisles. As parcels along Woodbury Avenue are redeveloped, sidewalk and crossing improvements will be needed between the entrance to the Crossings on Woodbury Avenue and Gosling Road and along Gosling Road to provide safe access to the existing bus stop.

Newington is a central link in the State Bicycle Route. Maintaining a pedestrian and bicycle link across Little Bay has been a core component of the Newington-Dover Little Bay Bridges construction project. For years the General Sullivan Bridge has provided a crossing for bicycle commuters and recreational riders from Dover, Durham and points north into Newington and Portsmouth. The bridge has been permanently closed and NHDOT is evaluating alternative designs. In the interim, NHDOT has opened the right shoulder of the northbound Little Bay Bridge for walking and bicycling traffic during construction with a protective traffic separation barrier. Newington maintains that a replacement to the General Sullivan Bridge is needed for long-term bicycle and pedestrian traffic. The remaining State Bicycle Route connection from the General Sullivan Bridge to Pease follows Shattuck Way to Nimble Hill Road. Bicyclists turn left onto Fox Point Road to a bike path cut through to the Tradeport following the road eventually leading to the Portsmouth Traffic Circle. Bicyclists riding further south toward South Newington follow Nimble Hill Road to Little Bay Road to McIntyre Road and onto Newington Road. The public forums also highlighted growth of cut-through traffic and speeding on these roads, suggesting a need for traffic calming to bring down speeds and potentially make the roads less attractive as cut-through routes.

TRANSPORTATION RECOMMENDATIONS

- Improve traffic signal coordination along Woodbury Avenue and Gosling Road.
- Research traffic calming techniques for Nimble Hill Road, Little Bay Road, McIntyre Road and Newington Road to minimize impacts of through traffic. Providing additional shoulder width on these roads while maintaining narrow travel lane striping would have safety as well as maintenance benefits without increasing speeds.
- Improve bike route safety along Newington Road, Nimble Hill Road, Little Bay Road and McIntyre Road to facilitate movement from the General Sullivan bridge to the NH 33 and NH 151 corridors.

- Continue support for a transit connection to Pease and to commercial areas on Woodbury Avenue/Gosling Road.
- Improve safety of transit stops at Gosling Road.
- Complete classification counts (volume and vehicle type) at turnpike interchanges and along Shattuck Way to better understand the volume of truck traffic and need for any improvements on that facility.
- Conduct volume counts on Nimble Hill Road and Little Bay Road to improve understanding of potential cut-through traffic issue.
- Advocate for prioritizing Shattuck Way in the state's Critical Urban Freight Corridor to enable funding for road improvements.
- Redevelopment of the Fox Run Mall may provide opportunities for other transportation improvements.
- Monitor plans for growth and improvements to the port keeping in mind that the Town has no funds nor access to funds to support port facilities.
- Advocate for dedicated, permanent bicycle and pedestrian lanes on the Little Bay bridges, separate from highway traffic and the breakdown lanes, to replace the General Sullivan Bridge.
- Require expanding and new commercial and industrial development in the Waterfront Industrial Zone to construct the infrastructure needed to support the industrial activity – power, water, sewer, roads, and railways.

NMP 2020-2030: PUBLIC UTILITIES

INTRODUCTION

Public utilities—electricity, water and sewer systems and internet service—provide a critical role in land use, land development and economic development in Newington. NH RSA 674:2III(g) requires the town's Master Plan to include a section on utilities, "analyzing the need for and showing the present future general locations of existing and anticipated public and private utilities, both local and regional, including telecommunication utilities, their supplies and distribution and storage."

For a town with only 735 residents and a land area of only 4.7 square miles (excluding Pease), Newington is home to a complex mix of public utility infrastructure serving the town and the region. As a result, Newington harbors more than the region's fair share of utility infrastructure, easements and right-of ways, impacting other land uses and development opportunities. The following is a description of utilities servicing and operating in Newington.

ELECTRICITY

Newington is supplied with electricity by Eversource. Two of the region's primary electricity generating facilities are in Newington, the 525 MW Essential Power plant at 200 Shattuck Way, which burns natural gas, and the 400 MW Newington Station at 165 Gosling Road, which burns oil and natural gas. A third plant, the 50 MW Schiller Station at 400 Gosling Road in Portsmouth, which burns wood chips, is near the Newington town line.

High-voltage transmission lines run parallel to Gosling Road and connect Newington Station and Schiller Station with the nuclear power plant in Seabrook. These lines are rated for 345KV and 115KV. Newington in served by several 34.5KV transmission lines which double as distribution lines for very large electricity consumers, such as the Fox Run Mall. The mall was one of the earliest facilities in New Hampshire to be served by an underground 34.5KV line. Currently, the 34.5KV is the highest voltage used for distribution in New Hampshire. Given that the 34.5KV line is enough to serve a complex as large as the Fox Run Mall, it is reasonable to conclude that these lines are capable of handling future commercial or industrial development in Newington.

In Newington, 34.5KV transmission/distribution lines run the length of the Spaulding Turnpike, Woodbury Avenue and the Avery Road, and along the northern stretch of Shattuck Way. 34.5KV branch lines serve Tyco, Sprague, Thermo Electron, GP Gypsum, the Fox Run Mall and the Crossings at Fox Run.

South Newington is served by a 4.16KV transmission line which is stepped down from a 34.5KV line off the old Route 101 in Greenland. The remainder of Newington's Residential District, except for Patterson Lane, is served by a 4.16KV line which is stepped down from a 34.5 KV transmission line at a site off Nimble Hill Road opposite Old Post Road.

As of October 2019, a new 115KV transmission line is under construction in the region as part of Eversource's Seacoast Reliability Project. The transmission line will travel from an existing substation in Madbury, across Durham, under Little Bay, and across Newington to an existing substation in Portsmouth. Considering the above, it is evident that electrical generating and distribution capacities in Newington are more than adequate for the foreseeable future.

NATURAL GAS

Natural gas is supplied to Newington by Northern Utilities, a subsidiary of the Bay State Gas Company. Most of the gas originates in western Canada, the Canadian maritime provinces or the Gulf Coast region of the United States. The gas is piped to Newington from the south via Massachusetts and from Montreal and Nova Scotia via Portland, Maine.

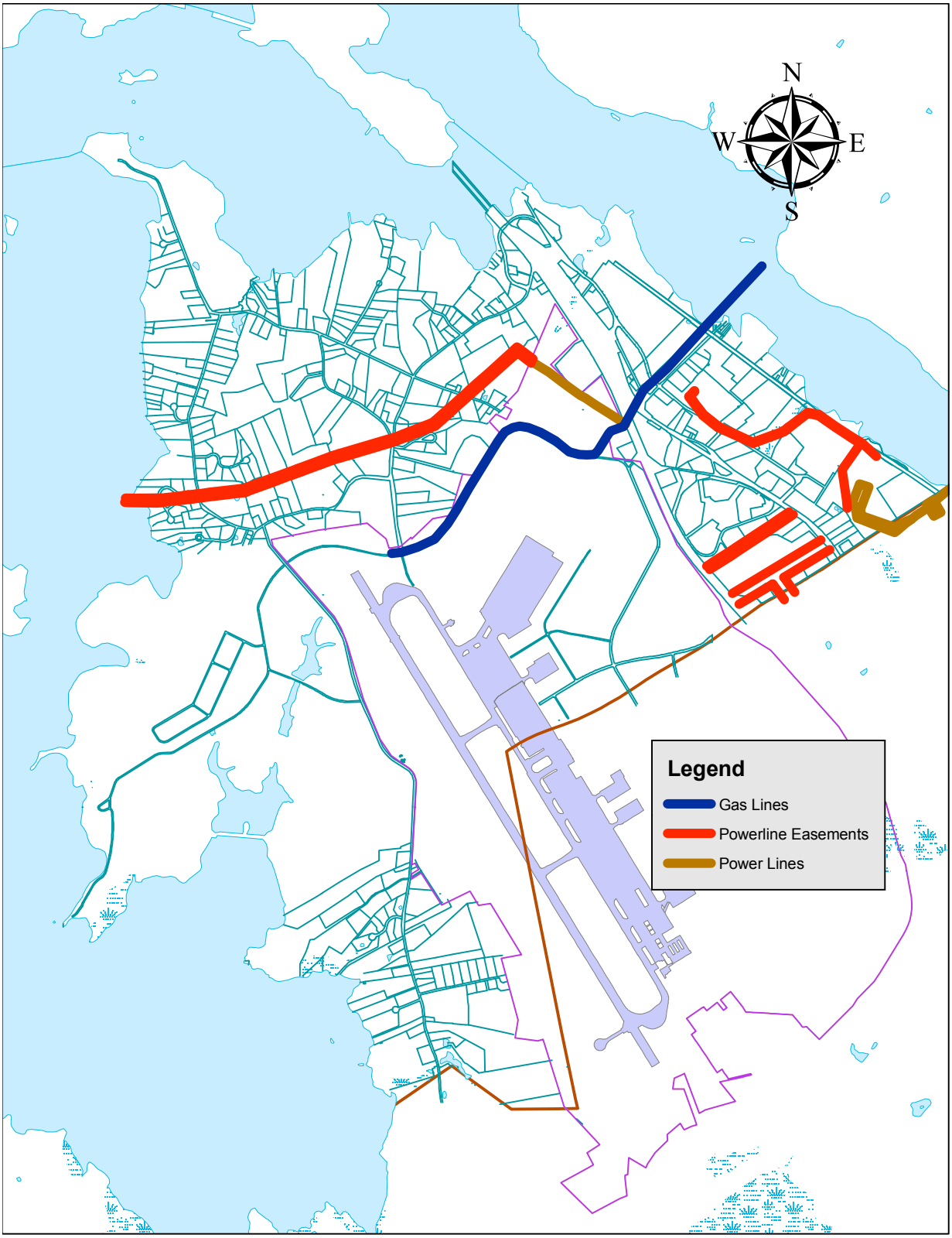
High-pressure natural gas transmission pipelines operated by Maritimes Northeast Pipeline LLC and Granite State Gas Transmission Line Inc. travel through Newington. These two-inch and four-inch gas distribution lines run throughout the Commercial and Industrial Districts. In the Residential District, a four-inch distribution line was laid along Nimble Hill Road and Fox Point Road in 1998. This line serves the Elementary School, Fire Station, and Police Station and can serve residential customers located within 100' of the distribution line. The town anticipates the existing gas supply and associated infrastructure can adequately meet future needs.

WATER

Newington is provided by the City of Portsmouth's Water Division and water lines run along every public road in town except McIntyre Road. In December 1965, the town entered into an agreement with Portsmouth whereby Newington would pay for installation of the local water distribution infrastructure and Portsmouth would assume ownership of the system and provide water. Portsmouth also provides water to the Pease Tradeport and other surrounding towns and this regional system is registered with the N.H. Department of Public Utilities. The Pease infrastructure operates separately from the rest of the system, however an inter-connect mechanism exists for utilization in the event of an emergency.

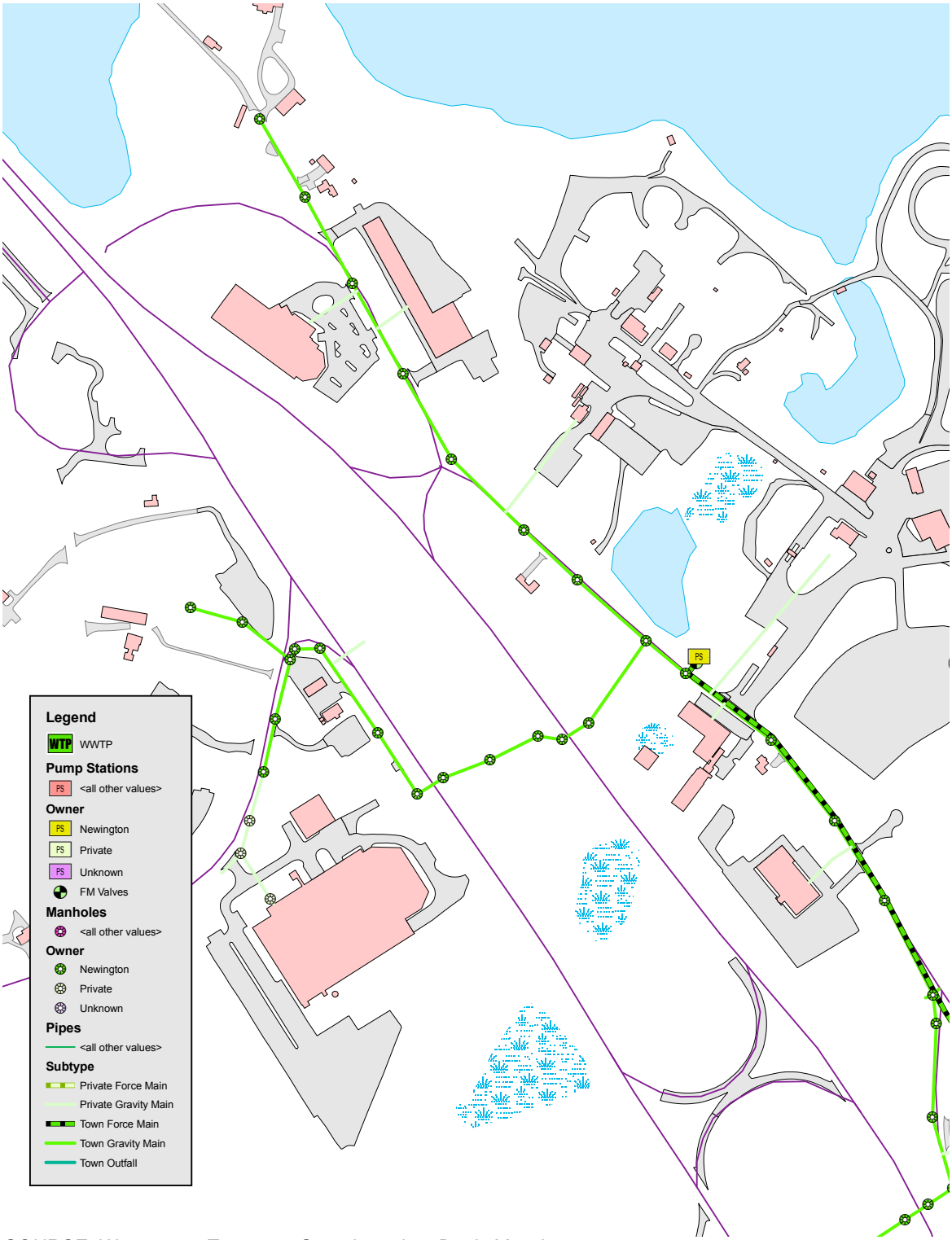
Water supplied by the Portsmouth water system comes from a combination of surface water and groundwater sources. The primary source of surface water is the Bellamy Reservoir in Madbury and Dover. The reservoir was created by the construction of a dam across the Bellamy River in 1959 and has a storage capacity of six million gallons per day. Water from the reservoir flows through a 24-inch gravity main to a treatment plant on Freshet Road, also in Madbury. From there, the water line travels through Durham and under Little Bay to Fox Point in Newington and along Fox Point Road to a booster station near Arboretum Drive and the Spaulding Turnpike. In addition to the Bellamy Reservoir, Portsmouth draws water from three groundwater wells in Madbury, two wells in Portsmouth, two wells at Pease Tradeport and one well in Greenland. The system's total daily average water production is 4.5 million gallons per day.

Utility Easements



Newington Sewer System

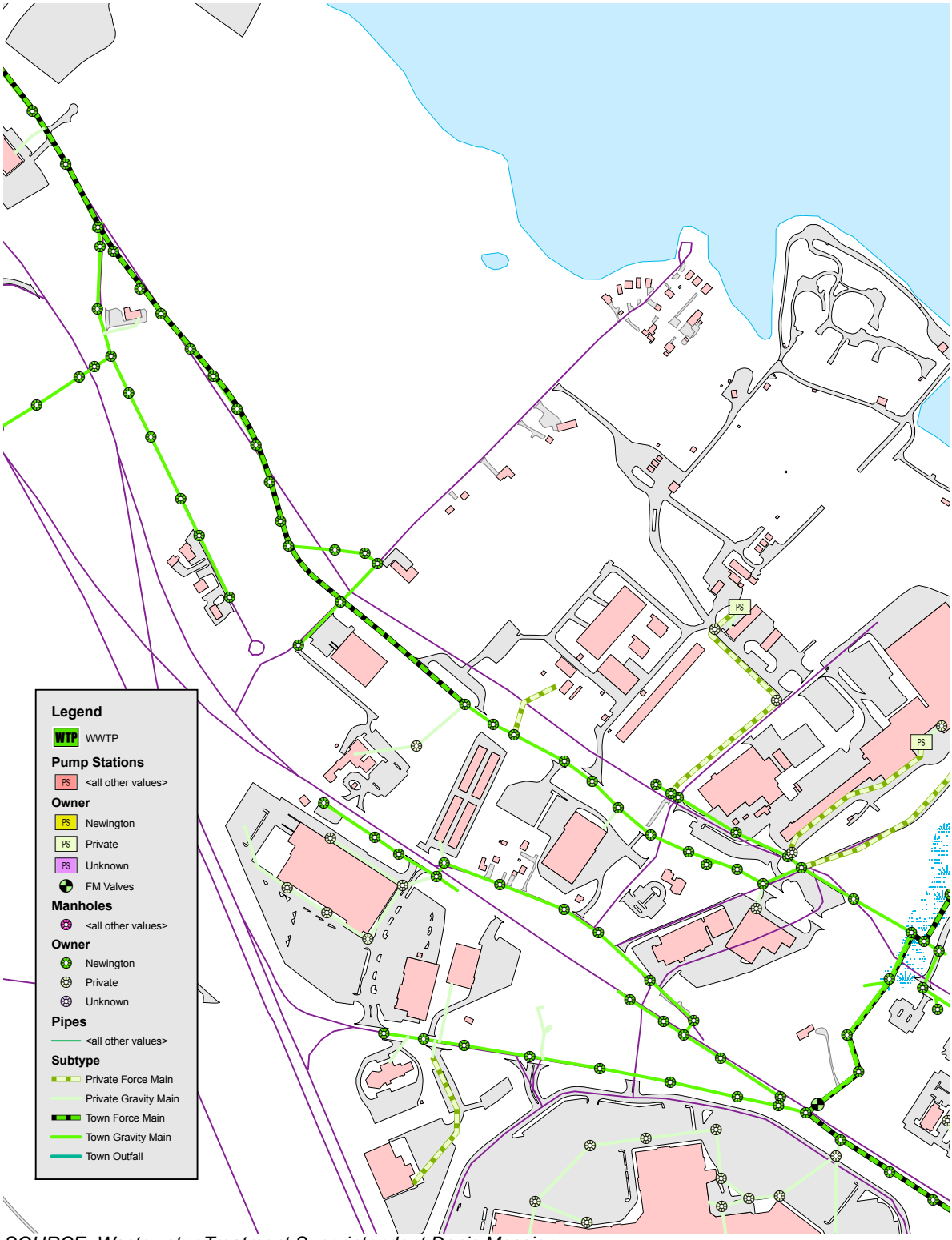
in the Vicinity of Bloody Point



SOURCE: Wastewater Treatment Superintendent Denis Messier

Newington Sewer System

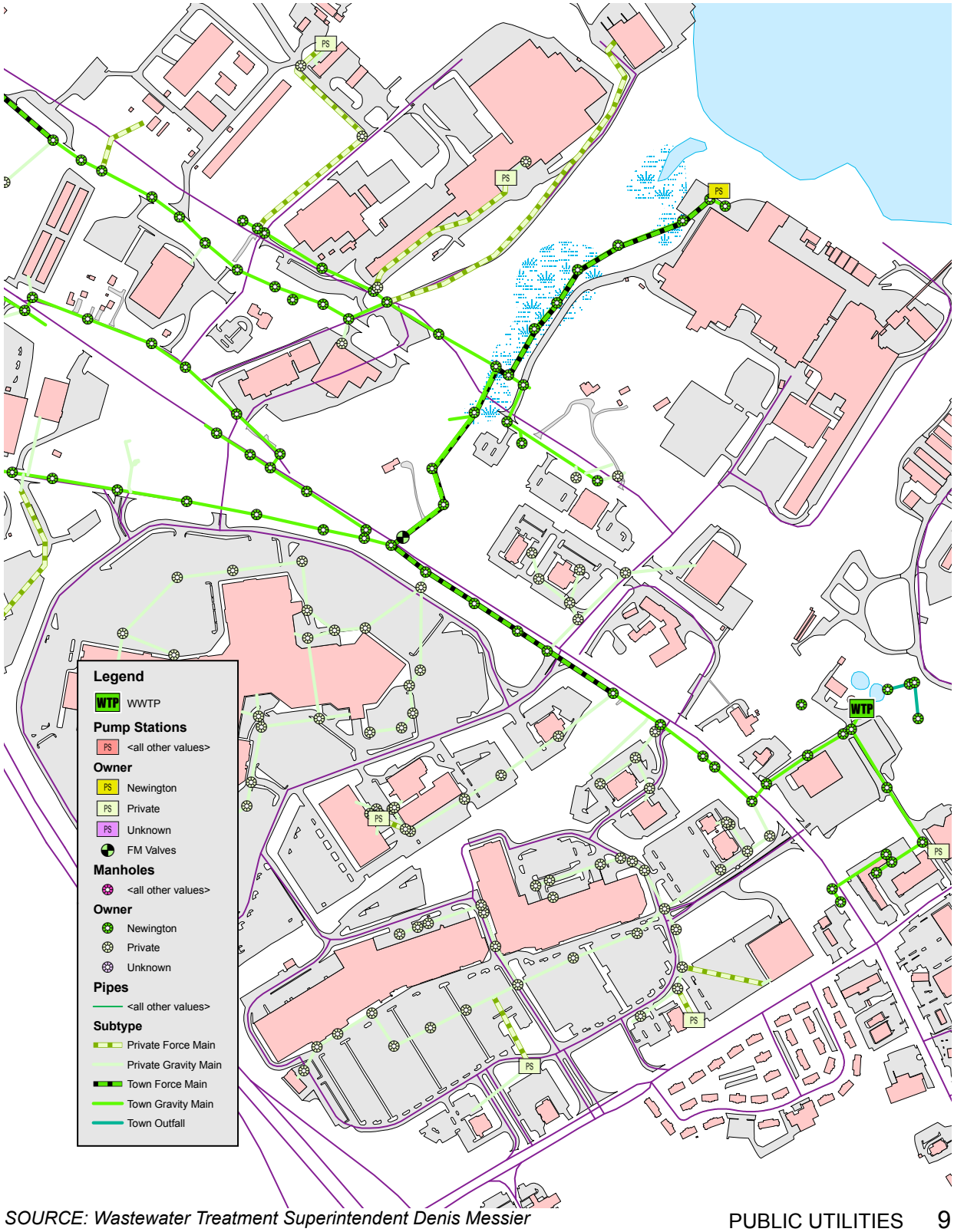
in the Vicinity of Bean's Hill



SOURCE: Wastewater Treatment Superintendent Denis Messier

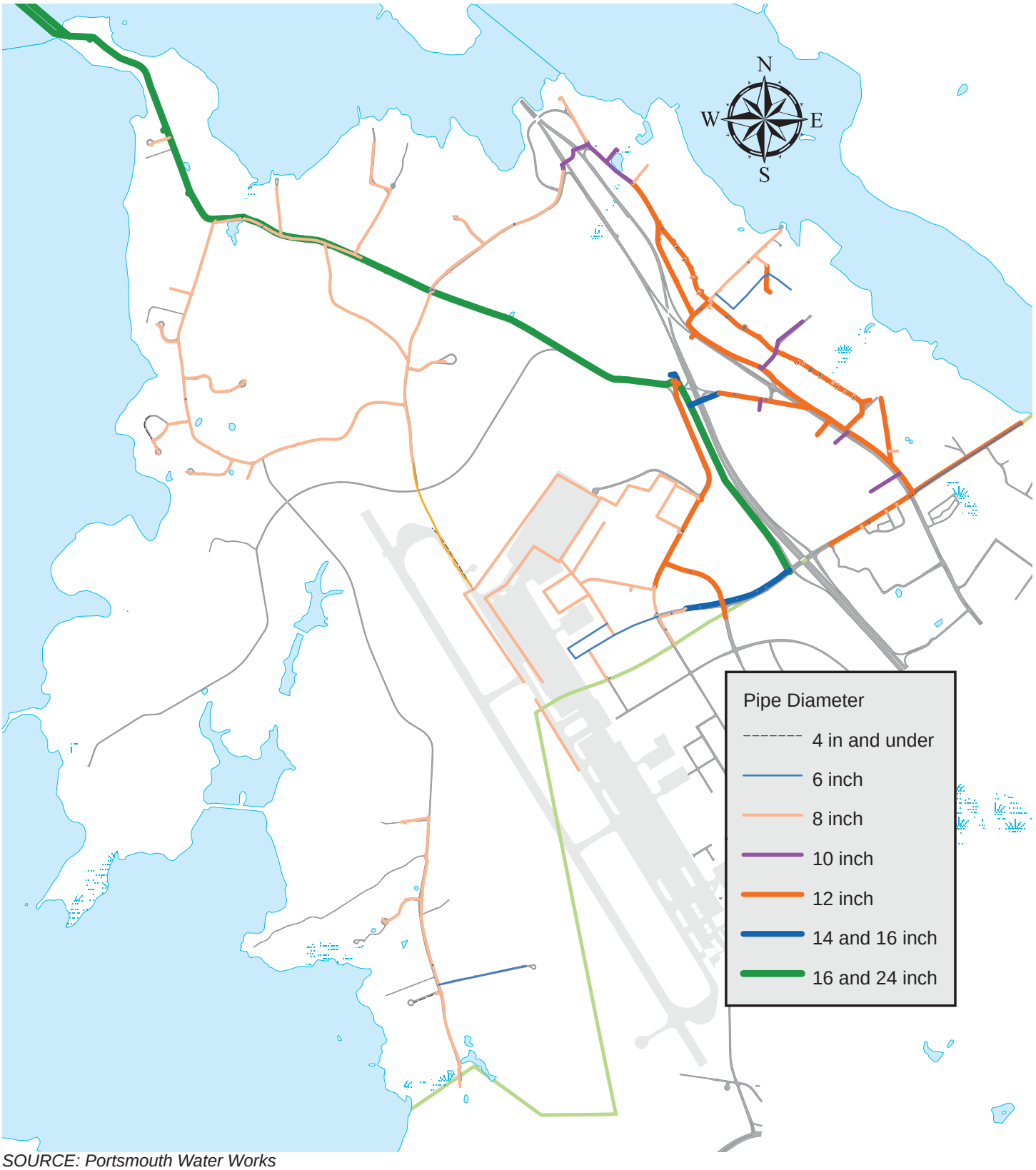
Newington Sewer System

in the Vicinity of the Malls



SOURCE: Wastewater Treatment Superintendent Denis Messier

Water Distribution System



SOURCE: Portsmouth Water Works

Newington hosts several large water consumers, including Newington Station, Tyco and GP Gypsum. Water mains serving Newington range in size from six-inch to 12-inch, with primarily eight-inch line serving residential areas and a 12-foot line running along Woodbury Avenue to River Road. The Newington Fire Department conducts tests of the water distribution system to monitor pressure and volume. The Town of Newington's 2019 Hazard Mitigation Plan recommends the town work with the City of Portsmouth to upgrade the water distribution lines serving Little Bay Road, Nimble Hill Road and Newington Road to increase volume and pressure for fire suppression and residential water use.

A Water and Sewer Consumption Analysis completed in 2013 for the City of Portsmouth reports Newington had 244 single-family residential water accounts with the average of 6,374 gallons of water used per month per account. Newington's water usage was significantly higher than the rate reported for single-family accounts in Portsmouth, which averaged 3,766 gallons per month per account. The report does not indicate a reason for Newington's higher residential water usage. The analysis reports there were 66 commercial water accounts in Newington, with an average of 103,676 gallons used per month per account, 16 industrial accounts with an average of 288,716 gallons used per month per account and three municipal accounts with an average of 3,885 gallons per account per month. In total, Newington used approximately 13% of all the water consumed by the Portsmouth water system, approximately 157,238,080 gallons annually, or 429,610 gallons per day.

In July 2019 the State of New Hampshire approved drinking water standards for four Perfluorinated compounds, commonly referred to as PFAS. PFAS are a large class of chemicals that have been widely used since the 1940s in commercial, industrial, and household products. Their widespread use, persistence and mobility in the environment, and bioaccumulative properties has resulted in the detection of PFAS in blood serum in humans and animals worldwide. The health effects associated with PFAS exposure are being studied. All four PFAS have detected in New Hampshire's groundwater and surface water and the City of Portsmouth has been proactive in sampling for PFAS ever since the discovery of the compounds above EPA's health advisory was discovered in the Pease Tradeport Water System's Haven Well in May 2014. The well was contaminated by the use of firefighting foam at the former Pease Air Force Base. The Haven Well was shut down and a comprehensive investigation into the source and extent of the contamination was undertaken. A monthly monitoring program of the Pease supply wells was also implemented as was installation of a system to filter PFAS compounds from the Pease wells. A new water treatment facility is scheduled to go online at Pease in 2021. Portsmouth conducts quarterly testing of water sources based on the new drinking water standards.

The City of Portsmouth provides monthly reports on water supply status, tracking precipitation, groundwater and reservoir levels, and surface water flows. The city asks Newington residents and other users to use water wisely, minimize waste and incorporate water efficient fixtures and appliances whenever possible so the system can continue to meet water demand.

SEWER

The Newington Sewer District was established in 1976, per NH RSA 252, and is governed by three elected commissioners, each serving a three-year term. The commission oversees the management of the Newington Wastewater Treatment Plant, which was constructed between 1979 and 1981 in response to several major septic system failures in the Industrial District in the mid-1970s.

The plant is a secondary wastewater treatment facility serving the Commercial and Industrial Districts of Newington and a few residential properties located along the existing sewer lines. Funding for the Wastewater Treatment Plant is provided by the users of the wastewater system.

The Sewer District is served by nearly 11 miles of six-inch to 10-inch separated sewer lines that include gravity fed pipes and a pressurized force main line. Sewage from the northern half of the district flows to a pumping station on Shattuck Way opposite Custom Pools. It is then pumped through a six-inch line to the crest of Beane's Hill and flows downhill to a pumping station at Paul Brook, next to the railroad just north of Tyco. Sewage from the Fox Run Mall, Tyco and Avery areas also flows to the Paul Brook pumping station. All sewage is then pumped via a 10-inch main toward the Newington Wastewater Treatment Plant located at 115 Gosling Road between Newington Station and TD Bank. The plant shares an outfall with the Pease Wastewater Treatment Plant.

The plant is designed to process 290,000 gallons per day, an average of 12,000 gallons per hour. The plant also processes approximately 60,000 gallons of septage per year, which originates from septic systems in Newington and Greenland. The plant exports approximately 500 tons of sludge annually for final disposal at the Hawk Ridge Compost Facility in Unity, Maine. Daily operations of the plant are by contract with Utility Partners.

It has long been the town's policy to reserve the sewer system's capacity for its original purpose to serve commercial and industrial users in Newington. The plant's current wastewater and septage capacities are adequate. The Planning Board recommends the acquisition of several acres adjacent to the plant to enable future expansion to meet the needs of users in the Commercial and Industrial Districts.

TELECOMMUNICATIONS

Telecommunications infrastructure, which includes telephone service, wireless telecommunications and cable television, is a key element of municipal infrastructure, affecting emergency response and preparedness, quality of life and economic development in Newington.

Landline residential telephone service in Newington is provided by FairPoint Communications and Comcast Phone of NH. Telephone service for business is provided by AT&T, Bay Ring Communications, Broadview Networks, Comcast Phone of NH, DSCI, Earthlink Business, FairPoint Communications, Firstlight Fiber and Paetec Communications. The town does not have its own phone exchange but is part of the Portsmouth exchange. Due to the deregulation of the telephone industry, the choice of long

distance and in-state long distance telephone service providers is up to the individual customer. The landline telephone network is adequate to serve existing and anticipated needs.

The growing demand for wireless telecommunications (i.e. internet, cellular phones) is creating a surge in demand for the installation of wireless telecommunication towers and antennae across the region. Newington has a generous policy governing the erection of antennae in the Industrial and Waterfront Industrial Districts resulting in numerous antennae atop Newington Station and Sprague's cement silo. These installations have created strong signal reception in the town's busy commercial sector. Reception is spottier in the Residential District.

Cable television system franchises are regulated by NH RSA 53-C. Each community has the right to grant a franchise to one or more companies after holding a public hearing. In the Newington, the franchise was granted to Comcast of Maine and New Hampshire. Broadband internet is available to Newington residences and businesses via Comcast's cable network. Comcast provides free broadband service to the Newington Elementary School and the Langdon Public Library. BayRing Communications provides broadband service to the Town Hall, Police Department and Fire Department.

UTILITY EASEMENTS

Utility easements often present significant obstacles to development of land that is otherwise suitable for building, such as the prohibition of buildings and septic systems. Descriptions of utility easements in Newington are below:

- The 345KV and 115KV electrical transmission lines crossing Newington have protective easements held by Eversource which are 300 feet in width; 34.5KV transmission lines are protected by a 100-foot easement. Land under easement by Eversource in Newington encompasses a total of 125 acres.

- Two major drainage ditches funnel stormwater from Pease to Great Bay. The ditches have a 100-foot wide protective easement, extending over 27 acres. In 2016, the Conservation Law Foundation (CLF) filed suit against the Pease Development Authority (PDA) claiming that stormwater runoff from the former Pease Air Force Base was polluting Great Bay and adjacent streams and brooks. CLF and PDA reached an agreement in January 2019 which requires the PDA to apply for and obtain a Clean Water Act permit regulating discharges from the storm sewer system at Pease and to implement a stormwater management program.

- The City of Portsmouth Water Division holds a utility easement to protect the 24-inch main connecting the Bellamy Reservoir with the Portsmouth water system. The line runs roughly parallel with Fox Point Road and varies in width from 10 to 20 feet.

PUBLIC UTILITIES RECOMMENDATIONS

- Improve cellular service reception in the Residential District.
- Acquire land to enable future expansion of the Newington Wastewater Treatment Plant in order to meet sewer needs in the Industrial and Commercial Districts.
- Monitor proposed expansion of utility rights-of-way to prevent additional encroachment in the Residential District.
- The Town of Newington's 2019 Hazard Mitigation Plan recommends the town work with the City of Portsmouth to upgrade the water distribution lines serving Little Bay Road, Nimble Hill Road and Newington Road to increase volume and pressure for fire suppression and residential water use. The Planning Board supports that recommendation.

NMP 2020-2030: NATURAL RESOURCES

INTRODUCTION

Within its small land area, Newington has a variety of natural resources the town believes are worth preserving. Without such protection, the condition of our natural resources might easily deteriorate under the pressure of development. Newington's long-held development policies include preservation of Newington's rural residential character with ample open access, including conservation of wetlands, forests, agriculture land and open space, as well as the protection of the shoreline of Great Bay, Little Bay, Piscataqua River and tributaries. The town recognizes the designation of Great Bay National Estuarine Research Reserve and the priority of enriching estuarine life, improving water quality and protecting diverse wildlife habitats in the face of a changing climate.

GEOLODGY AND SOILS

The geology of Newington and the Seacoast region consists of fractured metamorphic bedrock that is overlain by glacial materials deposited during the last glaciation, approximately 12,000 years ago. Newington's soils were formed from glacial outwash and marine silt and clay deposits.

The Rockingham County Soil Survey was completed in 1994 by the U.S. Department of Agriculture (USDA) Soil Conservation Service in cooperation with the New Hampshire Agricultural Experiment Station. The soil survey identifies distinct properties and characteristics of different soil types, from which certain predictions are made about the suitability of a soil for different uses. The soil survey also includes a map showing the distribution of soil types (See Map #1). The preponderance of both poorly drained (clay) soils, excessively drained (sand and gravel) soils and shallow bedrock are key factors for Newington's minimum residential building lot size.

Agriculture played a prominent role in the settlement of Newington and agricultural soils enabled highly productive orchards, dairy, poultry and vegetable farms. Fifty-eight percent of soils in Newington, 3,255 acres, are classified as either Prime Farmland or Farmland of Statewide Importance. Much of this farmland has been developed, with approximately 426 acres in Newington remaining in agricultural use.

One important characteristic of soil is its drainage class which relates to the ability of water to pass through the soil (soil permeability). Drainage class can indicate the presence or absence of wetlands and poorly drained soils, the ability of soil to filter wastewater from septic systems, and the ability of soil to absorb stormwater runoff and filter pollutants. This information is invaluable to the Planning Board in evaluating development proposals to determine the siting of septic systems and structures and assessing stormwater management. All applications for development must provide site specific data.

Soil Potential
Newington

Date: Fall 2018

Railroad

Pease Development Authority Boundary

Parcels

Very High
High
Medium
Low
Very Low
No Rating

RPC Standard Map Set

RPC Towns Boundaries
Water Feature
Tidal Feature
Shoreline; Stream
Apparent Wetland Limit
Intermittent Stream
Other Surface Water Feature

ROCKINGHAM PLANNING COMMISSION
theRPC.org

NH GRANIT

N W E S

Miles
0 0.125 0.25 0.5 0.75 1

Soil Ratings for Development
This data set indicates the relative quality of a soil for development when compared to other soils in the same county survey. Suitability of a soil as it pertains to septic tank absorption fields, dwellings with basements, and local roads and streets were used as the basis for determining the potential of a soil for development. A composite rating was given to each soil type combining the rating for each of the three uses stated above. The ratings are given as one of the following: Very High, High, Medium, Low and Very Low. Some soil ratings were NA (Not Available) or were Not Rated, and were not used in this product. For further information regarding Soil Potential Ratings for Low Density Development, contact your County Conservation District.

This information was produced by the Rockingham County Conservation District and was distributed in the publication: Soil Potential Ratings for Low Density Development, Rockingham County, New Hampshire, published in May 1987.

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the Study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-2012. The roads within the Rockingham Planning Region have been updated by NH Department of Transportation through local input by the RPC where available.

Although these data have been processed successfully on a computer system at the Rockingham Planning Commission, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data to evaluate data set limitations, restrictions or intended use. Rockingham Planning Commission shall not be held liable for improper or incorrect use of the data described and/or contained herein.

RPC extends every effort to ensure map data is current and complete, however, errors do happen. Please let us know if you spot errors or omissions.

Document Path: C:\Users\heybu\Desktop\New_GIS_Data\Newington_MP\d-mxds\Map 17 - NR - Soil Potential Rating.mxd

WATER RESOURCES

Newington is blessed with bountiful water resources, both fresh and saltwater. Brooks and ponds flow smoothly, but never any great distance. The freshwater resources are made up of several square miles of tidal saltwater bays and river~~s~~ that surround the town on its north, east and west boundaries.

Watersheds – A watershed is an area of land that drains all the rivers, streams, rainfall and snowmelt to a common outlet, such as a major river. Newington lies within the Piscataqua River drainage basin, which covers 930 square miles and drains southeastern New Hampshire and Southern Maine. Great Bay Estuary lies within the basin and bounds Newington on the west, north, and northeast. Great Bay Estuary is a drowned river valley composed of high-energy tidal waters, deep channels and fringing mudflats. Twelve miles of the bay's 41-mile shoreline are in Newington. Newington's watersheds are shown on Map #2.

The Piscataqua River is an ocean-dominated system extending from the Gulf of Maine at Portsmouth Harbor to the fork of its tributaries: Little Bay, Oyster River, Bellamy River, Salmon Falls River and Cocheco River. Three miles of the Piscataqua River's 12-mile shoreline are in Newington.

Surface Water – Surface waters are any type of standing or flowing body of water above the ground, including bays, rivers, streams, ponds (See Map #3) and freshwater and tidal wetlands. Newington has approximately 2,578 acres of tidal waters, 417 acres of wetlands and 22 ponds totaling 73 acres.

TABLE 1 – PONDS AND DAMS

Pond Name	Owner	Acres	Dam Height	Map Key
Bass Pond	US Fish & Wildlife Service	45.0	13	M
Upper Peverly	US Fish & Wildlife Service	9.0	13	K
Lower Peverly	US Fish & Wildlife Service	7.0	13	L
Sprague Fire Pond	Sprague Energy	2.0	10	D
Sprague Holding Pond	Sprague Energy	1.5	12	C
Mott's Pond	Town of Newington	1.5	10	G
Kennard's Pond	Multiple owners	1.0	10	P
Ferland's Pond	Evelyn Ferland	1.0	11	H
Flynn Pond	Town of Newington	0.6	NA	I
Dumpling Pond	Myers/Bellmare	0.6	3	-
Bay Pond	Frink	0.1	NA	-
Unnamed	Marion Frink	0.1	NA	J
Clamshell Pond	Town of Newington	0.1	NA	-
No Name	Packard	0.05	NA	-

Pond Name	Owner	Acres	Dam Height	Map Key
Loomie's Pond	Hyder	0.05	NA	-
Scum Pond	Thomas	0.05	NA	N
Wildlife Pond	-	0	4	-

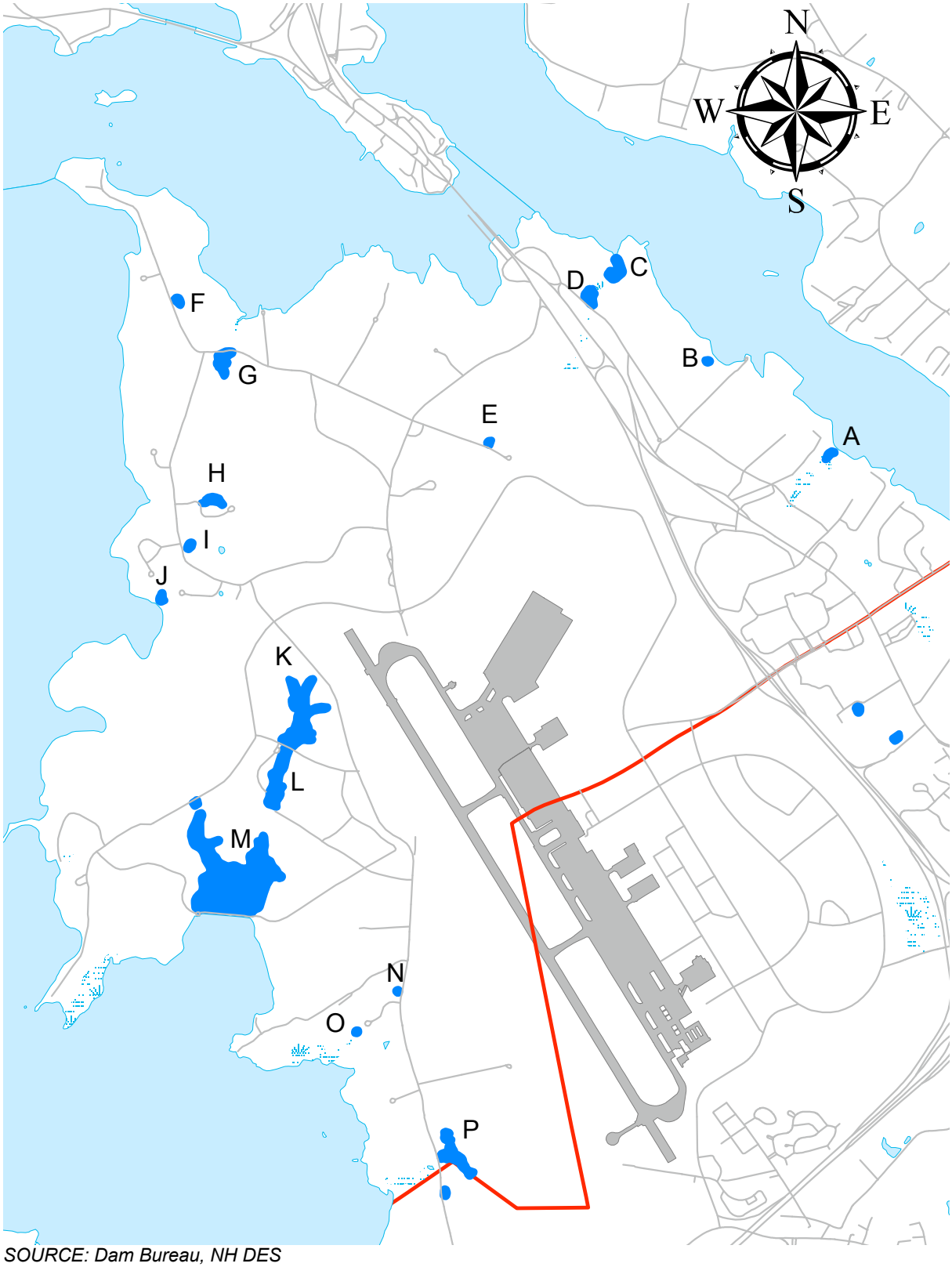
TABLE 2 – STREAMS

Name	Location	Map Key
Stoodley's Creek	Gosling Rd/Pine Cove	1
Paul's Creek	Shattuck Way/Canney's Cove	2
Uncle Siah's Creek	Patterson Lane/Downing Cove	3
Lower Pickering Brook	Nimble Hill Rd/Irving Terminal	4
Railroad Brook	Railway Tracks/Pease	5
Pickering Brook	Shattuck Way/Trickey's Cove	6
Coleman's Creek	Nimble Hill Road/Trickey's Cove	7
Unnamed	Coleman Drive/Zackey's Point Cove	8
Knight Branch	Little Bay Rd/Board Cove	9
Little Brook	GBNWR/Welsh Cove 2	10
Peverly Brook	GBNWR/Welsh Cove	11
Swadden's Creek	Newington Rd/Swan Island	12
Pinkham's Creek	Newington Rd/Greenland line	13

Freshwater and Tidal Wetlands – Wetlands are defined as an area that is inundated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation adapted for life in saturated soil conditions. Wetlands are valuable natural resources that provide floodwater and stormwater storage, remove and store silt and other sediments, remove and uptake pollutants and nutrients, and provide habitat and reproductive areas for plants, fish and wildlife. Because of its coastal location, Newington has tidal wetlands associated with Great Bay, Little Bay and the Piscataqua River.

Newington has significant areas of freshwater, tidally influenced and tidal wetlands. The Newington Conservation Commission conducted wetlands inventories in 2002 and 2019, identifying 32 wetland complexes (20 freshwater and 12 tidal) in town, listed below and shown on Map #4. The inventory did not include the wetlands in the Great Bay National Wildlife Refuge as the U.S. Fish and Wildlife Service acts as a responsible steward of these wetlands.

Ponds & Dams



SOURCE: Dam Bureau, NH DES

Newington Watersheds

SOURCE: Newington Planning Board member Jack Pare

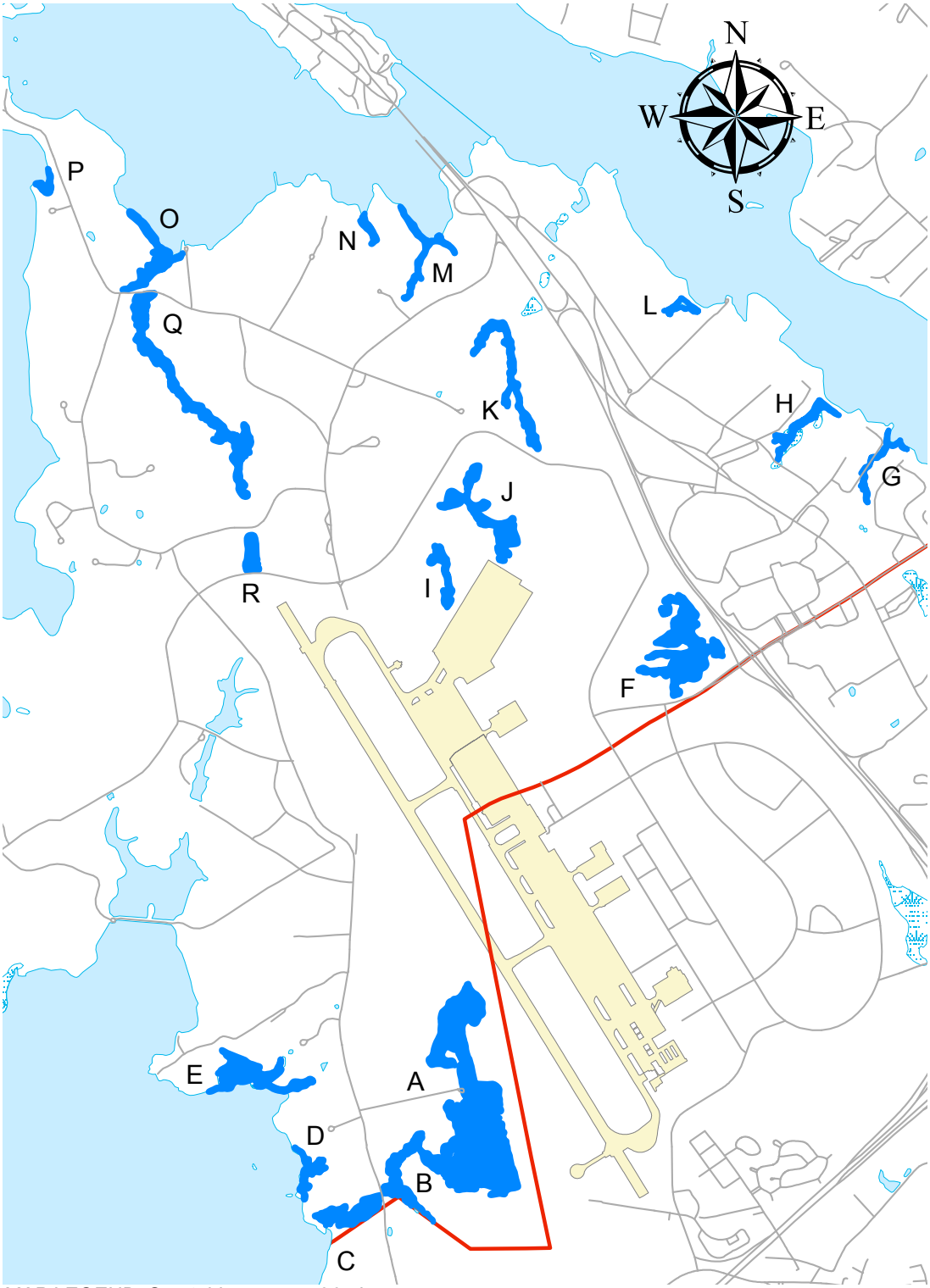
TABLE 3- WETLANDS

Wetland Name	Type	Acres
McIntyre Brook Wetland -prime wetland*	Forested swamp	126.8
Old Mill Pond and Knight's Pond – prime wetland	Shrub/scrub	25.6
Town Ramp – prime wetland	Forested/scrub shrub swamp	15.8
Kennard Pond and Marsh – prime wetland	Ponds, tidal marsh	13.5
Bulbous Bittercress Habitat – prime wetland	Forested swamp	12.8
Hodgdon Farm Salt Marsh – prime wetland	Tidal marsh	12.3
Upper Pickering and Flagstone's Ditch – prime wetland	Stream	10.2
Paul's Brook – prime wetland	Forested stream, salt marsh	8.7
Beane's Hill Vernal Pool – prime wetland	Vernal pool	6.2
Town Forest – prime wetland	Forested swamp	5.3
New Hampshire Avenue and Pease Boulevard	Forested swamp	5.0
Plover Meadow – prime wetland	Wet meadow	5.0
Newington Station – prime wetland	Stream	4.5
Lower Knight's Brook – prime wetland	Tidal marsh	3.8
Boiling Spring – prime wetland	Freshwater marsh	3.3
Florrie Orchard Vernal Pool - prime wetland	Vernal pool	3.1
Golf Course Wetlands	Forested swamp	2.5
Mazeau Salt Marsh – prime wetland	Tidal marsh	2.5
Middle Pickering Brook – prime wetland	Forested swamp	2.0
Trickey's Cove – prime wetland	Tidal marsh	1.8
Rollins Farm Wetlands	Forested swamp	1.0
Shackford Lot – prime wetland	Tidal marsh	1.0
Town Beach – prime wetland	Tidal Marsh	0.5

Source: West Environmental, 2002, Updated 2019

**Prime wetlands – Per NH RSA 482-A:15, Newington has designated some wetlands as prime wetlands because of their unspoiled character, ability to sustain rare or threatened species, and/or their large size.*

Prime Wetlands



MAP LEGEND: See table on page 26 above.

Floodplains – Floodplains are low-lying areas adjacent to surface water which may experience flooding during periods of heavy rain or rapid snowmelt. Newington has adopted a Floodplain Management Ordinance that establishes a permit system and review procedure for development in FEMA designated flood hazard areas.

Groundwater and Aquifers – Groundwater is water held underground in the soil or in the pores and crevices in rock. Groundwater is recharged through precipitation, snowmelt and surface water infiltration. Aquifers are found where these materials and fractures are filled or saturated with water. The ability of aquifers to transmit water is defined as transmissivity. A 1992 report by the U.S. Geologic Survey, "Geohydrology and Water Quality of Stratified Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern New Hampshire," identified the area of Newington with the greatest transmissivity to be under the Pease runway along the Portsmouth municipal boundary.

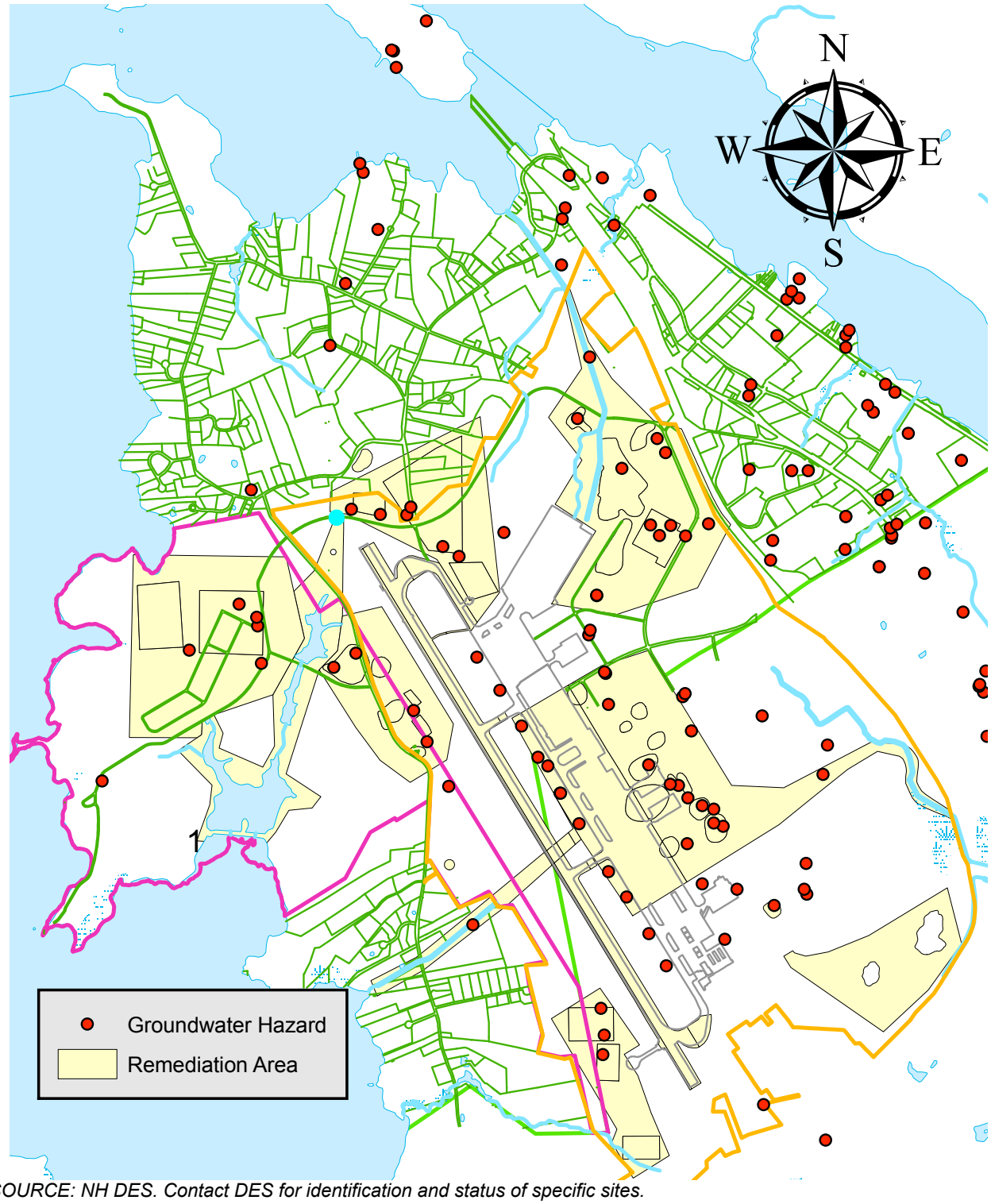
Groundwater Contamination – Studies conducted over several decades have determined groundwater resources on the Pease Tradeport abutting Newington have been contaminated with pollutants associated with activities at the former Pease Air Force Base (See Map #5). These activities include aircraft fuel, chemicals used or spilled during normal base operations and waste disposal associated with the base. In the 1990's, the Air Force identified pools of jet fuel floating underground at the top of ground water under the old town forest flowing north and installed a vapor mitigation system. In 2019, the State of N.H. in conjunction with the U.S. Department of Health and Human Services began studies focused on the health effects of per-and polyfluoroalkyl substances (PFAS), specifically people affected by the contaminated Haven Well that provided drinking water to the Pease Tradeport. PFAS are substances found in firefighting foam and other products that have been linked with a range of illnesses. Air Force officials believe the water was contaminated by firefighting foam used at the base. The City of Portsmouth closed the Haven Well in 2014 and the Air Force installed a groundwater treatment plant ~~at Pease~~ in 2019 to remove PFAS from drinking water supplied to the Tradeport. Private wells for drinking water are suspect and public water supply is recommended.

Salt Marsh – Marine life in Great Bay and Little Bay inhabits a richly varied environment, including salt marshes, mud flats, beds of eel grass and rocky shoreline. All these areas provide critical habitat for fisheries and other marine life and are vulnerable to change resulting from rising sea levels.

FOREST RESOURCES

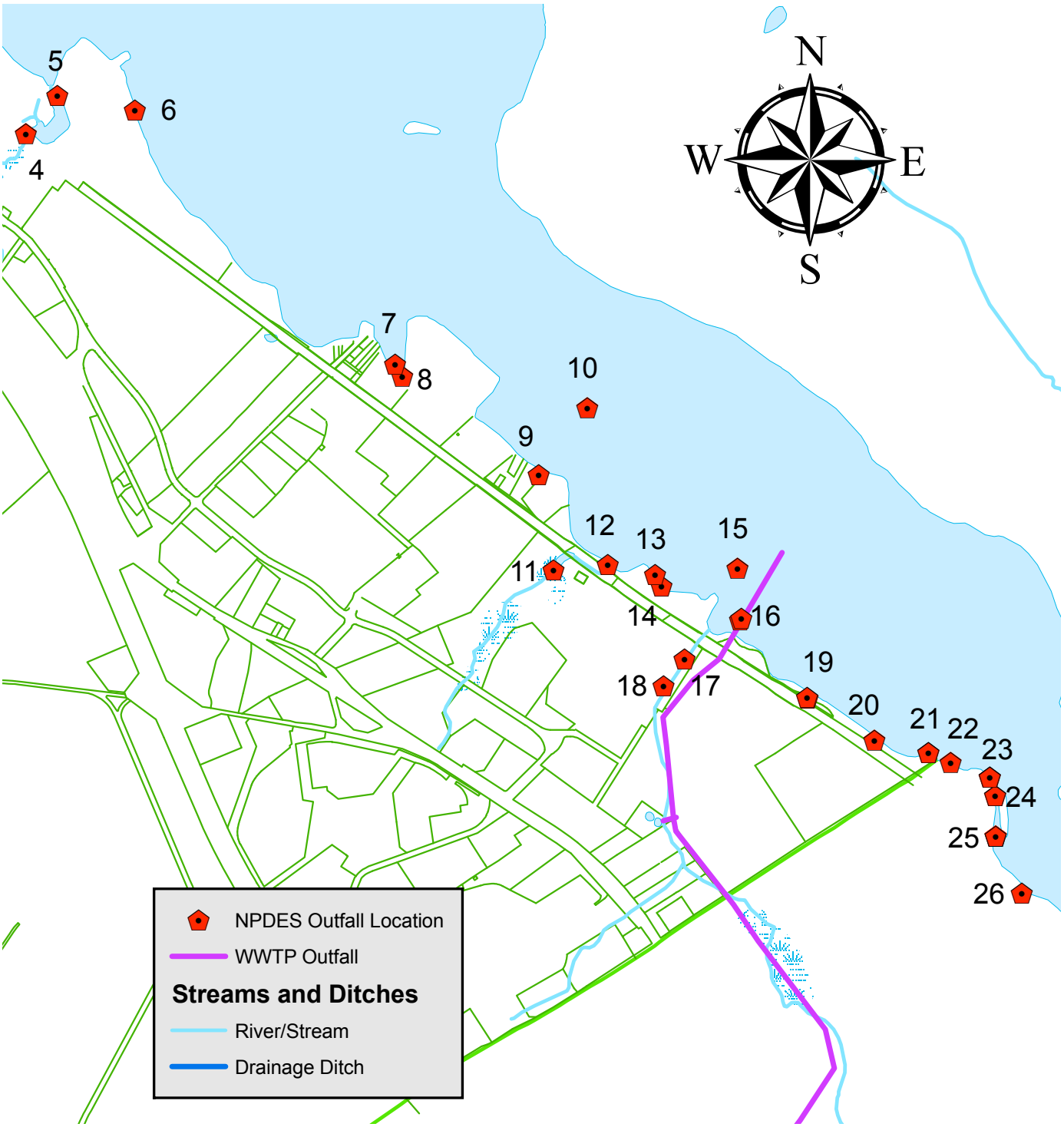
Forested land comprises 2,639 acres of Newington, more than any other type of land use. The forested landscape defines Newington's Residential District, and provides critical wildlife habitat, groundwater recharge and scenic beauty. Newington is home to the oldest Town Forest in the United States, established by the town in 1710. Located on Nimble Hill Road beside and across from the Old Town Hall, the original town forest was 50 acres and later expanded to 112 acres. Timber harvested from the forest has provided building material and funds for the construction of the village meeting house, parsonage, schools, Town Hall and library, as well as a source of firewood for community buildings. As forests mature and climate change brings new stresses, the town will need to employ active forest management to protect these resources.

Groundwater Hazard and Remediation Sites



SOURCE: NH DES. Contact DES for identification and status of specific sites.

EPA Regulated Outfalls



SOURCE: NH DES. Contact DES for identification and status of specific outfalls. In the map above, sites #4-8 are owned by Sprague Energy, #9 is Lordco. #10 is Newington Energy, #11-14 are Tyco, #15, 17, 19 & 21 are PSNH, 16 is the City of Portsmouth, #18 is the Town of Newington, and #20 is Granite State Minerals.

WILDLIFE HABITAT

Wildlife habitat in Newington has been documented in the 2015 N.H. Fish and Game *Wildlife Action Plan*. The plan is a blueprint for conserving Species of Greatest Conservation Need (SGCN) and their habitats in New Hampshire. The plan identifies 169 SGCN, which represent a broad array of wildlife, and focuses on the 27 habitats that support these species.

The plan identifies 10 types of wildlife habitats in Newington:

TABLE 4- 2015 NH WILDLIFE ACTION PLAN HABITAT TYPES

Habitat Type	Acres
Water	2,599.57
Appalachian Oak Pine Forest	1,606.13
Grassland	883.13
Temperate Swamp	429.67
Marsh and Shrub Wetlands	237.96
Salt Marsh	112.09
Dune	91.40
Hemlock Hardwood Pine Forest	75.84
Peatland	24.02
Rocky Coast	15.79

These habitat types are categorized as either Tier 1, Tier 2, or Tier 3, described in Table 5:

TABLE 5- 2015 NH WILDLIFE ACTION PLAN HABITAT TIERS IN NEWINGTON

Wildlife Action Plan	Acres	Acres Conserved	% Conserved
Tier 1 = Highest ranked habitat in NH by ecological condition	4199	961	22.9%
Tier 2 = Highest ranked habitat in biological region	192	28	14.8
Tier 3 = Acres of supporting landscape, significant habitat at regional scale	261	42	16.3

The complete Wildlife Action Plan is available from N.H. Fish and Game's website: https://wildlife.state.nh.us/wildlife/wap.html

Fisheries – The most commonly targeted species for fishing in the Great Bay Estuary and along the coastline include Striped Bass, Winter Flounder, Eels, Alewife and Shad. Public access to Great Bay and the Piscataqua River from Newington is provided by the Town Landing on Patterson Lane.

Shellfish – Shellfish and crustaceans harvested from the tidal waters of Newington include lobsters, blue mussels, softshell clams, oysters, sea scallops, whelks, rock crab, green crab, horseshoe crab and northern shrimp.

OPEN SPACE AND LAND CONSERVATION

Open space is land which has not been developed or altered from its natural state and can include farms and recreational land. Newington's rural residential character is derived from the scenic beauty provided by open fields and woodlands. Approximately 1,483 acres, or 18%, of land in Newington has been protected from development. A list of conservation land is included in the Appendix.

CLIMATE CHANGE IMPACTS

Newington's shoreline along Great Bay and Little Bay and their tidal tributaries are fringed with saltmarsh and freshwater wetland systems. As sea levels rise, freshwater systems will transition to brackish and saltwater systems with daily tidal inundation. Saltmarsh may migrate inland with rising seas, depending on the ability of saltmarsh to keep pace with the rate of sea-level rise, the topography (gentle slopes versus steep banks) and the absence of physical barrier such as development and roads.

Land conservation offers the greatest opportunity to adapt to the effects of climate change, sea-level rise and coastal storm flooding. The 2017 Vulnerability Assessment for Newington of projected impacts from sea-level rise and coastal storm surge flooding, completed by the Rockingham Planning Commission, identified the greatest impact to tidal wetlands, uplands associated with Knights Brook, Pickering Brook and Pail Brook, and shorelands along the Piscataqua River.

https://www.therpc.org/application/files/6614/9400/9406/Newington_Assessment_Report_Final.pdf

NATURAL RESOURCES RECOMMENDATIONS

- Continue to hold developers to the regulations enacted by the town to prevent the degradation of natural resources.
- Encourage new agricultural uses of land by adopting zoning and site plan regulations that minimize restriction on agriculture.
- Promote protecting and conserving land with funding for conservation easements.
- Enforce shoreland buffer and setback regulations to adequately separate development from tidal wetlands, freshwater wetlands and surface waters to sustain flood storage capacity, allow for inland migration of tidal marsh systems and enable conversion of freshwater systems to tidal systems to accommodate sea-level rise.

Conservation Land (2018)
Newington

Date: Fall 2018

Railroad

Pease Development Authority Boundary

Parcels

Unverified Potential Conservation Land

Conservation / Public Lands

Conservation and Public Lands
The conservation lands data layer describes parcels of land of two or more acres that are mostly undeveloped and are protected from future development. Unique or adjoining smaller parcels, as well as selected state-owned parcels, may also be included.

Unverified Protected Lands
This dataset was created from a number of dataset submitted to the RPC from various entities (mostly towns). This dataset has not been verified and has no backing data.

ROCKINGHAM PLANNING COMMISSION theRPC.org

NH GRANIT

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

RPC Standard Map Set

- RPC Towns Boundaries
- Water Feature
- Tidal Feature
- Shoreline; Stream
- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the Study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-2012. The roads within the Rockingham Planning Region have been updated by NH Department of Transportation through local input by the RPC where available.

Although these data have been processed successfully on a computer system at the Rockingham Planning Commission, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data to evaluate data set limitations, restrictions or intended use. Rockingham Planning Commission shall not be held liable for improper or incorrect use of the data described and/or contained herein.

RPC extends every effort to ensure map data is current and complete, however, errors do happen. Please let us know if you spot errors or omissions.

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NMP 2020-2030: HISTORIC AND CULTURAL RESOURCES

INTRODUCTION

Newington's historic landscape is a point of pride for residents and provides the community with a unique sense of identity, continuity and a sense of time and place. Despite decades of industrial and commercial development and the taking of land for government use, Newington's residential area and select other sites retain the character of rural New England homesteads surrounded by open fields and woods.

Preservation of this historic character is a priority sought by town residents, authorized by NH RSA 674:46 and coordinated among three partnering town groups—the Planning Board, the Historic District Commission and the Historical Society. The Planning Board and the Historic District Commission both review applications for development that have historic cultural impacts. The Commission also approves changes to the exteriors of buildings in the local historic districts. The Historical Society, as an independent non-profit organization, can assist by accepting grants and gifts as well as taking ownership and maintaining town artifacts and historical documents. The Historical Society also oversees two museums —the Old Parsonage and the Schoolroom Museum in the Old Town Hall—in buildings owned and maintained by the town.

The town's site plan review regulations include a cultural resource protection section which enables the Planning Board to require a cultural assessment and cultural resource management plan for development proposals in proximity to historic or archeological sites. These regulations describe cultural resources as historic and archeological sites and standing structures, cemeteries, private graveyards, scenic roads, stone walls, cellar holes, old growth trees and other artifacts and features which contribute to the authentic cultural heritage of Newington.

Since 1986, Newington has participated in the Certified Local Government (CLG) Program administered by the N.H. Division of Historical Resources. The program provides an opportunity for local governments to identify and seek voluntary protection of local properties of historic, architectural and archeological significance even if they are not located in a local historic district. The Historic District Commission has been designated Newington's coordinating body for the CLG activity within the town to serve as an advisory body to the municipal government and to the town's land use boards.

HISTORIC STRUCTURES

Several properties of historic significance have been listed on the National Register of Historic Places and the New Hampshire State Register of Historic Places. The town also maintains an inventory of historic properties, buildings and structures of local historic importance, included in the Appendix.

There are three properties currently listed on the National Register of Historic Places:

- Newington Center Historic District – Encompasses 120 acres, including the original lots of the oldest Town Forest in the U.S. (1640), private dwellings and buildings from the early 18th century to early 20th century, and the Frink Heritage farmland. Listed on November 30, 1987.
- Old Town Forest District – Encompasses additional lots of the oldest Town Forest in the United States (1640) totaling 69 additional acres of land located on the Pease Tradeport added as a boundary increase to the Newington Center Historic District. Listed on December 9, 1991.
- Newington Railroad Depot – Encompasses a depot and rail line corridor; listed on April 10, 2010.

The properties listed on the National Register of Historic Places, except the Railroad Depot, were categorized as "districts" and comprise both building(s) and surrounding land, embodying the historic elements of the National Register listing. It is important to note that the boundaries of these "districts" do not correlate with the boundaries of the local historic districts.

National Register designation protects the historic resource from federally funded or licensed actions. It does not prevent a property owner from altering or demolishing structures, except in those instances where the owner has voluntarily utilized federal rehabilitation tax credits.

The state maintains the New Hampshire State Register of Historic Places, which recognizes the state's historical, cultural and archaeological heritage. To date, the 23-acre Adams Homestead on Nimble Hill Road is the only property to be added to the state register, listed on October 30, 2017.

The New Hampshire State Register of Historic Places is largely honorary. Property owners who are looking to sell their development rights, while still retaining ownership of the property, may find a state register listing to be helpful because the property has been determined to be significant at the state level, not just the local level. As with the national register listings, the property owner of a state register-listed property is not prevented from altering or demolishing structures.

LOCAL HISTORIC DISTRICTS

Newington has established two Local Historic Districts, per NH RSA 674:46. Local Historic Districts are intended to prevent property owners from making building alterations which would harm the historic character of the district. Change to a building's exterior are approved by the Historic District Commission.

- Old Town Center Historic District - Created at Town Meeting in 1974. This district encompasses all the town-owned property in the old town center on either side of Nimble Hill Road south of the Little Bay Road intersection, which includes an 18th century parsonage, a 20th century stone

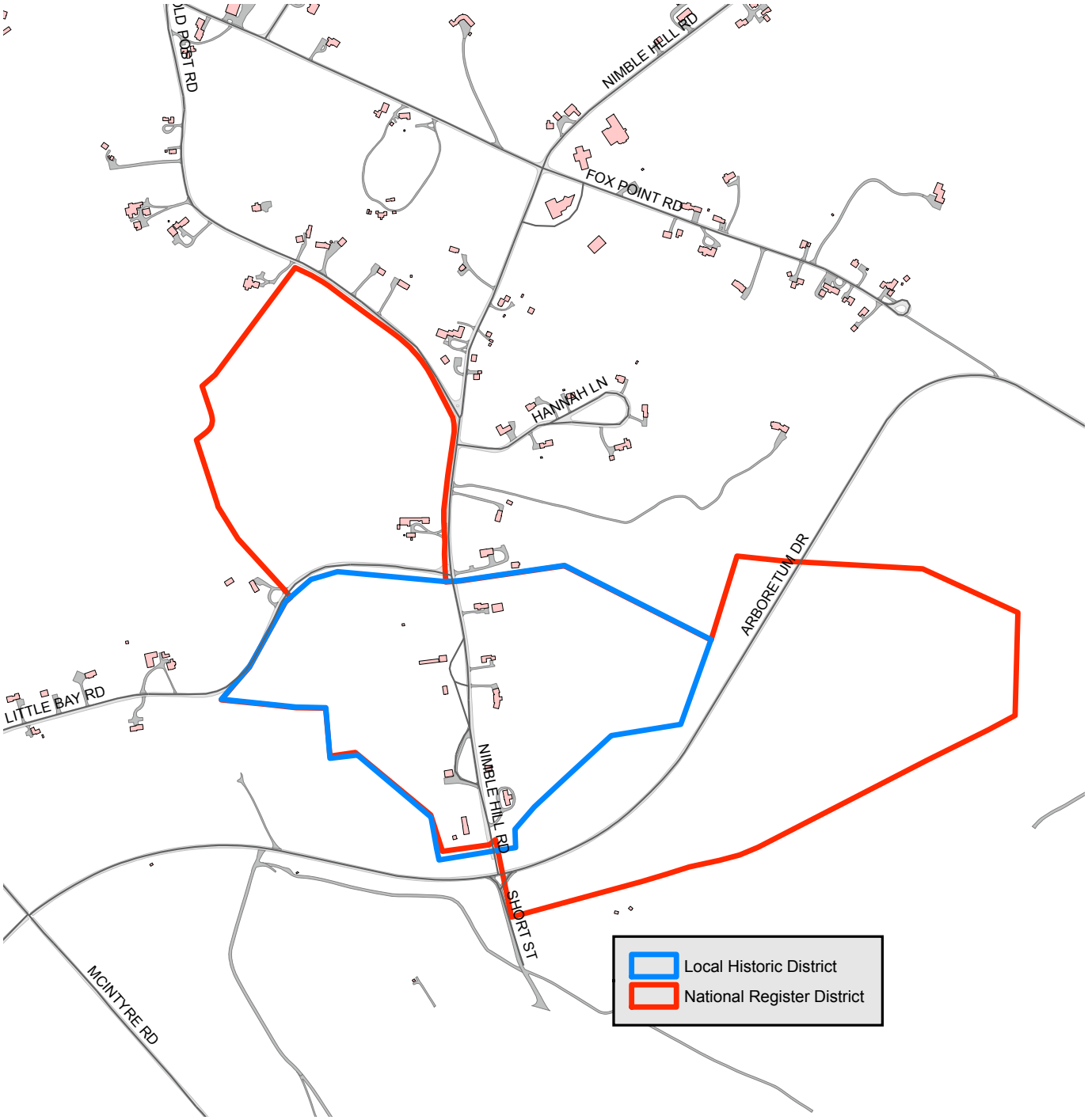
school, a modern town garage, a 19th century Town Hall, New Hampshire's oldest meetinghouse in continuous use (1712), the Town Cemetery and the 1892 Langdon Library. It also encompasses private properties, including a 19th century parsonage and land owned by the Newington Congregational Church, as well as land and buildings once owned by the Hoyt and Knight families and now owned by others.

There is significant overlap in the boundaries of the National Register-listed Newington Center Historic District with those of the local Old Town Center Historic District, but these boundaries deserve further investigation. The local Old Town Center Historic District specifically does not include the Frink Heritage Farmland and additional lots of the Town Forest that were part of the Pease Tradeport.

- Bloody Point Historic District **- E**stablished by Town Meeting in 1975. This local district encompasses the old Railroad Depot and land at Bloody Point that was owned by the State of New Hampshire and leased to the Town of Newington in 1972. It encompasses waterfront property located on the northeasterly side of the Spaulding Turnpike.

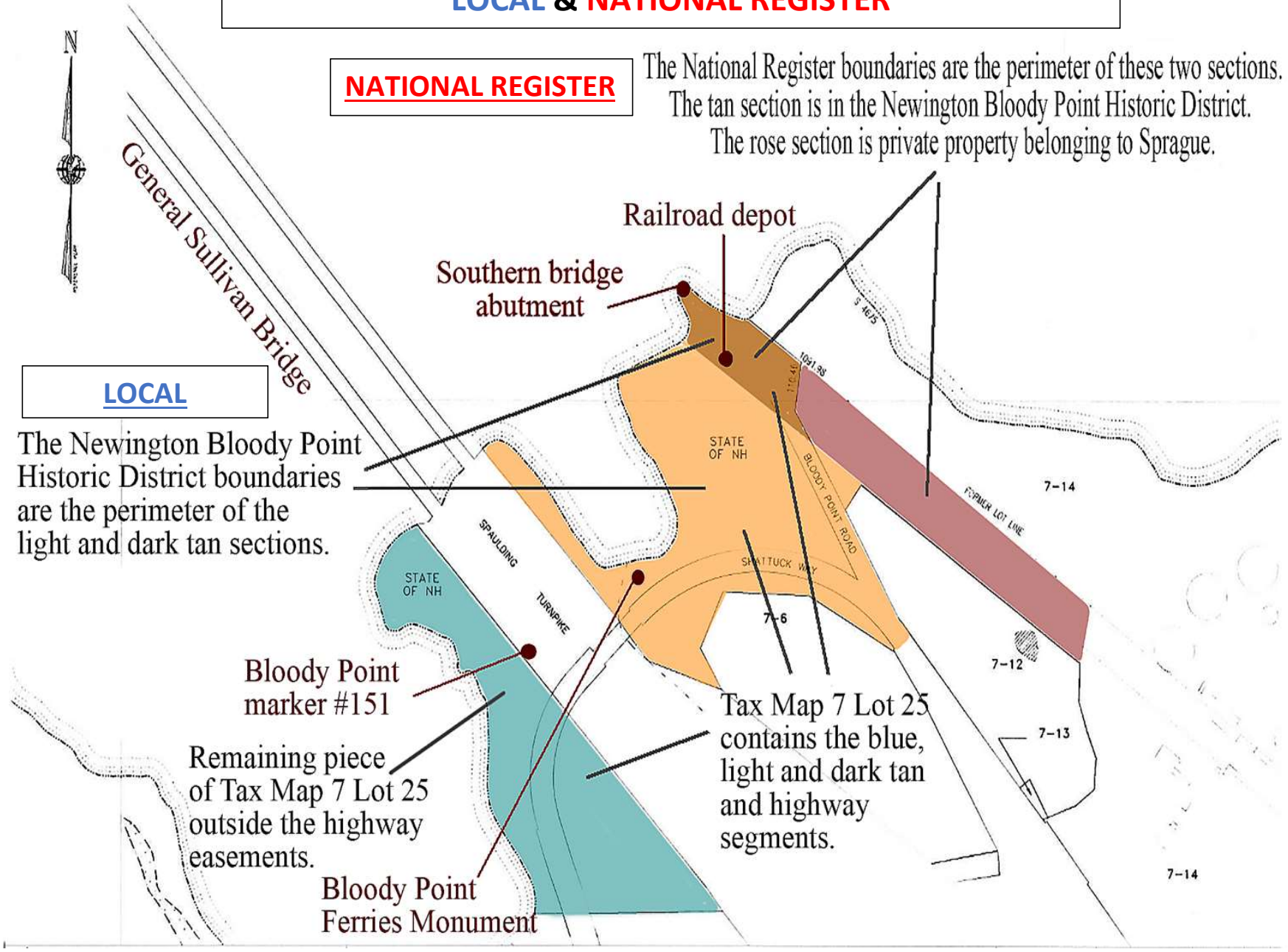
  There is only a small overlap between the boundaries of the National Register-listed Railroad Depot property and the local Bloody Point Historic District. The boundaries are quite distinct. The National Register-listed property includes only the land immediately adjacent to the Railroad Depot, as well as a linear corridor of land used for the old Boston & Maine railroad tracks that is now privately owned by Sprague. The local Bloody Point Historic District includes much more waterfront acreage but does not include the Sprague-owned land.

Local Historic District



BLOODY POINT / RAILWAY DEPOT HISTORIC DISTRICT

LOCAL & NATIONAL REGISTER



CULTURAL RESOURCES

Newington has evolved through several stages or periods that have come to identify the town's heritage. Specific sites developed as center places for capturing earlier cultural heritage (See appendix for details). From pre-colonial times to the present, the town continues to serve people on the move between destinations. From encampments along the shorelines to trails leading to ferries then bridges, people move through Newington. Ferry locations at Furber Straits, Fox Point and Bloody Point are historically marked. These gave way to the 1794 Piscataqua Bridge, the 1873 rail/carriage bridge, and the General Sullivan/Little Bay Bridges as the trails turned into turnpikes. In the mid-20th century, Newington became an airport for first military, then commercial air transportation.

Newington's dominant heritage is the development of agricultural homesteads with both crops and animal products. Early settlers recognized the value of forests, the first to be set aside for the public good, including several large tracts for the oldest Town Forest in the U.S. The town has some of the richest agricultural soils in southeast N.H. and is a prime location to markets for feeding the populations of surrounding towns. Rail and auto connections during the late 18th and early 19th centuries led to a blossom of apple orchards from which some trees remain today. Agricultural prosperity led to construction and remodeling of numerous farmland homesteads that were the envy of the state (see Historic Resource appendix for details).

Early industry and manufacturing bypassed Newington, except for a few brickyards and sawmills, due to short rivers that lacked sufficient running water for power. However, during the 20th century, the value of the deep-water seaport land along the Piscataqua River led to significant waterfront industry with the Shattuck World War 1 Wooden Shipyards, the trans-shipment of fossil fuels and construction of power plants. Newington wisely set this shorefront land aside through zoning to block diversion of this land to lower value uses.

Newington jumped into being known for commercial and retail land use in the mid-1980's with the development of major retail to include the Fox Run Mall, Crossings at Fox Run and the state acquiring Pease AFB to operate as an office and trade center. Although young by historic measures, the land area size and employment levels make this shift a major cultural heritage in future decades.

SPECIAL SITES: SCENIC ROADS, CEMETERIES, AND GRAVEYARDS

Newington's zoning includes provisions for scenic roads; the town has designated all town-maintained roads west of the Spaulding Turnpike and north of the Newington/Greenland town line as scenic roads, per NH RSA 231:157. As a result, any proposed work along these roads involving the cutting or removal of trees or the alteration of all or a portion of a stone wall shall receive approval of the Planning Board.

There are several 18th and 19th century gravestones scattered throughout Newington. NH RSA 289:4 requires municipalities to maintain an inventory of public cemeteries and private graveyards.

TABLE 1 – CEMETARIES AND GRAVEYARDS IN NEWINGTON

Name	Number of stones	Tax Map-Parcel
Town Cemetery	1,900	24-6
R. Pickering	7	27-16
Dow/Smith	8	19-14
Rollins	9	20-12
Downing	3	12-13
T. Pickering	3	23-21
Coleman	3	24-1
G. Pickering	3	53-12
M. Huntress	1	20-13
Hoyt	4	17-10

HISTORIC AND CULTURAL RESOURCES RECOMMENDATIONS

- Historical resources and community character should be routinely considered and protected as part of the planning and development review process.

- Existing inventories of Newington's historical and cultural resources are to be updated and better documented in the Historic and Cultural Resource Appendix to promote public appreciation.

- The town should investigate and designate more specific boundaries for both the National District Listing of Historic Property and the local Historic Districts to account for boundary discrepancies and new property additions. As these overlay districts are part of the Newington Zoning Ordinance, they require a vote of the town residents to re-designate.

NMP 2020-2030: MUNICIPAL FACILITIES AND SERVICES AND DEMOGRAPHIC PROFILE

INTRODUCTION

The chapter provides a summary of town-owned facilities and town services in Newington. The demographic profile provides a snapshot of community demographics, including population and resident characteristics. This information provides a baseline of existing conditions and enables a point for comparison for future master plans.

MUNICIPAL FACILITIES

TOWN HALL

The Newington Town Hall was dedicated in 1979 and contains offices for the Town Administrator, Clerk, Tax Collector, Finance, and Planning and Building Departments. Municipal boards and commissions conduct business in the deRochemont Room and the Paul Kent Auditorium that include the annual Town Meeting, elections, recurring public hearings and social functions. The Town Hall is equipped with a kitchen and generator enabling its use as a town emergency shelter.

POLICE DEPARTMENT

The Newington Police Station was constructed in 1989 and is located adjacent to Town Hall. A three-member Police Commission oversees the department. Currently, the department consists of the Chief of Police, nine full-time officers, two part-time officers, a part-time prosecutor and an administrative assistant. The Police Department patrols a resident population of 735 and approximately 35,000 people working and shopping in town daily. The Chief of Police also serves as the town's Emergency Management Co-Director.

FIRE DEPARTMENT

The Newington Fire Station was constructed in 1957 as a multi-purpose building for town government, police, and fire personnel. The building was remodeled in 1977, 1996, 2002 and 2020; it is located across the street from the Town Hall. A three-member Board of Fire Engineers oversees the department. Currently, the department consists of a Fire Chief, eight full-time firefighters, nine part-time/on-call firefighters and one secretary. The department provides fire suppression, EMS-licensed ambulance response and marine boat rescues. The Fire Chief also serves as the town's Emergency Management Co-Director.

PUBLIC WORKS DEPARTMENT

The Town Garage was constructed in 2009 and is located at the south end of Nimble Hill Road. Currently, the department consists of a road agent and five part-time personnel responsible for maintenance and repair of town-owned roads and other town-owned property.

NEWINGTON PUBLIC SCHOOL

The Newington Public School was constructed in 1960 to provide education for students in kindergarten through sixth grade. Building additions in 1977 and 1996 expanded capacity to over 100 students, with a current enrollment of 50-60 students. Standards for school buildings have changed since the building was expanded and the current student capacity is 72 students. Information on the school's capacity, provided by the School Board, is included in the Appendix. The school gymnasium is used in off-school hours for youth and adult recreational programs. Outdoor recreational facilities outside the school include playground equipment, tennis courts, a basketball court, soccer field, baseball diamond and an ice-skating rink maintained by the town and residents. Newington students in grade 7-8 attend Portsmouth Middle School and students in grade 9-12 attend Portsmouth High School, SAU 52. Newington is a member of School Administrative Unit (SAU) #50, which includes schools in Greenland, New Castle and Rye.

LANGDON LIBRARY

The Langdon Library was built in 1892 in the town's historic center with proceeds from the sale of lumber from the adjacent Town Forest. A new wing was added to the building in 2014. Current operations are overseen by four staff members and seven library trustees. The library serves as a hub for community activities and programs, including family hours, book groups, adult and children's programs, art displays and the annual Spring for the Bay series hosted by the Conservation Commission. The library is equipped with WiFi, public computers and several meeting rooms.

SOLID WASTE MANAGEMENT

Newington contracts with a private firm for weekly collection of household garbage. Larger items in need of disposal may be taken to the town's Transfer Station off Little Bay Road. Newington operates a voluntary recycling program that enables residents to bring recyclable materials to the Transfer Station.

SEWER AND WATER SYSTEMS

Public water is supplied by the City of Portsmouth. Sewer is supplied for commercial and industrial users by the town-owned wastewater treatment facility. A full description is included in the Utilities Chapter.

RECREATIONAL FACILITIES

Newington has a Recreation Committee comprised of seven residents appointed by the Board of Selectmen. The committee designs programs for adults and children and special events throughout the year, including a holiday light party, Septemberfest and summer camp opportunities. Town-maintained recreational facilities include:

- Fox Point – Walking paths, town beach, town dock, boat ramp, picnic tables and barbeque grill
- Town Forest – Walking trails, picnic tables, barbeque grill
- Newington School – Soccer field, baseball diamond, basketball court, tennis courts, playground, ice skating rink
- Carters' Rocks – Picnic table, car-top boat launch
- Town Landing at Patterson Lane – Boat launch
- Old Town Hall – Playground and field
- South Newington – Basketball court off Newington Road

ADDITIONAL MUNICIPALLY OWNED PROPERTY

- The Old Parsonage – Purchased by the town in 1765, this building has been used as a parsonage, a tavern, the Town Farm, Town offices, a school and a residence. The Newington Historical Society has leased the building since 1912 as a meeting place and a museum, which houses many of the town's historic artifacts. The building is open to visitors during the summer.

- Old Town Hall – Built in 1872, the Old Town Hall served as Newington's seat of government and a public meeting space until 1958. It also served as a two-room elementary school until 1921. The building includes a stage, a kitchen, meeting space and displays of historic materials.

- 1712 Meetinghouse – Also known as the Town Church, the Meetinghouse was erected in 1712 and is said to be the oldest Congregational Church in continuous use in the United States. The town took ownership in 1838 through a buy-out of pew owner families in order to allow spiritual worship by any faith practiced by town residents.

- The Stone School – Constructed in 1921, the Stone School was subject to ownership by the U.S. Air Force between 1960 and 1998. The building no longer meets life safety codes and public access is prohibited but provides storage for historic artifacts and town equipment.

- Fox Point – In 1980, the town acquired a 120-acre parcel of land on Fox Point. There are three structures on the property: a two-story house which the town leases to a caretaker, a large two-story carriage house that is used for the storage of town vehicles and boats, and a storage shed. The property includes a trail system for walking and cross-country skiing, with some trails available for ATV use and horseback riding.

DEMOGRAPHIC PROFILE – POPULATION CHARACTERISTICS

A demographic profile of Newington provides statistics which can be useful for identifying trends in the population and enables comparisons among Newington, surrounding communities, Rockingham County and New Hampshire.

**Note - 2017 data is taken from the American Community Survey (ACS) a report issued by the U.S. Census Bureau. ACS data is collected from a sample of the population, which differs from the data collected from the whole population for the decennial census. The 2017 ACS data is the most current data available pending the 2020 U.S. Census.*

TABLE 1 – NEWINGTON POPULATION HISTORY AND PROJECTIONS

Sources: 1980–2010 US Census
2017 American Community Survey
2020–2040, N.H. Office of Strategic Initiatives

Year	1980	1990	2000	2010	2017*	2020	2030	2040
Population	716	985	777	753	819	770	788	800

Table 1 displays population for Newington recorded by the U.S. Census Bureau from 1980-2017 and population projects estimated by the N.H. Office of Strategic Initiatives for the years 2020–2040.

TABLE 2 – POPULATION GROWTH RATES

Sources: 1980–2010 U.S. Census
2017 American Community Survey

	1980 Population	2010 Population	% Population increase/decrease 1980 - 2010	2017 Population
Newington	716	753	5.16%	819
New Castle	936	968	3.41%	979
Greenland	2,129	3,549	66.69%	4,035
Rye	4,508	5,298	17.52%	5,440
Stratham	2,507	7,255	189.38%	7,410
Portsmouth	26,254	21,233	-19.12%	21,796
Rockingham County	190,345	295,223	55.09%	302,479
New Hampshire	936,644	1,316,470	40.55%	1,331,848

Table 2 compares Newington's growth rate with surrounding communities, Rockingham County and the state for the period 1980 to 2010. New data will be available from the 2020 U.S. Census.

TABLE 3 - NEWINGTON POPULATION CHARACTERISITCS

Source: 2017 American Community Survey

2017	Number of residents	% of population
Total Population	819	
Male	413	50.4%
Female	406	49.6%
Under age 5 years	40	4.9%
5 to 9 years	14	1.7%
10 to 14 years	11	1.3%
15 to 19 years	47	5.7%
20 to 24 years	51	6.2%
25 to 34 years	65	7.9%
35 to 44 years	50	6.1%
45 to 54 years	138	16.8%
55 to 59 years	109	13.3%
60 to 64 years	129	15.8%
65 to 74 years	98	12.0%
75 to 84 years	58	7.1%
85 years and over	9	1.1%
Median Age - Newington	54.8 years	
Median Age – Rockingham County	44.1 years	
Median Age – New Hampshire	42.7 years	

Table 3 offers information on age distribution in Newington according to the 2017 American Community Survey. The median age was 54.8 years, older than the median age for both Rockingham County and the state. Residents age 45 to 54 comprise the largest population group in Newington.

TABLE 4 – HOUSING CHARACTISTICS

Source: 2017 American Community Survey

2017	Number	Percentage of total
Total Housing Units	355	100%
Single-Family Units, detached or attached	333	93.8%
Two to Four Units in Structure	20	5.6%
Five or More units in Structure	2	.5%
Mobile Homes	0	-

Table 4 shows the majority of Newington residents reside in single-family homes.

TABLE 5 – EDUCATIONAL ATTAINMENT FOR RESIDENTS 25 YEARS AND OVER

Source: 2017 American Community Survey

	High school graduate or higher	Bachelor's degree or higher
Newington	96.3%	41.9%
Rockingham County	93.5%	36.6%
New Hampshire	90.9%	32.9%

Table 5 highlights educational attainment in Newington is high.

TABLE 6 – HOUSEHOLD INCOME

Source: 2017 US American Community Survey

	2017 Median Family Income	2017 Per Capita Income	Percentage of Individuals Below the Poverty Level
Newington	$112,708	$48,688	2.8%
Rockingham County	$103,321	$43,474	4.8%
New Hampshire	$71,305	$36,914	7.6%

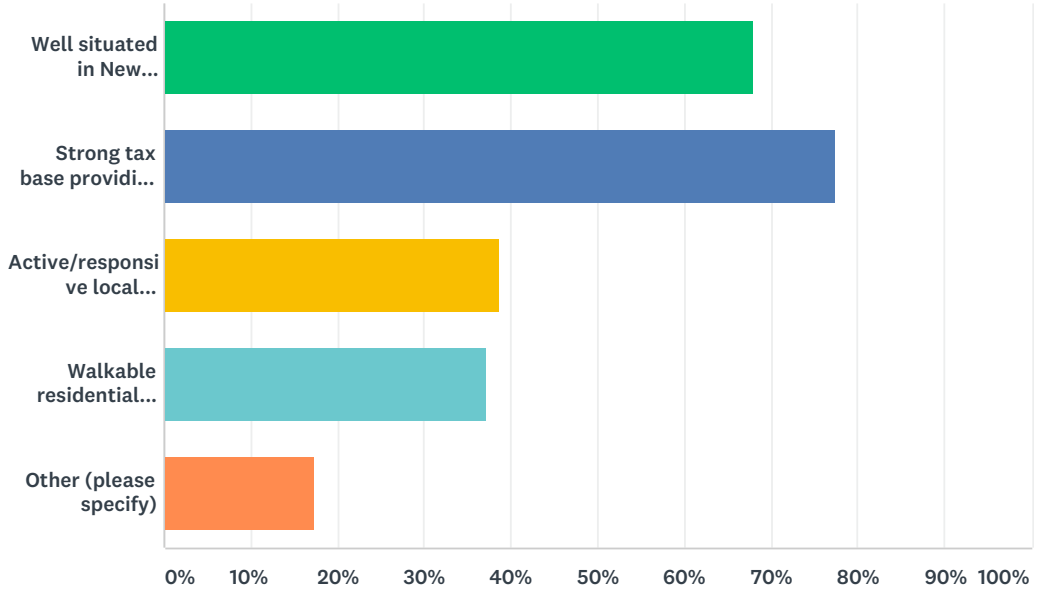
Table 6 shows median family income, per capita income and the percentage of individuals below the poverty level for Newington, Rockingham County and New Hampshire. Family and per capita income in Newington are above averages for the county and state. The percentage of individuals below the poverty level in Newington, 2.8%, is lower than the percentage in Rockingham County and the state.

MUNICIPAL FACILITIES AND SERVICES AND DEMOGRAPHIC PROFILE RECOMMENDATIONS

- Replace 2017 American Community Survey data with data from the 2020 U.S. Census when that information is available.

Q1 What are the town's greatest assets or benefits?

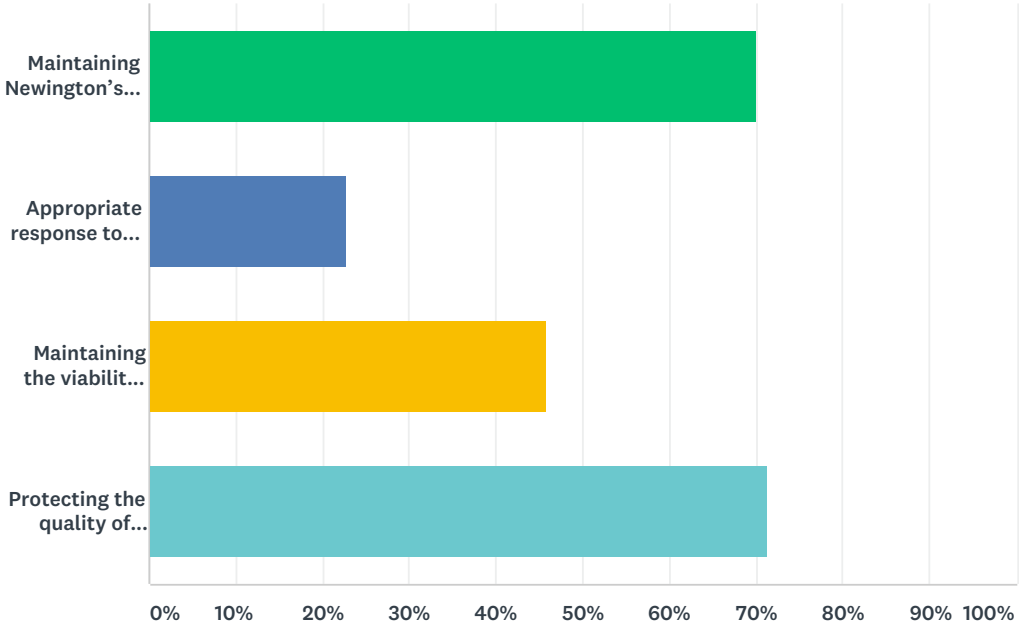
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
Well situated in New Hampshire with access/views to salt waters	68.00%	51
Strong tax base providing low property taxes	77.33%	58
Active/responsive local community with friendly neighbors	38.67%	29
Walkable residential areas with ample open space	37.33%	28
Other (please specify)	17.33%	13
Total Respondents: 75		

Q2 What are the town's most pressing issues now and in the future?

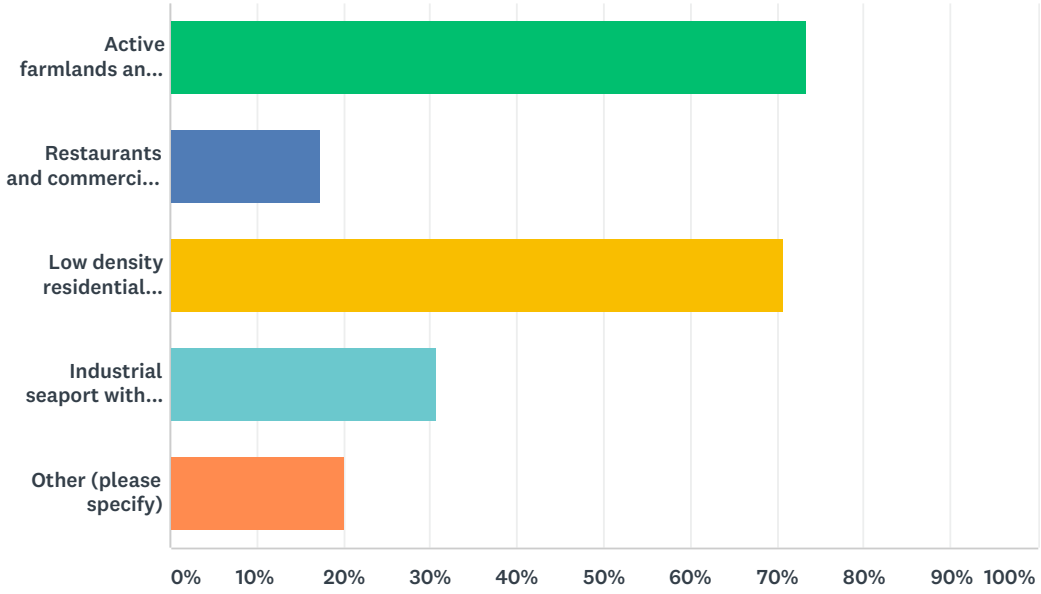
Answered: 70 Skipped: 6



ANSWER CHOICES	RESPONSES	
Maintaining Newington's rural, small-town character.	70.00%	49
Appropriate response to changes in climate.	22.86%	16
Maintaining the viability of the Town's retail center.	45.71%	32
Protecting the quality of Newington's natural environment.	71.43%	50
Total Respondents: 70		

Q3 What are the most appealing areas in town? (Y/N/Add)

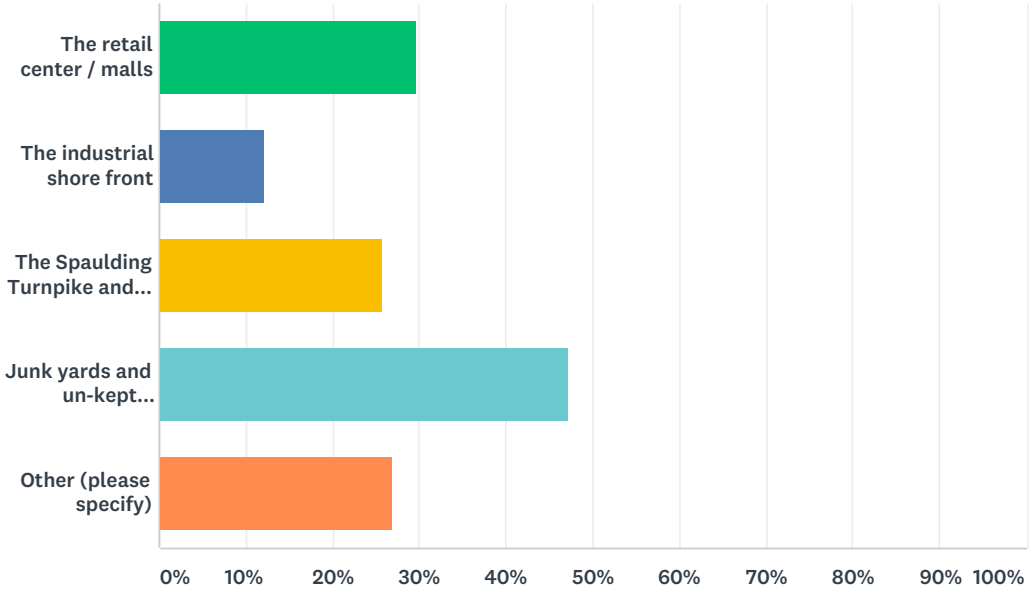
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
Active farmlands and undeveloped open spaces	73.33%	55
Restaurants and commercial enterprises with job opportunities	17.33%	13
Low density residential areas	70.67%	53
Industrial seaport with high paying jobs	30.67%	23
Other (please specify)	20.00%	15
Total Respondents: 75		

Q4 What is the least appealing area in town?

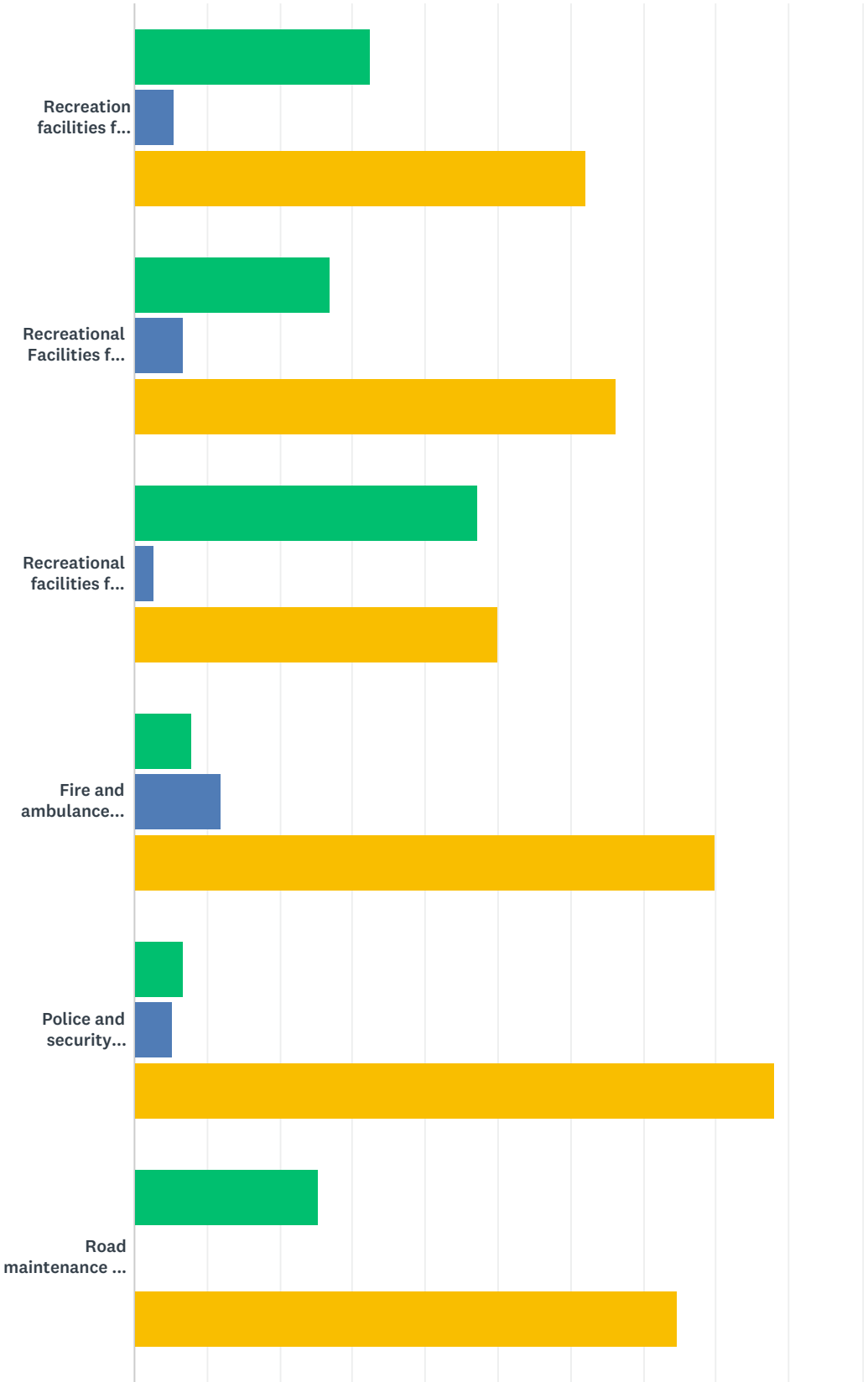
Answered: 74 Skipped: 2

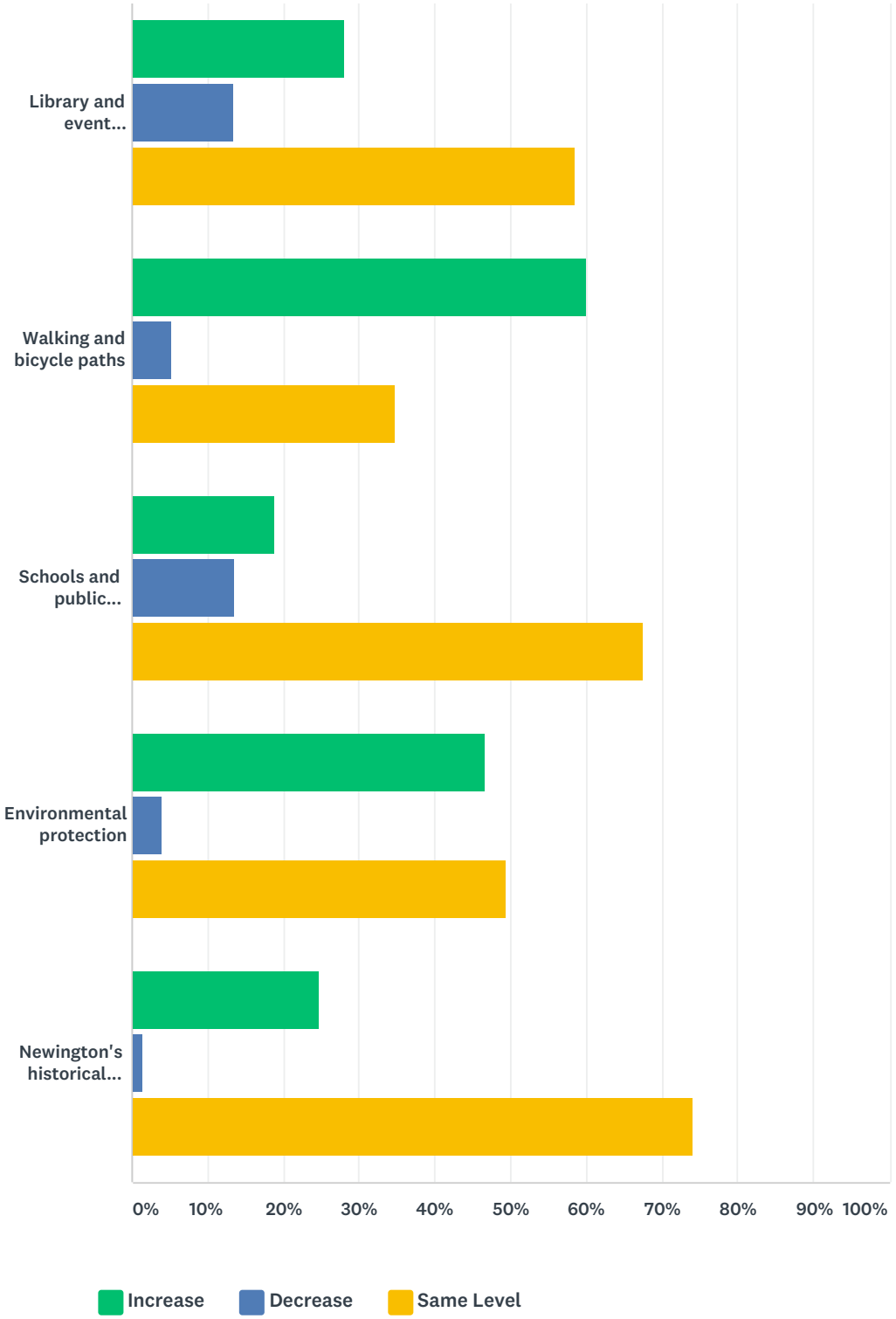


ANSWER CHOICES	RESPONSES	
The retail center / malls	29.73%	22
The industrial shore front	12.16%	9
The Spaulding Turnpike and Pease Tradeport	25.68%	19
Junk yards and un-kept buildings in our residential areas	47.30%	35
Other (please specify)	27.03%	20
Total Respondents: 74		

Q5 Should we increase, decrease or hold same with tax funding for each of the following:

Answered: 75 Skipped: 1



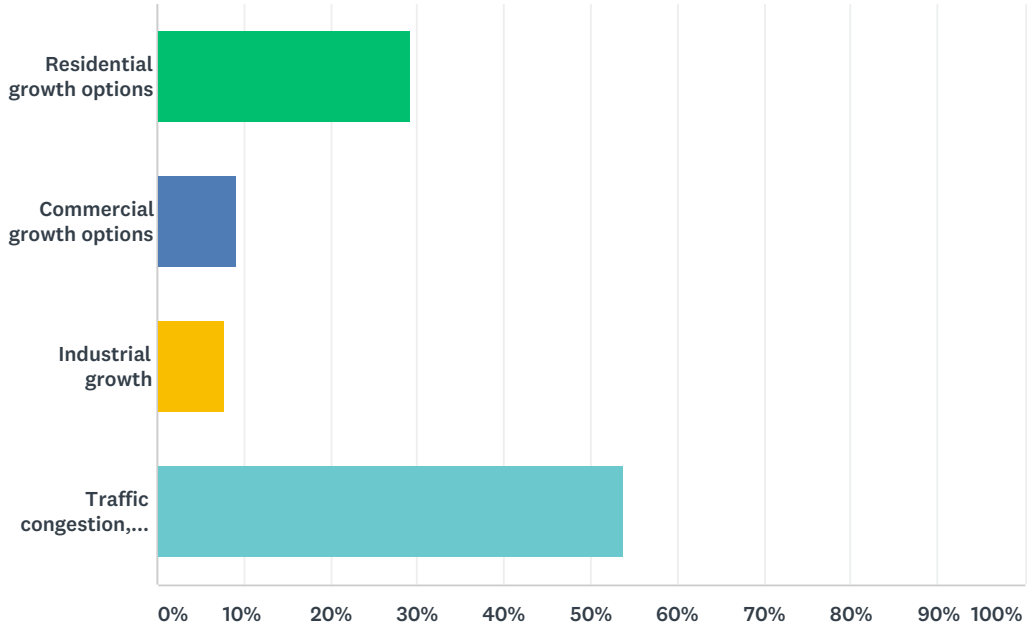


	INCREASE	DECREASE	SAME LEVEL	TOTAL
Recreation facilities for youth	32.43% 24	5.41% 4	62.16% 46	74
Recreational Facilities for wage earners	27.03% 20	6.76% 5	66.22% 49	74
Recreational facilities for the elderly	47.30% 35	2.70% 2	50.00% 37	74

Fire and ambulance protection	8.00% 6	12.00% 9	80.00% 60	75
Police and security protection	6.67% 5	5.33% 4	88.00% 66	75
Road maintenance and snow removal	25.33% 19	0.00% 0	74.67% 56	75
Library and event activities	28.00% 21	13.33% 10	58.67% 44	75
Walking and bicycle paths	60.00% 45	5.33% 4	34.67% 26	75
Schools and public education	18.92% 14	13.51% 10	67.57% 50	74
Environmental protection	46.67% 35	4.00% 3	49.33% 37	75
Newington's historical areas	24.66% 18	1.37% 1	73.97% 54	73

Q6 Do you consider any of the following to be serious local problems that the Town government should develop a strategy to resolve?

Answered: 65 Skipped: 11



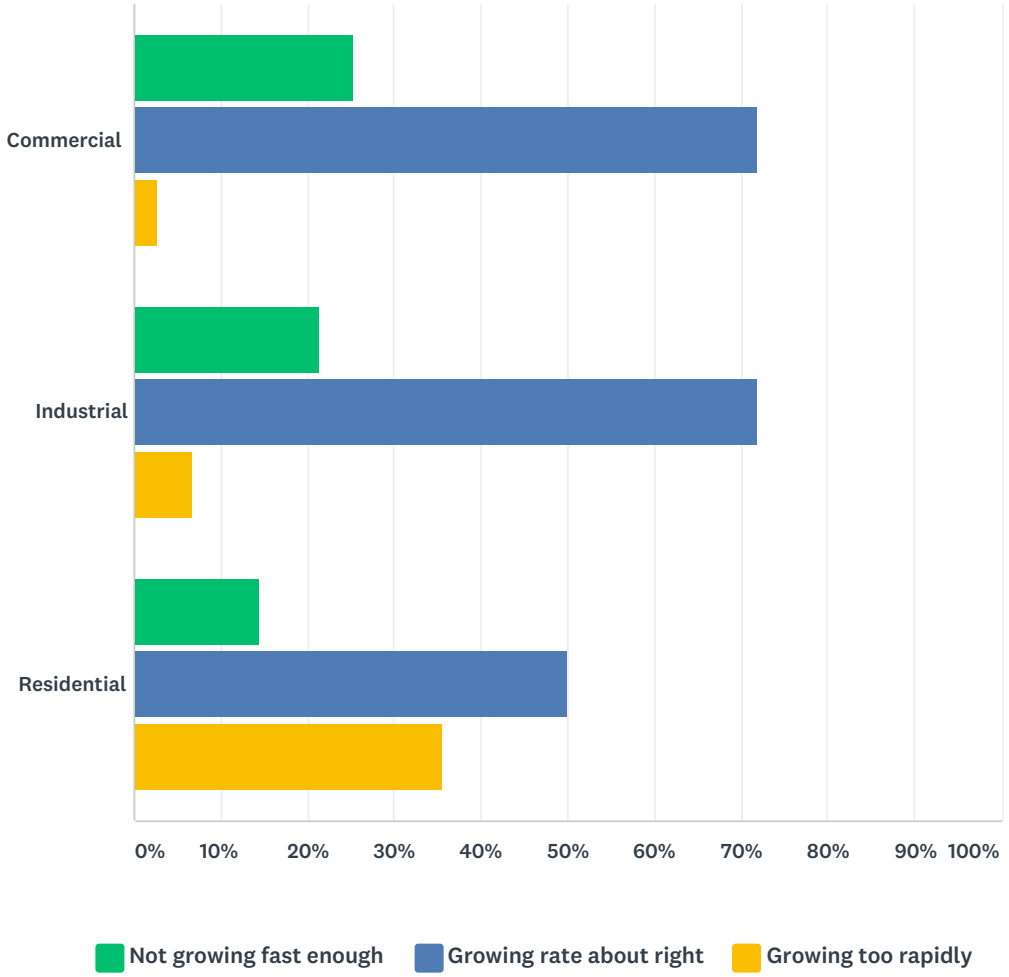
ANSWER CHOICES	RESPONSES	
Residential growth options	29.23%	19
Commercial growth options	9.23%	6
Industrial growth	7.69%	5
Traffic congestion, noise, and speeding vehicles on local rural roads	53.85%	35
TOTAL		65

Q7 What types of businesses, activity, and services does Newington need the most?If you have more than one response please list each from highest priority to lowest priority with the number one as the highest priority.

Answered: 50 Skipped: 26

Q8 At the present time, how would you describe the growth of Newington's three land categories: Commercial, Industrial, Residential

Answered: 76 Skipped: 0



	NOT GROWING FAST ENOUGH	GROWING RATE ABOUT RIGHT	GROWING TOO RAPIDLY	TOTAL
Commercial	25.33% 19	72.00% 54	2.67% 2	75
Industrial	21.33% 16	72.00% 54	6.67% 5	75
Residential	14.47% 11	50.00% 38	35.53% 27	76

Q9 In general, has the land in Newington been put to the best use? If not, WHY?

Answered: 56 Skipped: 20

Q10 What aspects of Newington's environment are threatened now and in future?

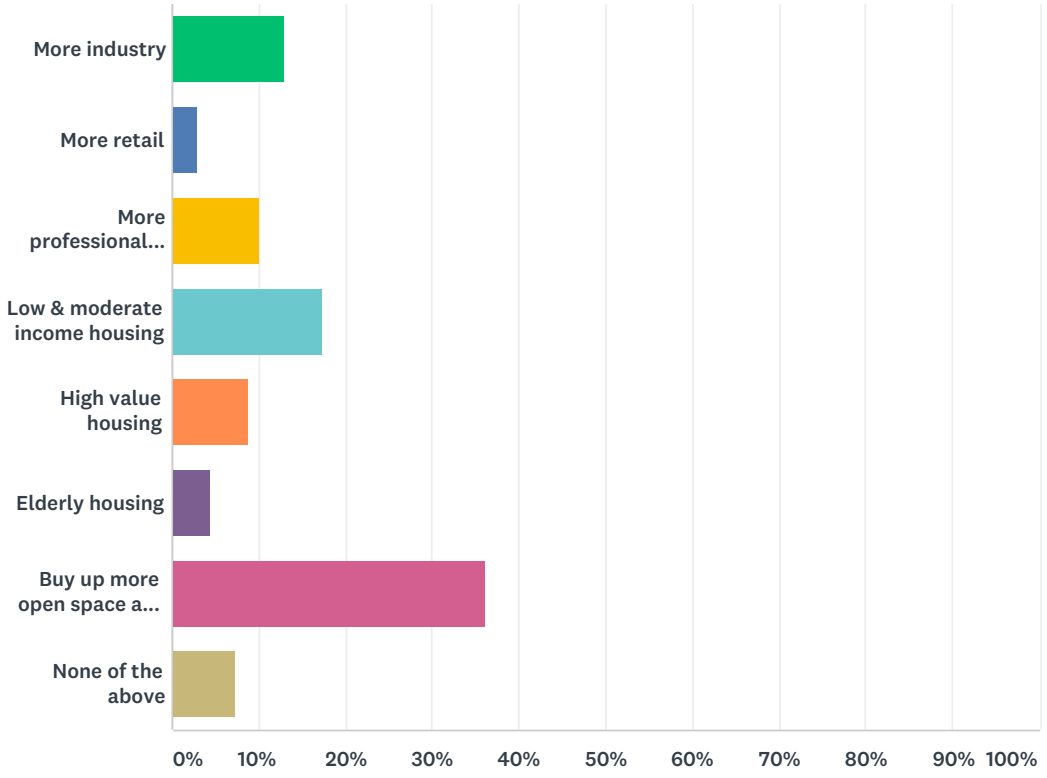
Answered: 58 Skipped: 18

Q11 Would you like Newington's character to be rural or suburban?

Answered: 71 Skipped: 5

Q12 What type of change do you feel we need a town strategy to encourage?

Answered: 69 Skipped: 7



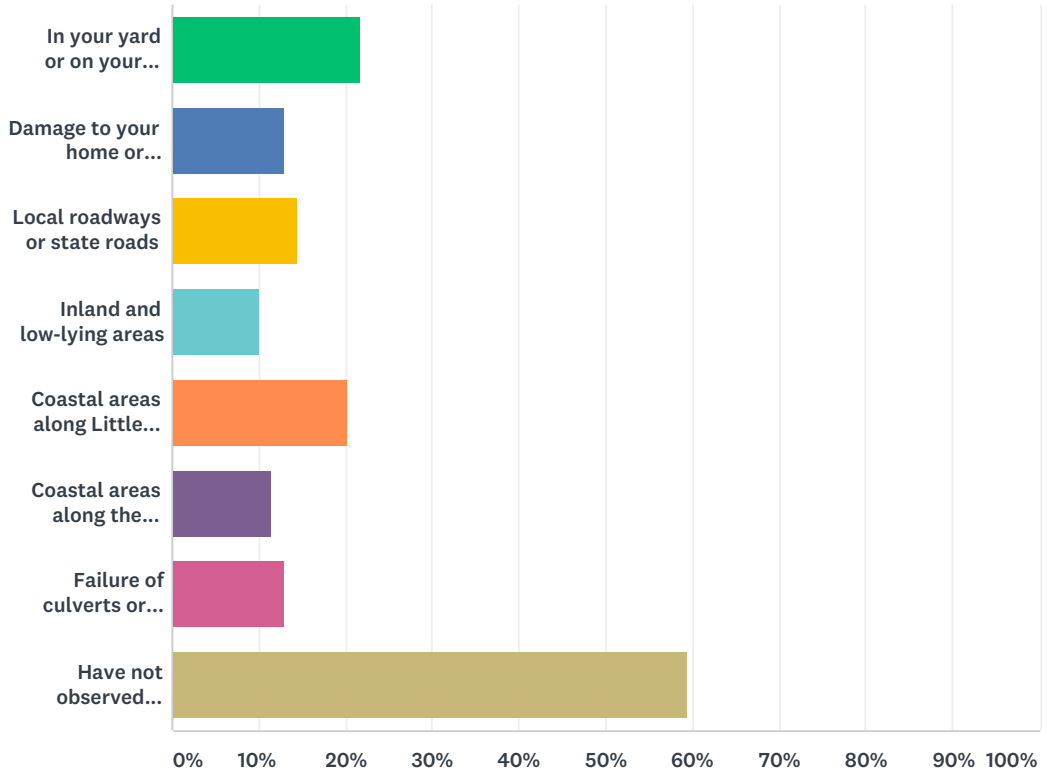
ANSWER CHOICES	RESPONSES	
More industry	13.04%	9
More retail	2.90%	2
More professional office development jobs	10.14%	7
Low & moderate income housing	17.39%	12
High value housing	8.70%	6
Elderly housing	4.35%	3
Buy up more open space and add to town's historic character	36.23%	25
None of the above	7.25%	5
TOTAL		69

Q13 How would you encourage more active volunteers in local government?

Answered: 53 Skipped: 23

Q14 During extreme weather events (e.g. rain, shoreline storms), have you experienced or observed the following types of flooding or erosion? Check all that apply.

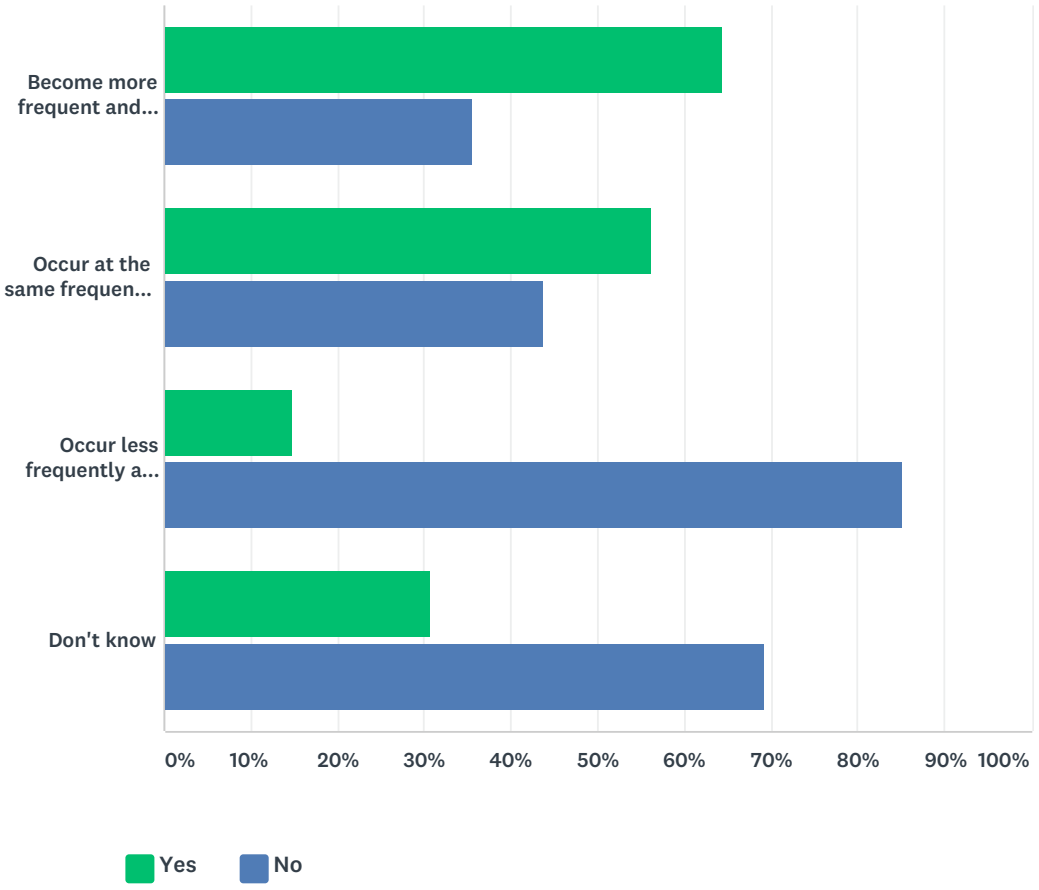
Answered: 69 Skipped: 7



ANSWER CHOICES	RESPONSES	
In your yard or on your property	21.74%	15
Damage to your home or business	13.04%	9
Local roadways or state roads	14.49%	10
Inland and low-lying areas	10.14%	7
Coastal areas along Little Bay	20.29%	14
Coastal areas along the Piscataqua River	11.59%	8
Failure of culverts or road crossings	13.04%	9
Have not observed flooding in Newington	59.42%	41
Total Respondents: 69		

Q15 Have you observed that extreme precipitation events have:

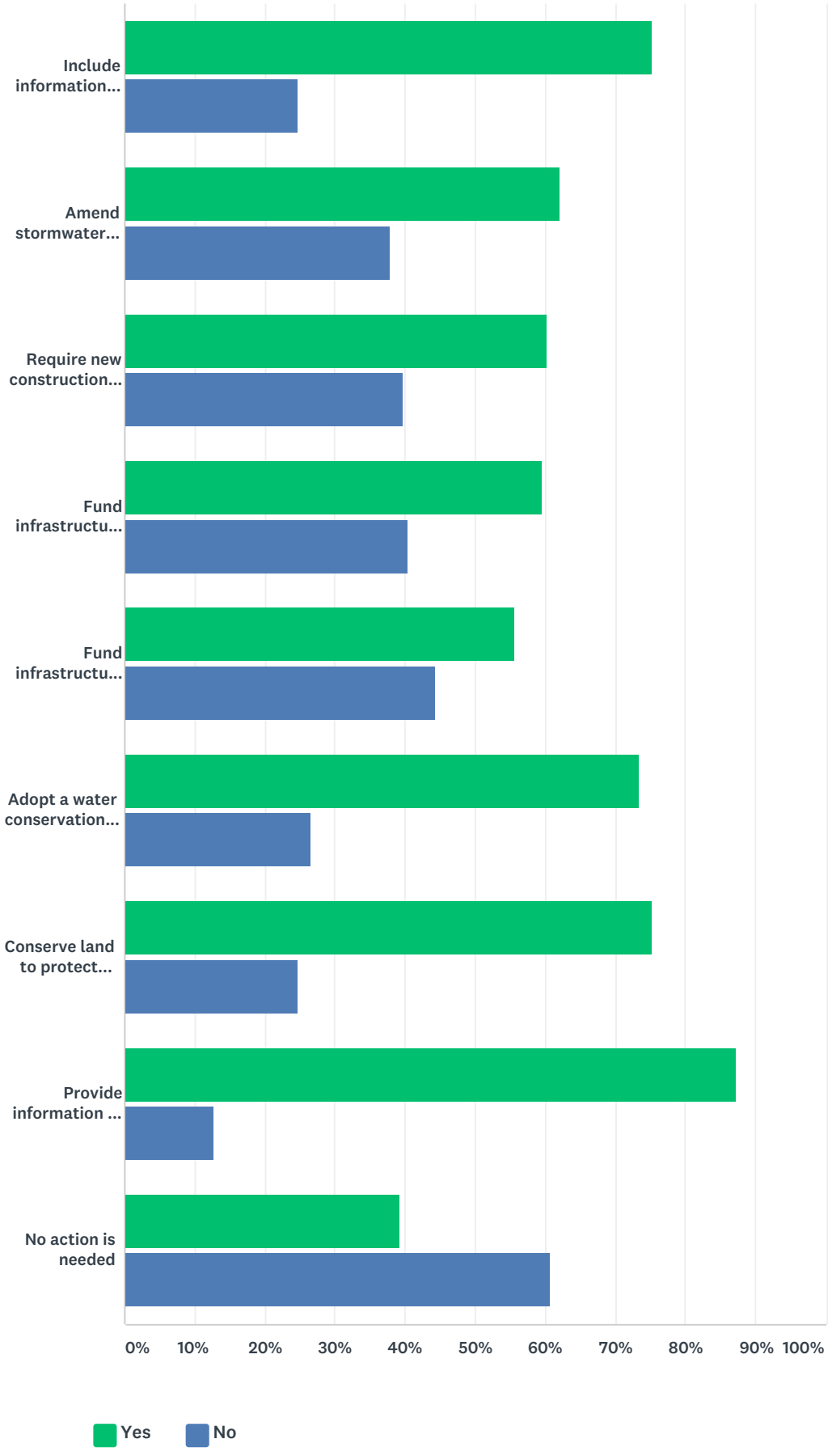
Answered: 74 Skipped: 2



	YES	NO	TOTAL
Become more frequent and more severe	64.52% 40	35.48% 22	62
Occur at the same frequency and severity as in the past	56.36% 31	43.64% 24	55
Occur less frequently and severe than in the past	14.89% 7	85.11% 40	47
Don't know	30.77% 4	69.23% 9	13

Q16 What actions should the Town of Newington take to address future impacts of climate change?

Answered: 73 Skipped: 3

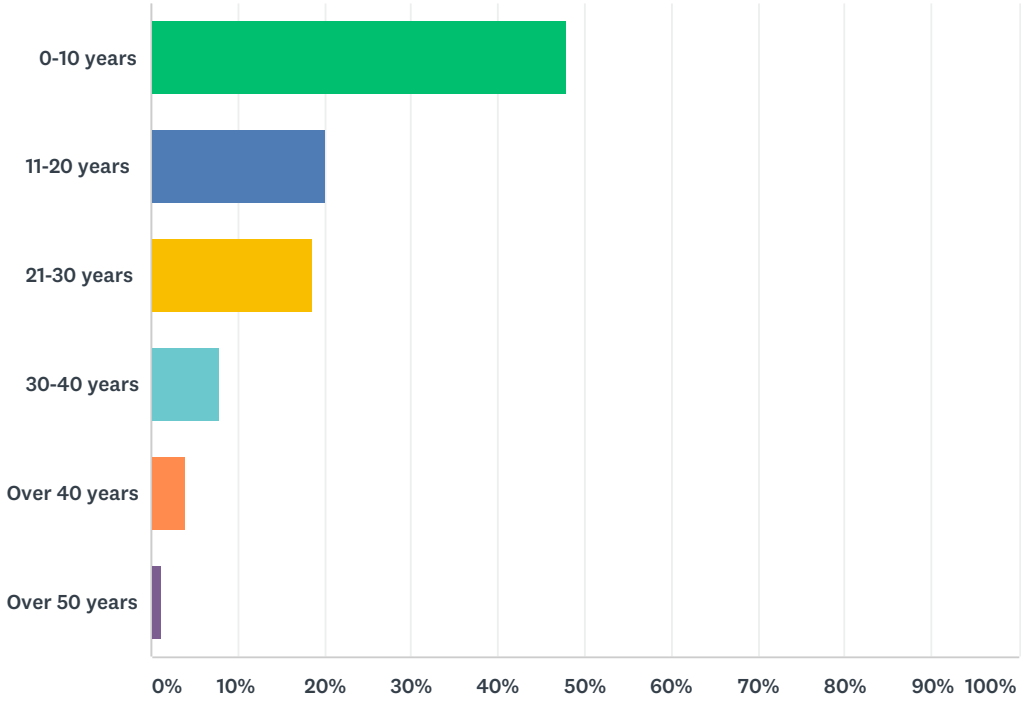

Include information...
Amend stormwater...
Require new construction...
Fund infrastructu...
Fund infrastructu...
Adopt a water conservation...
Conserve land to protect...
Provide information ...
No action is needed
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Yes
No

	YES	NO	TOTAL

Include information about climate change and recommendations in the Master Plan	75.38% 49	24.62% 16	65
Amend stormwater regulations to include flood prevention and groundwater recharge	62.12% 41	37.88% 25	66
Require new construction and redevelopment in the floodplain be raised above the 100-year/1% chance flood elevation	60.32% 38	39.68% 25	63
Fund infrastructure improvements to alleviate coastal flooding	59.68% 37	40.32% 25	62
Fund infrastructure improvements to alleviate inland flooding	55.74% 34	44.26% 27	61
Adopt a water conservation policy for periods of drought	73.44% 47	26.56% 17	64
Conserve land to protect natural resources for flood protection	75.38% 49	24.62% 16	65
Provide information to coastal residents and businesses about flood prevention	87.30% 55	12.70% 8	63
No action is needed	39.29% 11	60.71% 17	28

Q17 How long have you lived in town?

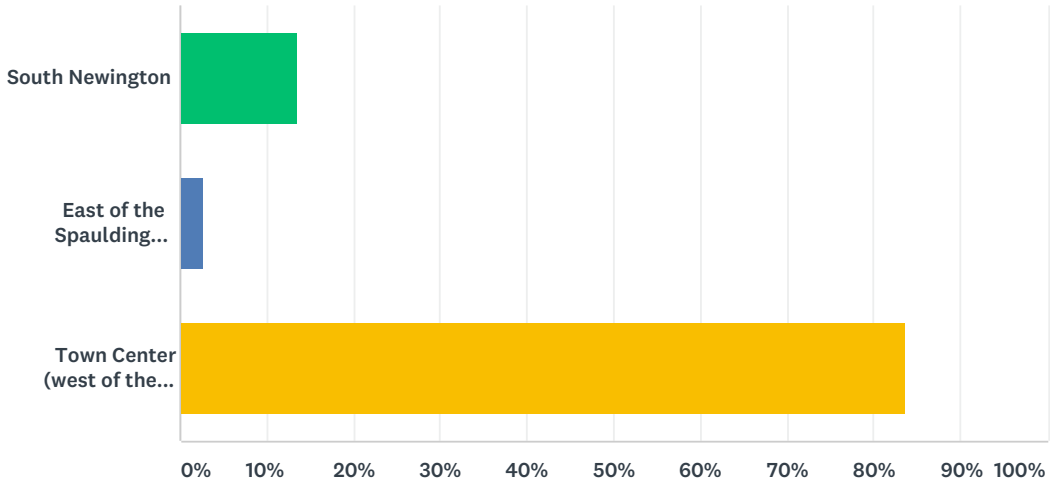
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
0-10 years	48.00%	36
11-20 years	20.00%	15
21-30 years	18.67%	14
30-40 years	8.00%	6
Over 40 years	4.00%	3
Over 50 years	1.33%	1
TOTAL		75

Q18 What part of town do you live in?

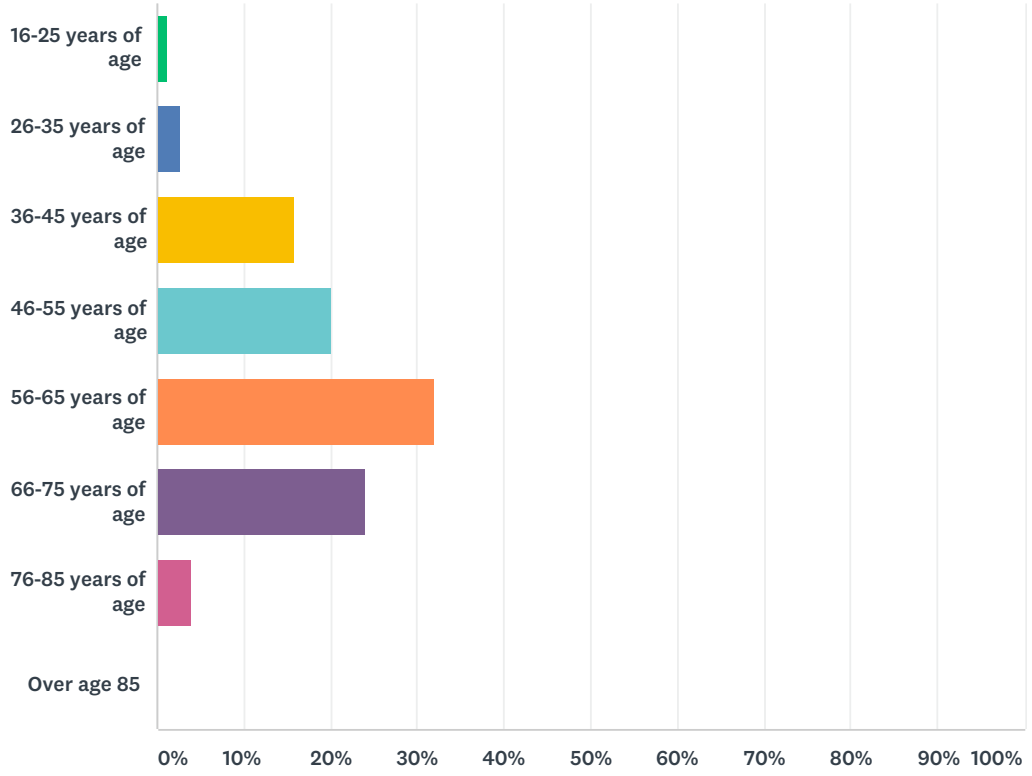
Answered: 74 Skipped: 2



ANSWER CHOICES	RESPONSES	
South Newington	13.51%	10
East of the Spaulding Turnpike	2.70%	2
Town Center (west of the Spaulding and North of Pease)	83.78%	62
TOTAL		74

Q19 How old are you?

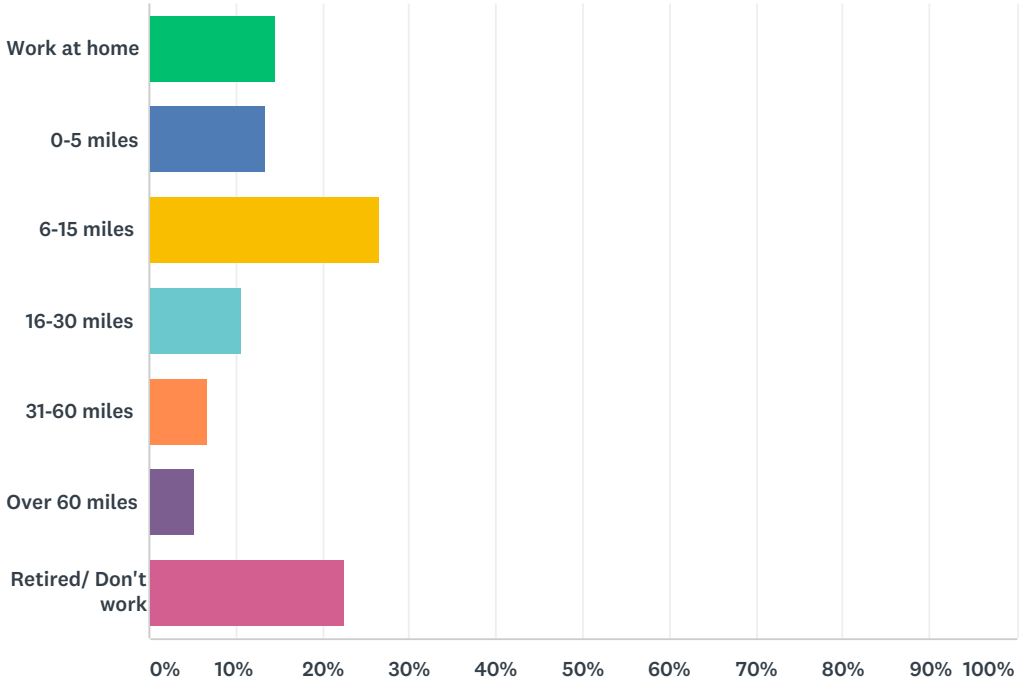
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
16-25 years of age	1.33%	1
26-35 years of age	2.67%	2
36-45 years of age	16.00%	12
46-55 years of age	20.00%	15
56-65 years of age	32.00%	24
66-75 years of age	24.00%	18
76-85 years of age	4.00%	3
Over age 85	0.00%	0
TOTAL		75

Q20 What distance do you commute to your workplace?

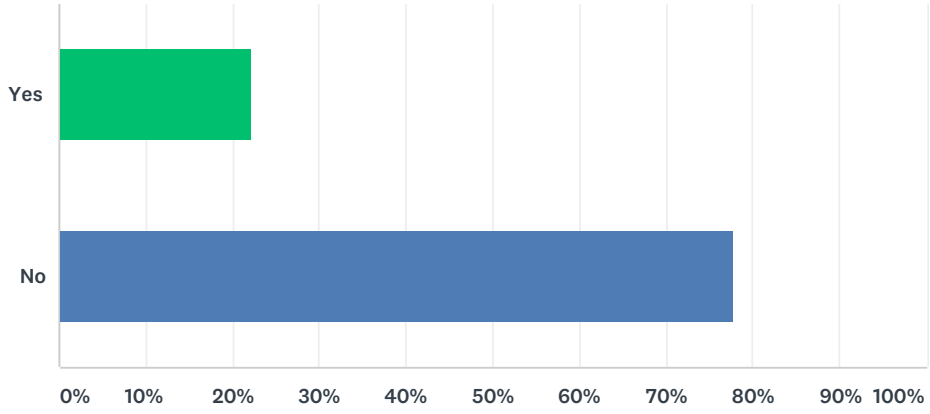
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
Work at home	14.67%	11
0-5 miles	13.33%	10
6-15 miles	26.67%	20
16-30 miles	10.67%	8
31-60 miles	6.67%	5
Over 60 miles	5.33%	4
Retired/ Don't work	22.67%	17
TOTAL		75

Q21 Are you an elected Town official or a member of any local boards or committees?

Answered: 72 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	22.22%	16
No	77.78%	56
TOTAL		72

TOWN OF Newington
Build Out Analysis

March 2019

ROCKINGHAM PLANNING COMMISSION
theRPC.org

Prepared by:
Robert Pruyne Jr., GISP
Rockingham Planning Commission
156 Water St.
Exeter, NH 03833

Table of Contents

Introduction

This report is part of the final product of the build out analysis project for the Town of Newington, NH. This build out is at the request of the Newington Planning Board to help them with future land use planning and update of the future land use chapter of the masterplan. This project was largely informed by a complete update of the existing land use maps from 1962, 1974, 1998, 2005, 2010 and 2015. The land use maps were updated by a sub-group of the Newington Planning Board.

What is a Build Out?

A build out is a process of analyzing spatial data along with current land use regulations. The build out process becomes a tool to be used to show potential future land use scenarios. Town planners should use the results of this build out to evaluate if the enacted zoning will accomplish the goals set forth by the town's masterplan. The planning board should leverage this analysis to determine if the desired balance of open space and development; residential and commercial will be achieved given the current regulations.

A common misconception of the build out process is that it is a prediction tool. A build out is not trying to predict where a new housing unit will be developed but is attempting to show potential for development in a spatial manner. When looking at the results of the build out analysis it is important to look at the aggregate effect, not zoom in on one parcel.

Methods

Tools and Data

The build out was conducted using Geographic Information systems (GIS) software. ArcMap and CommunityViz are the core programs used in the analysis. The application used for this project was ArcGIS Desktop 10.6 developed by the mapping software company ESRI. CommunityViz is an extension for ArcGIS that was created by the Orton Family Foundation. CommunityViz helps with visualization of data. In this instance Community Viz was used to simplify the build out model. GIS Staff

used Python IDLE 2.7 to write some scripts that helped the automation of some of the build out processes.

The GIS data used in this study originates from several sources. GRANIT is the GIS clearinghouse for the state of New Hampshire, as such they supplied much of the base data used in this analysis. The RPC houses and maintains many datasets for the town, some of these were used to create base data and cartographic data used in this build out. The parcel dataset provided from the town was older and somewhat inaccurate in the port area of town. The RPC cleaned the data to the extent needed.

It should be noted for the purpose of this build out there are three types of constraints, absolute constraints, partial constraints and zoning (density) constraints. These all create the constraint layer. Furthermore, there are constrained parcels, these are constrained based on their current development status. An absolute constraint means that area is completely removed from the buildable landmass, a partial constraint allows for the land area of the constraint to be used in density calculations, but development cannot take place on that specific area. A density constraint does nothing more than to lower the allowable developed density of that parcel.

1. Existing Buildings Layer – The existing buildings data was created by RPC using the 2010 aerial photos and updated with 2015 aerial photos. Existing buildings and their corresponding required land mass per zoning were removed from the remaining allowable area of the parcel to allow additional building. The 2015 data shows 478 buildings, 306 Residential, 4 Multi-family, and 168 Non-residential.
2. Conservation Land – Three conservation land datasets were used the RPC Public Lands (204 acres), GRANIT Conservation and Public Land (1411 acres) dataset, and revised conservation dataset that the town planner, conservation commission and the RPC updated in 2018. These three conservation land datasets were consolidated to remove overlaps. Conservation land was considered an absolute constraint.
3. Wetland Buffers - As described in the zoning, the RPC used four different wetlands buffers: here was an absolute constraint of 25' of buffer on fresh water wetlands (703 acres) and 75' on tidal

wetlands (2975 acres), and a partial constraint on 50' buffer of freshwater wetlands (856 acres) and 100' buffer of tidal wetlands (3064 acres).

4. National Wetlands Inventory (NWI) - In some cases the other wetlands datasets are too coarse for town scale analysis, to help to make this build out more accurate the National Wetland Inventory was used to supplement those wetland datasets. In most cases the NWI co-occurs with the wetland's datasets but in some places it does not. Newington has 3255 acres of NWI land, this was all considered an absolute constraint.
5. Prime Wetlands- The RPC used the existing mapped prime wetlands dataset (West Environmental) as an absolute constraint. There are 204 acres of prime wetlands.
6. Parcels data- The Parcel data used was from supplied by the town to RPC in 2010 and reflects 2009. This represented the most current at the start of the build out process. Parcels were divided into 3 categories based on existing land use: Fully constrained, partially constrained, Not Constrained. The way the parcels were categorized was based on whether existing buildings on each parcel fully used the parcel's land mass or not given the existing zoning on that parcel. For example, a 1.8 Acre lot in the R, which requires 1.8-acre minimum lots size, there is 1 existing house, this would be 'fully constrained' and thus nonbuildable. A 4-acre lot in the same zoning district with only one housing unit would still allow for another unit to be build and thus it would be considered 'partially constrained'. This effort yielded a dataset of parcels that were consumed, this data was applied an absolute constraint. This dataset is referred to as "FullyBuiltParcels". There are 319 fully built parcels.
7. Steep Slopes - Slopes larger than 25% were considered steep slopes. Steep slopes for this purpose were considered a partial constraint. The Steep slopes data were created by the RPC from 2011 LiDAR data. There are 225 acres of steep sloped areas in the Town of Newington.
8. FEMA Floodplain – This dataset shows the expected areas of flooding. This was used as a partial constraint. Floodplain areas consume 3014 acres.
9. Zoning – The zoning layer is the base upon which this whole analysis is predicated. Zoning is the layer that the build out process is testing, and is what should be changed to address any issues the town discovers when considering build out results. The zoning layer is created by CAI.

Zone	*Acres*
Commercial	205
Historic	133
Industrial	120
Marina	36
Natural Resource Protection District	1,323
Office	188
Pease Zones	1,322
Residential	1,498
ROW	268
Waterfront Industrial	259
Grand Total	5,351

*note due to differing datasets, the acres of each zone listed here are from the parcel dataset, thus the areas are slightly different from land use datasets.

Procedures

Staff from the RPC met with the Newington planning board to discuss the build out process. The first step in the build out is to obtain and clean the existing parcel data. Next the parcels were assigned a status of built-out, partially built-out or not built-out. Where parcels were determined to be partially built-out, the RPC calculated what percentage of the parcel was built-out. Next all the physical constraints were combined into one 'constraints layer'. In many cases the constraints were coincident; this explains why there is more acreage in constraints than the total size of the town. The constraints layer and the constrained (built-out) parcels are removed from the parcel fabric. This leaves the buildable land use layer. The buildable land use layer then has the zoning applied to it. The buildable land use layer with zoning applied leaves a layer of buildable land. Buildable land is divided up per the zoning calculate the quantity of new units. New units are placed randomly abiding by parcel lines and setback requirements.

Assumptions

Mixed Use and Multi-Family – This model tends to assume single family units for the most part. In the third scenario, 20% of new units were assigned to be multifamily in response to a perception that the new ADU (assessory dwelling unit) rules that New Hampshire has enacted would result in such change. There is simply not enough information to inform when or why a unit might be multifamily.

Assignment of Residential vs. Non-Residential – In Newington there are no mixed-use zones, except in the Waterfront Industrial zone, which require specific requirements to be met.

Combination of lots- This build out assumes that there is no combination of lots. As such. lots will not be combined for the purposes of this build out. Therefore, in some cases where there is a partial lot left over, it will not be combined with other leftover partial lots to create additional building lots. This should be offset by inefficient use in other places.

Overlay Districts – Overlay districts allow for much greater densities to try and accomplish a specific task or use. If the model is given these densities, it will assign all growth to be such. Thus, this type of overlay zone must be neglected for the purpose of the build out

Efficiency Factor – Past build outs have shown that very few developments are built at maximum efficiency due to things such as parking requirements, roads, driveways, and lot open space requirements. The maximum efficiency allowed in this model was 85%. This was been a consistent factor used in New Hampshire for build out purposes.

Frontage Requirements – Despite there being frontage requirements in the zoning, they are neglected in this build out. This build out assumes that new roads could provide frontage required for development. The efficiency factor described above assists to account for this type of issue.

Results

The results of the build out are buildable land mass and new units at the time of build out. It should be noted these results are not predictive but are the result of what the current zoning allows. The results will change with changes in the current zoning. Results of this analysis are a 'worst case' scenario, meaning that every bit of land mass is used. It should be noted; however, these results do not have a timescale attached to them. Build out conditions could happen in any timeframe.

The following tables show the new units at build out and the buildable area, both by zoning district and town-wide scale. The resulting build out shows a 78% growth in units in the town. While this is not likely to happen, it is possible with current enacted zoning.

Scenarios

The Town of Newington and the RPC used the build out to view what some different potential scenarios might mean for the Town of Newington at build out. The RPC encourages the town to continue to think of potential scenarios to test the sensitivity to changes in density and zones.

This build out analysis had 3 scenarios: Base Scenario, Little Bay Density, and Revised Non-Residential and ADU.

The Base scenario is simply a look at the potential growth due to existing zoning. The "Little bay scenario" was suggested by the planning board. The board noted that the Little Bay Road area was likely at the density that they expected for future developments. This area is a little less dense than the zoning allows for. The final scenario so-called "Revised Non-Residential and ADU" takes the base scenario and adds an additional floor of space to the non-residential zones and allows for 20% of new units to be multifamily in the residential zones.

Residential Build Out Scenario

	Existing	Base	Little Bay	ADU + Extra Floor NRes
Housing Units	354	631	579	636
Population	789	1,407	1,291	1,418
Acres	427	1,261	1,261	1,261

Non Residential Build Out Scenario

	Existing	Base	Little Bay	ADU + Extra Floor Nres
Units	168	228	228	199
Square Footage	XX	XX+45555109	XX+45555109	XX+60698668
Acres	746	2554	2554	2554

Town of Newington, NH
Road Management and Maintenance Plan

Prepared by

Rockingham Planning Commission

January 2019

Contents

1. Introduction

For most towns and cities, their road network is their most valuable asset when factoring in the pure material cost and the dedicated land. In fact, Rockingham Planning Commission (RPC) estimates that the Town of Newington's 2018 maintained road network has a material value of approximately $5,768,692.

Roads allow commuting, services, commerce and shipping, tourism, and provide recreational opportunities. However, maintaining such an integral aspect requires significant attention and funding. The challenge is finding a balance between funding and maintenance. The Town of Newington has contracted RPC to implement a maintenance plan for their road system.

The goal of a Road Surface Management System (RSMS) is to provide municipalities with information on their road system's condition and estimate future maintenance costs. The main objective of this project is to inventory distressed pavement manifestations, such as cracking, so that municipalities can prioritize maintenance strategies to stretch their funding and improve the quality of the road network. This process involves completing a road inventory, condition survey, priority analysis, repair selection, and planning/budget preparation.

2. Road Surface Management System

The assessment was conducted using software developed by the University of New Hampshire Technology Transfer Center (UNH T^2) in partnership with the New Hampshire Department of Transportation (NHDOT).

RPC inventoried the road system maintained by the Town of Newington, and subsequently divided each identified road into quarter-mile segments. RPC then performed a condition survey on each segment and documented multiple pavement-related attributes. In addition, the Town of Newington provided information for two additional attributes that were utilized to determine Priority Scores.

This data was then fed into the New Hampshire Statewide Asset Data Exchange System (NH SADES) RSMS Forecasting system. This web-based system calculates a Pavement Condition Index (PCI) based on the road inventory data inputs. Users can then apply repairs to specific road segments. After applying a repair, the system calculates the estimated repair cost and updates the life span of the road segment. The PCI (a number from 0 to 100) is a qualitative number representing the quality of the section of road, where the higher the score, the greater the general pavement condition of that section.

2.1. Road Segments

The Town of Newington maintains 14.4 miles of paved road which were divided into 63 segments. These road segments were evaluated and ranked according to Priority Score (see Newington_RSMS.xlsx tab “4-2018 Segment Rank”).

2.2. Road Condition Factors

The RSMS utilizes an attribute-driven methodology applied equally to each segment to ensure consistency and improve understanding of the output data. When surveying the road network, each segment is inspected for the relative severity and extent of the following surface distresses:

- Longitudinal Cracking – cracks which run parallel to the roadway centerline. These cracks are usually found at construction joints and between lanes.
- Transverse Cracking – cracks which run perpendicular to the roadway centerline. Transverse cracks are generally spaced at regular intervals and caused by expansion and contraction of the road surface material.
- Alligator Cracking – interconnected crack patterns that resemble alligator skin or chicken wire.
- Edge Cracking – cracks adjacent and/or parallel to the edge of the pavement. While generally confined to the outer one or two feet of pavement, edge cracking can progress into the travel lane.
- Patching – areas where the original pavement was removed and subsequently replaced but is showing deterioration.
- Potholes – areas where portions of the road pavement have broken, and loss of pavement has resulted in a bowl-shaped depression.
- Drainage – the ability for run-off to flow from the paved area to a location that does not influence roadway conditions.
- Rutting – channel depressions in the wheel paths. Rutting causes water to drain along the road surface rather than drain to the edge of the road.
- Roughness – irregularities in the roadway surface which adversely affect the comfort of the ride.

2.3. Priority Factors

Over the last decade, pavement management has changed from a ‘worst first’ strategy to a multi-criteria analysis. This is because the strategy of completely rehabilitating every road, waiting for it to deteriorate, and rehabilitating it again has not proven to be the most efficient management strategy. Typically, when following the ‘worst first’ method, there is not enough money to fund full-scale rehabilitation over a whole road network, and therefore roads are in a continuous state of disrepair most of their lifespan. An RSMS is a data-driven preventative maintenance strategy aimed at long-term cost savings.

A section's Priority Score is determined using the following factors:

- Traffic Volume – how much traffic volume this road experiences
- Importance – how important this road is to the Town (i.e. crucial connecting roads to critical services, etc.)
- Pavement Condition Index (PCI), based on the attributes and methods described in Section 2.2

The Town of Newington determined Traffic Volume and Importance scores for each road which are values from 1 to 5, with 5 being the greatest.

The overall Priority Score for each road segment is calculated according to the formula below. It should be noted that the three factors contributing to the Priority Scores are weighted in the following order of descending importance, as can be seen in the equation: Importance, Traffic Volume, and PCI. Accordingly, the PCI is not the largest factor in how we recommend the Town prioritizes its roads for maintenance.

Priority = (Importance * 40%) + (Traffic Volume * 35%) + (Pavement Condition Index * 25%)

It is also important to note that the PCI utilizes the "keep the good roads good" mentality. This is because $1 of preventative maintenance can eliminate or delay spending $8-$10 on rehabilitation (All State Materials Group). This means that a higher PCI will result in a higher Priority Score. An example of the Priority Score calculation is shown below:

Street	Importance	Traffic Volume	PCI 2018 (Road)	Importance Score	Traffic Volume Score	PCI Score	Priority Score
Nimble Hill Rd	5	3	73	0.4	0.21	0.1825	79.3

3. 2018 Road Ranks

Utilizing the calculated Priority Scores, RPC ranked each segment and road. The top ten roads with the highest Priority Scores are listed below (see Newington_RSMS.xlsx tab "5-2018 Road Rank" for the full list):

Street	Priority Score	Rank
Gosling Rd	91.8	1
Shattuck Way	81.8	2
Nimble Hill Rd	79.3	3
Mcintyre Rd	66.3	4
Little Bay Rd	61.5	5
Fox Point Rd	57.5	6
Beane Ln	54.3	7
Patterson Ln	48	8
Hodgdon Farm Ln	46.3	9
Gundalow Lndg	45.3	10

4. 3 Year Repair Schedule (2019-2021)

RPC applied a repair strategy for future years according to the road rank values and the Town's 2019 road maintenance budget of $190,000. After applying each year of repairs, Priority Scores were re-calculated based on new PCI values.

4.1 2019 Recommendations

For 2019, RPC recommends the following repairs at the road level. When multiple repairs are listed, this is because the select road has multiple road segments, and each segment has a specific repair. The "Cost" field takes into account a default per unit cost developed by the UNH T^2 and the NHDOT.

Repairs in 2019 prioritize routine maintenance, preventative maintenance, and rehabilitation, as follows:

	2018			2019	
Street	**PCI**	**Priority Score**	**Rank**	**Repair**	**Cost**
Gosling Rd	67	91.8	1	Deferred Maintenance	$0.00
Shattuck Way	83	81.8	2	Deferred Maintenance	$0.00
Nimble Hill Rd	73	79.3	3	Milling / HMA (1.5") HMA Overlay (1.25") Isolated Patch and HMA Shim	$68,064.10
Mcintyre Rd	81	66.3	4	Milling / HMA (1.5") Isolated Patch and HMA Shim Microsurfacing (Single) Crack Seal (Major)	$43,257.55
Little Bay Rd	90	61.5	5	Crack Seal (Minor) Crack Seal (Major) Isolated Patch and HMA Shim	$20,874.23
Fox Point Rd	78	57.5	6	Crack Seal (Minor) Isolated Patch and HMA Shim	$17,905.56
Beane Ln	93	54.3	7	Crack Seal (Major)	$2,667.57
Patterson Ln	66	48	8	Milling / HMA (1.5") HMA Overlay (1.25")	$39,633.16
					$192,402.17

4.2 2020 Recommendations

Repairs in 2020 prioritize routine maintenance, preventative maintenance, and milling sections of Fox Point Rd that were not repaired in 2019:

	2019			2020	
Street	**PCI**	**Priority Score**	**Rank**	**Repair**	**Cost**
Woodbury Ave	94	91.5	1	Crack Seal (Minor)	$13,906.74
Gosling Rd	61	90.3	2	Deferred Maintenance	$0.00
Nimble Hill Rd	90	83.5	3	Crack Seal (Major) Crack Seal (Minor)	$9,924.89
Shattuck Way	75	79.8	4	Deferred Maintenance	$0.00
Piscataqua Dr	97	77.3	5	Deferred Maintenance	$0.00
Mcintyre Rd	93	69.3	6	Crack Seal (Minor)	$6,380.64
Little Bay Rd	94	62.5	7	Crack Seal (Minor)	$6,565.41
Fox Point Rd	80	58	8	Milling / HMA (1.5")	$86,846.56
Beane Ln	85	52.3	9	Crack Seal (Minor)	$2,002.12
Patterson Ln	66	46.5	10	Crack Seal (Minor)	$2,536.87
Hodgdon Farm Ln	59	44.8	11	HMA Overlay (1.5")	$22,719.81
Gundalow Lndg	81	43.3	12	Crack Seal (Major)	$2,819.42
Old Post Rd	74	41.5	13	Crack Seal (Minor) Microsurfacing (Single) Fog Seal	$22,812.61
Airport Rd	72	40	14	Isolated Patch and HMA Shim Crack Seal (Minor)	$7,191.81
					$183,706.88

4.3 2021 Recommendations

Repairs in 2021 prioritize routine maintenance and rehabilitation/reconstructing Gosling Rd and Shattuck Way:

	2020			2021	
Street	**PCI**	**Priority Score**	**Rank**	**Repair**	**Cost**
Woodbury Ave	94	91.5	1	Crack Seal (Minor)	$4,770.00
Gosling Rd	58	89.5	2	FDR & Cold Mix (4") Isolated Patch and HMA Shim Fog Seal Microsurfacing (Single)	$94,347.37
Nimble Hill Rd	94	84.5	3	Crack Seal (Minor)	$3,192.91
Shattuck Way	72	79	4	FDR & HMA (4") Milling / HMA (1.5") Microsurfacing (Single)	$269,448.40
					$371,758.68

4.4 Network PCI

The major goal of an RSMS is to track the overall pavement condition of the network--the "Network PCI". RPC was able to calculate these conditions for 2018-2021 using a weighted average. It is important to note that the significant increase from 2018-2019 is partially due to the Town of Newington acquiring Woodbury Ave and Piscataqua Dr at DOT-level specifications.

Year	Network PCI
2018 (at time of survey)	78.2
2019 (with repairs)	86.5
2020 (with repairs)	89.7
2021 (with repairs)	91.2

5. Conclusions

RPC recommends that the Town utilize this road maintenance plan for the years 2019-2021 to better target maintenance strategies and funding. In addition, it is recommended to regularly update this document and paving plan to meet the needs of the Town. We would like to note that the Town's current road maintenance budget of $190,000 is projected to increase the overall network PCI for future years.

After discussion with the Town, it is undetermined as to when Gosling Rd and Shattuck Way can be repaired due to maintenance that the City of Portsmouth performs and an ongoing project by the United States Air Force. While these repairs might not occur in 2021, RPC sees it as critical to rehabilitate these roads as soon as practicable to prevent further degradation and cost increases.

WEST ENVIRONMENTAL INC.
48 Stevens Hill Road, Nottingham, NH 03290
603-734-4298 ♦ mark@westenv.net

Memorandum

Date: October November 25, 2019
To: Jane Hislop, Chair Newington Conservation Commission
From Mark West

RE: **Contiguous Wetland Mapping Project and Article IX Wetlands Overlay District Ordinance Update**

West Environmental, Inc. has completed the 2019 Wetlands Map and edits to Article IX Wetlands Overlay District based on our last Conservation Commission meeting.

Wetland Mapping
The goal of the Wetland Mapping Project is to prepare wetland maps that show all the contiguous wetlands that have 100-foot setbacks in the Town of Newington outside of the Great Bay National Wildlife refuge and Pease Tradeport. This is being undertaken to so that landowners, developers and consultants will know which wetlands have 100-foot setbacks and which wetlands do not. Currently the Wetland Ordinance identifies a 100-foot setback to wetlands contiguous to surface water, but these resources have not been mapped. The Prime Wetlands have been mapped onto the tax map the other wetlands shown include a variety of streams and wetlands which have been taken from years of wetland mapping submittals for development projects. It should be noted that these wetland boundaries are estimated and for preliminary planning purposes only. They do not constitute a wetland delineation in the field performed by a NH Certified Wetland Scientist as required for any land use project within the vicinity of wetlands.

Methodology

- The basis of the mapping of contiguous wetlands starts with the existing Prime Wetland Maps and named and unnamed streams.
- Sub-base maps were prepared to focus on areas to be mapped and include streams, prime wetlands and NWI mapped wetlands
- LiDAR maps were used in concert with leaf off/spring aerial photography to show wetlands, stream channels and topography
- All field verification was performed from public access locations

The New 2019 Wetlands Map shows both the Prime Wetlands and all other contiguous wetlands that have the 100-foot setback in blue. This will assist the public, the building inspector and local land use board in identifying these wetlands and their buffers. The contiguous wetlands are connected to streams, brooks and Great Bay. Streams are identified in the Wetland Ordinance as a protected resource and they are also protected in NHDES regulations.

As part of this mapping process the Newington Conservation Commission, based on the recommendation of West Environmental, reduced the setbacks to wetlands contiguous with intermittent streams. These three wetland systems are mapped in pink with a 75-foot setback.

Wetland Ordinance Update

While updating the Wetland Ordinance to reflect the new wetland mapping other minor changes were made. Several of the changes are related to updating reference documents in delineation standards and correction of typos. McIntyre Brook was specifically identified in the wetland definition section are it is a human altered stream system that is also contiguous to surface waters.

In addition, the wetland setback table was simplified to remove confusing language. There were also changes to the minimum size of wetlands with 50-foot setbacks from 5,000 square feet to 3,000 square feet and the addition of a 25-foot setback to wetlands smaller than 3,000 square feet. This change is based on the need to reduce the accidental incursion into unprotected wetlands. When development can occur right up to the edge of smaller wetlands, the result can include unforeseen wetland impacts. These violations to local and state regulations require enforcement actions by the Building Inspector, Conservation Commission and the NHDES. This also creates additional costs for the landowner and developers. Providing a small setback reduces these impacts on the Town and its citizens. The 3,000 square foot size was chosen as it represents the minimum wetland impact category for NHDES wetland permits and is the threshold that triggers the US Army corps of Engineers review.

C-RiSe

CLIMATE RISK IN THE SEACOAST

Assessing Vulnerability of Municipal Assets and Resources to Climate Change

Rollinsford • Dover • Madbury • Durham • Newmarket • Newfields • Exeter • Stratham • Greenland • Newington

TOWN OF NEWINGTON, NEW HAMPSHIRE

Vulnerability Assessment

of projected impacts from sea-level rise and coastal storm surge flooding

Prepared by the
Rockingham Planning Commission

Mach 31, 2017

This project was funded, in part, by NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the New Hampshire Department of Environmental Services Coastal Program

ACKNOWLEDGEMENTS

The Rockingham Planning Commission gratefully acknowledges the participation of Town of Newington:

Gerald Coogan, Town Planner

John Stowell, Building Inspector

Andrew Head, Emergency Management Director

Leonard Thomas, Road Agent

Planning Board: Denis Hebert-Chair, Christopher Cross-Vice Chair, James Weiner, Bernard Christopher, Jack Pane, Kenneth Latchaw, Peter Welch, Mark Phillips

Cover Photo: Great Bay Marine, Fox Point, Stubbs Pond Outlet
Photo Credit: Rockingham Planning Commission

Notes on Use and Applicability of this Report and Results:

The purpose of this vulnerability assessment report is to provide a broad overview of the potential risk and vulnerability of state, municipal and public assets as a result of projected changes in sea-levels and coastal storm surge. This report should be used for preliminary and general planning purposes only, not for parcel level or site specific analyses. The vulnerability assessment performed was limited by several factors including the vertical accuracy of elevation data (derived from LiDAR) and the static analysis applied to map coastal areas subject to future flooding which does not consider wave action and other coastal dynamics. Also, the estimated flood impacts to buildings and infrastructure are based upon the elevations of the land surrounding them, not the elevation of any structure itself.

March 31, 2017

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Project Partners:

March 31, 2017

PURPOSE AND APPLICATIONS OF THE VULNERABILITY ASSESSMENT

The *Climate Risk in the Seacoast* (C-RiSe) vulnerability assessment project produced maps and statistical data about the potential impacts from sea-level rise and storm related flooding to state and municipal infrastructure, critical facilities, transportation systems, and natural resources in New Hampshire's 10 Great Bay coastal municipalities. As shown in Figure 1, the assessment evaluated flood impacts from six sea-level rise and storm surge scenarios - 1.7 feet (intermediate-low), 4.0 feet (intermediate), and 6.3 feet (highest) sea-level rise projections at the year 2100 and these sea-level rise projections with the 100-year storm surge. These scenarios capture a range of plausible projections of sea levels at 2100, from the intermediate-low to the highest scenarios.

FIGURE 1: Sea-Level and Storm Surge Scenarios

Sea Level (SLR) Scenarios	SLR Intermediate Low 2100	SLR Intermediate High 2100	SLR High 2100	SLR + storm surge 2100	SLR + storm surge 2100	SLR + storm surge 2100
Sea Level Rise	1.7 feet	4.0 feet	6.3 feet	--	--	--
Sea Level Rise + Storm Surge	--	--	--	1.7 feet + storm surge	4.0 feet + storm surge	6.3 feet + storm surge

Note: Storm surge is the area flooded by the current 100-year/1% chance storm event as depicted on the FEMA Flood Insurance Rate Maps (preliminary maps, 2014).

The results of this vulnerability assessment can be incorporated into existing municipal plans including the Master Plan, Hazard Mitigation Plan, Road Improvement Plan, Infrastructure Management Plan, and Capital Improvement Plan. These results can also inform zoning amendments such as floodplain development standards and natural resource protection, and land development standards in site plan review regulations and subdivision regulations.

OVERVIEW OF NEWINGTON

The Town of Newington is situated along both tidal riverine and estuarine shorelines. Newington's land area covers roughly 8.2 square miles (5,248 acres) and 4.1 square miles (2,624 acres) of inland water area. With an estimated population of 800 (2014 Census), Newington is the least populated municipality in RPC's planning region. The inland coastal portion of Newington that is most susceptible to coastal flooding are low-lying areas along Little Bay, Great Bay and the Piscataqua River.

KEY FINDINGS OF VULNERABILITY ASSESSMENT RESULTS

KEY FINDINGS

Figure 2 reports the number of acres of land and inland water area affected under the sea-level rise and storm surge scenarios evaluated. The area impacted by flooding increases by 78 percent from 1.7 feet of sea-level rise to 4.0 feet of sea-level rise, then another 34 percent increase at 6.3 feet of sea level rise. Affected areas greatly increase under the storm surge scenarios which are infrequent events compared with daily flooding at high tide.

FIGURE 2: Total Acreage Affected by Sea Level Rise and Storm Surge Scenarios at year 2100

Municipality	Sea-Level Scenarios					
	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3feet + storm surge 2100
Newington (acres)	123.2	219.6	294.7	252.9	325.6	404.3
% impacted	1.6	2.8	3.7	3.2	4.1	5.1

Total Area = 7,872 acres

Figures 2 and 3 provide an overview of impacts to land and specific assets affected by each sea-level rise and storm surge flooding.

Newington has significant miles of coastal tidally-influenced shoreline along the Great Bay and Little Great Bay, however due to the increase in elevation landward only certain areas are particularly vulnerable to flooding from seasonal high tides, coastal storms, and sea-level rise. These high risk flood areas include lands currently used for commercial, industrial, residential and recreational development, and small sections of local roads and state Route 16 at the Little Bay Bridges. The following areas are most susceptible to sea-level rise and storm related flooding:

- River Road/Piscataqua River waterfront commercial/industrial area
- Great Bay Marine and low-lying supporting lands
- Fox Point and Newington Town Park conservation lands
- Residential parcels and structures along the west and southwest shorelines
- Shattuck Way, a designated evacuation route
- Fabyan Point (future residential development potential)
- 9 parcels valued at $10.8 million and 9 homes valued at $1.3 million

FIGURE 3: Summary of Assessment Data

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Infrastructure and Critical Facilities						
Infrastructure-Water Pipes (miles)	0.01	0.1	0.3	0.2	0.4	0.6
Roadways (miles)	0.0	0.1	0.7	0.4	0.9	1.3
Critical Facilities (# of sites)	na	na	1	na	na	3
Residential Structures	0	0	3	2	6	8
Assessed Value - Parcels Impacted	$519,647,600	$120,940,300	$127,201,800	$131,327,200	$127,954,100	$135,065,400
Natural Resources						
Freshwater Wetlands (acres)	8.2	10.0	11.0	10.9	11.7	15.2
Tidal Wetlands (acres)	113.4	117.5	119.4	118.6	119.8	120.6
Wellhead Protection Areas (acres)	0	0	0	0	0	0
Conserved and Public Lands (acres)	20.8	104.4	159.3	126.5	177.1	229.4
Wildlife Action Plan (acres)	39.2	130.5	195.7	157.4	216.4	278.3
Coastal Conservation Plan-Focus Area – Fabyan Point	33.8	113.4	160.7	133.2	175.4	211.5
100-year Floodplain (acres)	123.2	208.8	217.6	214.8	219.1	222.5

Note: Storm surge is the area flooded by the 100-year/1% chance storm event. "na" = not assessed

Property assessed values in areas impacted by future flooding are confined to the 6.3-foot sea-level rise scenario and the three sea-level rise plus storm surge scenarios. No impacts are reported under the 1.7-foot and 4.0-foot sea-level rise scenario.

The complete detailed vulnerability assessment data are provided in the following section of this report.

DETAILED VULNERABILITY ASSESSMENT RESULTS BY ASSET TYPE

Culvert Assessment

Map: Culvert Assessment – Climate Ready Culverts and Figure 4 show the hydraulic and aquatic organism passage function of culverts under existing precipitation conditions for the 10-year, 25-year, 50-year and 100-year storm event.

The hydraulic, performance of more than half of the ten culverts evaluated in this assessment have moderate to poor function under existing storm conditions (10-year up to the 100-year storm event). Newington does not own and operate a tremendous amount of water or sewer infrastructure thus impacts to these assets are minimal to none under all scenarios evaluated. Of the ten culverts analyzed for hydraulic rating, five pass, 2 are transitional and three fail under the 10-year storm event. Culverts #38, #43, #42, #46 and #47 are impacted by sea-level rise and storm surge flooding. For Aquatic Organism Passage (AOP) rating, one culvert has full capability, and 9 have reduced or no capability.

FIGURE 4: Assessment of Culvert Hydraulic and Aquatic Organism Passage Function

Crossing #	Location	Hydraulic Rating				Aquatic Organism Passage Rating	
		10-year	25-year	50-year	100-year	Color	Rating
38	Fox Point Road	Fail	Fail	Fail	Fail	GRAY	Reduced AOP
39	Nimble Hill Road @ Coleman Drive	Fail	Fail	Fail	Fail	GRAY	Reduced AOP
40	Shattuck Way @ Lower Pickering Brook	Pass	Transitional	Transitional	Transitional	GREEN	Full AOP
41	Patterson Lane	Transitional	Transitional	Transitional	Fail	GRAY	Reduced AOP
42	Captains Landing	Transitional	Fail	Fail	Fail	GRAY	Reduced AOP
43	Fox Point Road @ Upper Pickering Brk.	Pass	Pass	Pass	Pass	GRAY	Reduced AOP
44	Fox Point Road @ Flagstone Ditch	Pass	Pass	Pass	Pass	RED	No AOP
45	Shattuck Way @ Paul Brook	Fail	Fail	Fail	Fail	GRAY	Reduced AOP
46	Newington Road@ McIntyre Brook	Pass	Pass	Pass	Pass	RED	No AOP
47	Newington Road @ Kennard Pond	Pass	Pass	Pass	Transitional	GRAY	Reduced AOP

A rating of **Pass** means that the headwater depth is below the lowest top-of-pipe elevation of any culvert at the crossing; a rating of **Fail** means that the headwater depth is above the road surface; and a rating of **Transitional** means that the headwater depth is somewhere between these two elevations.

*AOP = Aquatic Organism Passage is the degree to which aquatic organisms are able to pass through a crossing. Green = Full AOP, Gray = Reduced AOP, Pink = No AOP, for all species except Adult Salmonids, Pink = No AOP, for any species including Adult Salmonids.

Municipal and Critical Facilities

Maps: Critical Facilities and Infrastructure show the municipal critical facilities affected by sea-level rise and coastal storm surge flooding. Figure 5 reports when specific municipal critical facilities are affected by each sea-level rise and coastal storm surge scenario. Only small segments of water distribution pipes are impacted by any of the six scenarios evaluated. Several dams might be at risk of both sea-level rise (4 dams) and storm related (6 dams) flooding. Three residential structures are located in flood areas associated with 6.3 feet of sea-level rise, and 9 residential structures are located in flood areas associated with 6.3 feet of sea-level rise plus storm surge.

FIGURE 5: Municipal Critical Facilities (# of facilities)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Sewer Pipes (miles)	0	0	0	0	0	0
Water Pipes (miles)	0.01	0.08	0.27	0.19	0.43	0.56
Transmission Lines (miles)	0	0	0	0	0	0
Analysis below for SLR 6.3 feet and SLR 6.3 feet + storm surge only						
Dams	Fuel Storage Corp. Holding Pond Lower Dunwoody Dam Lower Peverly Brook Dam Stubbs Pond Dam			Fuel Storage Corp. Holding Pond Lower Dunwoody Dam Lower Peverly Brook Dam Stubbs Pond Dam Barrott's Dam, Kennard Dam		
Residential Structures	3 (6.3 feet SLR)			9 (6.3 feet SLR+storm surge)		
Fuel Source/Storage	0			Pickering Stone		

Transportation

Maps: Road and Transportation Assets show the state and municipal roadways affected by sea-level rise and coastal storm surge flooding. Figure 6 reports the miles of state and local roadways affected by each flood scenario. Except in for the most extreme sea-level rise plus storm surge scenario, less than one mile of combined local, state and private roads are impacted by coastal flooding.

A small portion of Shattuck Way at the intersection of Route 16 is impacted by both sea-level rise and storm surge flooding which could be significant as it is a designated evacuation route. The town should evaluate

this flood risk and its implications for emergency access and response, and public safety in the event of an evacuation during a storm event.

FIGURE 6: State and Municipal Roadways and Infrastructure (miles)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Roadway Type						
Local	0.0	0.02	0.09	0.04	0.15	0.22
State	0.0	0.0	0.0	0.0	0.01	0.01
Private	0.0	0.06	0.60	0.41	0.79	1.05
Total Road Miles	0.0	0.08	0.69	0.45	0.95	1.28
Bridges	na	na	0	na	na	0
NH DOT 10-year Plan Projects	na	na	1	na	na	1
Evacuation Routes	na	na	1	na	na	1

na = not assessed

FIGURE 7: State, Municipal and Private Roadways (miles)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Arboretum Drive	na	na	0.04	na	na	0.11
Fabyan Point Road	na	na	0.06	na	na	0.17
Fox Point Road	na	na	0.00	na	na	0.01
General Sullivan Bridge Road	na	na	0.00	na	na	0.02
Merrimac Drive	na	na	0.08	na	na	0.12
No Name	na	na	0.42	na	na	0.63
Patterson Lane	na	na	0.04	na	na	0.05
Shattuck Way	na	na	0.04	na	na	0.16
Spaulding Turnpike N (state)	na	na	0.00	na	na	0.01
Spaulding Turnpike S (state)	na	na	0.00	na	na	0.01

na = not assessed

As reported in Figure 7, impacts to state, municipal and private roadways were assessed for the 6.3 feet sea-level rise and 6.3 feet sea-level rise plus storm surge scenarios as total miles impacted are minimal. Culverts are supporting infrastructure for the roadway network that are somewhat susceptible to flooding impacts. As sea levels rise in the future, some tidal culverts may become submerged by flooding even at low tide and freshwater culverts will be influenced by tidal flooding, creating hydrologic conditions these drainage systems were not designed for. As reported in Figure 6, the culvert analysis reports that four of the ten culverts analyzed in Newington fail under current conditions associated with the 10-, 25-, 50-, and 100-year storm events, and several others are marginally functional during these storm events.

Natural Resources

Maps: Conservation Areas and *Maps: Wetlands, Aquifers, Wellhead Protection Areas* show natural resources affected by sea-level rise and coastal storm surge flooding. Figure 8 reports the number of acres for each natural resource affected by each sea-level rise and coastal storm surge scenario.

FIGURE 8: Natural Resources (acres)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Stratified Drift Aquifers	0.44	1.39	4.29	2.44	5.16	7.62
Freshwater Wetlands (total)	8.17	10.05	10.97	10.89	11.68	15.19
Freshwater Emergent Wetland	1.59	3.58	5.39	3.70	6.69	7.74
Freshwater Forested/Shrub Wetland	0.59	4.29	7.76	6.07	9.21	14.05
Freshwater Pond	0.00	0.00	0.00	0.00	0.00	1.76
Lake	0.00	48.13	48.93	48.73	48.93	48.93
Tidal Wetlands (total)	113.43	117.53	119.40	118.57	119.82	120.62
Estuarine and Marine Deepwater	80.93	80.98	81.01	81.01	81.01	81.01
Estuarine and Marine Wetland	32.50	36.55	38.39	37.56	38.81	39.61
Wildlife Action Plan – Tiers 1, 2 and 3 habitats	39.2	130.53	195.71	157.37	216.42	278.35
Coastal Conservation Plan Focus Area – Fabyan Point	33.83	113.39	160.76	133.25	175.45	211.53
Conserved and Public Lands	20.85	104.40	159.26	126.53	177.13	229.41
Wellhead Protection Areas	0	0	0	0	0	0

The greatest impacts to wetland systems are in the tidal systems. Over time, low marsh may convert to mud flats and high marsh may convert to low marsh as these systems are inundated by rising seas. Significant acres of high quality habitat and natural resources identified in the NH Wildlife Action Plan and Coastal Conservation Plan, and Conserved lands may be impacted by future flooding. These natural shorelands can act as critical flood storage areas to protect infrastructure and private property from rising seas and storm events.

The shores of the Great Bay and Little Great Bay and their tidal tributaries are fringed with saltmarsh and freshwater wetland systems. As sea levels rise, freshwater systems will transition to brackish and saltwater systems with daily tidal inundation. Saltmarsh may migrate inland with rising seas, depending on the ability of saltmarsh to keep pace with the rate of sea-level rise, the topography (gentle slopes versus steep banks), and the absence of physical barriers such as development, roads and railroad lines

No impact to designated wellhead protection areas, and although minimal impacts are reported for stratified drift aquifers, the assessment did not evaluate potential impacts to private drinking water wells from salt water intrusion as sea-level rises.

FIGURE 9: Conservation Lands (acres)

Resource Type	Sea-Level Rise			SLR + Storm Surge		
	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Conservation Lands						
Beals Tract	0.46	3.90	10.00	6.25	11.82	16.91
Beane Tract	0.02	0.10	0.22	0.15	0.26	0.42
Fox Point	0.92	1.74	3.01	2.28	3.41	6.36
Great Bay National Wildlife Refuge	15.27	89.00	128.94	105.02	142.31	181.30
Mazeau Tract	3.00	7.18	12.74	9.48	14.20	17.79
Town of Newington	0.02	0.09	0.18	0.12	0.21	0.28
White	1.16	2.39	4.17	3.23	4.92	6.35

Figures 9 and 10 report acres of conservation lands, NH Wildlife Action Plan high value habitat and Land Conservation Plan for NH's Coastal Watershed – Focus Areas affected by each of the sea-level rise and storm surge scenarios. The riparian corridors and shorelands surrounding Great Bay and Little Great Bay will serve to accommodate flood waters and rising seas over time which will greatly reduce impacts to public and private assets. Based on the assessment, tidal marshes along the Great Bay and Little Great Bay may become open water as sea level rises, unless the marshes are able to keep pace by building upward. A

marsh migration model would need to be done to more accurately predict the condition of tidal marshes under different sea-level rise scenarios.

Over time, coastal flooding may impact sensitive habitats identified in the Land Conservation Plan for NH's Coastal Watershed (2006) and the NH Wildlife Action Plan (updated in 2015). Such habitats include nesting and breeding sites for shorebirds, tidal and freshwater wetlands, vernal pools, forests, scrub-shrub and meadow landscapes.

FIGURE 10: Wildlife Action Plan and Land Conservation Plan for NH's Coastal Watershed (acres)

Resource Type		Sea-Level Rise			SLR + Storm Surge		
		SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Wildlife Action Plan	Tier 1 habitat	38.93	129.88	194.02	156.43	214.20	272.10
	Tier 2 habitat	0.22	0.56	1.38	0.83	1.77	3.38
	Tier 3 habitat	0.05	0.09	0.31	0.11	0.45	2.87
Focus Areas -Land Conservation Plan for NH's Coastal Watershed	Fabyan Point	33.83	113.4	160.76	133.25	175.45	211.53

Land Use

Maps: Extent of Sea-Level Rise and Sea-Level Rise + Storm Surge Flooding show upland affected by sea-level rise and coastal storm surge flooding above mean higher high water. Figure 11 reports the number of acres of upland affected by each flood scenario. Under the 6.3 feet sea-level rise scenario, the majority of impacts to upland are located in the Knight Brook at Fox Point, Pickering Brook, and Paul Brook drainages, shorelands of the Great Bay National Wildlife Reserve, shoreland and waterfront facilities long the Piscataqua River, and agricultural lands at Lord Farm and Wild Iris Farm. Under the 6.3 feet sea-level rise scenario, additional upland impacts include industrial facilities along the Piscataqua River, and increased interior flooding at the site impacted under the 6.3 feet sea-level rise scenario.

FIGURE 11: Uplands (acres)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Acres	19.2	68.8	139.2	99.1	168.3	243.2
% Upland	0.37	1.34	2.72	1.93	3.28	4.74

Total Upland in Newington = 5,126 acres. Upland refers to land above mean higher high water (highest tidal extent) and excludes wetlands.

Parcels and Assessed Value

Parcels and Assessed Value

Figure 12 reports the number of parcels affected by for each of the six scenarios evaluated and the aggregated assessed value of these parcels. The degree to which the parcel and any development on the parcel is affected by sea-level rise or storm related flooding was not analyzed. Affected parcels were identified based on their location either partially or fully within the extent of the scenarios evaluated. The data may include a number of high value parcels under state and municipal ownership.

FIGURE 12: Parcels and Assessed Value by Scenario

Sea Level Rise (SLR) Scenarios	Number of Parcels Affected by Scenario	Aggregate Value of Affected Parcels	Percent Total Assessed Value
1.7 feet SLR	110	$120,940,300	11.9
4.0 feet SLR	115	$127,201,800	12.5
6.3 feet SLR	121	$131,327,200	12.9
1.7 feet SLR + storm surge	118	$127,954,100	12.6
4.0 feet SLR + storm surge	123	$135,065,400	13.3
6.3 feet SLR + storm surge	128	$136,845,000	13.5
The total assessed property value for Newington = $1,013,624,828 (2016 town report)			

Figure 13 reports the number of homes affected by each of the sea-level rise and storm surge scenarios and the aggregated percent assessed value of these homes. No impacts are reported for the two lowest sea-level rise scenarios and modest impacts under all other scenarios.

FIGURE 13: Homes and Assessed Value by Scenario

Sea Level Rise (SLR) Scenarios	Number of Homes Affected by Scenario	Aggregate Value of Affected Parcels	Percent Total Assessed Value
1.7 feet SLR	0	$0	0
4.0 feet SLR	0	$0	0
6.3 feet SLR	3	$1,123,900	0.11
1.7 feet SLR + storm surge	2	$813,900	0.08
4.0 feet SLR + storm surge	6	$2,770,900	0.27
6.3 feet SLR + storm surge	8	$8,364,400	0.82
The total assessed property value for Exeter = $1,013,624,828 (2016 town report)			

For Newington, the number of affected parcels is quite low, reported as three structures impacted at 6.3 feet of sea-level rise. There is a 240 percent increase in the number of affected parcels and nearly a $2 million increase in assessed value from the 1.7 feet to the 4.0 feet sea-level rise plus storm surge scenarios.

There is a 200 percent increase in the number of affected parcels and approximately a $5.6 million increase in assessed value from the 4.0 feet to the 6.3 feet sea-level rise plus storm surge scenarios

FEMA Flood Hazard Areas

Maps: Preliminary FEMA Flood Hazard Areas show areas within the 100-year floodplain affected by sea-level rise and coastal storm surge flooding. Figure 14 reports the acreage within the current 100-year and 500-year floodplains affected by each flood scenario.

From a floodplain management perspective, creating more resilient development within the current 100-year floodplain will provide protection against flood impacts from long term sea level rise.

In Newington, the 100-year floodplain is highly vulnerable to flooding from storm surge, extending well beyond its boundary under the 4.0 fee and 6.3 feet sea-level rise plus storm surge scenarios. The three sea-level rise scenarios generally fall within the current 100-year floodplain, extending beyond into the 500-year floodplain in certain areas. From a floodplain management perspective, creating more resilient development within the current 100-year floodplain will provide protection against flood impacts from long term sea level rise.

FIGURE 14: FEMA Flood Hazard Areas (acres)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
100-year floodplain	123.2	208.8	217.6	214.8	219.1	222.5
Percentage of SLR within 100-year floodplain (FP)	100% (0.07 acres beyond FP)	95% (0.07 acres beyond FP)	74% (0.07 acres beyond FP)	85% (0.07 acres beyond FP)	67% (0.07 acres beyond FP)	55% (0.07 acres beyond FP)

Floodplain assessment based on Preliminary Flood Insurance Rate Maps (FIRMs) released by FEMA in 2014 (not adopted).

ISSUES AND CONSIDERATIONS

The following issues and considerations of local and regional importance were identified during project meetings with municipal staff and land use board and commission members.

- The following areas are most susceptible to sea-level rise and storm related flooding:
  - River Road waterfront commercial/industrial area
  - Fox Point Marina has high flood risk
  - Residential parcels and structures along the west and southwest shorelines
  - Evaluate the flood risk on Shattuck Way at the Route 16 intersection; identify implications as a designated evacuation route
  - Fabyan Point has future residential development potential and high flood risk
  - Performance of more than half of the culverts assessed is moderate to poor

- Improvements to the state roadway network (elevating, enlarging culvert and bridges) may affect local connector roads, driveway access points and connecting infrastructure and utilities.

- Although roadways, buildings and infrastructure can be protected by raising them above projected sea-level rise elevations, supporting land and land based uses may be impacted by daily tidal flooding from projected sea-level rise.

- Planning for long term sea-level rise can be integrated with existing regulatory and management frameworks for the current 100-year floodplain.

- Ownership of transportation infrastructure and assets by multiple state agencies (roadways, culverts, state parks, parking areas) and town responsibility for management of assets creates complexity in comprehensively managing these systems and implementing climate adaptation strategies.

- Providing information about potential flood hazards to businesses and residents, and early notification of flood risk during a coastal storm event would enhance public safety and preparedness.

- Long term infrastructure management would benefit from an analysis of the costs necessary to improve roads and drainage infrastructure to withstand projected sea-level rise elevations at 2050 and 2100.

RECOMMENDATIONS

The following recommendations are short-term climate adaptation actions that can be included in the town's Natural Hazards Mitigation Plans, Master Plan and other planning and policy documents. These actions are focused on strengthening land use development standards, resource protection, municipal policy and plans, and public support to create more resilient development, infrastructure and natural systems. *Refer to Appendix B for an expanded list of climate adaptation strategies.*

REGULATORY

R1 - Elevate Structures 1-2 feet Above Base Flood Elevation. Adopt standards in floodplain zoning and/or Site Plan Review and Subdivision Regulations that require all new development and redevelopment to be elevated 2 feet above the base flood elevation. Two feet of additional elevation will ensure that structures are protected from flooding based on the highest sea-level rise projection of 2 feet by 2050.

R2 - Coastal Buffers and Tidal Marshes. Adopt buffers and setbacks that adequately separate development and infrastructure from tidal wetlands, freshwater wetlands and surface waters to sustain flood storage capacity, and allow for inland migration of tidal marsh systems and conversion of freshwater systems to tidal systems to accommodate projected changes in sea-levels.

PLANNING AND POLICY

P1 - Natural Hazards Mitigation Plan. Incorporate the vulnerability assessment information and recommendations from the Climate Risk in the Seacoast report and maps in the town's 2015/2016 Natural Hazards Mitigation Plan update. Continue revising and updating the assessment information and climate adaptation recommendations in future updates of the Plan.

P2 - Master Plan Coastal Hazards Chapter. Adopt a Coastal Hazards Chapter in the town's Master Plan that incorporates information and recommendations from the Climate Risk in the Seacoast Vulnerability Assessment report and maps.

P4 - Capital Infrastructure and Investments. Incorporate consideration of impacts from sea-level rise and coastal storm surge flooding in current and future capital infrastructure projects. Incorporate the Climate Risk in the Seacoast vulnerability assessment information into infrastructure management plans and capital improvement plans. Evaluate the extent of sea-level rise and storm surge flooding on individual facilities (e.g. wastewater treatment plant, transfer station, high school).

P5 - Land Conservation. Land conservation offers the greatest opportunities to provide for adaptation to the effects of sea-level rise and coastal storm flooding and climate change impacts.

- Adopt a targeted scoring framework or incorporate new scoring criteria into existing land conservation prioritization efforts that consider climate adaptation benefits when evaluating land for conservation purposes.
- Increase funding and resources for land conservation, land management programs, and land stewardship activities. (Note: Land conservation scores very high as an activity in the FEMA Community Rating System program.)
- Support retreat from high risk areas by buying properties and restoring them to a natural condition.
- Adopt a cluster/open space/conservation subdivision ordinance.

P6 - Wetlands Mitigation Site Inventory. Identify and inventory lands where protection of tidal and freshwater wetlands would provide tangible benefits to protect against flooding, and restoration opportunities to remove barriers to tidal function and marsh and migration. This inventory will allow the town to pre-identify and prioritize sites that can be permanently preserved as a mitigation strategy for wetland impacts from development in high risk coastal areas.

P7 - Evacuation Planning. Prepare evacuation plans and coordinate these plans with towns in the coastal region to implement timely and comprehensive planning and notification for coastal storm events. Mark evacuation routes with signage and communicate these routes to the public with information on the town's website and printed maps.

COMMUNITY OUTREACH AND ENGAGEMENT

O1 – NH Coastal Adaptation Workgroup. The NH Coastal Adaptation Workgroup (CAW) is a voluntary collaborative advocacy group consisting of members from federal and state agencies, regional and non-profit organizations, municipalities, academia, and private businesses. The group's focus is to: 1) pursue activities that improve the resilience of natural systems, infrastructure and development to the impacts of climate change; and 2) facilitate communication and cooperation among stakeholders throughout the coastal watershed, especially in regard to research, programs and other efforts designed to help preserve, protect, and strengthen the Great Bay and Hampton-Seabrook Estuary. CAW can assist the city with outreach, planning and regulatory activities involving climate adaptation implementation.

- Continue supporting work of the NH Coastal Adaptation Workgroup.
- Continue the town's partnership with NH Coastal Adaptation Workgroup in climate adaptation activities that facilitate, coordinate, provide technical information, and convene public outreach events.

O2 - Living Shorelines and Landscaping. Maintaining natural shorelines is an effective way to preserve the functions of shoreline systems (marshes, dunes, estuaries) in providing valuable services including flood storage, recreational areas, and commercial harvesting of fish and shellfish.

- Provide information to property owners about living shorelines and the importance of retaining the functions of natural shorelines, and implementing landscaping best practices.
- Implement living shorelines projects on town lands to demonstrate best practices, and the benefits and effectiveness of living shorelines approaches.

Refer to Newington's Natural Hazards Mitigation Plan for additional recommendations for outreach and engagement activities.

Recommendations from the Coastal Risk and Hazards Commission Final Report (2016)

CC7. Incorporate coastal hazards, risks and vulnerability in policies, plans and investments.

ACTIONS:

a. Evaluate deficiencies and barriers in municipal regulations, plans and policies, and their implications for regional vulnerability.
b. Incorporate coastal hazards and risks assessments, including social vulnerability information, in municipal hazard mitigation plans, natural hazards and climate change adaptation Master Plan chapters, and emergency management plans.
c. Encourage municipalities to develop detailed preparation, response and recovery plans that build on existing plans and initiatives.
d. Encourage municipalities to adopt buffers and setbacks that better account for risk and vulnerability of structures, facilities, and natural resources and maintain ecosystem services (e.g. flood storage, storm surge attenuation, reduced impacts to public structures and facilities, and private property).
e. Incorporate vulnerability assessment information and adaptation strategies for structures and facilities planning and investment for long term capital projects in municipal Capital Improvement Programs (CIPs).
f. Improve connections between municipal hazard mitigation plans, master plans and capital improvement plans.
g. Identify and reduce existing inconsistencies between municipal plans and state plans, such as hazard mitigation plans, building codes, design standards, and evacuation plans.
h. Consider the concepts of uncertainty and risk in decision-making and action planning.
i. Encourage communities that conduct floodplain management activities that exceed the minimum requirements of the National Flood Insurance Program (NFIP) to consider joining and participating in the Community Rating System (CRS), which provides discounts to annual flood insurance premiums for some residents and businesses as a reward for their communities' activities.

E2. Incorporate best available climate science and vulnerability assessment information in state, regional, and municipal economic development plans.

ACTIONS:

a. Encourage private property owners and businesses to incorporate best available climate science and vulnerability assessments in their decision making and preparedness plans.
b. Consider vulnerabilities of local tax base, state economic development plan, retention or replacement of economic resources, at risk populations and population migration.
c. Improve management, coordination and delivery mechanisms to ensure continuity of services to essential facilities, people, businesses and employment centers.

e. Identify economic assets that are vulnerable to storm surge, sea-level rise, and extreme precipitation; understand the scope of that vulnerability; and evaluate existing statutes, ordinances, rules and regulations, policies, programs, and plans to determine whether changes should be made to reduce

E3. Use appropriate and available mechanisms, including but not limited to incentives and market-based tools to fund climate adaptation strategies.

ACTIONS:

a. Align land acquisition and easement programs to transfer vulnerable properties into conservation.
b. Establish stormwater utilities to fund retrofits to existing development and future improvements.
c. Develop and utilize tools to identify cost effective strategies and public investments for adapting to increased flood risk in vulnerable areas.
d. Develop special overlay districts, tax credits and revolving loan funds as mechanisms to discourage development in vulnerable areas.
e. Implement voluntary transfer of development rights programs and other economic incentives to acquire or conserve property in high risk areas.
f. Create statewide and municipal funding programs for climate adaptation strategies.
g. Adapt economic development planning approaches to respond to changing environmental conditions and leverage shifting opportunities.
h. Promote resilience and sustainability planning as economic development strategies.

E4. Improve information available to property owners and prospective buyers about coastal hazards and vulnerabilities.

ACTIONS:

a. Improve consumer protection disclosure of properties vulnerable to coastal flooding.
b. Distribute flood protection safety information to property owners in high-risk areas.
c. Encourage homeowners in moderate- to low-risk areas to purchase Preferred Risk Policy.

BL2. Implement regulatory standards and/or enact enabling legislation to ensure that the best available climate science and flood risk information are used for the siting and design of new, reconstructed, and rehabilitated state-funded structures and facilities, municipal structures and facilities, and private structures.

ACTIONS:

c. Encourage municipalities to use one of the following three approaches[xiii,xiv,xv] for determining a higher vertical flood elevation and expanded corresponding horizontal floodplain than the current base flood elevation and floodplain to address current and future flood risk for new construction, substantial improvement, or repairs to substantially-damaged municipal and private structures and facilities:
    i. *Climate-informed Science Approach* – use the best available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science.[xvi]
    ii. *Freeboard Value Approach* – use the freeboard value, reached by adding an additional two (2) feet to the base flood elevation for non-critical structures and facilities and from adding an additional three (3) feet to the base flood elevation for critical[xvii] structures and facilities.
    iii. *The 0.2-percent-annual-chance Flood Approa*ch – use the 0.2-percent-annual-chance flood elevation (also known as the 500-year flood elevation).

xi An acceptable source of climate science for New Hampshire includes the Coastal Risk and Hazards Commission Science and Technical Advisory Panel report, Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Trends, as amended.

xii Any activity for which even a slight chance of flooding would be too great. For expanded description of "critical action" see Part I, Section 6 of Guidelines for Implementing Executive Order 13690.

xiii See Federal Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Input.

xiv See Guidelines for Implementing Executive Order 13690.

xv See Appendix F for State of New Hampshire comments on Draft Guidelines for Implementing Executive Order 13690.

xvi An acceptable source of climate science for New Hampshire includes the Coastal Risk and Hazards Commission Science and Technical Advisory Panel report, Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Trends, as amended.

xvii Any activity for which even a slight chance of flooding would be too great. For expanded description of "critical action" see Part I, Section 6 of Guidelines for Implementing Executive Order 13690.

BL4. Integrate comprehensive land use and environmental planning with floodplain management approaches that prevent and minimize impacts from coastal hazards.

ACTIONS:

c. Promote land development regulations that reduce vulnerability and protect ecosystem services (e.g. open space/cluster development).
d. Prepare watershed-based plans that address comprehensive water resource management principles focused on changes in hydrologic systems resulting from climate change.
e. Consider prohibiting development in areas destroyed by storms, experiencing repetitive loss of structures, and subject to chronic flooding and erosion. Consider adaptive reuse and/or acquisition of at-risk private properties.

NR2. Develop natural resource restoration plans that explicitly consider future coastal risk and hazards, and the ecological services that they provide.

ACTIONS:

b. Provide recommendations and incentives for removal or modification of structures and facilities, such as freshwater and tidal crossings, that create barriers to tidal flow and habitat migration, particularly those that will be impaired or severely impacted by sea-level rise, storm surge, or extreme precipitation.
c. Engage in best practices for invasive species planning and removal and incorporate climate considerations in invasive species removal plans.
d. Utilize existing funding sources for natural resource restoration (e.g. offset measures, state Aquatic Resource Mitigation fund).

NR4. Consider ecosystem services provided by natural resources in land use planning, master plans, and asset decisions.

ACTIONS:

b. Implement strategies and tools (such as land regulations, incentives, building regulations) designed to maintain or restore pervious surfaces, provide nutrient barriers, protect vegetated buffers and maintain wildlife passage.
e. Develop best management practices for shoreline buffers, including information on appropriate use of shoreline hardening, bank stabilization, vegetation restoration and agricultural practices.
f. Explore options to minimize shoreline hardening and promote natural or hybrid shoreline protection strategies.
h. Develop guidelines and provide incentives for communities to incorporate climate adaptation actions for wildlife protection in master plans, hazard mitigation plans, and zoning ordinances.

H2. Develop plans and implement strategies to prepare and adapt recreational resources based on best available climate science.

ACTIONS:

a. Conduct public information hearings to understand the impacts of proposed climate adaptation strategies.
b. Assess existing and future recreational areas for their potential to provide storage for flood waters and stormwater runoff.
c. Preserve open space and recreational areas that serve to minimize climate change impacts.
d. Integrate recreational and open space planning into climate adaptation planning and the Tidal Shoreline Management Plan.

e. Integrate protection of recreational resources into land use and management, engineering, regulatory components of state and municipal plans including the Tidal Shoreline Management Plan, hazard mitigation plans, Master Plans, and design standards.

H3. Identify and survey cultural and historic resources and assess their vulnerability to coastal risk and hazards based on best available climate science.

ACTIONS:

a. Map all currently surveyed cultural and historical resources.
b. Identify asset types that may also be cultural and historic resources.
c. Use reconnaissance level survey and vulnerability assessments to identify high priority areas for intensive survey.

H4. Develop long-term plans for protecting, adapting, or reducing risk to cultural resources affected by climate change.

ACTIONS:

a. Create or modify adaptation strategies for cultural and historic buildings affected by climate change, including plans for protecting or relocating resources.
b. Integrate protection of cultural and historical resources into land use and management, engineering, regulatory components of state and municipal plans including the Tidal Shoreline Management Plan, hazard mitigation plans, Master Plans, and design guidelines.
e. Create programmatic strategies to compensate for the loss of historic asset types that will be replaced in order to adapt to climate change impacts.

APPENDIX I – MAP SET

The following recommendations are short-term climate adaptation actions that can be included in the town's Natural Hazards Mitigation Plans, Master Plan and other planning and policy documents. These actions are focused on strengthening land use development

Map - Extent of Projected Tidal Flooding - SLR 1.7', 4.0' and 6.3'
Map - Extent of Projected Tidal Flooding - SLR + Storm Surge
Map - Infrastructure - SLR 1.7', 4.0' and 6.3'
Map - Infrastructure - SLR + Storm Surge
Map - Transportation Assets - SLR 1.7', 4.0' and 6.3'
Map - Transportation Assets - SLR + Storm Surge
Map – Water Resources 1.7', 4.0' and 6.3'
Map – Water Resources - SLR + Storm Surge
Map – Land Resources - SLR 1.7', 4.0' and 6.3'
Map – Land Resources - SLR + Storm Surge

APPENDIX II – MAPPING AND ASSESSMENT METHODS

Vulnerability Assessment: Sea Level Rise and Storm Surge Scenarios

The *Climate Risk in the Seacoast* (C-RiSe) vulnerability assessment project produced maps and statistical data about the potential impacts to New Hampshire's seven coastal municipalities from sea-level rise and storm surge to infrastructure, critical facilities transportation systems, and natural resources. Three sea-level scenarios were evaluated accounting for a range from the intermediate-low, intermediate high and highest projected sea-levels at the year 2100.

FIGURE 14: Sea-Level and Storm Surge Scenarios in NEWINGTON

Sea Level (SLR) Scenarios	SLR – Intermediate Low 2100	SLR – Intermediate High 2100	SLR – High 2100	SLR + storm surge 2100	SLR + storm surge 2100	SLR + storm surge 2100
Sea Level Rise	1.7ft	4.0ft	6.3ft	--	--	--
Sea Level Rise + Storm Surge	--	--	--	1.7ft + storm surge	4.0ft + storm surge	6.3ft + storm surge

Note: Storm surge is the area flooded by the 100-year/1% change storm event

Baseline: Flooding from the sea-level rise scenarios and sea-level rise plus storm surge scenarios evaluated in this study were mapped from Mean Higher High Water (MHHW) which is 4.4 feet in the coastal region of NH. *Mean Higher High Water is the average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch. The National Tidal Datum Epoch (NTDE) refers to the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken. The present NTDE is 1983 through 2001 and is considered for revision every 20-25 years (the next revision would be in the 2020-2025 timeframe).*[1]

Storm Surge: *Storm surge is the rise of water level accompanying intense coastal storm events such a tropical storm, hurricane or Nor'easter, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the storm event.*[2] Storm surge is mapped using the 100-year/1% chance flood events from the Preliminary Flood Insurance Rate Maps (FIRMs) released by FEMA in 2014. The preliminary FIRM's account for the limit of moderate wave action in coastal

[1] NOAA website at http://tidesandcurrents.noaa.gov/datum_options.html
[2] EPA website at http://epa.gov/climatechange/glossary.html

areas, however this assessment does not take into account additional flooding and impacts related to more severe wave action, wind action, erosion and other dynamic coastal processes.

Sea-Level Rise Scenarios

Figures 15 and 16 below document how the scenarios used in this report relate to 2011 by Wake et al (see reference in Figure 15) and are similar to a more recent report issued by the NH Coastal Risks and Hazards Commission's Science and Technical Advisory Panel in 2014

Figure 15: 2014 Sea Level Rise Scenarios (based on greenhouse gas emissions)

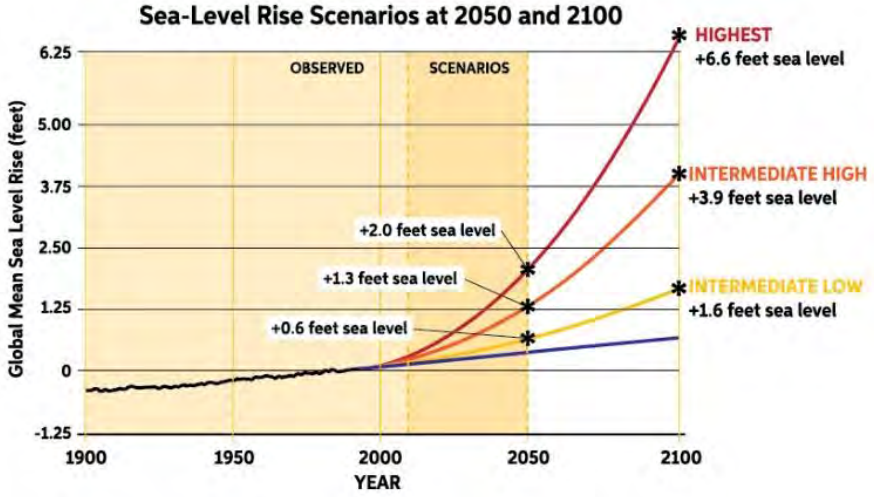
	Lower Emissions (B1)		Higher Emissions (A1fi)	
	2050	2100	2050	2100
Current Elevation of MHHW [a,b]	4.43	4.43	4.43	4.43
100-Year Flood Height	7.78	7.78	7.78	7.78
Subsidence	0.012	0.016	0.012	0.016
Eustatic SLR	1.0	2.5	1.7	6.3
Total Stillwater Elevation [a,c]	**13.2**	**14.7**	**13.9**	**18.5**

a - NAVD: North American Vertical Datum of 1988
b - MHHW: Mean Higher High Water at Fort Point, NH
c - Total Stillwater Elevation may not equal total of components due to rounding

Table 13. Preliminary estimates of future 100-year flood Stillwater elevations at the Fort Point Tide gauge under lower and higher emission scenarios (feet relative to NAVD[a]).

Source: Wake CP, E Burakowski, E Kelsey, K Hayhoe, A Stoner, C Watson, E Douglas (2011) *Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future*. Carbon Solutions New England Report for the Great Bay (New Hampshire) Stewards.

Figure 16: 2014 Sea Level Rise Scenarios (based on greenhouse gas emissions)



Source: Wake CP, Kirshen P, Huber M, Knuuti K, and Stampone M (2014) *Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Future Trends*, prepared by the Science and Technical Advisory Panel for the New Hampshire Coastal Risks and Hazards Commission.

The sea-level rise projections used in this study are based on an earlier study completed in 2011 by Wake et al (see reference in Figure 14) and are similar to a more recent report issued by the NH Coastal Risks and Hazards Commission's Science and Technical Advisory Panel Report (2014) as depicted in Figure 14. As shown in the graphics above, while slightly different than the scenarios cited in the 2014 report, the sea level rise scenarios used in the Climate Risk in the Seacoast assessment yield coverage estimates of flooding that are within the mapping margin of error for the scenarios in both the 2011 and 2014 reports.

Assets and Resources Evaluated

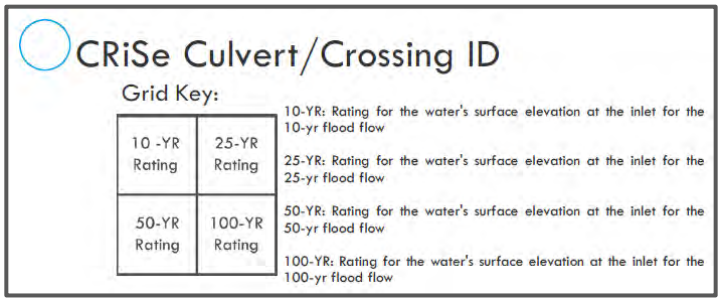
Figure 17 lists the three major categories and a detailed list of the assets and resources evaluated as part of the Climate Risk in the Seacoast vulnerability assessment. The assets and resources evaluated are listed in subsequent tables in this report only if they are affected by one or more of the sea-level rise and/or coastal storm surge scenarios.

FIGURE 17: Assets and Resources Evaluated for the Vulnerability Assessment

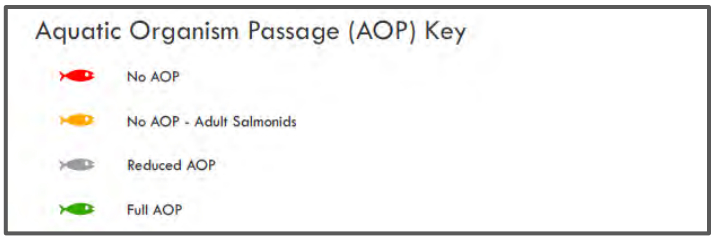
Category	Assets and Resources
State and Municipal Infrastructure	Municipal Culverts Federal and State Historic Register Properties Other Assets: graveyards, water access, transmission lines
Municipal Critical Facilities	Municipal Critical Facilities
Transportation Assets & Roadways	State and Local Roadways Bridges Regional and Municipal Evacuation Routes Urban Compact Areas NHDOT Transportation Infrastructure NHDOT Ten-year and Long Range Plan Projects
Natural Resources	Freshwater and Tidal Wetlands Aquifers and Wellhead Protection Areas Wildlife Action Plan – Tier 1 and Tier 2 habitats Floodplains
Land Use	Residential structures Assessed Value of Affected Parcels

Data, Methods and Results of Hydrologic and Hydraulic Modeling for Road Crossings

The hydrologic and hydraulic modeling of crossings was complete by the University of New Hampshire Stormwater Center. The C-Rise project assessed both aquatic organism passage capacity and hydraulic flow capacity of ten (10) road crossings in each of the ten Great Bay coastal municipalities. The assessment was based on runoff associated with the current 10-, 25-, 50- and 100-year storm events. For each storm, each crossing was assigned a hydraulic rating and an ***aquatic organism passage (AOP)*** rating; both ratings are described in greater detail below.

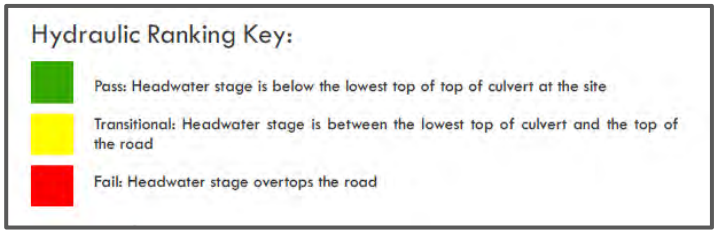


The AOP rating is labeled by color; Red, Orange, Gray, and Green. Ratings of Red and Orange mean that there is estimated to be little to no AOP at that crossing, with Red being no AOP for all species and Orange meaning no AOP for all species except for adult Salmonids. A rating of Gray means that there is reduced AOP at the crossing for all species. A rating of Green means that AOP is expected to be possible for all species.



The AOP ratings were developed using the New Hampshire protocol for assessment, which was borrowed directly from the Vermont Culvert Aquatic Organism Passage Screening Tool. This tool uses physical data collected at each crossing and may be used to rate each culvert at a crossing for AOP. At a crossing with multiple culverts, if one culvert is more passable than another, then that culvert is considered to be the path that organisms would utilize. Thus, the best rating for a culvert at a crossing is used as the rating for the crossing as a whole.

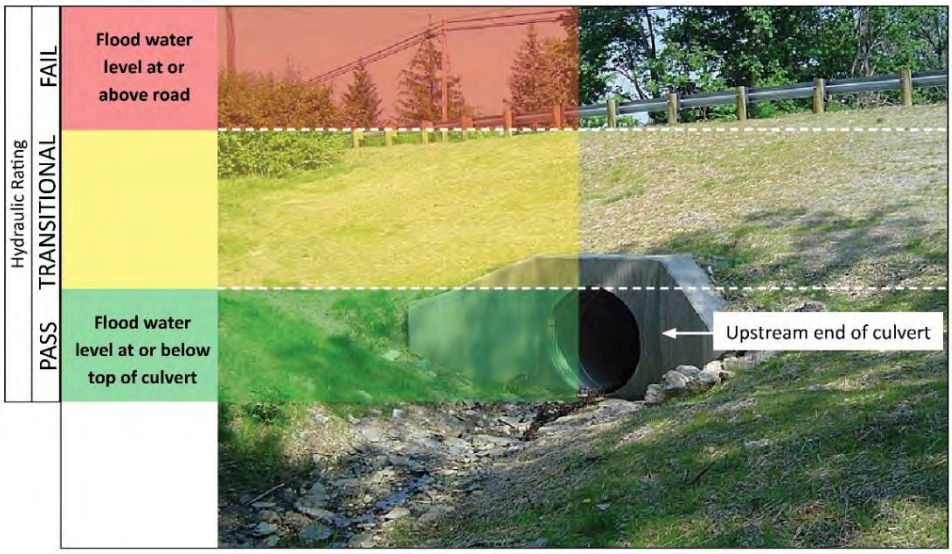
The hydraulic rating is color-coded similar to the AOP rating. The peak flows of the 10-, 25-, 50-, and 100-year storm events were used to assess the ability of the culvert to pass the flow (measured by the depth of water upstream of the culvert – known as the headwater depth) was determined and compared to culvert and road elevations. The ratings for hydraulics are: Pass (green), Transitional (yellow), and Fail (red). These ratings describe the depth of the water at the inlet (the Headwater) for the flows for each of the selected storm events compared to culvert and road elevations. A rating of Pass means that the headwater depth is below the lowest top-of-pipe elevation of any culvert at



the crossing; a rating of Fail means that the headwater depth is above the road surface; and a rating of Transitional means that the headwater depth is somewhere between these two elevations.

The hydraulic ratings describe the headwater depth (upstream of the culvert) for each storm event flood (see Figure 18). The headwater depths are calculated using field-collected culvert and crossing data. The flood flows were calculated by one of two methods: runoff from rainfall or regression equation. For all watershed areas smaller than one square mile, the Curve Number[3] method was used; and for watersheds larger than one square mile, flows were calculated using the Regression Equations[4] published by the USGS for New Hampshire. Once the flows at each crossing were calculated, they were input into the Federal Highway Administration's free culvert analysis software, HY-8, along with the necessary culvert and crossing data collected at each location. The program then calculated the headwater depth for each of the flows at each of the sites. This headwater depth is what is shown in the results, and are compared to the pipe crown and roadway elevations to determine the Hydraulic Ratings.

FIGURE 18: Example of how the hydraulic rating is applied to a culvert evaluation.



Map Design and Organization

The Climate Risk in the Seacoast map set is comprised of two components: a map depicting the extent of projected flooding from the three sea-level rise scenarios in shades of green, and a map depicting the three sea-level rise plus storm surge scenarios in shades of pink. Each of the asset categorized evaluated are displayed on these two maps. Examples of the two scenario maps are shown in Figures 19 and 20 on pages 24 and 25.

[3] A curve number is a number from zero to 100 that describes how much rainfall runs off versus how much is lost to infiltration. A high curve number implies most of the rainfall runs off.

[4] A regression equation describes a mathematical relationship between two variables in which one variable is used to predict the other.

Vulnerability Assessment: Planning to Reduce Risk and Impacts

New Hampshire's economy and quality of life have historically been linked to its shores, its vast expanses of productive saltmarshes and sandy beaches. Increased flooding has the potential to place coastal populations at risk, threaten infrastructure, intensify coastal hazards and ultimately impact homes, businesses, public infrastructure, recreation areas, and natural resources. Accounting for changes in sea level and coastal storms will help lead to informed decisions for public and private investments by minimizing risk and vulnerability.

What is a Vulnerability Assessment?

A vulnerability assessment identifies and measures impacts of flooding from sea level rise and storm surge on built structures, human populations and natural environments. Factors that influence vulnerability include development patterns, natural features and topography. The assessment evaluates existing and future conditions such as:

- inland extent and depth of flooding
- impacts to natural and human systems
- changes in impacts between different flood levels

New Hampshire seacoast municipalities are confronted by land use and hazard management concerns that include extreme weather events, storm surges, flooding and erosion. These issues are only intensified by recent increases in the frequency and intensity of extreme storm events and increases in sea level.

How can the vulnerability assessment be used?

Information from a vulnerability assessment can help guide common sense solutions, strategies and recommendations for local governments, businesses, and citizens to enable them to adopt programs, policies, business practices and make informed decisions. Planning for the long-term effects of sea level rise may also help communities better prepare in the short-term for periodic flooding from severe coastal storms. Results from a vulnerability assessment can be incorporated into various municipal planning, regulatory and management documents.

How can a vulnerability assessment benefit the community?

The Climate Risk in the Seacoast assessment is intended to assist coastal NH communities to take actions to prepare for increase flood risk, including:

- Enhance preparedness and raise community awareness of future flood risks.
- Identify cost-effective measures to protect and adapt to changing conditions.
- Improve resiliency of infrastructure, buildings and investments.
- Protect life, property and local economies
- Protect services that natural systems provide
- Preserve unique community character

Assessment results can be incorporated into existing practices, plans, policies and regulations.

Zoning Ordinance	Land Conservation Plan	Capital Improvement Plan
Site Plan Regulations	Master Plan	Roadway Management
Subdivision Regulations	Hazard Mitigation Plan	Facilities Management Plan

Extent of Flooding from Sea Level Rise and Storm Surge

The green and pink color schemes in Figures _____ are arranged from lightest to darkest with increasing flood levels and extents.

Figure 19: Sea Level Rise Scenarios 1.7 feet, 4.0 feet, and 6.3 feet

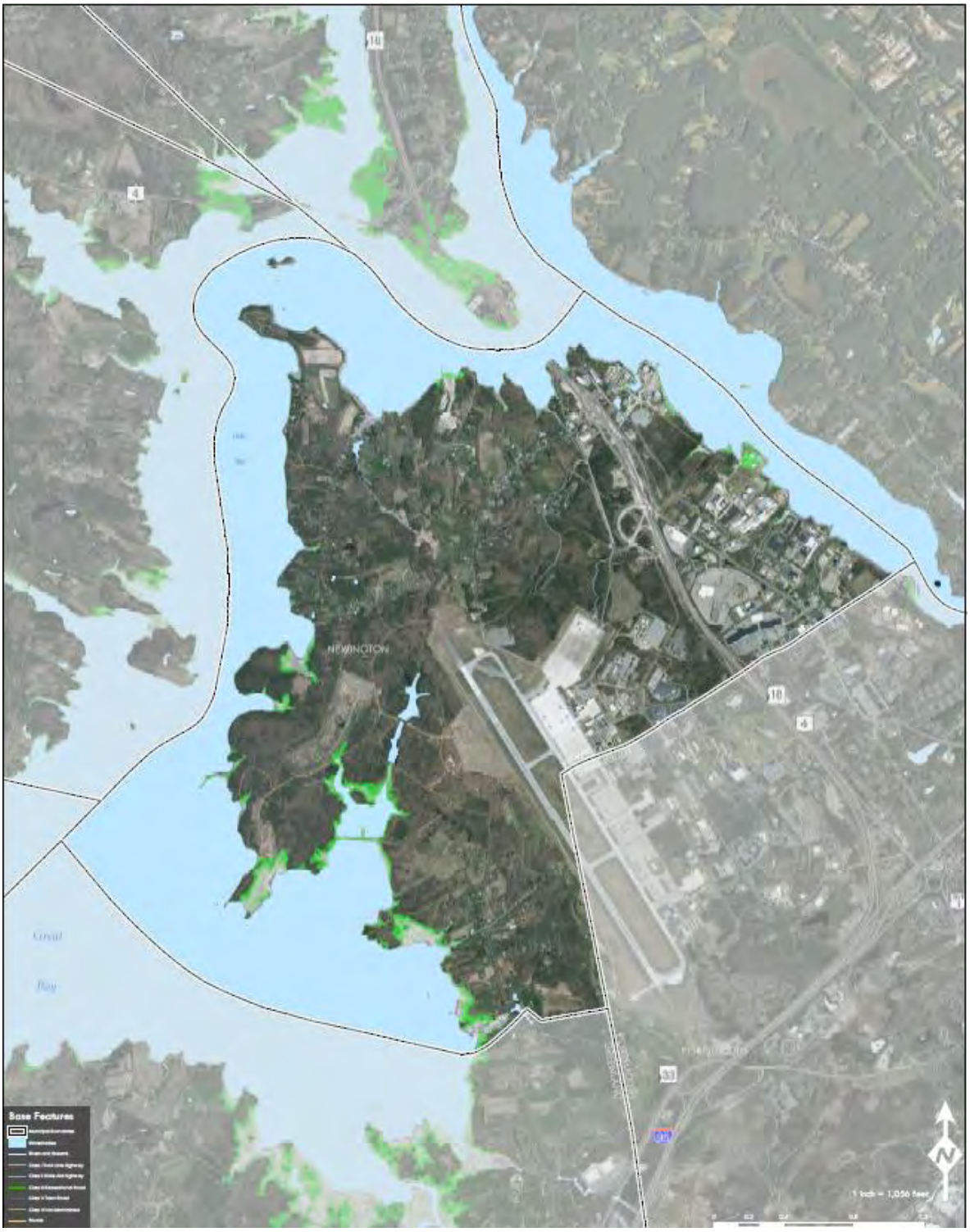
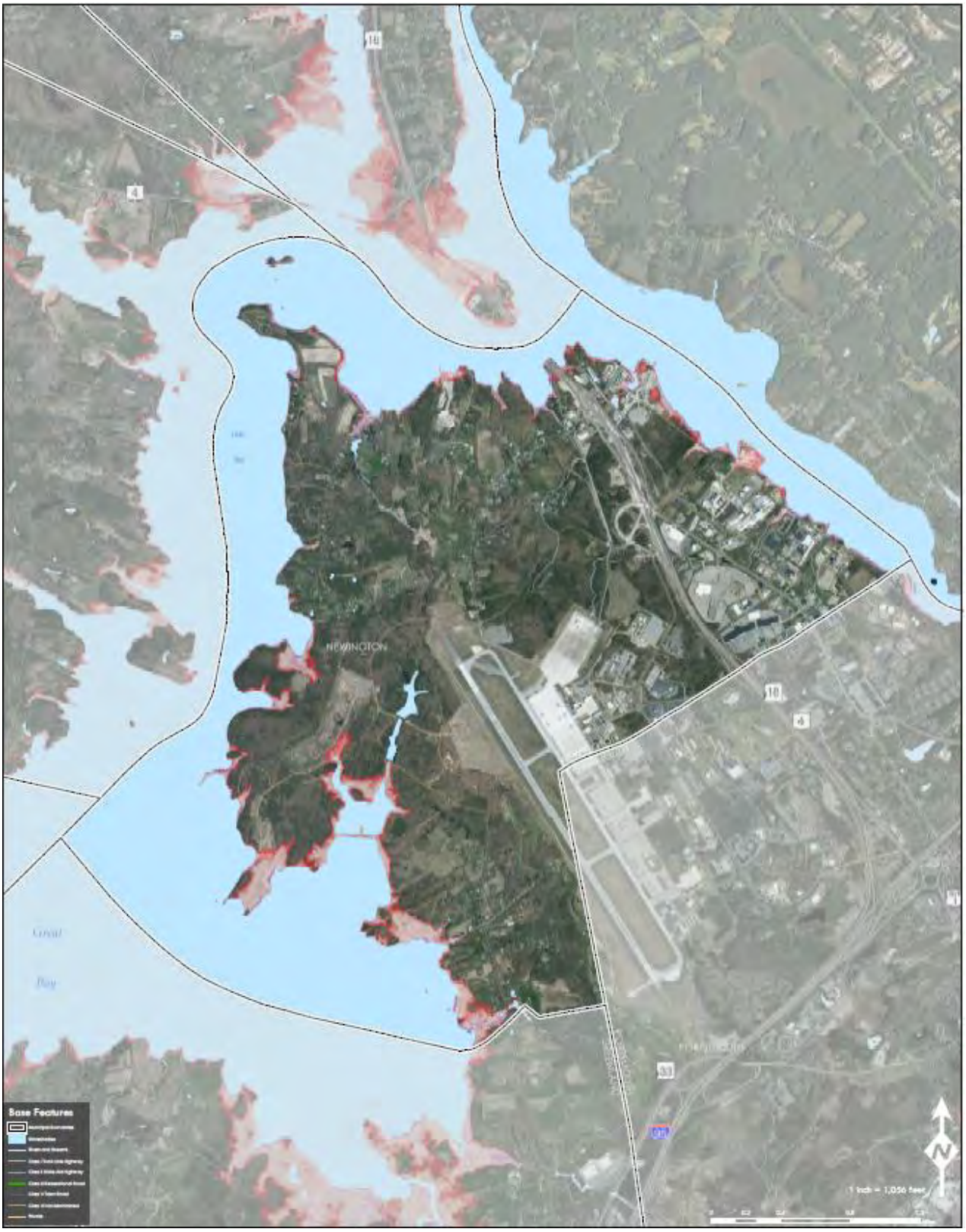


Figure 20: Sea Level Rise Scenarios 1.7 feet, 4.0 feet, and 6.3 feet + storm surge

Note: Storm surge = 100-year/1% chance flood.



Newington Public School Capacity
Using Newington Class Sizes

Grade Level	# of Rooms	Maximum Number of Students/Rooms	Mathematical Capacity
Kindergarten	1	18	18
Grades 1 - 6	3	18	54
Total	4		72

Functional Capacity: 90% of 72 = 65

The 90 percent factor takes into account variables such as assigning fewer pupils to some classes, accommodating combination classes (e.g., 1 – 2), and to make allowances for assigning fewer students to undersized classrooms as is the case here. The school's overall capacity using local guidelines is **72** and using the 90 percent factor, it is **65** students.

Inventory of Current Program Spaces at Newington Public School

Function	Quantity	RM #	Comments
Classroom Kindergarten/1	1	127	Area = 759 Sq Ft
Classroom Grades 1/2	1	125	Area = 782 Sq Ft
Classroom Grades 3/4	1	114	Area = 1030 Sq Ft
Classroom Grades 5/6	1	115	Area = 1030 Sq Ft
Multi-purpose gymnasium/cafe	1		Area = 2,360 Sq Ft
Physical Education Storage	1	111	Area = 120 Sq Ft
Special Education		131	Area = 219 Sq Ft
Special Education Specialist (Speech, OT, Guidance, BCBA)	1	128	Area = 256 Sq Ft
Multipurpose Library-Media Center / Art / Health / STEAM	1	104	Library Media Center Area = 523 Sq Ft Art / Health /STEAM Area = 476 Sq Ft Total Area = 1008 Sq Ft
Music	1	105	Area = 320 Sq Ft
Kitchen	1	112/113	Area = 350 Sq Ft
STEAM	1	106	Area = 330 Sq Ft
Admin Office-Gen Office Reception, Principal, Teachers Room, Nurse Office	1	120 123 121 122	Office Reception Area =305 Sq Ft Princ. Area = 200 Sq Ft Nurse Area = 126 Sq Ft Teachers Room / Conference Area = 245 Sq Ft
Unisex bathrooms (Sped Office)	1	129	Area = 32 Sq Ft
Student bathroom (k-2)	1		Area = 12 Sq Ft
Unisex Bath (new addition)	1	108	Area = 63 Sq Ft
Boys Bathroom	1	118	Area = 133 Sq Ft
Girls Bathroom	1	119	Area = 119 Sq Ft
Boiler Room	1	132	Area = 304 Sq Ft
Custodial / Sprinkler	1	101	Area = 230 Sq Ft
Kitchen / Custodial storage	1	116	Area = 59 Sq Ft

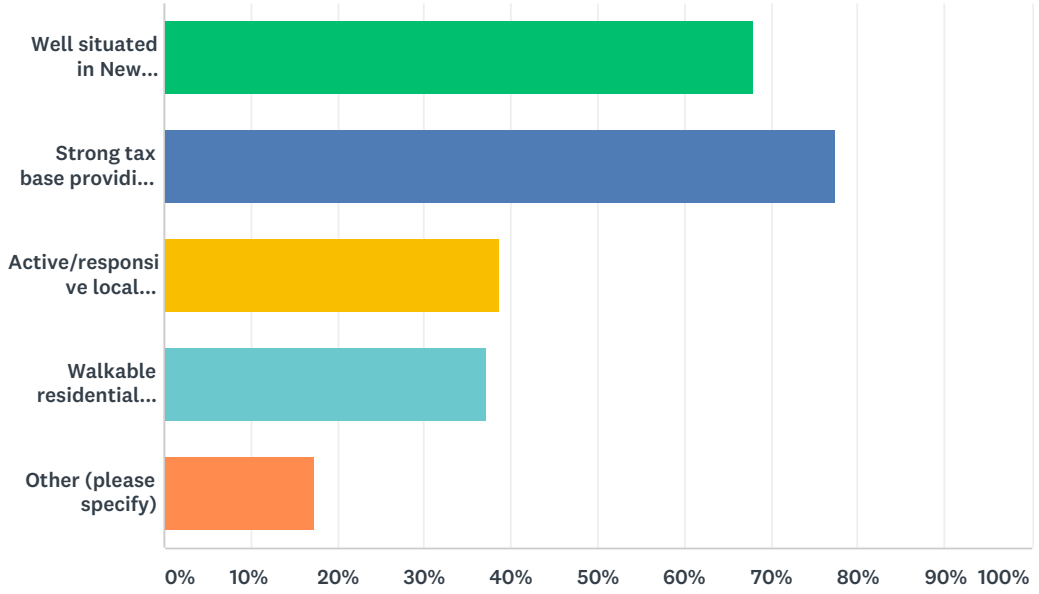
Note: The inventory of current program space represents usage during the 2019-19 school year.

(Cited ref. materials and tables: Prepared by: New Hampshire School Administrators Association: Dr. Mark V. Joyce, Dr. Richard W. Ayers, and Mr. Keith R. Burke (***Report For The Rollinsford School District Subject:Demographic Analysis/Enrollment Projections And an Assessment of Educational Facility Needs K – 6)***

Newington School Board approved August 2019

Q1 What are the town's greatest assets or benefits?

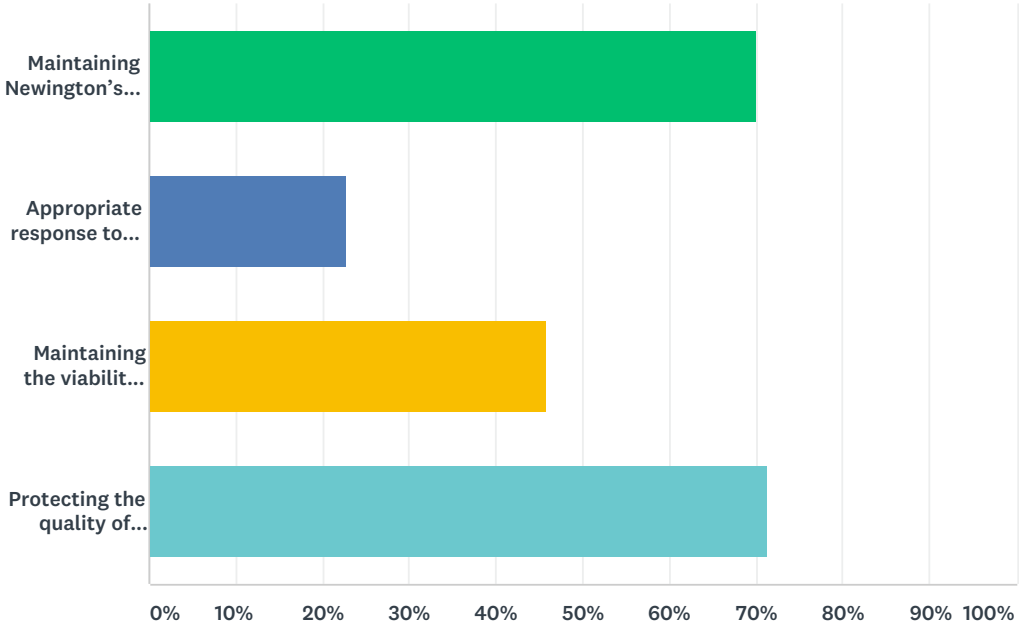
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
Well situated in New Hampshire with access/views to salt waters	68.00%	51
Strong tax base providing low property taxes	77.33%	58
Active/responsive local community with friendly neighbors	38.67%	29
Walkable residential areas with ample open space	37.33%	28
Other (please specify)	17.33%	13
Total Respondents: 75		

Q2 What are the town's most pressing issues now and in the future?

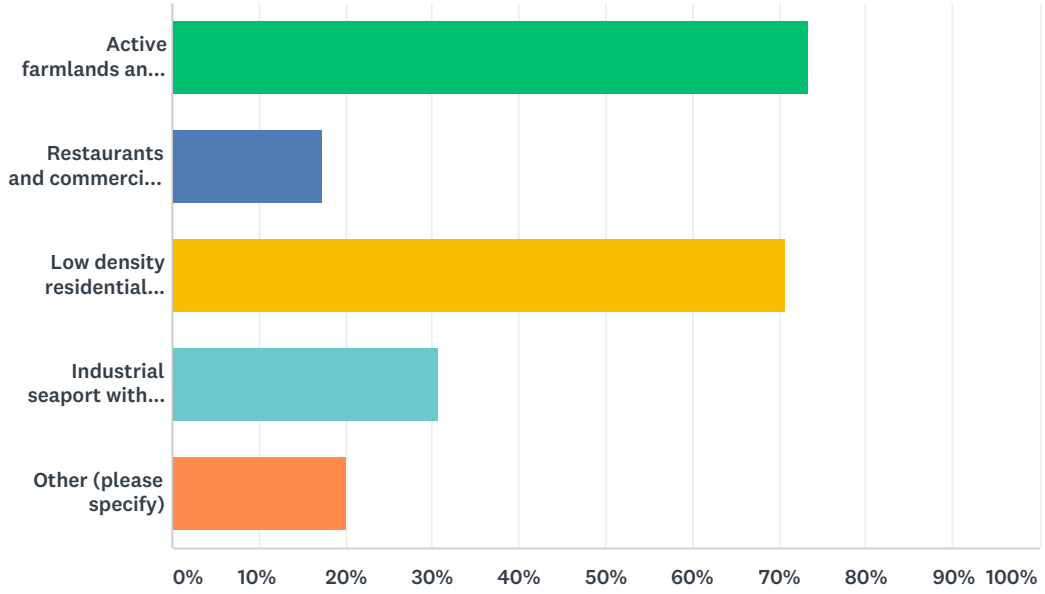
Answered: 70 Skipped: 6



ANSWER CHOICES	RESPONSES	
Maintaining Newington's rural, small-town character.	70.00%	49
Appropriate response to changes in climate.	22.86%	16
Maintaining the viability of the Town's retail center.	45.71%	32
Protecting the quality of Newington's natural environment.	71.43%	50
Total Respondents: 70		

Q3 What are the most appealing areas in town? (Y/N/Add)

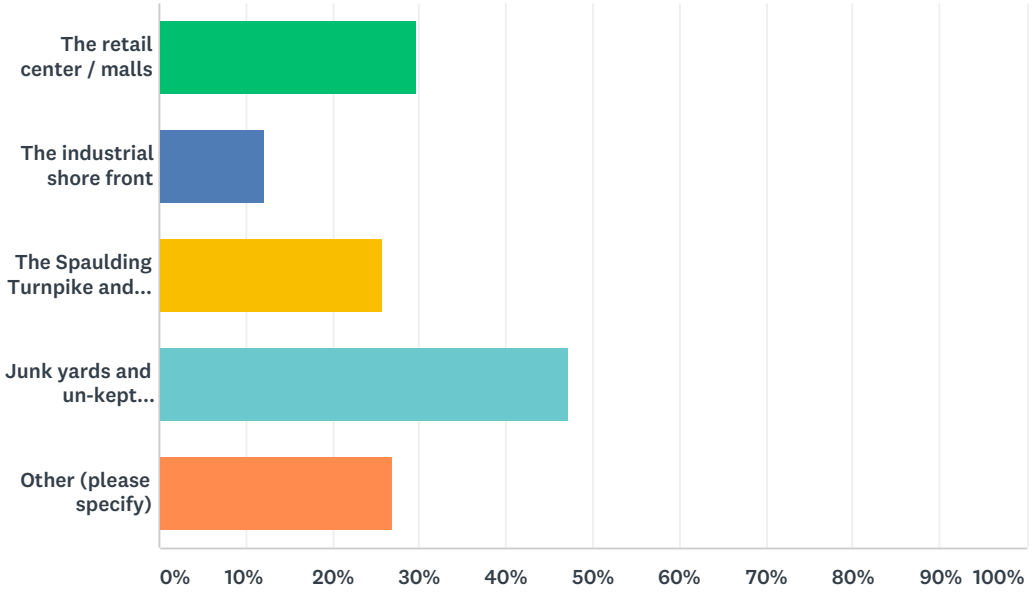
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
Active farmlands and undeveloped open spaces	73.33%	55
Restaurants and commercial enterprises with job opportunities	17.33%	13
Low density residential areas	70.67%	53
Industrial seaport with high paying jobs	30.67%	23
Other (please specify)	20.00%	15
Total Respondents: 75		

Q4 What is the least appealing area in town?

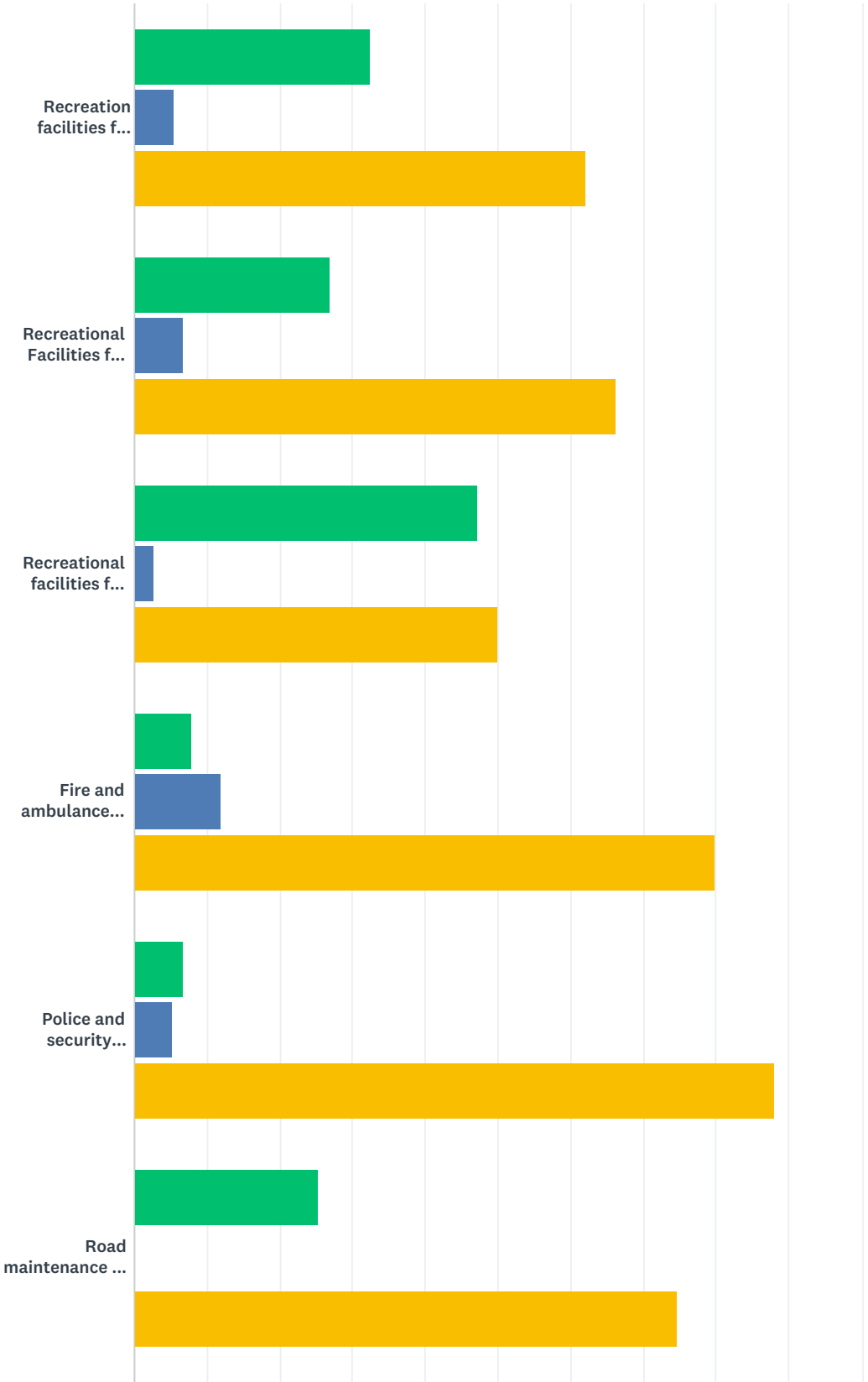
Answered: 74 Skipped: 2

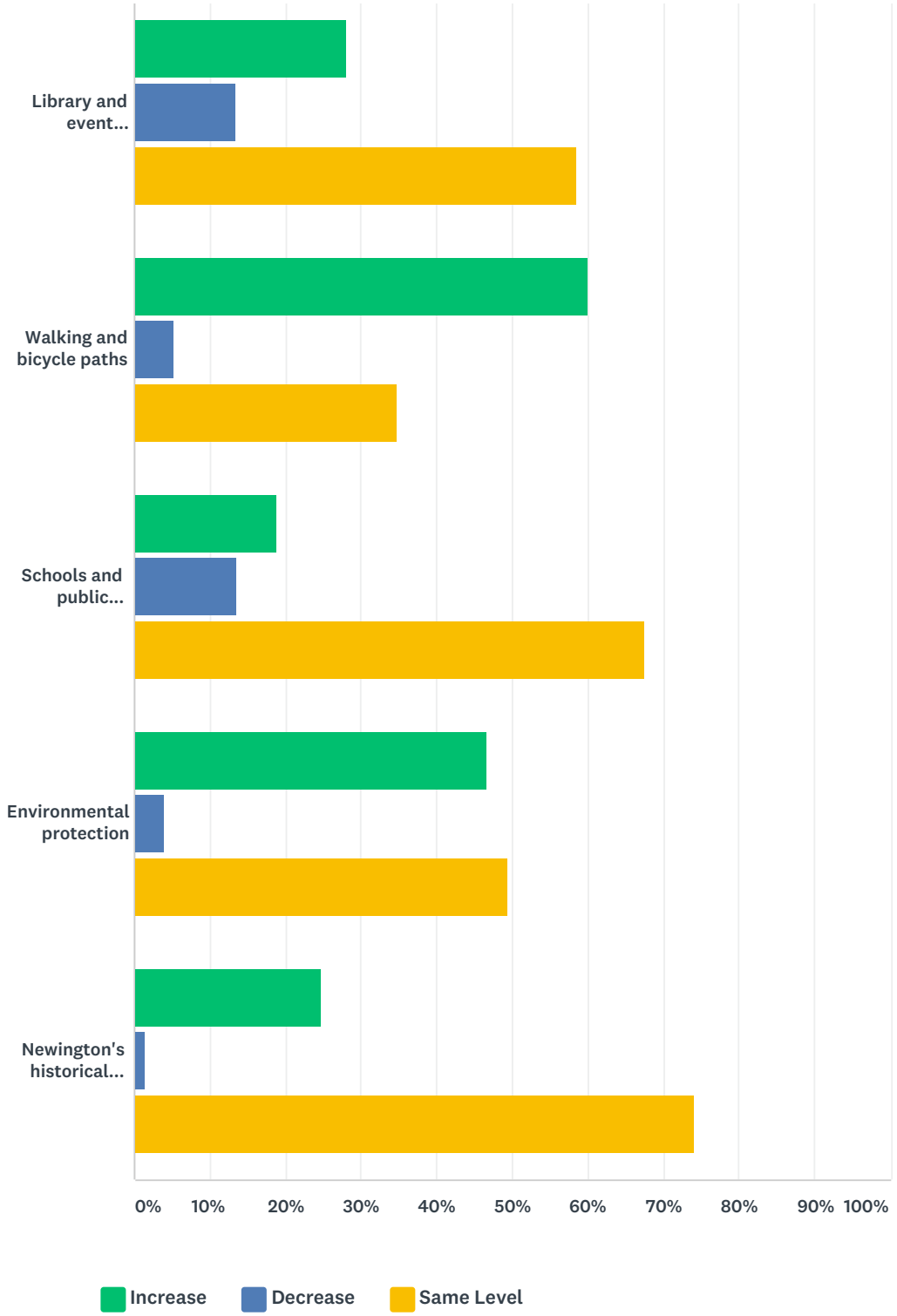


ANSWER CHOICES	RESPONSES	
The retail center / malls	29.73%	22
The industrial shore front	12.16%	9
The Spaulding Turnpike and Pease Tradeport	25.68%	19
Junk yards and un-kept buildings in our residential areas	47.30%	35
Other (please specify)	27.03%	20
Total Respondents: 74		

Q5 Should we increase, decrease or hold same with tax funding for each of the following:

Answered: 75 Skipped: 1



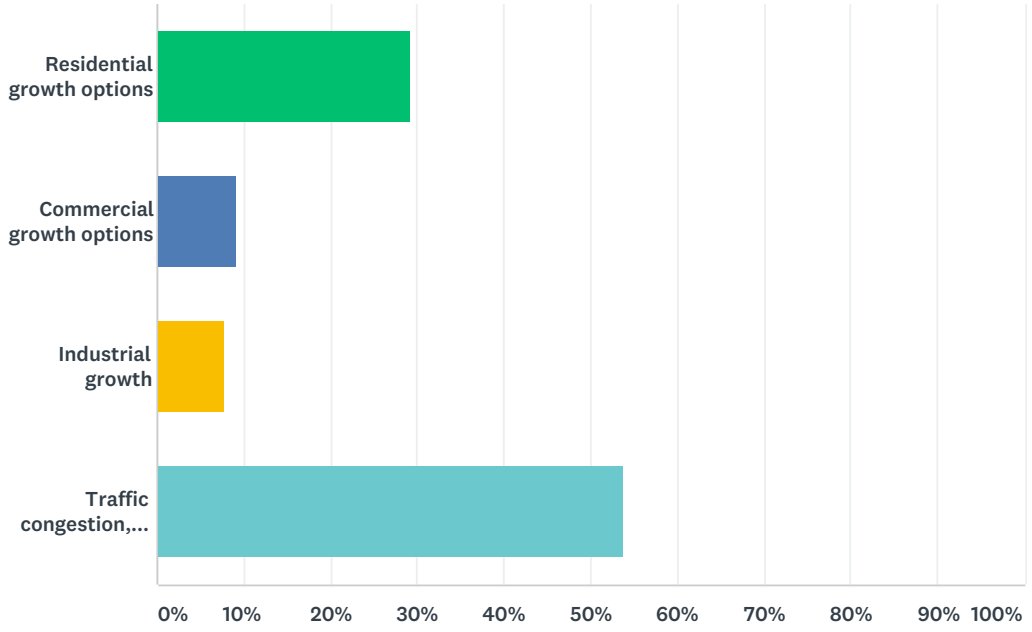


	INCREASE	DECREASE	SAME LEVEL	TOTAL
Recreation facilities for youth	32.43% 24	5.41% 4	62.16% 46	74
Recreational Facilities for wage earners	27.03% 20	6.76% 5	66.22% 49	74
Recreational facilities for the elderly	47.30% 35	2.70% 2	50.00% 37	74

Fire and ambulance protection	8.00% 6	12.00% 9	80.00% 60	75
Police and security protection	6.67% 5	5.33% 4	88.00% 66	75
Road maintenance and snow removal	25.33% 19	0.00% 0	74.67% 56	75
Library and event activities	28.00% 21	13.33% 10	58.67% 44	75
Walking and bicycle paths	60.00% 45	5.33% 4	34.67% 26	75
Schools and public education	18.92% 14	13.51% 10	67.57% 50	74
Environmental protection	46.67% 35	4.00% 3	49.33% 37	75
Newington's historical areas	24.66% 18	1.37% 1	73.97% 54	73

Q6 Do you consider any of the following to be serious local problems that the Town government should develop a strategy to resolve?

Answered: 65 Skipped: 11



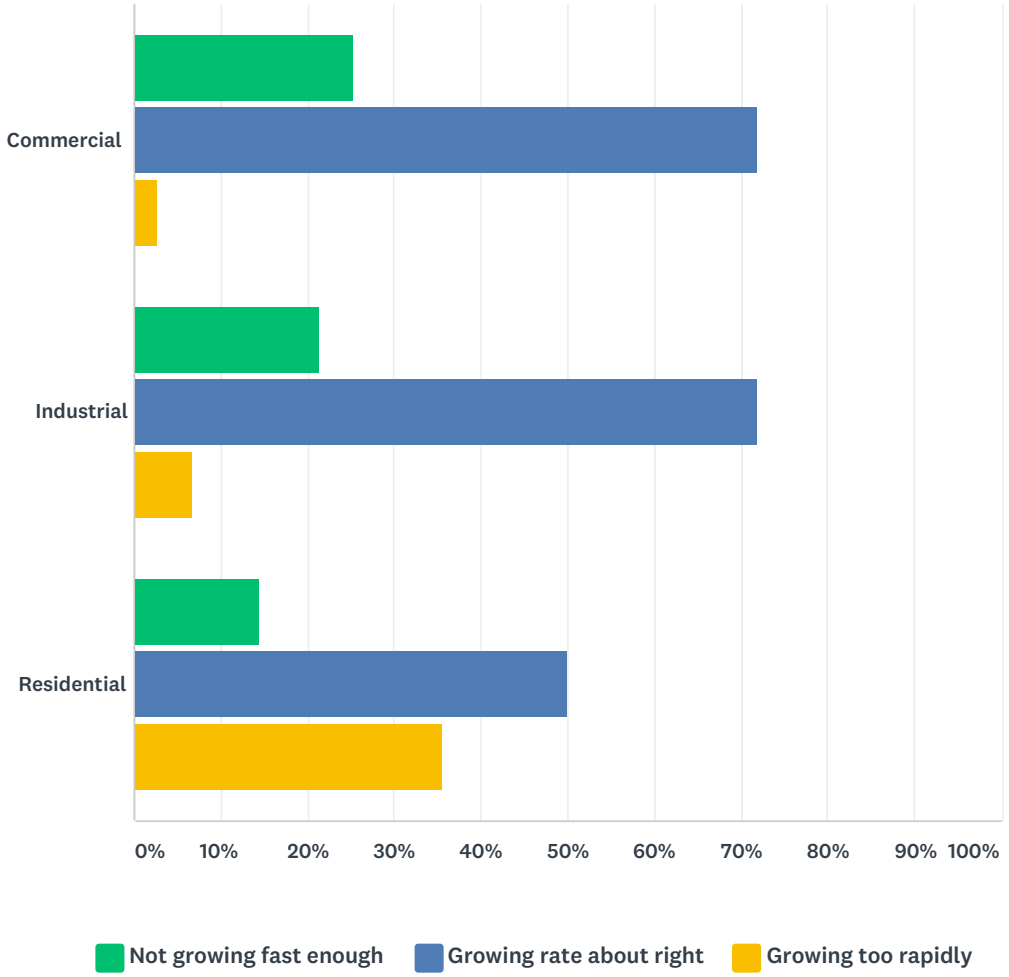
ANSWER CHOICES	RESPONSES	
Residential growth options	29.23%	19
Commercial growth options	9.23%	6
Industrial growth	7.69%	5
Traffic congestion, noise, and speeding vehicles on local rural roads	53.85%	35
TOTAL		65

Q7 What types of businesses, activity, and services does Newington need the most?If you have more than one response please list each from highest priority to lowest priority with the number one as the highest priority.

Answered: 50 Skipped: 26

Q8 At the present time, how would you describe the growth of Newington's three land categories: Commercial, Industrial, Residential

Answered: 76 Skipped: 0



	NOT GROWING FAST ENOUGH	GROWING RATE ABOUT RIGHT	GROWING TOO RAPIDLY	TOTAL
Commercial	25.33% 19	72.00% 54	2.67% 2	75
Industrial	21.33% 16	72.00% 54	6.67% 5	75
Residential	14.47% 11	50.00% 38	35.53% 27	76

Q9 In general, has the land in Newington been put to the best use? If not, WHY?

Answered: 56 Skipped: 20

Q10 What aspects of Newington's environment are threatened now and in future?

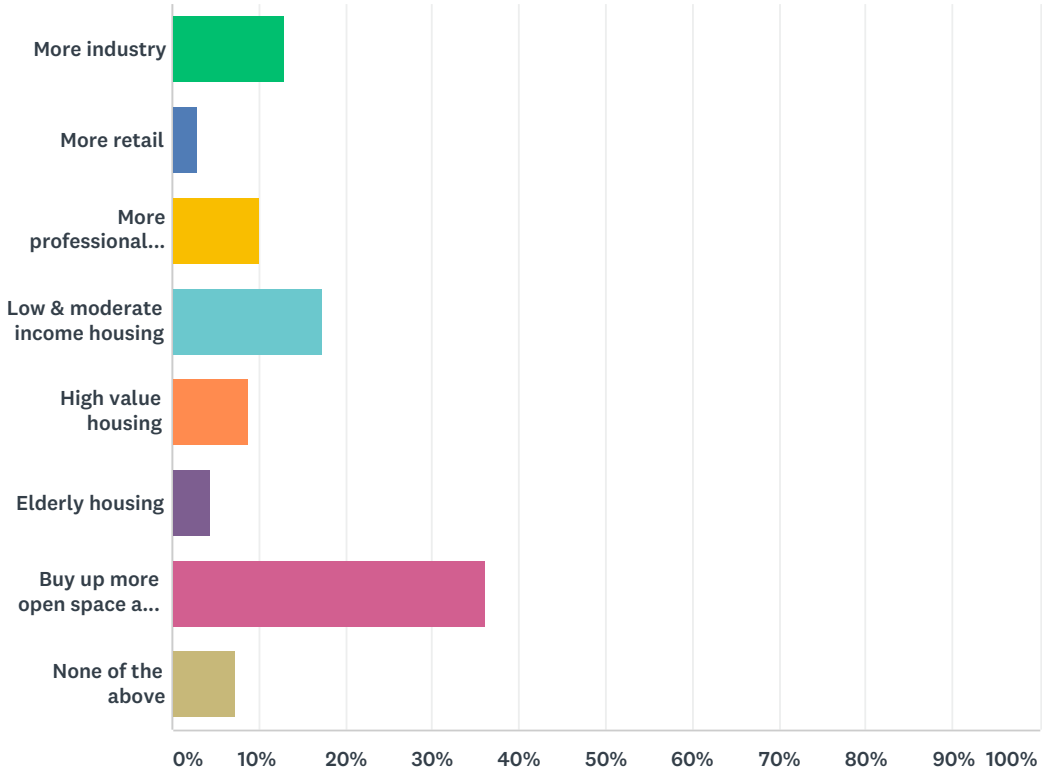
Answered: 58 Skipped: 18

Q11 Would you like Newington's character to be rural or suburban?

Answered: 71 Skipped: 5

Q12 What type of change do you feel we need a town strategy to encourage?

Answered: 69 Skipped: 7



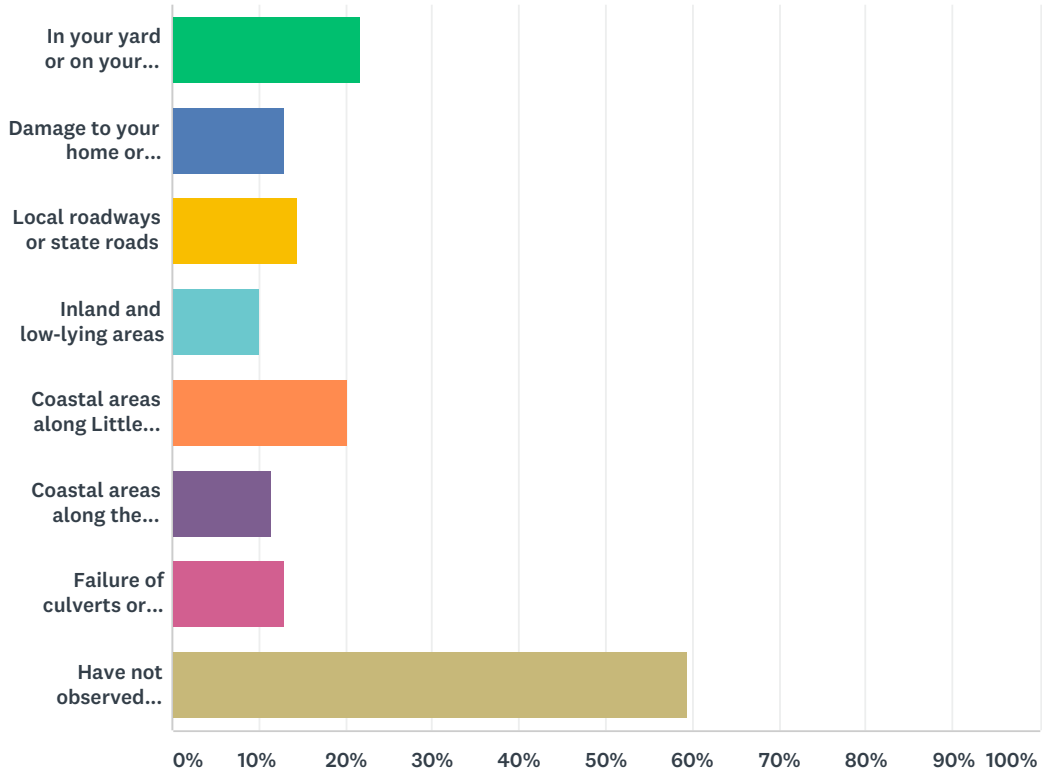
ANSWER CHOICES	RESPONSES	
More industry	13.04%	9
More retail	2.90%	2
More professional office development jobs	10.14%	7
Low & moderate income housing	17.39%	12
High value housing	8.70%	6
Elderly housing	4.35%	3
Buy up more open space and add to town's historic character	36.23%	25
None of the above	7.25%	5
TOTAL		69

Q13 How would you encourage more active volunteers in local government?

Answered: 53 Skipped: 23

Q14 During extreme weather events (e.g. rain, shoreline storms), have you experienced or observed the following types of flooding or erosion? Check all that apply.

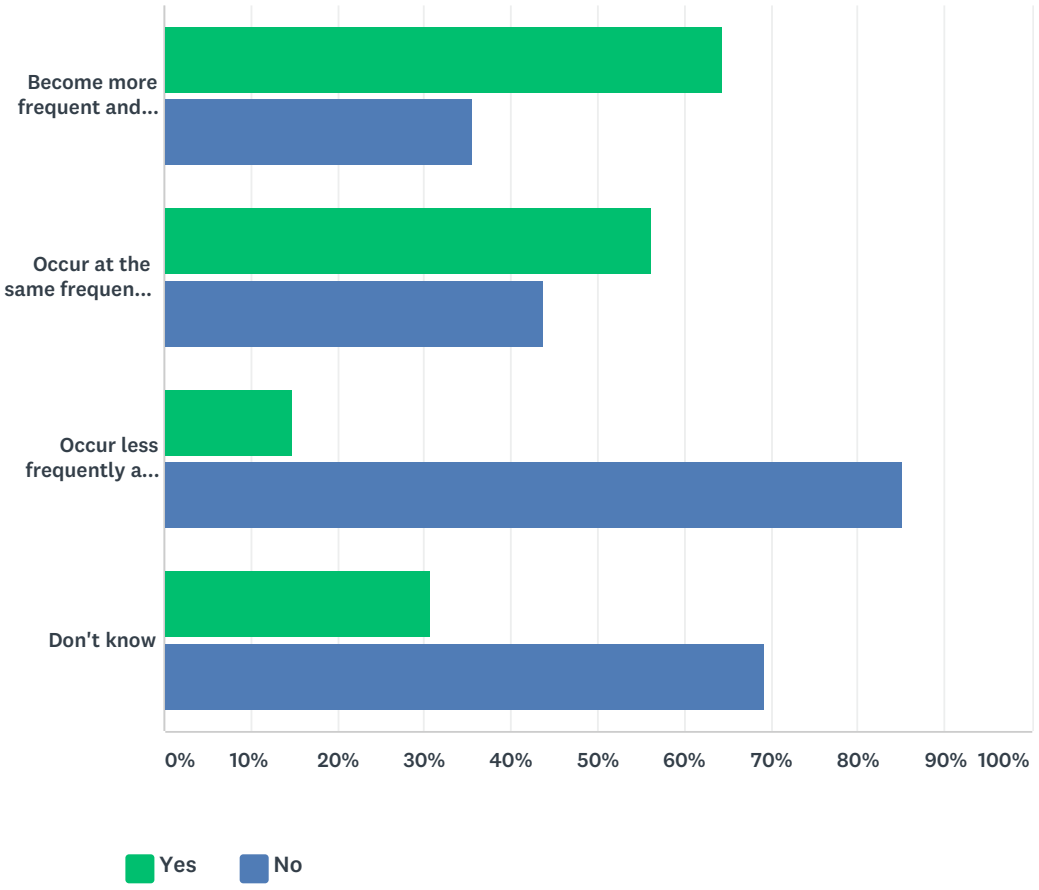
Answered: 69 Skipped: 7



ANSWER CHOICES	RESPONSES	
In your yard or on your property	21.74%	15
Damage to your home or business	13.04%	9
Local roadways or state roads	14.49%	10
Inland and low-lying areas	10.14%	7
Coastal areas along Little Bay	20.29%	14
Coastal areas along the Piscataqua River	11.59%	8
Failure of culverts or road crossings	13.04%	9
Have not observed flooding in Newington	59.42%	41
Total Respondents: 69		

Q15 Have you observed that extreme precipitation events have:

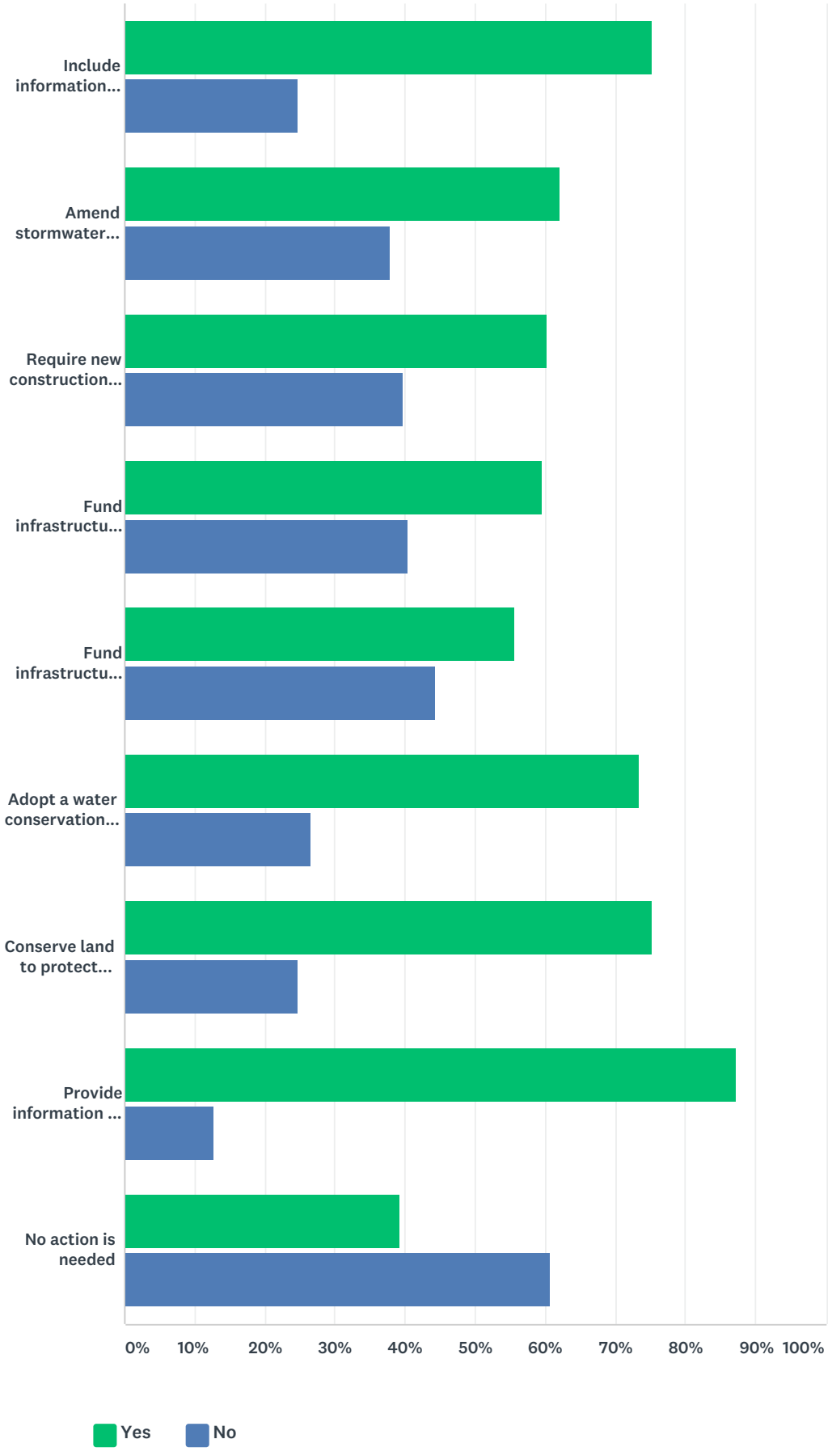
Answered: 74 Skipped: 2



	YES	NO	TOTAL
Become more frequent and more severe	64.52% 40	35.48% 22	62
Occur at the same frequency and severity as in the past	56.36% 31	43.64% 24	55
Occur less frequently and severe than in the past	14.89% 7	85.11% 40	47
Don't know	30.77% 4	69.23% 9	13

Q16 What actions should the Town of Newington take to address future impacts of climate change?

Answered: 73 Skipped: 3

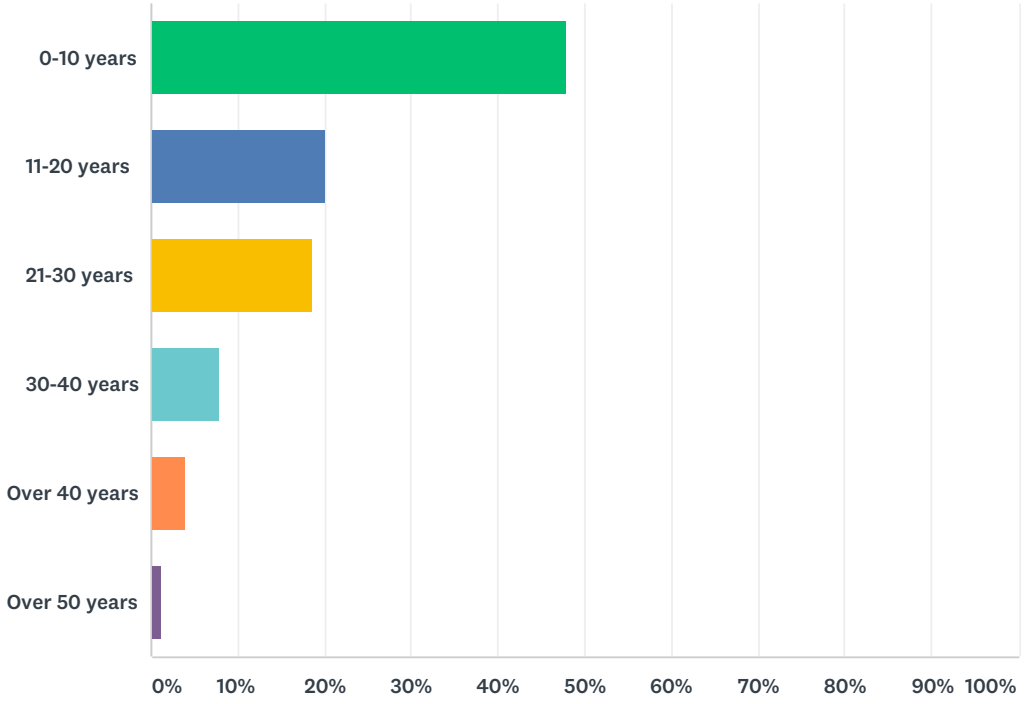

Include information...
Amend stormwater...
Require new construction...
Fund infrastructu...
Fund infrastructu...
Adopt a water conservation...
Conserve land to protect...
Provide information ...
No action is needed
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Yes
No

	YES	NO	TOTAL

Include information about climate change and recommendations in the Master Plan	75.38% 49	24.62% 16	65
Amend stormwater regulations to include flood prevention and groundwater recharge	62.12% 41	37.88% 25	66
Require new construction and redevelopment in the floodplain be raised above the 100-year/1% chance flood elevation	60.32% 38	39.68% 25	63
Fund infrastructure improvements to alleviate coastal flooding	59.68% 37	40.32% 25	62
Fund infrastructure improvements to alleviate inland flooding	55.74% 34	44.26% 27	61
Adopt a water conservation policy for periods of drought	73.44% 47	26.56% 17	64
Conserve land to protect natural resources for flood protection	75.38% 49	24.62% 16	65
Provide information to coastal residents and businesses about flood prevention	87.30% 55	12.70% 8	63
No action is needed	39.29% 11	60.71% 17	28

Q17 How long have you lived in town?

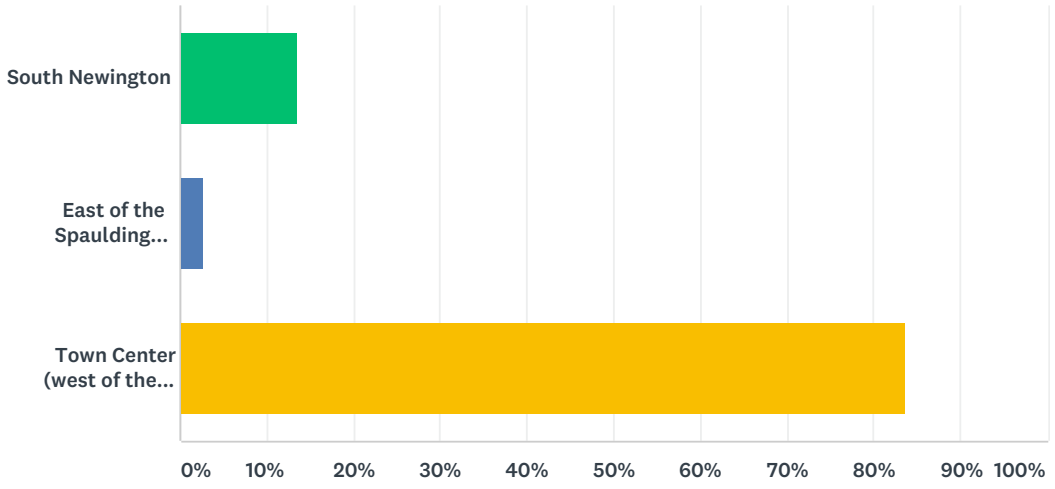
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
0-10 years	48.00%	36
11-20 years	20.00%	15
21-30 years	18.67%	14
30-40 years	8.00%	6
Over 40 years	4.00%	3
Over 50 years	1.33%	1
TOTAL		75

Q18 What part of town do you live in?

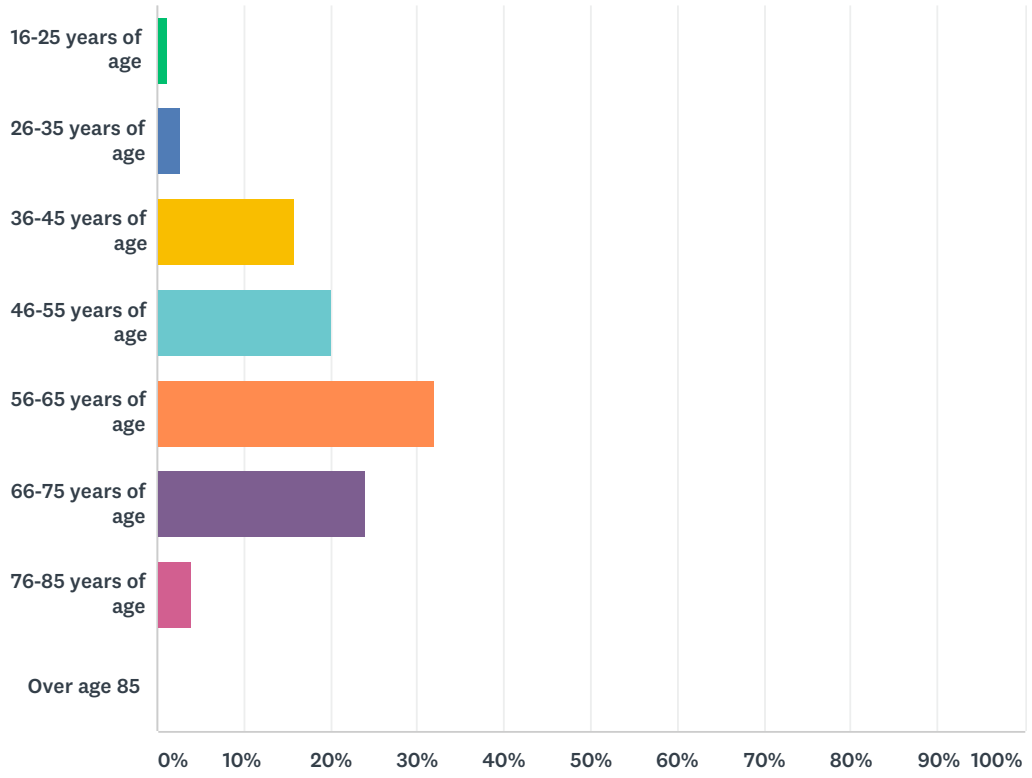
Answered: 74 Skipped: 2



ANSWER CHOICES	RESPONSES	
South Newington	13.51%	10
East of the Spaulding Turnpike	2.70%	2
Town Center (west of the Spaulding and North of Pease)	83.78%	62
TOTAL		74

Q19 How old are you?

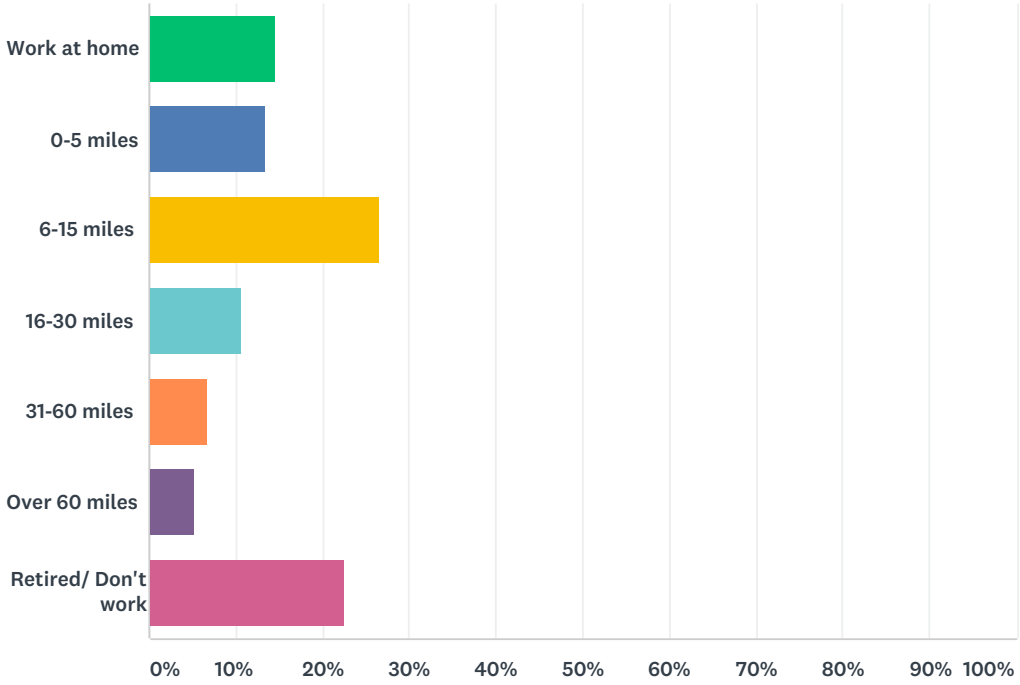
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
16-25 years of age	1.33%	1
26-35 years of age	2.67%	2
36-45 years of age	16.00%	12
46-55 years of age	20.00%	15
56-65 years of age	32.00%	24
66-75 years of age	24.00%	18
76-85 years of age	4.00%	3
Over age 85	0.00%	0
TOTAL		75

Q20 What distance do you commute to your workplace?

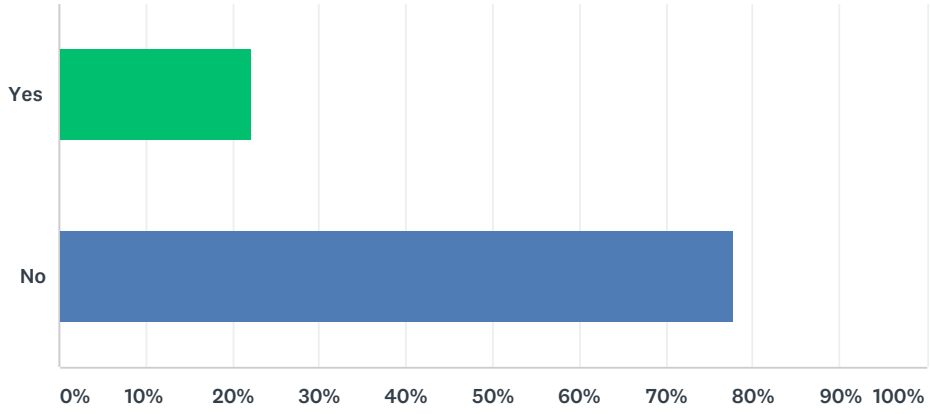
Answered: 75 Skipped: 1



ANSWER CHOICES	RESPONSES	
Work at home	14.67%	11
0-5 miles	13.33%	10
6-15 miles	26.67%	20
16-30 miles	10.67%	8
31-60 miles	6.67%	5
Over 60 miles	5.33%	4
Retired/ Don't work	22.67%	17
TOTAL		75

Q21 Are you an elected Town official or a member of any local boards or committees?

Answered: 72 Skipped: 4



ANSWER CHOICES	RESPONSES	
Yes	22.22%	16
No	77.78%	56
TOTAL		72

TOWN OF Newington
Build Out Analysis

March 2019

ROCKINGHAM PLANNING COMMISSION
theRPC.org

Prepared by:
Robert Pruyne Jr., GISP
Rockingham Planning Commission
156 Water St.
Exeter, NH 03833

Table of Contents

Introduction

This report is part of the final product of the build out analysis project for the Town of Newington, NH. This build out is at the request of the Newington Planning Board to help them with future land use planning and update of the future land use chapter of the masterplan. This project was largely informed by a complete update of the existing land use maps from 1962, 1974, 1998, 2005, 2010 and 2015. The land use maps were updated by a sub-group of the Newington Planning Board.

What is a Build Out?

A build out is a process of analyzing spatial data along with current land use regulations. The build out process becomes a tool to be used to show potential future land use scenarios. Town planners should use the results of this build out to evaluate if the enacted zoning will accomplish the goals set forth by the town's masterplan. The planning board should leverage this analysis to determine if the desired balance of open space and development; residential and commercial will be achieved given the current regulations.

A common misconception of the build out process is that it is a prediction tool. A build out is not trying to predict where a new housing unit will be developed but is attempting to show potential for development in a spatial manner. When looking at the results of the build out analysis it is important to look at the aggregate effect, not zoom in on one parcel.

Methods

Tools and Data

The build out was conducted using Geographic Information systems (GIS) software. ArcMap and CommunityViz are the core programs used in the analysis. The application used for this project was ArcGIS Desktop 10.6 developed by the mapping software company ESRI. CommunityViz is an extension for ArcGIS that was created by the Orton Family Foundation. CommunityViz helps with visualization of data. In this instance Community Viz was used to simplify the build out model. GIS Staff

used Python IDLE 2.7 to write some scripts that helped the automation of some of the build out processes.

The GIS data used in this study originates from several sources. GRANIT is the GIS clearinghouse for the state of New Hampshire, as such they supplied much of the base data used in this analysis. The RPC houses and maintains many datasets for the town, some of these were used to create base data and cartographic data used in this build out. The parcel dataset provided from the town was older and somewhat inaccurate in the port area of town. The RPC cleaned the data to the extent needed.

It should be noted for the purpose of this build out there are three types of constraints, absolute constraints, partial constraints and zoning (density) constraints. These all create the constraint layer. Furthermore, there are constrained parcels, these are constrained based on their current development status. An absolute constraint means that area is completely removed from the buildable landmass, a partial constraint allows for the land area of the constraint to be used in density calculations, but development cannot take place on that specific area. A density constraint does nothing more than to lower the allowable developed density of that parcel.

1. Existing Buildings Layer – The existing buildings data was created by RPC using the 2010 aerial photos and updated with 2015 aerial photos. Existing buildings and their corresponding required land mass per zoning were removed from the remaining allowable area of the parcel to allow additional building. The 2015 data shows 478 buildings, 306 Residential, 4 Multi-family, and 168 Non-residential.
2. Conservation Land – Three conservation land datasets were used the RPC Public Lands (204 acres), GRANIT Conservation and Public Land (1411 acres) dataset, and revised conservation dataset that the town planner, conservation commission and the RPC updated in 2018. These three conservation land datasets were consolidated to remove overlaps. Conservation land was considered an absolute constraint.
3. Wetland Buffers - As described in the zoning, the RPC used four different wetlands buffers: here was an absolute constraint of 25' of buffer on fresh water wetlands (703 acres) and 75' on tidal

wetlands (2975 acres), and a partial constraint on 50' buffer of freshwater wetlands (856 acres) and 100' buffer of tidal wetlands (3064 acres).

4. National Wetlands Inventory (NWI) - In some cases the other wetlands datasets are too coarse for town scale analysis, to help to make this build out more accurate the National Wetland Inventory was used to supplement those wetland datasets. In most cases the NWI co-occurs with the wetland's datasets but in some places it does not. Newington has 3255 acres of NWI land, this was all considered an absolute constraint.
5. Prime Wetlands- The RPC used the existing mapped prime wetlands dataset (West Environmental) as an absolute constraint. There are 204 acres of prime wetlands.
6. Parcels data- The Parcel data used was from supplied by the town to RPC in 2010 and reflects 2009. This represented the most current at the start of the build out process. Parcels were divided into 3 categories based on existing land use: Fully constrained, partially constrained, Not Constrained. The way the parcels were categorized was based on whether existing buildings on each parcel fully used the parcel's land mass or not given the existing zoning on that parcel. For example, a 1.8 Acre lot in the R, which requires 1.8-acre minimum lots size, there is 1 existing house, this would be 'fully constrained' and thus nonbuildable. A 4-acre lot in the same zoning district with only one housing unit would still allow for another unit to be build and thus it would be considered 'partially constrained'. This effort yielded a dataset of parcels that were consumed, this data was applied an absolute constraint. This dataset is referred to as "FullyBuiltParcels". There are 319 fully built parcels.
7. Steep Slopes - Slopes larger than 25% were considered steep slopes. Steep slopes for this purpose were considered a partial constraint. The Steep slopes data were created by the RPC from 2011 LiDAR data. There are 225 acres of steep sloped areas in the Town of Newington.
8. FEMA Floodplain – This dataset shows the expected areas of flooding. This was used as a partial constraint. Floodplain areas consume 3014 acres.
9. Zoning – The zoning layer is the base upon which this whole analysis is predicated. Zoning is the layer that the build out process is testing, and is what should be changed to address any issues the town discovers when considering build out results. The zoning layer is created by CAI.

Zone	*Acres*
Commercial	205
Historic	133
Industrial	120
Marina	36
Natural Resource Protection District	1,323
Office	188
Pease Zones	1,322
Residential	1,498
ROW	268
Waterfront Industrial	259
Grand Total	5,351

*note due to differing datasets, the acres of each zone listed here are from the parcel dataset, thus the areas are slightly different from land use datasets.

Procedures

Staff from the RPC met with the Newington planning board to discuss the build out process. The first step in the build out is to obtain and clean the existing parcel data. Next the parcels were assigned a status of built-out, partially built-out or not built-out. Where parcels were determined to be partially built-out, the RPC calculated what percentage of the parcel was built-out. Next all the physical constraints were combined into one 'constraints layer'. In many cases the constraints were coincident; this explains why there is more acreage in constraints than the total size of the town. The constraints layer and the constrained (built-out) parcels are removed from the parcel fabric. This leaves the buildable land use layer. The buildable land use layer then has the zoning applied to it. The buildable land use layer with zoning applied leaves a layer of buildable land. Buildable land is divided up per the zoning calculate the quantity of new units. New units are placed randomly abiding by parcel lines and setback requirements.

Assumptions

Mixed Use and Multi-Family – This model tends to assume single family units for the most part. In the third scenario, 20% of new units were assigned to be multifamily in response to a perception that the new ADU (assessory dwelling unit) rules that New Hampshire has enacted would result in such change. There is simply not enough information to inform when or why a unit might be multifamily.

Assignment of Residential vs. Non-Residential – In Newington there are no mixed-use zones, except in the Waterfront Industrial zone, which require specific requirements to be met.

Combination of lots- This build out assumes that there is no combination of lots. As such. lots will not be combined for the purposes of this build out. Therefore, in some cases where there is a partial lot left over, it will not be combined with other leftover partial lots to create additional building lots. This should be offset by inefficient use in other places.

Overlay Districts – Overlay districts allow for much greater densities to try and accomplish a specific task or use. If the model is given these densities, it will assign all growth to be such. Thus, this type of overlay zone must be neglected for the purpose of the build out

Efficiency Factor – Past build outs have shown that very few developments are built at maximum efficiency due to things such as parking requirements, roads, driveways, and lot open space requirements. The maximum efficiency allowed in this model was 85%. This was been a consistent factor used in New Hampshire for build out purposes.

Frontage Requirements – Despite there being frontage requirements in the zoning, they are neglected in this build out. This build out assumes that new roads could provide frontage required for development. The efficiency factor described above assists to account for this type of issue.

Results

The results of the build out are buildable land mass and new units at the time of build out. It should be noted these results are not predictive but are the result of what the current zoning allows. The results will change with changes in the current zoning. Results of this analysis are a 'worst case' scenario, meaning that every bit of land mass is used. It should be noted; however, these results do not have a timescale attached to them. Build out conditions could happen in any timeframe.

The following tables show the new units at build out and the buildable area, both by zoning district and town-wide scale. The resulting build out shows a 78% growth in units in the town. While this is not likely to happen, it is possible with current enacted zoning.

Scenarios

The Town of Newington and the RPC used the build out to view what some different potential scenarios might mean for the Town of Newington at build out. The RPC encourages the town to continue to think of potential scenarios to test the sensitivity to changes in density and zones.

This build out analysis had 3 scenarios: Base Scenario, Little Bay Density, and Revised Non-Residential and ADU.

The Base scenario is simply a look at the potential growth due to existing zoning. The "Little bay scenario" was suggested by the planning board. The board noted that the Little Bay Road area was likely at the density that they expected for future developments. This area is a little less dense than the zoning allows for. The final scenario so-called "Revised Non-Residential and ADU" takes the base scenario and adds an additional floor of space to the non-residential zones and allows for 20% of new units to be multifamily in the residential zones.

Residential Build Out Scenario

	Existing	Base	Little Bay	ADU + Extra Floor NRes
Housing Units	354	631	579	636
Population	789	1,407	1,291	1,418
Acres	427	1,261	1,261	1,261

Non Residential Build Out Scenario

	Existing	Base	Little Bay	ADU + Extra Floor Nres
Units	168	228	228	199
Square Footage	XX	XX+45555109	XX+45555109	XX+60698668
Acres	746	2554	2554	2554

Town of Newington, NH
Road Management and Maintenance Plan

Prepared by

Rockingham Planning Commission

January 2019

Contents

1. Introduction

For most towns and cities, their road network is their most valuable asset when factoring in the pure material cost and the dedicated land. In fact, Rockingham Planning Commission (RPC) estimates that the Town of Newington's 2018 maintained road network has a material value of approximately $5,768,692.

Roads allow commuting, services, commerce and shipping, tourism, and provide recreational opportunities. However, maintaining such an integral aspect requires significant attention and funding. The challenge is finding a balance between funding and maintenance. The Town of Newington has contracted RPC to implement a maintenance plan for their road system.

The goal of a Road Surface Management System (RSMS) is to provide municipalities with information on their road system's condition and estimate future maintenance costs. The main objective of this project is to inventory distressed pavement manifestations, such as cracking, so that municipalities can prioritize maintenance strategies to stretch their funding and improve the quality of the road network. This process involves completing a road inventory, condition survey, priority analysis, repair selection, and planning/budget preparation.

2. Road Surface Management System

The assessment was conducted using software developed by the University of New Hampshire Technology Transfer Center (UNH T^2) in partnership with the New Hampshire Department of Transportation (NHDOT).

RPC inventoried the road system maintained by the Town of Newington, and subsequently divided each identified road into quarter-mile segments. RPC then performed a condition survey on each segment and documented multiple pavement-related attributes. In addition, the Town of Newington provided information for two additional attributes that were utilized to determine Priority Scores.

This data was then fed into the New Hampshire Statewide Asset Data Exchange System (NH SADES) RSMS Forecasting system. This web-based system calculates a Pavement Condition Index (PCI) based on the road inventory data inputs. Users can then apply repairs to specific road segments. After applying a repair, the system calculates the estimated repair cost and updates the life span of the road segment. The PCI (a number from 0 to 100) is a qualitative number representing the quality of the section of road, where the higher the score, the greater the general pavement condition of that section.

2.1. Road Segments

The Town of Newington maintains 14.4 miles of paved road which were divided into 63 segments. These road segments were evaluated and ranked according to Priority Score (see Newington_RSMS.xlsx tab “4-2018 Segment Rank”).

2.2. Road Condition Factors

The RSMS utilizes an attribute-driven methodology applied equally to each segment to ensure consistency and improve understanding of the output data. When surveying the road network, each segment is inspected for the relative severity and extent of the following surface distresses:

- Longitudinal Cracking – cracks which run parallel to the roadway centerline. These cracks are usually found at construction joints and between lanes.
- Transverse Cracking – cracks which run perpendicular to the roadway centerline. Transverse cracks are generally spaced at regular intervals and caused by expansion and contraction of the road surface material.
- Alligator Cracking – interconnected crack patterns that resemble alligator skin or chicken wire.
- Edge Cracking – cracks adjacent and/or parallel to the edge of the pavement. While generally confined to the outer one or two feet of pavement, edge cracking can progress into the travel lane.
- Patching – areas where the original pavement was removed and subsequently replaced but is showing deterioration.
- Potholes – areas where portions of the road pavement have broken, and loss of pavement has resulted in a bowl-shaped depression.
- Drainage – the ability for run-off to flow from the paved area to a location that does not influence roadway conditions.
- Rutting – channel depressions in the wheel paths. Rutting causes water to drain along the road surface rather than drain to the edge of the road.
- Roughness – irregularities in the roadway surface which adversely affect the comfort of the ride.

2.3. Priority Factors

Over the last decade, pavement management has changed from a ‘worst first’ strategy to a multi-criteria analysis. This is because the strategy of completely rehabilitating every road, waiting for it to deteriorate, and rehabilitating it again has not proven to be the most efficient management strategy. Typically, when following the ‘worst first’ method, there is not enough money to fund full-scale rehabilitation over a whole road network, and therefore roads are in a continuous state of disrepair most of their lifespan. An RSMS is a data-driven preventative maintenance strategy aimed at long-term cost savings.

A section's Priority Score is determined using the following factors:

- Traffic Volume – how much traffic volume this road experiences
- Importance – how important this road is to the Town (i.e. crucial connecting roads to critical services, etc.)
- Pavement Condition Index (PCI), based on the attributes and methods described in Section 2.2

The Town of Newington determined Traffic Volume and Importance scores for each road which are values from 1 to 5, with 5 being the greatest.

The overall Priority Score for each road segment is calculated according to the formula below. It should be noted that the three factors contributing to the Priority Scores are weighted in the following order of descending importance, as can be seen in the equation: Importance, Traffic Volume, and PCI. Accordingly, the PCI is not the largest factor in how we recommend the Town prioritizes its roads for maintenance.

Priority = (Importance * 40%) + (Traffic Volume * 35%) + (Pavement Condition Index * 25%)

It is also important to note that the PCI utilizes the "keep the good roads good" mentality. This is because $1 of preventative maintenance can eliminate or delay spending $8-$10 on rehabilitation (All State Materials Group). This means that a higher PCI will result in a higher Priority Score. An example of the Priority Score calculation is shown below:

Street	Importance	Traffic Volume	PCI 2018 (Road)	Importance Score	Traffic Volume Score	PCI Score	Priority Score
Nimble Hill Rd	5	3	73	0.4	0.21	0.1825	79.3

3. 2018 Road Ranks

Utilizing the calculated Priority Scores, RPC ranked each segment and road. The top ten roads with the highest Priority Scores are listed below (see Newington_RSMS.xlsx tab "5-2018 Road Rank" for the full list):

Street	Priority Score	Rank
Gosling Rd	91.8	1
Shattuck Way	81.8	2
Nimble Hill Rd	79.3	3
Mcintyre Rd	66.3	4
Little Bay Rd	61.5	5
Fox Point Rd	57.5	6
Beane Ln	54.3	7
Patterson Ln	48	8
Hodgdon Farm Ln	46.3	9
Gundalow Lndg	45.3	10

4. 3 Year Repair Schedule (2019-2021)

RPC applied a repair strategy for future years according to the road rank values and the Town's 2019 road maintenance budget of $190,000. After applying each year of repairs, Priority Scores were re-calculated based on new PCI values.

4.1 2019 Recommendations

For 2019, RPC recommends the following repairs at the road level. When multiple repairs are listed, this is because the select road has multiple road segments, and each segment has a specific repair. The "Cost" field takes into account a default per unit cost developed by the UNH T^2 and the NHDOT.

Repairs in 2019 prioritize routine maintenance, preventative maintenance, and rehabilitation, as follows:

	2018			2019	
Street	**PCI**	**Priority Score**	**Rank**	**Repair**	**Cost**
Gosling Rd	67	91.8	1	Deferred Maintenance	$0.00
Shattuck Way	83	81.8	2	Deferred Maintenance	$0.00
Nimble Hill Rd	73	79.3	3	Milling / HMA (1.5") HMA Overlay (1.25") Isolated Patch and HMA Shim	$68,064.10
Mcintyre Rd	81	66.3	4	Milling / HMA (1.5") Isolated Patch and HMA Shim Microsurfacing (Single) Crack Seal (Major)	$43,257.55
Little Bay Rd	90	61.5	5	Crack Seal (Minor) Crack Seal (Major) Isolated Patch and HMA Shim	$20,874.23
Fox Point Rd	78	57.5	6	Crack Seal (Minor) Isolated Patch and HMA Shim	$17,905.56
Beane Ln	93	54.3	7	Crack Seal (Major)	$2,667.57
Patterson Ln	66	48	8	Milling / HMA (1.5") HMA Overlay (1.25")	$39,633.16
					$192,402.17

4.2 2020 Recommendations

Repairs in 2020 prioritize routine maintenance, preventative maintenance, and milling sections of Fox Point Rd that were not repaired in 2019:

	2019			2020	
Street	**PCI**	**Priority Score**	**Rank**	**Repair**	**Cost**
Woodbury Ave	94	91.5	1	Crack Seal (Minor)	$13,906.74
Gosling Rd	61	90.3	2	Deferred Maintenance	$0.00
Nimble Hill Rd	90	83.5	3	Crack Seal (Major) Crack Seal (Minor)	$9,924.89
Shattuck Way	75	79.8	4	Deferred Maintenance	$0.00
Piscataqua Dr	97	77.3	5	Deferred Maintenance	$0.00
Mcintyre Rd	93	69.3	6	Crack Seal (Minor)	$6,380.64
Little Bay Rd	94	62.5	7	Crack Seal (Minor)	$6,565.41
Fox Point Rd	80	58	8	Milling / HMA (1.5")	$86,846.56
Beane Ln	85	52.3	9	Crack Seal (Minor)	$2,002.12
Patterson Ln	66	46.5	10	Crack Seal (Minor)	$2,536.87
Hodgdon Farm Ln	59	44.8	11	HMA Overlay (1.5")	$22,719.81
Gundalow Lndg	81	43.3	12	Crack Seal (Major)	$2,819.42
Old Post Rd	74	41.5	13	Crack Seal (Minor) Microsurfacing (Single) Fog Seal	$22,812.61
Airport Rd	72	40	14	Isolated Patch and HMA Shim Crack Seal (Minor)	$7,191.81
					$183,706.88

4.3 2021 Recommendations

Repairs in 2021 prioritize routine maintenance and rehabilitation/reconstructing Gosling Rd and Shattuck Way:

	2020			2021	
Street	**PCI**	**Priority Score**	**Rank**	**Repair**	**Cost**
Woodbury Ave	94	91.5	1	Crack Seal (Minor)	$4,770.00
Gosling Rd	58	89.5	2	FDR & Cold Mix (4") Isolated Patch and HMA Shim Fog Seal Microsurfacing (Single)	$94,347.37
Nimble Hill Rd	94	84.5	3	Crack Seal (Minor)	$3,192.91
Shattuck Way	72	79	4	FDR & HMA (4") Milling / HMA (1.5") Microsurfacing (Single)	$269,448.40
					$371,758.68

4.4 Network PCI

The major goal of an RSMS is to track the overall pavement condition of the network--the "Network PCI". RPC was able to calculate these conditions for 2018-2021 using a weighted average. It is important to note that the significant increase from 2018-2019 is partially due to the Town of Newington acquiring Woodbury Ave and Piscataqua Dr at DOT-level specifications.

Year	Network PCI
2018 (at time of survey)	78.2
2019 (with repairs)	86.5
2020 (with repairs)	89.7
2021 (with repairs)	91.2

5. Conclusions

RPC recommends that the Town utilize this road maintenance plan for the years 2019-2021 to better target maintenance strategies and funding. In addition, it is recommended to regularly update this document and paving plan to meet the needs of the Town. We would like to note that the Town's current road maintenance budget of $190,000 is projected to increase the overall network PCI for future years.

After discussion with the Town, it is undetermined as to when Gosling Rd and Shattuck Way can be repaired due to maintenance that the City of Portsmouth performs and an ongoing project by the United States Air Force. While these repairs might not occur in 2021, RPC sees it as critical to rehabilitate these roads as soon as practicable to prevent further degradation and cost increases.

WEST ENVIRONMENTAL INC.
48 Stevens Hill Road, Nottingham, NH 03290
603-734-4298 ♦ mark@westenv.net

Memorandum

Date: October November 25, 2019
To: Jane Hislop, Chair Newington Conservation Commission
From Mark West

RE: **Contiguous Wetland Mapping Project and Article IX Wetlands Overlay District Ordinance Update**

West Environmental, Inc. has completed the 2019 Wetlands Map and edits to Article IX Wetlands Overlay District based on our last Conservation Commission meeting.

Wetland Mapping
The goal of the Wetland Mapping Project is to prepare wetland maps that show all the contiguous wetlands that have 100-foot setbacks in the Town of Newington outside of the Great Bay National Wildlife refuge and Pease Tradeport. This is being undertaken to so that landowners, developers and consultants will know which wetlands have 100-foot setbacks and which wetlands do not. Currently the Wetland Ordinance identifies a 100-foot setback to wetlands contiguous to surface water, but these resources have not been mapped. The Prime Wetlands have been mapped onto the tax map the other wetlands shown include a variety of streams and wetlands which have been taken from years of wetland mapping submittals for development projects. It should be noted that these wetland boundaries are estimated and for preliminary planning purposes only. They do not constitute a wetland delineation in the field performed by a NH Certified Wetland Scientist as required for any land use project within the vicinity of wetlands.

Methodology

- The basis of the mapping of contiguous wetlands starts with the existing Prime Wetland Maps and named and unnamed streams.
- Sub-base maps were prepared to focus on areas to be mapped and include streams, prime wetlands and NWI mapped wetlands
- LiDAR maps were used in concert with leaf off/spring aerial photography to show wetlands, stream channels and topography
- All field verification was performed from public access locations

The New 2019 Wetlands Map shows both the Prime Wetlands and all other contiguous wetlands that have the 100-foot setback in blue. This will assist the public, the building inspector and local land use board in identifying these wetlands and their buffers. The contiguous wetlands are connected to streams, brooks and Great Bay. Streams are identified in the Wetland Ordinance as a protected resource and they are also protected in NHDES regulations.

As part of this mapping process the Newington Conservation Commission, based on the recommendation of West Environmental, reduced the setbacks to wetlands contiguous with intermittent streams. These three wetland systems are mapped in pink with a 75-foot setback.

Wetland Ordinance Update

While updating the Wetland Ordinance to reflect the new wetland mapping other minor changes were made. Several of the changes are related to updating reference documents in delineation standards and correction of typos. McIntyre Brook was specifically identified in the wetland definition section are it is a human altered stream system that is also contiguous to surface waters.

In addition, the wetland setback table was simplified to remove confusing language. There were also changes to the minimum size of wetlands with 50-foot setbacks from 5,000 square feet to 3,000 square feet and the addition of a 25-foot setback to wetlands smaller than 3,000 square feet. This change is based on the need to reduce the accidental incursion into unprotected wetlands. When development can occur right up to the edge of smaller wetlands, the result can include unforeseen wetland impacts. These violations to local and state regulations require enforcement actions by the Building Inspector, Conservation Commission and the NHDES. This also creates additional costs for the landowner and developers. Providing a small setback reduces these impacts on the Town and its citizens. The 3,000 square foot size was chosen as it represents the minimum wetland impact category for NHDES wetland permits and is the threshold that triggers the US Army corps of Engineers review.

C-RiSe

CLIMATE RISK IN THE SEACOAST

Assessing Vulnerability of Municipal Assets and Resources to Climate Change

Rollinsford • Dover • Madbury • Durham • Newmarket • Newfields • Exeter • Stratham • Greenland • Newington

TOWN OF NEWINGTON, NEW HAMPSHIRE

Vulnerability Assessment

of projected impacts from sea-level rise and coastal storm surge flooding

Prepared by the
Rockingham Planning Commission

Mach 31, 2017

This project was funded, in part, by NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the New Hampshire Department of Environmental Services Coastal Program

ACKNOWLEDGEMENTS

The Rockingham Planning Commission gratefully acknowledges the participation of Town of Newington:

Gerald Coogan, Town Planner

John Stowell, Building Inspector

Andrew Head, Emergency Management Director

Leonard Thomas, Road Agent

Planning Board: Denis Hebert-Chair, Christopher Cross-Vice Chair, James Weiner, Bernard Christopher, Jack Pane, Kenneth Latchaw, Peter Welch, Mark Phillips

Cover Photo: Great Bay Marine, Fox Point, Stubbs Pond Outlet
Photo Credit: Rockingham Planning Commission

Notes on Use and Applicability of this Report and Results:

The purpose of this vulnerability assessment report is to provide a broad overview of the potential risk and vulnerability of state, municipal and public assets as a result of projected changes in sea-levels and coastal storm surge. This report should be used for preliminary and general planning purposes only, not for parcel level or site specific analyses. The vulnerability assessment performed was limited by several factors including the vertical accuracy of elevation data (derived from LiDAR) and the static analysis applied to map coastal areas subject to future flooding which does not consider wave action and other coastal dynamics. Also, the estimated flood impacts to buildings and infrastructure are based upon the elevations of the land surrounding them, not the elevation of any structure itself.

March 31, 2017

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Project Partners:

March 31, 2017

PURPOSE AND APPLICATIONS OF THE VULNERABILITY ASSESSMENT

The *Climate Risk in the Seacoast* (C-RiSe) vulnerability assessment project produced maps and statistical data about the potential impacts from sea-level rise and storm related flooding to state and municipal infrastructure, critical facilities, transportation systems, and natural resources in New Hampshire's 10 Great Bay coastal municipalities. As shown in Figure 1, the assessment evaluated flood impacts from six sea-level rise and storm surge scenarios - 1.7 feet (intermediate-low), 4.0 feet (intermediate), and 6.3 feet (highest) sea-level rise projections at the year 2100 and these sea-level rise projections with the 100-year storm surge. These scenarios capture a range of plausible projections of sea levels at 2100, from the intermediate-low to the highest scenarios.

FIGURE 1: Sea-Level and Storm Surge Scenarios

Sea Level (SLR) Scenarios	SLR Intermediate Low 2100	SLR Intermediate High 2100	SLR High 2100	SLR + storm surge 2100	SLR + storm surge 2100	SLR + storm surge 2100
Sea Level Rise	1.7 feet	4.0 feet	6.3 feet	--	--	--
Sea Level Rise + Storm Surge	--	--	--	1.7 feet + storm surge	4.0 feet + storm surge	6.3 feet + storm surge

Note: Storm surge is the area flooded by the current 100-year/1% chance storm event as depicted on the FEMA Flood Insurance Rate Maps (preliminary maps, 2014).

The results of this vulnerability assessment can be incorporated into existing municipal plans including the Master Plan, Hazard Mitigation Plan, Road Improvement Plan, Infrastructure Management Plan, and Capital Improvement Plan. These results can also inform zoning amendments such as floodplain development standards and natural resource protection, and land development standards in site plan review regulations and subdivision regulations.

OVERVIEW OF NEWINGTON

The Town of Newington is situated along both tidal riverine and estuarine shorelines. Newington's land area covers roughly 8.2 square miles (5,248 acres) and 4.1 square miles (2,624 acres) of inland water area. With an estimated population of 800 (2014 Census), Newington is the least populated municipality in RPC's planning region. The inland coastal portion of Newington that is most susceptible to coastal flooding are low-lying areas along Little Bay, Great Bay and the Piscataqua River.

KEY FINDINGS OF VULNERABILITY ASSESSMENT RESULTS

KEY FINDINGS

Figure 2 reports the number of acres of land and inland water area affected under the sea-level rise and storm surge scenarios evaluated. The area impacted by flooding increases by 78 percent from 1.7 feet of sea-level rise to 4.0 feet of sea-level rise, then another 34 percent increase at 6.3 feet of sea level rise. Affected areas greatly increase under the storm surge scenarios which are infrequent events compared with daily flooding at high tide.

FIGURE 2: Total Acreage Affected by Sea Level Rise and Storm Surge Scenarios at year 2100

Municipality	Sea-Level Scenarios					
	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3feet + storm surge 2100
Newington (acres)	123.2	219.6	294.7	252.9	325.6	404.3
% impacted	1.6	2.8	3.7	3.2	4.1	5.1

Total Area = 7,872 acres

Figures 2 and 3 provide an overview of impacts to land and specific assets affected by each sea-level rise and storm surge flooding.

Newington has significant miles of coastal tidally-influenced shoreline along the Great Bay and Little Great Bay, however due to the increase in elevation landward only certain areas are particularly vulnerable to flooding from seasonal high tides, coastal storms, and sea-level rise. These high risk flood areas include lands currently used for commercial, industrial, residential and recreational development, and small sections of local roads and state Route 16 at the Little Bay Bridges. The following areas are most susceptible to sea-level rise and storm related flooding:

- River Road/Piscataqua River waterfront commercial/industrial area
- Great Bay Marine and low-lying supporting lands
- Fox Point and Newington Town Park conservation lands
- Residential parcels and structures along the west and southwest shorelines
- Shattuck Way, a designated evacuation route
- Fabyan Point (future residential development potential)
- 9 parcels valued at $10.8 million and 9 homes valued at $1.3 million

FIGURE 3: Summary of Assessment Data

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Infrastructure and Critical Facilities						
Infrastructure-Water Pipes (miles)	0.01	0.1	0.3	0.2	0.4	0.6
Roadways (miles)	0.0	0.1	0.7	0.4	0.9	1.3
Critical Facilities (# of sites)	na	na	1	na	na	3
Residential Structures	0	0	3	2	6	8
Assessed Value - Parcels Impacted	$519,647,600	$120,940,300	$127,201,800	$131,327,200	$127,954,100	$135,065,400
Natural Resources						
Freshwater Wetlands (acres)	8.2	10.0	11.0	10.9	11.7	15.2
Tidal Wetlands (acres)	113.4	117.5	119.4	118.6	119.8	120.6
Wellhead Protection Areas (acres)	0	0	0	0	0	0
Conserved and Public Lands (acres)	20.8	104.4	159.3	126.5	177.1	229.4
Wildlife Action Plan (acres)	39.2	130.5	195.7	157.4	216.4	278.3
Coastal Conservation Plan-Focus Area – Fabyan Point	33.8	113.4	160.7	133.2	175.4	211.5
100-year Floodplain (acres)	123.2	208.8	217.6	214.8	219.1	222.5

Note: Storm surge is the area flooded by the 100-year/1% chance storm event. "na" = not assessed

Property assessed values in areas impacted by future flooding are confined to the 6.3-foot sea-level rise scenario and the three sea-level rise plus storm surge scenarios. No impacts are reported under the 1.7-foot and 4.0-foot sea-level rise scenario.

The complete detailed vulnerability assessment data are provided in the following section of this report.

DETAILED VULNERABILITY ASSESSMENT RESULTS BY ASSET TYPE

Culvert Assessment

Map: Culvert Assessment – Climate Ready Culverts and Figure 4 show the hydraulic and aquatic organism passage function of culverts under existing precipitation conditions for the 10-year, 25-year, 50-year and 100-year storm event.

The hydraulic, performance of more than half of the ten culverts evaluated in this assessment have moderate to poor function under existing storm conditions (10-year up to the 100-year storm event). Newington does not own and operate a tremendous amount of water or sewer infrastructure thus impacts to these assets are minimal to none under all scenarios evaluated. Of the ten culverts analyzed for hydraulic rating, five pass, 2 are transitional and three fail under the 10-year storm event. Culverts #38, #43, #42, #46 and #47 are impacted by sea-level rise and storm surge flooding. For Aquatic Organism Passage (AOP) rating, one culvert has full capability, and 9 have reduced or no capability.

FIGURE 4: Assessment of Culvert Hydraulic and Aquatic Organism Passage Function

Crossing #	Location	Hydraulic Rating				Aquatic Organism Passage Rating	
		10-year	25-year	50-year	100-year	Color	Rating
38	Fox Point Road	Fail	Fail	Fail	Fail	GRAY	Reduced AOP
39	Nimble Hill Road @ Coleman Drive	Fail	Fail	Fail	Fail	GRAY	Reduced AOP
40	Shattuck Way @ Lower Pickering Brook	Pass	Transitional	Transitional	Transitional	GREEN	Full AOP
41	Patterson Lane	Transitional	Transitional	Transitional	Fail	GRAY	Reduced AOP
42	Captains Landing	Transitional	Fail	Fail	Fail	GRAY	Reduced AOP
43	Fox Point Road @ Upper Pickering Brk.	Pass	Pass	Pass	Pass	GRAY	Reduced AOP
44	Fox Point Road @ Flagstone Ditch	Pass	Pass	Pass	Pass	RED	No AOP
45	Shattuck Way @ Paul Brook	Fail	Fail	Fail	Fail	GRAY	Reduced AOP
46	Newington Road@ McIntyre Brook	Pass	Pass	Pass	Pass	RED	No AOP
47	Newington Road @ Kennard Pond	Pass	Pass	Pass	Transitional	GRAY	Reduced AOP

A rating of **Pass** means that the headwater depth is below the lowest top-of-pipe elevation of any culvert at the crossing; a rating of **Fail** means that the headwater depth is above the road surface; and a rating of **Transitional** means that the headwater depth is somewhere between these two elevations.

*AOP = Aquatic Organism Passage is the degree to which aquatic organisms are able to pass through a crossing. Green = Full AOP, Gray = Reduced AOP, Pink = No AOP, for all species except Adult Salmonids, Pink = No AOP, for any species including Adult Salmonids.

Municipal and Critical Facilities

Maps: Critical Facilities and Infrastructure show the municipal critical facilities affected by sea-level rise and coastal storm surge flooding. Figure 5 reports when specific municipal critical facilities are affected by each sea-level rise and coastal storm surge scenario. Only small segments of water distribution pipes are impacted by any of the six scenarios evaluated. Several dams might be at risk of both sea-level rise (4 dams) and storm related (6 dams) flooding. Three residential structures are located in flood areas associated with 6.3 feet of sea-level rise, and 9 residential structures are located in flood areas associated with 6.3 feet of sea-level rise plus storm surge.

FIGURE 5: Municipal Critical Facilities (# of facilities)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Sewer Pipes (miles)	0	0	0	0	0	0
Water Pipes (miles)	0.01	0.08	0.27	0.19	0.43	0.56
Transmission Lines (miles)	0	0	0	0	0	0
Analysis below for SLR 6.3 feet and SLR 6.3 feet + storm surge only						
Dams	Fuel Storage Corp. Holding Pond Lower Dunwoody Dam Lower Peverly Brook Dam Stubbs Pond Dam			Fuel Storage Corp. Holding Pond Lower Dunwoody Dam Lower Peverly Brook Dam Stubbs Pond Dam Barrott's Dam, Kennard Dam		
Residential Structures	3 (6.3 feet SLR)			9 (6.3 feet SLR+storm surge)		
Fuel Source/Storage	0			Pickering Stone		

Transportation

Maps: Road and Transportation Assets show the state and municipal roadways affected by sea-level rise and coastal storm surge flooding. Figure 6 reports the miles of state and local roadways affected by each flood scenario. Except in for the most extreme sea-level rise plus storm surge scenario, less than one mile of combined local, state and private roads are impacted by coastal flooding.

A small portion of Shattuck Way at the intersection of Route 16 is impacted by both sea-level rise and storm surge flooding which could be significant as it is a designated evacuation route. The town should evaluate

this flood risk and its implications for emergency access and response, and public safety in the event of an evacuation during a storm event.

FIGURE 6: State and Municipal Roadways and Infrastructure (miles)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Roadway Type						
Local	0.0	0.02	0.09	0.04	0.15	0.22
State	0.0	0.0	0.0	0.0	0.01	0.01
Private	0.0	0.06	0.60	0.41	0.79	1.05
Total Road Miles	0.0	0.08	0.69	0.45	0.95	1.28
Bridges	na	na	0	na	na	0
NH DOT 10-year Plan Projects	na	na	1	na	na	1
Evacuation Routes	na	na	1	na	na	1

na = not assessed

FIGURE 7: State, Municipal and Private Roadways (miles)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Arboretum Drive	na	na	0.04	na	na	0.11
Fabyan Point Road	na	na	0.06	na	na	0.17
Fox Point Road	na	na	0.00	na	na	0.01
General Sullivan Bridge Road	na	na	0.00	na	na	0.02
Merrimac Drive	na	na	0.08	na	na	0.12
No Name	na	na	0.42	na	na	0.63
Patterson Lane	na	na	0.04	na	na	0.05
Shattuck Way	na	na	0.04	na	na	0.16
Spaulding Turnpike N (state)	na	na	0.00	na	na	0.01
Spaulding Turnpike S (state)	na	na	0.00	na	na	0.01

na = not assessed

As reported in Figure 7, impacts to state, municipal and private roadways were assessed for the 6.3 feet sea-level rise and 6.3 feet sea-level rise plus storm surge scenarios as total miles impacted are minimal. Culverts are supporting infrastructure for the roadway network that are somewhat susceptible to flooding impacts. As sea levels rise in the future, some tidal culverts may become submerged by flooding even at low tide and freshwater culverts will be influenced by tidal flooding, creating hydrologic conditions these drainage systems were not designed for. As reported in Figure 6, the culvert analysis reports that four of the ten culverts analyzed in Newington fail under current conditions associated with the 10-, 25-, 50-, and 100-year storm events, and several others are marginally functional during these storm events.

Natural Resources

Maps: Conservation Areas and *Maps: Wetlands, Aquifers, Wellhead Protection Areas* show natural resources affected by sea-level rise and coastal storm surge flooding. Figure 8 reports the number of acres for each natural resource affected by each sea-level rise and coastal storm surge scenario.

FIGURE 8: Natural Resources (acres)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Stratified Drift Aquifers	0.44	1.39	4.29	2.44	5.16	7.62
Freshwater Wetlands (total)	8.17	10.05	10.97	10.89	11.68	15.19
Freshwater Emergent Wetland	1.59	3.58	5.39	3.70	6.69	7.74
Freshwater Forested/Shrub Wetland	0.59	4.29	7.76	6.07	9.21	14.05
Freshwater Pond	0.00	0.00	0.00	0.00	0.00	1.76
Lake	0.00	48.13	48.93	48.73	48.93	48.93
Tidal Wetlands (total)	113.43	117.53	119.40	118.57	119.82	120.62
Estuarine and Marine Deepwater	80.93	80.98	81.01	81.01	81.01	81.01
Estuarine and Marine Wetland	32.50	36.55	38.39	37.56	38.81	39.61
Wildlife Action Plan – Tiers 1, 2 and 3 habitats	39.2	130.53	195.71	157.37	216.42	278.35
Coastal Conservation Plan Focus Area – Fabyan Point	33.83	113.39	160.76	133.25	175.45	211.53
Conserved and Public Lands	20.85	104.40	159.26	126.53	177.13	229.41
Wellhead Protection Areas	0	0	0	0	0	0

The greatest impacts to wetland systems are in the tidal systems. Over time, low marsh may convert to mud flats and high marsh may convert to low marsh as these systems are inundated by rising seas. Significant acres of high quality habitat and natural resources identified in the NH Wildlife Action Plan and Coastal Conservation Plan, and Conserved lands may be impacted by future flooding. These natural shorelands can act as critical flood storage areas to protect infrastructure and private property from rising seas and storm events.

The shores of the Great Bay and Little Great Bay and their tidal tributaries are fringed with saltmarsh and freshwater wetland systems. As sea levels rise, freshwater systems will transition to brackish and saltwater systems with daily tidal inundation. Saltmarsh may migrate inland with rising seas, depending on the ability of saltmarsh to keep pace with the rate of sea-level rise, the topography (gentle slopes versus steep banks), and the absence of physical barriers such as development, roads and railroad lines

No impact to designated wellhead protection areas, and although minimal impacts are reported for stratified drift aquifers, the assessment did not evaluate potential impacts to private drinking water wells from salt water intrusion as sea-level rises.

FIGURE 9: Conservation Lands (acres)

Resource Type	Sea-Level Rise			SLR + Storm Surge		
	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Conservation Lands						
Beals Tract	0.46	3.90	10.00	6.25	11.82	16.91
Beane Tract	0.02	0.10	0.22	0.15	0.26	0.42
Fox Point	0.92	1.74	3.01	2.28	3.41	6.36
Great Bay National Wildlife Refuge	15.27	89.00	128.94	105.02	142.31	181.30
Mazeau Tract	3.00	7.18	12.74	9.48	14.20	17.79
Town of Newington	0.02	0.09	0.18	0.12	0.21	0.28
White	1.16	2.39	4.17	3.23	4.92	6.35

Figures 9 and 10 report acres of conservation lands, NH Wildlife Action Plan high value habitat and Land Conservation Plan for NH's Coastal Watershed – Focus Areas affected by each of the sea-level rise and storm surge scenarios. The riparian corridors and shorelands surrounding Great Bay and Little Great Bay will serve to accommodate flood waters and rising seas over time which will greatly reduce impacts to public and private assets. Based on the assessment, tidal marshes along the Great Bay and Little Great Bay may become open water as sea level rises, unless the marshes are able to keep pace by building upward. A

marsh migration model would need to be done to more accurately predict the condition of tidal marshes under different sea-level rise scenarios.

Over time, coastal flooding may impact sensitive habitats identified in the Land Conservation Plan for NH's Coastal Watershed (2006) and the NH Wildlife Action Plan (updated in 2015). Such habitats include nesting and breeding sites for shorebirds, tidal and freshwater wetlands, vernal pools, forests, scrub-shrub and meadow landscapes.

FIGURE 10: Wildlife Action Plan and Land Conservation Plan for NH's Coastal Watershed (acres)

Resource Type		Sea-Level Rise			SLR + Storm Surge		
		SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Wildlife Action Plan	Tier 1 habitat	38.93	129.88	194.02	156.43	214.20	272.10
	Tier 2 habitat	0.22	0.56	1.38	0.83	1.77	3.38
	Tier 3 habitat	0.05	0.09	0.31	0.11	0.45	2.87
Focus Areas -Land Conservation Plan for NH's Coastal Watershed	Fabyan Point	33.83	113.4	160.76	133.25	175.45	211.53

Land Use

Maps: Extent of Sea-Level Rise and Sea-Level Rise + Storm Surge Flooding show upland affected by sea-level rise and coastal storm surge flooding above mean higher high water. Figure 11 reports the number of acres of upland affected by each flood scenario. Under the 6.3 feet sea-level rise scenario, the majority of impacts to upland are located in the Knight Brook at Fox Point, Pickering Brook, and Paul Brook drainages, shorelands of the Great Bay National Wildlife Reserve, shoreland and waterfront facilities long the Piscataqua River, and agricultural lands at Lord Farm and Wild Iris Farm. Under the 6.3 feet sea-level rise scenario, additional upland impacts include industrial facilities along the Piscataqua River, and increased interior flooding at the site impacted under the 6.3 feet sea-level rise scenario.

FIGURE 11: Uplands (acres)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
Acres	19.2	68.8	139.2	99.1	168.3	243.2
% Upland	0.37	1.34	2.72	1.93	3.28	4.74

Total Upland in Newington = 5,126 acres. Upland refers to land above mean higher high water (highest tidal extent) and excludes wetlands.

Parcels and Assessed Value

Parcels and Assessed Value

Figure 12 reports the number of parcels affected by for each of the six scenarios evaluated and the aggregated assessed value of these parcels. The degree to which the parcel and any development on the parcel is affected by sea-level rise or storm related flooding was not analyzed. Affected parcels were identified based on their location either partially or fully within the extent of the scenarios evaluated. The data may include a number of high value parcels under state and municipal ownership.

FIGURE 12: Parcels and Assessed Value by Scenario

Sea Level Rise (SLR) Scenarios	Number of Parcels Affected by Scenario	Aggregate Value of Affected Parcels	Percent Total Assessed Value
1.7 feet SLR	110	$120,940,300	11.9
4.0 feet SLR	115	$127,201,800	12.5
6.3 feet SLR	121	$131,327,200	12.9
1.7 feet SLR + storm surge	118	$127,954,100	12.6
4.0 feet SLR + storm surge	123	$135,065,400	13.3
6.3 feet SLR + storm surge	128	$136,845,000	13.5
The total assessed property value for Newington = $1,013,624,828 (2016 town report)			

Figure 13 reports the number of homes affected by each of the sea-level rise and storm surge scenarios and the aggregated percent assessed value of these homes. No impacts are reported for the two lowest sea-level rise scenarios and modest impacts under all other scenarios.

FIGURE 13: Homes and Assessed Value by Scenario

Sea Level Rise (SLR) Scenarios	Number of Homes Affected by Scenario	Aggregate Value of Affected Parcels	Percent Total Assessed Value
1.7 feet SLR	0	$0	0
4.0 feet SLR	0	$0	0
6.3 feet SLR	3	$1,123,900	0.11
1.7 feet SLR + storm surge	2	$813,900	0.08
4.0 feet SLR + storm surge	6	$2,770,900	0.27
6.3 feet SLR + storm surge	8	$8,364,400	0.82
The total assessed property value for Exeter = $1,013,624,828 (2016 town report)			

For Newington, the number of affected parcels is quite low, reported as three structures impacted at 6.3 feet of sea-level rise. There is a 240 percent increase in the number of affected parcels and nearly a $2 million increase in assessed value from the 1.7 feet to the 4.0 feet sea-level rise plus storm surge scenarios.

There is a 200 percent increase in the number of affected parcels and approximately a $5.6 million increase in assessed value from the 4.0 feet to the 6.3 feet sea-level rise plus storm surge scenarios

FEMA Flood Hazard Areas

Maps: Preliminary FEMA Flood Hazard Areas show areas within the 100-year floodplain affected by sea-level rise and coastal storm surge flooding. Figure 14 reports the acreage within the current 100-year and 500-year floodplains affected by each flood scenario.

From a floodplain management perspective, creating more resilient development within the current 100-year floodplain will provide protection against flood impacts from long term sea level rise.

In Newington, the 100-year floodplain is highly vulnerable to flooding from storm surge, extending well beyond its boundary under the 4.0 fee and 6.3 feet sea-level rise plus storm surge scenarios. The three sea-level rise scenarios generally fall within the current 100-year floodplain, extending beyond into the 500-year floodplain in certain areas. From a floodplain management perspective, creating more resilient development within the current 100-year floodplain will provide protection against flood impacts from long term sea level rise.

FIGURE 14: FEMA Flood Hazard Areas (acres)

Sea Level Rise (SLR) Scenarios	SLR 1.7 feet Intermediate Low 2100	SLR 4.0 feet Intermediate High 2100	SLR 6.3 feet High 2100	SLR 1.7 feet + storm surge 2100	SLR 4.0 feet + storm surge 2100	SLR 6.3 feet + storm surge 2100
100-year floodplain	123.2	208.8	217.6	214.8	219.1	222.5
Percentage of SLR within 100-year floodplain (FP)	100% (0.07 acres beyond FP)	95% (0.07 acres beyond FP)	74% (0.07 acres beyond FP)	85% (0.07 acres beyond FP)	67% (0.07 acres beyond FP)	55% (0.07 acres beyond FP)

Floodplain assessment based on Preliminary Flood Insurance Rate Maps (FIRMs) released by FEMA in 2014 (not adopted).

ISSUES AND CONSIDERATIONS

The following issues and considerations of local and regional importance were identified during project meetings with municipal staff and land use board and commission members.

- The following areas are most susceptible to sea-level rise and storm related flooding:
  - River Road waterfront commercial/industrial area
  - Fox Point Marina has high flood risk
  - Residential parcels and structures along the west and southwest shorelines
  - Evaluate the flood risk on Shattuck Way at the Route 16 intersection; identify implications as a designated evacuation route
  - Fabyan Point has future residential development potential and high flood risk
  - Performance of more than half of the culverts assessed is moderate to poor

- Improvements to the state roadway network (elevating, enlarging culvert and bridges) may affect local connector roads, driveway access points and connecting infrastructure and utilities.

- Although roadways, buildings and infrastructure can be protected by raising them above projected sea-level rise elevations, supporting land and land based uses may be impacted by daily tidal flooding from projected sea-level rise.

- Planning for long term sea-level rise can be integrated with existing regulatory and management frameworks for the current 100-year floodplain.

- Ownership of transportation infrastructure and assets by multiple state agencies (roadways, culverts, state parks, parking areas) and town responsibility for management of assets creates complexity in comprehensively managing these systems and implementing climate adaptation strategies.

- Providing information about potential flood hazards to businesses and residents, and early notification of flood risk during a coastal storm event would enhance public safety and preparedness.

- Long term infrastructure management would benefit from an analysis of the costs necessary to improve roads and drainage infrastructure to withstand projected sea-level rise elevations at 2050 and 2100.

RECOMMENDATIONS

The following recommendations are short-term climate adaptation actions that can be included in the town's Natural Hazards Mitigation Plans, Master Plan and other planning and policy documents. These actions are focused on strengthening land use development standards, resource protection, municipal policy and plans, and public support to create more resilient development, infrastructure and natural systems. *Refer to Appendix B for an expanded list of climate adaptation strategies.*

REGULATORY

R1 - Elevate Structures 1-2 feet Above Base Flood Elevation. Adopt standards in floodplain zoning and/or Site Plan Review and Subdivision Regulations that require all new development and redevelopment to be elevated 2 feet above the base flood elevation. Two feet of additional elevation will ensure that structures are protected from flooding based on the highest sea-level rise projection of 2 feet by 2050.

R2 - Coastal Buffers and Tidal Marshes. Adopt buffers and setbacks that adequately separate development and infrastructure from tidal wetlands, freshwater wetlands and surface waters to sustain flood storage capacity, and allow for inland migration of tidal marsh systems and conversion of freshwater systems to tidal systems to accommodate projected changes in sea-levels.

PLANNING AND POLICY

P1 - Natural Hazards Mitigation Plan. Incorporate the vulnerability assessment information and recommendations from the Climate Risk in the Seacoast report and maps in the town's 2015/2016 Natural Hazards Mitigation Plan update. Continue revising and updating the assessment information and climate adaptation recommendations in future updates of the Plan.

P2 - Master Plan Coastal Hazards Chapter. Adopt a Coastal Hazards Chapter in the town's Master Plan that incorporates information and recommendations from the Climate Risk in the Seacoast Vulnerability Assessment report and maps.

P4 - Capital Infrastructure and Investments. Incorporate consideration of impacts from sea-level rise and coastal storm surge flooding in current and future capital infrastructure projects. Incorporate the Climate Risk in the Seacoast vulnerability assessment information into infrastructure management plans and capital improvement plans. Evaluate the extent of sea-level rise and storm surge flooding on individual facilities (e.g. wastewater treatment plant, transfer station, high school).

P5 - Land Conservation. Land conservation offers the greatest opportunities to provide for adaptation to the effects of sea-level rise and coastal storm flooding and climate change impacts.

- Adopt a targeted scoring framework or incorporate new scoring criteria into existing land conservation prioritization efforts that consider climate adaptation benefits when evaluating land for conservation purposes.
- Increase funding and resources for land conservation, land management programs, and land stewardship activities. (Note: Land conservation scores very high as an activity in the FEMA Community Rating System program.)
- Support retreat from high risk areas by buying properties and restoring them to a natural condition.
- Adopt a cluster/open space/conservation subdivision ordinance.

P6 - Wetlands Mitigation Site Inventory. Identify and inventory lands where protection of tidal and freshwater wetlands would provide tangible benefits to protect against flooding, and restoration opportunities to remove barriers to tidal function and marsh and migration. This inventory will allow the town to pre-identify and prioritize sites that can be permanently preserved as a mitigation strategy for wetland impacts from development in high risk coastal areas.

P7 - Evacuation Planning. Prepare evacuation plans and coordinate these plans with towns in the coastal region to implement timely and comprehensive planning and notification for coastal storm events. Mark evacuation routes with signage and communicate these routes to the public with information on the town's website and printed maps.

COMMUNITY OUTREACH AND ENGAGEMENT

O1 – NH Coastal Adaptation Workgroup. The NH Coastal Adaptation Workgroup (CAW) is a voluntary collaborative advocacy group consisting of members from federal and state agencies, regional and non-profit organizations, municipalities, academia, and private businesses. The group's focus is to: 1) pursue activities that improve the resilience of natural systems, infrastructure and development to the impacts of climate change; and 2) facilitate communication and cooperation among stakeholders throughout the coastal watershed, especially in regard to research, programs and other efforts designed to help preserve, protect, and strengthen the Great Bay and Hampton-Seabrook Estuary. CAW can assist the city with outreach, planning and regulatory activities involving climate adaptation implementation.

- Continue supporting work of the NH Coastal Adaptation Workgroup.
- Continue the town's partnership with NH Coastal Adaptation Workgroup in climate adaptation activities that facilitate, coordinate, provide technical information, and convene public outreach events.

O2 - Living Shorelines and Landscaping. Maintaining natural shorelines is an effective way to preserve the functions of shoreline systems (marshes, dunes, estuaries) in providing valuable services including flood storage, recreational areas, and commercial harvesting of fish and shellfish.

- Provide information to property owners about living shorelines and the importance of retaining the functions of natural shorelines, and implementing landscaping best practices.
- Implement living shorelines projects on town lands to demonstrate best practices, and the benefits and effectiveness of living shorelines approaches.

Refer to Newington's Natural Hazards Mitigation Plan for additional recommendations for outreach and engagement activities.

Recommendations from the Coastal Risk and Hazards Commission Final Report (2016)

CC7. Incorporate coastal hazards, risks and vulnerability in policies, plans and investments.

ACTIONS:

a. Evaluate deficiencies and barriers in municipal regulations, plans and policies, and their implications for regional vulnerability.
b. Incorporate coastal hazards and risks assessments, including social vulnerability information, in municipal hazard mitigation plans, natural hazards and climate change adaptation Master Plan chapters, and emergency management plans.
c. Encourage municipalities to develop detailed preparation, response and recovery plans that build on existing plans and initiatives.
d. Encourage municipalities to adopt buffers and setbacks that better account for risk and vulnerability of structures, facilities, and natural resources and maintain ecosystem services (e.g. flood storage, storm surge attenuation, reduced impacts to public structures and facilities, and private property).
e. Incorporate vulnerability assessment information and adaptation strategies for structures and facilities planning and investment for long term capital projects in municipal Capital Improvement Programs (CIPs).
f. Improve connections between municipal hazard mitigation plans, master plans and capital improvement plans.
g. Identify and reduce existing inconsistencies between municipal plans and state plans, such as hazard mitigation plans, building codes, design standards, and evacuation plans.
h. Consider the concepts of uncertainty and risk in decision-making and action planning.
i. Encourage communities that conduct floodplain management activities that exceed the minimum requirements of the National Flood Insurance Program (NFIP) to consider joining and participating in the Community Rating System (CRS), which provides discounts to annual flood insurance premiums for some residents and businesses as a reward for their communities' activities.

E2. Incorporate best available climate science and vulnerability assessment information in state, regional, and municipal economic development plans.

ACTIONS:

a. Encourage private property owners and businesses to incorporate best available climate science and vulnerability assessments in their decision making and preparedness plans.
b. Consider vulnerabilities of local tax base, state economic development plan, retention or replacement of economic resources, at risk populations and population migration.
c. Improve management, coordination and delivery mechanisms to ensure continuity of services to essential facilities, people, businesses and employment centers.

e. Identify economic assets that are vulnerable to storm surge, sea-level rise, and extreme precipitation; understand the scope of that vulnerability; and evaluate existing statutes, ordinances, rules and regulations, policies, programs, and plans to determine whether changes should be made to reduce

E3. Use appropriate and available mechanisms, including but not limited to incentives and market-based tools to fund climate adaptation strategies.

ACTIONS:

a. Align land acquisition and easement programs to transfer vulnerable properties into conservation.
b. Establish stormwater utilities to fund retrofits to existing development and future improvements.
c. Develop and utilize tools to identify cost effective strategies and public investments for adapting to increased flood risk in vulnerable areas.
d. Develop special overlay districts, tax credits and revolving loan funds as mechanisms to discourage development in vulnerable areas.
e. Implement voluntary transfer of development rights programs and other economic incentives to acquire or conserve property in high risk areas.
f. Create statewide and municipal funding programs for climate adaptation strategies.
g. Adapt economic development planning approaches to respond to changing environmental conditions and leverage shifting opportunities.
h. Promote resilience and sustainability planning as economic development strategies.

E4. Improve information available to property owners and prospective buyers about coastal hazards and vulnerabilities.

ACTIONS:

a. Improve consumer protection disclosure of properties vulnerable to coastal flooding.
b. Distribute flood protection safety information to property owners in high-risk areas.
c. Encourage homeowners in moderate- to low-risk areas to purchase Preferred Risk Policy.

BL2. Implement regulatory standards and/or enact enabling legislation to ensure that the best available climate science and flood risk information are used for the siting and design of new, reconstructed, and rehabilitated state-funded structures and facilities, municipal structures and facilities, and private structures.

ACTIONS:

c. Encourage municipalities to use one of the following three approaches[xiii,xiv,xv] for determining a higher vertical flood elevation and expanded corresponding horizontal floodplain than the current base flood elevation and floodplain to address current and future flood risk for new construction, substantial improvement, or repairs to substantially-damaged municipal and private structures and facilities:
    i. *Climate-informed Science Approach* – use the best available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science.[xvi]
    ii. *Freeboard Value Approach* – use the freeboard value, reached by adding an additional two (2) feet to the base flood elevation for non-critical structures and facilities and from adding an additional three (3) feet to the base flood elevation for critical[xvii] structures and facilities.
    iii. *The 0.2-percent-annual-chance Flood Approa*ch – use the 0.2-percent-annual-chance flood elevation (also known as the 500-year flood elevation).

xi An acceptable source of climate science for New Hampshire includes the Coastal Risk and Hazards Commission Science and Technical Advisory Panel report, Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Trends, as amended.

xii Any activity for which even a slight chance of flooding would be too great. For expanded description of "critical action" see Part I, Section 6 of Guidelines for Implementing Executive Order 13690.

xiii See Federal Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Input.

xiv See Guidelines for Implementing Executive Order 13690.

xv See Appendix F for State of New Hampshire comments on Draft Guidelines for Implementing Executive Order 13690.

xvi An acceptable source of climate science for New Hampshire includes the Coastal Risk and Hazards Commission Science and Technical Advisory Panel report, Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Trends, as amended.

xvii Any activity for which even a slight chance of flooding would be too great. For expanded description of "critical action" see Part I, Section 6 of Guidelines for Implementing Executive Order 13690.

BL4. Integrate comprehensive land use and environmental planning with floodplain management approaches that prevent and minimize impacts from coastal hazards.

ACTIONS:

c. Promote land development regulations that reduce vulnerability and protect ecosystem services (e.g. open space/cluster development).
d. Prepare watershed-based plans that address comprehensive water resource management principles focused on changes in hydrologic systems resulting from climate change.
e. Consider prohibiting development in areas destroyed by storms, experiencing repetitive loss of structures, and subject to chronic flooding and erosion. Consider adaptive reuse and/or acquisition of at-risk private properties.

NR2. Develop natural resource restoration plans that explicitly consider future coastal risk and hazards, and the ecological services that they provide.

ACTIONS:

b. Provide recommendations and incentives for removal or modification of structures and facilities, such as freshwater and tidal crossings, that create barriers to tidal flow and habitat migration, particularly those that will be impaired or severely impacted by sea-level rise, storm surge, or extreme precipitation.
c. Engage in best practices for invasive species planning and removal and incorporate climate considerations in invasive species removal plans.
d. Utilize existing funding sources for natural resource restoration (e.g. offset measures, state Aquatic Resource Mitigation fund).

NR4. Consider ecosystem services provided by natural resources in land use planning, master plans, and asset decisions.

ACTIONS:

b. Implement strategies and tools (such as land regulations, incentives, building regulations) designed to maintain or restore pervious surfaces, provide nutrient barriers, protect vegetated buffers and maintain wildlife passage.
e. Develop best management practices for shoreline buffers, including information on appropriate use of shoreline hardening, bank stabilization, vegetation restoration and agricultural practices.
f. Explore options to minimize shoreline hardening and promote natural or hybrid shoreline protection strategies.
h. Develop guidelines and provide incentives for communities to incorporate climate adaptation actions for wildlife protection in master plans, hazard mitigation plans, and zoning ordinances.

H2. Develop plans and implement strategies to prepare and adapt recreational resources based on best available climate science.

ACTIONS:

a. Conduct public information hearings to understand the impacts of proposed climate adaptation strategies.
b. Assess existing and future recreational areas for their potential to provide storage for flood waters and stormwater runoff.
c. Preserve open space and recreational areas that serve to minimize climate change impacts.
d. Integrate recreational and open space planning into climate adaptation planning and the Tidal Shoreline Management Plan.

e. Integrate protection of recreational resources into land use and management, engineering, regulatory components of state and municipal plans including the Tidal Shoreline Management Plan, hazard mitigation plans, Master Plans, and design standards.

H3. Identify and survey cultural and historic resources and assess their vulnerability to coastal risk and hazards based on best available climate science.

ACTIONS:

a. Map all currently surveyed cultural and historical resources.
b. Identify asset types that may also be cultural and historic resources.
c. Use reconnaissance level survey and vulnerability assessments to identify high priority areas for intensive survey.

H4. Develop long-term plans for protecting, adapting, or reducing risk to cultural resources affected by climate change.

ACTIONS:

a. Create or modify adaptation strategies for cultural and historic buildings affected by climate change, including plans for protecting or relocating resources.
b. Integrate protection of cultural and historical resources into land use and management, engineering, regulatory components of state and municipal plans including the Tidal Shoreline Management Plan, hazard mitigation plans, Master Plans, and design guidelines.
e. Create programmatic strategies to compensate for the loss of historic asset types that will be replaced in order to adapt to climate change impacts.

APPENDIX I – MAP SET

The following recommendations are short-term climate adaptation actions that can be included in the town's Natural Hazards Mitigation Plans, Master Plan and other planning and policy documents. These actions are focused on strengthening land use development

Map - Extent of Projected Tidal Flooding - SLR 1.7', 4.0' and 6.3'
Map - Extent of Projected Tidal Flooding - SLR + Storm Surge
Map - Infrastructure - SLR 1.7', 4.0' and 6.3'
Map - Infrastructure - SLR + Storm Surge
Map - Transportation Assets - SLR 1.7', 4.0' and 6.3'
Map - Transportation Assets - SLR + Storm Surge
Map – Water Resources 1.7', 4.0' and 6.3'
Map – Water Resources - SLR + Storm Surge
Map – Land Resources - SLR 1.7', 4.0' and 6.3'
Map – Land Resources - SLR + Storm Surge

APPENDIX II – MAPPING AND ASSESSMENT METHODS

Vulnerability Assessment: Sea Level Rise and Storm Surge Scenarios

The *Climate Risk in the Seacoast* (C-RiSe) vulnerability assessment project produced maps and statistical data about the potential impacts to New Hampshire's seven coastal municipalities from sea-level rise and storm surge to infrastructure, critical facilities transportation systems, and natural resources. Three sea-level scenarios were evaluated accounting for a range from the intermediate-low, intermediate high and highest projected sea-levels at the year 2100.

FIGURE 14: Sea-Level and Storm Surge Scenarios in NEWINGTON

Sea Level (SLR) Scenarios	SLR – Intermediate Low 2100	SLR – Intermediate High 2100	SLR – High 2100	SLR + storm surge 2100	SLR + storm surge 2100	SLR + storm surge 2100
Sea Level Rise	1.7ft	4.0ft	6.3ft	--	--	--
Sea Level Rise + Storm Surge	--	--	--	1.7ft + storm surge	4.0ft + storm surge	6.3ft + storm surge

Note: Storm surge is the area flooded by the 100-year/1% change storm event

Baseline: Flooding from the sea-level rise scenarios and sea-level rise plus storm surge scenarios evaluated in this study were mapped from Mean Higher High Water (MHHW) which is 4.4 feet in the coastal region of NH. *Mean Higher High Water is the average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch. The National Tidal Datum Epoch (NTDE) refers to the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken. The present NTDE is 1983 through 2001 and is considered for revision every 20-25 years (the next revision would be in the 2020-2025 timeframe).*[1]

Storm Surge: *Storm surge is the rise of water level accompanying intense coastal storm events such a tropical storm, hurricane or Nor'easter, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the storm event.*[2] Storm surge is mapped using the 100-year/1% chance flood events from the Preliminary Flood Insurance Rate Maps (FIRMs) released by FEMA in 2014. The preliminary FIRM's account for the limit of moderate wave action in coastal

[1] NOAA website at http://tidesandcurrents.noaa.gov/datum_options.html
[2] EPA website at http://epa.gov/climatechange/glossary.html

areas, however this assessment does not take into account additional flooding and impacts related to more severe wave action, wind action, erosion and other dynamic coastal processes.

Sea-Level Rise Scenarios

Figures 15 and 16 below document how the scenarios used in this report relate to 2011 by Wake et al (see reference in Figure 15) and are similar to a more recent report issued by the NH Coastal Risks and Hazards Commission's Science and Technical Advisory Panel in 2014

Figure 15: 2014 Sea Level Rise Scenarios (based on greenhouse gas emissions)

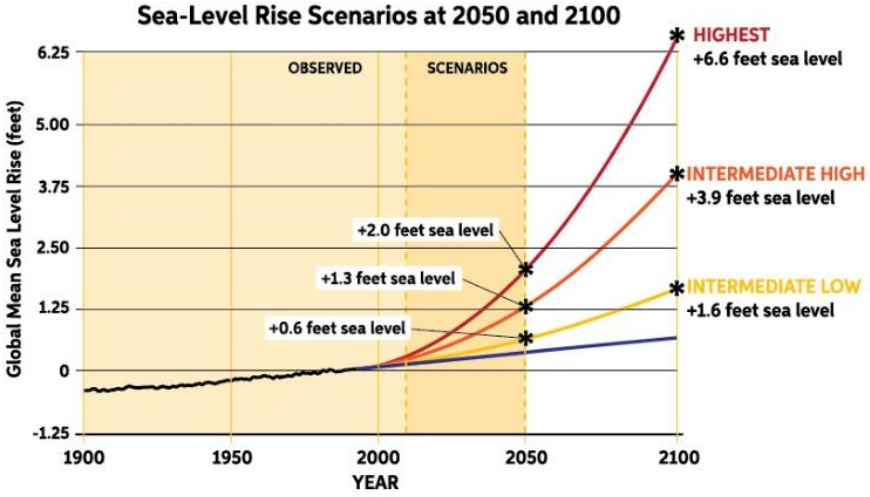
	Lower Emissions (B1)		Higher Emissions (A1fi)	
	2050	2100	2050	2100
Current Elevation of MHHW [a,b]	4.43	4.43	4.43	4.43
100-Year Flood Height	7.78	7.78	7.78	7.78
Subsidence	0.012	0.016	0.012	0.016
Eustatic SLR	1.0	2.5	1.7	6.3
Total Stillwater Elevation [a,c]	**13.2**	**14.7**	**13.9**	**18.5**

a - NAVD: North American Vertical Datum of 1988
b - MHHW: Mean Higher High Water at Fort Point, NH
c - Total Stillwater Elevation may not equal total of components due to rounding

Table 13. Preliminary estimates of future 100-year flood Stillwater elevations at the Fort Point Tide gauge under lower and higher emission scenarios (feet relative to NAVD[a]).

Source: Wake CP, E Burakowski, E Kelsey, K Hayhoe, A Stoner, C Watson, E Douglas (2011) *Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future*. Carbon Solutions New England Report for the Great Bay (New Hampshire) Stewards.

Figure 16: 2014 Sea Level Rise Scenarios (based on greenhouse gas emissions)



Source: Wake CP, Kirshen P, Huber M, Knuuti K, and Stampone M (2014) *Sea-level Rise, Storm Surges, and Extreme Precipitation in Coastal New Hampshire: Analysis of Past and Projected Future Trends*, prepared by the Science and Technical Advisory Panel for the New Hampshire Coastal Risks and Hazards Commission.

The sea-level rise projections used in this study are based on an earlier study completed in 2011 by Wake et al (see reference in Figure 14) and are similar to a more recent report issued by the NH Coastal Risks and Hazards Commission's Science and Technical Advisory Panel Report (2014) as depicted in Figure 14. As shown in the graphics above, while slightly different than the scenarios cited in the 2014 report, the sea level rise scenarios used in the Climate Risk in the Seacoast assessment yield coverage estimates of flooding that are within the mapping margin of error for the scenarios in both the 2011 and 2014 reports.

Assets and Resources Evaluated

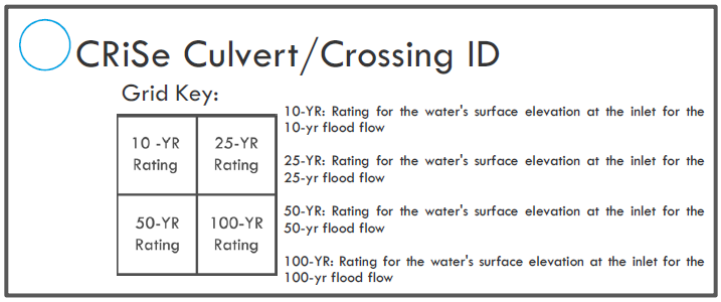
Figure 17 lists the three major categories and a detailed list of the assets and resources evaluated as part of the Climate Risk in the Seacoast vulnerability assessment. The assets and resources evaluated are listed in subsequent tables in this report only if they are affected by one or more of the sea-level rise and/or coastal storm surge scenarios.

FIGURE 17: Assets and Resources Evaluated for the Vulnerability Assessment

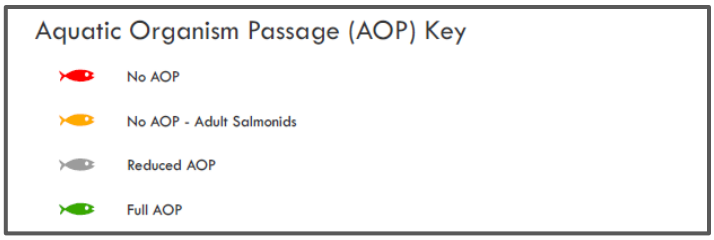
Category	Assets and Resources
State and Municipal Infrastructure	Municipal Culverts Federal and State Historic Register Properties Other Assets: graveyards, water access, transmission lines
Municipal Critical Facilities	Municipal Critical Facilities
Transportation Assets & Roadways	State and Local Roadways Bridges Regional and Municipal Evacuation Routes Urban Compact Areas NHDOT Transportation Infrastructure NHDOT Ten-year and Long Range Plan Projects
Natural Resources	Freshwater and Tidal Wetlands Aquifers and Wellhead Protection Areas Wildlife Action Plan – Tier 1 and Tier 2 habitats Floodplains
Land Use	Residential structures Assessed Value of Affected Parcels

Data, Methods and Results of Hydrologic and Hydraulic Modeling for Road Crossings

The hydrologic and hydraulic modeling of crossings was complete by the University of New Hampshire Stormwater Center. The C-Rise project assessed both aquatic organism passage capacity and hydraulic flow capacity of ten (10) road crossings in each of the ten Great Bay coastal municipalities. The assessment was based on runoff associated with the current 10-, 25-, 50- and 100-year storm events. For each storm, each crossing was assigned a hydraulic rating and an ***aquatic organism passage (AOP)*** rating; both ratings are described in greater detail below.

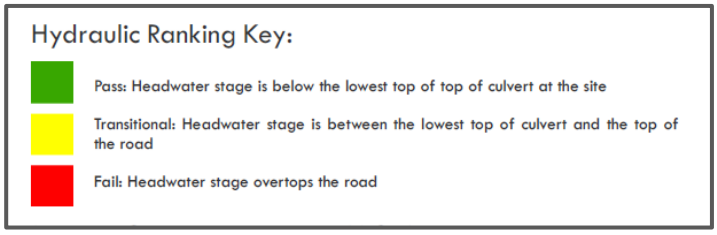


The AOP rating is labeled by color; Red, Orange, Gray, and Green. Ratings of Red and Orange mean that there is estimated to be little to no AOP at that crossing, with Red being no AOP for all species and Orange meaning no AOP for all species except for adult Salmonids. A rating of Gray means that there is reduced AOP at the crossing for all species. A rating of Green means that AOP is expected to be possible for all species.



The AOP ratings were developed using the New Hampshire protocol for assessment, which was borrowed directly from the Vermont Culvert Aquatic Organism Passage Screening Tool. This tool uses physical data collected at each crossing and may be used to rate each culvert at a crossing for AOP. At a crossing with multiple culverts, if one culvert is more passable than another, then that culvert is considered to be the path that organisms would utilize. Thus, the best rating for a culvert at a crossing is used as the rating for the crossing as a whole.

The hydraulic rating is color-coded similar to the AOP rating. The peak flows of the 10-, 25-, 50-, and 100-year storm events were used to assess the ability of the culvert to pass the flow (measured by the depth of water upstream of the culvert – known as the headwater depth) was determined and compared to culvert and road elevations. The ratings for hydraulics are: Pass (green), Transitional (yellow), and Fail (red). These ratings describe the depth of the water at the inlet (the Headwater) for the flows for each of the selected storm events compared to culvert and road elevations. A rating of Pass means that the headwater depth is below the lowest top-of-pipe elevation of any culvert at



the crossing; a rating of Fail means that the headwater depth is above the road surface; and a rating of Transitional means that the headwater depth is somewhere between these two elevations.

The hydraulic ratings describe the headwater depth (upstream of the culvert) for each storm event flood (see Figure 18). The headwater depths are calculated using field-collected culvert and crossing data. The flood flows were calculated by one of two methods: runoff from rainfall or regression equation. For all watershed areas smaller than one square mile, the Curve Number[3] method was used; and for watersheds larger than one square mile, flows were calculated using the Regression Equations[4] published by the USGS for New Hampshire. Once the flows at each crossing were calculated, they were input into the Federal Highway Administration's free culvert analysis software, HY-8, along with the necessary culvert and crossing data collected at each location. The program then calculated the headwater depth for each of the flows at each of the sites. This headwater depth is what is shown in the results, and are compared to the pipe crown and roadway elevations to determine the Hydraulic Ratings.

FIGURE 18: Example of how the hydraulic rating is applied to a culvert evaluation.

Map Design and Organization

The Climate Risk in the Seacoast map set is comprised of two components: a map depicting the extent of projected flooding from the three sea-level rise scenarios in shades of green, and a map depicting the three sea-level rise plus storm surge scenarios in shades of pink. Each of the asset categorized evaluated are displayed on these two maps. Examples of the two scenario maps are shown in Figures 19 and 20 on pages 24 and 25.

[3] A curve number is a number from zero to 100 that describes how much rainfall runs off versus how much is lost to infiltration. A high curve number implies most of the rainfall runs off.

[4] A regression equation describes a mathematical relationship between two variables in which one variable is used to predict the other.

Vulnerability Assessment: Planning to Reduce Risk and Impacts

New Hampshire's economy and quality of life have historically been linked to its shores, its vast expanses of productive saltmarshes and sandy beaches. Increased flooding has the potential to place coastal populations at risk, threaten infrastructure, intensify coastal hazards and ultimately impact homes, businesses, public infrastructure, recreation areas, and natural resources. Accounting for changes in sea level and coastal storms will help lead to informed decisions for public and private investments by minimizing risk and vulnerability.

What is a Vulnerability Assessment?

A vulnerability assessment identifies and measures impacts of flooding from sea level rise and storm surge on built structures, human populations and natural environments. Factors that influence vulnerability include development patterns, natural features and topography. The assessment evaluates existing and future conditions such as:

- inland extent and depth of flooding
- impacts to natural and human systems
- changes in impacts between different flood levels

New Hampshire seacoast municipalities are confronted by land use and hazard management concerns that include extreme weather events, storm surges, flooding and erosion. These issues are only intensified by recent increases in the frequency and intensity of extreme storm events and increases in sea level.

How can the vulnerability assessment be used?

Information from a vulnerability assessment can help guide common sense solutions, strategies and recommendations for local governments, businesses, and citizens to enable them to adopt programs, policies, business practices and make informed decisions. Planning for the long-term effects of sea level rise may also help communities better prepare in the short-term for periodic flooding from severe coastal storms. Results from a vulnerability assessment can be incorporated into various municipal planning, regulatory and management documents.

How can a vulnerability assessment benefit the community?

The Climate Risk in the Seacoast assessment is intended to assist coastal NH communities to take actions to prepare for increase flood risk, including:

- Enhance preparedness and raise community awareness of future flood risks.
- Identify cost-effective measures to protect and adapt to changing conditions.
- Improve resiliency of infrastructure, buildings and investments.
- Protect life, property and local economies
- Protect services that natural systems provide
- Preserve unique community character

Assessment results can be incorporated into existing practices, plans, policies and regulations.

Zoning Ordinance	Land Conservation Plan	Capital Improvement Plan
Site Plan Regulations	Master Plan	Roadway Management
Subdivision Regulations	Hazard Mitigation Plan	Facilities Management Plan

Extent of Flooding from Sea Level Rise and Storm Surge

The green and pink color schemes in Figures _____ are arranged from lightest to darkest with increasing flood levels and extents.

Figure 19: Sea Level Rise Scenarios 1.7 feet, 4.0 feet, and 6.3 feet

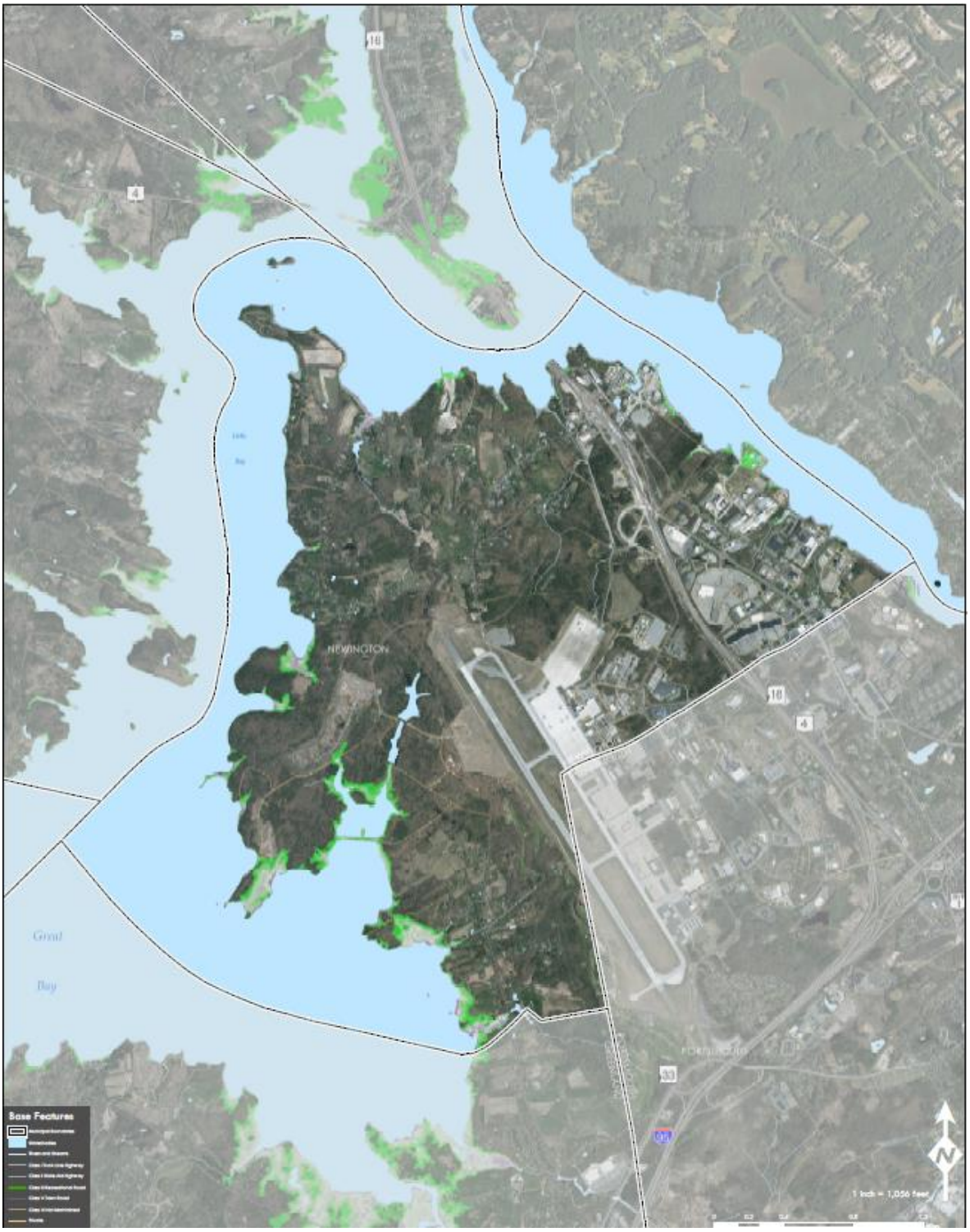
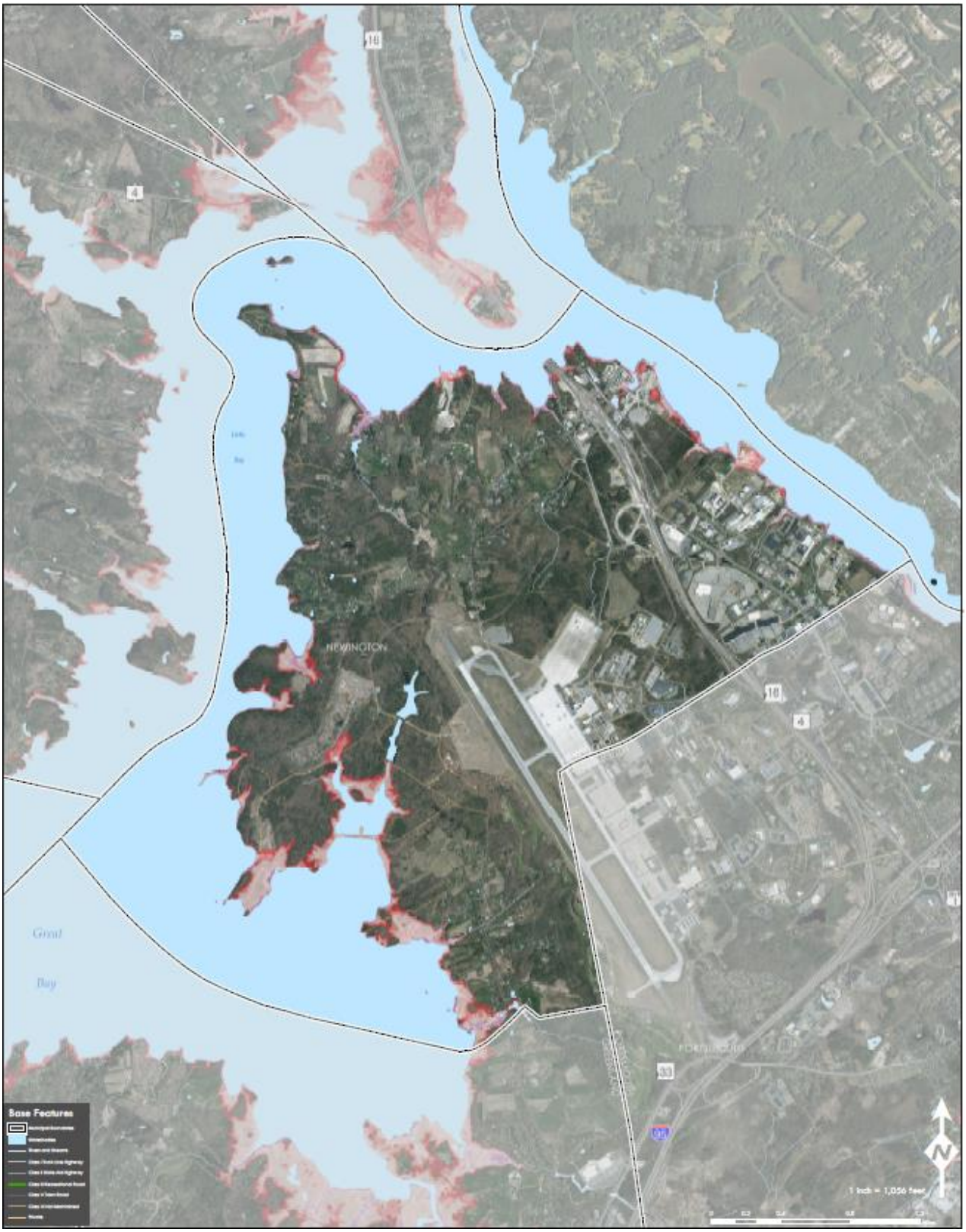


Figure 20: Sea Level Rise Scenarios 1.7 feet, 4.0 feet, and 6.3 feet + storm surge

Note: Storm surge = 100-year/1% chance flood.



Newington Public School Capacity
Using Newington Class Sizes

Grade Level	# of Rooms	Maximum Number of Students/Rooms	Mathematical Capacity
Kindergarten	1	18	18
Grades 1 - 6	3	18	54
Total	4		72

Functional Capacity: 90% of 72 = 65

The 90 percent factor takes into account variables such as assigning fewer pupils to some classes, accommodating combination classes (e.g., 1 – 2), and to make allowances for assigning fewer students to undersized classrooms as is the case here. The school's overall capacity using local guidelines is **72** and using the 90 percent factor, it is **65** students.

Inventory of Current Program Spaces at Newington Public School

Function	Quantity	RM #	Comments
Classroom Kindergarten/1	1	127	Area = 759 Sq Ft
Classroom Grades 1/2	1	125	Area = 782 Sq Ft
Classroom Grades 3/4	1	114	Area = 1030 Sq Ft
Classroom Grades 5/6	1	115	Area = 1030 Sq Ft
Multi-purpose gymnasium/cafe	1		Area = 2,360 Sq Ft
Physical Education Storage	1	111	Area = 120 Sq Ft
Special Education		131	Area = 219 Sq Ft
Special Education Specialist (Speech, OT, Guidance, BCBA)	1	128	Area = 256 Sq Ft
Multipurpose Library-Media Center / Art / Health / STEAM	1	104	Library Media Center Area = 523 Sq Ft Art / Health /STEAM Area = 476 Sq Ft Total Area = 1008 Sq Ft
Music	1	105	Area = 320 Sq Ft
Kitchen	1	112/113	Area = 350 Sq Ft
STEAM	1	106	Area = 330 Sq Ft
Admin Office-Gen Office Reception, Principal, Teachers Room, Nurse Office	1	120 123 121 122	Office Reception Area =305 Sq Ft Princ. Area = 200 Sq Ft Nurse Area = 126 Sq Ft Teachers Room / Conference Area = 245 Sq Ft
Unisex bathrooms (Sped Office)	1	129	Area = 32 Sq Ft
Student bathroom (k-2)	1		Area = 12 Sq Ft
Unisex Bath (new addition)	1	108	Area = 63 Sq Ft
Boys Bathroom	1	118	Area = 133 Sq Ft
Girls Bathroom	1	119	Area = 119 Sq Ft
Boiler Room	1	132	Area = 304 Sq Ft
Custodial / Sprinkler	1	101	Area = 230 Sq Ft
Kitchen / Custodial storage	1	116	Area = 59 Sq Ft

Note: The inventory of current program space represents usage during the 2019-19 school year.

(Cited ref. materials and tables: Prepared by: New Hampshire School Administrators Association: Dr. Mark V. Joyce, Dr. Richard W. Ayers, and Mr. Keith R. Burke (***Report For The Rollinsford School District Subject:Demographic Analysis/Enrollment Projections And an Assessment of Educational Facility Needs K – 6)***

Newington School Board approved August 2019